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*Updated by AA*

# BEHAVIORAL QUESTIONS

## 1. Tell me about yourself?

First of all, I would like to thank you for giving me this opportunity and I really appreciate for your time. My name is Alper Aslan but mostly known as Albert.

- I have been in **IT** industry for more than 6 years and I am currently an **SDET** on my team.
- After working in different types of industry;
  - I have gained **domain** knowledge in the communication, Education and Financial industries.
  - So, I have a strong understanding of **SDLC**, and I am familiar with both **Waterfall and Agile** environment
  - I am highly proficient in various testing types, including like; functional, regression and smoke testing.
- I started off as a **manual tester** and eventually became proficient in **automation testing**
  - I develop Automation framework from scratch. I have successfully designed and developed many "many" tests scripts by using **Data driven, Behavior driven and Hybrid Frameworks**.
  - I am good at core **java, Selenium webdriver, Maven, Cucumber, JUnit, TestNG, Jenkins** and many more tools for test automation. Mostly I prefer opensource tools.
  - I have used
    - **GITHUB** for version control, (in current company we use **SVN** for version control)
    - **JENKINS** for continuous integration/deployment,
    - **JIRA** for project management and bug tracking
    - and **SQL** for back-end testing
  - I have worked on **API** testing on my project and I used **Restful, postman, and Rest Assured library**
  - I developed Automation framework from scratch several times.
    - I have successfully designed and developed many "many" tests scripts by using **Data driven, Behavior driven (BDD) and Hybrid Frameworks**.
    - I developed my "testing framework" based on the **POM** which supports BDD.
    - **Also, my framework supports Database testing using JDBC. These days I am learning and trying JOOQ. It is like writing real SQL queries. I don't know if you know it, but it is amazing.**
- I certified Scrum master and Oracle Java Programmer.
- As far as soft skill concerned, I consider myself;
  - A **positive** person, cross-functional team member
  - **Quick learner** and adaptable to changing circumstances and detail oriented.
  - as Steve Jobs said, "*no matter how smart you are, you need a team of great people*" and sir/madam believe me I am a great team player. I am a people person.
  - I can also work well individually in a **team**
  - I always make sure that I meet the **deadline** (if you'd like me to elaborate on any of that, I'd be happy to go further into detail.?)
- That is pretty much about me. Thank you.

## 2. Describe your role?

- I am responsible for developing and maintaining our “test automation framework” base on the POM and adding new test cases to our automated regression suite.
- I am mainly responsible for the automation of Academic features as Grading, Attendance, Behavior, Application, Parent and Student Modules. In addition to this also Business features as “Payment Request Management, Fee Tracking, HR Filing Modules.
- I performed various types of testing, like; functional testing, smoke testing, regression testing and back-end testing
- I am responsible, in my current project, to execute Regression test when developers add new functionality to the application or end of the sprint.
- **When I joined the company, We had a large regression suit that we had to Automate. Regression coverage for Automation was very low around %10. We had very little automated test cases. Therefore, we were spending a lot of time on Running Regression. Because they didn't have enough time to run all the test cases from regression suite, so we had a lot of new defects, so automation was really needed for the project. Since I joined, they were analyzing the application functionality. For the last two years I have been analyzing the Regression suit, I came up with prioritized test cases like, Which functionality is most used, which functionality is most critical, which functionalities will take a long time to manually execute, which functionalities that break often.**
- I developed my automation framework from scratch.
- I automate test cases. Once I automate test cases, I schedule some of them for a daily smoke test to be repeated as much as needed. The smoke test will then send its report to me and my team.
- **I run the entire regression suit before each application release.** I analyze the test result. I provide a pass-fail report. I monitor the execution to see if anything is wrong, once it fails. If it fails because of my code I have to fix my code. (Perhaps during that time, the application was down, and I ran my script at the wrong time.) If there is really a defect, I log the defect and test it again until it is fixed.
- As a Cross functional team member, I help the functional testers, teach them basic automation framework, Java and Selenium to make them part of the team, All to improve productivity of the team. At least they can execute test cases and analyze the results.
- As a CROSS FUNCTIONAL team member, I also try to help the functional testing team whenever it's needed, to execute manual test cases. And if there is any defect that I am able to reproduce, I log the defect to JIRA.
- I also do production support in every major release. Normally production support are on the weekend. I will come and execute 'read only' test cases on production environment after the deployment. If there is any issue on the deployment I have to immediately contact with Dev and QA to fix the issue ASAP.
- In sprint grooming meeting I always give feedback to the user stories to make sure it is something testable and measurable. For example: there were a user story said after such and such change in the application the performance should improve. I have asked the business people what do you mean by performance improvement? How do you measure the improvement ? After that they have come up with better user stories(requirement in agile)
- Beside that I can tell you one of my responsibilities which I really enjoy is user story generating sessions, because it is very interesting from a user's perspective. Because we are the ones testing the application all the time. I am thinking from the end-user perspective. I think I am doing good, by putting myself in the end user's perspective. Therefore, when we attempt user story sessions, we are making our acceptance criteria much better. So, Business Analyst go over the user stories, they go over the acceptance criteria, we ask questions we give feedback, improve user stories therefore making our team more productive. Because we have better, clear acceptance criteria. That makes us, our requirements better, our code better, clearer and we are avoiding some of defects in terms of the user story generation session itself, instead of having unclear a user story, making unclear code, making something wrong.
- Also, as a part of the Agile Scrum Team, I participate in the several walkthroughs meeting for the requirement reviews and provide valuable feedback to the BA.
- That is pretty much about %80 of my role as an automation engineer in my current project.

### 3. Can you describe your daily activity?

- My daily activities at work, Mostly, I go to work early in the morning and check result report of Smoke test to make sure that environment is up and running and the application is stable or not for the day.
- If something goes wrong, I will send out an email to my team so they can take care of it asap before everyone comes to work, to reach maximum productivity.
- And then I check my email if there are any important tasks or notices, also check my schedule if there are any meetings for the day and also check Jira to review what needs to be done that day in which priority.
- Then I go to attend daily standup meeting with my scrum team to talk about what I did yesterday, what we will do today and are there any impediments in my way. This meeting takes about 15 minutes.
- After that, I go back to my desk and start automating test cases from regression suits. And also, I automate test cases from sprint backlog after doing manually if it is passed. We are end of our sprint and we are finishing our automating, test execution, reporting, preparing for and conducting Sprint Demo
- Also, once a week, we have Code Review meetings, to review the code. this is really helpful
- Most fulfilling for me, is my mentoring sessions with junior testers or developers in which i train them on automation and sometimes non-technical skills. we do this as a brown bag lunch, and it really helps us increase our overall productivity, saving the company resources and money but also, gives us the valuable opportunity to get to know our coworkers and at the end of the day, the most important thing to me in my opinion, is the people I work with.

### 4. Tell me about your project?

- I'm currently working on an application in which my team are specifically focused on **search FUNCTIONALITY**.

#### FRAMEWORK

- In my framework, I was developing my testing code using JavaScript programming language and Protractor.
- I used Jasmine to manage and centralize my dependencies which I have pom.xml
- My framework was structured based on the POM that every page element go to one class and it makes easy to maintenance and to keep my code organized and clean.
  - Also, I have separate classes where I keep my implemented step ...
  - I created other separate folders for my drivers, for my runners and for my useful methods.
- My framework supports Behavior Driven Development (BDD) and scenario outline.
- I am using Jira as bug tracking tool.
- And I achieve continuous integration and schedule my tests using Jenkins. **(I accomplished X THING, by doing Y THING, and achieved Z MEASURABLE RESULT)**
- Nice little touch: achievement during this project, that really helped me grow as an automation tester, was that I discovered ISSUE X, did ACTION Y, and then measurable result Z happened.

#### FRAMWORK

My company's application was built as web application using a JavaScript based UI Framework called SmartClient in the front-end and C# code at the back end. We have Microsoft SQL Database which are located over ten servers located all around the world. These being web applications, testing them involved testing on various browsers, various versions and using a variety of school configurations. We have used a ticketing system called ComindWork to track the work and I acted as the sole tester and quality control person in making sure that everything worked as designed. I would do various design and functionality recommendations.

## 5. What is your biggest Accomplishment?

- One of my accomplishments I would say is establishing a great trustworthy relationship within the team.
- If you are asking for technical : When I joined my last project, the application had very less "id" so I had to spend hours to locate one Webpage elements in my POM project so I communicated with developers and other team members and all together we come up with the solution which I got the access to put "Id" in the application by myself.
- That was great for me it saved my and others time. So instead of spending time to locating elements I spend my time to more creating automation test scripts and executing them.
- I really love to find and use new tools. And before I joined the team, they only had taken screenshots in PNG format. But I started to use GIF animated images with notations which makes the issue a lot clearer to understand for the developers.

## 6. Why are you looking for a job? (Why are you in the market?)

- I am looking for a job because my current project is ending soon. My manager told me I should start looking for new opportunities.
- My company they would love to keep me. We are like a family there. But the company plans to relocate, and I don't feel comfortable with that. I am not planning to leave Dallas.

## 7. Why did you apply for this position?

- After looking at the job description, I think it matches my day-to-day activity and my experience.
- I was confident with the job description that's why I applied.
- **Also, I have done some research on the company and I am really excited about the company's product and services like...**

## 8. Where do you see yourself 5 years from now?

- I want to learn as much as possible to be more technical. I would like to move to Mobile Development. I want to be a professional Mobile Developer.
- I want to be technically very competitive person 5 years from now.

## 9. What is your weakness?

- Well, I think my weakness is that whenever I am given some responsibilities and there is a deadline for it, I work day and night, sometimes 7 days a week. This is bad for my family life; the reality is I cannot sleep unless I am done with my assignments.

### **GREATEST weakness?**

- My greatest weakness was that I am a very dedicated and passionate person towards my job.
- While this may sound like a good quality to have, but you know if the team members do not share that the same passion as you, it might be very frustrated. Like, I saw people don't follow their requirements , I was always waiting the people take seriously against all problems which we face.
- I realized that I had to take practical, realistic steps to improve upon this weakness.
- And I think it is important that to be able to open dialogue and some kind of communication methods to ensure all team members in our scrum team have great chemistry.
- I have organized many activities outside of work such as: coffee meeting, escape room, some barbeque organization which I love :).
- This helped me to connect closely my team members with their family and especially their environment and understand them better and the most importantly these helped my team members understand my passion towards the work.
- Also, I have enrolled in some leadership courses to help me understand the dynamics of a team and how I can mentor my team members to get my mentality.
- As a result, I have improved the chemistry of our scrum team and our projects have been released with the highest customer satisfaction.
- I truly have had a good experience combating my weakness and I am very proactive when it comes to approaching a problem.

## 10. What are your strengths?

- I am a very detail-oriented person. I can prioritize my job according to the deadline.
- I am also very much dedicated person towards my job.
- I am also an honest person and I have the skills and expertise in QA process.
- One of my greatest strengths is that I have a graphing skill. I mean  
*For example; when I saw or heard a paragraph, event, case or even if a sentence, I can easily graph it in my mind and implement it in a real life.*
- I am really good at presentations. When I present an issue or any topics, I make it very clear and to-the-point way. Let me give you an example;  
*In my previous company, we had a review meeting and there was 3 team members, upper management asked us every team member to present their opinion. We separate our responsibilities and we are ready to tell one by one, but unfortunately every team member got the meeting concept wrong because the requirements are not clear and we realized that the upper management was waiting for a presentation and one of the team members presents our project and after the first team starts to present their review, everyone looked at each other and I feel that the team is a little nervous and*
  - *We had a group for this review on slack and I wrote them don't worry about that I have a plan.*
  - *I just focus on the subject and prepare a template and send the team members and they prepared their parts and I combined all, then we are ready within 20 minutes and then I present all easily.**So, my strength helps to organize the team and solve our problem and all the team members were happy for that because we finished and present it very successfully... We were a team and I believe that if you worked with a team with passion, anything can be achieved, and we can reach the expected result on time which means the customer satisfaction, and which means company success.*
- Technical Greatest strength:
  - I am strongest at Java because I LOVE IT. explain why: pros, benefits, etc.
    - Explain logic of why: Closures, callback, promises are my strength because they suits my comprehensive analytical skills, my brain is wired to work this way already, so JS language came very naturally and easily to me.

## 11. Describe a challenge you faced during your last project?

- I think, one of the biggest challenges that I faced with in my current project is that...
  - ... we had a new developer. He is young and but very smart kid. Every time I found a bug, it made the developer nervous and he disagreed to accept it and most of the time I had to calm him down and sometimes we had to ask BA for clarification
  - Then I realize the requirement itself was not specific enough, so I understood it differently than the developer
  - In the Sprint Retro, I said we should spend more time on requirement clarification because you know that is the key to the project success. We did so and this issue was solved.
- This is not very common in many companies but in our company, we have platinum package user clients. They have the right to ask a new report or correction on a feature from day to night or vice versa. Sometimes I got a call at 11pm that there is a feature or report that needs to be tested. So, I had to work many times till 2-3 also 4 am to test those changes or features. (if needed give an example)
- Work on result more. I think, the most important problem is misunderstanding and the lack of communication in the business life. If we come together as a group and discuss it, there is nothing we cannot solve. I'm really grateful and blessed to have been in the team that I was in, because we were able to collaborate and come together to solve the problem.
- And technical challenge I have faced is locating dynamic elements by retrieving the right HTML code from the web pages. Id's were problem; sometimes it appears on the page, while sometimes it just disappears. Then I had to put either implicit or explicit wait to locate them.

## **NON-TECHNICAL Challenges:**

### **A. What to do in case of you have too much work and you cannot finish for the deadline?**

- When developers don't deploy their code on time, our tester team don't have enough time for completion. And the upper management keeps asking for us for completion. - Some of my team members simply focuses on task completion and not on the test coverage and quality of work. - So, at the Sprint Grooming Meeting, I suggested that we should work very closely with the developer and make sure that we are communicating on daily base. - And also, the developers prioritize the important tasks and work on them first. Any scenarios left, would be pushed to the next sprint since it is not as important as the other ones. - Lastly, I try to prioritize my work and follow my test lead and manager whatever they see is more important I start with that.
- One of my recent challenge is that another coworker who is also QA had to leave from company for personal reason, probably he had to go to back to his country for some visa issue, and I had to take care of his task with my own since there were only two automation guy, me and Jason. - And the production date cannot be delayed. - So, I took responsibility, I started to make a new plan and communicated with my SM that would try my best, but I need some help to reach the production goal on time. As always, communication is key to understand each other to the better team work. - And also, developers joined to test application as well. At the end, we made it on time. - That is one of the reasons I am proud of to be a member of the scrum team. Everybody works for same goal and share the responsibility.
- I don't really have technical challenges because I consider any issue that is technical to be a part of my job. There will always be some challenge to overcome and I ALWAYS overcome and learn. what is really challenging, in my opinion, and not always so easy to fix is: PEOPLE. again, we work 40+ hours with the same people in high stress, fast paced environments. - often-times, they are from different cultures, countries, backgrounds, etc. which can make communication extremely difficult - naturally, conflicts corrupt, and I've had extensive experience in observing, and eventually learning to prevent and solve such conflicts. - how do I do this? - by paying attention, empathizing and above all, communicating effectively. this means, doing a lot of work with a lot of people, because conflicts generally involve two or more participants and can negatively impact the rest of the team, thereby reducing productivity. - happy employees mean productive employees. - I've learned through trial and error to really understand my colleagues and be able to navigate the tricky waters of office-place politics. for example, [go into specific example]

### **B. How do you handle conflict?**

- Nothing is personal. Everyone thinks company's benefits so I would like to explain my concern and his/her explanation makes sense for me. - Of course, I can do the things which is most helpful to my company. So, I try to communicate with his/her, and I would try to understand the concern. Because everyone have the same goal and wants to get job done successfully.

### **12. How do you handle stress?**

- One of our sprints my developer deployed code very late time and I didn't have much time to get job done. But I was working so hard worked extra hours and especially nights and I was finished my task on time.
- My first approach is trying to calm down and work extra hours. I try to react to situations, rather than to stress. That way, the situation is handled and doesn't become stressful. Mostly these have helped me to handle stress. I also eat chocolate.
- Also, in scrum environment we working as a team. I always maintain good communication and relationship with my colleagues. So, they trust me and they can communicate with me very easily. I always avoid miscommunication and my team believe me every time.
- Sometimes some requirements are not understandable, so I try to figure out and I try to understand the requirements. In the beginning of the application I spend extra effort to understand functionality. Sometimes it takes time to understand.

### **13. Can you work under pressure?**

- I don't remember any project that I worked had no pressure. Pressure is good thing sometimes. It forces you to work harder and smarter.
- Good pressure, such as having a lot of assignments to work on, or an upcoming deadline, helps me to stay motivated and

productive. Of course, there are times when too much pressure can lead to stress; however, I am very skilled at balancing multiple projects and meeting deadlines, which prevents me from feeling stressed often. For example, I once had three large projects due in the same week, which was a lot of pressure. However, because I created a schedule that detailed how I would break down each project into small assignments, I completed all three projects ahead of time and avoided unnecessary stress.

**14. How soon can you start?**

- I think, I can start in 2 to 3 weeks after getting offer letter and start date.

**15. Can you start tomorrow?**

- It won't be fair to my current company and My team won't be happy with me if I leave tomorrow, and I don't think it is professional and I have never done that before. I am so sorry I cannot start tomorrow.
- I have to transfer the automation framework knowledge to other team members before I leave.

**16. How much are you expecting from us? or For how much you are willing to work us?**

- My expectation is between 90-100K. It will be big motivation for me to have some amount of increase. *( remember that 48 is depended on your confidence level. You can increase it if you want. The reason they ask you is they want to confirm the rate. They will have specific budget and consulting firm has to mark up a couple dollars to make some money. So, it is always negotiable. If you say too low, it means you are not confident. )*

**17. If you get hired, how long are you planning to stay?**

- As long as there is a project to work, I am willing to stay as long as possible. I love to work long term with my companies. So that, I would be a piece of the success. If you check my resume, I have worked in two companies for the last 10 years.

**18. What do you do if I hire you?**

- In first week, you know, I will get done all the paper works, getting the machines and necessary access to the project, databases etc.
- Then I will have to learn the company culture. Boarding process.
- I have to learn also more about my projects and my teammates.
- I think, understanding what the project is doing, it is very important if I want to be more productive.

**19. May I contact your current employer for reference?**

- Please go ahead, (to recruiters) if you would like to submit my resume. But I am receiving a lot of phone calls from other recruiters. I don't want to let anyone to call my employer if they are not sure to submit my resume or not. *(if they say they will submit your resume then tell them you will send out asap after work. )*

**20. What do you like the most about testing?**

- Testing is fun job for me because you are very important person to the client and end users. I love testing because as end user I want to buy better product that is peas of art and defect free. Also, I am helping others to make sure their product has top quality. Imagine if you are testing the safety features of the Toyota Camry you are almost saving 100 of lives by doing your job and loving your job.



## 21. Why should we hire you?

- First of all, I've done thorough research into this position and have read your job description and combined with the information you have so helpfully provided me during this interview, I can CONFIDENTLY say that I'm well qualified for this position. Meaning, I have all the technical and non-technical expertise, as required and preferred in the job description to not only succeed in this position but also to **thrive**.
- Steve J. said, "*no matter how smart you are, you need a team of great people*" and believe me I am a great team player.
- However, this to me is the basic requirement, and I truly believe that I'm the best qualified and will exceed expectations beyond just what I have noted, because I have crucial soft skills that can't always be quantified and measured. And I believe, that at the end of the day, regardless of job description or what we do, it's the personality of your employees that really matters. In this, I am unique and stand out because I learned the value of soft skills many years ago and I have extensive experience in honing those skills.
- I always bring new techniques and tools that help to jump forward to the company that I worked for.
- Many people can train in any technical skill within a short time frame, but training someone to communicate can be incredibly difficult. I have such skills in abundance: I'm an excellent communicator, extremely motivated AND motivating, and above all, I am the very definition of a problem solver. Whatever it is that needs to be done to accomplish my job and more, I WILL DO IT.
- I think you should hire the candidate that has the best qualifications for this position.
- Since I don't know the other candidates, I can represent only myself.
- I think my experience and technical expertise will bring a lot of values and benefits to the company and the project. I think that's why you should hire me.

## 22. Do you have any question for us?

- It's very important to ME, that I'm surrounded by good/kind, hard-working, smart people that will motivate me to also work hard and continue to improve myself. Considering that we spend more time at work with our colleagues than we do with friends or family even, it's important to me know that I can fit in with the culture of my workplace and grow as a professional there. So, what is your company culture like? What's the team like?  
*(if you did research you can bring up something interesting about the company and ask them to elaborate/how it works etc.*
- it's also important to me that I continually improve and try to achieve excellence in my position and the best way to do this is to continually learn. I'm always trying to learn new things or learn old things better. Do you provide trainings, seminars or anything to support the education of your employees?



# SDLC & AGILE

## 1. What is Software Testing?

- Process of executing a program or application with the intent of find software bugs using functional and automation tools
- Process of validating/verifying a software program/application
- Testers should test to break approach, not test to pass.

## 2. What is Software Requirements Specification?

- A software requirements specification is a document which acts as a contract between the customer and the supplier.
- This SRS contains all the requirement of the end user regarding that application. SRS can be used as a communication medium between the customer and the supplier.
- The developer and tester prepare and examine the application based on the requirements written in the SRS.
- The SRS documented is prepared by the Business Analyst by taking all the requirements for the customer.

## 3. Software Development Life Cycle (SDLC) - What is SDLC?

- SDLC defines the phases in **building** of software or application.
  - Project Planning
  - Requirement Gathering (Gathering information used to plan project, Identifying risks)
  - Design (How the application will be built)
  - Coding (developing) (Based on requirements, developers will write the application)
  - Testing
  - Production (deployment)(Releasing product)
  - Maintenance (Making sure product is stable, looking at customer report on bugs and fixing it)

## 4. Software Testing Life Cycle (STLC) - What is STLC?

- STLC defines the phases in **testing** of software or application. In STLC process in different activities are carried out to improve the quality of the product.
  - Requirements analysis
  - Test Planning
  - Test Designing
  - Test Environment Setup
  - Test Execution
  - Test Reporting

## 5. What is the difference between STLC and SDLC?

- STLC is part of SDLC. It can be said that STLC is a subset of the SDLC set.
- STLC is limited to the testing phase where quality of software or product ensures. SDLC has vast and vital role in complete development of a software or product.
- However, STLC is a very important phase of SDLC and the final product or the software cannot be released without passing through the STLC process.
- STLC is also a part of the post-release/ update cycle, the maintenance phase of SDLC where known defects get fixed or a new functionality is added to the software.

## 6. What is requirement?

- Requirements convey the expectation of users for the software or product.
- Process to gather requirements from client, analyze and document them is known as requirement engineering.
- Goal of requirement engineering is to develop and maintain sophisticated and descriptive SRS 'System Requirements Specification' Document

## 7. Where is the requirement coming from?

- Customers give requirements for the application
- Talk to the End-users → the person that will be using this application the most
- Talk to Partners –
- Talk to Domain Experts – coders and developers that have already build this application similar before or someone that is an expert the type of product being built
- Industry Analysts and Information about competitors

## 8. When the testing starts?

- Testing starts from testing the requirements (not after the coding phase which seems like the most likely answer.)
- We have to make sure the requirement is correct in first place. With the wrong requirement it is impossible to build bug free application.

## 9. How to tell if the requirement is good or bad?

- Requirement must be (SMART)
  - Specific → User should be able to login. Authorized user with valid username and password should be able to login
  - Measurable → User should able to login very fast (in 2 second after clicking login button).
  - Attainable
  - Realistic
  - Testable → User should able to download the receipt very fast (in 2 second

## 10. Why we test?

- To build bug free application.
- To satisfied end user and client.
- To build great product to generate more revenue.
- I love testing and testing is my passion.

## 11. What is tester's main responsibility?

- To find bug as much as possible as early as possible. Make sure most of the bug gets fixed.
- To satisfy the end user and client by delivering bug free and user-friendly application.

## 12. Is 100% testing possible?

- We can't test the application 100% since there are unlimited scenarios that we can't even imagine.
- Software testing is risk-based activity based on **priority of the functionality** we can test as much as possible.
- Even though 100% testing is not possible, but I believe 100% customer satisfaction is certainly possible.

## 13. What is testing hierarchy?

- Unit testing → Developers test each module or block of code during development.
- Component Testing → Component is a standalone functionality that can work by itself. Ex. Amazon Buyer Functionality, Seller Functionality, Prime Video Functionality.
- Integration Testing → Combine all of the Functionalities. When I integrate them, can I still use all of the functions? Make sure they all still work.
- System Testing → End-to-End testing. Test everything from beginning to end.
- Acceptance Testing → Hire a UAT (User Acceptance Testing) Team or Business Analyst can also do Acceptance Testing. After testing has been complete you have to get another team to do acceptance testing so they can confirm the QA teams testing was successful and have the product ready for the customer.

#### 14. What is positive testing? Happy Path testing?

- Testing the application with valid inputs. Also called "**Happy Path**" Testing.  
Ex. If you log in with valid username and password it is positive testing.

#### 15. What is 508 Compliance testing?

- If someone in the interview, ask what 508 testing is, Just tell them what it is. Don't say I have 5-10 years of experience in 508 Compliance testing.
- **It's a requirement for government websites.**
- All the websites that are used by and for the government. **They have to make sure disabled people can use it.**
- Example: For healthcare.gov they have Compliance manager and he has a dedicated QA team that does 508 Compliance testing to make sure the website is 508 compliant for disability users.

#### 16. What is risk-based testing?

- Since 100% testing is not possible, we have to do risk analysis. Based on the analysis we have to prioritize our testing activity and test high risk area first. For example:
  - The most critical functionalities
  - The most often used functionalities
  - The most complicated functionalities etc...

#### 17. How long did it take to build this regression suite?

- It took 3 years with; 2 testers 1 manual tester + 1 automation tester
- when we run:
  - before release
  - after major bug fix
  - after major new functionality
- where we keep test scenarios and where we as a team take decision which will be executed more than once, in one sprint you test some scenarios.

#### 18. Tell us one challenge while running regression suite?

- Failures. Because regression suite was developed so long ago, and you don't know what has changed. The properties of a button may have changed.

#### 19. How many environments you have?

- Development Environment
  - Unit testing
  - Less stable than test environment
- Test Environment
  - Manual testing happens here
  - Replicates the production environment exactly
  - Changes are deployed in intervals
  - Automated **smoke tests** are ran here
    - Runs against the test environment to make sure if the application is stable enough to perform other major testing activities.
    - Run every time changes are deployed to Test environment
    - Can be ran in dev environment
  - Automation tests are ran here
  - Automated Integration tests run here
- Pre-production Environment

- UAT environment
- Demo happens here
- load/performance testing happen here
- Changes are deployed in big intervals
- Automated major **regression tests** here (before release)
  - Runs against the UAT environment
  - To find out if new changes result in any defects
  - Runs after major bug fixes and every release
  - This test is decided in test plan
- Very stable
- Production environment

**20. Which part of regression test should be automated?**

- Tests which are stable
- Repeated frequently
- Simple and require no tester input are good candidates for automation

**21. How do you ensure that your regression tests are effective?**

- The regression tests should be wide and detailed enough to allow catching defects. You can also eliminate duplicate test cases, merge test cases and automated tests as feasible.

**22. A number of critical bugs are fixed in software. All the bugs are in one module, related to reports. The test manager decides to do regression testing only on the report's module.**

- Regression testing should be done on other modules as well because fixing one module may affect other modules.

**23. How do you run your regression? How often, how many VMs, how many days, how many tests?**

- Regression is scheduled before every release and we release twice a year (Spring release and fall release).
- Regression also happens when there is a major bug fix.
- Around 500 feature files and 1300 scenarios.
- Regression tests are kicked off by Jenkins. Tests are executed on the Jenkins server (VM). My Linux server is RedHat.
- The latest run took more than 12 hours. Another answer is;
  - I have built a suite of regression tests. They are feature files with regression tag. And I have a job in Jenkins that kicks off the regression tests. It uses the Maven command to trigger the test. The Maven command includes that tag name: `mvn test -D cucumber.options="--tags @Regression"`.
  - At the end of the execution, Jenkins generates HTML report with detailed test steps and screenshots.

**24. What is Functional testing?**

- Functional testing team can also be called manual testers it can also be done by automation team (automation functional testing). Similar to Black box testing or manual testers. Just testing the specific functionality of the application. Ex. Can user login? Can user logout? Not testing look and feel of application.

**25. What is non-functional testing?**

- Performance testing, Security testing, Ex. Can 2000 user's login to the application at the same time? Can user move to next page in 1 second?

**26. What is unit testing? Have ever done unit testing?**

- It is part of the white box testing. It's done by the developers before they deploy the code from Development environment to QA environment.
- Since it is performed by developers, I have never done unit testing yet. But I think I can learn it and do it if it is needed.

## 27. What is component testing?

- Testing each component of the application separately. In application it could be one component. One component has stand-alone functionality. Ex. in amazon.com Seller functionality can be one component. Buyer can be another component. Also, Amazon prime videos can be another component.

## 28. Smoke Test →

- **TESTING order:** Code → Unit Testing → Integration Testing → Sanity Testing → **Smoke Testing** → Functional Testing
- In our project, there are five modules like; login, view user, user detail page, new user creation and task creation
- In these five modules, the developer will first perform the smoke testing by executing all the major functionality of modules like; user is able to login with valid login credentials or not, after login new user can be created or not, user that is created is viewed or not etc.

## 29. What is black box testing? What are the different black box testing techniques?

- Black box testing is the software testing method which is used to test the software without knowing the internal structure of code or program.
- This testing is usually done to check the functionality of an application. The different black box testing techniques are;
  - Equivalence Partitioning
  - Boundary value analysis
  - Cause effect graphing

## 30. What is Equivalence partitioning testing?

- Equivalence partitioning testing is a software testing technique which divides the application input test data into each partition at least once of equivalent data from which test cases can be derived. By this testing method it reduces the time required for software testing.
- Example: When testing a grade calculation system, a tester determines that all scores from 90 to 100 will yield a grade of A, but scores below 90 will not.
- Which technique can be used to achieve input and output coverage? It can be applied to human input, input via interfaces to a system, or interface parameters in integration testing.

## 31. What is Boundary value testing?

- Test boundary conditions on, below and above the edges of input and output equivalence classes.
- For instance, let say a bank application where you can withdraw maximum \$1000 and a minimum of \$100, so in boundary value testing we test only the exact boundaries, rather than hitting in the middle. That means we test above the maximum limit and below the minimum limit.
- For example, of my credit card: Activated date is lower boundary. Expiration date 10/2019 is upper boundary. \$0 is lower boundary for spending limit. \$25.000 is upper boundary for spending limit.

## 32. Why does the boundary value analysis provide good test cases?

- Because errors are frequently made during programming of the different cases near the 'edges' of the range of values.

## 33. Why we use decision tables?

- The techniques of equivalence partitioning and boundary value analysis are often applied to specific situations or inputs. However, if different combinations of inputs result in different actions being taken, this can be more difficult to show using equivalence partitioning and boundary value analysis, which tend to be more focused on the user interface.
- The other two specification-based techniques, decision tables and state transition testing are more focused on business logic or business rules. A decision table is a good way to deal with combinations of things (e.g. inputs).
- This technique is sometimes also referred to as a '**cause-effect**' table. The reason for this is that there is an associated logic diagramming technique called '**cause-effect graphing**' which was sometimes used to help derive the decision table.

**34. What is white box testing and list the types of white box testing?**

- White box testing technique involves selection of test cases based on an analysis of the internal structure (Code coverage, branches coverage, paths coverage, condition coverage etc.) of a component or system.
- It is also known as Code Based testing or Structural testing. Different types of white box testing are
  - Statement Coverage
  - Decision Coverage

**35. In white box testing what do you verify?**

- Verify the security holes in the code
- Verify the incomplete or broken paths in the code
- Verify the flow of structure according to the document specification
- Verify the expected outputs
- Verify all conditional loops in the code to check the complete functionality of the application
- Verify the line by line coding and cover 100% testing

**36. What is Gray Box Testing?**

- Grey box testing is the hybrid of black box and white box testing.
- In gray box testing, test engineer has the knowledge of coding section of the component and designs test cases or test data based on system knowledge.
- In this tester has knowledge of code, but this is less than the knowledge of white box testing. Based on this knowledge the test cases are designed and the software application under test treats as a black box & tester test the application from outside.

**37. What is the difference between static and dynamic testing?**

- **Static testing:** During Static testing, the code is not executed, and it is performed using the software documentation.
- **Dynamic testing:** To perform this testing the code is required to be in an executable form.

**38. What is Integration Testing?**

- Integration testing is black box testing. Integration testing focuses on the interfaces between units, to ensure that units work together to complete a specific task.
- The purpose of integration testing is to confirm that different components of the application interact with each other. Test cases are developed with the purpose of exercising the interfaces between the components.
- Integration testing is considered complete, when actual results and expected results are same. Integration testing is done after unit testing. There are mainly three approaches to do integration testing:
  - **Top-down Approach** → tests the components by integrating from top to bottom.
  - **Bottom-up approach** → It takes place from the bottom of the control flow to the higher-level components
  - **Big bang approach** → In this are different module are joined together to form a complete system and then testing is performed on it.

**39. What is Scalability Testing?**

- Scalability testing is testing performed in order to enhanced and improve the functional and performance capabilities of the application. So that, application can meets requirements of the end users.
- The scalability measurements is done by doing the evaluating the application performance in load and stress conditions. Now depending upon this evaluation, we improve and enhanced the capabilities of the application.

#### 40. What is Storage Testing?

- In Storage Testing we test those functionalities of the application which is responsible for storing the data into DB.
- The data entered by the end user in GUI or front end, is the same data which is stored in the database.
- The storage testing determines that the data taken from the front end of the application is stored in correct place and in correct manner in the database.

#### 41. What is Stress Testing?

- Stress testing tests the software with a motive to check that the application do not crashes if we increase the stress on the application by increasing the large number of users working on the application.
- We can also apply the stress on the application firing the lots of process which cannot be handled by the application.
- We perform the stress testing on the application evaluate the application capabilities at or beyond the limits of its specified requirements to determine.
- Generally, this is a type of performance testing performed in a very high level of load and stress condition.

#### 42. What is maintenance testing?

- Triggered by modifications, migration or retirement of existing software.

#### 43. What is Test Harness?

- A test harness is a collection of software and test data required to test the application by running it in different testing condition like stress, load, data- driven, and monitoring its behavior and outputs. Test Harness contains two main parts:
  - Test execution engine
  - Test script repository
- Automation testing is the use of a tool to control the execution of tests and compare the actual results with the expected results. It also involves the setting up of test pre-conditions.

#### 44. What is test coverage?

- Test coverage means is how many test cases that we have and what functional area those test cases are covering.

#### 45. What is a V-Model?

- A software development model that illustrates how testing activities integrate with software development phases.

#### 46. Which of the following is likely to benefit most from the use of test tools providing test capture and replay facilities?

- Regression testing
- Integration testing
- System testing
- User Acceptance Testing

#### 47. What is Acceptance testing?

- The Acceptance testing will be performed after QA testing. In my current project it is done by UAT team. After UAT team performing the acceptance testing the code will go to production.
  - Development environment( where developers write code and perform unit testing)
  - QA environment (where we test the application.)
  - UAT environment (after the code is tested QA environment it will be deployed to the UAT environment. UAT testing team will perform testing to make sure it fits the business requirement. It is also called staging environment.
  - Production environment( is when the end user can see the real application)



#### 48. What is the difference between UAT (User Acceptance Testing) and System testing?

- **System Testing:** System testing is finding defects when the system undergoes testing as a whole, it is also known as **end to end testing**. In such type of testing, the application undergoes from beginning till the end.
- **UAT:** User Acceptance Testing (UAT) involves running a product through a series of specific tests which determines whether the product will meet the needs of its users.

#### 49. What is continuous integration ?

- Developers can check-in and check-out codes into the system when making new code changes to the application.
- Whenever a developer Check-in a new code into the system, there is a server called **Continuous integration (CI) server**.
- The **CI server** is continuously looking for new code. Once the new code is added to the application the CI server will immediately recognize that code has been checked in. *(there is a tool integrated with this maybe Jenkins or something)*.
- That tool will kick out the automated smoke test to check the basic functionality of the application. Then it will say whether that code affected the app negatively or not.

#### 50. How is code deployed to production environment?

- From Local
  - check in code to Git using pull and push (in my company it is SVN)
  - Run unit tests
  - Deploy changes to server
    - Done by Jenkins automatically every time developer checks in code.
    - After it passes deploy changes to Dev environment
- From Dev environment
  - Deploy changes to Test environment done by Jenkins
  - Can be scheduled or manually triggered
- From Test → Deploy changes done by Jenkins
- From Pre-production

#### 51. Agile Framework?

- **Role :** PO, SM, Team
- **Ceremonies :** -Sprint Planning, Daily Scrum, Sprint Review, Sprint Retro, Grooming Session
- **Artifacts :** Product backlog, - Sprint backlog, -Burnout chart

#### 52. What is Agile?

- Agile is **iterative** product **development** methodology that is alternative to the waterfall methodology.
- Scrum : Team plans for amount of work for the next sprint
- Kanban : No sprint planning, stories are picked up as is, but you still have everything else

#### 53. Why do we need Agile? Waterfall and Agile?

- Because waterfall methodologies have following disadvantage;
  - Requirement cannot be change or hard to change once document is signed.
  - In waterfall before completing the one phase you can't move to the next phase. For example, before coding phase is completed testing cannot be started.
  - Customer can't see what they are going to get until very late stage in development life cycle.
  - It takes longer time to go to the production. By the time product goes to the market it might be outdated already.
- Agile has following advantages :
  - The change is welcomed. For example, after the sprint demo if client does not like something, we can take their feedback and improve the product. Requirement change is OK.
  - Since it is iterative development process, the development team can developed piece of functionality, get feedback

and improve next iteration. So, the product will be continuously improve.

- Waste is eliminated in agile with the help of scrum master. For example, if I am blocked, I don't have to wait and waste my time. Since team members communicates with each other efficiently we can be more productive by preventing duplicated effort.
- Waterfall emphasizes tools and platform, like C#\_.NET, but agile emphasizes people. You can have best tool but at the end people are using those tools. I believed inspired people can make amazing products even they have less money or less resources.

**54. What kind of Agile methodology did you use in your previous projects?**

- I have heard Extreme programming(XP) , Kanban and Scrum. But I have only worked with scrum only.

**55. Scrum is an Agile framework, right? Name few other Agile frameworks.**

- Yes, Scrum is an Agile framework. Few other Agile frameworks are –Feature Driven Development Test Driven Development, Kanban

**56. What are the different roles in Scrum?**

- Product owner is actually the stakeholder of the project.
  - He represents the project requirements before the team.
  - He is responsible to have a vision of what to build and convey his detailed vision to the team.
  - He is the starting point of an agile scrum software development project.
- Scrum team is formed by the collective contribution of individuals who perform for the accomplishment of a particular project.
  - The team is bound to work for the timely delivery of the requested product.
- Scrum master – Scrum master is the leader and the coach for the scrum team who checks whether the scrum team is executing committed tasks properly.
  - He is also responsible to increase the efficiency and productivity of the team so that they can achieve the sprint goal effectively.

**57. How do you describe a scrum team?**

- If you put 5 rock stars together it doesn't mean they are a team, or it doesn't mean they can build great product.
- For me the team is a group of people who are sharing the same goal , moving to the same direction , who trust each other and who will effectively communicate and collaborate with each other to build great product. There should be no star individual but a star team.

**58. What are the responsibilities of a Scrum Master?**

- Tracking and monitoring
- Understanding requirements properly
- Work to reach the project goal
- Process checking master and quality master
- Protect the team from detachments
- Improving the performance of the team
- Lead the meetings and resolve issues
- Resolution of conflicts and impediments
- Communication and reporting

**59. What is a negative test case?**

- Negative test cases are created based on the idea of testing in a destructive manner. For example, testing what will happen if inappropriate inputs are entered into the application. Wrong login information

#### 60. What do you understand by the term "Scrum of Scrums"?

- Let us assume an active project on which seven teams are currently working. Each team is responsible to lead its own scrum meeting. But, in order to coordinate and communicate with different teams, it is required to organize a separate scrum meeting. There is one team leader from every team, known as ambassador, who is responsible to represent his team in the scrum of scrums.
- **The scrum meeting organized to hold a coordination between scrum teams is known as the scrum of scrums.**

#### 61. Shippable product/increment?

- The piece of the product is made, and it keeps getting added functionality from each sprint
- The increment must align to the development team's *Definition of Done*
  - When the product increment is delivered, it needs to meet "Definition of Done"
  - Acceptance criteria is fulfilled
  - Product owner accepts the user stories
- The increment must be acceptable by the P.O

#### 62. What is BurnDown Chart?

- Graphic representation of the rate at which work is completed and how much work remains to be done

#### 63. What is Verification and Validation?

- Verification happens during developing by testers and developers; it is a process of evaluating software at development phase and to decide whether the product of a given application satisfies the specified requirements.
- Validation by testers; is the process of evaluating software at the end of the development process and to check whether it meets the customer requirements.

#### 64. What is Definition of Ready?

- Acceptance Criteria is cleared/reviewed
- Point/hours are given

#### 65. What is User Story?

- *(Note: basically, a user story is just a requirement)* User story is a short simple description minimum **shippable** product.
- It normally looks like this: As **<end-user>** I want to do **< action>** So that I can **<benefit>**.
  - As amazon user I should able to login, so I can buy stuffs online

#### 66. You said "shippable", what do you mean by that?

- Well, You can't really say As a user I want to put my username in the username field.
- So, I can write my username in there. It has to be complete functionality. Putting user name is not a shippable functionality. But able to login is a complete functionality. That is what I mean by shippable.

#### 67. What is parking lot?

- In Agile it means this: In meeting when you have a problem that is not really relevant to other people we should not keep discussing that item in the meeting because we are wasting other people's time.< Let's make it **parking lot** item > means whoever is interested in that issue can talk after the meeting.

#### 68. What is sprint workflow?

- How a story moves from to do to done and lifecycles - what happens when something is blocked, etc.

## 69. Agile experience in your most recent project?

- Our sprint is 4 weeks and we have release every 3 sprints as a release cycle
- We have 7 people in my team. 3 developers (Shwan, Simon, Sinan), 1 automation (Me) and 1 functional testers(Usman), also 1 SM (Yasin) and 1 PO (Simon B.).
- We start a sprint with Sprint Planning Meeting and
  - we discuss about the team's priority features and product backlog items and
  - we learn the part of the application which we are going to developed.
  - Choosing story based on *velocity* and *capacity*
    - **Velocity:** Number of story points delivered/demo in a sprint. For example: if team planned 30 story points (Business value); worth of user stories in a sprint and able to deliver as planned then team's velocity is 30
    - **Capacity:** Total number of available hours for a sprint is Team's capacity. Calculates holiday and PTO hours
  - This meeting is held every week and lasts for almost 1 hour. We get general idea than we do Sprint Grooming meeting for giving some estimates for the tasks.
    - Team, SM, and PO get together to ensure work items are relevant and useful
    - Ask questions to P.O of user stories
    - Re-define acceptance criteria
    - Writing new stories
    - Breaking epics into user stories
    - Understand the story to give proper estimation/to prevent under/over estimate

### How do you estimate?

Based on my experience and complexity of the story and it is something I worked on before.

- After sprint starts, we do Daily Standup Meeting
  - everyday morning and we discuss what did we do yesterday, what will we do today and is there any blocker.
  - Just we synchronize info about the sprint.
- End of the sprint, usually we do Sprint Demo/Review Meeting .
  - It is just to show customer what we build sprint (PO can put feedback)
  - As an SDET in my team, I have done presentation sometimes and go over through the functionalities in the conference room.
  - Client or stakeholders or business people they ask questions what they don't know.
- After Sprint Demo, we do Sprint Retrospective Meeting .
  - In sprint Retro, we talk about what was good in last sprint, what kind of mistakes we made.
  - We go over them and make sure that we don't make the same mistakes again.
  - If we did something good and improvements, we would continue doing it.
  - This meeting that is held at the sprint review meeting or at the end of the sprint; it lasts for 2-3 hours.

## 70. What is an Epic?

- Epic is a big user story that you cannot complete in one sprint.
- For example, as a user I want to buy online so I don't have to visit the local store. This story is too big, and it cannot be completed in one sprint. So, we can call it Epic instead of user story. It should be divided to multiple user stories like:
  - As a customer I want to be able to login so I can view my account.
  - As a customer I want to be able to search for a product so I can buy them.
  - As a customer I want to be able to proceed to checkout so I can pay for the item that I am going to buy.
  - As a customer I want to be able to logout so I can protect my account.
  - As you can see< As a customer I want to be able to buy...> can be divided to multiple user stories. The team can pick one or more user story in every sprint.

#### 71. What is Acceptance criteria?

- Acceptance criteria is the way that we know the user story is successfully developed or not.
- Statements of requirements that are described from the point of view of the user to determine when a story is “done” and working as expected
- 3 parts examples
  - Input → valid email address
  - Process → marking messaging
  - Outcome → marketing message design matches the specs provided by marketing

#### 72. What is rat hole?

- Since there is a lot of communication going on in agile team, team has to discuss a lot of stuffs. But sometimes the discussion will last too long for one topic and it is not really productive. We will say it is <rat hole> it means we should not keep talking about that issue too long and move forward.

#### 73. What types of Test cases?

- I cover different scenarios
  - Positive
  - Negative
  - Boundary Value Analysis

#### 74. Test Case?

- Test case is a specific condition to check against the Application Under Test. It has information of test steps, prerequisites, test environment, and outputs.
- Test case describes the functionality and test steps.
  - Test Case ID
  - Step number
  - Description of the functionality
  - Expected result
  - Actual Result

#### 75. How many Test cases (in your regression suite) do you usually complete in a week?

- 10 small test cases, 7-8 medium, 2-3 larges
- OR It depends on the project. In my company we have 2000 test cases. In 4Stay, we have around 700 test cases.

#### 76. How long it will take to run your regression suite?

- It depends on the project. In my current project out of 2000 test cases in the regression suite around 1500 are already automated. If we use 10 virtual machines to perform parallel execution it takes 2 to 3 days to execute automated test cases. Also, manual testers will execute some manual test cases, but I am not sure how much they are executing. I believe they are only executing some important test cases only after prioritization.

#### 77. What do you do when you run your automated script or what do you when you run regression?

- First, I have to execute my script. Once the script execution is completed, I have to analyze the run result to see if there is any failed test cases. If there is failed test cases I have to determine if it is failed due to legitimate application issue or it is caused by some script issue. (the script can be failed due to automation code issue too) if it is caused by application issue, I will try to manually reproduce it and log a defect if I can reproduce. If it is due to my script, I have to fix it. But this is not the case most of the time.

### 78. What are the steps you take to automate?

- Learn the functionality
  - Reading requirements
  - Knowledge transfer session with B.A
  - Ask teammates
- Manually test it
  - Making sure I understand each step properly
  - Understand expected results
- Automate it
  - Create POM pages
    - Add necessary elements/methods I am going to use and add PageFactory design pattern
    - Create a driver class with Singleton pattern
- Validate the tests using TestNG Assertions

### 79. What percentage of position is automation vs manual?

- 80-85% automation 15-20% manual

### 80. When do you choose automated testing over manual testing?

- If the test cases are high priority test cases.
- If the functionality is critical functionality.
- Shakeout or smoke-test test cases.
- If the test cases are too long and too difficult to execute. The regression test cases based on the priority.
- We should automate as much as possible.

### 81. When do you do automation in your sprint?

- When developers are done with their part
- When code is deployed to QA/test environment
- When testing framework is set up
- When all manual tests are done
- Smoke tests are passing

### 82. What is Test Plan?

- Test plan is a word document that described the testing scope
  - High level test cycle
  - Defect life cycle
  - Entrance Criteria (defines what all need to start the testing)
  - Exit Criteria (defines what the testing is finished)

### 83. What are the tables in test plans?

- Test design, scope, test strategies , approach are various details that Test plan document consists of.
  - Test case identifier
  - Scope
  - Features to be tested
  - Features not to be tested
  - Test strategy & Test approach
  - Test deliverables
  - Responsibilities
  - Staffing and training
  - Risk and Contingencies

**84. What is the difference between a test plan and a QA plan?**

- A test plan lays out what is to be done to test the product and includes how quality control will work to identify errors and defects.
- A QA plan on the other hand is more concerned with prevention of errors and defects rather than testing and fixing them.

**85. What is a peer review?**

- Peer reviews are reviews conducted among people that work on the same team. For example, a test case that was written by one QA engineer may be reviewed by a developer and/or another QA engineer.

**86. How can you tell when enough test cases have been created to adequately test a system or module?**

- You can tell that enough test cases have been created when there is at least one test case to cover every requirement. This ensures that all designed features of the application are being tested.
- A2-That is the reason we need to have requirement traceability matrix. We can tell how many requirements has been covered by test cases and how many still left from RTM.

**87. Who approves test cases?**

- The approver of test cases varies from one organization to the next. In some organizations, the QA lead may approve the test cases while another approves them as part of peer reviews.

**88. Who writes test plans and test cases?**

- Test plans are typically written by the quality assurance lead while testers usually write test cases.

**89. What is the purpose of test design technique?**

- Identifying test conditions and Identifying test cases.

**90. Difference between Test case and Test script?**

- Test case terminology mostly used for Manual Testing whereas Test Script mostly used for Automation Testing
- **A test case is a documentation which specifies input values, expected output and the preconditions for executing the test.** It's also a layout of the low-level details on how to test the scenario
- A test script in software testing is a set of instructions that will be performed on the system under test to test that the system functions as expected.

**91. What should be included in a test strategy?**

- The test strategy includes a plan for how to test the application and exactly what will be tested (*user interface, modules, processes, etc.*). It establishes limits for testing and indicates whether manual or automated testing will be used.

**92. What will you do when script fails?**

- In my experience, I will identify the failure,
  - if it is this due to application error, sync error, script issue or environment is down, first of all I analyze the result by reproduce it through Jenkins run only the fail one,
  - if it is due to synchronization issue, I will add extra time by using implicit, explicit and some custom expected conditions,
  - If it is script issue I will debugging (identify) my script and fix it, analyze the exceptions,
  - if it is real defect then I will log defect.

### 93. Test Scenario?

- Make sure that end to end functionality of application under test is working as expected
- The tester needs to put his/her foot in the end users' shoes to check and perform the action as how they are using application under test
- T.S can have many test cases associated with it, Before executing the T.S we need to think of test cases for scenario
- Test Scenario: Validate the login page
  - Test Case 1: Enter a valid username and password
  - Test Case 2: Reset your password
  - Test Case 3: Enter invalid credentials
- In each test case are detailed steps and condition for execution

### 94. Requirement Traceability Matrix (RTM)

- RTM is used to make sure that all test cases cover the requirement or not. It is like excel sheet.

### 95. What can be done to develop a test for a system if there are no functional specifications or any system and development documents?

- When there are no functional specifications or system development documents, the tester should familiarize themselves with the product and the code. It may also be helpful to perform research to find similar products on the market.

### 96. What are the functional testing types?

- Unit Testing
- Smoke testing
- Sanity testing
- Integration Testing
- System Testing
- Regression Testing
- UAT (user acceptance testing)

### 97. What is the difference between sanity testing and smoke testing?

- When sanity testing is conducted, the product is sent through a preliminary round of testing with the test group in order to check the basic functionality such as button functionality. Smoke testing, on the other hand is conducted by developers based on the requirements of the client.

### 98. What steps are involved in sanity testing?

- Sanity testing is very similar to smoke testing. It is the initial testing of a component or application that is done to make sure that it is functioning at the most basic level and it is stable enough to continue more detailed testing.

### 99. What is the difference between WinRunner and Rational Robot?

- WinRunner is a functional test tool but Rational Robot is capable of both functional and performance testing. Also, WinRunner has 4 verification points and Rational Robot has 13 verification points.

### 100. What is the difference between QA and testing?

- The goals of QA are very different from the goals of testing.
- The purpose of QA is to prevent errors in the application while the purpose of testing is to find errors.

### 101. Explain random testing.

- Random testing involves checking how the application handles input data that is generated at random. Data types are typically ignored, and a random sequence of letter, numbers, and other characters are inputted into the data field.



**102. What is the difference between Quality Control and Quality Assurance?**

- Quality control (QC) and quality assurance (QA) are closely linked but are very different concepts. While QC evaluates a developed product, the purpose of QA is to ensure that the development process is at a level that makes certain that the system or application will meet the requirements.

**103. What is the role of QA in a project development?**

- QA team is responsible for monitoring the process to be carried out for development.
- Responsibilities of QA team are planning testing execution process.
- QA Lead creates the time tables and agrees on a Quality Assurance plan for the product.
- QA team communicated QA process to the team members. QA team ensures traceability of test cases to requirements.
- 

**104. What makes a good QA or Test manager?**

- Knowledge about Software development process
- Improve the teamwork to increase productivity
- Improve cooperation between software, test, and QA engineers
- To improvements the QA processes.
- Communication skills.
- Able to conduct meetings and keep them focused

**105. What is the difference between regression testing and retesting?**

- Regression testing is performing tests to ensure that modifications to a module or system do not have a negative effect on previous releases. Retesting is merely running the same testing again. Regression testing is widely asked manual testing interview questions and hence further research to understand this topic is needed.

**106. Explain the difference between bug severity and bug priority.**

- Bug severity refers to the level of impact that the bug has on the application or system while bug priority refers to the level of urgency in the need for a fix.
- Usually the severity is defined in terms of financial loss, damage to environment, company's reputation and loss of life. Priority of a defect is related to how quickly a bug should be fixed and deployed to live servers.

**107. What is the difference between system testing and integration testing?**

- For system testing, the entire system as a whole is checked, whereas for integration testing, the interaction between the individual modules are tested.

**108. Explain the difference between functional and structural testing.**

- Functional testing is considered to be behavioral or black box testing in which the tester verifies that the system or application functions according to specification. Structural testing on the other hand is based on the code or algorithms and is considered to be white box testing.

**109. 109. What is difference between Pilot and Beta testing?**

- The differences between these two are listed below:
  - A beta test when the product is about to release to the end user whereas pilot testing take place in the earlier phase of the development cycle.
  - In beta testing application is given to a few users to make sure that application meet the user requirement and does not contain any showstopper whereas in case of pilot testing team member give their feedback to improve the quality of the application.

**110. What is Alpha testing?**

- Pre-release testing by end user representatives at the developer's site.

**111. What is a failure?**

- Failure is a departure from specified behavior.

**112. What are Test comparators?**

- Is it really a test if you put some inputs into some software, but never look to see whether the software produces the correct result?
- The essence of testing is to check whether the software produces the correct result, and to do that, we must compare what the software produces to what it should produce.
- A test comparator helps to automate aspects of that comparison.

**113. Describe how to perform Risk analysis during software testing?**

- Risk analysis is the process of identifying risk in the application and prioritizing them to test. Following are some of the risks:
  1. New Hardware.
  2. New Technology.
  3. New Automation Tool.
  4. Sequence of code delivery.
  5. Availability of application test resources.
- We prioritize them into three categories these are:
  - High magnitude: Impact of the bug on the other functionality of the application.
  - Medium: it can be tolerable in the application but not desirable.
  - Low: it can be tolerable. This type of risk has no impact on the company business.

**114. What is Silk Test?**

- Silk Test is a tool developed for performing the regression and functionality testing of the application. Silk Test a tool is used when we are testing the applications which are based on Window, Java, web or traditional client/server.
- Silk Test help in preparing the test plan and management of those test plans, to provide the direct accessing of the database and validation of the field.

**115. What is difference between Master Test Plan and Test Plan?**

- Master Test Plan contains all the testing and risk involved area of the application whereas Test case document contains test cases.
- Master Test plan contain all the details of each and every individual test to be run during the overall development of application whereas test plan describe the scope, approach, resources and schedule of performing test.
- Master Test plan contain the description of every tests that is going to be performed on the application whereas test plan only contain the description of few test cases. during the testing cycle like Unit test, System test, beta test etc
- Master Test Plan is created for all large projects but when it is created for the small project then we called it as test plan.

**116. When is a test considered to be successful?**

- The purpose of testing is to ensure that the application operates according to the requirements and to discover as many errors and bugs as possible. This means that tests that cover more functionality and expose more errors are considered to be the most successful.

**117. What is defect?**

- When the expected result does not match the actual result, it is defect.

**118. Define defect density?**

- Defect density is the total number of defects per lines of code.

**119. What is Defect Life Cycle (DLC)?**

- New → Assigned → Open → Fixed → Retested → Close

**120. What are the categories of defects?**

- **Wrong:** The requirements are implemented incorrectly in the application.
- **Missing:** When requirement given by the customer and application is unable to meet those application.
- **Extra:** A requirement incorporated into the product that was not given by the end customer. This is always a variance from the specification but may be an attribute desired by the user of the product.

**121. What to do when you find a defect?**

- If I find a defect, before reporting it I reproduce the bug that I need to make sure that is a valid defect.
- If it is a small issue, I will go to the developer desk, and he can fix it right away.
- If it is a big issue, then I open my JIRA and log the defect.
- If I am not sure it is bug or not, I will talk to SME (subject matter expert it means the person who knows the application better than anyone).

**122. If developer says not a defect, what to do?**

- I always make sure that it is a real defect that's why I reproduce it.
- I take screenshots and give all the steps to reproduce the defect.
- Actually, one of my biggest challenges that I faced in my current project is that.

**123. Can you test a program and find 100% of the errors?**

- It is impossible to find all errors in an application mostly because there is no way to calculate how many errors exist. There are many factors involved in such a calculation such as the complexity of the program, the experience of the programmer, and so on. This Manual testing interview questions is the trickiest questions considered by testers.

**124. What is the difference between debugging and testing?**

- The main difference between debugging and testing is that debugging is typically conducted by a developer who also fixes errors during the debugging phase. Testing on the other hand, finds errors rather than fixes them. When a tester finds a bug, they usually report it so that a developer can fix it.

**125. How should testing be conducted?**

- Testing should be conducted based on the technical requirements of the application.

**126. What is considered to be a good test?**

- Testing that covers most of the functionality of an object or system is considered to be a good test.

**127. When should testing be stopped?**

- It depends on the risks for the system being tested. There are some criteria bases on which you can stop testing.
  - Deadlines (Testing, Release)
  - Test budget has been depleted
  - Bug rate fall below certain level
  - Test cases completed with certain percentage passed
  - Alpha or beta periods for testing ends
  - Coverage of code, functionality or requirements are met to a specified point

**128. What is the difference between top-down and bottom-up testing?**

- **Top-Down** testing begins with the system and works its way down to the unit level.
- **Bottom-up** testing checks in the opposite direction, unit level to interface to overall system. Both have value but bottom-up testing usually aids in discovering defects earlier in the development cycle, when the cost to fix errors is lower.

**129. What is the average size of executables that you have created?**

- This is a simple interview question about our experience with executables. If you know the size of any that you've created, simply provide this info.

**130. Have you performed tests on the front-end and the back-end?**

- When I test Front-End, I am actually testing the UI by open up the application and perform testing on UI. If I have done anything on the UI, I have to perform backend testing to see if the change has been made in the database as well. For example, when I update a parent contact information or create new application, I connect to the database and check if the changes are applied to the data or the new application is created or not.

**131. What is difference between Front End Testing and Back End testing?**

- Front End Testing is performed on the Graphical User Interface, whereas Back End Testing involves databases testing.
- Front end consist of web site look where user can interact whereas in case of back end it is the database which is required to store the data.
- When ender user enters data in GUI of the front-end application, then this entered data is stored in the database. To save this data into the database we write SQL queries.

**132. What is the most difficult problem you've found during testing?**

- *(This is a simple interview question in which you should provide an example}*. This is one of most tricky manual testing interview questions as your answer will decide your job. You need to answer in such a way that your problem-solving skills and your job. You need to answer in such a way that your problem-solving skills and your eagerness to learn new things, and your dedication towards the job will indicated by your answers.

**133. What is your challenge in scrum?**

- Since scrum emphasizes cross functional team (it means developer should able to test and testers should able to develop) it is hard to be part of development team as a traditional QA tester. Because generally QAs don't know how to write code. That is why I have to keep myself very competitive. Whenever I have time, I am learning more coding like Java.
- Time change issue → When I save a date the date entered to the database one, they earlier.

**134. What is Automation Testing?**

- The process of performing testing automatically which reduces the human intervention this is automation testing.
- The automation testing is carried out with the help of some automation tool like QTP, Selenium, WinRunner etc.
- In automation testing we use a tool that runs the test script to test the application; this test script can be generated manually or automatically. When testing is completed then tools automatically generate the test report and report

**135. When will you automate?**

- If it is taking a lot of manual effort. I run at least once manual and after that I automate it.
- Automation is good for most repetitive functionality

**136. What tests can be automated?**

- Regression tests
- Smoke tests
- Functional tests
- API
- Database

**137. When will you NOT automate?**

- If functionality keeps changing
- If functionality is used only once during the entire project
- **Ad-hoc test** cannot be automated.

**138. What is the duration of a scrum sprint? How long is your sprint?**

- In my current project our sprint cycle is 4 weeks. How long is your sprint here? 2 weeks or 4 weeks? (sometimes it is good to ask question. Remember you should not act like an ATM. They generally forget people only answering question. There should be a balance.)
- Our team size is 7 members. 1 SM, 1 PO, 3 developer, 1 MT, 1 AT

**139. What is Velocity?**

- Velocity is the rate at which team progresses print by sprint.
- I can also say that it cannot be compared to two different scrum teams.

**140. What do you know about **impediments** in Scrum? Give some examples of impediments.**

- Impediments are the obstacles or issues faced by scrum team which slow down their speed of work.
- If something is trying to block the scrum team from their getting work "Done" then it is an impediment.
- Impediments can come in any form. Some of the impediments are given as
  - Resource missing or sick team member
  - Technical, operational, organizational problems
  - Lack of management supportive system
  - Business problems
  - External issues such as weather, war etc.
  - Lack of skill or knowledge
- Solution : Teamwork, work hard, communicate well, online connect, mentoring and training

**141. What is the difference and similarity between Agile and Scrum?**

- Agile is a broad spectrum, it is a methodology used for project management while Scrum is just a form of the Agile that describes the process and its steps more concisely.
- Agile is a practice whereas scrum is a procedure to pursue this practice.
- The similarity that → Agile involves completing projects in steps or incrementally. The Agile methodology is considered to be iterative in nature. Being a form of Agile, Scrum is same as that of the Agile. It is also incremental and iterative.

**142. What is increment? Explain.**

- An increment is **the total of all the product backlogs items completed during a sprint.**
- Each increment includes all the previous sprint increment values as it is cumulative.
- It must be in the available mode in the subsequent release as it is a step to reach our goal.

**143. What is the "build breaker"?**

- The build breaker is a situation that arises when there is a bug in the software.
- Due to this sudden unexpected bug, compilation process stops, or execution fails, or a warning is generated.
- The responsibility of the tester is then to get the software back to the normal working stage removing the bug.

**144. What do you understand by Daily stand-up?**

- The daily stand-up is an everyday meeting (most preferably held in the morning) in which the whole team meets for almost 15 minutes to find answer to the following three questions –
  - What was done yesterday? What is your plan for today?
  - Is there any impediment or block that restricts you from completing your task?
- The daily stand-up is an effective way to motivate the team and make them set a goal for the day.

**145. What do you know about Scrumban?**

- Scrumban is a Scrum and Kanban based model for the software development.
- This model is specifically used for the projects that need continuous maintenance, have various programming errors or have some sudden changes.
- This model promotes the completion of a project in minimum time for a programming error or user story.

**146. State some of the Agile quality strategies?**

- Iteration
- Refactoring
- Dynamic code analysis
- Short feedback cycles
- Reviews and inspection
- Standards and guidelines
- Milestone reviews

**147. Do you know about Agile Manifesto & its Principles? Explain in brief.**

- This is the theory which most of agile/scrum roles aspirant should be on tips.
- Four manifesto values and 12 principles should be explained as much as possible as part of this question.
- Even if it's not explained in 100% accurate manner it should be fine, but intentions of values and principles should come out e.g.
- Manifesto
  - Individuals and interactions over processes and tools
  - Working software over comprehensive documentation
  - Customer collaboration over contract negotiation
  - Responding to change over following a plan
- Guiding Principles
  - Customer Satisfaction
  - Welcome Changing Requirements
  - Working Software is Delivered Frequently (Weeks rather than months)
  - Close, Daily Cooperation between Business People and Developers
  - Project are built around motivated individuals, who should be trusted
  - Face-to-Face Conversation is the best form of communication
  - Working software is the primary measure of progress
  - Sustainable development, able to maintain a constant pace
  - Continuous attention to technical excellence and good design
  - Simplicity - The art of maximizing the amount of work not done - is essential
  - Best architectures, requirements and designs emerge from self-organizing teams
  - Regularly, the team reflects on how to become more effective, and adjusts accordingly

**148. What is the use of burn-up and burn-down charts?**

- The burn-up chart illustrates the amount of completed work in a project whereas the burn-down chart depicts the amount of work remained to complete a project.
- Thus, the burn-up and burn-down charts are used to trace the progress of a project.

**149. Is there any drawback of the Agile model? If yes, explain.**

- Yes, there are some drawbacks of the Agile model, some of them are like;
  - It is not easy to make a prediction about the effort required to complete a task. It becomes more problematic in case of large projects as it becomes difficult to get an idea of the total effort required.
  - At sometimes, it's not possible to properly focus on the design and documentation of the project
  - In case the requirements of the client are not understood properly, the final project will not meet the customer requirements. Thus, it will lead to the customer dissatisfaction.
  - Only the leader who has considerable experience in Agile methodologies is capable to take important decisions. The team members with little or no experience are not involved in decision-making, thus they don't get chance to advance their knowledge.

**150. Define Zero Sprint and Spike in Agile.**

- Zero Sprint can be defined as the preparation step of the first sprint in Agile.
  - There are some activities that are required to be done before actually starting the project.
  - These activities are considered as the Zero sprint; the examples of such activities are – setting the environment for development, preparation of backlogs etc.
- Spike is the type of story that can be taken between the sprints.
  - Spikes are commonly used for the activities related to the design or technical issues such as research, design, prototyping, and exploration.
  - There are two types of spikes – functional spikes and technical spikes.

**151. What is the role of the Scrum Master?**

- The scrum master is the leader as well as coach of the Scrum team.
- The SM is responsible to serve and protect the team from any kind of block that could affect the performance.
- The main role of the SM is to motivate his team to achieve the sprint goal.
- He is focused to build a self-organized and motivated team where each member is familiar with the implementation of Agile and Scrum principles and applications.
- The SM keeps a proper check on the scrum team if they are executing committed tasks properly.
- He is also responsible to increase the efficiency and productivity of the team so that they can achieve the sprint goal effectively.

**152. What do you know about a story point in Scrum?**

- A story point in Scrum is the unit for the estimation of total efforts that are required to perform or complete a particular task.

**153. What is the role of Sashimi in Scrum methodology?**

- Sashimi plays an important role in Scrum methodology.
- Sashimi is a technique used by Scrum to check the completion of all the functions created by the developers.
- Using this technique, all the requirements such as analysis, designing, coding, testing and documentation that are used in the constitution of a product are checked and only after that the product is displayed.

**154. What do you understand by the term Agile testing?**

- Agile testing is a software testing practice that is fully based on the agile principles of software development. It is an iterative methodology where the requirements are the outcome of collaboration between the product owner and team. The agile principles and applications are applied to meet the customer requirements by successful completion of the project.

**155. Is it ever suggested to use waterfall over Scrum? If yes, explain when.**

- Yes, sometimes it is suggested to use waterfall model over Scrum.
- It is done when the customer requirements are simple, well-defined, fully understood, predictable, and are not subjected to change until the completion of the project.

**156. Why does Scrum encourage the use of automated testing for projects?**

- Scrum encourages the use of automated (automated performance or automated regression) testing to make the fastest possible delivery of the project . *you may explain some tools that you have used for automating*

**157. Explain some common matrices for Agile.**

- **Velocity** → Velocity is the average number of points from last 3-4 sprints. It is measured by the summation of the all approved estimates of the stories. It gives an idea of the capacity, progress etc.
- **Cumulative Flow Diagram** → With the help of it, an inspection is done over the uniform workflow. In this diagram/graph, the x-axis represents time whereas the y-axis represents the number of efforts.
- **Work Category Allocation** → it is an important factor that gives a quick information of the time investment i.e. where the time is being invested and which task should be given priority as a factor of time.
- **Time Coverage** → It is the time that is given to a code during testing. It is calculated in percentage as a factor of the number of lines of code called by test suite and the total number of relative lines of code.
- **Business Value Delivered** → It is a term which denotes the working efficiency of the team. The business objectives are assigned numerical values 1,2,3 and so on, as per the level of priority, complexity, and ROI.
- **Defect Removal Awareness** → It is the factor that helps the team to deliver a quality product. The identification of an active number of defects, their awareness, and removal plays an important role in delivering a high-quality product.
- **Defect Resolution Time** → It is a procedure through which the team members detect the defects (bugs) and set a priority for the defect resolution. The procedure of fixing errors/bugs or defect resolution comprises of multiple processes such as clearing the picture of defect, schedule defect fixation, completing defect fixation, generation, and handling of resolution report.
- **Sprint Burndown Matrix** → The sprint burndown chart is a graph to represent the number of non-implemented or implemented sprints during as Scrum cycle. This matrix helps to track the work completed with the sprint.

**158. Name some methodologies and development where you have used Agile model.**

- Some of the methodologies and development where Agile model can be used are –
  - Crystal methodologies
  - Lean software development
  - Dynamic development and Feature driven development

**159. Share your experience as Scrum M/Product O/Agile team member and what were your primary responsibilities?**

- The trick in this question is whether while explaining you are showing self-organizing and self-motivational team.

**160. What was the length of sprints/iterations in your project?**

- The idea here is to judge in which kind of environment you have worked. There will be definitely follow up question like was this length fixed in the beginning and never changed? Have you tried with more than this length or less than that?



**161. What do you know about “Planning Poker” technique?**

- Planning poker, also known as Scrum Poker, is a card based agile technique that is used for planning and estimation. To start a session of planning poker technique, the agile user story is read by the product owner.
- The steps performed in the poker planning technique are –
  - Each estimator has a deck of poker cards with the values such as 0, 1, 2, 3, 5, and so on, to denote story points, ideal days or something else that the team uses for estimation.
  - Each estimator has a discussion with the product owner and then privately selects a card on the basis of their independent estimation.
  - If the cards with same value are selected by all estimators, it is considered as an estimate. If not, the estimator discusses the high and low value of their estimates.
  - Then again, each estimator privately selects a card and reveals. This process of poker planning is repeated to reach a general agreement.

**162. How have you done user story mapping & estimation of stories in your projects?**

- Have you used any estimation technique like planning poker, t-shirt, sizing etc.? Whatever technique you used in your project just mention it very clearly.

**163. How is agile testing methodology different from other testing methodologies?**

- The agile testing methodology involves the division of whole testing process into multiple small segments of codes. In every step, these segments of codes undergo testing.
- There are a number of additional processes involved in agile testing methodologies such as team communication, strategic modifications for optimal results and many others.

**164. What is the biggest challenge you faced in your project while handling the Scrum team members?**

- Challenges generally faced in the initial stages of scrum is stabilizing the velocity, team members conflicts, sticking to time-boxing etc.
  - Application should be stable enough to be tested.
  - Testing always under time constraint
  - Understanding the requirements.
  - Domain knowledge and business user perspective understanding.

**165. Which tests to execute first?**

- Testing the Complete Application.
- Regression testing.
- Lack of skilled testers.
- Changing requirements.
- Lack of resources, tools and training

**166. Do you have a Scrum Master certification?**

- If you are a certified scrum master, just share the details of your certification like certification exam, score obtained, and the year of passing the certification exam. In case you don't have a certification, mention and highlight your experience in the particular field. Also, let the interviewer know if you are planning to invest in the certification in the near future.

**167. Do you hold any agile certification? Why did you choose this certification?**

- Agile and Scrum methodologies are used to complete a project at earliest.
- Implementing agile principles results in customer satisfaction whereas scrum is known for its flexible feature as per the requirements.

**168. Have you worked with offshore team before?**

- No, I don't work...
- Offshore basically means that the team is situated in a different country but is still employed by your company.

**169. What are the common UI test automation tools?**

- Selenium
  - Cucumber
  - TestNG
- Appium
- Protractor
- Winium
- UFT/QTP
- **Katalon Studio**

**170. What is Testware? Test ware?**

- It is the subset of software which helps in performing the testing of application.
- Testware are required to plan, design, and execute tests. It contains documents, scripts, inputs, expected results, set-up and additional software or utilities used in testing.
- Testware is term given to combination of all utilities and application software that required for testing a software package. It is special because it has;
  - Different purpose
  - Different metrics for quality and
  - Different users

**171. How does a client or server environment affect testing?**

- There are lots of environmental factors that affect the testing like speed of data transfer data transfer, hardware, and server etc. while working with client or server technologies, testing will be extensive.
- When we have time limit, we do the integration testing. In most of the cases we prefer the load, stress and performance testing for examine the capabilities of the application for the client or server environment.



# JAVA

## 1. Java Virtual Machine

- JVM stands for Java Virtual Machine which is a run-time environment for the compiled java class files.

## 2. Are JavaScript and Java the same?

- Java is an OOP programming language while Java Script is an OOP scripting language.
- Java creates applications that run in a virtual machine or browser while JavaScript code is run on a browser only.
- Java code needs to be compiled while JavaScript code are all in text.
- They require different plug-ins.

## 3. Java Runtime Environment

- JRE is what we need to run a Java program and contains set of libraries and other files that JVM uses at run time.
- JRE = JVM + Library Classes

## 4. Java Development Kit

- JDK is what we need to compile Java source code and contains JRE, development tools.
- JDK = JRE + Development tools

## 5. Object Oriented Programming (OOP)

- OOP is a programming language model organized around object rather than actions;
  - It makes development and maintenance easier - It provides data hiding - It provides ability to simulate real-world.
- **OOP language follow 4 principles:**
  - **Encapsulation** : We can hide direct access to data by using private key and we can access private data by using getter and setter method.
  - **Abstraction** : It is a process of hiding implementation details and showing only functionality to the user. Abstraction lets you focus on what the object does instead of how it does it.
  - **Inheritance** : It is used to define the relationship between two classes. When a child class acquires all properties and behaviors of parent class known as inheritance. Child class can reuse all the codes written in parent class. It provides the code reusability.
  - **Polymorphism** : It is an ability of object to behave in multiple form. The most common use of polymorphism is Java, when a parent class reference type of variable is used to refer to a child class object.
    - E.g.: `WebDriver driver = new ChromeDriver();` We use method overloading and overriding to achieve Polymorphism.

## 6. What is the concept of Abstraction?

- In OOP, abstraction is a process of hiding the implementation details from the user, only the functionality will be provided to the user.
- In other words, the user will have the information on what the object does instead of how it does it.
- In Java, abstraction is achieved using Abstract classes and interfaces.
- For example: when you log in to your bank account online, you enter your user-id and password and press the login. What happens then, how the input data sent to the server, how it gets verified are all abstracted away from you.

## 7. Difference between **Abstraction** and **Encapsulation**?

- **Abstraction** lets you focus on **what** the object does instead of **how** it does it.
  - **Encapsulation** means hiding the internal details of how the object does something.
- **Abstraction** is used for hiding the **unwanted** data and giving relevant data.
  - **Encapsulation** means hiding the code and data, and to protect the data from outside.
- **Abstraction** can be achieved by using Abstract class and Interfaces
  - **Encapsulation** can be achieved by using "private" keyword.

## 8. What is encapsulation and how did you use it?

- Data: hiding by making variables private and providing public getter and setter methods.
- In my project I created multiple POJO/BEAN classes in order to manage test data and actual data.
  - EX: I take JSON from API response and convert to object of my POJO class all variables are private with getters and setter.

## 9. Difference between Abstract Class and Interface?

- A class that is declared with abstract keyword, is known as abstract class. It can have abstract and non--abstract methods.
- An Interface is a blueprint of a class. It is a template and it is declared with interface keyword. It can have abstract methods, default methods, static methods and public final static variables
- When we want to use Abstract class, we use "extend" keyword. When we want to use Interface, we use "implement" keyword.
- Abstract class and interface both are used to achieve abstraction Both cannot be instantiated; we cannot create an object.

## 10. What is immutable ?

- Immutable means that once the constructor for an object has completed execution that instance can't be altered.
- This is useful as it means you can pass references to the object around, without worrying that someone else is going to change its contents.  
Especially when dealing with concurrency, there are no locking issues with objects that never change.

```
class Foo {
    private final String myvar;
    public Foo (final String initialValue) {
        this.myvar = initialValue;
    }

    public String getValue ()
    return this.myvar;
}
```

## 11. What is Polymorphism?

- Polymorphism is a very important concept in OOP because;
  - it enables to change the behavior of the applications in the run time based on the object on which the invocation happens.
  - by Polymorphism; one object can have different forms
- Two types → **Compile Time** which is Static and **Run Time** Polymorphism which is related with child and parent class.
- Polymorphism is implemented using the concept of Method overloading and method overriding. This can only happen when the classes are under the parent and child relationship using inheritance.

## 12. Difference between Polymorphism and Inheritance

- Like in real world, Inheritance is used to define the relationship between two classes. It is similar to Father-Son relationship. In Java, we have Parent class (also known as super class) and child class (also known as subclass). Similar to the real-world, Child inherits Parents qualities, methods and codes.
  - A child class can reuse all the codes written in Parent class and only write code for behavior which is different than the Parent.
  - Inheritance is actually meant for code reuse.
- On the other hand, Polymorphism is an ability of object to behave in multiple form.
  - It is classified as overloading and overriding.
- By the way, they are actually related to each other, because its inheritance which makes Polymorphism possible, without any relationship between two class. It is not possible to write polymorphic code.
  - Dynamic Polymorphism → Overriding
  - Static Polymorphism → Overloading

## 13. What is static binding vs dynamic/runtime binding?

- Static binding is overloading, and dynamic binding is method overloading

## 14. What is Access modifier and what are the different access modifiers?

- Java provides a number of access modifiers to set access levels for classes, variables, methods, and constructors.
  - Visible to the package, the default. No modifiers are needed.
  - Visible to the class only (private).
  - Visible to the world (public).
  - Visible to the package and all subclasses (protected).

## 15. Difference between Public, Private and Protected modifier in Java?

- In Java, access modifier which specifies accessibility of class, methods and variables. There are four access modifiers in Java namely Public, Private, Protected and Default.
- The difference between these access-modifies is that;
  - The most importantly is the level of accessibility.
  - Public is accessible to anywhere
  - Private is only accessible in the same class which is declared
  - Default is accessible only inside the same package
  - Protected is accessible inside the same package and also outside the package but only the child classes.
- We cannot use private or protected modifier with a top--level class.
- We should also keep in mind that access modifier cannot applied for local variable public, private or protected in Java.

## 16. Difference between a Constructor and a Method?

- Constructor doesn't have a return type and constructor's name must be same as the class name.
  - Constructor is called automatically when a new object is created. Constructor is invoked implicitly.
  - The Java compiler provides a default constructor if we don't have any constructor.
  - Constructors are not inherited by child classes
- Method have a return and the method's name may or not be same as the class name
  - Method is invoked explicitly.
  - Method is not provided by compiler in any case.
  - Methods are inherited by child classes.

## 17. Difference between method Overloading and method Overriding?

- First and most important difference between overloading and overriding is that,
  - in case of overloading , method name must be the same, but the parameters must be different;
  - in case of overriding , method name and parameters must be same
- Second major difference between method overloading and overriding is that;
  - We can overload method in the same class but method overriding occurs in two classes that have inheritance relationship.
- We cannot override static, final and private method in Java, but we can overload static, final and private method in Java.
- In method overloading , return type can be same or different. In method overriding , return type must be same or covariant type.

## 18. Difference between Set, List and Map in Java?

- Set, List and Map are 3 important interface of Java collection framework.
  - List provides *ordered* and indexed collection which *may contain duplication* .
  - Set provides *un-ordered* collection of unique objects. Set *doesn't allowed duplication* . List and Set are both extend collection interface.
  - Map provides a data structure based on Key Value. Key is always unique, value can be dupl.

## 19. When to use List, Set and Map?

- If we need to access elements frequently by using index, then List is a way to go ArrayList provides faster access if we know index.
- If we want to store elements and want them to maintain an order, then go for List again. List is an ordered collection and maintain order.
- If we want to create collection of unique elements and don't want any duplicate than choose any Set implementation. (HashSet...)
- If we want store data in form Key and Value than Map is the way to go. We can choose from HashMap, Hashtable...

## 20. How do you find if ArrayList contains duplicates or not?

- There are several ways available. Shortest one is `.stream().distinct().count()` method  
`list.size() != list.stream().distinct().count()`
- Other methods:

```
//METHOD 1
public static <T> boolean containsUnique(List<T> list){ Set<T> set = new HashSet<>();
return list.stream().allMatch(t -> set.add(t));
}

//METHOD 2
public static <T> boolean containsUnique(List<T> list){ return list.stream().allMatch(new
HashSet<>()::add);
} // seems to be the best not only because it can handle pure streams, but also because it stops on
the first duplicate (while #1 and #2 always iterate till the end)

//METHOD 3
public static <T> boolean containsUnique(List<T> list){
    Set<T> set = new HashSet<>();
    for (T t: list){
        if (!set.add(t))
    return false; }
}
```

## 21. What is Array?

- An array is a container object that holds a fixed number of values of a single type. The length of an array is established when the array is created. After creation, its length is fixed. You have seen an example of arrays already, in the main method of the "Hello World!" application. This section discusses arrays in greater detail.
- Each item in an array is called an element, and each element is accessed by its numerical index. As shown in the preceding illustration, numbering begins with 0. The 9th element, for example, would therefore be accessed at index 8.
- **Advantage of Java Array**
  - Code Optimization: It makes the code optimized, we can retrieve or sort the data easily.
  - Random access: We can get any data located at any index position.
- **Disadvantage of Java Array**
  - Size Limit: We can store only fixed size of elements in the array. It doesn't grow its size at runtime. To solve this problem, collection framework is used in java.

## 22. Difference between Arrays and ArrayList in Java?

- Array is a part of core Java programming and has special syntax ArrayList is part of collection framework and implement List interface
- Major difference is that; Array is a fixed length data structure, so we can change length of Array one created, ArrayList is resizable.
- The other major one is that Array can contain both primitives and objects. ArrayList can only contain objects. It cannot contain primitive types.
- Also, we can compare Array and ArrayList on how to calculate length of Array or size of ArrayList. We use length for an Array, we use size() method for an ArrayList.

Array	ArrayList
<pre>int[] arr = {6,9,1};</pre> <ul style="list-style-type: none"><li>• arr.length</li><li>• Arrays.sort(arr); //import java.util.Arrays</li><li>• Java also provides a convenient way to search, but only if the array is already sorted. Arrays.binarySearch(arr, value);</li><li>• string [ ] [ ] marry = new string [3] [2];</li><li>• Arrays.asList(arr);</li><li>• Arrays.toString(arr);</li><li>• Arrays.deepToString(arr); //for multidimensional</li></ul>	<pre>ArrayList list = new ArrayList();</pre> <ul style="list-style-type: none"><li>• list.add(obj);</li><li>• list.add(index position, obj);</li><li>• list.remove(obj);</li><li>• list.set(index position, new obj); //replace object</li><li>• list.isEmpty(); //boolean</li><li>• list.size();</li><li>• list.clear();</li><li>• list.contains(obj);</li><li>• list.get(int index);</li><li>• list.toArray();</li><li>• Sorting → Collection.sort(list);</li></ul>

## 23. What is thread safe or Synchronized?

- Thread safety is very important, and it is the process to make our program safe to use in multi-threaded environment, there are different ways through which we can make our program thread safe.
- **Synchronization** is the easiest and most widely used tool for thread safety.
- JVM guarantees that synchronized code will be executed by only one thread at a time.
- JAVA keyword **synchronized** is used to create synchronized code and internally it uses locks on Object or Class to make sure only one thread is executing the synchronized code.
- I mean Java synchronization works on locking and unlocking of the resource, so no thread enters into synchronized code.
- We can use synchronized keyword in two ways, one is to make a complete method synchronized and other way is to create synchronized block.

## 24. How do you sort an object that you created?

- Sort it will be able to sort.
- Also, I can store my objects into a TreeSet or TreeMap → Ex: NEXT PAGE
- Java provides a number of ways to sort a list.
  - COMPARABLE - COMPARATOR interfaces can be used for sorting. In these cases, We should override the compareTo method.
- Another way is List interface sort method which can use a comparator. With this method we can sort ascending or descending.

```
users.sort(Comparator.comparing(User::getUserID));
```

- If we don't want to modify the original list, but return a new sorted list; then we can use the sorted() method from the Stream interface...

```
List<User> sortedUsers = users.stream()  
    .sorted(Comparator.comparing(User::getUserID))  
    .collect(Collectors.toList());
```

## 25. Difference between Hashtable and HashMap in Java?

There are several differences between HashMap and Hashtable in Java:

- Hashtable is synchronized, whereas HashMap is not. This makes HashMap better for non-threaded applications, as unsynchronized Objects typically perform better than synchronized ones.
- Hashtable does not allow null keys or values. HashMap allows one null key and any number of null values.
- For example; one of HashMap's subclasses is LinkedHashMap, so in the event that you'd want predictable iteration order (which is insertion order by default), you could easily swap out the HashMap for a LinkedHashMap. This wouldn't be as easy if you were using Hashtable.

If synchronization is not an issue for me, I prefer using HashMap. If it becomes an issue, then I prefer Collections.synchronizedMap() or ConcurrentHashMap.

- Both Hashtable and HashMap implements Map interface and both are Key and Value.
- HashMap is not thread-safe while Hashtable is a thread-safe collection.
- Second important difference is performance since HashMap is not synchronized. It performed better than Hashtable. → Collections.synchronizedMap(...Map...);

## 26. How would you handle Exception?

I would use try-catch-finally approach to handle the Exception

- 1- I would put my code that might generate an exception inside a try-catch block. With try-catch block I can rethrow an exception or try to perform my recovery steps. Also, If needed I can use multi or Union Catch blocks
- 2- I can also use throws keyword. BUT it does mean that anyone that calls my method now needs to handle it too!
- 3- Another way is AutoCloseable: When we place references that are AutoCloseable in the try declaration, then we don't need to close the resource ourselves. We can still use a finally block, though, to do any other kind of cleanup we want. try-with

## 27. TreeSet vs TreeMap

- TreeSet: Can contain only unique values - is sorted in ascending order
- TreeMap: can contain only unique keys. - keys are sorted in ascending order

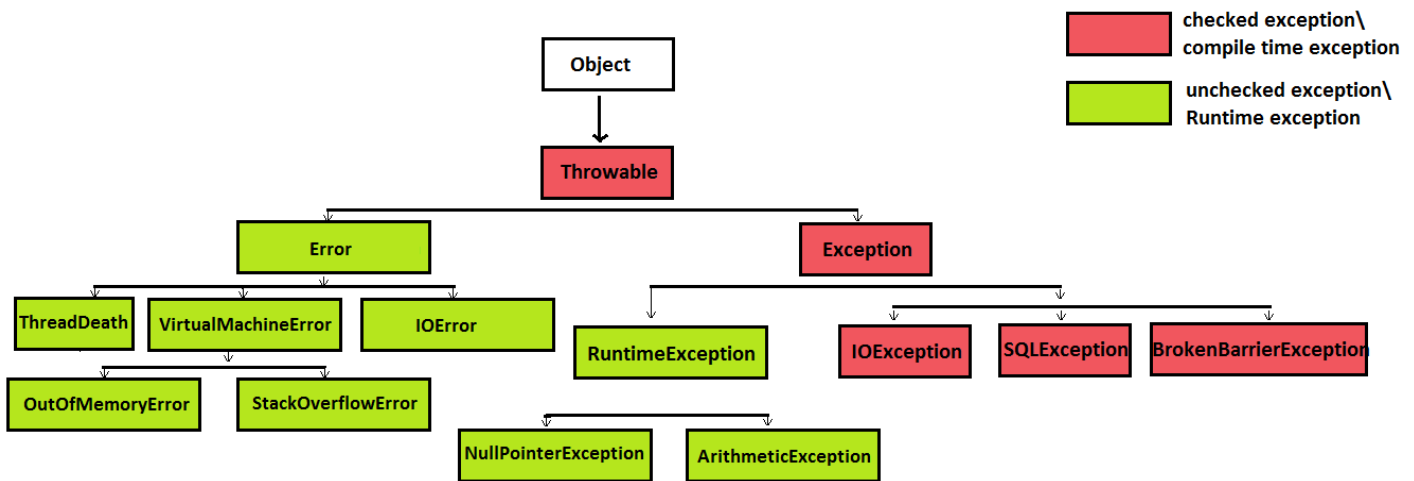


## 28. final vs finalize vs finally ?

- **final** → is a keyword and used to apply restrictions on class, method and variable.
  - final Class CAN'T be Inherited
  - final Method CAN'T be Overridden
  - final Variable value CAN'T be changed.
- **finally** → is a block and used to place important code, it will be executed whether exception handled or not
- **finalize** → is a method and used to perform clean-up processing before Object is Garbage collected.

## 29. Difference between Error and Exception in Java?

- Both Error and Exception are derived from Throwable in Java.
- Error represent errors which are generally cannot be handled.  
For examples: OutOfMemoryError, NoClassDefFoundError
- On the other hand, Exception represent errors which can be catch and dealt.  
For examples> IOException, NullPointerException
- Exception is divided in two categories checked and unchecked Exception. Checked Exception require a mandatory try-catch code block to handle it. Unchecked Exception mostly represent programming errors (NullPointerException or RuntimeException)
- Errors are unchecked exception and the developer is not required to do anything with these
- **All the Errors are Exceptions, but the reverse is not true.**
- In general Errors are which nobody can control or guess when it happened, on the other hand Exception can be guessed and can be handled



## 30. Difference between RuntimeException and CheckedException in Java?

- Exception are divided in two categories Runtime (unchecked) Exception and CheckedException.
- Main difference between RuntimeException and CheckedException is that, it is mandatory to provide try-catch to handle CheckedException while in case of RuntimeException is not mandatory.
- Some of the most common Exception like NullPointerException, ArrayIndexOutOfBounds, ClassNotFoundException, IOException.

First I want to remind that Java Exceptions are divided in two categories RuntimeException also known as unchecked Exception and checked (compile time) Exception.

Main difference between RuntimeException and checked Exception is that, It is mandatory to provide try catch or try finally block to handle checked Exception and failure to do so will result in compile time error, while in case of RuntimeException this is not mandatory.

Some of the most common Exception like NullPointerException, ArrayIndexOutOfBoundsException are unchecked and they are descended from java.lang.RuntimeException.

Popular example of checked Exceptions are ClassNotFoundException and IOException and that's the reason you need to provide a try catch finally block while performing file operations in Java as many of them throws IOException.

If you I ask my personal opinion, I think Checked Exceptions makes our code code UGLY by adding boiler plate code in for of try-catch finally block.

### 31. Difference between throw and throws in Java?

- throw and throws are two keywords related to Exception feature of Java programming language.
- throw keyword is used to throw an exception explicitly, on the other hand, throws keyword is used to declare an exception which means it works similar to the try--catch block.
- If we see syntax wise than throw is followed by an instance of Exception class throws is followed by exception class names.
- throw new ArithmeticException ("Arithmetic Exception"); throws ArithmeticException;
- throw keyword is used to method body, while throws is used in method signature to declare the exception.

Both of them are two keywords related to Exception feature of Java. As I remember the main difference between throw and throws is in their usage and functionality.

- throws is used in method signature to declare Exception possibly thrown by any method, for example

```
public void shutdown() throws IOException{
    throw new IOException("Unable to shutdown");
}
```

But throw is actually used to throw Exception in Java code.

```
Throw new Exception("is Not able to initialized");
```

In other words; throws keyword cannot be used anywhere exception method signature while throw keyword can be used inside method or static initializer block provided sufficient exception handling.

Oh, I remember one other thing about throw, throw keyword can also be used to break a switch statement without using break keyword

### 32. Difference between Object and Class?

- Class is a blueprint or template which you can create as many objects as you like Object is a member or instance of a class
- Class is declared using class keyword, Object is created through new keyword mainly.

A class is a template for objects. A class defines object properties including a valid range of values, and a default value. A class also describes object behavior. An object is a member or an "instance" of a class and has states and behaviors in which all of its properties have values that you either explicitly define or that are defined by default settings.

Class - A class can be defined as a template/blueprint that describes the behavior/state that the object of its type support.

If we compare them there are many differences but let me tell you some of them which are important to know;

- There are many ways to create object in java such as new keyword, newInstance() method, clone() method, factory method and deserialization. There is only one way to define class in java using class keyword.
- Object is created many times as per requirement. Class is declared once.
- Object is an instance of a class. Class is a blueprint or template from which objects are created.
- Object is a physical entity. Class is a logical entity.

**For Example:** Class: Human Object: Man, Woman

Class: Fruit Object: Apple, Banana, Mango, Guava wtc.

Class: Mobile phone Object: iPhone, Samsung, Moto

Class: Food Object: Pizza, Burger, Samosa

### 33. StringBuffer and StringBuilder?

- The main difference is StringBuffer is synchronized while StringBuilder is non-synchronized. So, StringBuilder can be called simultaneously. And this makes StringBuilder more efficient.
- StringBuffer is synchronized, StringBuilder is non-synchronized
- StringBuilder is more efficient than StringBuffer
- Constructor;
  - `StringBuilder()` → created an empty string with the initial **capacity of 16**.
  - `StringBuilder(str str)` → created an StringBuilder the specified string.
  - `StringBuilder(int length)` → created an empty string with the specified capacity as length.
- Method;
  - `StringBuilder str = new StringBuilder("Hello");`
  - `str.append("Java");` → //Hello Java
  - `str.insert(1,"Java");` → //HJavaello
  - `str.replace(1,3,"Java");` → //HJavaalo
  - `str.delete(1,3);` → //Hlo
  - `str.reverse();` → //olleH

```
string str = "Hello";
string reversed = " ";

for (int i = str.length()-1; i>=0 ; i--){
    reversed += str.charAt(i);
}
sysout(reversed);
```

### 34. What is **finalize()**?

- `finalize()` method is a protected and non-static method of `java.lang.Object` class.
- This method is available in all objects that we create in java.
- This method is used to perform some final operations or clean-up operations on an object before it is removed from the memory.
- We can also override the `finalize()` method to keep those operations we want to perform before an object is destroyed. It can be called. `object.finalize();`

### 35. What is **system.gc()**?

- A request to JVM to run Garbage collector to free up memory
- Doesn't always work

The `java.lang.System.gc()` method runs the garbage collector. Calling this suggests that the Java Virtual Machine expend effort toward recycling unused objects in order to make the memory they currently occupy available for quick reuse. It is not a command but is a request. It is up to garbage collector to honor this request

### 36. What is the method?

- Collection of statements that are grouped together to perform an operation. When you call the **`System.out.println()`** method, for example, the system actually executes several statements in order to display a message on the console.
- A method is a set of code which is referred to by name and can be called (invoked) at any point in a program simply by utilizing the method's name. Think of a method as a subprogram that acts on data and often returns a value. Each method has its own name.

### 37. Important String Methods?

Method	Description
<a href="#">char charAt(int index)</a>	returns char value for the particular index
<a href="#">int length()</a>	returns string length
<a href="#">String substring(int beginIndex)</a>	returns substring for given begin index
<a href="#">String substring(int beginIndex, int endIndex)</a>	returns substring for given begin index and end index
<a href="#">boolean contains(CharSequence s)</a>	returns true or false after matching the sequence of char value
<a href="#">boolean equals(Object another)</a>	checks the equality of string with object
<a href="#">boolean isEmpty()</a>	checks if string is empty
<a href="#">String concat(String str)</a>	concatinates specified string
<a href="#">String replace(char old, char new)</a>	replaces all occurrences of specified char value
<a href="#">String replace(CharSequence old, CharSequence new)</a>	replaces all occurrences of specified CharSequence
<a href="#">static String equalsIgnoreCase(String another)</a>	compares another string. It doesn't check case.
<a href="#">String[] split(String regex)</a>	returns splitted string matching regex
<a href="#">String[] split(String regex, int limit)</a>	returns splitted string matching regex and limit
<a href="#">String intern()</a>	returns interned string
<a href="#">int indexOf(int ch)</a>	returns specified char value index
<a href="#">int indexOf(int ch, int fromIndex)</a>	returns specified char value index starting with given index
<a href="#">int indexOf(String substring)</a>	returns specified substring index
<a href="#">int indexOf(String substring, int fromIndex)</a>	returns specified substring index starting with given index
<a href="#">String toLowerCase()</a>	returns string in lowercase.
<a href="#">String toLowerCase(Locale l)</a>	returns string in lowercase using specified locale.
<a href="#">String toUpperCase()</a>	returns string in uppercase.
<a href="#">String toUpperCase(Locale l)</a>	returns string in uppercase using specified locale.
<a href="#">String trim()</a>	removes beginning and ending spaces of this string.
<a href="#">static String valueOf(int value)</a>	converts given type into string. It is overloaded.

### 38. What's the difference between IS-A and HAS-A relationship?

- **IS-A** is based on inheritance → This thing is a type of that thing
- **HAS-A** relationships are based on usage
  - Ex: class A HAS -A B if code in Class A has a reference to an instance of class B

```
public Horse{
    private Halter myHalter;
    public void jump(){
        Sysout "im jumping"
```

- You are calling a Halter instance variable to use jump method that is coming from horse class - what this does is that it is means that Horse HAS-A Halter
- Horse class has a Halter, because Horse declares an instance variable of type Halter. When code invokes tie() on the Horse object's Halter instance variable -}
- Abstract class have constructors while interface don't have one

### 39. What is Iterator and difference between for each loop?

- Iterator works with ArrayList and not array.
- It will help us Iterate through the elements.
- Difference is with iterator you can make changes(remove item) to the list while iterating.
- within for each loop we cannot make changes to our list

#### 40. Java Collection Framework

Two types of Collection (Be careful not to mix them up)

★ **java.util.Collection** - interface from Set and List extend (not implement)

★ **Set** (*Unique things*) - DOES NOT ALLOW DUPLICATES. Classes that Implement Set;

- ◆ **HashSet** → Use when you don't want any duplicates and you don't care about order when you iterate through
  - Unordered and Unsorted
- ◆ **LinkedHashSet** → Ordered version of HashSet and Use over HashSet when you care about iteration order
- ◆ **SortedSet**
- ◆ **TreeSet** → Elements will be in ascending order, according to the natural order of the elements
  - Can also customize constructor to implement your own rules of the natural order

★ **List** (*list of things*) - cares about the index. Classes that implement List;

- ◆ **LinkedList** → Ordered by index position and elements are doubly-linked to one another
  - It is a good choice for implementing stack and queue
  - Iterates more slowly than ArrayList but fast insertion and deletion
- ◆ **Vector** → Same as ArrayList BUT vector methods are synchronized (thread-safe)
- ◆ **ArrayList** → Fast iteration and Fast random access and ordered(by index)
  - Also unsorted (but can invoke Collections.sort() to sort it)

★ **java.util.Collections** - a class that holds static utility methods for use with collections; Includes add, remove, contains, size, and iterator, etc.

• **Map** (*things with unique ID*) → Important: none of the Map-related classes and interfaces extend from Collection. The implementation classes of Map are thought of "collections", not Collection. Classes that implement Map;

◆ **Hashtable**

- Same as HashMap BUT Hashtable methods are synchronized (REMEMBER. ONLY METHODS ARE SYNCHRONIZED, NOT CLASSES OR VARIABLES)
- Hashtable won't let you have anything NULL(NO NULLS AT ALL)

◆ **LinkedHashMap**

- Maintains insertion order(or optionally, access order)
- Slower than HashMap for adding/removing elements but FASTER ITERATION

◆ **HashMap** → Unsorted and Unordered & Allows one null KEY and multiple null values in a collection

- KeySet()
- Map.keySet() - returns a set of Keys
- Map.keySet().size - return # of keys

◆ **SortedMap** → TreeMap

• The implementation classes of Set,List, and Map can NEVER be both sorted but unordered, can be all other combinations.

#### 41. How to convert float to String?

```
float f = Float.parseFloat("25");
String s = Float.toString(25.0f);
```

#### 42. Let's say you have an "int b=3; and int a=4;" how can you swap them?

```
// one-line methods
a = a ^ b ^ (b = a);
b = (a + b) - (a = b);
a += b - (b = a);

int temp = a; // temporary variable
a = b; b = temp;
```

#### 43. Do you know typecasting? What is casting?

- **Auto-boxing** → is a process when you take a primitive value and assign into wrapper class object `int i=10;`

```
Integer n=i;
Integer num=200;
Integer num2=new Integer(400);//NO BOXING
```

- **Un-boxing** → is a process when you take Wrapper class object and convert to primitive.

```
Integer num2=new Integer(400);
Integer num=200;
int i=num2;
```

- Assigning a value of one type to a variable of another type is known as Type Casting.

#### 44. What is the output for this program?

```
for (int i = 0; i < 3; i++) {
    for (int j = 3; j >= 0; j--) {
        if (i == j)
            continue;
        System.out.println(i + " " + j);
    }
}
```

Output: 1 0 2 3 2 1 2 0

#### 45. How do you use an abstract class in your project give me an example?

- These concepts are commonly used in framework development. Abstract class is used in defining a common super class while writing Page Object Model layer of the framework. We usually create an abstract class named `BasePage` to have all common members for every page written in this class example `getPageTitle()`.
- Then each Page class (`HomePage`, `LoginPage`, `DashboardPage` etc.) inherit from `BasePage`. Sometimes one may need to change the behavior of methods implemented in superclass. So, subclass has freedom to override that method where we use polymorphism. This is how we use Abstract class in real projects.

#### 46. What is the difference between pass-by-value and pass-by-reference? pass by value & pass by reference?

- Passing by value means that the value of the function parameter is copied into another location of your memory, and when accessing or modifying the variable within your function, only the copy is accessed/modified, and the original value is left untouched. Passing by value is how your values are passed on most of the time.
- Passing by reference means that the memory address of the variable (a pointer to the memory location) is passed to the function. This is unlike passing by value, where the value of a variable is passed on. In the examples, the memory address of `myAge` is `106`. When passing `myAge` to the function `increaseAgeByRef`, the variable used within the function (`age` in this example) still points to the same memory address as the original variable `myAge` (Hint: the `&` symbol in front of the function parameter is used in many programming languages to get the reference/pointer of a variable).



# SELENIUM

## 1. What is Selenium and what is composed of?

- Selenium is a suite of tools for automated web testing. It is composed of;
  - Selenium IDE(Integrated Development Environment); a Firefox plugin that works for recording and playing back.
  - Selenium RC(Remote Control) (1.0) ; is a test tool and is used to work on JS to automate the web application. (2004)
  - WebDriver (2.0); is a web automation framework and allows you to execute your tests in different browsers. (2011)
  - Selenium Grid; allows tests to run in parallel across multiple machines.

## 2. What are the advantages of Selenium?

- Selenium is open source and free to use without any licensing cost
- It supports multiple languages like Java, Ruby, Python, C#...
- It supports multi-browser testing
- It has a good amount of resources and helping community
- It supports many operating systems like Windows, Mac, Linux ...
- Interact with the web application

## 3. What are the disadvantages of Selenium?

- Selenium supports only web-based applications, does not support windows-based application
- No built-in reporting tool, it needs third party tools for report generation activity
- Cannot work with graphics, captchas, barcodes, shapes
- It does not support file upload facility.
- Hard to master, requires developer level knowledge
- Hard to write good locators
- Hard to synchronize

## 4. What are the limitations of Selenium?

- We cannot test desktop application
- We cannot test web services
- Ewe have to use external libraries and tools for performing tasks like testing framework (TestNG, JUnit), reading from external files (Apache POI for excel)
- Automating Captcha is not possible using Selenium
- It does not support file upload facility.

## 5. What types of testing you automate with Selenium?

- functional tests (positive/negative, UI)
- smoke tests
- regression tests
- integration tests
- end to end testing
- data driven

## 6. What we don't do with selenium?

- Performance, load, stress testing, manual ad hoc testing, (These tests are done by experts trained in these tools)
- Pure database testing (if we only test the DB itself),
- Unit tests..., look and feel based testing (color, shapes, etc.),
- static testing

## 7. What is in the Selenium tool set?

- Selenium IDE → implemented as a Chrome and Firefox extension, and allows you to record, edit, and debug tests.
- Selenium RC → to write automated web application UI tests in any programming language
- Selenium WebDriver → execute your tests against different browsers
- Selenium GRID → run your tests on different machines against different browsers in parallel.

## 8. What version of Selenium do you use right now?

- JDK (JAVA) - 1.8 → I like it because of → Lambda exp. and, Try catch error handling you may add multiple catches.
- IntelliJ - 2018.03.04
- Selenium - 3.141.59
- TestNG - 6.14.3
- Cucumber – 4.2.6
- Maven - 3.6.0
- GIT - 2.17.2

## 9. Implicit Wait vs Explicit Wait?

- **Implicit wait** is a wait which waits for a specified time while locating an element before throwing "NoSuchElementException". As by default selenium tries to find elements immediately without any wait. So, it is good to use implicit wait. This wait applied to all elements of the current driver instance.
- **Explicit wait** is a wait which is applied to a particular webelement until the ExpectedCondition specified is met.
- Implicit wait is simply; if condition is met before the timeout, it will continue to next step, if condition is not met within timeout throw "No Such Element" exception.
- Explicit wait sometimes we need to wait for a certain event/condition such as element is visible, clickable, enabled....

```
driver.manage().timeouts().implicitlyWait(5, TimeUnit.SECONDS);
WebDriverWait wait = new WebDriverWait (driver, 5);
wait.until (ExpectedConditions.visibilityOf(element));
```

## 10. What is fluentWait?

- Let's say you have an element which sometime appears in just 1 second and some time it takes minutes to appear. In that case it is better to use fluent wait, as this will try to find element again and again until it find it or until the final timer runs out. Example is AJAX or JQuery
- Subtype of explicit wait but you can override the conditions

```
Wait<WebDriver>wait=new
FluentWait<Webdriver>(driver).withTimeout(5,timeUnit.seconds).pollingEvery(100,timeunit.
milliseconds).ignoring(NoSuchElementException.class);
```

## 11. What are various ways of locating an element in Selenium?

- Selenium Locators → Id & name
- In selenium locator is a means of finding an element in the html :
- Id, name, className, xpath, css, linkText, partialLinkText, tagName

## 12. Why I cannot find element?

- Locator changed
- There is an iframe
- Waiting time:: page is loading slowly or Element is dynamic:: locator
- Page is not fully loaded/opened
- Page changes and that element does not exist anymore



### 13. How to highlight an element?

- Selenium WebDriver doesn't have highlight action.
- But we can use JavaScript to do it

```
JavaScriptExecutor js = ((JavaScriptExecutor) driver);
String bgcolor = element.getCssValue("backgroundColor");
for(int i=0; i< 10; i++){
    changeColor("rgb(0,200,0)",
    element, driver); //1
    changeColor(bgcolor,
    element, driver); //2
}
```

### 14. What is Xpath?

- Xpath is used to find the location of any element on a webpage using html structure.
- We could navigate through elements and attributes in an XML document to locate web Elements such as textbox, button, checkbox, Image ext... in web Page

### 15. Absolute (/) and Relative (//) Xpath?

- Syntax → //tagname[@attribute=`value`]
- Absolute xpath starts with single slash (/), starting from root element and all the way to the element.
- Relative xpath starts with double slash (//), starting selection matching anywhere in the document.

### 16. How do you handle dynamic elements?

- Find the static part of the id and write a locator(xpath or css) → And then use Startswith, contains, EndsWith
- contains() → //\*[contains(@name=`btn`)]
- startwith() → //label[startwith(@id, `message`)]
- text() → //td[text() = `usedId`]
- or & and → //input[@type = `submit` AND @name = `login`]

### 17. How to test dynamic web page?

- There is no one size fits all solution to this problem. We have to understand the application very well
  - Use explicit waits where necessary.
  - Use custom xpaths and css locators
    - Xpath: contains, starts with, ends with, contains text.
    - By finding the element in relation to another stable element using parent, child, sibling relationships

### 18. How to test dynamic table?

- Use custom xpaths and css locators
  - Xpath: contains, starts with, ends with, contains text.
  - By finding the element in relation to another stable element using parent, child, sibling relationships
- I have utility methods that work with table. I have method that takes a table webelement and returns all the column names. I have a method that takes a table, number and returns all the data in that row.

### 19. How can we move to parent element using xpath?

- Using (..) expression in xpath, we can move to parent element

### 20. Difference between close() and quit() command?

- driver.close() → used to close the current browser
- driver.quit() → used to close all the browser instances

## 21. How can we move to nth child element using xpath?

- **There are two ways:**
  - using square brackets with index position  
For ex: `div[2]` will find the second div element
  - using position ( ) method  
For ex: `div[position()=2]` will find the second div element

## 22. Difference between xpath and css selector?

- with xpath, we can search elements backward or forward... while css works only in forward direction
- Xpath can work with text, css cannot work
- Xpath has more combination and can search by index  
css cannot search by index, but css is working faster than xpath.

## 23. What is framework?

- In test automation, framework is the blueprint of test automation.
- It includes your folder structures, where to save you function library, test results, test data, resources.
- It is essential because when you are working on a automation project everyone will have a guideline to follow and our script will be easier to maintain.

## 24. Talking about HTML reporting during the interview?

- I use multiple methods of reporting in my framework, driver script writes pass/fail to the test cases excel sheet,
- Reporter utility object writes to UFT report, also I have developed a custom HTML reporting engine.
- It sends HTML code to the Notepad and creates a nice HTML report document that nontechnical people can easily understand and use.

## 25. How to maximize a web page?

```
driver.manage().window().maximize();
```

## 26. In some cases, maximize() will not work > so what will be the way around?

- Actions or change version.

```
ChromeOptions options = new ChromeOptions();  
options.addArguments("startmaximized");
```

## 27. What is the key class in Selenium?

- Gives us option for pressing keys from keyboard
- `Key.ENTER`
- **MUST BE PASSED TO SendKeys() method**
- Ex: `.sendKeys("charger" + keys.ENTER)`

## 28. What if there is a dynamic popup that comes up randomly

- Use try/catch with alert

## 29. What is Thread.sleep()?

- Slows down selenium to catch up
- Throws exception so must handle it or throw it

### 30. What is Selenium Framework?

- It is a code structure that helps to make code maintenance easy, code readability and code reuse.
- There are mainly 3 type of frameworks created by Selenium WebDriver to automate test cases:

#### Data Driven Framework

- It is one of the most popular automation frameworks in the market
- All of our test data is generated from some external files;
  - excel
  - or scenario outline in feature file
  - or TestNG Data Provider
- Selenium WebDriver is a great tool to automate web-based applications. But it does not support read and write operations on excel files. Therefore, we use third party APIs like **Apache POI**

#### Keyword Driven Framework

- Keyword driven testing is a scripting technique that uses data files to contain the keywords related to the application being tested.
- Keywords are written in some external files like excel file and Java code will call this file and execute test cases.

#### HybridDriven Framework

- A combination of the DDF and KDF is commonly said to be HDF.
- Both the test data and test action are kept in external files.

### 31. How did you use overloaded Methods in Selenium?

- When asserting if two values are equal, I use → `Assert.assertEquals(actual, Expected)` from TestNG
- You can put in the parameters String, Objects, int, boolean values

### 32. Why we get NoSuchElementException?

- Check if locator is correct
- Check if timing is correct
- Check if element is hidden inside an iframe

### 33. How you handle js alerts?

- If the alert on the browser comes from JavaScript, we use the Alert class.

```
Alert alert = driver.switchTo().alert();
alert.accept();
alert.dismiss();
alert.sendKeys();
alert.getText()
```

### 34. How to handle multiple frames?

- If there are 4 frames, you have to go through each from consecutively to reach certain frame. Can't jump to the 3rd frame from 1st frame.

### 35. What is the difference between driver.get() and driver.navigate() ?

- `driver.get()` → To open an URL and it will wait till the whole page gets loaded
- `driver.navigate()` → To navigate to an URL and it will not wait till the whole page get loaded

### 36. How to handle frames in Selenium?

- Frames used to embed a html page into another
- Steps
  - Locate the iframe
  - Switch to another iframe with `driver.switchTo().frame();`  
`.frame()` → takes string, Integer, WebElement, name or id directly as parameter

```
driver.switchTo().frame(webElement);  
driver.switchTo().frame();
```

- Now you are in the 2nd frame, if you want to find an element outside of the 2nd frame (that you're currently on) throws NoSuchElementException
  - If you need to switch back to previous frame
    - `driver.switchTo().parentFrame()` → Goes one level up
    - `driver.switchTo().defaultContent()` → Goes to the very top
  - Can switch using count
    - `driver.switchTo(o)` → Counts anything that is not the default frame
- These methods might give you different results based on what browser you are using*

### 37. How you handle browser pop ups?

- **void dismiss()** → clicks on the "Cancel" button as soon as the pop-up window appears.
- **void accept()** → clicks on the "Ok" button as soon as the pop-up window appears.
- **String getText()** → returns the text displayed on the alert box.
- **void sendKeys(String stringToSend)** → enters the specified string pattern into the alert box.

### 38. How you handle windows/ OS pop ups?

- Selenium doesn't support windows-based apps, it is an automation testing tool that supports only web application testing.
- We could handle windows-based popups in Selenium using some third-party tools such as AutoIT, Robot class
- **driver.getWindowHandle();** This will handle the current window that uniquely identifies it within this driver instance.
- **driver.getWindowHandles();** To handle all opened windows

### 39. How to handle Headless browser

- Headless browser: browser that does not open, it runs as a background service / program.
- Example is `htmlunitdriver` from selenium
  - `WebDriver = new htmlunitdriver()`
  - Not very stable
- `Phantomjsbrowser`
  - More stable
  - `browser = new phantomjsbrowser()`

### 40. findElement vs findElements?

- `findElement` > this method returns first `WebElement` !
  - gives Exception if the element not found
- `findElements` > returns `List <WebElement>`;
  - does not give Exception if the element not found as a result list has null values

#### 41. How to handle multiple windows/tabs?

- Selenium stays on one window
- If you open a window and then 5 tabs popped open, selenium is focused on the first window
- If you are on a new window and you tell selenium to print an element on the default window, it will still work even that user's focus is on the new window
- Must switch to new window
  - Use `windowHandle()`
  - `Driver.getWindowHandle()`
    - Everytime Selenium opens a browser, it's going to give an index ID for the page called Handles
    - Returns the handle/id of current page (as a string)
  - `driver.switchTo().window(string handle)`
  - `driver.getWindowHandles()` for multiple windows
    - Returns a Set of window handles
  - Switch using titles

```
for(string handle: driver.getWindowHandles()){
    driver.switchTo().Window(handle)
    if(driver.getTitle().equals(targetTitle){
        break;
    }
}
```

#### 42. How to find all links in the page?

```
List<WebElement> list = driver.findElements(By.tagName("a"));
```

#### 43. Difference between `isDisplayed()`, `isEnabled()`. And `isSelected()` method in selenium WebDriver?

- `isDisplayed()` → verify the presence of a web element within the web page. If found → true, If not found → false
- `isDisplayed()` → check for the presence of all kinds of web elements available
- `isEnabled()` → verify if the web element is enabled or disabled within the web page.
- `isEnabled()` → is primarily used with buttons
- `isSelected()` → verifies if the web element is selected or not
- `isSelected()` → used with radio buttons, dropdowns and checkboxes.

#### 44. How to Drag And Drop ?

```
Actions action = new Actions(driver);
action.clickAndHold(driver.findElement(By.id("item")))
.moveToElement(driver.findElement(By.id("destination")))
.release().build()
.perform();
```

#### 45. For Scroll down:

```
WebDriver driver = new ChromeDriver(); JavascriptExecutor jse = (JavascriptExecutor)driver;
jse.executeScript("window.scrollTo(0,250)", "");
```

- OR, we can do as follows:

```
jse.executeScript("scroll(0, 250);");
```

#### 46. For Scroll up:

```
jse.executeScript("window.scrollTo(0,-250)", ""); OR, jse.executeScript("scroll(0,-250);");
```

#### 47. How to check if element is present/visible/enable/ and to check text present?

- To check Element Present:

```
if(driver.findElements(By.xpath("value")).size() != 0){
    System.out.println("Element is Present");
}else{
    System.out.println("Element is Absent");}
```

- or

```
if(driver.findElement(By.xpath("value"))!= null){
    System.out.println("Element is Present");
}else{
    System.out.println("Element is Absent"); }
```

- To check Visible:

```
if(driver.findElement(By.cssSelector("a > font")).isDisplayed()){
    System.out.println("Element is Visible");
}else{
    System.out.println("Element is InVisible"); }
```

- To check Enable:

```
if(driver.findElement(By.cssSelector("a > font")).isEnabled()){
    System.out.println("Element is Enable");
}else{
    System.out.println("Element is Disabled"); }
```

- To check text present

```
if(driver.getPageSource().contains("Text to check")){
    System.out.println("Text is present");
}else{
    System.out.println("Text is absent"); }
```

#### 48. Do you use JavaScriptExecutor?

- This helps me write my own JavaScript. JS has way more control than selenium.
- we can send JS commands to the browser with using this class  
JavaScriptExecutor jsExecutor=(JavaScriptExecutor)driver;
  - executeScript(); performs the command
  - Inside the parameter is where you put JS code
- jsExecutor.executeScript("alert('WARNING: This is a useless message');" → This code will bring up a JS popup
- You can also put 2 parameters is .executeScript("js code",element);
  - Used for scrolling (selenium is not good with scrolling, you can say a challenge is when I was working on terms and condition page, where you have to read the page before clicking on continue.
  - When I tried using selenium and actions class it didn't work, so i used javaexecutor ) and clicking an element;

#### 49. How check the multiple selected values in dropdown?

- Select carsList = new Select(el)
- carList.getSelectedOptions(): //returns the the selected options a list ( List<webelement>)
- for each : carList.getSelectedOptions()

## 50. How to use actions class?

- Actions class lets us do advanced mouse and keyboard operations:
- Control the mouse
- Class that provides methods for advanced user interactions
  - Hovering
  - Double click
  - Right click
  - Scroll
  - Drag and drop
  - mix/match operators
- Actions action=new Actions(driver)
- Action methods
  - click()
  - hold()
  - moveToElement(element)
  - perform()
  - keydown()build()
  - dragAndDrop(source,target).perform()
  - sendKeys() different from the one we usually use
    - Let's you do the sendkeys operation on different elements
    - Regular sendkeys that comes from WebElement will throw an exception on something that is not input text.
    - The long way is;  
actions.moveToElement(source).clickAndHold().moveToElement(target).release().perform();
- Actions won't work unless perform() is used
- If you are chaining methods, you must use build() before perform()

## 51. What is the syntax for double click action ?

- To perform any actions against web element using actions class, we need to locate the element first:

```
WebElement e1 = driver.findElement
Actions actions = new Actions (driver).perform actions.doubleClick(e1).perform()
actions.moveTo(e1).perform actions.doubleClick.perform
actions.moveTo(e1).doubleClick().build.perform()
```

## 52. File download and upload

- **Download**
  - Selenium itself cannot verify file downloads, can click on download link but can't go outside the browser and open the downloaded file
  - Other tools need to be used for that Robot and AutoIT
- **Upload**
  - Selenium handles the upload, but does it differently compared to actual user
  - Steps
    - Find the element that triggers the upload window
    - Find the path of the file you want to upload
      - Store into a String
        - Ex: String → file="C:\\Users\\Andy\\Desktop\\folder1\\file.key";
        - Then driver.findElement(upload button).sendKeys(file);

## 53. How check the selected value in dropdown?

```
Select carsList = new Select(e1)
carList.getFirstSelectedOption()
assertEquals("some text",carList.getFirstSelectedOption().getText() )
```

#### 54. How to work with dropdown without the select tag?

- If the dropdown list has no select tag, we cannot use the select class
- Treat the dropdown list and its options as separate elements, locate every element separately
- To select an option:
  - 1. Find and click on the list
  - 2. Find and click on the option

#### 55. What if there's no select tag?

- You have to select the label for the dropdown separately as a webelement.
- Then manually use click method

#### 56. What is the syntax for switching frame ?

- Frame is a html document inside another html document.
- Web driver handles one page/html document at a time. To control another frame, we always need to switch
- `Driver.switchTo.frame(webelement)` → find the iframe and pass as a param
- `Driver.switchTo.frame(string)` → find the id or name of the iframe and pass as a param
- `Driver.switchTo.frame(int)` → find the index and pass as a param

#### 57. Sometimes sendKeys does not work

- Robot or AutoIT
- library==jar file==dependency

#### 58. What is the syntax for switching windows ?

- To handle separate tabs/windows we have to switch to that tab
- Web driver handles one page/html document at a time.
- To control another tab, we always need to switch
- To be able switch we need to get the window handle first using

```
getWindowHandles() method driver.switchTo.window(String) // → window handle
//for each loop : driverGetWindowHandles:
Driver.switchTo.window("handle")
Ifdriver.getTitle==expectedtitle;
Break;
```

#### 59. What is the syntax for uploading a file?

```
Public void fileUpload(Stirng path){
    WebElement upload = driver.findElement; Upload.sendKeys(path)
}
```

- We need to locate the upload button in html.
- The element will have tag input.
- Then we do sendKeys by passing the path to file which we want to upload

#### 60. Sometimes sendKeys/path does not work

- Building a dynamic path for a file inside our project Path to the project location:

```
String projectDir= System.getProperty("user.dir") // project directory
String file= "src/test/resources/test_data/myfile.txt";
Element.sendKeys(projectDir+file);
```



### 61. How to input text in the text box without calling the sendKeys()?

```
//Use javascriptExecutor
JavascriptExecutor JS = (JavascriptExecutor)webdriver;
//To enter username
JS.executeScript("document.getElementById('User').value= 'www.google.com'");
//To enter password
JS.executeScript("document.getElementById('pass').value= 'tester'");
```

### 62. How to press ENTER key on text box in Selenium WebDriver?

- To press Enter key using Selenium WebDriver,
- We need to use Selenium Enum keys with its constant Enter
- `Driver.findElement(By.xpath("xpath")).sendKeys(Keys.ENTER);`

### 63. Have you done any cross-browser testing? cross browser testing

- Always mention that you have a control file for keywords like browser type, main url, username, password, environment.

### 64. How you resolve certification issue?

- CHROME, IE → DesiredCapabilities capability = `DesiredCapabilities.chrome();`
- on Jenkins we need to insert → `.relaxedHTTPSValidation`

```
Response response=RestAssured.given()
    .contentType(ContentType.JSON)
    .relaxedHTTPSValidation()
    .get("https://api.got.show/api/continents");
System.out.println(response.asString());
```

### 65. How would you verify the position of the Web Element on the page?

- `element.getLocation();`
- WebElement class has a get Location method with returns the top left corner of the element

### 66. Page Factory class?

- Page Factory class comes with Selenium.
- And it is used whenever we create page object classes.
- Its purpose is to initialize webElements that were defined in the class.

### 67. Explain me your test execution flow with cucumber.

- Runner > Feature file > Scenario > Steps > Step def > Selenium code using POM

### 68. What tools are you using to test UX and Restful webServices?

- UX → User Experience. First ensure UX is acceptable manually.
- After that since it is UI testing, I use Selenium WebDriver to automate it.
- RESTful API Automation > RestAssured Library, PostMan for manual tests

### 69. How To resize browser Window Using Selenium WebDriver?

- To resize the browser window to particular dimensions, we use 'Dimension' class to resize the browser window.
- `//Create object of Dimensions class`  
`Dimension d = new Dimension(480,620);`
- `//Resize the current window to the give n dimension`  
`driver.manage().window().setSize(d);`

#### 70. What exceptions do you know in Selenium?

- I often have **NoSuchElementException**
- **StaleElementException**
  - The element has been deleted entirely.
  - The element is no longer attached to the DOM.
  - How we handle StaleElementException;
    - Element is not attached to DOM → 'try catch block' within 'for loop'  
Or
    - 1. Refresh the page and try again for the same element.
    - 2. Wait for the element till it gets available
- **TimeoutException**

#### 71. ASSERT(hard assert) VS VERIFY(soft assert)

- Hard assert throws an `AssertException` immediately when an assert statement fails, and test suite continues with next `@Test`. If Assert steps fails, execution of test stops at that point! and will go to next test if present!
  - (Example: just simple `Assert.assertTrue(boolean);`)
- Soft assert collects errors during `@Test` Soft Assert does not throw an exception when an assert fails and would continue with the next step after the assert statement. If Verify steps fails, it will report a fail but will continue execution!
  - Example: `SoftAssert soft=new SoftAssert(); //for soft create object`
  - `soft.assertTrue(boolean);`
  - `soft.assertAll(); //put at the end it will report what is failing!`

#### 72. What the verification point available in Selenium ?

- In selenium IDE, We use Selenium Verify and Assert Commands as Verification points
- In Selenium WebDriver, There is no built-in features for verification points, it totally depends on our coding style. Some of the Verification points are
  - to check for page title
  - to check for certain text
  - to check for certain element(text box, button, drop down, etc.)

#### 73. Verify text exists?

- `VerifyTextPresent` → returns TRUE if the specified text string was FOUND somewhere in the page; FALSE if otherwise.
- `VerifyTextNotPresent` → returns TRUE if the specified text string was NOT FOUND anywhere in the page; FALSE if it was found.

#### 74. How do you find a text in a webpage?

- `//tagname[contains(text(),'text')]` contains certain test
- `//tagname[.='text']` contains exact text sometimes doesn't work Selenium

#### 75. How to get all the preceding siblings of Apple?

- Xpath: `"//ul/li[contains(text(),'Apple Mobiles')]/precedingsibling::li"`
- This will give "Samsung Mobiles"

#### 76. How to get all the following siblings of Apple?

- Xpath: `"//ul/li[contains(text(),'Apple Mobiles')]/followingsibling::li"`
- This will give all the preceding siblings ( Nokia Mobiles, HTC Mobiles, Sony Mobiles, Micromax mobiles)

## 77. How to handle Web Tables/grid?

- Table tag used for table data is arranged in a grid format
  - th tag for column name Example –

```
<tr>
  <th>FirstName</th>  column names on the very top row
  <th>Lastname</th>
  <th>Age</th>
</tr>
```

- </tr> tr tag used to indicate a row, applies to whole column td tag to indicate a column in a row Example

```
<tr>
  <td>Danny</td>  actual_data_on_the_very_first_row
  <td>Smith</td>
  <td>29</td>
</tr>
```

- Some tables have tbody Used to indicate the data of the table, usually does not include column names ( th )

## 78. How to use Excel?

```
FileInputStream ExcelFile = new FileInputStream(path);
excelWorkbook = new XSSFWorkbook(ExcelFile);
excelWorksheet = excelWorkbook.getSheet(sheetName);
cell = excelWorksheet.getRow(rowNum).getCell(colNum);
```

## 79. How do you like Selenium version 3? Is Selenium 3 drastically different from Selenium 2?

- Selenium 3 has bug fixes from selenium 2 also it is more mobile automation focused.
- We aim for Selenium 3 to be "a tool for user-focused automation of mobile and web apps".
- Here is the summary of the change.
  - For WebDriver users, it's more of bug fixes and drop-in replacement for 2.
  - Selenium Grid bug fixes are done as well.
  - Selenium project will not actively support only the WebDriver API.
  - By a quirk of timing, Mozilla have made changes to Firefox that mean that from Firefox 48 you must use their geckodriver to use that browser, regardless of whether you're using Selenium 2 or
  - As we know Selenium 3.0 is the latest version of Selenium Jar



# MAVEN

## 1. What is Maven?

- A build tool and command prompt tool that called POM xml file that calls my runner class and manages my dependencies
- Command Prompt mvn archetype; generate
  - Creates project
- Choose a # press enter
- Choose a # press enter
- groupId; com.nameOfProject (usually a reversed domain name, like com.example.foo)
- ArtifactID; testmavenproject
  - Version enter
  - Package enter
  - Y; enter

## 2. Why Maven? How it helps you developing your project effectively?

- answer

## 3. What is Maven Artifact?

- An artifact is a file, usually a JAR, that gets deployed to a Maven repository.
- A Maven build produces one or more artifacts, such as a compiled JAR and a "sources" JAR.
- Each artifact has a group ID (usually a reversed domain name, like com.example.foo), an artifact ID (just a name), and a version string. The three together uniquely identify the artifact. Example:

```
<groupId>org.seleniumhq.selenium</groupId>  
<artifactId>seleniumjava</artifactId>  
<version>3.11.0</version>
```

- A project's dependencies are specified as artifacts.

## 4. Explain me the maven lifecycle?

- Commands can only run in the same directory where the specific **pom xml** file is located
- 3 built in build lifecycles
  - Default → Handles your project deployment
  - Clean → Handles project cleaning
  - Site → Handles creation of project's site documentation

## 5. A build lifecycle is made up of phases

- Validate → Validate the project is correct and all necessary information is available
- Compile → Run the source code of the project (checking if there is any error or not, if not → build success)  
→ Target folder is created, and Reports will be stored here
- Test
  - Test the compiled source code using a suitable unit testing framework.
  - Should not require the code to be packaged or deployed
  - Mvn D(VariableName) = testname → Run specific tests based on the parameter
- Package → Take the compiled code and package it in a distributed format, like JAR
- Verify → Runs any checks on results of integration tests to ensure quality criteria are met
- Install → Install the package into local repo, for use as dependency
- Deploy → Done in the build environment, copies the final package to the remote repository for sharing with other devs and projects

## 6. How do you convert maven project to eclipse project?

- Mvn eclipse

## 7. How java projects are made?

1. Create folders/packages
2. Add libraries/dependencies
3. Create class files
4. Compile
5. Run tests
6. Deploy

## 8. Where do you find your dependencies/libraries?

- Mvnrepository.com
- Update project if maven not working
  - When you have dependencies inside your pom file and you use update, maven will pull the JAR files from internet and add it to your project

## 9. What is .m2 folder?

- Where your jar files/repositories are saved in your computer

## 10. What is POM xml file?

- A file that manages the whole project
- When you run a maven command, everything should be done through the pom.xml

## 11. Versions of tools?

- RestAssured 3.3.0 release date: 2019-01-11

## 12. Log4j?

- Used by any application
- Example: LOG4J2 → From Apache
- Records activity
- Dev will look at the logs, look at the time, go to the IP address and see what going on if there was a bug
- Loggers are very important part of applications and it keeps each step/event happened with timestamp
- Normally logs are written programmatically into .log file
- There are ready tools/libraries to add to any framework or application.
- In java, the most famous logging library/framework is LOG4J from apache

## 13. Purpose of logs?

- Help us debug the issues that you may have with application.
- Sometimes when a bug is found in application, developers firstly check the logs. In order to see which steps the user was taking and application did not behave as expected.
- Logs MAY help you find the source of the problem (in application perspective, not testing)

## 14. What is the role of logs in Test automation?

- • We are looking at console or html report to see the status of our test runs. If anything fails, we find from there.
- • If we implement logging into our framework, it will be another way of looking at automation execution steps and will help us find the problem whenever our test fails



# TESTNG & JUNIT

## 1. What is TestNG?

- You have 500 test cases → We create a Java Package and 500 Class for each test cases  
Client asked you run only 40 of them for smoke test → We handle it in Jasmine with it blocks and reporting mechanism.
- TestNG is a testing framework
- Centralized controller: manage run different test cases then create reports, logs
- Batch execution: 100 test cases and run them one by one
- Optional execution: we can skip some test cases

## 2. What is assertions in TestNG?

- We run the test and title test case failed. It will not affect the other test cases, so we don't want our script to stop.
  - Critical → stop/failure Assert
    - It takes one boolean argument and String message. It Asserts that a condition is true. If it isn't, an AssertionError, with the given message, is thrown.
  - Non critical → failure/continue SoftAssert
    - Soft Assert does not throw an exception when an assert fails and would continue with the next step after the assert statement.

## 3. Difference between JUnit and TestNG

- Annotations; **JUnit**: @Test, @BeforeClass, @AfterClass, @Before, @After, @Ignore  
**TestNG**: @Test, @BeforeTest, @BeforeClass, @BeforeSuite, @BeforeMethod, @AfterTest, @AfterClass, @AfterSuite, @AfterMethod

- Both are testing framework to help us running automation scripts.
- TestNG provide html report
- TestNG has @DataProvider annotation same as Cucumber Scenario Outline for Data Driven Testing.
- In TestNG, we can do parallel testing, but JUnit doesn't support to parallel test, so we use sauceLab for it.
- TestNG support group test but JUnit doesn't support
- TestNG and JUnit both of them have parameterize testing but TestNG parameterized test configuration is very easy to configure. There are two ways to achieve parameterization in TestNG;
  - @Parameters and TestNG xml file
  - @DataProvider

FEATURE	JUNIT	TESTNG
Purpose	General unit testing	Focus on Integration testing for Enterprise projects
IDE support	yes	Yes
Maven support	yes	Yes
setup/teardown for test	@Before / @After	@BeforeMethod / @AfterMethod
setup/teardown for class	@Before / @After	@BeforeClass / @AfterClass
setup/teardown for suite	no	@BeforeSuite / @AfterSuite
setup/teardown for test groups	no	@BeforeGroups/ @AfterGroups
setup/teardown for test	in annotations	In annotations and/or XML file
Parameterised tests	Yes, but in a limited way	Yes
Test groups	Yes with Categories (new feature)	Yes
Test for Exceptions	Yes	Yes
Timeouts in tests	Yes	Yes
Test order	Non-Deterministic or alphabetical	Can be defined in detail with dependencies
Dynamic test input	No	Yes with DataProviders
Can run tests of the other library	No	Yes, TestNG can run JUnit tests
Assumptions before running a test	Yes	No
Dependency injection for tests	No	Yes, with Google Guice
Ignore/disable test	Yes	Yes
Parallel testing	No	Yes
Test listeners	No	Yes
Test reporters	No	Yes

#### 4. Cross Browser and Parallel Test

- In my current project, we use sauceLab for cross browser testing. But my previous project I used testng.xml file.
- Basically, inside the suite there are 3 keys (name, thread count, parallel) and I created 2 different tests, one of them is for Chrome and the other one is for Firefox.
- There is also parameter annotation and include name and value; name is browser and value is Chrome.

```
<?xml version="1.0" encoding="UTF 8"?>
<!DOCTYPE suite SYSTEM ...>
<suite ...>
  <test name="ChromeTest" ... >
    <parameter name="browser" value="chrome"/>
    <classes>
      <class name="testsuite..."/>
    </classes>
  </test> <! First Test >
  <test name="FireFox" ... >
    <parameter name="browser" value="FireFox"/>
    <classes>
      <class name="testsuite..."/>
    </classes>
  </test> <! Second Test >
</suite> <! Suite >
```



# CUCUMBER & GHERKIN

## 1. Tell me more about Cucumber, how did you guys decide to start using Cucumber ?

- In the past few years, more and more IT teams follow Agile methodology in their development process to adapt to the rapid changes of the market. This is also a challenge for the test team in managing test cases and test scripts which can be changed when the requirements are updated monthly. Finding a suitable testing method from the beginning is one of the keys to the success of an Agile software project.
- Many Agile teams have successfully applied Behavior Driven Development (or BDD) approach in testing process using the Cucumber tool. So, what is Cucumber? And why is it one of the good approaches in Agile projects, used together with BDD?
- Cucumber is a tool for running automated acceptance tests written in a behavior driven development style. One of its wonderful main features is the ability to execute plain text functional description (written in language named Gherkin) as automated tests. Here is an example:

```
Feature: Update password
Scenario: Admin user can update user password
Given I am in the HR system with an Admin account
When I update password of another "user"
Then I receive a message for updating password successfully
And user's password is updated to the new password
```

- This great feature has played a primary role in supporting the BDD approach with the following **advantages**:
  - Writing BDD tests in Ubiquitous language, a language structured around the domain model and used by all team members including developers, testers, BAs, etc.
  - Building bridges between the technical and nontechnical members of a software team
  - Allows interaction directly with the developers' code, but written in a language that business stakeholders can understand
  - Last but not least, Cucumber is an Automated Acceptance Test Tool which running tests written in a behavior driven development (BDD) style.
- **Cucumber Tool helps to improve communication between technical and non-technical members in a project.**

## 2. Tell me what are the most important things in Cucumber, what makes it unique ?

- Features file, Step Defs, Runner Classes, Hook Class, Tags

## 3. How to see your reports in cucumber?

- My framework generates cucumber reports folder in the target folder which contains the reports.
- When we run the tests on Jenkins, Jenkins saves the report of every run.
- Home page of the Jenkins job always points to the last run reports.
- All the reports for previous runs can be found under the build number.
- Go to target folder
- Open with system explorer
- Go to target>cucumber report>index shows the tests you ran

## 4. What is Gherkin?

- Language used by feature files
- Feature, Scenario, Given, Then, When, And, But, Background, Scenario Outline



## 5. What are the components of Cucumber BDD framework?

### 1. Feature files

- Consists of scenarios that test a certain feature or functionality
- Feature is main story while scenarios are the test cases to the story(feature)

### 2. Cukes Runner

- A class that strictly runs the tests, generates codes for step definition
- @smoketest
- Cukesrunner → IN CUCKESRUNNER I HAVE A FEATURE LOCATION THAT SHOWS WHERE MY FEATURE ARE LOCATED

### 3. Step definition

- A class that made of steps that starts with Gherkin language
- Make sure the step definition is in the same package as cukes Runner, or child package (not parent or sibling)

- FOR NON-TECH PPL TO UNDERSTAND
- DEPENDENCY BDD IS A DEPENDENCY
- MVN REPOSITORY IN THE POM.XML FILE
- CUCUMBER BDD FROM CUCUMBER.IO
- Combine techs of TDD
- Behavior driven
- Express the flow customer behavior → Don't focus on the elements

## 6. What does @CucumberOptions do?

- Tag used to customize the running of the cucumber tests
- Inside @CucumberOptions you can add:
  - dryRun
  - Plugin
    - "Pretty"
      - Adds more info in the console → Gives you tag, scenario, method info.
      - "html:target/cucumber report" → Generates html report located in target/cucumber report folder
      - "json:target/cucumber.json"
    - Tags
      - Tags must be located in feature path
      - Can add multiple tags...tags= "@Dog, @Cat"
    - Features location of where feature files are
    - Glue where to look for step definition steps. hook class is part of glue too.

## 7. How to run Cucumber with JUnit?

- Add cucumber JUnit dependency
- Adding @RunWith (Cucumber.class) on top of cukesRunner class

## 8. How to run Cucumber with TestNG?

- Add cucumber testNG dependency
- Make CukesRunner extend to AbstractTestNG CucumberTests

## 9. What happens we you run your runner class with no tags?

- All the feature files will run from top to bottom but only the feature files that are located in the @CucumberOptions "features="

## 10. What are Hooks in cucumber?

- Cucumber hook allows us to better manage the code workflow and helps us to reduce the code redundancy. We can say that it is an unseen step, which allows us to perform our scenarios or tests.
- Class that uses
  - @Before → runs before each cucumber scenario
  - @After → runs after each scenario (It will always run no matter if scenario passes or fails)
- Class must be in same package as stepdefinition
- I implemented screenshots inside hook class
- Hook Class will not run if dryRun=true
- I use Scenario as a parameter in my before/after method

## 11. How do you take screenshots in cucumber?

- In my Aftermethod I use a code:
- I use TakeScreenShot interface
- You can store screenshot as a byte or file
  - @After

```
public void tearDown(Scenario scenario) {
    if(scenario.isFailed()) {
        //taking a screenshot
        final byte[] screenshot = ((TakesScreenshot)
            Driver.getDriver()).getScreenshotAs(OutputType.BYTES);
        //adding the screenshot to the report
        scenario.embed(screenshot, "image/png"); }
}
```

## 12. How to run a Cucumber with DDT?

- I use Cucumber tables:  
[| Home | Emails | Documents | Projects |](#)
- You get the method with (DataTable arg1)
- In the parameter DataTable you can change it to  
[List<YourType>, List<List<E>>, List<Map<K,V>>, and Map<K,V>](#)
- Prints in order for list
- No order for map

## 13. What is Background?

- Cucumber has their own before method
- The one in hooks is for java
- A step that runs BEFORE a scenario inside the feature file
- Can only put on top, before all scenarios
- Cannot put pipelines in backgrounds (Only in scenario outline)

## 14. What is Scenario Outline? vs Scenario?

- Scenario in cucumber runs once.
- Used for data driven testing
- Have the same cucumber steps but we provide data after the scenario as a table using keyword examples

## 15. How do I limit the types of variables I can pass?

- In the gherkin parenthesis you can add (Collaboration | Sales | Marketing, etc.)
- Ex: @When("^I hover over the (Collaboration | Sales | Marketing | Activities | All ) menus\$")

```
public void i_hover_over_the_Collaboration_menu(String menu) {
    switch(menu) {
    case "Sales":
        BrowserUtils.hover(dashboard.sales); break;
    case "Marketing":
        BrowserUtils.hover(dashboard.marketing); break;
    case "Collaboration":
        BrowserUtils.hover(dashboard.collaboration); break;
    case "Activities":
        BrowserUtils.hover(dashboard.activities); break;
    case "All":
        BrowserUtils.hover(dashboard.all); break;};
}
```

## 16. What if you have a scenario that has two parameters (limiting parameter, table parameter)?

- Example :
  - Scenario: Verify Collaboration menu options
  - Given I logged into suiteCRM
  - When I hover over the Collaboration menu
  - Then the following menu options should be visible for Collaboration:  
| Home | Emails | Documents | Projects |
  - In this scenario i have a table, I want to limit collaboration to just collaboration and the other menus categories
- Solution:
  - @Then("^following menu options should be visible for ( Collaboration | Sales | Marketing | Activities | All ):\$")
  - public void following\_menu\_options\_should\_be\_visible\_for\_Collaboration(String menu, List<String> options) {
  - String menu represents the 5 menu options ( Collaboration | Sales | Marketing | Activities | All )
  - List<String>options represents the tables; | Home | Emails | Documents | Projects |

## 17. How do I use cucumber scenario for DDT?

- In my current project I use Scenario Outline with Examples
- In my scenario feature file, whenever I'm using a variable as a data driven I use "<variable>"
- Then in Examples:  
| variable | column name  
| data1. | row1  
| data 2 | row 2  
| data3 | row3

## 20. Data driven

- Test data is separated from code and stored into external sources: Cucumber Examples table, Excel files, CSV files, Database.
- If the amount of data is not that huge, then I use Cucumber Scenario outline with Examples table.
- And other times I maintain test data in Excel files, and I use Apache POI library to read and write data
- If data comes from a database, or I need to do database validation, I use SQL queries along with JDBC library in java.

## 18. How to use Maps in cucumber?

- Using a nonScenario Outline
- Scenario: Create contact using a map
  - Given I logged into suiteCRM
  - When I create a new contact:

first_name	John	
last_name	Smith	
cell_phone	801 888 888g	
  - Then I should see contact information for "John Smith"
  - Left side is key, and right is value 2 columns only
- Using a Scenario Outline
  - Scenario Outline: Create contact using a map
  - Given I logged into suiteCRM
  - When I create a new contact:

first_name	<first_name>	
last_name	<lname>	
cell_phone	<cell_phone>	
office_phone	<office_phone>	
  - Then I should see contact information for "<first\_name> <lname>"
  - Examples:

first_name	lname	cell_phone	office_phone	
Michael	Jackson	1234567890	2345678891	
Bonnie	Garcia	4569871234	4567890987	
- In step def I write;

```
@When("^I create a new contact:$")
public void i_create_a_new_contact(Map<String,String>contact) {
// open the create contact dialog
```

## 21. How to use POJO in cucumber?

- Create **contactBean** class
  - Add all variables
  - Add the getter/setters
- Create bean feature file
- Create a table with first row containing the variables in the contactBean class
  - Add values under the table
  - Implement method with parameter (List<ContactBean>contacts)
- Scenario: Create contact
  - Given I logged into suiteCRM
  - When I save a new contact:

firstName	lastName	officePhone	cellphone	email	
Steve	Gates	3456758888	1234329999	SteveGates123@gmail.com	
  - Then I should see contact information for "Steve Gates"

## 22. How to run a group of test case using TestNG?

```
@Test (groups={"smokeTest","FunctionalTest"})
public void loginTest(){
    System.out.println("Logged in successfully");
}
```

### 23. Data Driven Testing

- **WHEN:** Whenever a functionality or a module in an app requires testing with multiple sets of data (Parametrization), Multiple inputs then we need to perform data driven testing and automation.
- These scenarios are one of the things That must be automated.
- **HOW:** Test data is separated from code and stored into external sources: Cucumber Examples table, Excel files, CSV files, Database.
- **BENEFIT:** More organized, Data centralized, Collaboration on test data - it can come from BA, MTs etc

### 24. How can we create data driven framework using TestNG?

- By using @DataProvider annotation, we can create a Data Driven Framework

```
@DataProvider(name="getData") Public Object[][] getData(){ Object [][] data = new Object[2][2];
Data[0][0] = "firstUid"; Data[0][1] = "FirstPWD";
Data[1][0] = "SecondUid";
Data[1][1] = "SecondPWD"; Return data; }
```

### 25. How to create Group of Groups in TestNG?

- These groups are called metagroups.
- Example: you might want to define a group all that includes smokeTest and FunctionalTest.  
Let's modify our testing.xml file:

```
<groups>
  <define name="all">
    <include name ="smoke Test"/>
    <include name = "functionalTest"/>
  </define>
  <run>
    <include name = "all"/>
  </run>
</groups>
```

### 26. How to run test cases in parallel using TestNG?

- We can use "parallel" attribute in testng.xml to accomplish parallel test execution in TestNG
- The parallel attribute of suite tag can accept four values:
  - Classes → All the test cases inside a java class will run parallel
  - Methods → All the methods with @Test annotation will execute parallel
  - Instances → Test cases in same instance will execute parallel but two method of two different instances will run in different thread. <suite name="softwaretestingmaterial" parallel="methods">

### 27. How to ignore a test case in testNG?

- To ignore the test case, we use the parameter enabled = false to the
- @Test annotation @Test(enabled=false)

### 28. How to exclude a particular test method from a test case execution?

- By adding the exclude tag in the testing.xml

```
<classes>
  <class name="TestCaseName">
    <methods>
      <exclude name="TestMethodNameToExclude"/>
    </methods>
  </class>
</classes>
```

### 29. How to exclude a particular test group from a test case execution?

- By adding the exclude tag in the testing.xml

```
<groups>
  <run>
    <exclude name="TestGroupNameToExclude"/>
  </run>
</groups>
```

### 30. What are the different way to produce reports for TestNG results?

- TestNG offers two ways to produce a report
  - Listeners implement the interface **org.testng.testListener** and are notified in real time of when a test starts, passes, fails, etc...
  - Reporters implement the interface **org.testng.reporter** and are notified when all the suites have been run by TestNG.
- The IReporter instance receives a list of objects that describe the entire test run

### 31. What is the use of @Listener annotation in TestNG?

- configure reports and logging.
- widely used listeners : ITestListener interface.
- It has methods like onTestStart, onTestSuccess, onTestFailure, onTestSkipped...
- we should implement this interface creating a listener class of our own,
- Next, we should add the listeners annotation (@Listeners) in the class

### 32. What Is a Regular Expression, Regexp, or Regex?

- A regular expression is a special text string for describing a search pattern.
- You can think of regular expressions as wildcards on steroids.
- You are probably familiar with wildcard notations such as \*.txt to find all text files in a file manager.
- Regex equivalent is.\*\txt.

### 33. How to write regular expression in testing.xml file to search @Test methods containing "smoke" keyword?

- Regular expression to find @Test method containing keyword "smoke" is a mentioned below

```
<methods>
  <include name=".*smoke.*"/>
</methods>
```

### 34. What is the time unit we specify in test suites and test cases ?

- We specify the time unit in test suites and test cases is in milliseconds.

### 35. What is the use of @Test(invocationCount= someInteger)?

```
@Test(invocationCount=10)
Public void testcase(){}
```

- //the invocation count attribute tells how many times TestNG should run a test method

### 36. What is the use of @Test(threadPoolSize=someInteger)?

- The threadPoolSize attribute tells to from a thread pool to run the test method through multiple threads
- Note: this attribute is ignored if invocation count IS NOT SPECIFIED

### 37. What does the test timeout mean in testing?

- The maximum number of milliseconds a test case should take

```
@Test1(threadPoolSize=3,invocationCount=10,timeOut=10000)
public void test() {}
```

- :// in this example: the function test1 will be invoked ten times from three different threads, Additionally, a time-out often seconds guarantees that none of the threads will block on this thread forever.

### 38. What are @Factory and @DataProvider annotation?

- @Factory → executes all the test methods present inside a test class using a separate instance of the class with different set of data
- @DataProvider → a test method that uses dataProvider will be executed the specific methods multiple number of times based on the data provided by the dataProvider.

### 39. annotations - priority

- Doesn't matter what number you start Ex: @Test(priority=0)
- DependsOnMethods = "test method name" You Can add multiple test names
- If the first one fails, the 2nd test won't run at all
- If the first method failed, your report will show that the 2nd test will be skipped

### 40. parallel execution in testNG

- In xml file write.
  - parallel="tests"thread-count="4"
- Thread-count is how many browsers you want to open same time
- In xml file you can add .\* to run everything
  - Ex:<package name=".\*"></package>
- TestNG has its own reports -When you run xml, it gives you the report in test-output folder
- Contains the test report in html

### 41. Framework Tools : Cucumber BDD framework

- Junit, Cucumber Java, Maven
- Selenium, HTML reporting with screenshots Log4j,
- JDBC, Rest Assured, Apache POI, Git, Jenkins

### 42. Framework Tools: TestNG + Selenium

- Java, Maven, TestNG,
- Selenium, Extend Reports with screenshots Log4J,
- JDBC, Rest Assured, Apache POI, Git, Jenkins

### 43. How does your framework generate reports?

- Our Cucumber BDD framework generates HTML reports.
- The report shows the pass/fail coverage for feature files, tags, steps
- The report contains all the steps for each test The report has screenshots for failures

### 44. How to run tests selectively cucumber?

- tags keyword the cukesrunner
- feature keyword the cukesrunner
- tags and features can also be passed using the command line
- mvn test -Dcucumber.options="--tag @smoke"

#### 45. What do you use for logging?

- I use Log4J for logging. I always log important steps in the test execution. That helps me to debug when there is a failure.
- Log4J is not a replacement for HTML reports.

```
<dependency>
  <groupId>org.apache.logging.log4j</groupId>
  <artifactId>log4j- core</artifactId>
  <version>2.11.0</version>
</dependency>
```

#### 46. How does the FEATURE FILE WORK?

- **Feature** → description of what is being tested @tags. Sample feature file;
  - Feature: login functionality → Background:
  - Given I am on the login page → Scenario: 1, Scenario: 2
  - The background runs before both of the scenarios
- **Scenario** → description of the scenario being test
  - Given I am on the login page
  - And I enter username and password
  - When I click on the submit button
  - Then I should be able to see the profile picture
  - But the submit button should not be displayed
- **Given** → a precondition
- **When** → condition that triggers the expected result Then → expected condition

#### 47. What is test base Class ? and How do you implement in your framework ?

- Test Base class is class where I have most used methods in my tests.
- My **test classes extend** the **Test Base** class and thus have access to those methods. This helps me us **make my code reusable**
- Before/after test methods wait/synchronization utility methods.
  - **SwitchToWindow(title)**
  - **WebDriver driver;**

#### 48. How to rerun the failed tests again in TestNG?

- In my TestNG framework, **failed tests** are reported in the **testng\_failed\_.xml** file in the target folder.
- We can add this file in the **pom file** so that **maven** will try to run the failed tests every time.
- If will **only run** when there are **failures** in the test.

#### 49. How to rerun the failed tests again in Cucumber?

- we use the re-run option in the CukesRunner.
- Add the rerun to cukes runner.
- This option will create a file with a list of failed tests
- Create a second runner class which points to file with a list of failed tests
- Add the second runner in the pom file

#### 50. How to rerun the failed tests again in Jenkins?

- In Jenkins there are plugin that re run the failed tests Unit cases.
- So you can configure your Maven build execution on Jenkins using the option:
- `Dsurefire.rerunFailingTestsCount=2`



## 51. RUNNING CUCUMBER TESTS IN PARALLEL?

There are couple options on how to make Cucumber + JUnit framework run in parallel

### 1. There is a plugin **cucumber-jvm-parallel-plugin**

<https://github.com/temyers/cucumber-jvm-parallel-plugin>

- This plugin automatically generates multiple cukes runner files.
- Based on the configuration, this plugin creates one cukes runner per feature file.
- Each runner will point to one feature file. and these cukes runners will run in parallel.
- Normally cucumber runs feature files one after another. when we use this plugin, it runs starts them at the same time. we can specify how many tests running at the same time

### 2. Cucumber 4.x parallel option

Starting from cucumber 4.0, cucumber supports parallelization natively.

<https://cucumber.io/blog/2018/09/24/announcing-cucumber-jvm-4-0-0>

By official documentation, in order to run tests in parallel, we have to add parallel option to the maven surefire plugin in pom file.

```
<build>
  <plugins>
    <plugin>
      <artifactId>maven-surefire-plugin</artifactId>
      <configuration>
        <parallel>both</parallel>
        <threadCount>4</threadCount>
      </configuration>
    </plugin>
  </plugins>
</build>
```

But in my specific project, we added maven failsafe plugin to make sure that tests continue to execute even though some fail. This plugin makes sure that tests keep running

```
<plugins>
  <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-failsafe-plugin</artifactId>
    <version>2.18</version>
    <configuration>
      <testFailureIgnore>>true</testFailureIgnore>
      <skipTests>>false</skipTests>
      <includes>
        <include>**/runners/*TestRunner.java</include>
      </includes>
    </configuration>
  </plugin>
</plugins>
```

### 3. Second plugin is **maven-surefire-plugin**

this plugin executes tests in parallel. in this plugin configuration, we indicate which runner files we want to run. we can also indicate how many simultaneous tests we want to run.

```
<include>**/runners/*TestRunner*.java</include>. → plugin will run these files  
<threadCount>10</threadCount> → this shows how many browsers we want to have in at the same time.  
<parallel>classes</parallel> → this line tells that cukes runner classes must run in parallel
```

We created cukes runner files based on how many tests we want to run and how we want to break down tests. Each cukes runner will point to certain set up scenarios/feature files

#### How to run?

- we can execute tests in parallel in our framework only by running tests as a maven command
- **mvn verify** → this will run the tests and generate reports
- **mvn clean verify** → it will first delete the target folder, then runs tests, then generate reports

#### Benefits of parallelization:

- cuts down on the execution time. UI tests usually take a long time, especially in regression testing.

#### Challenges of parallelization?

- hard to implement --> not easy to do.
- load --> if we open too many instances in the same machine, it can overload the machine. it will result in tests running slow, and it increases the fail rate.
- this can be addressed by running tests in different machines using GRID.
- certain tests cases did not work in parallel in my project.



# API

## 1. What is API?

- It means connectivity. I mean API is the messenger that takes requests and tells a system what you want to do and then returns the response back to you.
- API is the acronym for **Application Programming Interface** (which is software intermediary) that allows how applications to talk to each other.

## 2. API vs Webservices?

- API = *browser*: Selenium WebDriver, *database*: JDBC, *MsOffice*: Apache POI
- Webservices = if an API uses internet for communications, it is a webservice. \*All webservice are API.
- No UI (user interface) → web application with UI and we use Selenium Webdriver
- We use:
  - SOAP → XML
  - REST → JSON, XML, TEXT
  - Postman, Rest Assured Library

## 3. What is SoapUI? and how did you use it in your current project?

- SOAP UI is the leading open source cross-platform API Testing tool
- SOAPUI allows testers to execute automated functional, regression, compliance, and load tests on different Web API.
- SOAPUI supports all the standard protocols and technologies to test all kinds of API's.
- SOAPUI interface is simple that enables both technical and non-technical users to use seamlessly.

## 4. Name of some commonly used HTTP methods in REST based architecture?

- Create → POST (send data to the server)
- Read → GET (retrieves data from given server using a given URI)
- Update → PUT (Replaces all current representations of the target resource with the uploaded content)
- Delete → DELETE (Removes all current representations of the target resource given by a URI.)

## 5. HTML Status Codes?

- 1xx → Informational
- 2xx → Success (request was accepted successfully) (200→ Ok, 201→ Created, 202→ Accepted, 204→ No Content)
- 3xx → Redirection
- 4xx → Client Error (400-Bad Request, 401-Unauthorized, 403-Forbidden, 404-Not Found, 405-Method not Allowed)
- 5xx → Server Error (500-Internal server Error, 502-Bad Gateway, 501-Not implemented, 503-Service Unavailable)

## 6. What first thing you check when you get response?

- Status code (200 always mean Ok)
- We always check the 404 means not found
- rest-assured.io==> for automation to find the ECS machine in search type remote Desktop

## 7. Http methods and request types

- **Get** does not requires body
- **Put** requires body means **UPDATE** information
- **Post** requires body means **CREATE** information
- **Delete** does not requires body
- GET -> READ , POST -> CREATE, PUT -> UPDATE, DELETE -> DELETE
- POST VS PUT

## 8. Parameters api

- 2 TYPES:
  - PATH PARAMETER (VALUE WILL BE PART OF URL) QUERY/REQUEST
  - PARAMETERS (KEY+ VALUE FORMAT)

## 9. What is Hamcrest Matcher for?

- Hamcrest is a framework for writing matcher objects allowing 'match' rules to be defined declaratively.

```
import org.junit.jupiter.api.Test;
import static org.hamcrest.MatcherAssert.assertThat;
import static org.hamcrest.Matchers.*;

public class BiscuitTest {
    @Test
    public void testEquals() {
        Biscuit theBiscuit = new Biscuit("Ginger");
        Biscuit myBiscuit = new Biscuit("Ginger");
        assertThat(theBiscuit, equalTo(myBiscuit));
        assertThat("chocolate chips", theBiscuit.getChocolateChipCount(), equalTo(10));
        assertThat("hazelnuts", theBiscuit.getHazelnutCount(), equalTo(3));
    }
}
```

```
// verify if first argument is equal to the second
assertThat(str1, is("Kunkka"));
assertThat(str1, is(str2));

// verify if first argument is NOT equal to the second
assertThat(str1, is(not("Tidehunter")));

// compare ignoring case
assertThat(str1, equalToIgnoringCase("kunkka"));

// compare ignoring space before and after
assertThat(str1, equalToIgnoringWhiteSpace(" Kunkka "));

// compare numbers
assertThat(10, greaterThan(9));
assertThat(10, lessThan(11));
assertThat(10, lessThanOrEqualTo(11));

// verify not null
assertThat(str1, notNullValue());

List<String> list = Arrays.asList("one", "too", "tree");
assertThat(list, hasSize(3));
assertThat(list, containsInAnyOrder("too", "tree", "one"));
assertThat(list, hasItems("one", "too"));

List<Integer> numbers = Arrays.asList(11, 12, 13);
assertThat(numbers, everyItem(greaterThan(9)));
```

## 10. RestAssured Log Logging Logs

- Request Logging

```
given().log().all() // Log all request specification details including parameters, headers and body
given().log().params() // Log only the parameters of the request
given().log().body() // Log only the request body
given().log().headers() // Log only the request headers
given().log().cookies() // Log only the request cookies
given().log().method() // Log only the request method
given().log().path() // Log only the request path
```

- Response Logging

```
get("/x").then().log().body()
get("/x").then().log().ifError()
get("/x").then().log().all()
get("/x").then().log().statusCode() // Only log the status code
get("/x").then().log().statusCode(302) // Only log if the status code is equal to 302
get("/x").then().log().statusCode(matches(matcher)) // Only log if the status code matches the supplied Hamcrest matcher
```

## 11. Serialization and Deserialization

- Serialization; when we MAP a Java object to API JSON format (CONVERT JAVA OBJECT TO JSON);
  - Java object (POJO(Plain Old Java Object), BEANS) → MAP it to API JSON/XML
  - When we have an object from a class and MAP it to a JSON format in our RESTful API

```
{make: "Toyota",
Model: "Camry" }
Car car = new Car();
car.setMake("Toyota");
car.setModel("Camry");
given().body(car).when().post(uri)
```

- Deserialization; API JSON/XML → MAP it to Java Object (JSON TO JAVA OBJECT)

```
Car car2 = new Car();
car2=when().get(uri).body.as(car.class);
car.setMake("Toyota");
car.setModel("Camry");
```

## 12. API/Webservices with RestAssured Library?

```
import static io.restassured.RestAssured.* ;
URI uri = new URI(" ... / methods(get,post)")
```

- GET;

```
Response response = given().accept(ContentType.JSON).when().get(URI);
response.then().assertThat().statusCode(200).
    and().assertThat().ContentType(ContentType.JSON);
```

- POST;

```
Response response = given().ContentType(ContentType.JSON).with().accept(ContentType.JSON)
    .and().body(JSONbody).when().post(URI);
response.then().assertThat().statusCode(200);
```

- 

```
import static org.hamcrest.Matchers.* ;
then().assertThat().body("Id",Matchers.equalTo(123));
```

- 

```
JsonPath json = JsonPath(JSONbody);
json.getString("key");
json.getInt("key");
json.getList("key1.key2");
```

## 13. What is EndPoint?

- <protocol>://<service-name>/<ResourceType>/ResourceID → URI (Uniform Resource Identifier)  
Base URI / resource ? Parameters  
(<http://www.google.com/search?source=book...>) → ? → query parameters

## 14. Authorization vs Authentication

- authentication --> who are you
- authorization --> what rights do you have
- Authentication is user and password
- Authorization has types:
  - no Authorization
  - Basic Authorization
  - Bearer Token
  - Inherit Auth from parent

## 15. RESTful Web Service / API

- REST stands for Representational State Transfer
- RESTful is referred for web services written by applying REST architectural concept.
  - In RESTful, web service http methods like GET, POST, PUT, DELETE can be used to perform CRUD operations.
  - CRUD = Create → Read → Update → Delete

## 16. How do you verify a value in your Response body?

- For exp: verify ID contains correct number
  - Hamster Matcher is assertion library.

```
then().assertThat().body("Id", Matchers.equalTo(123));
```

- Parse into JsonPath and use getInt(), getList(), getString() methods to read Id value.  
And, I can use JUnit Assertion:

```
String body = ...thenReturn().body().asString();  
JsonPath json = new JsonPath(body);  
assertEquals(123, json.getInt("Id"));
```

- De-serialize into a (POJO) object (or Object Mapping)

```
POJO myPojo = ... when().post(url).thenReturn().body().as(Pojo.class);  
assertEquals(123, myPojo.getId( ));
```

And, I can use JUnit Assertion.

## 17. Types of API's Authentication

- Basic
  - Pre-emptive
    - If a service is configured to be pre-emptive, it will not request credentials from a client even though it requires it.
    - If a request doesn't contain credentials, it will return **401 Unauthorized** status code.
  - Challenged
    - When request reaches the API then API will tell that it requires credentials then client will provide credentials.
  - oauth --> types of authentication where keys and tokens from 3rd party is used to authenticate. There are 2 types of oauth:
    - oauth1 → hard to implement
    - oauth2 → more secure
- Digest
  - It is more encrypted than basic. https...

## 18. What is the advantage of using SOAP?

- REST allows a greater variety of data formats, whereas SOAP only allows XML.
- Coupled with JSON (which typically works better with data and offers faster parsing), REST is generally considered easier to work with.
- Thanks to JSON, REST offers better support for browser clients.
- REST provides superior performance, particularly through caching for information that's not altered and not dynamic
- It is the protocol used most often for major services such as Yahoo, Ebay, Amazon, and even Google.
- REST is generally faster and uses less bandwidth. It's also easier to integrate with existing websites with no need to refactor site infrastructure. This enables developers to work faster rather than spend time rewriting a site from scratch. Instead, they can simply add additional functionality.

**19. Difference between SOAP and RESTful web services?**

- RESTful supports JSON, XML, TEXT, however SOAP supports only XML
- REST is faster than SOAP based web services

**20. What is URI, purpose and format?**

- URI stands for Uniform Resource Identifier
- The purpose of URI is to locate a resource on the server hosting the web service.
- A URI is of the following format:
  - <protocol>://<service-name>/<ResourceType>/<ResourceID>

**21. What WebServices do you use in your project?**

- I use Restful which is Representational State of Transfer and it communicates with XML and JSON, but my current project uses JSON

**22. What is XML?**

- In computing, Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

**23. What is JSON?**

- It is JavaScript Object Notation (is a minimal, readable format for structuring data.)
- It is used primarily to transmit data between a server and web application, as an alternative to XML.
- Basically, a lightweight version of XML
- In Key: Value format
- Key is always in double quotes and value if string its double quotes and if numbers no quotes
- It is purely based on http protocol, - so it hits the link on the browser and see the results

**24. Do you know swagger? What is swagger**

- Swagger is an open-source software framework backed by a large ecosystem of tools that helps developers design, build, document, and consume RESTful Web services.
- Swagger allows you to describe the structure of your APIs so that machines can read them.
- The ability of APIs to describe their own structure is the root of all awesomeness in Swagger
- similar to xml schema but for Json

**25. json vs gson**

- JSON is a format which has key and values
- GSON is a process of converting
  - from java to json(serialization),
  - from json to java(deserialization)

**26. How and where are you sending request?**

- Since i am using Rest, it has endpoints. My developers create public URLs and requests are sent to that URL

**27. Do you use any non-web services API?**

- - I use Selenium API for browser, JDBC for database, and RestAssured for API

**28. Do you have API documentation website for your API?**

- Yes, we use swagger for our api documentation, and this is where the description and guidelines of API endpoints are



**29. How do you test API in your project?**

- In my current project we are testing not only our companies api but other external api.
  - For example, we use LinkedIn api to easily transfer the authorized end user's info to our database.
- As a tester we send a API request and verify the status code, response body and checking the endpoints of the api URL is working as expected
  - For example, in my project, I also do Positive/Negative testing of API
- Positive - I am sending valid requests, headers, parameters, and Json body and verify that response is 200/201
- Negative- I am sending invalid requests, headers, parameters, and body, expecting to the status to not be 200

**30. How do you test rest api?**

- I verify if each REST API endpoint is working as expected.
- I use POSTMAN for manual API testing and use RESTASSURED library in Java for automation.
- I send POST,PUT,GET, DELETE type of requests and verify response status code and response body, header.
- I also do positive and negative testing of API.
- When I do positive testing, I send valid request parameters , valid headers, valid request json body and verify that response status code is 200 successful and Json response body data is also matching the expected.
- When I do negative testing, I send invalid request parameters , or invalid headers, or invalid request json body and verify that response
  - status code is not 200 and Json response body contains error message.

**31. Can All API endpoints use all of the Http protocols?**

- It depends, My API developer decides if that URL works with GET,POST,PUT, or DELETE requests

**32. How do you manually test your API?**

- I use Postman → it is a REST API client tool that test the REST API URL

**33. What tools for api testing you use?**

- Postman for manual testing
- Rest Assured library

**34. What are the types of Request in Rest API?**

- There are Get, Post, Put, and Delete requests
  - Get read data
  - Post creates data
  - Put updates data
  - Delete deletes data

**35. What are headers in REST API?**

- I am using Accept.(Content Type.JSON) type - checks what I am receiving should be in JSON or XML format
- And ContentType.(Contenttype.Json) - checks what i am sending should be in JSON format

**36. What is RestAssured Library?**

- A non-web service api that's BDD format and helps integrate java code using deserialization and serialization to extract data from the Json and transform it into a java object in order to store, verify, and validate the data to the expected one.

**37. How are you using Enum in your project?**

- I am using content Type to make sure that my response type is JSON format

### 38. What is JsonPath?

- Another way to validate response body
- `JsonPath j=response.jsonpath;`

### 39. What methods are you using to verify the size of the response data?

- I use Matchers from Hamcrest
  - `hasItems()`
  - `equalTo()`

### 40. How would I use Response interface?

#### ★ Reporting

- Mvn Verify will run tests even if it fails (it ignores the failure)
  - Waits for all the test to finish
  - It ignores failure b.c we have this in our build configuration  
`<testFailureIgnore>true</testFailureIgnore>`
  - Verify is a Maven lifecycle that comes after test
- Mvn test will stop running the test if something fails
- The original html report we get is not that great, we need statistical data
- Ex; "html:target/cucumber-report" → Like how many test are pass/failing percentages
- We going to use Cucumber Sandwich (this is a dependency file in pom xml) for more statistical data reporting
- In cukesrunner add; "json:target/cucumber.json"
  - It's a html report from a JSON file → How this report works is the Json file is used to generate the report
  - Version 3.15 (from the vid)
  - Add a new build xml in pom (its already in your pom file, the one called TestProject)
    - You will only get this json reporting(cucumber report with graphs and statistics. This report will be only local for YOU to see, not for Jenkins) ONLY if you execute MVN Verify
    - BUT YOU WILL ALWAYS GET A JSON FILE(different from cucumber report) AFTER RUNNING THE TEST, EVEN W.O VERIFY
      - This JSON file is very important for Jenkins - for the cucumber report plugin
- TestProject build:
  - `<id>execution</id>`
  - `<phase>verify</phase>` - this is why html (json) report will only generate when using verify
  - `<goals>`
  - `<goal>generate</goal> </goals>`
  - The report will also give you a json file
  - To run tests using verify, right click pom file and click on maven build...
    - You can also add parameters (like runner variable and value which is the xml file) - Type in goals: verify
- To run this in the command line
  - Go to location of pom file and type `mvn verify`
  - Syntax is `mvn<lifecycle/goal>`
- Order of Execution using mvn verify
  1. Run against the pom file
  2. Pom file runs the xml file
  3. Xml runs the cukesrunner file
  4. Cukesrunner runs the cucumber feature file/test
- Does json cucumber report show screenshot?

**41. How would I write a method where I need parameter with limit of 100 and path parameter of employee id = 100?**

- I would write;
  - `.and().params("limit",100)`
  - `.and().pathParams("employee_id", 110)`

**42. What is Backend-API?**

- It is where application logic code is. Your conditions etc.
- How to test?
  - 1) Manually → Using tools like Postman etc. By sending requests and verifying responses.
  - 2) Automation → Java + RestAssured Library



# HTML & CSS

## 1. What is <div> tag is used in HTML code??

- <div> elements → the <div> tag is nothing more than a container until that encapsulates other page elements and divides the HTML document into sections.
- Web developers use <dib> elements to group together HTML elements and apply CSS styles to many elements at once.



# SQL

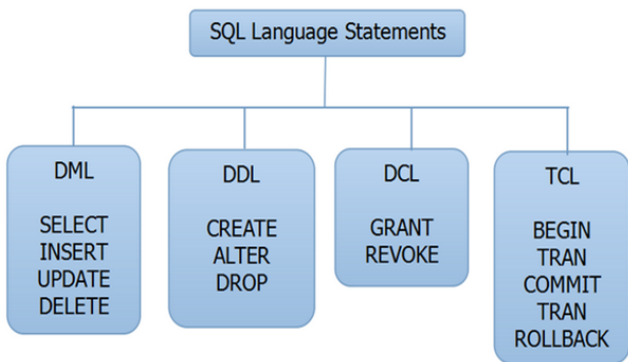
## 1. Do you know SQL?

- Yes, I am very comfortable with writing SQL Queries and DDL and DML commands.
- Currently working with Oracle database that is running in AMAZON CLOUD SERVER.
- DDL (Data definition language) : CREATE , ALTER, DROP, TRUNCATE..
- DML(Data manipulation language): SELECT, DELETE, INSERT, UPDATE

## 2. SQL?

- Structured Query Language. Used for managing and manipulating data in db.
- Provide statements for a variety of tasks
  - Querying data
  - Inserting, updating ,deleting rows in a table
  - Creating, replacing, altering, and dropping objects
  - Controlling access to the database and its objects
  - Database consistency and integrity

## 3. What are the categories of SQL statements?



### i. DML (Data Manipulation Language)

- DML statements affect records in a table. These are basic operations we perform on data such as selecting a few records from a table, inserting new records, deleting unnecessary records, and updating/modifying existing records.

### ii. DDL (Data Definition Language)

- DDL statements are used to alter/modify a database or table structure and schema. These statements handle the design and storage of database objects.

### iii. DCL (Data Control Language)

- DCL statements control the level of access that users have on database objects.

### iv. TCL (Transaction Control Language)

- TCL statements allow you to control and manage transactions to maintain the integrity of data within SQL statements.

## 4. Tell me about TCL?

- SQL language is divided into four types of primary language statements: DML, DDL, DCL and TCL.
- Using these statements, we can define the structure of a database by creating and altering database objects, and we can manipulate data in a table through updates or deletions.
- We also can control which user can read/write data or manage transactions to create a single unit of work.

## 5. Versions

- Java 8 → 2014 present Java 7 → 2011 - 2014 Java 6 → 2006 - 2011  
Selenium 3.5.3

## 6. Database Schema?

- It is like a diagram with all tables and column names, data types and PK, FK and how tables are related to each other

## 7. SQL clause?

- SELECT and FROM

## 8. What kind of Database testing are you doing?

- I am mostly doing Database validations.
- I make changes or insert data (create loan) in the front end and validate in the database. Data in front end matches the DB
- I also make changes using RESTapi and verify that changes are successful in Database as well.
- I also support DB migration process. My code connects to Sybase (legacy database) using JDBC then Connects to Oracle (NEW DB) then compare records to make sure data was migrated



## 9. RDBMS

- Relational Database Management System
- Data is organized into tables that are related to each other
  - How are they related?
    - Primary Key (unique and not NULL) and Foreign Key (duplicate and NULL)
  - What type of database system you have expertise with?
    - RDBMS, such as SQL and Oracle

## 10. What are constraints?

- Properties that table column must comply with.
- Columns have constraints that defined how data can be stored.
  - Primary Key: unique and NOT NULL
  - Foreign Key: duplicate and NULL and cannot add data which is not in PK
  - Unique Key: only unique value
  - Null: can have null
  - Not null: cannot have null

## 11. Data types in SQL?

- Number
- Integers
- char → char(20): 20 years spaces are taken from memory
- varchar → varchar(30): 5 spaces from memory varchar2
- boolean
- date
- currency

## 12. Capabilities for SQL select statements

- Projection → Select the columns in a table that are returned by a query
- Selection → Selects the rows in a table that are returned by a query
- Join → Brings together data that is stored in different tables by specifying the link between them

### 13. DML (Data Manipulation Language) vs DDL (Data Definition Language)

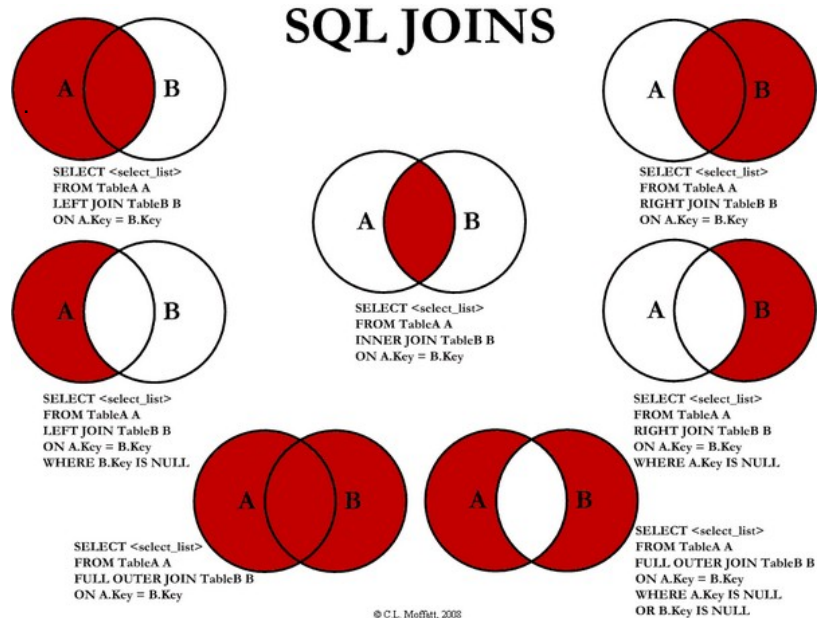
DML command actions can be restored.	DDL command actions <b>cannot</b> be restored / undone.
<b>Commands:</b> <ul style="list-style-type: none"> <li>● <b>SELECT</b> from tablename; (<b>read</b>)</li> <li>● <b>INSERT</b> into tablename values (...); (<b>add</b>)</li> <li>● <b>UPDATE</b> tablename SET value WHERE location;</li> <li>● <b>DELETE</b> from tablename WHERE location; (<b>rows</b>)</li> <li>● <b>MERGE</b></li> </ul>	<b>Commands:</b> <ul style="list-style-type: none"> <li>● <b>CREATE</b> table tablename (column1, column2 ...);</li> <li>● <b>ALTER</b> table tablename modify value;</li> <li>● <b>TRUNCATE</b> table tablename; (<b>delete whole table data</b>)</li> <li>● <b>DROP TABLE</b>; (<b>delete whole table with structure</b>)</li> <li>● <b>RENAME</b></li> <li>● <b>COMMENT</b></li> </ul>

### 14. PL / SQL functions and Triggers in Oracle?

- A trigger is triggered automatically when a DML statement is executed.
- There are 2 types of functions:
  - Procedure (like a void method in Java)
  - Function (like a non-void (return) method in Java)

### 15. SQL JOIN JOINS

<b>JOIN (INNER) JOIN</b> is used when retrieving data from multiple tables and will return only matching data
<b>LEFT (OUTER) JOIN</b> is used when retrieving data from multiple tables and will return left table and any matching right table records.
<b>RIGHT (OUTER) JOIN</b> is used when retrieving data from multiple tables and will return right table and any matching left table records.
<b>FULL (OUTER) JOIN</b> is used when retrieving data from multiple tables and will return both table records, matching and non-matching



### 16. UNION

- Union combines the resultSets of two queries ((1)select from column-names from table-name {UNION} (2) select column-name from table-name)

### 17. How to find top 3 high paid employees?

- In mySQL \*\*oracle has ROWNUM
- SELECT salary, first\_name, last\_name FROM employees ORDER BY salary DESC LIMIT 3;

**18. How to find duplicate names in employees?**

- SELECT first\_name, COUNT (first\_name) FROM employees  
GROUP BY first\_name  
HAVING (COUNT(first\_name)>1);

**19. How to find employees whose salaries are below the average?**

- SELECT first\_name, salary FROM employees  
WHERE salary<= (SELECT AVG(salary) FROM employees);

**20. How to find maximum salaries in each department?**

- SELECT first-name, MAX(salary)  
FROM department d LEFT OUTER JOIN employee e ON (d.department\_id = e.department\_id)  
GROUP BY department\_id;

**21. How to find lowest salaries?**

- SELECT first\_name, last\_name, salary, job\_id FROM employees
- WHERE salary = (SELECT MIN(salary) From employees);

**22. How to find second highest salary of employees?**

```
SELECT MAX(salary) FROM employees  
WHERE salary NOT IN (SELECT MAX(salary) FROM employees);
```

**23. SQL Developer**

- Development environment (manual testing the database using the queries)
  - Release 2.1 -2009 → 3.0 - 2011
  - Release 4.0 - 2013(latest)
- Has a Migration release(1.2) → provides users with a single point to browse data in third-party DB and to migrate from these DB to Oracle
- Supports Window, Linux and Mac OS x

**24. Writing SQL Statements**

- Keywords are uppercased while columns and table names are lowercase
- Statements are not case sensitive
- Clauses are usually placed on separate lines
- Keywords cannot be abbreviated or split across lines

**25. Arithmetic Expressions**

- You use the operators in any clause (except the From clause)
- With Date and Timestamp - can only use addition and subtraction
- Add (+), Subtract (-), Multiply (\*), Divide (/)

**26. Working with Dates**

- Default date display format is DD-MON-RR

```
Sysdate function  
Returns date and time  
Select sysdate From dual;
```

**27. Do you have experience with SQL?**

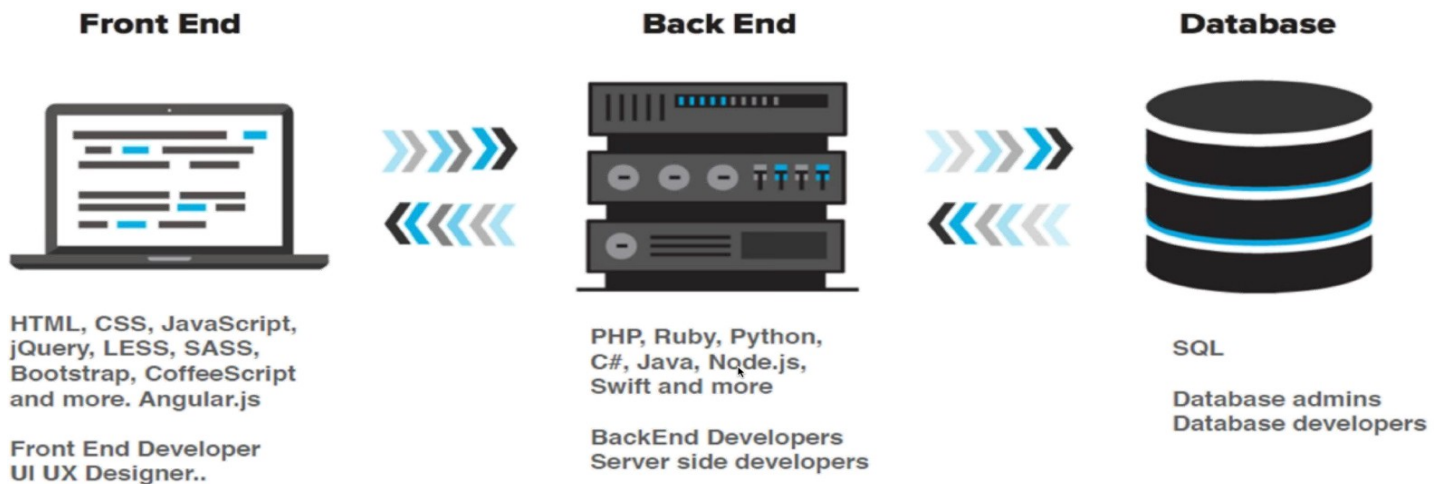
- Yes, I have worked with relational databases and i am very comfortable with DDL and DML commands



## 28. Back-end test framework

- Using RESTASSURED in my framework in order for the process of Deserialization and serialization to occur that way you store Json response into a java collection data structure and assert the data with the expected value (also stored in java data structure)
- I use postman for manual testing first BEFORE I INVOKE MY FRAMEWORK

## 29. Back-end Testing



## 30. Have you done any backend/database testing?

- Yes, I have lots of experience with working with databases.
- And I am very comfortable with writing SQL queries.
- I have experience with working on Relational Databases like Oracle, MySQL, SQL Server
- Have you worked with non-relational databases?
- I don't have hands on experience, but I know that it is like JSON format
- Database and I have good experience with working with JSON files.
- And I am a quick learner

## 31. Database testing framework

- For manual testing I use SQL developer for producing SQL queries
- FOR AUTOMATION; I use JDBC library to integrate java by getting a CONNECTION from oracle database then creating STATEMENTS using SQL queries and then storing the data into a RESULTSET object.

## 32. What is metadata?

- MetaData Data about Data

```
ResultSetMetaData rsmd = rs.getMetaData();
int columnNum=rsmd.getColumnCount();
```

## 33. Data Structures and Why we need it

- Data structures are way of organizing data for efficient
- manipulation: Insertion , searching, reading , deletion of data.
- I always use java data structures for reading data and storing data from our application, database, or API.

### 34. How can we connect db?

```
Connection connection = DriverManager.getConnection(URL, user, password);
Statement statement = connection.createStatement();
ResultSet resultset = statement.executeQuery("query");

resultset.close();
statement.close();
connection.close();

// After connection;
DatabaseMetaData db = connection.getMetaData();

// After resultSet;
ResultSetMetaData rs = resultSet.getMetaData();
```

- If failure to connect will throw an exception:
  - SQLException (bad URL or credentials)
  - ClassNotFoundException (JDB driver not in classpath)

### 35. Dependency for JDBC

```
<dependency>
  <groupId>oracle</groupId>
  <artifactId>ojdbc6</artifactId>
  <version>11.2.0.3</version>
</dependency>
```

### 36. What is the Procedure?

- A stored procedure is a group of SQL statements that has been created and stored in the database.
- A stored procedure will accept input parameters so that a single procedure can be used over the network by several clients using different input data.
- A stored procedures will reduce network traffic and increase the performance. If we modify a stored procedure all the clients will get the updated stored procedure. Sample of creating a stored procedure

```
CREATE PROCEDURE test_display AS
SELECT FirstName, LastName FROM tb_test;
EXEC test_display;
```



## Git & GitHub

### 1. What is GitHub?

- Version control system
- Keeps track of new/old version of documents
- Manages/stores set of files

### 2. What is repository?

- Folder where the files are saved and
- It may contain single, collections of files, or single projects.

### 3. What is Remote & Local Repository?

- Remote Repository: Host on server(GITHUB) Our changes go from local to remote repo
- Local Repository: Typically, on your computer -Our changes are done here consist of Working Directory, index and HEAD

### 4. What are Git commands?

- **Add**: add to staging area
- **Commit**: add from working directory and local repo
- **Push**: add to remote repo
- **Pull**: take changes from remote to working directory
- Clone with url: clones url into directory
- Git version: give you version of git
- Git status: shows you what branch you're on, any changed files that aren't tracked
  - Origin: name of remote
  - Master: name of branch
- Git add:
  - Adding to staging area
  - Recursive add
  - Adds everything
- **git commit -m**: "message will apply for all files"
- **git push**: origin nameOfBranch
- **git ignore**:
  - Notepad.gitignore → In the notepad add files you don't want to add to staging area
  - YOU MUST PUSH THE .GITIGNORE FILE TO REPO IN ORDER FOR THE FILES YOU WANT TO IGNORE TO BE IGNORED ON GIT
  - Some files don't matter and shouldn't be pushed to git
- Remove file-git → GIT ADD REMOVE POM → COMMIT THAT → AND PUSH Creating own branch
- checkout branch -git → Git checkout -b nameOfBranch master

### 5. How do I use Git in terminal?

- create new repo-git
- echo "# SqlMentor" >> README.md
  - git init
  - git add README.md
  - git commit -m "first commit"
  - git remote add origin
  - https://github.com/Andylam224/SqlMentor.git git push -u origin
  - master
- push an existing repo-git
  - git remote add origin https://github.com/Andylam224/SqlMentor.git
  - git push -u origin master
- Default editor

## 6. GIT Commands?

```
git init
git add .
git commit -m "my comment"
```

```
-----
git info
git log
git push -u origin master
git push
```

```
-----
git init
git remote add origin URL // copy paste https:// url to URL place
git add src/ // if i want to add only this folder
git commit -m "my comment"
git log
git push -u origin master
```

## 7. Returning to the latest version?

```
// we need to type both of them
git fetch origin
git reset --hard origin/master
```

## 8. Adding couple files in one time?

```
git add file1 file2 file3 //
```

## 9. GIT Branch branches?

```
git rm file.java
git commit -m "removing"
git push origin master
```

git branch BranchName	:- Creating branch
git branch	:- checking branch master
git checkout BranchName	:- name is a branch name where you want to switch
git branch -d BranchName	:- deleting brach on local
git push origin : deletedBranchName	:- deleting Branch deteled on local(intellij) from Remote(gitHub WebSite)
git branch -a	:- Cheking all branchs even deleted on Local (but not in remote)
git checkout -b BranchName	:- Creating branch and Switching to the new branch
git merge BranchName	:- Merging branch
git push --set-upstream origin BranchName	:- Pushing branch to remote (gitHub WebSite) from local (intellij)
git fetch origin BranchName	:- Pulling branch to local (intellij) from remote(github WebSite)

```
git push origin branch1:branch2
git pull origin branch1:branch2
```

## 10. Merging branch with master

--go to your second branch do next steps

```
git add .
```

```
git commit -m "your comment"
```

--go to your master branch

```
git merge "branchName"
```

--if its not merging we need to do git commit -m "comment" again from master branch

## 11. Merging new Branch from GitHub repository to Local master with Changes in code GIT Commands?

```
git fetch origin BranchName
```

```
git checkout BranchName
```

```
git branch // you must be in new branch
```

```
git checkout master
```

```
git branch // you must be in master branch
```

```
git merge BranchName // it will merge. if any conflict you need to fix it, if you don't have merge conflict it will pas
```

```
git branch -a // we are able to see both local and remote branches
```

```
git clone URL of what you want to clone // and after copy link
```

```
git fetch // ctobi obnovit obnovleniya v glavnom
```

```
git merge
```

```
git log --graph // showing what's committed and happining
```

```
git log --graph -- online // showing in one line what's happining
```

--if you have conflict go to project right click -> git -> resolve conflict -> merge :

**wq** and escape

## 12. CHECK THE GITHUB URL?

```
git remote -v
```

```
git config --get remote.origin.url
```

```
git remote show origin
```

```
git config --get remote.origin.url
```

## 13. What is pull request?

```
git merge fetch_head --allow-unrelated-histories
```

- Resolved an issue for pulling a non-fast-forward issue
- Press escape then
  - Press shift ":x!" → Saves and exit
  - ":q!" → No save and exit

## 14. What is pull request?

- Git merge fetch\_head --allow-unrelated-histories
  - Resolved an issue for pulling an non-fast-forward issue

## 15. How do you resolve conflict on git?

- your repository → cd ~/<repo\_directory>
- Pull recent version repo → git pull
- Checkout the source branche → git checkout <feature\_branch>
- Pull destination branch into the source branch → git pull origin <destination\_branch>
- Fix conflicts and then commit the result.



## 1. What is JIRA?

- Project management tool and helps tracks defects
  - Allows for planning and time management
  - Tracks due dates/assignment
- Tester only in backlog, and active sprints

## 2. For bug tracking what tools do you use?

- JIRA treats all work inside it as an Issue
- So, in JIRA to create a defect would be to create an issue of the type "Bug".
- Defect reporting :
  - Defect ID
  - Defect title
  - Defect description (steps to reproduce)
  - Environment information
  - Screenshot(attachment)
  - Severity
  - Assign it to Developer

## 3. What is Active Sprint Board?

- Workflow: To do>In Progress(can have blocked in here too)>Review(Tech lead review the code before moving to done>Done
- Blocked: Go to story and click on options and click on more options>blocked
  - Write a comment about why it is blocked
  - Scrum master will have to deal with ASAP
  - Nothing should be in the block for more than a day
  - Once it's fixed you can change to blocker resolved

## 4. What are the Jira terms?

- Issue → We you need to do and fix
- Types of Issue
  - Story
  - Task
  - Bug
  - Epic

## 5. What's the difference epic and tickets?

- Epic are written by B.A, tickets are created by testers
- Description box
  - Example reporting a bug
  - You write in the box
    - What the bug is about
    - What functionality is breaking
    - What are the steps of recreating the bug (with necessary data)
    - Attach report and screenshot of bug
    - Expected results
    - Actual results

## 6. How do you automate User Stories from JIRA?

- Look at description - Agile story
- Create feature file and save file as Jira story.feature
  - Add scenario located in Acceptance criteria
- Run cukesRunner with dryRun=true
- Implement the methods
- BEFORE AUTOMATING THE TEST CASES IN JIRA ALWAYS MANUAL TEST IT FIRST

## 7. How you integrate Selenium with Jira?

- Selenium does not have a built-in integration with Jira.
- But there are plugins that integrate selenium testing framework with Jira.
  - Xray (Jira plugin, Jenkins plugin)
  - Zephyr (Jira plugin)



# JENKINS

## 1. What is JENKINS?

- Continuous Integration and Deployment tool. 3 components of Jenkins
  - 1. Code change → Devs makes changes to the application code
  - 2. Test → CI tool automatically picks up the changes and tests the application
  - 3. Deploy → CI tool deploys the application with changes

## 2. What is Jenkins job?

- Everything is done by creating a job
- A task that Jenkins performs based on its schedule
- Made of several steps
- Can have a trigger that determines when it runs
- Reports the results of the run automatically

## 3. What is continuous Integration?

- CI is a development practice that requires developers to integrate code into a shared repository several times a day.
- Every time the software's code is changed, it is built and tested automatically

## 4. What is continuous deployment?

- Code changes are automatically built, tested, deployed, and prepared for a release to production
- Each check-in is then verified by an automated build, allowing teams to detect problems early.

## 5. Do you maintain Jenkins?

- It is done by Special Team, environment team, architecture team
- But i provide them information of my tests and configuration info and also the emails to send notifications.
  - Git path
  - Mvn code ; goals - compile, or verify -drunner=xml, etc
  - Time schedule for certain tests
- If you run your regression test on jenkins, how do you execute it if it automatically runs?

## 6. What goes in the regression test?

- Depends on the team, test plan, scope, and business value

## 7. How many jobs in Jenkins?

- I personally set up 2-3 jobs for automated tests
  - 1 for smoke → Smoke is running daily 2,3 times a day , making sure that all environments are up and running
  - Full regression (running manual and automated tests)?
    - Before each production release(after 3 sprints)
    - Only very stable test cases are stored in full regression
    - Updating functionality
  - Minor regression
    - Runs at the end of sprint
    - Tests that are related to certain modules and functionalities
    - I use tags to specify which module to run



## 8. How is code deployed to your environment?

- Devs write the code, test it then is deployed in Jenkins from dev to test environment
- **What if it doesn't?**
  - Talk to your developer and ask them to deploy it

## 9. How do you search by tags?

- You can use **ctrl+H** to open search tool in Eclipse and put the tag name in there and

## 10. How schedule a build in Jenkins?

- In Jenkins, under the job configuration we can define various build triggers.
- Simple find the 'Build Triggers' section and check the 'Build Periodically' checkbox.
- With the periodically build you can schedule the build definition by the date or day of the week and the time to execute the build.
- The format of the 'Schedule' textbox is as follows:
  - MINUTE (0-59), HOUR (0-23), DAY (1-31), MONTH (1-12), DAY OF THE WEEK (0-7)
- How do you do scheduling in Jenkins? How will you schedule test to be executed every 3 hours?
  - `H 3***` If you want to schedule your build every day at 7h00, this will do the job: `0 7 * * *`

## 11. What is build pipeline in Jenkins?

- Job chaining in Jenkins is the process of automatically starting other job(s) after the execution of a job.
- This approach lets you build multi-step build pipelines or trigger the rebuild of a project if one of its dependencies is updated.

## 12. How do you maintain your smoke tests job on Jenkins?

- I have configured the job to get the code from git, run the tests by passing a mvn command, generate reports and send email. I do not go and change the job configuration. Once set up, it always works.

## 13. JENKINS CUCUMBER REPORT

- Jenkins has Cucumber report plugin that can generate User Friendly report
- Only data Cucumber report plugin needs is Json format report
- Once Cucumber report is generated, send the URL of the report to anyone who asks for the report
- All the history of automation tests are stored in Jenkins. It shows dates and hours and other details.
- If you need to see the automation report from past you find it in Jenkins.

## 14. Scheduling the Jenkins Job

- CRON Job → Scheduled automated task
  - That is the reason why Jenkins users use CRON time format.



# SELENIUM GRID & SauceLabs

## 1. What is Selenium Grid?

- Gives you the ability to run your automated tests in different browsers (and their different versions) and platforms (basically Operating systems and their versions. Window, Linux, Mac) VISGRID
- This tool is useful if you have lots of Tests (over 500)
- Instead of doing

```
WebDriver driver=new Chromedriver()
```

- Do

```
WebDriver driver=new RemoteWebDriver(url, capabilities) //Contains 2 parameters in constructors
```

## 2. When do you use Selenium Grid?

- Selenium Grid can be used to execute same or different test scripts on multiple platforms and browsers concurrently so as to achieve distributed test execution

## 3. How does Selenium Grid work?

- Grid is a set up that consists of Hub and nodes
- Hub is a central machine that all nodes connect to
  - Has IP address and port number, Then you link the Hub to Nodes
- There is a main machine which is called a Hub and multiple nodes (the machines that actually run your tests)
- The order of execution is;
  - Your code > remote driver > Selenium Hub > Selenium nodes (might be multiple ones)
    - You asked your Selenium Hub to run your tests
      - Then selenium hub will find a node that is linked to the hub and run your test from there
    - You can have as many nodes as you want but only one hub

## 4. How do you set up your selenium grid?

- Hub is a different server machine and each node is a separate server machine
- Our hub and nodes will be set up in Amazon AWS Ec2 machines (ideally)
- You can ask your hub to run tests and then the hub will find a node and run your test from there
- We can also have hub and multiple nodes in same machine or server
- Each node registers to the HUB with a certain configuration and HUB is aware of the browser available on the node
- When a request comes to the HUB for a specific browser (with Desired capabilities object), the HUB, if found a match for the requested browser, redirects the call to \*that\* particular GRID Node and then a session is established bidirectionally and execution starts

## 5. Where are the cross browser/platform running?

- It is running in Amazon AWS machine where Jenkins is installed. But normally, company jenkins is used by developers' team, devops, deployment team, and QA automation team
  - It is not recommended there
- Ideally is Jenkins > GitHub > Maven > Runner class > Selenium Hub and run in one of the nodes that is configured in different server
  - In your hooks class, instead of having you webDriver point to a local driver, change it to a RemoteDriver(); and have it point to the cloud machine that has the hub

**6. What are the challenges in multi browser testing?**

- Something is not clicking
- Not visible
- Some items look different in one browser than another browser

**7. What browsers are you testing?**

- Chrome - Firefox - IE/Edge - Safari - Opera

**8. What is a hub in Selenium Grid?**

- A hub is server or a central point that controls the test executions on different machines

**9. What is node in Selenium Grid?**

- Node is the machine, which is attached to the hub, There can be multiple nodes in Selenium Grid.

**10. How do you automate multi browser testing?**

- Change the browser to something else in my properties file in my framework
  - When I want to run my tests in different browser
  - Ex; "Browser=chrome" to "Internet Explorer"
  - This method works if your tests are less than 500 tests
- In my framework, I implemented Selenium Grid and I can run tests in different cloud machines using different browsers

**11. What to do with failed tests?**

- Look at the automation execution report
- Find out the reason of failure
- Try to do steps manually,
  - If manual is passing then automation issue → so you fix, re-run and see if its passing
  - If its application issue
    - Create a defect
      - While the defect is being fixed, i am testing manually using Ad-hoc test
  - If the defect is not a showstopper then you run other tests and automate
    - If it is, you have to wait, can't do any further testing
  - When rerunning, I use @ReRun tag to test only the test you want to rerun

**12. What is Ad-Hoc test?**

- Performed without proper planning and documentation
- Defects found using this method are hard to replicate since there no test cases aligned for those scenarios
- Performed after formal test execution

**13. SauceLabs - cloud Grid service. Access to multiple Platforms with multiple browsers**

- Provides cloud machine so you can run a lot of
- Does parallel testing well

**14. How do you report using SauceLabs?**

- I link to my JIRA server

## 15. How to test with SauceLabs?

- Usually, we do "WebDriver driver=new FireFoxDriver();
- Now we going to do;

```
DesiredCapabilities caps=DesiredCapabilities.firefox(); caps.setCapability("platform","Windows 7");
caps.setCapability("version","38.0");
WebDriver driver=new RemoteWebDriver(new
    URL("http://YOUR_USERNAME:YOUR_ACCESS_@ondemand.saucelabds.com:80/wd/hub",ca ps)
```

## 16. Steps to run your tests in saucelabs/Any ready selenium Grid

- Create desiredCapabilities object and specify with type of OS, browser you want your tests to run with selenium Grid.

```
DesiredCapabilities caps=DesiredCapabilities.firefox(); caps.setCapability("platform","Windows 7");
caps.setCapability("version","38.0");
```

- Create RemoteWebDriver with HUB url:

```
WebDriver driver=new RemoteWebDriver(new URL(URLOFHub),caps);
```

- Create sauceLabsDemo class

```
// In @BeforeTest
// DesiredCapabilities(comes from Selenium)
caps=DesiredCapabilities.firefox(); //(chooses which browser)
caps.setCapability("platform","Windows 7");
caps.setCapability("version","38.0");
```

- String URL="http://YOUR\_USERNAME:YOUR\_ACCESS\_@ondemand.saucelabds.com:80/wd/hub"
  - This is Selenium Hub address
  - **URI**= unified resource identifier
  - **URL**=unified resource locator

## 17. How do you run your tests in multiple threads parallely?

- Thread is like one process or instance of application run
- 4ways
  - 1. We can create multiple cukesrunner with different tags
    - Ex. cukesrunner has tag "@Test"
    - Smokerunner has @smoke
    - Regression runner has @Regression
  - 2. Create testng xml and add those runner class under one test
    - Add all 3 runners in one xml
    - Then next to verbose=2(on top of xml file) add "parallel="classes" thread-count="10">
  - 3. Then make sure our driver opens a remote WebDriver that is point to hub
    - Add the code in driver class
  - 4. Run the testng xml by itself or using maven.

## 18. How do you set up Selenium Grid in AWS?

- (1) 2 cloud servers (Ec2)
  - 1 will be HUB
  - 1 will be node
- (2) In machine 1, download Selenium StandAloneServer
  - It is needed in order to run Remote Selenium WebDriver
    - A lot of configuration
    - Use command line
      - Set up HUB;  
*java -jar selenium-server-standalone-3.5.3.jar -role hub http://localhost:4444/grid/console*
      - Set up node1  
*java -jar selenium-server-standalone-3.5.3.jar -role node -hub http://localhost:4444/grid/register*
      - Node2  
*java -jar selenium-server-standalone-3.5.3.jar -role node -hub http://localhost:4444/grid/register -port 7777*
- (3) You can also use Visgrid
  - Download in machine 1
  - Open jar file
    - Set max session to 10
    - Start hub
    - Port 4444 (where your hub is. You can change it but remember it)
  - Click Create node
    - Choose a browser for the node
    - Type in number of instances
    - Click Add
      - Open browser in ec2 machine
      - Type: localhost:4444 (this is seleniumGrid hub) (Now we just powered up our HUB)
      - Click on console
      - Refresh the page
      - Now it Show nodes ( all in the same machine)
      - Add another node(now it will show 2 nodes)
  - Now go to another machine and create nodes from there and link it to HUB
  - Before going to machine 2
    - Go to aws console
    - Go to the instance that hold your hub
      - Click on security groups = launch wizard
      - Go to inbound
        - Add the port number of hub (which is 4444) and save it
  - Go to machine 2
    - Download same jar file of Visgrid you used for 1st machine
    - Download jdk ( in order to open the file)
    - Open jar> start hub>create node>click Override HUB(we don't need this hub since we have another one on the first machine)>add machine 1 ip address and port number: 4444>add

## 19. Linux Commands (case-sensitive)

- reboot → reboots system
- man → gives you instruction of the command - Ex: "man reboot"
- mkdir → Creates directory(folder)
- cd → Change directory
- Ls → List directory content
- pwd → Print name of the current working directory. It gives you the exact location; Ex: /home/Andy/Desktop
- ll → Long list format
- ls-la → Prints files and hidden file
- clear → Clear screen
- cd.. → Goes to the parent file (not the root file)
- cd/ → Goes to the parent root file
- cd~ → Goes to the home of the user file
- grep → Prints a line matching a pattern
- df-h → Prints the disk space usage
- top → Displays linux tasks (like task manager)
  
- **How to create an account**
  - User → useradd Andy
  - Group → groupadd Cybertek
  
- **Adding a user into group**
  - useradd -G Cybertek Andy
  - id Andy → prints details for this individual (shows it Andy has cybertek)
  
- **Configuration/changing the network**
  - vi /etc/sysconfig/network
  - crontab → Sets a timer for your file to run (build schedule likejenkins)
  
- **Setting permissions**
  - chmod → Change file mode bits
    - Order is owner, group, others
      - If the file is folder, d is in the front
      - If not a folder there is no d
  - chmod 777 → Gives access to owner,group, and others; Very dangerous; DON'T USE
    - r- read
    - W-write
    - X-execute
    - rwxrwxrwx (777)
  - chmod 644 → Give access to owner (read and write),group(read only),others(read only)
    - -rw-r--r--
    - Default access and Standard
  
- How to find an file using grep (if you know the name of file)
  - grep 'name of test failed file' /home/Andy/Test1/TestScenario (location) > /home/Alex/AutomationFile
    - Now the file is inside this location; /home/Alex/AutomationFile
  - Find any file that has ' name'
  - grep 'fail scenario' \*



## AWS

### 1. Do you work with AWS?

- I am working with EC2 instances.
- Basically, that is my virtual machines.
- When I have Selenium Grid, I have different virtual machines and each machine I am running separately.
- For instance, to minimize the time for regression tests, it is really efficient, it saves a lot of time to our company

### 2. What is AWS?

- AWS is providing cloud VM. Create an EC2 instance.
- I can use this instance with remote desktop. Actually, after launching my instance I just use like a regular computer.

### 3. What is base page?

- We store our common functionalities in a base class and later we extend that base class and use in other class.



## How to build your framework from scratch

- Testing Framework - guidelines and rules used for creating and designing test cases

1. **Set up Environment ; install JDK, MAVEN, ECLIPSE IDE**
2. **Create Maven project**
  - ArtifactID - name of your project
  - GroupID - identifies your project uniquely across all projects
3. **Add Dependencies from Maven Repository**
  - Selenium Java
  - Cucumber Sandwich
  - JRE System library 1.8 in <properties>
  - TestNG
  - WebDriverManager\_BoniGarcia
  - Cucumber Java
  - Cucumber TestNG
  - Apache POI.XML
  - APACHE POI
  - JDBC
  - Restassured
  - Gson
  - Log4j
4. **Create framework Structure (packages)**
  - Pages
    - i. Webelements and methods
  - Beans
    - i. Custom classes
  - Runner
    - i. Cuckesrunner - generates codes and stores html report to target
    - ii. Smoke
    - iii. Regression
  - StepDefinitions
    - i. Actual codes and hook class
  - Tests
    - i. Data driven tests
  - JDBC
  - API
  - Utilities
    - i. ConfigurationReader
    - ii. Driver class (Singleton)
    - iii. browserUtils
    - iv. DBUtils
    - v. ApiUtils
  - Configuration.properties
  - Testng\_runner.xml
    - i. One of the runner class Call the packages with com.app.utilities



## 5. Create feature folder with feature file (.feature) in resources

- File executable specification written in a gherkin language

## 6. After you finish writing your scenario, run your cukesRunner with dryRun=false, this will give you implementation code that you will store in StepDefinition class

## 7. How to run your code?

- Use runner class - run codes and generate cucumber report and html reports

## 8. Send framework to GitHub or SVN

- Create new repo
- Copy git url and go to eclipse
- Configure git repo and add the url
- Right click project, click team, click commit and you'll be in git staging
- NOW YOUR CODE IS IN GITHUB

## 9. Next is JENKINS INTEGRATION

- Jenkins
  - i. Open source automation server
  - ii. Helps to automate the non-human part of the software development process
  - iii. Allows continuous integration
  - iv. Development practice that requires dev to integrate code into a shared repo at reg intervals
  - v. Port is 8081 localhost
- To run your project in jenkins
  - i. Login to jenkins account
  - ii. Create project - freestyle
  - iii. Install plugins -cucumber report and git
  - iv. Under source code management choose git and past git url
  - v. Build trigger - choose to build periodically
  - vi. Invoke top-level maven
    1. Maven version ; MAVEN\_HOME
    2. Goals ; clean verify -Drunner=smoke\_runnerxml
  - vii. Under post-build actions
    1. Choose cucumber reports
    2. Choose editable email notify
  - viii. Editable email notification
    1. Attach build log ; choose build log
    2. Click advanced settings
  - ix. Failure-Any
    1. Click advanced
    2. Recipient list - email address who will receive the report. Add comma if multiple
    3. Click add trigger - like failure always
    4. Attach build log; select attach build log
    5. Save
  - x. Final Step
    1. Click build now and test will run and gives your cucumber report



## Talk about cucumber report after the build

### 1. What is Page Object Model

- a. Reduces code redundancy and organizes code
- b. Helps identify elements and store it as a page object variable
- c. You can link it to where it was stored
- d. Added PageFactory design pattern

### 2. Selenium WebDriver as my automation tool

- e. Manual test it first by:
  - i. Front end
    - Functional testing
  - ii. Back-end
    - Database- SQL Developer IDE
    - API - Postman
- f. Integrate Selenium with:
  - i. Maven
    - Test package
    - Utility package
      - a. UI
      - b. DB
      - c. API
    - Configuration file
      - a. Properties
    - Driver class
      - a. Singleton design pattern
        - a. Have a private constructor
  - ii. Cucumber BDD
    - Facilitate the collaboration during the BDD process
    - Enables explaining the story and the acceptance criteria in easy language.
  - iii. Git - source control
  - iv. Jenkins
  - v. Java
    - Collections Framework
    - Apache POI
    - JDBC
    - Rest-Assured

### 3. Behavior Driven Development

- Developing together with the customer to ensure it meets the right standards for the customer

### 4. Data Driven Development

- Executing same test case against different sets of data
- Test flow should not change based on data

### 5. Cucumber reporting

- Target folder
- Jenkins



## Describe your Framework and Tests

MY FRAMEWORK and how to explain to interviewer - Andy Lam and little bit of Alex

```
//based on Data Driven and Behavior Driven - Hybrid framework
//Maven - build tool and not only for dependency management but also as a command prompt tool using the pom.xml file, I
    also have specific xml file that run my smoke,
//regression, and functionality tests
//Java as programming language - working frontend, backend(api), and database I use Java Collection framework to store
    data and compare
//i also have a properties file that stores sensitive/reusable data - URL, password, browser
//and i use TestNG testing tool to control flow and assert data, after formatting data to java, in order to find defects
I also created Driver class in utility package that uses singleton pattern to create and use only one universal webdriver
```

**FRONT END ; selenium webdriver**, and in my framework i am using **Page object model** as my design pattern; - create page objects; identify webElements and store as a webelement variable ,

POM = REUSABILITY OF ELEMENT/METHODS BASED PAGE OBJECT

```
//i also use Page Factory design pattern to instantiate my webelements using @FindBy - easier/convenient
//utility; browser util - where static reusable code that makes your life easier, to make codes for automating browser easier;
```

### BACK END (Api)

```
//using RESTASSURED in your framework in order for the process of Deserialization and serialization to occur
//that way you store Json response into a java collection data structure(/i produce high level Pojos and map objects) and assert
    the data with the expected value (also stored in java data structure)
//i also have a api utility class - reusable codes -method where one line creates a Pojo
//i use postman for manual testing first BEFORE I INVOKE MY FRAMEWORK
```

### DATABASE testing

```
//manual I sql developer for producing SQL queries
//FOR AUTOMATION ;I use JDBC library to integrate java by getting a CONNECTION from oracle database
//then creating STATEMENTS using SQL queries and then storing the data into a RESULTSET object.
//I use java data structures to use store data inside and compare them
```

```
//and since I'm using DATA DRIVEN and CUCUMBER BDD framework, all of these tests are stored inside feature files
//I have RUNNER classes that helps generate codes from FEATURE FILE and implement them into a file called b
//also have HOOK class that implements my codes that run before and after all my tests - this is where i invoke my
TAKESCREENSHOT interface which triggers when i use scenario interface(when scenario fails)
//take a picture when you are on the step that failed
//S.D - this is where i stored my codes that based on gherkin language expected value
```

### DDT

```
//if I'm working with small amounts of test data I'm going to operate with scenario outlines, this where I create examples and
    store data using pipeline
//if there are large amount of test data its usually in a external file (excel) so i use Apache POI to INVOKE DDT EXCEL
AUTOMATION and read from excel file and store the data
//into java data structure
```

//I also have a logging tool called **log4j2** to log my codes that are basically high risk

//and lastly for my reports,, in my framework i use **Rerun.txt code** in cucumber "rerun:target/rerun.txt" generated by cucumber sandwich library

//this will store my failed cucumber feature files

//then i also have **failedScenario runner class** which has the location of failed scenarios (rerun.txt)

//i create a failedScenario xml file

//so whenever I have failed feature files I use mvn command ; **mvn -Drunner=failedScenarios.xml** file to run my failed tests

//reporting - I used html report that's located in target folder which is called cucumber-reports -"html:target/cucumber-report"

**Parallel testing** - used **cucumber jvm-parallel plugin** to generate runners and **maven fail-safe plugin** to run the tests

For **continuous integration (jenkins)**

//devops takes care of configuration

//have github path

//but the tool is invoked my a mvn command - mvn verify -drunner=smoketest.xml that is provided by the tester - xml file

//for reports each build will have a cucumber report that give graphical information of test and screenshot

**How many test cases/scenarios/feature files:** 23 test cases per sprint, 150 feature files, 400 scenarios My smoke test 2 feature files, 2 scenarios each, 5 mins smoke tests run once a day.

My regression

150 feature files

400 scenarios

3 years ; 1 tester worked 3 years, second worked 2 years

**How often is your smoke test, how long does it take and tests what?** Every morning at 5am, around 5 minutes, creates 5 students in two browsers with the necessary fields, checks if it is accurately saved from both UI and database, then populate the report from the browser and also download as an excel file and then compare.

**How often is your regression test, how long does it take and tests what?** Once a week 1am, half an hour, all districts every day, only SIMS. Validation regression tests on the weekends, 5 separate EC2 machines, parallel testing for each school, submission, validation, crossvalidation and certification. Our test validates with SCS.

**Sample Scenario:** Given the SIMS report is downloaded, and the file type is an Excel File type, then the first column title must be "LASID", and every cell in the first column must be alphanumeric, and every cell in the first column must be 9 digits, and all LASID numbers must be unique.

**Sample Test Case:** Given the user is logged in, when the SIMS report is executed, then every cell in the first column must be 9 digits, and also alphanumeric.

Must Have: precondition, steps, test data, expected result, actual result

**Edge Case Scenario:** null, negative numbers, empty list/string, duplicate control, checking the limits, extreme cases (length, size)

**Risk based testing:** when there is no time to do whole regression testing, you only test the parts that matters, that is related

**Testing without requirements:** Production defects usually don't have any requirements and I talk to developer to understand the situation better and then test it.

**Example for Overloading method:** Several overloaded methods in BrowserUtils for waits. Explicit waits by locator or WebElement.

**Example for Overriding method:** Below

**Example for inheritance/abstraction:** Top bar and sidebar pages are abstract classes and some of the methods are abstract because we have different implementations based on where they are and where they click it. School/District functions are populated differently on the dropdown menus.



## From MARUFJAN Classes

### What is Jenkins?

- Continuous integration tool.
- It is used to schedule and automated builds, deployments etc. it is used for by developers and testers.

### What kinds processes can be automated using Jenkins?

- running unit tests
- building the application
- running automated UI tests
- deploying to different environments

### How Jenkins is used in your company for testing?

- In my project, we use Jenkins for scheduling and running out automated smoke tests.
- our smoke tests run every day.

### What tests you have on Jenkins?

- In my project we have our smoke and regression tests for Jenkins.

### What kind of tests can be done in Jenkins?

- So, Jenkins can run any automated test.
- For example, we can have unit tests, smoke tests, integration tests, regression tests, sanity.

### What layers of tests can be tested using Jenkins?

- Testing different layers of the application is done with our test code.
- Jenkins does not care if we are testing UI or database or API. it only kicks off the tests and sends reports.
- So, if my automated test is a UI test, it means Jenkins is running UI tests. or if my automated test is an API test it means Jenkins is running API tests.

### Who sets up Jenkins?

- In my company we have DevOps/Operations Support team who is responsible for maintaining Jenkins. those installed and configured Jenkins.
- For deployments etc. they work with developers to create jobs for building and deploying the applications.
- For creating smoke tests, they work with automation engineers.

### Who sets up smoke tests in Jenkins?

- As an automation engineer, I work with the devops/operations supports to create my smoke tests.
- For running my tests I need certain plugins installed on Jenkins, I also need Java, Maven configured on Jenkins, I also need browsers installed on the server where the tests will run.
- In my project, only devops/operations support team members have right to do the configurations above. that is why I have to work with them.
- Once the configuration of the Jenkins is completed, I can create and run the smoke test job.

### How your smoke tests are configured on Jenkins?

- Our Jenkins job is configured to get my automated tests from GitHub and run every day using Maven.
- In configuration, first I created a new job and gave name "smoke tests". then I selected option git in the Source Code Management section and entered the path to my framework on GitHub. and also entered the git credentials.
- Next configuration is about build triggers where I chose option Build periodically and enter the time how often I want to run my tests.

**In the Build section**, I choose option invoke top level maven command since my automation framework is created using maven.

- in the section I enter the maven command (without the mvn part). so fi normal command to run my test using terminal is 'mvn test', in jenkins I only enter 'test'. here I also enter the tag i want to run using command line.  
**test -Dcucumber.options="--tags @smoke"**
- if I want to run regression tests, command is:  
**test -Dcucumber.options="--tags @regression"**

**In the Post-build Actions**, I do couple configuration,

- I add Cucumber reports option. This is available because we have installed cucumber html reports plugin to our jenkins. Cucumber reports plugin will generate html report for every build. Every time we run smoke tests on jenkins, we get a new report. and all reports for all build are saved.
- I add email option as the next Post-build Actions. Here I configure it so that everyone in my agile team is notified about the test results.

**Who gets the email reports for tests?**

- Everyone in my agile team is notified about the test results.

**"Have you worked on DevOps pipeline?"**

- I have built smoke tests on jenkins which part of the devops pipeline are. devops pipeline is built and managed by DevOps/Operations Support. But our smoke test are part of the pipeline.
- So, I participated by creating and configuring the smoke tests on jenkins.

**What is the difference between integration test and end to end test?**

- **Google often suggests a 70/20/10 split: 70% unit-tests, 20% integration tests, and 10% end-to-end tests.**
- **Unit Tests**
  - Tests the smallest unit of functionality, typically a method/function (e.g. given a class with a particular state, calling x method on the class should cause y to happen). Unit tests should be focused on one particular feature
- **Integration Tests**
  - Integration tests build on unit tests by combining the units of code and testing that the resulting combination functions correctly. This can be either the innards of one system or combining multiple systems together to do something useful. It is white box testing approach . Developer develop single unit one by one and integrate it with each other and test it .
- **Functional Tests**
  - Functional tests check a particular feature for correctness by comparing the results for a given input against the specification. Functional tests don't concern themselves with intermediate results or side-effects, just the result (they don't care that after doing x, object y has state z).
- **Acceptance Testing**
  - This is the last test that is conducted before the software is handed over to the client. It is carried out to ensure that the developed software meets all the customer requirements. There are two types of acceptance testing - one that is carried out by the members of the development team, known as internal acceptance testing (Alpha testing), and the other that is carried out by the customer or end user known as (Beta testing)
- **End to End testing**
  - is where you go from point a to z and you touch various different points on the way there. It could be for a single system like the process of sending an email or it could be used where multiple systems are involved for example a student registering for a test, taking the test and then finally receiving his/her scores.
  - Its real-world system testing. Application is tested with all integrated hardware, database, network and other interfaces.





Feature: **User roles**

# in the given you need to figure out a way to find out if there are any available spots

@login @BRIT\_3521 @smoke

Scenario Outline: login as <user> type

Given the user logs in as a light-side <user>

And there are available spots for scheduling

When the user hunts for a spot

Then book button <expected> be displayed

Examples:

user	expected	
team member	should not	
team lead	should	
teacher	should	

**Parallelization** → we run our tests in parallel using the maven-surefire-plugin. we use cucumber 4 which supports parallel testing natively.

**Test data** → use feature files, excel files to store our test data in the test/resources package

### Flow of the execution or how we run tests

#### 1. running from cukes runner

we put tag in the cukes runner and right click and run the file. cukes runner runs all the matching tags.

#### 2. run from terminal as a maven command

we enter command mvn verify or mvn test to kick off the tests. and maven will run the cukes runner files shown in the pom file. cukes runner file runs the features matching the tags it has.

### GIT branching

#### how do you do git branching now?

Currently HOW IT IS DONE IN GROUP PROJECTS:

There is master branch and separate branches for each team member. when someone finishes work, they push to their own branch, then after reviewing it is merged to master.

#### HOW WE DID IT?

in my project we had master, develop and branch for person. so, if we have 2 automation testers, we will have

master

develop

tester1

tester2

each tester check in to their own branches. then after reviewing it is merged to develop branch. we merge master and develop only once a sprint.

★ in the interview when they ask about branching, talk about your automation project branching strategy. in your project, your code is separate repo from the application code repo. Automation framework have a smaller code base and fewer people involved. So, we can have less complicated branching policy.

## TALK ABOUT FRAMEWORK

### Tools:

**Java:** My framework is written using Java language

**Maven:** My framework created as a maven project, maven is used to manage dependencies and also run our tests as mvn goals from terminal

**Selenium WebDriver:** a library/tool/api which is used to automate the browser, it interacts with the browser.

**TestNG:** used to group tests using xml files, do soft and hard assertions, create test methods, run in certain order

**Extent:** my framework generates detailed HTML reports with is easy to read and understand to non-technical team members. My reports have details test steps and screenshots for any failures that may occur. It can also do metrics on what percentage is passing, failing, skipped etc.

**IDE:** I use IntelliJ in my current framework, but I am also quite comfortable with Eclipse with I used previously

### Design:

**Page Object model:** my framework used page object model according to which I created a separate class for the pages of my application.

**PageFactory design:** a design which makes it easy to access the page object class.

this is not Page factory design. it is class which has the same name as the PageFactory design:

PageFactory.initElements(driver, this)

**Singleton Driver:** My frameworks uses a singleton pattern to share the webdriver instance between different classes

**TestBase:** My framework has a testbase class which my tests extent. testbase class has the common steps for all my tests.

**configuration file:** used to store the important test data

**utilities:** have reusable utilities which can be used across different classes of my framework

### Benefits:

#### easy to maintain:

My framework uses **page object model** which makes it easy to maintain. for example, if I have to update any locator, I only need to do one code change.

I try to make my tests independent from each other. this mean if I update one test, it will not affect others and also if one fails, others will not be affected.

test 1

test 2

test 3

**easy to extend;** it is easy to add new test cases to my framework.

**easy to reuse;** I have page object model, utilities which I can reuse for any tests.

**Multi browser testing:** my framework can run the same tests against different browsers with minimal code change

**Types of tests:** My framework can test the UI, database and API of the application.

**Packaging:** I have create different packages for different types of classes and logic. Each page package only contains classes with same functionality.

**Naming conventions:** in my team we pay a lot of attention to coding standards, especially naming conventions. Classes, methods variable are named on based on what they do and follow a standard

#### Page object class:

homepage, loginpage

**Variables:** loginButton, signOutLink

**Methods:** login(): this method only used to login, not for other functionality.

### **Data Driven Framework**

a framework where tests are executed based on set of data, framework is designed to read data from outside sources like excel and run tests based on the data. In data driven framework we can execute the same test multiple times against different sets of data.

### **Page Object Model Framework**

uses the page object design pattern according to which we create a separate java class for each page of the application

Behavior Driven Framework

we will talk about it later

Keyword Driven Framework

In KDF we use keywords in outside source (excel. csv) to run our tests. Framework is designed to read the data and steps from excel and execute actions based on it.

Once KDF is set up even non-technical testers can write and execute automated tests.

### **Hybrid Framework**

hybrid framework is a framework uses at least two of the types given above



## JAVA Interview Technical Questions

### Reverse String - For Loop

```
public static String reverseString(String str) {
    String reverse= "";
    for(int i = str.length()-1; i >=0; i--) {
        reverse += str.charAt(i);
    }
    return reverse;
}
```

#### BEST WAY:

```
String name= "Alper Aslan";
String reversed = new StringBuilder(name).reverse().toString();
System.out.println(reversed);
```

### Reverse String - StringBuilder

```
public static void main(String[] args) {
    String str = "Hello World";
    StringBuilder sb = new StringBuilder(str);

    System.out.println(sb.reverse()); }
}
```

### Reverse String - Char Array

```
public void printReverse(char[] letters, int size){
    for (int i = letters.length-1; i >= 0 ; i--){
        System.out.print(letters[i]);
    }
}
```

### Prime Number

```
public static boolean checkPrime(int n) {
    if (n <= 1) {
        return false;
    }
    for (int i = 2; i < Math.sqrt(n); i++) {
        if (n % i == 0) {
            return false;
        }
    }
    return true; }
}
```

## Palindrome

```
public static boolean isPalindrome(String str) {
    if(str == null)
        return false;
    StringBuilder sb = new StringBuilder(str);
    return sb.reverse().toString().equals(str); }

```

## Palindrome - with charAt()

```
public static boolean isPalindrome(String s) {
    int head = 0;
    int tail = s.length() - 1;
    while (head < tail) {
        if (s.charAt(head) != s.charAt(tail)) {
            return false;
        }
        head++;
        tail--;
    }
    return true; }

```

## Reverse String - ArrayList - Iterator

```
public static void main(String[] args){
    String input = "Geeks For Geeks";
    List<Character> arrList = new ArrayList<>();

    for (char c: input.toCharArray()){
        arrList.add(c);
    }
    Collections.reverse(arrList);

    Object[] arr2 = arrList.toArray();

    for(int i = 0; i < arr2.length; i++) {
        reverse += arr2[i];
    }
    System.out.println(reverse);
}

```

## ANOTHER WAY

```
String reverse = arrList.stream()           // Stream<Character>
    .map(String::valueOf)                  // Stream<String>
    .collect(Collectors.joining());

```

### Factorial

```
int number = 10;
int factorialSum = 1;

for(int i = 1 ; i <=number; i++) {
    factorialSum = factorialSum * i;
}
System.out.println("Factorial of " + number + " is " + factorialSum); }
```

### Sum of Digits

```
int number = 1346;
int sum = 0;

while(number > 0) {
    sum += number%10;
    number = number/10;
}
System.out.println(sum); }
```

### Armstrong

```
int sum = 0;
int digit;
int temp;
int number = 370;
temp = number;
while(temp >0){
    digit = temp %10;
    sum = sum + (digit*digit*digit);
    temp = temp /10;
}
if(number==sum)
    System.out.println(number + " is an armstrong number");
}else
```

### Merdiven

```
for(int x = 1; x<=5; x++) {
for(int y=1; y<=x; y++) {
    System.out.print(y+"");
}
System.out.println(); }
```

### Fibonacci

```
int a = 0;
int b = 1;
System.out.print(a + " " + b + " ");

for(int i = 2; i <=10; i++) {
    int c = a+b;
    a = b;
    b = c;
    System.out.print(c + " + ");
}
```

### Swap Two Numbers Without Using A Temporary Variable

```
// one line methods
a = a ^ b ^ (b = a); //method 1
b = (a + b) - (a = b); //method 2
a += b - (b = a); //method 3

// temporary variable
int temp = a;
a = b;
b = temp;
```

### Largest Number in Array using Arrays

```
int [] arr = {5, 6, 76, 31, 43, 1};
Arrays.sort(arr);
System.out.println(arr[arr.length-1]);
```

### Largest Number in Array using Collections

```
public static int returnLargest(Integer[]b, int total) {
    List<Integer> list1 = Arrays.asList(b);
    Collections.sort(list1);
    int largest = list1.get(total-1);
    return largest; }

public static void main(String args[]){
    Integer x[] = {4,3,2,12,54,34,88};
    System.out.println(returnLargest(x,7));
```

### Largest Number in Array using Collections

```
public static int getLargest(int[] a, int total){
    int temp;
    for (int i = 0; i < total; i++) {
        for (int j = i + 1; j < total; j++) {
            if (a[i] > a[j]) {
                temp = a[i];
                a[i] = a[j];
                a[j] = temp;    }}}
    return a[total-1]; }
```

### Reverse Number

```
public static int reverse(int number){
    int reverse = 0;
    int remainder = 0;
    do{
        remainder = number%10;
        reverse = reverse*10 + remainder;
        number = number/10;
    }while(number > 0);

    return reverse; }
```

### Find First Two Max Number in an Array

```
public void GetTwoMaxValues(int[] nums) {

    int maxOne = 0;
    int maxTwo = 0;

    Arrays.sort(nums);
    System.out.println("Max1 - " + (nums[nums.length-1]));
    System.out.println("Max2 - " + (nums[nums.length-2]));
}
```

### Division without using Divide or Mod Operator

```
public static String division(int dividend, int divisor) {
    int quotient = 0;
    int remainder = 0;
    while(dividend >= divisor) {
        dividend = dividend - divisor;
        quotient++;
        remainder = dividend; }
    return "quotient = " + quotient + " remainder = " + remainder;}
```



## Binary Search (Faster than Linear) -

It finds the position of a target value within a sorted array. Binary search compares the target value to the middle element of the array. If it is match then return true, if not you divide it again until you reach.

```
public static void binarySearch(int arr[], int first, int last, int key){
    int mid = (first + last)/2;
    while( first <= last ){
        if ( arr[mid] < key ){
            first = mid + 1;
        }else if ( arr[mid] == key ){
            System.out.println("Element is found at index: "
                               + mid);
            break;
        }else{
            last = mid - 1;
        }
        mid = (first + last)/2;
    }
    if ( first > last ){
        System.out.println("Element is not found!"); }
}

public static void main(String args[]){
    int arr[] = {10,20,30,40,50};
    int key = 30;
    int last=arr.length-1;
    binarySearch(arr,0,last,key); }
```

## Bubble Sort

Current element is compared with the next element. If current element is greater than the next element, it is swapped.

```
public static void bubbleSort(int[] arr) {
    int n = arr.length;
    int temp = 0;
    for(int i=0; i < n; i++){
        for(int j=1; j < (n-i); j++){
            if(arr[j-1] > arr[j]){
                temp = arr[j-1]; //swap elements
                arr[j-1] = arr[j];
                arr[j] = temp;
            } } } }
    public static void main(String[] args) {
        int arr[] ={3,60,35,2,45,320,5};
        bubbleSort(arr);//sorting array elements using bubble sort
        System.out.println("Array After Bubble Sort");
        for(int i=0; i < arr.length; i++){
            System.out.print(arr[i] + " ");
        }
    }
}
```

## Filter Duplicates in an Array

```
public static void main(String[] args) {
    ArrayList<String> list = new ArrayList<String>();

    // Form a list of numbers from 0-9.
    for (int i = 0; i < 10; i++) {
        list.add(String.valueOf(i));
    }
    // Insert a new set of numbers from 0-5.
    for (int i = 0; i < 5; i++) {
        list.add(String.valueOf(i));
    }

    System.out.println("Input list : " + list);
    System.out.println("\nFiltered duplicates : " + processList(list));    }

    public static Set<String> processList(List<String> listContainingDuplicates) {

        final Set<String> resultSet = new HashSet<String>();
        final Set<String> tempSet = new HashSet<String>();

        for (String yourInt : listContainingDuplicates) {
            if (!tempSet.add(yourInt)) {
                resultSet.add(yourInt);
            }
        }
        return resultSet;    }
}
```

## Biggest Palindrome

```
public static String biggestPalindrome(String str) {
    str = str.toLowerCase();
    String biggestPalindrome = "";
    String[] arr = str.split(" ");

    for(String each : arr) {
        String reverse = "";
        for(int i = each.length() - 1; i >= 0; i--) {
            reverse += each.charAt(i);
        }
        if(each.equals(reverse) && each.length() >
            biggestPalindrome.length()){
            biggestPalindrome = each;    }
    }
    return biggestPalindrome; }
}
```

## Remove Extra Spaces from a String

```
public class removeExtraSpaces {
    public static void main(String args[]){

        String input = "Try    to    remove    extra    spaces.";
        StringTokenizer substr = new StringTokenizer(input, " ");
        StringBuffer sb = new StringBuffer();

        while(substr.hasMoreElements()){
            sb.append(substr.nextElement()).append(" ");        }

        System.out.println("Actual string: " + input);
        System.out.println("Processed string: " + sb.toString().trim()); }
}
```

### ANOTHER WAY

```
String input = "Try    to    remove    extra    spaces.";
String inputNew = input;

while (inputNew.contains(" ")) {
    inputNew = inputNew.replace(" ", " ");
};

System.out.println(input);
System.out.println(inputNew);
```

## Count number of Vowels & Consonants

```
public static String numbers(String word) {
    int countVowels = 0;
    int countConsonants = 0;

    List<Character> vowels = Arrays.asList('a', 'e', 'i', 'o', 'u');
    List<Character> consonants = new ArrayList<>();

    for(char i = 'a'; i <= 'z'; i++) {
        if(!vowels.contains(i)) {
            consonants.add(i); }
    }
    word = word.toLowerCase();

    for( int i = 0; i < word.length(); i++) {
        if(vowels.contains(word.charAt(i))) {
            countVowels++;
        }else {
            countConsonants++; }
    }
    return "number of vowels is " + countVowels + " and number of consonants is " +
countConsonants; }
}
```

## Dynamic - Runtime Polymorphism

```
class Animal {
    void eat() {
        System.out.println("eating"); }
}
class Dog extends Animal {
    void eat() {
        System.out.println("eating fruits");}
}
class BabyDog extends Dog {
    void eat() {
        System.out.println("drinking milk");
    }
}
public static void main(String args[]) {
    Animal a1, a2, a3;
    a1 = new Animal();
    a2 = new Dog();
    a3 = new BabyDog();
    a1.eat(); // prints "eating"
    a2.eat(); // prints "eating fruits"
    a3.eat(); } }
```

## Dynamic Polymorphism with Multilevel Inheritance

```
class Animal {
    void eat() {
        System.out.println("animal is eating..."); }
}
class Dog extends Animal {
    void eat() {
        System.out.println("dog is eating..."); }
}
class BabyDog1 extends Dog {

}

public static void main(String args[]) {
    Animal a = new BabyDog1();
    a.eat(); }
}
```

## Xpath - Following Sibling

```
Following-sibling::siblingName[1];
Parent::parentTag
//label[starts-with(@id,'message')]
```

## Compile Time Polymorphism

```
class Overload {
    void demo (int a) {
        System.out.println ("a: " + a); }

    void demo (int a, int b) {
        System.out.println ("a and b: " + a + "," + b);
    }
    double demo(double a) {
        System.out.println("double a: " + a);
        return a*a; }
}

class MethodOverloading {
    public static void main (String args []) {
        Overload Obj = new Overload();
        double result;
        Obj .demo(10);
        Obj .demo(10, 20);
        result = Obj .demo(5.5);
        System.out.println("O/P : " + result); } }
```

All even numbers (  $i \% 2 == 0$  ) between 1-100

All odd number ( $i \% 2 != 1$ )

Runtime polymorphism can't be achieved by data members.

## To convert String to Double

```
Double doubleString = Double.parseDouble(toBeDouble);
Double doubleStr = Double.valueOf(toBeDouble);
```

To convert Double to String

```
String strDouble = String.valueOf(toBeString);
String stringDouble = toBeString.toString();
```

```
public static char returnFirstChar(String str) {
    return str.charAt(0);
}

public static char returnLastChar(String str) {
    return str.charAt((str.length()-1));
}
```

## Alerts

```
Alert alert = driver.switchTo.alert();
alert.accept(); alert.dismiss(); alert.sendKeys() alert.getText()
```

## Implicit Wait

```
driver.manage.timeouts.implicitlyWait(5 seconds)
```

## Explicit wait

```
WebDriverWait wait = new WebDriverWait(driver,30);
    WebElement element = wait.until(
ExpectedConditions.elementToBeClickable(By.id(item)));
visibilityOf(), alertIsPresent()
```

## Excel - Apache POI

```
public void readExcel() throws IOException {
    String filePath = "D:\\sampledoc.xls";
    FileInputStream fis = new FileInputStream(filePath);
    Workbook wb = WorkbookFactory.create(fis);

    Sheet sh = wb.getSheet("Sheet1");//getSheetAt(1)
    // To get the number of rows present in sheet
    int totalNoOfRows = sh.getRows();
    // To get the number of columns present in sheet
    int totalNoOfCols = sh.getColumns();
    for (int row = 0; row < totalNoOfRows; row++) {
        for (int col = 0; col < totalNoOfCols; col++) {
            System.out.print(sh.getCell(col, row).getContents() + "\t");
            System.out.println();}

    Row row= workSheet.getRow(0);
    Cell cell=row.getCell(0);
    System.out.println(cell.toString());

    Cell cell=row.getCell(0);
    cell.setCellValue("coffee");
    FileInputStream outputStream = new FileInputStream(filePath);
    workbook.write(outputStream);
```

## JDBC - Database Connection

```
Connection connection=DriverManager.getConnection(Url, User, Pass);
Statement statement=connection.createStatement
(ResultSet.TYPE_SCROLL_INSENSITIVE,ResultSet.CONCUR_READ_ONLY);
ResultSet resultSet = statement.executeQuery("select * from countries");
resultSet.last(); //find out how many records in the resultset
int rowCount = resultSet.getRow();
System.out.println("Number of rows:" + rowCount);

resultSet.first();
while(resultSet.next()) {
System.out.println(resultSet.getString(1)+"-"+resultSet.getString("country_name")+"-
"+resultSet.getInt("region_id"));}
```

## Select Class

```
Select carsList = new Select(e1);
carList.getFirstSelectedOption();
assertEquals("some text",carList.getFirstSelectedOption().getText())
```

## Iframe

```
Driver.switchTo.frame(webElement or id as String or index)
```

## WindowHandle

```
getWindowHandles()
for(String handle : driver.get().getWindowHandles())
driver.switchTo.window("handle"):: takes a string
If (driver.getTitle().equals(expected title)
break;
```

## Action Class

```
WebElement e1 = driver.findElement
Actions actions = new Actions (driver).perform
actions.doubleClick(e1).perform
```

## File upload

```
Public void fileUpload(String path){
WebElement upload = driver.findElement;
Upload.sendKeys(path)
```

## SQL - Inner Join

```
SELECT e.FIRST_NAME, e.SALARY, j.JOB_TITLE  
FROM EMPLOYEES e INNER JOIN JOBS j ON e.JOB_ID = j.JOB_ID;
```

## Desired Capabilities - Certificate Issue

```
DesiredCapabilities capability = DesiredCapabilities.chrome();  
// To Accept SSL certificate  
capability.setCapability(CapabilityType.ACCEPT_SSL_CERTS, true);  
System.setProperty("webdriver.chrome.driver", "E:/chromedriver.exe");  
// create Google Chrome instance and maximize it  
driver = new ChromeDriver(capability);
```

## Display the 5<sup>th</sup> Row from the table

```
SELECT * from (SELECT EMPLOYEE_ID, FIRST_NAME, ROWNUM AS RN  
FROM EMPLOYEES) WHERE RN = 5;
```





## B10 – REAL LIFE INTERVIEW QUESTIONS:

Shahin G.

- Tell us about your project.
- Where do you use Java?
- What's the difference between String and StringBuilder?
- What's the difference between stack and heap?
- What are joins (SQL)?
- What is the use of Scenario Outline?

Ibrahim S.

- What tools you are using backend testing and What do you test in Backend Testing in your project
- What is selenium identifier?
- Difference between explicit and implicit wait, give me an example?
- what is java synchronized data structures and when do you use?
- do you use JENKINS, (yes), what SRC tools you are using with Jenkins?
- What is your approach to create Test Strategy and Test Plan?
- What is browser compatibility testing?
- What are the steps involved in creating Test automation framework?

Enes S.

- I see you have AWS certification,
  - can you little talk about?
  - how do configure jenkins on EC2
- Day to day activities
- he opened a google doc document and wanted to me write some value as a list and key value for map--> how do you put inside map
- in selenium how do scroll down if the element is not visible--> he wanted me type jsxecuter scroll down method
- What is stream in Java?

Feruk C.

- Could explain your current and last job project?
- How many API are you using in your current project?
- Do you familiar with the cloud system and can you explain it?
- Do you have experience with AWS, please explain it?
- Can you explain your team structure?
- Why do you interested in this position and Why would we hire you?
- Have you ever create a framework from scratch?
- Can you explain your BDD framework and what was the reason you need data-driven framework on your current project and please explain it?
- Can you explain the tools you use in your current project?
- Difference between JMeter vs PostMan?
- Do you know how to do integration testing?

Merve O.

- I explained my framework in detail.
- And he asked me about smoke and regression testing
  - how do you know it is smoke or regression testing?
- He asked about the OOP
- Abstract and interface?
- Inheritance (I give an example in more human language)
- Explicit wait and Implicit wait
- He talked about Jira and bitbucket

Toufiq N.

- Tell me about your day to day activities?
- What is WebDriver in terms of Java?
- How do you reverse a string in Java?
- JUnit annotations vs testNG annotations?
- How do you handle pop ups in browser with Selenium?
- How do you handle a drop down in a browser?
- Say we are in a browser, and there was 5 different elements that directed us to a different link. Once we click on an element and a new window pops up, how do you switch to that window?
- What method in Selenium provides if the checkbox button is selected or not?
- What is the difference between XSSF and HSSF?
- What is the difference between implicit and explicit wait?
- What is the difference between Set and a List?
- What is a HashMap in Maps framework?
- What is the difference between PUT and POST http protocol and API?
- What is a query parameter in API?
- Tell me about your framework? (don't just mention what tools you have used in your framework, explain HOW you have used these tools in your framework and WHY you have used these tools...)
- Define your POM.xml in your framework? (what it is used for, why it's important for your framework and how it effects... )
- What is the difference between Overloading and Overriding in Java?
- Can a subclass class call a parent class's functions which is initialized as final in Java?
- What is the difference between FindElement() and FindElements() ?
- Are you familiar with Jenkins? What do you use it for?
- What is a garbage collector in Java?
- What is an inner join in SQL?
- What is a left join in SQL?
- What is a right join in SQL?
- What is a Union in SQL?
- What are constraints in SQL?
- What is URI and its purpose in terms of API?
- What type of Authentication are there in API? What is an OAuth(Oauthenticaiion)?
- How do you handle Exceptions in Java?
- Give me different types of conditional statements in Java? (if-else, ternary, switch statement...)
- What are different ways of locating an element in Selenium?
- In terms of locating an element, what is a single slash(/) and double forward slash(//)?
- What is Encapsulation in OOP?
- What is the difference between a Primary and a Foreign key in SQL?
- What is the difference between an Array and a Vector (Collections framework)?

Tarik K.

### **WEBEX INTERVIEW**

- Can you explain briefly about your last project and your experience with Selenium and Cucumber specifically?
- Can you explain little bit about your automation framework?
- Can you talk about your team structure?
- Let's say you're given some test cases; how do you decide them to automate or not? Can you tell me any specific factors?
- How big is your regression suite?
- Follow up Q for this -> Are all of these(test cases) more like UI based or REST based?
- How long does it take to complete one cycle of execution of Regression suite?
- After you execute them, do you see any failures or they're running perfectly fine?
- Can you tell me one automation challenge you faced and how did you solve?
- How do you handle dynamic elements on a webpage?
- Do you perform back end validations other than API? (He asked about database validation and how I do it)
- Do you have any experience with test management tools such as Jira and ALM?
- Does your Java code identifies and logs defect in Jira automatically or you do it manually?

- Can you tell me about your reporting structure? How do you organize your reports?
- Do you have any experience with other test automation tools like UFT, Protractor?
- Can you tell me about your source control structure?

#### **SKYPE INTERVIEW**

- Can you tell me about yourself?
- Can you tell me about your project, framework, and tools/technologies you use?
- You said you're also working with DDD, where do you get your test data? Is it from examples table or from external source?
- When using API, what are the different status codes you are getting?
- What are the components in the Cucumber feature file?
- Can we use background for only one scenario?
- What kind of browsers did you use for UI automation?
- How often do you run your smoke tests? What kind of CI/CD process you follow?
- How many test cases do you have in your regression suite?
- How often do you run your regression suite?
- How long is your sprint?
- How do you implement OOP in your framework?
- How do you use Maven? (I told her about maven commands to run my tests and she asked what are those commands)
- Have you use Collections framework in your project?
- Can you tell me one challenge or scenario while you automating? (After I explained the challenge, she asked more details about that challenge)
- How do you handle browser pop-ups?

#### **TELECONFERENCE INTERVIEW**

- Can you tell me about yourself while waiting X (SDET team member) to join the call?
- Tell me about your current Scrum Team, what is your role, how many people are there?
- What is your contribution to the team as an SDET?
- SDET team member joined the call and asked: Can you walk me through your framework? What are the technologies and tools you use? How is your test execution happening?
- You also mentioned you're maintaining smoke and regression suites, how do you organize them?
- Can you walk me through all the steps to create a job? (Jenkins)
- How does your Jenkins sends the reports? How do you store the reports? What kind of reports do you using?
- Who receives the reports email?
- Can you tell me how the cucumber works technically? Explain the steps to execute Cucumber tests?
- Can you walk me through your Runner class? What is inside in the class?
- You also mentioned that you used Page Object Model in your class, could you talk about the structure of your page object classes?
- Can you tell me the difference between Credit Union and Bank?
- Who can be members of Credit Union?
- Does the application you're working on has a database?
- Do you run your own queries, or someone does it for you?
- Can you tell me difference between Inner Join and Outer Join?
- This could be technical or non-technical, tell me something that you learned while working in X (first company that I worked) ?
- Do you have an implementation of API testing in your framework? How did you use it and what tools did you use?
- Can you tell me about your POJO's?
- What are the HTTP status codes that you're working on daily basis?

Khazar M.

- How many test cases do you have in your regression suite?
- How often do you run your regression suite?
- Tell me about yourself.

- A: I started my IT career in 2013 as a manual tester. Then I learned Java and at the same company after a year started doing automation using Java. Although I specialized in Automation, so far performed QA in Healthcare, Insurance and Finance domains using both manual and automation techniques. I am very comfortable in Java and OOPS concepts. So far, I worked with Maven, Gradle built BDD, DDF and Hybrid frameworks using POM design pattern and used testing tools such as TestNG, JUnit, Cucumber, Selenium WebDriver and libraries such as Apache POI, Rest-Assured, Jackson, JDBC in it. Experienced in SQL, performing Data Integrity Test with RDBSs such as Oracle, PostgreSQL and MySQL. I am very comfortable in creating different type frameworks and can easily adapt and maintain existing ones. I am experienced in Smoke, Regression, Functional and Back-End testing. So far, I worked in Waterfall and Agile/Scrum methodologies and well experienced in all phases of SDLC, STLS and Bug Life Cycle. Participated closely in all scrum ceremonies and played important role as a cross-functional team member. I am very positive, result oriented, adaptive team-player and my friends say you have great interpersonal and communication skills, I can work under pressure in order to meet deadline. Quick learner and flexible person.
- 1. Test cases, tests, duration, sprint, release:
  - Smoke: About 20 test cases and it executes during 16 mins +-20 secs, executes every day at 7 am
  - Regression: 500+ test cases, 200+ feature files 2-4 scenarios each and executes during about 5.5- 6 hours-executes every sprint, every release, after new functionality added, after major bug fixed
  - Each sprint 3- 5 user stories
  - 1-2 test cases a day, 15-20 test cases per sprint
  - Release every 2 month(4 sprints), about 14-18 user stories, 60- 70 test cases per release.
- Tell me about your agile process:
  - A: Agile processes generally promote a disciplined project management process that encourages frequent inspection and adaptation, a leadership philosophy that encourages teamwork, self-organization and accountability, is a set of engineering best practices intended to allow for rapid delivery of high-quality product. My sprint is 2 weeks. We make all scrum ceremonies and additionally we have some other meetings as well: mid-sprint(2nd Tuesday), before release(every 2 months), grooming and knowledge transfer(every month) meetings. We start our sprint with sprint planning meeting, and we learn part of the application which we are going to develop and test. After we get the general idea about the project, we do sprint grooming for giving some estimate points and time for the stories. Our release is in every 2 months. When the sprint starts, we do daily standup meeting everyday morning and we discuss what we did yesterday, what we are going to do today and if there is any blocker. End of the sprint we usually do sprint Demo. as SDET, in my team I have done presentations and go over the functionalities. Clients, stakeholders or business people will ask questions about the technical part that they don't understand. After sprint demo we do sprint retrospective meeting. in sprint retro we talk about what went good in last sprint. what kinds of mistakes we made all the good and bad! and we go over them and make sure we don't make the same mistakes again. about the good parts we would keep continue and try to be better for coming sprint.
- Tell me about your team:
  - A: My team consist of adaptive, cross-functional and self-organized individuals that highly motivated and knowledgeable. We are 4 developers, 3 testers- 1 manual, 2 automation, 1 BA, 1 scrum master.
- What is your role and responsibilities in your current project?
  - A: As a automation engineer, I develop/modify my "testing framework" which is based on POM design pattern.
  - I perform various type of testing such as functional testing, smoke testing, regression testing, back end testing.
  - I am responsible to execute regression test when the is new functionality in the application or at end of the sprint or after any major bug fixed.
  - I am also responsible to check reports of smoke test to make sure that environment is up and running first thing in the morning. If there is any issues, I will analyze them. if it is server issue, i will immediately contact developers. if it is about my scripts, i will debug them. if it is a defect i will reproduce it and log the defect.
  - Now, we have about 80% of automated test cases. It was my main accomplishment, before 50/50
  - Also, I was involved in Back-end automation activities, so I was using rest-assured library for automation, Postman-Client for manual API testing. I was performing API testing with PostgreSQL DBs
  - I'm using Jira as bug tracking tool. once the bug was fixed by developers, I retest it and if it passes, I close it. if the defect is not fixed I will re-open my ticket. Also, as a part of the Agile-Scrum team, I participate in the several walkthrough meetings for requirement reviews and provide valuable feedback to the BA. Lastly, I'm a cross-functional team member that is always willing the help my team in any way to achieve our sprint goal. This is pretty much about my role as a automation engineer in my current project.
- Tell me about your framework:

- My framework in my current project is Maven built, Selenium Java BDD framework with DDT in it. Framework is developed by using POM and Singleton WebDriver design pattern. I actively participate in developing and maintaining the framework by adding new page objects, generic and functional methods relying on OOPS.
- The framework uses Cucumber with JUnit and can execute Data integrity Testing using JDBC and API Testing using RestAssured libraries. Framework handles automation scripts about 80% of all tests. Framework connected remotely to GitHub repo for source control and Continuous Integration by Jenkins. It generates cucumber Json and html reports with failure screenshots. It is well organized and easy to understand and adapt.
- Meetings:
  - Sprint planning- 1st week 1st day- Tuesday
  - Sprint demo- 2nd Monday morning
  - Sprint retro- 2nd Monday afternoon
  - Daily stand-up every day at 10 am
- Tell me about your application and what functionality you are working on currently
  - My application is web application, We provide wide banking, investment and brokerage services. Right now, we are working on Individual approach functionality on mortgage requests, so when customer applies for mortgage, the approval result not only depends on credit report and income, also his membership history and assets play important role in decision. It gives you opportunity to insure your mortgage by your assets or involve them. Last Bug found- in requirement says that you can choose that option after credit report. System automatically shows you minimum recommended amount for insure your loan if needed. And also it allows you to enter manually and shows the minimum boundary value. When you enter less after leaving the amount box error message should be displayed next to the box. But actual result was different message which is related to investment types.
- 2. Imagine you have a room with no window, one closed door, there are 3 bulbs inside and 3 switches outside. You are allowed to open the door once. How you can define which switch is connected to which bulb.
- 3. A good one-hour questions about Rest Api. They almost asked everything, Pojo included.
- 4. if you have list of elements how you can pick certain element to check if it is visible or not?
- 5. How you integrate with developers?
- 6. What's your approach to create test plan, test case?
- 7. As you know Api use static methods, it takes a long time to execute our test cases, we cannot run them parallel, because it uses static methods, what do you think how can we reduce that execution time and make it shorter?
- 8. How you can check functionality of any method in library does it work properly or not?
- 9. Please draw your framework how you use POM in your framework
- 10. How do you perform stress testing, unit testing and integration testing
- 11. When we use static objects while executing parallel testing it gives conflicts, do you have better suggestions?
- 12. What type of API's do you know, which one you prefer, why?
- 13. What's difference between xpath and css? which one you prefer? why? what are challenges?
- 14. We are sending request to the server and getting back response as an java object, How can you test the response?
- 15. Why do you use Junit with Cucumber? not TestNG?
- 16. Can you tell me pros and cons of Cucumber?
- 17. How do you configure you API library? How you call methods from that lib?
- 18. Tell me about yourself, your framework, your role
- 19. Why did you apply to this company, talk about our culture and about what we are doing
- 20. One-unit testing task, one java task (check if the word is Palindrome)
- 21. Right now we are having a performance issue with our load balances(displayed the graphical issue with all data flow) how you can solve this challenge?
- 22. My friend is director of QA in your company, do you know George? ☺
- 23. Talk about postman, how do you perform testing using Postman?
- 24. how to put body in your request (API)?
- 25. How do you define your test data? where do you get it?
- 26. Do you do testing in dev environment?
- 27. When creating a framework what do you take into account?
- 28. How do you solve timeout challenges? I don't rely on wait methods which selenium provides? How do you find proper wait method when there is timeout issue?
- 29. In our API library there is a search method which accepts a parameter sends request to the server and returns back a java object, how would you test that response? (edited)
- 30. You wrote a method for aaaabbbccddaa==> a4b2c3d2a, good.! What datas will you use to check if your method works correct or not? *(answer is at the end of these questions)*
- 31. What do you do in your free times?

- 32. What do you do when you free at work? just get your phone and play games?
- 33. Who decides which test cases to automate and how it is defined?
- 34. How often you work remote and does it reduce productivity of work?
- 35. He took a pen and draw a unique figure and put dot in it, said this is a map and you are here, what paths will you choose to define the gas stations in this map? I said i ll grub my phone and google it)

*write a method to get string and return as below:*

*aaaabbccdda==> a4b2c3d2a*

```
public class returnWord {
    public static void main(String[] args) {
        System.out.println(getword("aaaabbccdda"));
    }
    public static String getword(String word) {
        int count=1;
        String ret="";
        for (int i = 0; i < word.length()-1; i++) {
            if(word.charAt(i)==word.charAt(i+1)) {
                count++;
                continue;
            }else {
                ret=ret+word.charAt(i)+count;
            }
            count=1;
        }
        ret=ret+word.charAt(word.length()-1);
        return ret;
    }
}
```

## Interview Questions

### \* JVM:

- is java virtual machine the jvm actually runs java byte code .class files
- write once and run everywhere -> bytecode

### \* JRE:

- is java runtime environment is what you need to run a java program and contains a jvm among other things.

### \* JDK:

- is java developer kit -- the jdk is what you need to compile java source code. java to .class file
- to program in java you will need jdk you can install JDK from oracle website.

---

### \* difference between Path and classPath?

- Path:
  - is used to define where the executables are .exe files java.exe, javac.exe etc
- Class path:
  - is used to specify location of Java.class files
- java source code -> compile (javac) -> bytecode .class extension

---

### \* versions of java you worked with?

#### \* what is the difference between Java 7 and 8?

- | - Version    | Release | end public dates            |
|--------------|---------|-----------------------------|
| - Java SE 7  | 2011    |                             |
| - Java SE 8  | 2014    | january 2019, december 2020 |
| - Java SE 9  | 2017    | March 2018                  |
| - Java SE 10 | 2018    | September 2018              |

- | JAVA 7                        | vs | JAVA 8 }                                                 |
|-------------------------------|----|----------------------------------------------------------|
| - String in Switch statement  |    | - Lambda Expression                                      |
| - Multiple Exception Handling |    | - pipelines and Streams                                  |
|                               |    | - date and time API                                      |
|                               |    | - Java 8 interface changes Static Method, Default Method |

---

### \* What is garbage collector and how many types?

- Automatic garbage collection is the process of looking at heap memory identifying which objects are in use and which are not and deleting unused objects
- An in use object or a referenced object means that some part of your program still maintains a pointer to that

object

\* Garbage Collectors

- serial : works with a single thread works for single threaded apps
- parallel: uses multiple threads for managing heap space
- CSM: (current mark sweep) uses multiple GC threads
- G1: is designed for application running on multiprocessor machines with large memory space. breaks heap into smaller

regions

\* how to call Garbage Collector?

- System.gc();

---

\* Explain Public Static void main (String args[])

- public:

public is an access modifier which is used to specify who can access this method. Public means that this method will

be

accessible by any Class.

- static:

It is a keyword in java which identifies it is class bases

i.e

it can be accessed without creating the instance of a

class

- void:

it is the return type of the method void defines the

method which

will not return any value

- main:

it is the name of the method which is searched by JVM as a starting point for an application with a particular

signature only.

it is the method where the main execution occurs

- String args:

it is the parameter passed to the main method

---

\* can one class call another class main method?

- yes a main method can be called in another class main method
- code will compile without main method but will not run

---

\* what are the primitives and wrapper classes?

- every primitive data type has a class dedicated to it
- these are known as wrapper classes because they wrap the primitive data type into an object of that class.
- we can convert from one type to another using casting

\* PRIMITIVE  
boolean

\* WRAPPER CLASS  
Boolean

\* CONSTRUCTOR ARGUMENT  
boolean or String



byte	Byte	byte or String
char	Character	char
int	Integer	int or String
float	Float	float double or
String		
double	Double	double or String
long	Long	long or String
short	Short	short or String

---

\* implicit casting vs explicit casting?

- Implicit Casting:

```
int i = 100;
double d = i;
```

- Explicit Casting:

```
int n = 12;
byte b = (byte)n;
```

- Auto - Boxing

```
Integer num = n;
```

- Un - Boxing

```
int j = num;
```

DONT WORK:

```
Integer i = new Integer(100);
double d = i ; // will not work
```

---

\* difference between Instance Variable and static Variable?

- Static Variables:

belongs to the class itself not to objects  
of the class, different objects can not have

different

values for a static variable. only one copy of

static variable

for everyone. Every object instance of a class has

its own copy

of each instance variable declared in the class

---

\* What is constructor in java

\* what is the difference between constructor and method?

- A constructor in java is a block of code similar to a method  
thats called

when an instance of an object is created. Difference between  
constructor and

method:

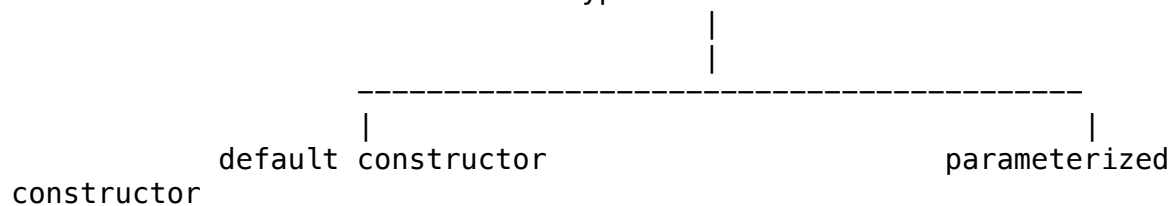
- A constructor doesnt have a return type

- the name of the constructor must be the same as the name of

the class

- unlike methods constructors are not considered members of a class
- a constructor is called automatically when a new instance of object is created
- the purpose of a constructor is to initialize the object of a class while the purpose of a method is to perform a task by executing java code
- default constructor is added if programmer did not add a constructor.

### Types of Java Constructor



---

\* Can a super() and this() keywords be in same constructor?

```
public computer(){
    this();
    super();
    //code
}
```

- NO they both need to be in first line within constructor.

---

\* Super. VS Super()

- super.  
is used to access parent/super class members vars, methods
- super()  
is used to call super class constructor

\* this. VS this()

- this.  
this object by using this. we can access instance variables and method. to differentiate between instance and argument variable
- this()  
call a constructor from another constructor in same class

Example:

```
public class computer{
    private String brand;

    public computer(){
```

```

        this("apple");
    }
    public computer (String brand){
        this.brand = brand;
    }
}

```

---

\* What is the difference between access modifiers in java?

Modifier	Class	Package	Subclass	World
- public	Y	Y	Y	Y
- protected	Y	Y	Y	N
- no modifier	Y	Y	N	N
- private	Y	N	N	N

---

\* what is static keyword in java?

- Static keyword means that the variable or method belongs to class

and shared between all instances.

- we can call static members by using class name or object
- static methods can not call/refer Non Static members
- Static can be: variables, method, block, inner class

```

public class Computer{
    private String brand;
    public Computer(){
        this("Apple");
    }
    public Computer(String brand) {
        this.brand = brand; }
    public static class Memory{
        private int ramsize;
    }
}
Memory c = new Computer().new Memory();

```

---

\* Static block and instance initializer block?

- the static initializer block will be called on loading of the class and code

will run only once in the begining

- instance initializer block execute every time you create an object

for a class. before any constructor.

Example:

```

public class programer{
    System.out.println("constructor")
}
static{
    System.out.println("static")
}

```

```
}  
{  
    System.out.println("instance ")  
}
```

---

\* pass by value or pass by reference?

- Java is a "pass-by-value" language. This means that a copy of the variable is made and the method receives that copy. Assignments made in the method do not affect the caller.

---

\* final vs finally vs finalize()

- Final:
  - final is a keyword
  - final is used to apply restriction on class method and variable
  - if a class is marked as final then this class can not be inherited by any other class
- finally:
  - finally is a block
  - finally is a block which is used for exception handling along with try and catch blocks
- Finalize:
  - finalize() method is protected method of java.lang.Object class
  - it is inherited to every class you create in java
  - finalize() method is used to perform some clean up operations on a object before it is removed from memory

---

\* where did you use static in your framework?

- I normally write utility classes for better reusability and make all methods in my utilities as static methods so that i can easily call them by class name.
- DatabaseUtil class has static methods to connect and run queries and get data

---

\* difference between equals method and "==" operator in java?

- "==":
  - reference and address comparison
  - == in case of primitives it is checking the value. as primitives are single value without any behavior.
- equals()
  - content comparison

---

\* what is String pool?  
- String Pool in java is a pool of Strings stored in Java Heap Memory. Used to save space in memory.

---

\* how to reverse String in java?

1:

```
String string="whatever";
String reverse =
newStringBuilder(string).reverse().toString();
System.out.println(reverse);
```

2:

```
String result="";
for(int i = string.length()-1; i>=0; i--){
    result = result+ string.charAt(i);
}
System.out.println(result);
```

---

\* how to reverse a sentence word by word?

```
StringBuilder stringBuilder = new StringBuilder();
String [] words = string.split(" ");
for(int j = words.length-1; j>=0; j--){
    stringBuilder.append(words[j].append(""));
}
System.out.println("reverse Words "+
stringBuilder.toString().trim());
```

---

\* String vs StringBuilder vs StringBuffer?

	STRING	STRINGBUFFER	STRINGBUILDER
Storage Area	constant String pool	HEAP	Heap
Modifiable	no(inmutable)	YES(mutable)	YES(mutable)
Thread Safe	YES	YES	NO
Performance	FAST	VERY SLOW	FAST

Inmutable means values can not be changed once its created:

---

\* what is Tread-safe or Synchronized?

- what is tread: A sequential or single threaded program has single flow
- synchronized: Means that two threads can not execute the method or access the variables at the same time and the JVM takes care

of

enforcing that. it is used to achieve thread-safety

---

```
* how to check if String is palindrome?
- civic = civic <- is a palindrome
- public static boolean isPalindrome(String str){
    if(str==null)
        return false;
    StringBuilder strBuilder = new StringBuilder(str);
    strBuilder.reverse();
    return strBuilder.toString().equals(str);
}
```

---

```
* what is singleton class and how can we make a class singleton?
- Ensures that a class has only one instance and provide a global
point
of access to it
public class SingletonExample{
// static member holds only one instance of the singleton class
    private static singletonExample singletonInstance;

// singleton prevents any other class from instantiating
    private SingletonExample(){
    }
}
```

Example:

```
- Singleton Example in Java
public class dbaseConnector{
    private static final dbaseConnector instance = new
DbaseConnect();

    private dbaseConnector(){
        //construction code ....
    }
    public static DbaseConnector getInstance(){
        return(instance);
    }
}
```

---

\* what is armstron ?

---

```
* how to prevent Instantiation of a class?
- private constructor
- abstract class
```

---

```
* what are OOP concepts in Java?
- encapsulation
```

- inheritance
- abstraction
- polymorphism

---

\* what is encapsulation and how did you use it?

- data: hiding by making variables private and providing public getter and setter methods.
- in my project i created multiple POJO/BEAN classes in order to manage test data and actual data.

EX: I take JSON from API response and convert to object of my POJO class all variables are private with getters and setter.

---

\* What is inheritance and benefits of it?

- inheritance is a process when a sub class inherits members from super class.  
All public and protected and sometimes default members are inherited to sub class.
- we will achieve code re-usability and code organization with it. also very useful for polymorphic programming.
- test base is super class and other test classes are sub classes.

EX: we had a page object for one page and as another page contained same elements i used inheritance in order to reuse the elements defined in super page object class in selenium webdriver.

---

\* what is abstraction in java and purpose?

- in General using abstraction in programming we can create a base/blueprint for our code and let sub classes implement as needed according to requirements

hiding the implementation and showing only behavior

abstract class can have a constructor

2 ways to achieve abstraction in JAVA:

- 1) Abstract Classes
- 2) interfaces

---

\* difference between Abstract class and interface?

- difference between abstract class and interface in java
  - types of methods: interface can have only abstract methods.
- abstract

class can have abstract and non abstract methods. from java 8 it can have default and static methods also.

- final variables: variables declared in java interface are by default final.

an abstract class may contain non final variables

- a class can implement multiple interfaces, but it can extend only single

abstract class. java does not support multiple inheritance

- methods

- in interface: abstract static defaults,

- in abstract class: abstract non-abstract static

- abstract class can have a constructor

interface can not have a constructor

- interface can extend other interfaces(multiple)

---

\* why java does not support multiple inheritance?

-

---

\* Difference between overloading and overriding?

Overloading allows different methods to have same name, but different signatures where signature can differ by number of input parameters or type of input parameters or both. Overloading is related to compile time

(or static) polymorphism.

1: overloading = same method name but different parameters

overloading = return type can be different

2: overriding = same type or sub type

overriding = same method name and same parameters

---

\* Can you override a static method?

- No static methods can not be overridden, they can only be hidden.

---

\* What is static binding vs dynamic/runtime binding?

- Static binding is overloading and

- dynamic binding is method overriding.

---

\* What is polymorphism ? where did we use it on framework?

- Polymorphism is the ability of an object to take on many forms. The most common use of polymorphism in OOP occurs when a parent class reference is used to refer to a child class object.

- DYNAMIC POLYMORPHISM - OVERRIDING

- STATIC POLYMORPHISM - OVERLOADING



---

\* Data Structures and Why we need it

- Data structures are way of organizing data for efficient manipulation: Insertion , searching, reading , deletion of data.

- I always use java data structures for reading data and storing data from our application , database, or API.

---

\* How do you create an Array or dynamic array?

```
- int [] nums = new int [7];
  nums [0] = 100;
  nums [1] = 100;
  nums [2] = 100;
  nums [3] = 100;
  nums [4] = 100;
  nums [6] = 100;
```

- Java does not support dynamic Arrays  
You have to use ArrayList for dynamism.

---

\* How to read unique values from Array?

```
- int [] nums = new int [7];
  nums [0] = 44;
  nums [1] = 32;
  nums [2] = 100;
  nums [3] = 100;
  nums [4] = 7;
  nums [5] = 7;
```

```
public static void main (String[] args){
// 1st way
    int [] nums = new int [6];
    nums [0] = 44;
    nums [1] = 32;
    nums [2] = 100;
    nums [3] = 100;
    nums [4] = 7;
    nums [5] = 7;

    Set<Integer> set = new HashSet<>();
    for (int i = 0; i < nums.length; i++) {
        set.add(nums[i]);
    }
    System.out.println(set);
// 2nd way
    String uniqNums="";
    for (int n:nums) {
        if (!uniqNums.contains(String.valueOf(n)))
            uniqNums = uniqNums+n+" ";
    }
}
```

```

    }
    System.out.println(uniqNums);
}

```

---

\* How to print unique values from String?

```

-
public static void main (String[] args){

    String str = "aaabbcccddeereeeegggg";
    // 1st print only unique values from string
    Set<Character> setC = new HashSet<>();
    for (int i = 0; i < str.length(); i++) {
        setC.add(str.charAt(i));
    }
    System.out.println(setC);
    // 2nd print only unique values from string
    String unique = "";
    for (int i = 0; i < str.length(); i++) {
        if(!unique.contains(str.charAt(i)+"")) {
            unique += str.charAt(i);
        } }
    System.out.println(unique);
}
}

```

---

\* difference between array and arraylist?

- Array is fixed size ArrayList is dynamic
  - Array can store primitive type ArrayList only wrapper types and Objects
  - Array can be multi-dimensional ArrayList is not
  - Array is faster and ArrayList is slower
- 

\* what is Iterator and difference between for each loop?

- Iterator works with arrayList and not array. It will help us Iterate through the elements.
  - Difference is with iterator you can make changes(remove item) to the list while iterating.
- within for each loop we can not make changes to our list

// for each loop:

```

int arr[] = {23,54,6,56,76,878,9};
    for(int n : arr) {
        System.out.println(n);
}

    System.out.println("=====");

    List<Integer> list = new ArrayList<>();
    list.add(23);

```

```
list.add(2323);
list.add(2312);
list.add(2343);
list.add(2553);
```

// Iterator loop:

```
Iterator<Integer> it = list.iterator();
while(it.hasNext()) {
    Integer n = it.next();
    System.out.println(n);
    it.remove();
}
System.out.println(list);
System.out.println("=====");
for(Integer n : list) {
    System.out.println(n);
    //list.remove(n);
}
}
```

---

\* How to join 2 arrays into single array?

- I am sure there are different ways to solve this solution I am coming up at at this point is:

1. I would create a third array with the size of
2. other other arrays and assign each value from Both arrays into a 3rd array using a loop.
3. I can create an array list and loop through each Item in 2 arrays and add them to arraylist, Then I can convert ArrayList into array if needed.

---

\* List vs Set vs Map interfaces

- LIST: - can store duplicate values,
  - maintains /keeps the insertion order
  - list allows any number of null values
  - Comes from collection interface
  - from list we can read a certain value by index
- SET : - can only store unique values.
  - set does not maintain order
  - set allows only 1 null
  - Comes from collection interface
  - set doesnt allow that
- MAP : is a key+value format and keys are always unique
  - map read value by passing key
  - map can have single null key but multiple null values

---

\* what is hashcode and equals method used for?

- I created multiple POJO(Plain old Java object) classes to store data that came from different sources. Like Database, API JSon format, Excel, CSV file, Webtable.
- And whenever I needed unique set of pojos, I had to override hashCode and equals methods, that by storing into HASHSET , I was sure that only unique objects are being stored.
- Any challenges you had and how did you solve them?  
When did you have to override hashCode and equals methods?  
In my project, I had to validate data from web-tables, database, JSON ,  
Excels etc. As they all come in different formats, It was challenging to work with them and assert that they are correct and expected.  
So What I did was I created multiple POJOs to match my app data. And sometimes, I need unique POJO objects, I override hashCode and equals methods.
- How did you use data structures in automation?  
In my project, I had to validate data from web-tables, database, JSON ,  
Excels etc. As they all come in different formats, It was challenging to work with them and assert that they are correct and expected.  
So I stored all data from different sources into Java Data structures.  
like Lists, Maps etc. and compared/asserted to expected.

= Example:

```
Employee emp1 = new Employee(100);
Employee emp2 = new Employee(100);
Employee emp3 = new Employee(110);
System.out.println(emp1.equals(emp2));

Integer i1 = new Integer(100); Integer i2 = new Integer(100);
System.out.println(i1.hashCode());
System.out.println(i2.hashCode());
Set<Employee> set = new HashSet<>(); set.add(emp1);
set.add(emp2);
set.add(emp3);
System.out.println(set.size());

class Employee {
private int id;
public Employee(int id) { this.id=id;
}
public int getId() {
return id;
}
```

```

public void setId(int id) {
    this.id = id;
} }
@Override
public int hashCode() { return id;
}
@Override
public boolean equals(Object other) {
    return this.id == ((Employee)other).id;
}

```

---

\* How do you sort an object that you created?  
 - I implement Comparable interface and override compareTo method.  
 Then whenever I store my objects into a List then use  
 Collections.Sort  
 it will be able to sort. Also I can store my objects into a  
 TreeSet or TreeMap.

```

public static void main (String[] args){

    Employee emp1 = new Employee(500);
    Employee emp2 = new Employee(100);
    Employee emp3 = new Employee(110);
    List list = new ArrayList<>();
    list.add(emp1);
    list.add(emp2);
    list.add(emp3);
    Collections.sort(list);
    for (Object object : list) {
        System.out.println(object);
    }
}

class Employee implements Comparable<Employee>{
    private int id;
    public Employee(int id) {
        this.id=id;
    }
    public int getId() {
        return id; }
    public void setId(int id) {
        this.id = id;
    }
    @Override
    public int hashCode() {
        return id;
    }
    @Override
    public boolean equals(Object other) {

```

```

        return this.id == ((Employee)other).id;
    }
    @Override
    public int compareTo(Employee emp) {
        if(this.id > emp.id) {
            return 1;
        }else if(this.id < emp.id) {
            return -1;
        }
        return 0; }
    @Override
    public String toString() {
        return id+"";
    }
}

```

---

#### \* ArrayList vs LinkedList

- ArrayList is ordered collection like array.
  - linkedList consists of nodes:
    - 1: Singly Linked List  
value + pointer to next node
    - 2: doublyLinked List:  
Value + pointer to previous node and pointer to next node
- 

#### \* ArrayList vs Vector?

- They both implement List Interface and maintains insertion order
  - ArrayList
    - is not synchronized
    - its fast because its not synchronized
  - Vector
    - is synchronized
    - slow because its synchronized
- 

#### \* HashSet vs HashMap

- HashSet stores unique elements
  - HashSet implements Set
  - HashSet stores Single Objects
  
  - HashMap stores unique keys, and duplicated values
  - HashMap implements Map
  - HashMap stores Key, Value paired objects
- 

#### \* Hashtable vs HashMap

- Both key + value
  - both implement MAP
  - HashMap: Not Synchronized, only 1 null key and multiple null values
  - Hashtable: its synchronized, no null keys or values
-

- \* Stack vs Queue
    - queue: first in first out
    - Stack: last in first out
- 

- \* TreeSet vs TreeMap

Major difference between TreeSet and TreeMap is that TreeSet implements Set interface while TreeMap implements Map interface in Java. ... TreeSet stores only one object while TreeMap uses two objects called key and Value. Objects in TreeSet are sorted while keys in TreeMap remain in sorted Order.

- TreeSet: Can contain only unique values
  - is sorted in ascending order
  - TreeMap: can contain only unique keys.
  - keys are sorted in ascending order
- 

- \* Exception handling in java?
  - Depending on situation, we can use try catch finally blocks.

TRY : Code that might throw some exception

CATCH: We define exception type to be caught  
And what to do if exception happens in TRY block code

FINALLY: Code that always runs , regardless if there is Exception or no.

FINALLY block: WILL NOT RUN if JVM crashes, or System.exit(0)  
Is present  
in try or catch blocks. Clean up code, to close some connections, close open files etc

example:  

```
public static void testCatch() {
    try {
        int i = 4/0;
    }catch(Exception e) {
        return;
    }finally {
        System.out.println("FINALLY!"); //will run
    }
}
```

---

- \* What is the parent of all exceptions?
    - Throwable class is parent
- 

- \* What types of Exception do you know?

- CHECKED -> You handle or declare, otherwise will Not compile.
- UNCHECKED -> Subclasses of RUNTIMEEXCEPTION. And optional to handle or no.

-----  
\* what is throw vs throws

-THROW VS THROWS:

THROW : -> CREATES AN EXCEPTION OBJECT

throw new RuntimeException();

THROWS -> goes to method signature, And declares that a method might throw And exception

-----  
\* Types of exceptions you faced in your project

-

JAVA : NULLPTRER EXCEPTION, ILLEGALARGUMENT, CLASSNOTFOUND, FILENOTFOUND, CLASSCAST, ARITHMETIC, INDEXOUTOFBOUNDS,.. SQLEXCEPTION, IOEXCEPTION

SELENIUM: NOSUCHELEMENT, STALEELEMENT, NOTCLICKABLE, NOTVISIBLE, TIMEOUTEXEPTION, WEBDRIVER, ILLEGALSTATE EXP, NO SUCHWINDOW, ALERTNOTFOUND...

CUCUMBER: PENDINGEXCEPTION, DUPLICATE METHOD IMPLEMENTATION EXP,  
-----

=====

=====  
===== SELENIUM

=====

=====

=====  
=====

May 10th, 2018

Boot CAMP

==== SELENIUM REVIEW =====

SELENIUM GRID: node

YOU HAVE YOUR CODE --> REMOTE DRIVER -> SELENIUM HUB -> node

node

EXAMPLE: WebDriver driver = new RemoteWebDriver( , )

\* SauceLabs

- they provide testing in cloud

\* Selenium Grid

- Gives you avility to run your automated tests in different browsers



and versions and operating systems.

- open source tool that is part of Selenium Suite

\* what is test automation and what are the benefits?

- no human interaction
- fast
- reliable
- scalable
- data driven testing

\* what can be automated?

- Something stable
- Smoke / sanity test
- functional test
- Test data creating
- API
- Database

\* what Test case should be automated?

- must be stable test case
- should be repetitive, can be used more than once
- should not need any human interaction
- should have a value, High ROI

\* What are the common test automation tools?

- Watir, selenium, UFT

\* What is SELENIUM?

- selenium is a tool that automates browser, it is used for testing

\* Advantages of selenium?

- Open source
- interact with web application
- supports multiple browsers, operating systems
- supports different languages
- reusability
- community

\* Disadvantage of Selenium?

- it only supports web applications
- no official support / no help desk
- can not work with graphics, capchas, bar codes, shapes
- no built in reporting tool
- hard to master requires developer level knowledge
- hard to write good locators
- hard to synchronize

\* what we dont do in selenium?

- performance, load, stress testing, manual, ad hoc testing

usability pure database testing (if we only test the db it self)  
, unit tests.. we dont do it. look and feel based testing  
color shapes static testing.

\* what is a locator in selenium?

- in selenium locator is a means of finding a element in html
  - ID
  - name
  - css
  - Xpath
  - tagName
  - className
  - linkText
  - partialLinkText

\* what is xpath?

- is one of the locators in selenium

\* what is difference between Absolute and Relative Xpath?

- Absolute:
  - Starts with /, starts looking from the root element of the html document
- Relative:
  - Starts with // looks for element in any part of the page

\* In which situations are you going to use Xpath?

- when we can not use unique information such as ID, name, tags, class ..
- when dealing with dynamic elements: id changes every time we can use contains, starts-with, ends-with
- when we deal with indexes
- when we search by text: //span[.='submit']
- when tables xpath can handle parents child sibling

\* how do you choose locators?(whats the best locator)

- it depends on the situation on the web site, on the application
- If there is ID on web site yes, if no ID then Name,
- if it is a link:
  - linktext
  - partiallinktext
  - then others
- if its not a link:
  - Id
  - name
  - tagname
  - class
  - css : easy to read and write, fast
  - Xpath

\* css vs Xpath?

- CSS:
  - fast easy to read and write, should be used if both ccc and xpath are options.
  - does not support index
  - does not support text
- Xpath:
  - works with text
  - supports index
  - xpath has more convination so its powerful but it can get ugly.

\* what is implicit wait / explicit wait?

- Implicit wait:
  - Syntax: `driver.manage.timeouts.implicitlyWait(5)`

- set once always works if it doesnt find element it will wait for 5 seconds otherwise it complains applies every time when findelement/s method runs

- The implicit wait will tell to the web driver to wait for certain amount of time before it throws a "No Such Element Exception".

- Explicit wait:
  - sometimes we need to wait for certain event such as element is visible, clickable, enabled..
  - `WebDriverWait`,
  - `ExpectedConditions`
  - `timeoutexception`

- `FluentWait`:
  - is also a type of explicit wait. Using fluent wait wecan customize the `webDriverWait`

-

\* what is difference between Assert and Verify?

- Assert:
  - if it fails test execution stops

- Verify:
  - verify if it fails you make a note and continue with the test

\* whats difference between QUIT and CLOSE?

- Quit:
  - closes the windows

- Close:

- closes the current tab/window

\* how selenium handles drop downs?

- select class is used to deal with drop down list in selenium. to create a select object we need to pass a webElement as constructor. that element must have the select tag

- select by Index: Takes a int param, selects based on the index 0 based.

- select by visible text: takes a string, select based on the text displayed.

- select by value: takes a string parameter selects based on the value attribute of the option

- example: WebElement element =

```
driver.findElement(by.id"dropdown")
Select list = new Select (element)
list.getFirstSelectedOption;
```

\* how to check the multiple selected value in dropdown?

- select carsList = new Select(el)

- carList.getSelectedOption(): returns the selected option a list(List<WebElement>)

- carList.getFirstSelectedOption <- method that returns the selected option(the webElement)

- assertEquals("Wooden Spoon",

```
carList.getFirstSelectedOption().getText())
```

\* how do you verify all options in dropdown?

- Select stateList = new Select(el)

- stateList.getOptions(): returns all the available options selected or not

\* how to work with dropdown without the select tag?

- if they dropdown list has no select tag we can not use the select class

- thread the dropdown list and its options as separate elements locate every element separately

- the select an option: 1 find and click

\* What is the syntax for switching frame?

- its html page inside html page / we have to treat them as different pages.

- Iframe/frame : tags for frames. Frame is a html document inside another html document.

- Web driver handles one page at a time to control another frame we always need to switch

- driver.switchTo.frame() : takes webElement -> find the iframe

and pass it as a param.

- driver.switchTo.frame() : takes String -> find the id or name of the iframe and pass as param

- driver.switchTo.frame() : takes int -> find the index and pass as param

\* what is the syntax for switching windows?

- to handle separate tabs/ windows we have to switch to that tab

- web driver handles one page html document at a time. to control another tab we always need to switch

- to be able to switch we need to get the window handle first using getWindowHandle() method

- driver.switchTo.window() : takes a string -> window handle

```
for each : driver.getWindowHandles():
    driver.switchTo.window("title")
    if driver.getTitle == expected title
        break;
```

- selenium needs the windows handle to switch tabs it doesn't use the title. to switch using title we still switch using the window handle first then check the title.

\* What operations can you do using actions class?

- Actions class lets us do advanced mouse and keyboard operations.

- Hover over element / move to element

- scroll up/down

- double click

- right click

- drag and drop

- keyboard combinations

\* what is the syntax for double click actions?

- perform any actions against a web element using actions class we need to locate the element first

```
WebElement el = driver.findElement
Actions actions = new Actions(driver)
actions.doubleClick(el);
```

```
actions.moveTo(el)
actions.doubleClick
```

\* what is the syntax for uploading a file?

- in order to upload file using selenium we need to locate the upload button in html. the element will have tag input then we do sendKeys by passing the path to file which

```
WebElement upload = driver.findElement
```

```
upload.sendKeys("C:/user/me/file.txt")
```

- \* sometimes sendKeys path does not work
  - you have to use the robot or autoid
  - to fix you have to build a dynamic path for file inside our project
  - path of the file in the project :  
String projectDir= System.getProperty("usr.dir")
  - path of the file in the project :  
"src/test/resources/test\_data/myfile.txt"
  - Element.sendKeys(projectDir+file)
- \* have you done any cross browser testing?
  - yes
  - always mention that you have a control file for keywords like browserType main url password username enviroment.
- \* have you done any headless browser testing?
  - its a browser that does not open it runs as a background service or program. They are fast
  - html unitdriver: headless browser that comes from selenium  
webdriver driver = new hemlUnitDRiver();
  - phantomjsDriver: thrid party driver  
webdriver driver = new htmlUnitDriver();
  - taking screenshots will still work with headless browser
- \* how you resolve certification issue?
  - IF you are using CHROME, Internet Explorer  
DesiredCapabilities capability = DesiredCapabilities.chrom();  
capability.setcapability(capability.ACCEPT\_SSL\_CERTS, true );  
System.setProperty("webdriver.chrome.driver","E:/chromedriver.exe")  
driver = new ChromeDriver(capability);
  - more examples badssl.com
- \* How will do you performance Stress Security SQL injection testing?
  - selenium engineer does not do any of these tests. these tests are done by experts trained in these tools.
- \* how do you handle Js alerts?
  - if the alert on the browser comes from javaScript we use the Alert Class.
  - Alert alert = driver.switchTo.alert();
  - alert.accept();
  - alert.dismiss();
  - alert.sendKeys();
- \* how you handle browser popup?
  - Treat it as another webElement to close find the cancel link

to the x icon and click());

\* how you handle windows/OS pop ups?  
- using the robot or the AutoIT

\* Verify element is not displayed?  
- element = driver.findElement()  
- element.isDisplayed();  
- driver.findElement().isDisplayed() -> this line will throw  
exception if the element  
is not in the html  
try{  
    find  
    return if displayed  
}  
Catch(element not fund)  
{return true}

\* Why I can not find element?  
- locator changed  
- there is an iframe  
- waiting time : page is loading slowly  
- element is dynamic : locator can not find it  
- page is not fully loaded/opened  
- page changes and that element does not exist anymore

=====  
=====  
May 12th 2018  
SELENIUM BOOTCAMP

-----  
----  
Verify text exists?

\* using xpath. write xpath for text

Xpath for finding any element with certain / exact text:

```
//*[.='text']
```

Xpath for finding any element that contains certain text:

```
//*[contains(text(),'note')]
```

getPageSource() -> all the html of the ..

-----  
----

how do you handle StaleElementExceptions?

- we can get stale element exception when the element we want to interact with is reloaded the webelement we located earlier does not exist in the DOM.  
we need to wait until the javascript or the AJAX process to end the locate the element again

example:

```
counter = 0;
while (counter < 5 ){
    try {
        find and click
        break;

    }catch(staleelementexcetion)
        wait 1 sec
        counter ++
}
```

```
=====
====
===== SQL AND REST
=====
=====
====
```

May 11th, 2018

SQL and REST

---

When you talk about your framework mention this frameworks:

- Page Object model framework
- cucumber Bdd framework
- TestNG based
- Data Driven framework

( comes from QTP / UFT style) <- do not mention much because its mostly UFT

- Hybrid Framework
- Keyword Driven Framework

\*\* Tell me about your self SQL \*\*

I am confortable with front end test automation using java and selenium  
WebDriver, Cucumber, Maven, Testng, Junit also i am good at



restful API  
test automation using postman and restassured library in JAVA.  
I have rich  
experience with database test automation using sql queries  
along with JDBC library  
in JAVA.

---

\* data driven Testing ?

- data driven framework when do we do it?

- When: Whenever a functionality or a module in an app requires testing with

multiple sets of data(also called parametrization)  
multiple inputs then we need to perform data driven testing and automation.

these scenarios are one of the things that must be automated.

- How: Test data is separated from code and stored into external sources. Excel files,  
CSV files, Database.

BENEFIT: more organized data centralized collaboration on test data it can come with  
BA, MTs, ETC

---

\* how to read data from excel?

- I use Apache POI to read data from excel or any excel related tests

EXAMPLE:

```
String file = "TestData.xlsx";  
FileInputStream inStream = new FileInputStream(file);  
  
String filePath = "C:\\user\\alex\\Desktop";  
FileInputStream instream = new FileInputStream(filePath);  
Workbook workBook = WorkbookFactory.create(inStream);  
Sheet worksheet = workBook.getsheet(0);  
Row row = workSheet.getRow(0);  
Cell cel = row.getCell(0);  
System.out.println(cell.toString());
```

WRITE DATA:

CENTRAL MAVEN REPO -> WE ARE USING  
COMPANY MAVEN REPO -> YOU USE AT WORK

---

\* read Data From Database?  
- Manually: Oracle SQL developer <- for manually testing  
- Automation: JDBC -> JAVA DATABASE CONNECTIVITY <- is used  
for automation

Hierarchy of Objects:

CONNECTION -> STATEMENT -> RESULTSET

HOW TO STABLISH CONNECTION:

```
Connection conn =  
DriverManger.getConnection("URL","username","password")  
Statement stat =  
connection.createStatement(ResultSet.TYPE_...)  
ResultSet resu =  
statement.executeQuery("select * from employees");
```

- test data is separted from code ..

- if the amount of data is not that huge then i use cucumber  
scenario outline with example  
table

- and other times i maintain test data in excel files and i  
use apache POI library  
to read and write data using JAVA

- if data comes from a database or i need to do datase  
validation  
i use sql queries along with JDBC library in java

---

\* where do we close connection in database in try catch block  
in case we will get exeption thrown. " in catch block"

- 1) in finally block
- 2) i use try-with-resources and it will automatically close

Example 1: in fanally block

```
try{  
    Connection conn =  
DriverManger.getConnection("URL","username","password")  
    Statement stat =  
connection.createStatement(ResultSet.TYPE_...)  
    ResultSet resu =  
statement.executeQuery("select * from countries");
```

```

}catch(SQLException e){
    //some code to report
    e.printStackTrace();
}finally{
    try{
        result.close();
        statement.close();
        connection.close();
    }catch(exception e){
        // some code
    }
}

```

### Example 2: try-with-resources

any class or interface that extends closable or autoclosable interface

```

try(
    Connection conn =
DriverManger.getConnection("URL","username","password")
    Statement stat =
connection.createStatement(ResultSet.TYPE_...)
    ResultSet resu =
statement.executeQuery("select * from countries");)
{
    //some code to read data from resulset
}
}catch(SQLException e){
    //some code to report
    e.printStackTrace();
}

```

---

\* have you done any BACK END TESTING or DATABASE TESTING?(they mean API and Database)

- Yes I have lots of experience with working with databases and I am comfortable with writing SQL queries. I have experience with working on relational databases like ORACLE, MySQL, SQL Server.

- Have you worked with non-relational databases?  
- I dont have hands on experience i know that its is like JSON format database and i have good experience with working with JSON

files. And I am quick learner and crossfunctional.

---

\* how do you create a table in SQL what are constraints?

```
- create table computer(  
    computer_id number primary key,  
    brand varchar2(20) not null,  
    type char(1) not null  
);
```

```
- SQL column constraints:  
    Primary key, foreign key, null, not null unique.
```

- Describe computers -> to display table information metadata  
of table

```
Describe computers;
```

```
- insert data in SQL database  
    insert into computers values( 123 , 'HP', 'L');  
    select * from computers
```

---

\* SQL technical interview

1. Write a SQL query to find how many records are there  
in Town table where

"TOWN\_NAME" has "ell" in them?

```
- select count(*)  
    from town  
    where town_name like '%ell%';
```

2. Write a SQL query to find how many occurrences of  
each "COUNTRY\_CODE" are  
there in the Town table?

```
- select country_code, count(*)  
    from town  
    Group by country_code;
```

3. Write a SQL query to find the "TOWN\_NAME" where there  
are non-alphanumeric

characters? REGEX is used for matching some formats like 10  
number etc

```
select(*)  
    from town  
    where town_name not like '%[^a-zA-Z0-9]%';
```

4. Write a SQL query to select the first 5 records from Town table?

```
select *
from town
where rownum <= 5;
```

---

\* Inner JOIN interview

- when we query data from multiple tables we need joins and when we need to find matching records we use inner joins.  
- inner join is used when we need to display data from multiple tables.  
and it will return matching records.

1. Write a SQL query to find the salary for the people working in the QA department and the HR Department?

```
select empid, name, salary, deptid
from employee e join departments d
on e.empid = d.empid
where deptid in('QA','HR');
```

---

\* selfJoin interview ( )

1.  
select emp.employee\_id, emp.first\_name, man.first\_name,  
man.last\_name  
from employees emp join employees man  
on emp.manager\_id = man.employee\_id;

---

\* inner join vs outer join

- we need joins when ever we need query data from multiple tables

1. Inner join returns matching records from both tables according to joining condition  
2. outer join returns matching data plus non matching data either from right or left tables.

Example: inner join

```
select last_name, department_name
from employees join departments
```

```
        on employees.department_id =
departments.department_id;
```

---

\* difference between Union and Union ALL

- we use these set operators when we need to display data from multiple or 2 queries
- UNION: removes duplicates and null values and sorts the result,
- UNION ALL: does not remove duplicates and does not sort

---

\* difference between Intersect and Minus

- INTERSECT: displays common data en both queries
- MINUS: returns records from first query that is not present in second query.

---

\* JOIN VS UNION interview question

- joins are used to display query from multiple tables
- Union is used to query data from multiple queries.

---

\* difference between GROUP BY vs ORDER BY

- group by is used whenever we work with group functions it will help to create sub groups within a group
- order by is used to sort either descending and ascending

---

\* difference between HAVING vs WHERE

Ans: HAVING is used to specify a condition for a group or an aggregate function used in select statement. The WHERE clause selects before grouping. The HAVING clause selects rows after grouping. Unlike HAVING clause, the WHERE clause cannot contain aggregate functions.

- when ever our condition includes a group function  
example: HAVING max(salary) > 9000;
- where is used to filter the results and when we do not use group function  
example: where employee\_id = 234;

---

\* Display 5th row from table ( CORE RELATED SUB QUERY)

- we need to use correlated subquery
- inner query will get columns along with rownumber and outer query will look for specific row number

example 1:  
select \*  
from (select employee\_id,first\_name, rownum as rn from employees)  
where rn = 5;

example 2:  
(select \* from employees where rownum <=5)  
minus  
(select \* from employees where rownum <=4);

example 3: 5th largest salary questions  
select salary from employees e1  
where 5= (select count(salary)  
from employees e2 where e1.salary<=e2.salary);

---

\* difference between drop vs truncate

- both are ddl commands and cannot be undone,
- drop will remove data and table together
- truncate will remove all data but not table structure.
- DROP EMPLOYEES;
- TRUNCATE EMPLOYEES;

---

\* Commit commands

- when ever we make changes to database we can commit to save changes

---

\* do you know SQL?

- yes I have experience and i am comfortable with writing SQL queries DDL and DML commands. currently working with oracle database that is running in amazon cloud server.

- WHAT IS DDL? data definition language : create alter drop truncate
- DML data manipulation languages: select delete insert update

---

\* What is SQL?

- SQL is Structured Query Language designed for inserting and modifying in a relational database system.

\*What is the difference between primary key and unique constraints?  
- Ans: Primary key cannot have NULL value, the unique constraints can have NULL values.  
There is only one primary key in a table, but there can be multiple unique constrains.

=====  
=====  
===== API =====  
=====  
=====

API BOOTCAMP

\* what kind of database testing are you doing?  
- I am mostly doing database validations  
- I make changes or insert data in the front end and validate in the database  
Data in front end matches the database  
- i also make changes using RESTapi and verify that changes



are successful in database

as well

- I also support database migration process, My code connects to all database

Sybase (legacy database) using JDBC then connects to oracle (new DB )

and then compare records to make sure data was migrated successfully

---

\* Batch jobs of application?

- some automated code that runs every night time and make some status changes to some data

Example: coupon that is valid for 7 days. Batch job is scanning through each coupon and if coupon hit 7 days it will update the status in database as invalid.

---

\* do you have experience with RestfulAPI Testing?

- application in the current project needs to be integrated to other internal

and external application for the integration our team developed restful api so i am testing it.

- i verify rest api end point is working as expected  
i use postman for manual api testing and use restassured library in java for automation

i send post put get delete type of request and veirfy responses status code and response body header

i also do positive and negative testing of api.

when i do positive testing i send valid request parameters, valid headers valid request json body

and verify that response status code is 200

---

\* http methods/request?

- get: read data

- post: create

- put: update

- delete: delete

- post vs put

---

- \* Status code
  - 2xx Success
    - 200 OK
    - 201 Created
  
  - 3xx Redirection
    - 300 Multiple Choices
    - 301 Moved Permanently
    - 302 Found
  
  - 4xx Client Error
    - 400 Bad Request
    - 401 Unauthorized
    - 402 Payment Required
    - 403 Forbidden
    - 404 Not Found
  
  - 5xx Server Error
    - 500 Internal Server Error
    - 501 Not Implemented
    - 502 Bad Gateway

---

- \* Headers
  - accept, content-type, application JSON, Application XML

---

- \* parameters
  - 2 types
  - path parameters ( value will be part of URL)
  - query / request parameters(key+value format)

---

- \* Validate/check /assert JSON body

- {
  - "employee\_id": 100,
  - "first\_name": "steven"}

- we use hamcrest matcher that comes with restassured library
  - 1.When().get(uri).then().body("first\_name",equalTo("steven"));

- using jsonpath:
  - 2.JsonPath json =
  - when().get(uri).thenReturn().body().jsonpath();
  - assert.asserEquals(json.getString("last\_name"),"king");

- 3.Using collections. HashMap

```
Response response = when().get(uri);
Map map = response.body().as(Map.class);
assert.assertEquals(map.get(job_id),"AD_PRES");
```

```
- 4.Using POJOs. create a class first
public class employee{}
Response response = when().get(uri);
Employee map = response.body().as(Employee.class);
assert.assertEquals(emp.getSalary(),24000);
```

-----  
\* Serealization vs DE-Serealization  
- serealization: convert java object to Json  
- De-serialization: JSON to java Object  
-----

-----  
\* Gson Parser  
- Gson parser is used to convert json to java object or vise versa  
- 2 useful methods from json tojson  
-----  
-----

=====  
===== Framework  
=====

FRAMEWORK

May 12, 2018

-----  
----  
\* Testng vs Junit

	Junit	Testng
Annotation support	y	y
suite Test	y	y
ignore Test	y	y
exception Test	y	y
timeout	y	y
parameterizeed Test	y	y
dependency test	N	y

- 
- 
- \* what tools used to develop your application?
    - Java Spring -> back end code of the website
    - angular -> front end of the application
    - Tomcat server -> developers use it hosts the website
    - Oracle Database -> Database
    - jenkins -> to deploy the application
    - Eclipse and IntelliJ Idea
    - SonarCube -> code coverage age tool
    - Docker -> host, deploy

- 
- 
- \* describe your framework 1 TestNG + selenium
    - JAVA
    - MAVEN
    - TestNG
    - SELENIUM
    - EXTEND REPORTS : works with testng and selenium for reports
    - LOG4J
    - JDBC
    - REST ASSURED
    - APACHE POI

- 
- 
- \* describe your framework 2 ( CUCUMBER BDD FRAMEWORK)
    - TESTNG / JUNIT ( ONE OF THEM NOT BOTH)
    - CUCUMBER
    - JAVA
    - MAVEN
    - SELENIUM
    - HTML REPORTING
    - JDBC
    - REST ASSURED
    - APACHE POI
    - GIT
    - JENKINS

- 
- 
- \* HOW DOES YOUR FRAMEWORK GENERATE?
    - our cucumber BDD framework generates HTML reports
    - the reports shows the pass/fail coverage for feature files tags, steps.
    - the report contains the steps for each test

- the report has screenshots for failures

---

-----

\* how do you take screenshot in your framework?

- IN my framework i have the logic for taking screen screenshots in the hook class. that is because i want to take screenshot even if the test fails. Hook guarantees that the method for screenshot will work even if test fails.

- TakeScreenshot interface is the method used to take the screenshot. It comes from selenium interface.

- this report is the same report used in my jenkins test. when on jenkins i generate the report using the cucumber reports plugin

- when i run locally same report is generated by the configuration in the pom file.

- both of this configuration options use the Json file to generate report

```
    PLUGIN = "json...."
```

---

-----

\* what do you use for logging?

- i use log4j for logging. i always log important steps in the test executing that helps me to debut when there is a failure.
- log4j is not a replacement for html reports.

---

-----

\* how does the feature file work? tell me the syntax of an entire feature file

- feature -> description of what is being tested
- scenario -> description of the scenario being tested
  - Given -> a precondition
  - When -> condition that triggers the expected result
  - Then ->

---

-----

\* cucumber scenario example

- Given i am on the login page
  - And i enter username and password
  - When i click on the submit button
  - Then i should be able to see the profile picture
-

-----

\* Sample of feature file

- Feature: log in functionality
- Background:" anything common will go in background "  
    Given I am on the log in page
- Scenario: 1
- Scenario: 2

-----

\* Scenario Outline

- Scenario outline: search
- Given I am there
- And I search for "<item>"

Example:

```
|item|  
|wooden spoon|  
|carbon fiber spoon|
```

\* the scenario will run twice first time it will search for wooden spoon  
next time will search for carbon fiber spoon

-----

\* what is test base class? and how do you implement in your framework?

- When we talk about test base class we talk about framework 1 only
- test base class is class where i have most used methods in my test  
    my test classes extend the test base class and thus have access to those  
    methods this helps us make my code reusable

- Before/after test methods
- wait/synchronization utility methods
- switchToWindow(title)
- WebDriver driver;

-----

\* How to re-run the failed tests again?

- it is different depending on what tools are being used?  
    THIS IS DONE IN POM \*  
    - In TESTNG : framework (not cucumber), failed tests are reported in the  
        testng\_failed.xml file in target folder. we can  
add  
        this file in the pom file so that maven will try  
to run the

failed tests every time. it will only run when  
there are failures in the test.

---

-----

\* how to rerun the failed tests again in cucumber?  
- to re-run the failed tests in cucumber we use the re-run option in the CukesRunner

- 1: Add the re-run to cukes runner. this option will create a file with a list of failed tests.
- 2: create a second runner class which points to file with a list of failed tests
- 3: Add the second runner in pom file

---

-----

\* how to run failed tests again in Jenkins?  
- in jenkins there are plugin that are run the failed tests. Unit cases(not cucumber)  
-

---

-----

\* how to run tests selectively cucumber?  
- tags keyword the CukesRunner  
- feature keyword the CukesRunner  
- tags and features can also be passed using the command line

- mvn clean test -Dcucumber.options="--tags ~@nonexistantTag"

---

-----

\* please choose one user story from your current application and walk me through for the automation?  
- //come up with 1 or 2

---

-----

\* What is your thropy bug?  
- //come up with 1 or 2

---

-----

- \* How you intergrate selenium with JIRA?
    - selenium does not have a built in integration with JIRA. but there are plugins that integrate selenium testing framework with jira.
    - XRAY(jira plugin, Jenkins plugin)
    - Zephyr(jira plugin)
- 

- \* when do you do automation in your sprint?
    - When developers are done with their part
    - When code is deployed to QA/test environment
    - when all manual test are done
    - if you are test in the staging/UAT environment you wont be testing stories which are being develop.
    - You are in team of testers. all the stories you get in your team are testing stories and ready to be tested.
    - you are part of a mixed team with testers and developers in this case you will test features which are being developed so you want for developer to finish the code changes and push to QA environment
- 

- \* Have you set up any job in jenkins?
    -
- 

- \* \* where do you store the test results/reports?
    - the location of the reports depends n how we are running them.
    - if we are running locally, reports will be generated in the target folder. my framework generates cucumber reports folder in the targer foder which contains the report
    - when we run the tests on jenkins jenkins saves the report of every run. all the reports for previous runs can be found under the build number.
- 

- \* How do you GET TEST DATA?
  - delphix -> tool/or company that provides test data
  - in my project there were 2 sources for test data
    1. Developers got the data from production database changed the sensitive information
    2. i had to generate test data. in my job i had to generate test data for parking tickets i had to use selenium to fill



the form to create  
parking tickets in the test environment.

- java faker
- apache also has couple dips

---

-----

\* what coding standards to you have?

- in my project we had a formatter for code format. everyone had to use the same formating standard.
- in my company one of the things we check during the code review is the coding standards

---

-----

\* how many environment do you have?

- in my project we had the following enviroments:
  1. dev enviroments
  2. QA/Test enviroment- this is where i test
  3. Staging enviroment
  - 4.

---

-----

\* How do you code review?

- in my company we use cricuable to do code reviews. it only works with bitbucket
- In github it is different:
  - you check in code
  - create a pull request
  - Some will review the pull request and merge

---

-----

\* Who will review your code?

- other testers
- test lead.

---

-----

\*How do you test API service?  
I am using Restassured library, what I am verifying is the status code, Response message/error message few other response details like Json format.

#### COMMON ERRORS IN API:

1xx: Informational – Communicates transfer protocol-level information

2xx: Success -Indicates that the client's request was accepted successfully.

3xx: Redirection - Indicates that the client must take some additional action in order to complete their request.

4xx: Client Error - This category of error status codes points the finger at clients.

5xx: Server Error - The server takes responsibility for these error status codes.

<https://nordicapis.com/best-practices-api-error-handling/>

What type is your database?

\*Are you storing your JSON body in Oracles?

Yes I store Json data en Oracle Database using columns whose data types are

varchar2. (also clob or blob) the choice of which to use is typically motivated

by size of the JSON document i need to manage:

-I use varchar2 (4000) if my Jason document does not exceed 4000 bytes(or characters)

-Use VARCHAR2(32767) if you know that some of your JSON documents are larger than 4000

bytes (or characters) and you are sure than none of the documents exceeds 32767 bytes

(or characters)Footref 1.

-I use BLOB (BINARY LARGE OBJECT) or CLOB(CHARACTER LARGE OBJECT) storage if you know

that you have some JSON document that are larger than 32767 bytes or characters

Example for JSON Data to ORACLE: (press command+click ) to open link

<https://docs.oracle.com/en/database/oracle/oracle-database/12.2/adjsn/creating-a-table-with-a-json-column.html#GUID-E6CC0DCF-3D72-41EF-ACA4-B3BF54EE3CA0>

When are you testing your service and your received 500 error and how would you debug it?

First of all 500 its a internal server error. This isn't because these errors are usually

hard to fix, however. It's because the error is usually not specific and can occur for a

number of different reasons. What i do to debug the error depends upon the server and

what's actually running at the time.

#### \*DEBUG COMMON PLATFORMS

1: If the software was just upgraded to a new version, it's likely that the upgrade failed and needs to be refreshed.

2: If a new plugin or theme was just activated, it's probably a good idea to roll that change back and try again. Even well-tested plugins might conflict with other plugins in the installation.

3: If the software has been upgraded, older plugins or themes might not be compatible with the upgrade. The only course of action is to start deactivating things until the error goes away. That doesn't directly solve the problem; however, it will find the issue. It might be possible to get the plugin developer to release an update.

#### \*DEBUGGING SERVER SIDE SCRIPTS

1: Server permission: Very commonly, incorrect permissions on a file or folder that contains one of the scripts causes this this error.

2: Server timeout: If the server was busy, needed to be rebooted, or the connection was lost, the script might still report a 500 Internal Server Error. It's possible that the error might not happen the next time.

#### \*What is 400 ?

4XX – Client Error

The 4XX series of error codes is perhaps the most famous due to the iconic 404 Not Found status, which is a well-known marker for URLs and URIs that are incorrectly formed. Other more useful status codes for APIs exist in this range, however.

414 URI Too Long is a common status code, denoting that the data pushed through in a GET request

is too long, and should be converted to a POST request. Another common code is 429 Too many

Requests, which is used for rate limiting to note a client is attempting too many requests at once, and that their traffic is being rejected.

\*How do you validate your response from your API?

\*Are you doing any verifications in your database?

yes but before that i make sure to create a connection:

```
1: Connection con =  
DriverManager.getConnection(dbUrl,username,password);
```

Send Queries to the Database Once connection is made, I execute the queries.

```
2: Statement  
statement=connection.createStatement(ResultSet.TYPE_SCROLL_INSENSITIVE  
,ResultSet.CONCUR_READ_ONLY);
```

Process Results from the executed query are stored in the ResultSet Object.

```
3:  ResultSet resultSet = statement.executeQuery("select * from  
countries");
```

\*\*\*\* Summary of Steps for Selenium Database Testing \*\*\*\*

Step 1) Make a connection to the Database using method.

```
    DriverManager.getConnection(URL, "userid", "password" )
```

Step 2) Create Query to the Database using the Statement Object.

```
    Statement stmt = con.createStatement();
```

Step 3) Send the query to database using execute query and store the results in the ResultSet object.

```
    ResultSet rs = stmt.executeQuery(select * from employee;);
```

How do you automate database validation part?

```
@Test  
public void jdbcMetadata() throws Exception{  
    Connection  
connection=DriverManager.getConnection(oracleDbUrl, oracleDbUsername,  
oracleDbPassword);  
    Statement  
statement=connection.createStatement(ResultSet.TYPE_SCROLL_INSENSITIVE  
,ResultSet.CONCUR_READ_ONLY);  
    String sql = "select employee_id,last_name,job_id, salary  
from employees";  
    ResultSet resultSet = statement.executeQuery(sql);
```

```

        // 1: DATABASE METADATA
        DatabaseMetaData dbMetadata = connection.getMetaData();
        System.out.println("User:" + dbMetadata.getUserName()); //
returns User and database type
        System.out.println("Database type:" +
dbMetadata.getDatabaseProductName());

        // 2: RESULTSET store it in ResultSetMETADATA
        ResultSetMetaData rsMetadata = resultSet.getMetaData();
        System.out.println("Columns count:" +
rsMetadata.getColumnCount());
        System.out.println( rsMetadata.getColumnName(1));

        //print all column names using a loop
        for (int i = 1; i <= rsMetadata.getColumnCount() ; i++) {
            System.out.println(i +" -> " +
rsMetadata.getColumnName(i));
        }

        //Throw ResultSet into a List of Maps
        //Create a List of Maps
        List<Map<String,Object>> list = new ArrayList<>();
        ResultSetMetaData rsMetadata = resultSet.getMetaData();

        int colCount = rsMetadata.getColumnCount();

        while(resultSet.next()) {
            Map<String,Object> rowMap = new HashMap<>();

            for(int col = 1; col <= colCount; col++) {
                rowMap.put(rsMetadata.getColumnName(col),
resultSet.getObject(col));
            }

            list.add(rowMap);
        }

        //print all Employees ID from a list of maps
        for (Map<String, Object> emp: list) {
            System.out.println(emp.get("EMPLOYEE_ID"));
        }

        resultSet.close();
        statement.close();
        connection.close();
    }

```

}

\* How would u test api manually. Describe steps

First of all I start by going over the API documentation. thats where

i collect the api Authentication url. in order to get my access token.

I use postman as manual automation tool I make sure to have access by

entering authorization as key and my access token as value. of course

i have to make sure that content type is json and my acceptance type is also

Json. Then once i get my call I test based on my API documentation my end points

currently i am testing preferences API. I also make sure the status code is 200

and that is how i do manual testing. The other option is using the Network option

when i inspect my UI application. i check the Headers, Preview, Response.

===== LINUX INTERVIEW QUESTION

\*How to find all the links in a folder in UNIX or Linux ?:

I use ls -lrt to be more specific i use grep to collect only links by using

```
ls - lrt | grep '^l'      " ^ <- this symbol is called caret"
```

```
linux@nyj872:~ ls -lrt total 2.0K
-rw-r--r-- 1 Linux Domain Users 0 Dec 6 2011 a
drwxr-xr-x+ 1 Linux Domain Users 0 Sep 19 12:30 java/
lrwxrwxrwx 1 Linux Domain Users 4 Sep 19 12:31 version_1.0 ->
```

java/

```
linux@nyj872:~ ls -lrt | grep '^l'
lrwxrwxrwx 1 Linux Domain Users 4 Sep 19 12:31 version_1.0 ->
```

java/

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5IkaVVrHV>

\*How to find a process and kill that?:

by using "ps -ef" you can get a list of all process and then use grep to find your

process and get the PID of that process. Once you got PID you can use the kill command to kill that process

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5IkfGi5lc>

\*How to run a program in the background in UNIX or Linux ?:

You can use `&` to run any process in the background and then you can use `jobs` to find the job id for that process and can use `fg` and `bg` command to bring that process into foreground and background

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5IkfwCDNf>

\*How to sort the output of a command in reverse order in Linux or UNIX ?:

1) Sorting based on numeric value of String using UNIX sort command:  
Many times instead of alphabetic sorting we need numeric sorting. Just

like in below example of Unix sort command if we want to sort based upon a numeric value of PID we can use `sort -n` along with `sort -k(column)`.

Since here PID is second column `sort -nk2` will work for us. This is also another great example of UNIX sort by column, which allows you do sort the data based on any column in UNIX

```
unix-sort-examples@unix-tutorial:~/test ps -ef | sort -nk2
UID          PID         PPID  TTY          STIME COMMAND
unix-sort-examples    500        2832    0      Jul 18 /usr/bin/bash
unix-sort-examples   1976        3556    2      Jul18 /usr/bin/ps
unix-sort-examples   2324          1 con     Jul 18 /cthelper
unix-sort-examples   2676          1 con     Jul 18 /cthelper
unix-sort-examples   2832          1 con     Jul 18 /cthelper
unix-sort-examples   3332        2676    1      Jul 18 /usr/bin/bash
unix-sort-examples   3556        2324    2      Jul 18 /usr/bin/bash
```

2) Reverse sort by using UNIX sort command:

Sometimes we need to sort in reverse order e.g. descending order. `sort -r` option allows us to perform reverse sorting in Unix.

```
unix-sort-examples@unix-tutorial:~/test ps -ef | sort -rnk2
unix-sort-examples   3616        3556    2 11:49:43 /usr/bin/ps
unix-sort-examples   3556        2324    2    Jul 18 /usr/bin/bash
```

```

unix-sort-examples    3448      0  0   Jan  1 /usr/bin/ps
unix-sort-examples    3332    2676  1   Jul 18 /usr/bin/bash
unix-sort-examples     500    2832  0   Jul 18 /usr/bin/bash
  UID      PID      PPID TTY      STIME COMMAND

```

3) UNIX sort by column : Sorting based on any column in the input.

sort command in Unix mostly used in combination of other Unix commands

like find, grep, ls or ps and most of these commands produce output in

tabular format and we want to sort based on any column. Unix sort command

allows us to do this by using sort -k option. Let's see an example or Unix sort

command to sort the output on any column we will use ps command output for this

example and we will sort this output on column 2 (PID) and later on column 3 (PPID)

```

unix-sort-examples@unix-tutorial:~/test ps -ef | sort -nk2
  UID      PID      PPID TTY      STIME COMMAND
unix-sort-examples     500    2832  0   Jul 18 /usr/bin/bash
unix-sort-examples    2324      1 con   Jul 18 /cygdrive/c/
Software/puttycyg-20101029/puttycyg-20101029/cthelper
unix-sort-examples    2564      0  0   Jan  1 /usr/bin/bash
unix-sort-examples    2676      1 con   Jul 18 /cygdrive/c/
Software/puttycyg-20101029/puttycyg-20101029/cthelper
unix-sort-examples    2832      1 con   Jul 18 /cygdrive/c/
Software/puttycyg-20101029/puttycyg-20101029/cthelper
unix-sort-examples    3332    2676  1   Jul 18 /usr/bin/bash
unix-sort-examples    3556    2324  2   Jul 18 /usr/bin/bash
unix-sort-examples    3764    3556  2 11:58:08 /usr/bin/ps

```

Read more: <https://javarevisited.blogspot.com/2011/08/unix-sort-command-example-tutorial.html#ixzz5IkhnBhek>

\*How to create an archive file in UNIX or Linux Operating System ?:

Another interview question based on knowledge of UNIX or Linux command.

you can use the tar command to great archives in UNIX or Linux. you can

even combine tar and gzip to create a compressed archive in UNIX

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5IkijuQg4>

\*What is the meaning of a file has 644 permission ?

The 644 represents permission 110 for the owner,



permission 100 for group and 100 for others which means read + write for an owner  
who creates that file and read only permission for group and others.

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5IkjF0am7>

\* How will you remove empty files or directories from /tmp ?:

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5Ikls2zoo>

CREATE:

```
//This will create empty file in current directory
test@localhost:~/unix touch empty.txt
```

```
//This will create empty directory inside current directory
test@localhost:~/unix mkdir empty_dir
```

Unix //This command will find all empty files and directories in

```
test@localhost:~/unix find . -empty
./empty.txt
./empty_dir
```

PRINT:

```
//this command will print empty files
test@localhost:~/unix find . -type f -empty
./empty.txt
```

```
//this command will print empty directories
test@localhost:~/unix find . -type d -empty
./empty_dir
```

```
//How to use grep command to print empty files and directories
test@localhost:~/unix ls -ltr | grep '\<0\>'
drwxr-xr-x+ 1 test Domain Users 0 Jun 15 11:43 empty_dir/
-rw-r--r-- 1 test Domain Users 0 Jun 15 11:44 empty.txt
```

```
//find command to print empty files and directories
test@localhost:~/unix find . -maxdepth 1 -size 0 -ls
0 Jun 15 11:43 .
0 Jun 15 11:44 ./empty.txt
```

```
19421773393554899    0 drwxr-xr-x    1 test Domain Users
0 Jun 15 11:43 ./empty_dir
```

#### REMOVE:

```
//removing Empty files and directories using find command
test@localhost:~/unix find . -empty -delete
```

```
test@localhost:~/unix find . -empty -delete
```

```
test@localhost:~/unix ls -lrt
total 1.0K
```

```
-rw-r--r-- 1 test Domain Users 118 Aug  4 2011 contacts.txt
```

directories //using find and xargs command to remove empty files and

```
test@localhost:~/unix find . -empty | xargs rm -r
```

```
test@localhost:~/unix find . -empty -type d -exec rm -r {} \;
find: `./empty_dir': Not a directory
```

Read more: <https://javarevisited.blogspot.com/2012/08/delete-empty-files-directories-unix.html#ixzz5IkledGw5>

\*I have read permission on a directory but I am not able to enter it why ?:

In order to get into a directory, you need to execute permission. if your directory

does not have to execute permission then you can not go into that directory by using the cd command

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5IkKTFXi>

#### NUMERIC FILE PERMISSION UNIX:

```
0 - no permissions
1 - execute only
2 - write only
3 - write and execute
4 - read only
5 - read and execute
6 - read and write
7 - read, write and execute
```

#### SYBOLIC FILE PERMISSION UNIX:

Reference	Class	Description
u	user	the owner of the file
g	group	users who are members of the file's group

o	others	users who are not the owner of the file or members of the group
a	all	all three of the above, is the same as ugo
r	read	read a file or list a directory's contents
w	write	write to a file or directory
x	execute	execute a file or recurse a directory tree

DEFAULT PERMISSION:

Default permission of file -- 666  
 umask -- 022

-----  
 Final permissions on file -- 644 (which is 110 100 100 i.e. rw- r-- r--)  
 read and write for user and read only for group and others

Default permission of directory -- 777  
 umask -- 022

-----  
 Final permission of file -- 755 (which is 111 101 101 i.e. rwx r-x r-x)  
 read, write and execute for user (owner) and read+execute for group members and others.

CHANGE PERMISSION:

stock\_options:~/test touch stock\_trading\_systems

```
stock_options:~/test ls -lrt
total 8.0K
-rw-r--r--  1 stock_options Domain Users    0 Nov 15 11:42
stock_trading_systems
```

stock\_options:~/test chmod 400 stock\_trading\_systems

```
stock_options:~/test ls -lrt
total 8.0K
-r-----  1 stock_options Domain Users    0 Nov 15 11:42
stock_trading_systems
```

stock\_options:~/test vim stock\_trading\_systems

stock\_options:~/test chmod 777 stock\_trading\_systems

```
stock_options:~/test ls -lrt
total 8.0K
-rwxrwxrwx  1 stock_options Domain Users    0 Nov 15 11:42
stock_trading_systems*
```

Read more: <https://javarevisited.blogspot.com/2011/11/file-permissions-in-unix-linux-example.html#ixzz5IknXmjRM>

\*How to find size of file / directory /document :?

I use `du -h "filename"` to make it readable the result will be in bytes/Megabites etc.

```
alex-MacBook-Pro:Desktop arod$ du -h ALEX.pdf
6.9M    ALEX.pdf
alex-MacBook-Pro:Desktop arod$
```

\*How do you find all the process listening on a particular port in Linux?:

I use `netstat` to find a process in a particular port example

```
$ netstat -nap | grep 8084
```

(Not all processes could be identified, non-owned process info will not be shown, you would have to be root to see it all.)

```
tcp 0 0 0.0.0.0:8084 0.0.0.0:* LISTEN 25314/java
```

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5Ikp8kt62>

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5Ikp3c6W9>

\*How to you find all the process which has opened a file in Linux?:

You can use the `lsof` (list open files) command to find out the process which has a file

handle on the particular file. It's very useful command to check which process are reading a file

\*How to find all opened files by a user

```
$ lsof -u username
```

```
alex-MacBook-Pro:Desktop arod$ lsof | grep java
```

Read more: <https://javarevisited.blogspot.com/2016/06/10-example-of-lsof-command-in-unix-linux.html#ixzz5Ikr9eUQV>

How to send HTTP request from a Linux server?:

You can use either `wget` or `curl` command to send HTTP request, both GET and POST from a Linux machine as shown below

```
alex-MacBook-Pro:Desktop arod$ curl http://
34.223.219.142:1212/ords/hr/employees/100
```

```
{"employee_id":
100,"first_name":"Steven","last_name":"King","email":"SKING","phone_nu
mber"
```

```
      : "515.123.4567", "hire_date": "2003-06-17T04:00:00Z", "job_id": "A
D_PRES", "salary": 24000,
      "commission_pct": null, "manager_id": null, "department_id":
90, "links":
      [{"rel": "self", "href": "http://34.223.219.142:1212/ords/hr/
employees/100"},
      {"rel": "edit", "href": "http://34.223.219.142:1212/ords/hr/
employees/100"},
      {"rel": "describedby", "href": "http://34.223.219.142:1212/ords/
hr/metadata-catalog/employees/item"},
      {"rel": "collection", "href": "http://34.223.219.142:1212/ords/
hr/employees/"}]} alexs-MacBook-Pro:Desktop arod$
```

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5IkrjrAE2>

\*How do you create a full directory structure e.g. /parent/child/grandchild in UNIX?:

Well, you can use the mkdir command with option -p to create all parent directories in one go

```
$ mkdir -p software/java/app/config
$ pwd /home/john
$ cd software/java/app/config/
[# ~/software/java/app/config]$
```

Read more: <http://www.java67.com/2012/09/10-linux-and-unix-interview-questions-answers-wipro-tcs-capegemini.html#ixzz5Iksbn3uU>

===== SQL QUERIES =====

SQL? STRUCTURE QUERY LANGUAGE

SQL STATEMENTS:

DML: DATA MANIPULATION LANGUAGE (SDET JOB)

SELECT  
INSERT  
UPDATE  
DELETE  
MERGE

DDL: DATA DEFINITION LANGUAGE ( DEVELOPER )

CREATE  
ALTER  
DROP  
RENAME

```
TRUNCATE
COMMENT
DCL: DATA CONTROLLER LANGUAGE
GRANT
REVOKE
TRANSIT CONTROL
COMMIT
ROLLBACK
SAVEPOINT
```

```
-- how to print duplicate row in a tables
select first_name,manager_id
from employees
group by first_name, manager_id
having count (*) > 1;
```

```
-- how to print specifit duplicate individual from list based on
manager id 145
```

```
select *
from employees
where first_name = 'Peter'
and manager_id = 145;
```

```
----- Inner/left/right/outter JOIN -----
```

```
-- Inner join Ans: An SQL Join is used
-- to combine data from two or more tables,
-- based on a common field between them. For
-- example, consider the following two tables.
```

```
select e.first_name, d.manager_id, d.location_id
from employees e join departments d
on e.department_id = d.department_id;
```

```
select e.first_name, d.manager_id, d.location_id
from employees e left join departments d
on e.department_id = d.department_id;
```

```
select e.first_name, d.manager_id, d.location_id
from employees e right join departments d
on e.department_id = d.department_id;
```

```
select e.first_name, d.manager_id, d.location_id
from employees e full join departments d
on e.department_id = d.department_id;
```

```
----- NATURAL JOIN ----- qualifier
```

```

-- Natural join
-- joins on columns with same name
-- if name changes query will stop working
-- if new columns are added query may stop working
-- or show incorrect data
-- can not qualifier next to e.

        select first_name,
               last_name,
               department_id,
               department_name
        from employees natural join departments;

----- CARTESIAN JOIN -----
-- Not usually what you want
-- often because join condition is missed
-- gives you more records than expected
-- use cross join keyword

        select first_name
               department_name
        from employees cross join departments;

        select first_name
               department_name
        from employees, departments;

----- SELF JOIN -----
-- join a table to itself
-- used when a record in a table is related to another
record in the same table
-- employee_id // manager_id

        Select e.employee_id,
               e.first_name,
               e.last_name,
               m.first_name,
               m.last_name,
               m.employee_id
        from employees e
        left join employees m
        on e.manager_id = m.employee_id;

----- MULTIPLE TABLES JOIN -----
-- Multiple Tables
-- big advantage of database
-- we just add another join keyword

```

```

select
  e.employee_id,
  e.first_name,
  j.start_date,
  l.job_title
from employees e
join job_history j
on e.employee_id = j.employee_id
join jobs l
on j.job_id = l.job_id;

```

=====

----- instr function -----

-- shows the number where that specific position is lets say  
for EABEL print me the number position of letter B

```

select first_name,
last_name,
email,
instr(email,'B')
from employees;

```

-- length of the name in numbers.

```

select length(first_name), first_name
from employees;

```

----- Nesting function within function -----

-- will allow you to print starting at 4568 which is the last 4 of a  
phone number

```

select first_name
last_name,
email,
phone_number,
instr(phone_number,4568)
from employees;

```

----- Dates functions -----

==== how to print todays Date ====

for this you dont need any tables sql already comes with it

```

select sysdate
from dual;

```

-- print first name and last name and hire date for Steven King and



show add 5 years  
from his hire date and name it alias as review\_date.

```
select first_name,  
last_name,  
hire_date,  
ADD_MONTHS(hire_date,60) as review_date  
from employees  
where first_name = 'Steven'  
and last_name = 'King';
```

how to print how long has an employee been working with the company?

---- IN DAYS months between function is used first parameter is  
sysdate it will

generate the date between system date and time of hire.

```
select first_name,  
last_name,  
hire_date,  
months_between(sysdate, hire_date) as  
time_with_company  
from employees;
```

--- in years we divide by 12 and later round by 1 decimal

```
select first_name,  
last_name,  
hire_date,  
round (months_between(sysdate, hire_date)/12, 1) as  
Year_with_company  
from employees;
```

----- ROUND numbers functions -----

rounds numbers from 20.59 to 21

```
select min_salary,  
ROUND (min_salary)  
from jobs;
```

----- SQL INTERVIEW QUERIES -----

-- find the second highest salary of employee

```
select max(salary)  
from employees  
where salary not in  
(select max (salary) from employees);
```

-- Find Max Salary from each department

```

select department_id, max(salary)
from employees
group by
department_id;

-- print current date

select sysdate
from dual;

-- print the name of the distinct employee
-- whose hireDate is between 17-JUN-03 and 21-MAY-07

select distinct first_name
from employees
where hire_date between '17-JUN-03' and '21-MAY-07';

-- find employee whose salary is equal or greater than 10000

select *
from employees
where salary >= 10000;

-- find name of employees whose name starts with M

select first_name
from employees
where first_name like 'M%';

-- print anual salary for employees

select first_name, last_name, salary*12
from employees;

-- print Lex from employees

select *
from employees
where first_name = 'Lex';

-- print salary for employees who earn 4000 to 8000

select *
from employees
where salary between 4000 and 8000;

-- list employees who are working in department 60 and 80

```

```

select *
from employees
where department_id in (60,80);

-- get employee id and last name in descending order based on employee
id

select employee_id, last_name
from employees
order by employee_id desc;

-- print last_name from employees and the length of their last names
-- also count how many employees have the same last name

select last_name, count(*) ,LENGTH(last_name)
from employees
group by last_name;

-- select employee record with max salary

select *
from employees
where salary = (select max (salary) from employees);

-- select highest salary in employee table

select max(salary)
from employees;

-- select range of employee based on Id

select *
from employees
where employee_id between 100 and 113;

--return employee name, highest salary and department name

select e.first_name,
e.salary,
d.department_name
from employees e join departments d
on (e.department_id = d.department_id)
where salary in (select max(salary) from employees);

-- return highest salary employee name department name for each
department

select e.first_name,

```

```

e.salary,
d.department_name
from employees e join departments d
on (e.department_id = d.department_id)
where salary in
(select max(salary) from employees group by department_id);

-- select a row if an employee is president or a sales
-- representative and if the employee earns more than 15000

select last_name, job_id, salary
from employees
where (job_id = 'SA_REP'
or job_id = 'AD_PRES')
and salary > 10000;

-- select the row if an employee is a president and earns more than
15k
-- or if the employee is a sales representative
select last_name, job_id, salary
from employees
where job_id = 'SA_REP'
or job_id = 'AD_PRES'
and salary > 15000;

-- select employees from FI_ACCOUNT who makes highest salary
select last_name, job_id, salary
from employees
where job_id = 'FI_ACCOUNT'
and salary =
(select max(salary)
from employees
where job_id = 'FI_ACCOUNT');

--find how many records are in countries table where country_name has
"in" in them
select count(*)
from countries
where country_name like '%in%';

--natural join
select *
from employees, jobs
where employees.job_id = jobs.job_id;

-- query: return first name job title and max salary

```

```

--natural join
    select jobs.job_title ,
           jobs.max_salary,
           employees.first_name
    from employees,jobs
    where employees.job_id = jobs.job_id;

-- self Join

    select a.first_Name, b.first_name
    from employees a, employees b
    where a.first_name = b.first_name;

-- explicit inner join using join and on..

    select a.first_Name, b.first_name
    from employees a
    join employees b
    on a.first_name = b.first_name;

-- joins right join

    select c.first_name,c.department_id, j.min_salary,j.job_title
    from employees c
    right join jobs j
    on c.job_id = j.job_id
    order by c.first_name;

-- print how many employees are in department id and id is 100 label
-- it as employees

    select count(department_id) as employees
    from employees
    where department_id=100;

```

#### SQL DEVELOPER QUERY

```

-- QUERY: print everything inside employees

```

```

SELECT *
FROM EMPLOYEES;

```

```

-- Query: print firstname and lastname from employees
select first_name, last_name
from employees;

```

```

-- Query: Print country name and region id from countries
select country_name, region_id
from countries;

-- Query: print Argentina from countries table.
select country_name
from countries
where country_name = 'Argentina';

--Query: Print first name and last name from employees;
select first_name, last_name
from employees;

--Query: Print all colums where commission pct is not null
select *
from employees
where commission_pct is not null;

--Query: Print first name last name together from employees and
--rename the column as full name and make sure table name is in lower
case
--Example name: Ellen Abel -> EllenAbel
--Example Column Heading: FIRST_NAME --> fullname
select first_name || last_name as "fullname"
from employees;

--Query: print components of employees table what does it consist of
describe employees;

--Query: print Schema of Database
select table_name
from user_tables;

--Query: Print first name print the salary and anual salary from
employees
-- and rename it as anual_salary
select first_name, salary, salary*12 as anual_salary
from employees;

--Query: Print anual salary+300 from employees
select salary*12+300 from employees;

--Query: print first name and concatenate " 's mercedes rocks "
select first_name || q'['s mercedes rocks]'
from employees;

--Query: Select everything form employees where employees_id is less
--than 120
select *
from employees

```

```
where employee_id < 120;
```

```
--Query: print first name that contains first letter of name capital A
```

```
select first_name  
from employees  
where first_name like 'A%';
```

```
--Query: Print unique job id and first name from employees
```

```
select distinct job_id  
from employees;
```

```
--Inner JOIN
```

```
--Query: Give department name of an employee id
```

```
select department_name, employee_id, first_name, last_name  
from employees e left join departments d  
on e.department_id = d.department_id  
where d.department_id is not null;
```

```
select department_name, employee_id, first_name, last_name  
from employees e left join departments d  
on e.department_id = d.department_id;
```

```
--Query: how do I find out if department table and employee table are
```

```
--exactly the same
```

```
(select employee_id  
from employees)  
minus  
(select department_id  
from employees);
```

```
(select department_id  
from employees)  
minus  
(select employee_id  
from employees);
```

```
===== Soft Skills =====
```

1. Tell us about yourself and your framework/current project.

Currently I am a senior automation Engineer and I am currently doing automation, how ever when its needed

i am also doing manual testing. I have experience working with banking and health care web applications. I have profound experience using various tools, like java as my

programming language, selenium, maven, testNG, Junit. Jenkins for continuous integration, Jira for management aws for parallel execution and unix for my commands.

I am dedicated to a belief, I go by 3 core values, passion, opportunity, and integrity.

I am goal oriented, detail oriented and always focus on tasks to be completed.

2. When the time is tight, would you just write an okayish code or do you always take extra time to review the code you wrote and polish it to make it better?

I always deliver quality product, the reason is over the years I learned how important is

to be organized and at the same time focus on your task. I don't like to waste time watching tv

I am either coding or learning new technology. When ever i have time to spare i participate on meet up meetings. I like to share knowledge at the same time learn from others.

3. Difference between final and finally?

final is a keyword, final is used to put restrictions in class methods and variables

if a class is marked as final then this class can not be inherited by another class.

finally is used on a try catch statement, its a block, finally is used for exception handling along with try and catch blocks.

4. how do you use overloading in your project?

I used overloading when I create my methods

one example on my current project we have listbox class I have created a

```
public class Listbox {  
  
    Select list;  
  
    public Listbox(Select list) {  
        this.list = list;  
    }  
  
    public void select(int i) {  
        this.list.selectByIndex(i);  
    }  
  
    public void select(String text) {  
        this.list.selectByVisibleText(text);  
    }  
}
```



```
public void deSelect(int i) {
    this.list.deselectByIndex(i);
}

public void deSelect(String text) {
    this.list.deselectByVisibleText(text);
}
```

5. How do you migrate 18 million rows of data from one place to another?

it depends on the database type. it can be as complicated as eating spaghetti

6. What is the difference between functional tester and manual tester? (I guess the product owner thought they were different titles as I was mentioning either one time to time)

functional testing on my project is our smoke test. its covering the important aspects of our environment.

manual testing is what i normally do to understand my functionality. to check and see if something

cant be automated or if something doesnt need automation.

7. If there's an argument between you and the developer regarding a bug, who has the final say? (I said PO)

We had an instance in which my developer declined my bug. the reason is that because

my understand of the requirement was not relevant to his understanding. What we did to overcome

this argument was speak to our BA for clarification on requirement. maybe he understood the requirement

different to what I understood. So from that day on forward on every meeting we have for planning

we make sure to be clean and ask as many questions. At the end we will be the ones delivering the product.

8. How do you resolve conflict between coworkers?

conflict is always there, For instance we had our colleague gihan whos temper was always on the way.

He would snap really quick if something did not go as he wanted. As a team we pointed out to him

the tools available to find a solution. there are so many tools online to take advantage of like stackoverflow

guru99 among other that provide some help. So he learned how to deal with his reactions now.

9. How do you handle stress?

as you know there is always stress specially on IT. we have dead lines and we have limited time for testing.

you can ask my team mates my boss my wife and they always wonder

how can i stay so calm. how can i be so relax  
the reason is this. when i come to work i leave my bag of stress  
on the door. I start my morning fresh  
i look at my schedule and my deadlines. i prioritize my goals  
based on what needs to be done.

10. The sprint is ending very soon and you have to do release, but you found a minor issue, what would you do?  
(I said talk to the team or PO) And they said: But the product owner wants you to just close it, it's too late, we have to do the release.. (I said then it's up to whatever the PO says)

As a team member we have to evaluate the importance of this release. I would rather deliver a product well done than a product half way done. for that I will stay up late nights after all we are a committed team and we like to deliver what we promise.

11. Tell us about a time where you took leadership role and led a group to do something at your work.

Thank you Currently we are working on a project that involves testing our database. our PO came to us in the middle of the sprint and told us to work on a different project. he needed that project to be done within short period of time, we had another team also assissting us because this project had a time line and what I did was I gather our team talked about the aproach we will take to complete this task. We organized based on functionality and what needed priority. I was in charge of setting up meetings talking to our scrum master, our BA creating tickets for team mates who needed assistance on clarifications. at the same time i was doing peer code review. Like i mention In such a small period of time we can make so many mistakes. Therefore i stayed late to review the codes to ensure our work was done good. at the same time i got calls from a woman reminding me that I have a wife. so It was exisiting and challenging. but we got it. ahh Also On my way home I make sure to grab some flowers for my wife.

12. You have 2 user stories with same/high priority, how would you make sure to finish both of them in a timely manner?

organize my self and work 1 task at a time. I have seen people work on both tests at ones at the end they are rushing to finish their code. because their mind is not focus on each user story but 2. so why make your life harder  
I know i can acomplish my dead lines so I do it 1 at the time. before doing it I understand in dept

13. How do you convince your team about a new tool/idea that you want

to bring in to the team that everyone is against?

I have introduced Selenium Grid. they were using Sauce Labs and it was challenging specially for testers. since we have to do it our selfs they did not like much the idea. After showing them a Demo and also Explaining the set up and the benefits of doing it our selfs they loved it. Because we would configure our own reports and also we would be able to launch it in different browsers and OS.

14. Have you done demo?

I have conducted different types of Demo. because we have the resources I take advantage of what is given to me one demo was my parallel execution and another was for a small project, I presented to my team our Functionality as part of our training we conduct a Demo to help us get better proffessionally. when I join my team I introduced so many ideas but due to time constraint we were only able to acomplish some. I have a big imagination as far as project come and also different approches we can take.

15. Do you only do testing or do you help with developers and/or BA with their job?

I am reliable when it comes to helping peers. On my current project we participate on different types of meetings. My BA once asked me to review some of the user stories with him. now because I can provide my feedback on testing side I helped him write test cases and learn the functionality.

16. In your current project, do you believe everything can be automated? (I said no, that's why we have manual tester)

no not everything can be automated because we still have to manual test before we automate and that is where

we find a feature that can be automated or not. When i find a story or a functionality that cant be automated

I make sure to manually tested until i am satisfy and i automate what needs automation. Of course I can not go against requirements if documentation says automate it I will automate it.

But thats why we have our meetings our planning to

and thatst why i like to participate in BA/PO meetings to also contribute my thoughts about what needs automation and what not.

17. Explain to us what is the definition of done?

Currently for my project when i finish my code i make sure its ..... need to work on this....

18. How good is your math skills?

Its great. Rusted but I used to work for a bank long ago.

19. How many environments do you have?

in my current job we have 5 at capital one i have dev enviroment, QA environement, regression environemt, pre-prod - and production.

20. When you are done with a certain task, do you review it others or just submit it? (correct answer is review it with whole team)

when i finish my task as a team we review our codes once its reviewd we submit it.

1. Tell me about yourself?

Currently I am a senior automation Engenieer with capital one. I started my career as manual tester

something that caught my attention was the passion to grow. So I started doing automation after 1 year

Evolent, BCBS provided with so much support as far as growing and learning new tools. Currently on my project

I am working with BDD framework. using java as my core language, selenium and cucumber for my feature files.

maven, jenkins, testNG for testing, and I also worked with Test NG. Jira we use for our project management git for our

code repositories. for my api testing i am using restassured librarie and postman as manual testing tool as well as the

browser console. for database and backend i am using JDBC and for manual queries I use sql developer.

I currently hold a java, linux and Scrum Master certification. I like to challenge my self and i like to achieve goals

I like to motivate my team and and at the same time provide value.

2. Whats your project?

my poject at capital one is for he user to be able to manipulate the settings preferences. What I am currently automating is

the setting for personal accounts, external accounts, and language. as a user they can configure the account also add external accounts

when ever data is enter it creates an API call. I make sure to automate on my feature file negative, positive scenario as well as api and database.

3. In the future do you willing to be a developer?

Becoming a developer is challenging your self to changes. I like challenge not only to be developer but

also to be BA/SMaster. i would like to learn as much as I can.

Because understanding different roles different

views helps me be better at what i do. So if a change comes then I am open.

3. What do you not like in automation? (I said SQL. He said. OK.. Lets start with SQL..)

I dont API testing. There are many things that can go wrong. normally because we are also dealing with other API for instance credit card, API, Loan API, so we have to make sure that the data get properly transfer when used. therefore i testing has to be rebust and at the same time we have to finish it in time.

4. There are two tables they supposed to have same data. How can you test it?

lets say its an API, what i do its i test data stored on the database against data entered.

first of all i test if my key values match, i have to test the data inside lets say my json response.

if its related to database i test with select minus. I make sure to check A and B and B and A

5. There are two tables they supposed to have the same number of row. How can you test it?

SQL I use row count.

6. There is a table. It has a first name, last name, salary, depID. I want to know the average salary of each department

7. What is JOINS in SQL?

joins i use it when i query data from multiple tables, its useful when finding matching records and for that i use inner join there is different types of joins: like inner join, left join, right, full join. self joins.

8. Union, Union All

the difference between union and union all is when we use union it removes the duplicates and null values also it sorts it

9. What is 'final' in java? When do you use it?

final we use it in a method or variable normally used to restrict a class

10. OOP concepts in Java?

Encapsulation  
Abstraction  
Polymorphism  
inheritance

11. Reverse String method

```
String name = "alex"  
String temp = new StringBuilder(""+name).reverse().toString();  
System.out.println(temp);
```

```
String name = "alex";  
for(int i = name.length()-1; i >=0; i--){  
    reverse = reverse+name.charAt(i);  
}  
System.out.println(reverse);
```

12. How do you use Cucumber in your framework?

Cucumber enables the story and the acceptance criteria to be implemented

in a language that can be understood by any user.

the language we use is gherkin and each user story is

===== INTERVIEW QUESTIONS =====

What is important to you the employee?

people = whats important to me is my team mates. I will be with them all

day  
stability  
growth  
networking

What is important to you the employer?

thorny problems: Can you tell me what problems are you facing  
unresolved challenges: What can i do to resolve that challenge.

Why how did this position become available? did someone leave?

(AKA: are you good enough for ME?)



# Interview/Topics Study Guide

- Andy L.(batch 7)

## Interview Preparation

### **Tell me about yourself**

1. First of all I would like to thank you guys for giving me the time and opportunity to be part of your company.
2. I have been in the IT industry for 6 years so far and I am currently an **SDET** on my team.
3. After working in different types of Industry I have gained domain knowledge in networking , banking, and healthcare.
4. I started off as a manual tester and eventually became proficient in automation testing
5. I have been exposed and have experience in Frontend testing and backend testing
6. The tools I used in my current project are Selenium WebDriver, Java, TestNg, , cucumber for front end.
  - a. Sql, jdbc, and oracle database for back end
  - b. I have also worked on API testing in my project and I used Restful , postman, and restassured library
  - c. I also used github for version control, and Jenkins for continuous integration/deployment, and maven for framework organization and jira for project management and bug tracking
  - d. amazon aws cloud machine server management
7. I have been exposed to waterfall methodology early in my career and currently I am in a agile scrum team and participate in meetings and analyze artifacts
8. I have also constructed and design my own framework that are data driven and behavior driven based on POM and I am also able to adapt to any existing frameworks
9. As an individual im highly motivated person, growing up a low income poverty I learned at a very young age that hard work pays off and you must be hungry for success. Im a positive person and I love helping companies achieve their goals and grow with them . I'm a team player and my team that I'm in right would say that i'm very reliable and that have good communication skills to ensure that we meet our goals during the sprint.

### **Questions to prepare for interview**

What are the challenges you faced in Automation?

Day to day activities?

Tell me about your project?

What are your strengths?

What are your weaknesses?

Describe me a test case you worked on?

Explain to me a test scenario you work on

Tell me a time you take a leadership role and led a group to do something at your work

Describe me your trophy bug?

What is your scrum team composition?



How long is your sprint?

How many test cases you automate a week?

How many defects you found a week?

## **QA Testing**

### **What is a test strategy?**

- A test plan for software project can be defined as a document that defines the scope, objective, approach and emphasis on a software testing effort

### **What is a test plan?**

- Documentation about the test/testing process
  - Consist of
    - Introduction
    - Test strategy
      - Test objectives
      - Test assumptions
      - Data approach
      - Scope and levels of testing
    - Execution strategy
      - Describes how the test will be performed and process to identify and report defects, and to fix and implement fixes
    - Test management process
      - Handles the logistics of the test and all the events that come up during execution
    - Test execution
    - Test Environment
    - Must be reviewed before execution by Devs, testers, and business team

### **What does Test case consist of?**

- Prerequisite or pre-condition that must be followed before executing test steps
- Test steps
- Test results- Pass/Fail
- Automation status
- Date of Execution

### **What is a Test Scenario?**

- Make sure that end to end functionality of application under test is working as expected
  - The tester needs to put his/her foot in the end users shoes to check and perform the action as how they are using application under test
  - T.S can have many test cases associated with it, Before executing the T.S we need to think of test cases for scenario
- Test Scenario: Validate the login page

- Test Case 1: Enter a valid username and password
  - Test Case 2: Reset your password
  - Test Case 3: Enter invalid credentials
- In each test case are detailed steps and condition for execution

## **Difference between Test case and Test script?**

### **Test Case :**

- A test case is a documentation which specifies input values, expected output and the preconditions for executing the test.
- This terminology mostly used for Manual Testing
- It's a layout of the low-level details on how to test the scenario

### **Test Script:**

- A test script in software testing is a set of instructions that will be performed on the system under test to test that the system functions as expected.
- This terminology mostly used for Automation Testing

## **What is Quality Assurance/ Quality Control?**

- QA is used to verify the quality of the output

## **How to build your framework from scratch**

- Testing Framework - guidelines and rules used for creating and designing test cases
1. Set up Environment ; install JDK, MAVEN, ECLIPSE IDE
  2. Create Maven project
    - a. ArtifactID - name of your project
    - b. GroupID - identifies your project uniquely across all projects
  3. Add Dependencies from Maven Repository
    - a. Selenium Java
    - b. Cucumber Sandwich
    - c. JRE System library 1.8 in <properties>
    - d. TestNG
    - e. WebDriverManager\_BoniGarcia
    - f. Cucumber Java
    - g. Cucumber TestNG
    - h. Apache POI.XML
    - i. APACHE POI
    - j. JDBC

- k. Restassured
- l. Gson
- m. Log4j
- 4. Create framework Structure (packages)
  - a. Pages
    - i. Webelements and methods
  - b. Beans
    - i. Custom classes
  - c. Runner
    - i. Cukesrunner - generates codes and stores html report to target
    - ii. Smoke
    - iii. regression
  - d. StepDefinitions
    - i. Actual codes and hook class
  - e. Tests
    - i. Data driven tests
  - f. JDBC
  - g. API
  - h. Utilities
    - i. ConfigurationReader
    - ii. Driver class (Singleton)
    - iii. browserUtils
    - iv. DBUtils
    - v. ApiUtils
  - i. Configuration.properties
  - j. Testng\_runner.xml
    - i. One of the runner class

Call the packages with com.app.utilities

#### 5. Create feature folder with feature file (.feature) in resources

- File executable specification written in a gherkin language

6. After you finish writing your scenario, run your cukesRunner with dryRun=false, this will give you implementation code that you will store in StepDefinition class

#### 7. How to run your code?

- Use runner class - run codes and generate cucumber report and html reports

#### 8. Send framework to github

- Create new repo
- Copy git url and go to eclipse
- Configure git repo and add the url
- Right click project, click team, click commit and you'll be in git staging
- NOW YOUR CODE IS IN GITHUB

## 9.Next is JENKINS INTEGRATION

### Jenkins

- Open source automation server
- Helps to automate the non-human part of the software development process
- Allows continuous integration
- Development practice that requires dev to integrate code into a shared repo at reg intervals
- Port is 8081 localhost

### To run your project in jenkins

- Login to jenkins account
- Create project - freestyle
- Install plugins -cucumber report and git
- Under source code management choose git and past git url
- Build trigger - choose build periodically
- Invoke top-level maven
  - Maven version ; MAVEN\_HOME
  - Goals ; **clean verify -Drunner=smoke\_runnerxml**
- Under post-build actions
  - Choose cucumber reports
  - Choose editable email notify
- Editable email notification
  - Attach build log ; choose build log
  - Click advanced settings
- Failure-Any
  - Click advanced
  - Recipient list - email address who will receive the report. Add comma if multiple
  - Click add trigger - like failure always
  - Attach build log; select attach build log
  - Save
- Final step
  - Click build now and test will run and gives your cucumber report

### What is Software Testing?

1. Process of executing a program or application with the intent of find software bugs using functional and automation tools
2. Process of validating/verifying a software program/application
3. Testers should test to break approach, not test to pass

### What is Software Development Life Cycle

#### 1. Requirement Gathering

- a. Gathering information used to plan project approach and feasibility study
- b. Identifying risks

- c. Planning QA requirements
- 2. Defining Requirements**
  - a. Phase to clear define/document product requirements
  - b. SRS (Software Requirement Specification)
- 3. Designing**
  - a. How the application will be built
- 4. Developing (coding)**
  - a. Based on requirements, developers will write the application
    - i. Using tools/ techniques chosen during design phase
- 5. Testing**
- 6. Deployment**
  - a. Releasing product
- 7. Maintenance**
  - a. Making sure product is stable
  - b. Looking at customer report on bugs and fixing it

#### **What is STLC?**

- It's testing process which is executed in systematic and planned manner.
- In STLC process in different activities are carried out to improve the quality of the product.

#### **How many environments you have?**

- Development
  - Unit testing
  - Less stable than test environment
- Test environment
  - Manual testing happens here
  - **Replicates the production environment exactly**
  - Changes are deployed in intervals
  - Automated smoke tests are ran here
  - Automation tests are ran here
  - Automated Integration tests run here
- Pre-production Environment
  - UAT environment
  - Demo happens here
  - load/performance testing happen here
  - Changes are deployed in big intervals
  - Automated major regression tests here (before release)
    - This test is decided in test plan
  - Very stable
- Production environment

#### **How is code deployed to production environment?**

- From Local
  1. check in code to Git using pull and push
  2. Run unit tests
  3. Deploy changes to server

- a. Done by Jenkins automatically every time developer checks in code. After it passes, deploy changes to Dev environment
- From Dev environment
  - Deploy changes to Test environment done by Jenkins
  - Can be scheduled or manually triggered
- From Test
  - Deploy changes done by Jenkins
- From Pre-production

### Smoke test

- Runs against the test environment
- Run everytime changes are deployed to Test environment
- Can be ran in dev environment

### Regression Test

- Runs against the UAT environment
- To find out if new changes result in any defects
- Runs after major bug fixes and every release

### What is RTM?

- Requirement Traceability Matrix
  - a. Connecting the test cases to the requirements

### What is Regression Hierarchy?

#### 1. Programming language

#### 2. Top layer

#### 3. Testing framework

#### 4. Build tool

#### 5. Frontend - Selenium WebDriver

#### 6. Backend - JDBC, and RestAssured

#### 7. Jenkins - CI/CD

#### 8. Data driven - Apache Poi

### Modular

### Reusable

### Independent

### Describe me your Framework

MY FRAMEWORK and how to explain to interviewer - **Andy Lam and little bit of Alex**

//based on **Data Driven and Behavior Driven** - Hybrid framework

//**Maven** - build tool and not only for dependency management but also as a command prompt tool using the pom.xml file, i also have specific **xml file** that run my smoke,

//regression, and functionality tests

//**Java** as programming language - working frontend, backend(api), and database i use **Java Collection framework** to store data and compare

//i also have a **properties file** that stores sensitive/reusable data - url, password, browser

//and i use **Testng** testing tool to control flow and assert data, after formatting data to java, in order to find defects

I also created **Driver class** in utility package that uses **singleton pattern** to create and use only one universal webdriver

**FRONT END ; selenium webdriver**, and in my framework i am using **Page object model** as my design pattern; - create page objects; identify webelements and //and store as a webelement variable ,POM = REUSABILITY OF ELEMENT/METHODS BASED PAGE OBJECT

//i also use **Page Factory design pattern** to instantiate my webelements using **@FindBy** - easier/convenient

//utility; browser util - where static reusable code that makes your life easier, to make codes for automating browser easier;

### **BACK END (Api)**

//using **RESTASSURED** in your framework in order for the process of **Deserialization** and **serialization** to occur

//that way you store **json response** into a java collection data structure(/i produce high level pojoes and map objects) and assert the data with the expected value (also stored in java data structure)

//i also have a api utility class - reusable codes -method where one line creates a pojo

//i use **postman** for manual testing first BEFORE I INVOKE MY FRAMEWORK

### **DATABASE testing**

//manual i **sql developer** for producing sql queries

//FOR AUTOMATION ;i use **JDBC library** to integrate java by getting a **CONNECTION** from oracle database

//then creating **STATEMENTS** using SQL queries and then storing the data into a **RESULTSET** object.

//i use java data structures to use store data inside and compare them

//and since im using **DATA DRIVEN and CUCUMBER BDD** framework, all of these tests are stored inside **feature files**

//i have **RUNNER classes** that helps generate codes from **FEATURE FILE** and implement them into a file called b

//also have **HOOK class** that implements my codes that run before and after all my tests - this is where i invoke my **TAKESCREENSHOT** interface which triggers when i use scenario interface(when scenario fails)

//take a picture when youre are on the step that failed

//S.D - this is where i stored my codes that based on **gherkin language** expected value

## DDT

//if the im working with small amounts of test data im going to operate with **scenario outlines**, this where i create **examples** and store datas using pipeline

//if there large amount of test data its usually in a external file (excel) so i use **Apache POI** to **INVOKE DDT EXCEL AUTOMATION** and read from excel file and store the data

//into java data structure

//i also have a logging tool called **log4j2** to log my codes that are basically high risk

//and lastly for my reports,, in my framework i use **Rerun.txt code** in cucumber

"rerun:target/rerun.txt" generated by cucumber sandwich library

//this will store my failed cucumber feature files

//then i also have **failedScenario runner class** which has the location of failed scenarios (rerun.txt)

//i create a failedScenario xml file

//so whenever i have failed feature files i use mvn command ; **mvn -Drunner=failedScenarios.xml** file to run my failed tests

//reporting - i used html report that's located in target folder which is called cucumber-reports -"html:target/cucumber-report"

**Parallel testing** - used **cucumber jvm-parallel plugin** to generate runners and **maven fail-safe plugin** to run the tests

## For **continuous integration (jenkins)**

//devops takes care of configuration

//have github path

//but the tool is invoked my a mvn command - mvn verify -drunner=smoketest.xml that is provided by the tester - xml file

//for reports each build will have a cucumber report that give graphical information of test and screenshot

Talk about cucumber report after the build

### 1. What is Page Object Model

- a. Reduces code redundancy and organizes code
  - b. Helps identify elements and store it as a page object variable
  - c. You can link it to where it was stored
  - d. Added PageFactory design pattern
- ### 2. Selenium WebDriver as my automation tool
- a. Manual test it first by:
    - i. Front end
      1. Functional testing
    - ii. Back-end
      1. Database- SQLDeveloper IDE



## 2. API - Postman

- b. Integrate Selenium with:
  - i. Maven
    - 1. Test package
    - 2. Utility package
      - a. UI
      - b. DB
      - c. API
    - 3. Configuration file
      - a. Properties
    - 4. Driver class
      - a. Singleton design pattern
        - i. Have a private constructor
  - ii. Cucumber BDD
    - 1. Facilitate the collaboration during the BDD process
    - 2. Enables explaining the story and the acceptance criteria in easy language.
  - iii. Git - source control
  - iv. Jenkins
  - v. Java
    - 1. Collections Framework
    - 2. Apache POI
    - 3. JDBC
    - 4. Rest-Assured
- 3. Java for writing code
- 4. Behavior Driven Development
  - a. Developing together with the customer to ensure it meets the right standards for the customer
- 5. Data Driven Development
  - a. Executing same test case against different sets of data
  - b. Test flow should not change based on data
- 6. Cucumber reporting
  - a. Target folder
  - b. Jenkins

### **Waterfall Methodology**

What is Waterfall?

The drawbacks of Waterfall?

- 1. Communication is problem
  - a. Hierarchy
    - i. Bad communication channel flow
- 2. Once you move down to next phase, cant go back up

Benefits of Waterfall

1. More predictability

## **Agile**

### Agile Framework

- **Role**
  - Product Owner
  - Scrum Master
  - Team
- **Ceremonies**
  - Sprint Planning
  - Sprint Review
  - Sprint Retro
  - Daily Scrum
  - Grooming session
- **Artifacts**
  - Product backlog
  - Sprint backlog
  - Burnout Chart
    - Chart that shows

### **What is Agile**

- A methodology based on developing software in short iterations
  - Scrum
    - Team plans for amount of work for the next sprint
  - Kanban
    - No sprint planning, stories are picked up as is but you still have everything else

### **What are the components of Agile?**

- **Product Backlog**
  - Lists requirements + technical tasks
  - W.e the product owner wants. Requirements
  - User stories that should done
  - Unaccomplished Tasks
- **Sprint**
  - Time duration
    - 2 -4 weeks
- **Sprint Backlog**
  - List of stories that we selected for this sprint
    - Stories that will be worked on during the sprint
    - Should be done by end of sprint
- **Sprint Planning**
  - We go to Product Backlog and see the stories
  - Choosing story based on velocity and capacity
    - **Velocity**

- Number of story points delivered/demo in a sprint
- For example: if team planned 30 story points (Business value) worth of user stories in a sprint and able to deliver as planned then team's velocity is 30
- **Capacity**
  - Total number of available hours for a sprint is Team's capacity.
  - Calculates holiday and pto hours
- **Daily Scrum**
  - Everyday we inform the team about what we did last day, what we are going to do, any blockers?
    - No more than 15 mins
- **Sprint Demo/Review**
  - Just a demo
  - Show customer what we build sprint
  - Product owner can put feedback
- **Sprint Retrospective**
  - Team will analyze the last sprint
  - Discuss problems + their causes
  - Decision will be based on team discussion
    - No boss
- **Shippable product/increment**
  - The piece of the product is made and it keeps getting added functionality form each sprint
  - The increment must align to the development team's Definition of Done
  - The increment must be acceptable by the P.O-
- **Sprint Grooming session**
  - Happens before sprint planning
  - Team, Scrum master, and P.O get together to ensure work items are relevant and useful
  - Ask questions to P.O of user stories
    - Re-define acceptance criteria
    - Writing new stories
    - Breaking epics into user stories
    - Understand the story to give proper estimation
      - To prevent under/over estimate

#### **What is Definition of Done?**

- When the product increment is delivered, it needs to meet "Definition of Done"
- Acceptance criteria is fulfilled
- Product owner accepts the user stories

#### **What is Verification and Validation?**

- Verification happens during developing
  - When you're building your checking if you're building the right thing
- Validation

- After it is done, you are validating, it does what it suppose to do after developing it.
- Testers /Dev - verification
- Testers -validation

### **What is Definition of Ready?**

- Acceptance Criteria is cleared/reviewed
- Point/hours are given

### **What is BurnDown Chart?**

- Graphic representation of the rate at which work is completed and how much work remains to be done

### **What is User Story?**

- "As a customer..I want to....So that....."

### **What is Epic?**

- An *epic* captures a large body of work. It is essentially a large [user story](#) that can be broken down into a number of smaller stories. It may take several [sprints](#) to complete an epic.

### **What is Acceptance criteria?**

- Statements of requirements that are described from the point of view of the user to determine when a story is "done" and working as expected
- 3 parts examples
  - Input - valid email address
  - Process - marking messaging
  - Outcome - marketing message design matches the specs provided by marketing

### **What is sprint workflow?**

- How a story moves from to do to done and lifecycles - what happens when something is blocked, etc.

### **What types of Test cases**

You cover different scenarios

- Positive
- Negative
- Boundary Value Analysis

### **How many Test cases do you usually complete in a week?**

- 10 small test cases
- 7-8 medium
- 2-3 large

### **What are the steps you take to automate?**

1. Learn the functionality
  - a. Reading requirements
  - b. Knowledge transfer session with B.A
  - c. Ask teammates
2. Manually test it
  - a. Making sure you understand each step properly
  - b. Understand expected results

3. Automate it
  - a. Create POM pages
    - i. Add necessary elements/methods you are going to use and add PageFactory design pattern
    - ii. Create a driver class with Singleton pattern
  - b. Validate the tests using TestNG Assertions

## JUnit

- Annotations
  - @BeforeClass
    - Run once before any of the test methods in the class
  - @AfterClass
    - Run once after all the tests in the class have been run
  - @Before
    - Runs before @Test
  - @After
    - Runs after @Test
  - @Test
    - Test method to run
  - @Ignores
    - Used if you want to ignore some statements during test execution

## TestNG

- Annotations
  - Priority
    - Doesn't matter what number you start or if its consecutive
    - Ex: @Test(priority=0)
  - DependsOnMethods="test method name"
    - Can add multiple test names
    - If the first one fails, the 2nd test won't run at all
    - If the first method failed, your report will show that the 2nd test will be skipped
      - **If the 2 methods depend on each other, why not combine into one single test?**
        - B.c in each test method, we are testing different functionality
        - We want to test the smallest piece possible in one test
          - Functional testing
- Enabled
  - @Test(priority=0, enabled=false)
    - This skips a test
    - It will be picked up by testNG and will be on the report
- @BeforeClass vs @BeforeMethod
  - BM - will run every time you have a test

- BC - will run before everything else, even before @BeforeMethod
- Groups
  - Ex: @Test(priority=0, groups="smoke")
  - If you add groups, sometimes @Before and @After dont work,so put AlwaysRun=true in the before and after
  - Can be added in xml file
- Parameter annotation
- @Optional annotation
  - Lets you run a specific test w.o invoking the xml
- Parallel execution in testng
  - In xml file write;
  - parallel="tests" thread-count="4"
    - Thread-count is how many browser do you want to open same time
  - Batch running
    - In xml file you can add .\* to run everything
    - Ex: <package name=".\*"></package>
- Testng has it own reports
  - When you run xml, it gives you the report in test-output folder
    - Contains the test report in html

## TestNG vs JUnit

<b>FEATURE</b>	<b>JUNIT</b>	<b>TESTNG</b>
Purpose	General unit testing	Focus on Integration testing for Enterprise projects
IDE support	yes	Yes
Maven support	yes	Yes
setup/teardown for test	@Before / @After	@BeforeMethod / @AfterMethod
setup/teardown for class	@Before / @After	@BeforeClass / @AfterClass
setup/teardown for suite	no	@BeforeSuite / @AfterSuite
setup/teardown for test groups	no	@BeforeGroups/ @AfterGroups
setup/teardown for test	in annotations	In annotations and/or XML file
Parameterised tests	Yes, but in a limited way	Yes
Test groups	Yes with Categories (new feature)	Yes
Test for Exceptions	Yes	Yes
Timeouts in tests	Yes	Yes
Test order	Non-Deterministic or alphabetical	Can be defined in detail with dependencies
Dynamic test input	No	Yes with DataProviders
Can run tests of the other library	No	Yes, TestNG can run JUnit tests
Assumptions before running a test	Yes	No
Dependency injection for tests	No	Yes, with Google Guice
Ignore/disable test	Yes	Yes
Parallel testing	No	Yes
Test listeners	No	Yes
Test reporters	No	Yes

## GitHub

What is GitHub?

- Version control system
- Keeps track of new/old version of documents
- Manages/stores set of files

## What is a Repository?

- Folder where files are saved
- May contain single, collections of files, or single projects

## What is Remote Repository?

- Host on server(GITHUB)

- Our changes go from local to remote repo

### What is local Repository?

- Typically on your computer
- Our changes are done here consist of Working Directory, index and HEAD

### What are Git commands?

- Add - add to staging area
- Commit - add from working directory and local repo
- Push - add to remote repo
- Pull - take changes from remote to working directory
- Clone with url - clones url into directory
- Git version - give you version of git
- Git status - shows you what branch you're on, any changed files that aren't tracked
  - Origin - name of remote
  - Master - name of branch
- Git add .
  - Adding to staging area
  - Recursive add
  - Adds everything
- Git commit -m "message will apply for all files"
- Git commit -am
- Git push origin nameOfBranch
- Git ignore
  - Notepad.gitignore
  - In the notepad add files you don't want to add to staging area
  - YOU MUST PUSH THE .GITIGNORE FILE TO REPO IN ORDER FOR THE FILES YOU WANT TO IGNORE TO BE IGNORED ON GIT
  - Some files don't matter and shouldn't be pushed to git
- Removing a file
  - GIT ADD REMOVE POM
  - COMMIT THAT
  - AND PUSH

### Creating own branch

Git **checkout -b** nameOfBranch master

### How do I use Git in terminal?

- To create a new repo;
 

```
echo "# SqlMentor" >> README.md
git init
git add README.md
git commit -m "first commit"
git remote add origin https://github.com/AndyIam224/SqlMentor.git
git push -u origin master
```
- Push an existing repo



- `git remote add origin https://github.com/AndyLam224/SqlMentor.git`
- `git push -u origin master`
- Default editor
  - Press escape then
    - Press shift “:x!”
      - Saves and exit
    - “:q!”
      - No save and exit
- What is pull request?
- `Git merge fetch_head --allow-unrelated-histories`
  - Resolved an issue for pulling an non-fast-forward issue

## Jira

### What is Jira?

- Project management tool and helps tracks defects
  - Allows for planning and time management
  - Tracks due dates/assignment

Tester only in backlog, and active sprints

### Active Sprint Board

- **Workflow:** To do>In Progress(can have blocked in here too)>Review(Tech lead review the code before moving to done)>Done
- **Blocked**
- Go to story and click on options and click on more options> blocked
  - Write a comment about why it is blocked
  - Scrum master will have to deal with ASAP
  - Nothing should be in the block for more than a day
  - Once it's fixed you can change to blocker resolved
- **What are the Jira terms?**
  - Issue
    - W.e you need to do and fix
  - Types of Issue
    - Story
    - Task
    - Bug
    - Epic
- **What's the difference epic and tickets**
  - Epic are written by B.A
  - Tickets are created by testers
  - Description box

- Example reporting a bug
- You write in the box
  - What is the bug about
  - What functionality is breaking
  - What are the steps of recreating the bug
    - With necessary data
  - Attach report and screenshot of bug
  - Expected results
  - Actual results

### **How do you automate User Stories from JIRA?**

1. Look at description - Agile story
2. Create feature file and save file as jira story.feature
  - a. Add scenario located in Acceptance criteria
3. Run cukesRunner with dryRun=true
4. Implement the methods
5. BEFORE AUTOMATING THE TEST CASES IN JIRA ALWAYS MANUAL TEST IT FIRST

### **Jira Plugins**

- **Zephyr**
- **Xray**

### **What is SPA?**

- Single Page Application
  - Page loads once and no more
  - Some parts of the page loads but whole web page doesn't reload/change
  - Example is AJAX
    - When client adds/save something on the page, the page uses AJAX to communicate to server then server send JSON back to the page and the items are updated

### **HTML**

#### **CSS**

- class= .C
  - E.C
- id=#id value
  - E#id value
- name= [name=N]
- Link = value
- Contain= E[='value']
- Starts-with
- ends-with

### **How to get all the preceding siblings of Apple**

Xpath: `"/ul/li[contains(text(),'Apple Mobiles')]/preceding-sibling::li"`

This will give "Samsung Mobiles"

How to get all the following siblings of Apple

Xpath: `"/ul/li[contains(text(),'Apple Mobiles')]/following-sibling::li"`

This will give all the preceding siblings ( Nokia Mobiles, HTC Mobiles, Sony Mobiles, Micromax mobiles)

How do you use CSS?

- Name me some methods you used in your project

How do you find a text in a webpage?

`//tagname[contains(text(),'text')]` - contains certain test

`//tagname[.='text']` - contains exact text - sometimes doesn't work

Selenium

- Name a couple of exceptions in selenium

- How to handle Web Tables/grid?

- **Table** - tag used for table - data is arranged in a grid format

- **th** -tag for column name

- Example - `<tr>`

`<th>FirstName</th>` - column names on the very top row

`<th>Lastname</th>`

`<th>Age</th>`

`</tr>`

- **tr** -tag used to indicate a row, applies to whole column

- **td** - tag to indicate a column in a row

- Example - `<tr>`

`<td>Danny</td>` - actual data on the very first row

`<td>Smith</td>`

`<td>29</td>`

`</tr>`

- Some tables have **tbody**

- Used to indicate the data of the table, usually does not include column names (**th**)

- How to handle `staleElementReferenceException`? (interview question)

- First you get this exception when after initially finding the element, page or element was refreshed and selenium cannot work with the original element anymore

- ```
public boolean retryingFindClick(By by) { boolean result = false; int attempts = 0; while(attempts < 2) { try {
```

```
driver.findElement(by).click(); result = true; break; }
catch(StaleElementException e) { } attempts++; } return result; }
```

#### - **FindElement vs FindElements**

- F.E returns single element
- FES returns a list of webelements
- If multiple elements are found;
  - F.e returns first element
  - FES returns whole list of elements
- If no element is found;
  - F.e throws NOSUCHELEMENT exception
  - FES returns a empty array list

#### - **Driver.close vs Driver.quit?**

- Driver.close - only closes the current tab, **Does not make driver object null**
- Driver.quit - closes the browser with all tabs, **makes object NULL**

#### - **How do you handle dynamic id?**

- Find the static part of the id and write a locator(xpath or css)
- And then use Startswith, contains, EndsWith
- //E[ends-with(@A,'t')]
- //E[starts-with(@A,'t')]
- //E[contains(@A,'t')]

#### - **How to handle dropdowns?**

- I find the **select** tag and create a object from it
- Ex; WebElement element=driver.findElement(by.id("blah");
- ex;Select list=new Select(element)
- I can use 3 methods
  - SelectByVisibleText() - select option based on text displayed. Takes String param
  - SelectByIndex() -selects option based on the count.Takes int param
  - SelectByValue() - selects option based on the value of the value attribute.Takes string param
  - getFirstSelectedOption() - returns option that is selected
  - getAllSelectedOption() - returns all the options which are selected (multiple selected options are possible)
  - getOptions()
    - Returns all options in a list of webelements

#### - **What if there's no select tag?**

- You have to select the label for the dropdown separately as a webelement.
- Then manually use click method

#### - **What if there is a dynamic popups that comes up randomly**

- Use try/catch with alert

- **How to maximize a web page?**
  - driver.manage().window().maximize();
- **What is the key class in Selenium?**
  - Gives us option for pressing keys from keyboard
  - Key.ENTER
  - MUST BE PASSED TO SendKeys() method
  - Ex; .sendKeys("charger" + keys.ENTER)
- **What is Thread.sleep()?**
  - Slows down selenium to catch up
  - Throws exception so must handle it or throw it
- **How did you use overloaded Methods in Selenium?**
  - When asserting if two values are equal I use Assert.assertEquals(actual,Expected) from TestNG
    - You can put in the parameters String, Objects, int, boolean values
- **How to handle frames in Selenium?**
  - Frames - used to embed a html page into another
  - Steps
    1. Locate the iframe
    2. Switch to another iframe
      - a. driver.switchTo().frame();
        - i. .frame() - takes string, Integer, WebElement, name or id directly as parameter
        - ii. driver.switchTo().frame(WebElement);
        - iii. driver.switchTo().frame();
          1. Now you are in the 2nd frame, if you want to find an element outside of the 2nd frame (that you're currently on) - throws **NoSuchElementException**
          2. Need to switch back to previous frame
            - a. driver.switchTo().parentFrame()
              - i. Goes one level up
            - b. driver.switchTo().defaultContent()
              - i. Goes to the very top
          3. Can switch using count
            - a. driver.switchTo(0)
              - i. **Counts anything that is not the default frame**
          - iv. These methods might give you different results based on what browser you are using

#### **Why we get NoSuchElementException?**

- Check if locator is correct
- Check if timing is correct
- Check if element is hidden inside an iframe

### How to handle multiple frames?

- If there are 4 frames, you have to go through each from consecutively to reach certain frame. Cant jump to the 3rd frame from 1st frame.

### How to handle Headless browser

- Example is htmlunitdriver -from selenium
  - WebDriver=new htmlunitdriver()
  - Not very stable
- Phantonjsbrowser
  - More stable
  - browser=new phantomjsbrowser()

### How to handle multiple windows/tabs?

- Selenium stays on one window
- If you open a window and then 5 tabs popped open, selenium is focused on the first window
- If you are on a new window and you tell selenium to print an element on the default window, it will still work even that user's focus is on the new window
- **Must switch to new window**
  - 1. Use windowHandle()
    - Driver.getWindowHandle()
      - Everytime Selenium opens a browser, it's going to give an index ID for the page - called Handles
      - Returns the handle/id of current page (as a string)
    - driver.switchTo().window(string handle)
    - driver.getWindowHandles() - for multiple windows
      - Returns a **Set of window handles**
  - **Switch using titles**
    - for(string handle: driver.getWindowHandles()){
    - driver.switchTo().Window(handle)
    - if(driver.getTitle().equals(targetTitle)
    - Break;
    - }

### Difference between implicit wait and Explicit Wait?

- **implicit Wait**
  - driver.manage().timeouts().implicitlyWait(3,TimeUnit..seconds)
    - Everytime you are looking for something, if you cannot find it, wait for 3 seconds and keep finding during those 3 seconds
      - Throws **NoSuchElementException** if cannot find element during the the time range
    - Only kicks in when we use **findElement** method
    - It is set only once (in the hooks class)
  - **Explicit Wait**
    - Use **WebDriverWait**

- Class that lets you wait for certain actions/certain webelement/locator
  - Example - wait until element with id" id" becomes visible
- WebDriverWait needs two things
  - Element or locator
  - Condition (what you are waiting for)
  - Ex: `WebDriverWait wait=new WebDriverWait(driver,5)`
    - Time parameter is always in secs
    - `wait.until(ExpectedConditions.visibilityofElementLocated(By.cssSelector("#fished"));`
      - `wait.until()` - starts wait actions
      - This method will find the element and see if its visible, then it will wait until the element is visible
      - If can't find it, throws **timeoutException**
    - Can also store boolean reference in `wait.until` for `expectedcondition.invisibilityofElementLocated`
    - `ExpectedCondition.elementTobeClickable()`
      - Does not always work as expected
      - Only 90% of time
- **What is fluentWait?**
  - Subtype of explicit wait but you **can override the conditions**
  - `Wait<WebDriver>wait=new FluentWait<Webdriver>(driver).withTimeout(5,timeUnit.seconds).pollingEvery(100,timeunit.milliseconds).ignoring(NoSuchElementException.class);`

### When to use the 3 waits?

**Implicit Wait:** During Implicit wait if the Webdriver cannot find it immediately because of its availability, it will keep polling (around 250 milliseconds) the DOM to get the element. If the element is not available within the specified Time an `NoSuchElementException` will be raised. The default setting is zero. Once we set a time, the Web Driver waits for the period of the WebDriver object instance.

**Explicit Wait:** There can be instance when a particular element takes more than a minute to load. In that case you definitely not like to set a huge time to Implicit wait, as if you do this your browser will going to wait for the same time for every element.

To avoid that situation you can simply put a separate time on the required element only. By following this your browser implicit wait time would be short for every element and it would be large for specific element.

**Fluent Wait:** Let's say you have an element which sometime appears in just 1 second and some time it takes minutes to appear. In that case it is better to use fluent wait, as

this will try to find element again and again until it find it or until the final timer runs out. Example is AJAX or JQuery

### How to check if element is present/visible/enable/ and to check text present?

1. To check Element Present:
2. 

```
if(driver.findElements(By.xpath("value")).size() != 0){  
    System.out.println("Element is Present"); }else{  
    System.out.println("Element is Absent"); }
```
3. Or
4. 

```
if(driver.findElement(By.xpath("value"))!= null){  
    System.out.println("Element is Present"); }else{  
    System.out.println("Element is Absent"); }
```
5. To check Visible:
6. 

```
if( driver.findElement(By.cssSelector("a > font")).isDisplayed()){  
    System.out.println("Element is Visible"); }else{  
    System.out.println("Element is InVisible"); }
```
7. To check Enable:
8. 

```
if( driver.findElement(By.cssSelector("a > font")).isEnabled()){  
    System.out.println("Element is Enable"); }else{  
    System.out.println("Element is Disabled"); }
```
9. To check text present
10. 

```
if(driver.getPageSource().contains("Text to check")){  
    System.out.println("Text is present"); }else{ System.out.println("Text is  
    absent"); }
```

### Do you use JavaScriptExecutor?

This helps me write my own JavaScript

JavaScriptExecutor jsExecutor=(JavaScriptExecutor)driver;

- Using this class we can send JS commands to the browser
- executeScript(); performs the command
  - Inside the parameter is where you put JS code

jsExecutor.executeScript("alert('WARNING: This is a useless message');")

- This code will bring up a JS popup

You can also put 2 parameter is .executeScript("js code",element);

- Used for scrolling (selenium is not good with scrolling, you can say a challenge is when i was working on terms and condition page, where you have to read the page before clicking on continue. When i tried using selenium and actions class it didn't work, so i used javaexecutor ) and clicking an element;



For **Scroll down**:

```
WebDriver driver = new FirefoxDriver(); JavascriptExecutor jse =  
(JavascriptExecutor)driver; jse.executeScript("window.scrollTo(0,250)", "");
```

OR, you can do as follows:

```
jse.executeScript("scroll(0, 250);");
```

For **Scroll up**:

```
jse.executeScript("window.scrollTo(0,-250)", ""); OR, jse.executeScript("scroll(0,  
-250);");
```

JavaScript has way more control than selenium.

- **How to use actions class?**

- Control the mouse
- Class that provides methods for advanced user interactions
  - Hovering
  - Double clic
  - Right click
  - Scroll
  - Drag and drop
  - mix/match operators
- Actions action=new Actions(driver)
- Action methods
  - click()
  - hold()
  - build()
  - perform()
  - keydown()
  - moveToElement(element)
  - dragAndDrop(source,target).perform()
  - sendKeys() - different from the one we usually use
    - Lets you do the sendkeys operation on different elements
    - Regular sendkeys that comes from webelement will throw an exception on something that is not input text.
    - The long way is  
actions.moveToElement(source).clickAndHold().moveToElement(t  
arget).release().perform();
- **Actions won't work unless perform() is used**

- **If you are chaining methods you must use build() before perform()**
- **File download and upload**
  - Download
    - Selenium itself cannot verify file downloads, can click on download link but can't go outside the browser and open the downloaded file
    - Other tools need to be used for that - Robot and autoIT
  - Upload
    - Selenium handles the upload, but does it differently compared to actual user
    - Steps
      1. Find the element that triggers the upload window
      2. Find the path of the file you want to upload
        - a. Store into a String
          - i. Ex: String  
file="C:\\Users\\Andy\\Desktop\\folder1\\file.key";
          - ii. Then driver.findElement(upload button).sendKeys(file);

## Maven

### What is Maven?

- A build tool and command prompt tool that called POM xml file that calls my runner class and manages my dependencies
- Command Prompt - mvn archetype:generate
  - Creates project
- Choose a # - press enter
- Choose a # - press enter
- **GroupID**; Com.nameOfProject (usually a reversed domain name, like com.example.foo)
- **ArtifactID**; test-maven-project
- Version - enter
- Package - enter
- Y; enter

### What is a Maven artifact?

An artifact is a file, usually a JAR, that gets deployed to a Maven repository.

A Maven build produces one or more artifacts, such as a compiled JAR and a "sources" JAR.

Each artifact has a **group ID** (usually a reversed domain name, like com.example.foo), an **artifact ID** (just a name), and a **version** string. The three together uniquely identify the artifact.

Example: <groupId>org.seleniumhq.selenium</groupId>

<artifactId>selenium-java</artifactId>

<version>3.11.0</version>

A project's dependencies are specified as artifacts.

### **Explain me the maven lifecycle;**

- **Commands can only run in the same directory where the specific pom xml file is located**

#### 1. 3 built-in build lifecycles

##### a. Default

- i. Handles your project deployment

##### b. Clean

- i. Handles project cleaning

##### c. Site

- i. Handles creation of project's site documentation

#### 2. A build lifecycle is made up of phases

##### a. Validate

- i. Validate the project is correct and all necessary information is available

##### b. Compile

- i. Compile the source code of the project
- ii. Target folder is created
  - 1. Reports will be stored here

##### c. Test

- i. Test the compiled source code using a suitable unit testing framework.
- ii. Should not require the code to be packaged or deployed
- iii. Mvn -D(VariableName)=testname
  - 1. Run specific tests based on the parameter

##### d. Package

- i. Take the compiled code and package it in a distributed format, like JAR

##### e. Verify

- i. Runs any checks on results of integration tests to ensure quality criteria are met

##### f. Install

- i. Install the package into local repo, for use as dependency

##### g. Deploy

- i. Done in the build environment, copies the final package to the remote repository for sharing with other devs and projects

### **How do you convert maven project to eclipse project?**

- Mvn eclipse

### **How java projects are made?**

1. Create folders/packages
2. Add libraries/dependencies
3. Create class files
4. Compile
5. Run tests
6. Deploy

### **Where do you find your dependencies/libraries?**

- Mvnrepository.com
- Update project if maven not working
  - When you have dependencies inside your pom file and you use update, maven will pull the JAR files from internet and add it to your project

### **What is m2 folder?**

- Where your jar files/repositories are saved in your computer

### **What is POM xml file?**

- A file that manages the whole project
- When you run a maven command, everything should be done through the pom.xml

### **Versions of tools**

RestAssured Library release date: 2015

### **Log4j**

- Used by any application
- Example: LOG4J2
  - From Apache
- Records activity
- Dev will look at the logs, look at the time, go to the ip address and see what going on if there was a bug

Loggers are very important part of applications and it keeps each step/event happened with timestamp

Normally logs are written programmatically into .log file

There are ready tools/libraries to add to any framework or application.

In java, the most famous logging library/framework is LOG4J from apache

Purpose of logs:

- Help us debug the issues that you may have with application.

Sometimes when a bug is found in application, developers firstly check the logs. In order to see which steps the user was taking and application did not behave as expected.

Logs MAY help you find the source of the problem (in application perspective, not testing)

LOG4J in Java

### **What is the role of logs in Test automation?**

We are looking at console or html report to see the status of our test runs. If anything fails, we find from there.

If we implement logging into our framework, it will be another way of looking at automation execution steps and will help us find the problem whenever our test fails.

### **Cucumber BDD**

#### **What are the components of Cucumber BDD framework?**

1. Feature files
2. Cukes Runner
3. Step definition

FOR NON TECH PPL TO UNDERSTAND

DEPENDENCY - BDD IS A DEPENDENCY

MVN REPOSITORY IN THE POM.XML FILEEEEEEEEEEE

CUCUMBER BDD FROM CUCUMBER.IO

Combine techs of tdd

Behavior driven

- Express the flow - customer behavior
- Dont focus on the elements

#### **What is feature file?**

- Consists of scenarios that test a certain feature or functionality
- Feature is main story while scenarios are the test cases to the story(feature)

#### **What is Cukes Runner (Runner class)**

- A class that strictly runs the tests, generates codes for step definition
- @smoketest
- Cukesrunner
- IN CUCKESRUNNER I HAVE A FEATURE LOCATION THAT SHOWS WHERE MY FEATURE ARE LOCATED

#### **What is step definition class?**

- A class that made of steps that starts with Gherkin language
- **Make sure the step definition is in the same package as cukes Runner, or child package (not parent or sibling)**
- 

#### **What is Gherkin?**

- Language used by feature files
- Feature, Scenario, Given, Then, When, And, But, Background, Scenario Outline, Examples

### What does @CucumberOptions do?

- Tag used to customized their running of the cucumber tests
- Inside @CucumberOptions you can add:
  - dryRun
  - Plugin
    - "Pretty"
      - Adds more info in the console
        - Gives you tag, scenario, method info.
    - "html:target/cucumber-report"
      - Generates html report located in target/cucumber-report folder
    - "json:target/cucumber.json"
  - Tags
    - Tags must be located in feature path
    - Can add multiple tags...tags= "@Dog,@Cat"
  - Features - location of where feature files are
  - Glue - where to look for step definition steps. **hook class is part of glue too.**

### How to see your reports in cucumber?

- Go to target folder
- Open with system explorer
- Go to target>cucumber-report>index - shows the tests you ran

### How to run Cucumber with JUnit?

- Add cucumber -junit dependency
- Adding @RunWith(Cucumber.class) on top of CukesRunner class

### How to run Cucumber with TestNG?

- Add cucumber -testng dependency
- Make CukesRunner extend to AbstractTestNGCucumberTests

### What are Hooks in cucumber?

- Class that uses @Before - runs before each cucumber scenario
- @After - runs after each scenario
  - It will always run no matter if scenario passes or fails
- **Class must be in same package as stepdefinition**
- I implemented screenshots inside hook class
- **HookClass will not run if dryRun=true**
- I use Scenario as a parameter in my before/after method

### How do you take screenshots in cucumber?

- In my Aftermethod i use a code:
  - I use TakeScreenShot interface
  - You can store screenshot as a byte or file
- ```
@After
public void tearDown(Scenario scenario) {
```

```

        if(scenario.isFailed()) {
            //taking a screenshot
            final byte[] screenshot = ((TakesScreenshot)
Driver.getDriver()).getScreenshotAs(OutputType.BYTES);
            //adding the screenshot to the report
            scenario.embed(screenshot, "image/png");
        }

```

### What happens we you run your runner class with no tags?

- All the feature files will run from top to bottom but only the feature files that are located in the @CucumberOptions "features="

### How to run a Cucumber with DDT?

- I use Cucumber tables:
- |Home|
- |Emails|
- |Documents|
- |Projects|

You get a the method with (DataTable arg1)

- In the parameter DataTable you can change it to List<YourType>,List<List<E>>,List<Map<K,v>>,and Map<K,v>
- Prints in order for list
- No order for map

### How do I limit the types of variables I can pass?

- In the gherkin parenthesis you can add (Collaboration|Sales|Marketing,etc)
- Ex: @When("^I hover over the (Collaboration|Sales|Marketing|Activities|Support|All) menu\$")
- public void i\_hover\_over\_the\_Collaboration\_menu(String menu) {
- switch(menu) {
- case "Sales":
- BrowserUtils.hover(dashboard.sales);
- break;
- case "Marketing":
- BrowserUtils.hover(dashboard.marketing);
- break;
- case "Support":
- BrowserUtils.hover(dashboard.support);
- break;
- case "Collaboration":
- BrowserUtils.hover(dashboard.collaboration);
- break;
- case "Activities":
- BrowserUtils.hover(dashboard.activities);

```

-         break;
-     case "All":
-         BrowserUtils.hover(dashboard.all);
-         break;
- }

```

### What if you have a scenario that has two parameters (limiting parameter, table parameter)?

Example :

Scenario: Verify Collaboration menu options

Given I logged into suiteCRM

When I hover over the Collaboration menu

Then following menu options should be visible for Collaboration:

```

|Home|
|Emails|
|Documents|
|Projects|

```

In this scenario i have a table and I want to limit collaboration to the just collaboration and the other menus categories

Solution:

@Then("^following menu options should be visible for

(Collaboration|Sales|Marketing|Activities|Support|All):\$")

public void following\_menu\_options\_should\_be\_visible\_for\_Collaboration(**String** menu,**List<String>** options) {

- **String menu** represents the 5 menu options  
((Collaboration|Sales|Marketing|Activities|Support|All))
- **List<String>options** represents the tables;
 

```

|Home|
|Emails|
|Documents|
|Projects|

```

### How do I use cucumber scenario for DDT?

- In my current project i use Scenario Outline with Examples
- In my scenario feature file, whenever im using a variable as a data driven i use "<variable>"
- Then in Examples:
  - |variable| - column name
  - |data 1| - row 1
  - |data 2| - row 2
  - |data 3| - row 3



- How this work is that each row will run the test and scenario will run based on how many row you have in Example

### What is Scenario Outline?

- Used for data driven testing
- Have the same cucumber steps but we provide data after the scenario as a table using keyword examples

### What is Background?

- Cucumber has their own before method
- The one in hooks is for java
- A step that runs BEFORE a scenario inside the feature file
- Can only put on top, before all scenarios
- Cannot put pipelines in backgrounds
  - Only in scenario outline

### How to use Maps in cucumber

#### - Using a nonScenario Outline

- Scenario: Create contact using a map
- Given I logged into suiteCRM
- When I create a new contact:
 

first_name	John
last_name	Smith
cell_phone	801-888-8889
- Then I should see contact information for "John Smith"
- Left side is key and right is value - 2 columns only

#### - Using a Scenario Outline

- Scenario Outline: Create contact using a map
- Given I logged into suiteCRM
- When I create a new contact:
 

first_name	<first_name>
last_name	<lname>
cell_phone	<cell_phone>
office_phone	<office_phone>
- Then I should see contact information for "<first\_name> <lname>"

Examples:

- |first\_name|lname|cell\_phone|office\_phone|
- |Michael|Jackson|1234567890|2345678891|
- |Bonnie|Garcia|4569871234|4567890987|

In step def i write;

- @When("^I create a new contact:\$")
- public void i\_create\_a\_new\_contact(Map<String,String>contact) {
- // open the create contact dialog
- Works for both scenario

### How to use POJO in cucumber?

- Create contactBean class
- Add all variables
- Add the getter/setters
- Create bean feature file
- Create a table with first row containing the variables in the contactBean class
- Add values under the table
- Implement method with parameter (List<ContactBean>contacts)

Scenario: Create contact

Given I logged into suiteCRM

When I save a new contact:

firstName	lastName	department	officePhone	cellPhone	email
Steve	Gates	IT	3456758888	1234329999	SteveGates123@gmail.com

Then I should see contact information for "Steve Gates"

### Java

#### What is finalize()?

The finalize() method of an object is called by the Garbage Collector before it removes the object from memory (when there are no references to that object). You can write the object cleanup code in the finalize method.

```
protected void finalize() throws Throwable {}
```

- every class inherits the finalize() method from java.lang.Object
- **the method is called by the garbage collector when it determines no more references to the object exist**
- the Object finalize method performs no actions but it may be overridden by any class
- normally it should be overridden to clean-up non-Java resources ie closing a file
- if overriding finalize() it is good programming practice to use a try-catch-finally statement and to always call super.finalize(). This is a safety measure to ensure you do not inadvertently miss closing a resource used by the objects calling class
- ```
protected void finalize() throws Throwable { try { close(); // close open files } finally { super.finalize(); } }
```
- any exception thrown by finalize() during garbage collection halts the finalization but is otherwise ignored
- finalize() is never run more than once on any object

For example;

```

class OpenAFile {
    FileInputStream aFile = null;
    OpenAFile(String filename) {
        try {
            aFile = new FileInputStream(filename);
        } catch (java.io.FileNotFoundException e) {
            System.err.println("Could not open file " + filename);
        }
    }
}

```

To be well behaved, the OpenAFile class should close the file when it is finalized. Here's the finalize method for the OpenAFile class:

```

protected void finalize () throws Throwable {
    if (aFile != null) {
        aFile.close();
        aFile = null;
    }
}

```

**The problem is that any code that you put into your finalize() method may NOT guaranteed to run so dont put an essential code inside it**

What is system.gc()?

- A request to JVM to run Garbage collector to free up memory
- Doesn't always work

## Java Collection Framework

### Collection

- Two types of Collection (Be careful not to mix them up)
- java.util.Collection - interface from Set and List extend (not implement)
- java.util.Collections - a class that holds static utility methods for use with collections
  - Includes add, remove, contains, size, and iterator, etc.
- **Set**(Unique things) - DOES NOT ALLOW DUPLICATES
  - Classes that Implement Set
    - **HashSet**
      - Use when you don't want any duplicates and you don't care about order when you iterate through
      - Unordered
      - Unsorted
    - **LinkedHashSet**
      - Ordered version of HashSet
      - Use over HashSet when you care about iteration order
    - **SortedSet**

- **TreeSet**
  - Elements will be in ascending order, according to the natural order of the elements
  - Can also customize constructor to implement your own rules of the natural order
- **List**(list of things) - cares about the index
- Classes that implement List
  - **LinkedList**
    - Ordered by index position
    - Elements are doubly-linked to one another
    - Good choice for implementing stack and queue
    - Iterates more slowly than arraylist but fast insertion and deletion
  - **Vector**
    - Same as ArrayList BUT vector methods are synchronized (thread-safe)
  - **ArrayList**
    - Fast iteration
    - Fast random access
    - ordered(by index)
    - Unsorted (but can invoke Collections.sort() to sort it)

**Map**(things with unique ID)

- **Important:**none of the Map-related classes and interfaces extend from Collection
  - The implementation classes of Map are thought of “collections”, not Collection
- Classes that implement Map
  - **Hashtable**
    - Same as HashMap BUT HashTable methods are synchronized (REMEMBER. ONLY METHODS ARE SYNCHRONIZED, NOT CLASSES OR VARIABLES)
    - Hashtable won't let you have anything NULL(NO NULLS AT ALL)
  - **LinkedHashMap**
    - Maintains insertion order(or optionally, access order)
    - Slower than Hashmap for adding/removing elements but FASTER ITERATION
  - **HashMap**
    - Unsorted
    - Unordered
    - Allows one null KEY and multiple null values in a collection
  - **SortedMap**
    - TreeMap

The implementation classes of Set,List, and Map can NEVER be both sorted but unordered, can be all other combinations.

HashMap

- KeySet()
- Map.keySet() - returns a set of Keys
- Map.keySet().size - return # of keys

## Version and Release dates of Tools

Cucumber BDD

- Release date = 2014

## Java

- **What's the difference between IS-A and HAS-A relationship?**
- IS-A is based on inheritance
  - This thing is a type of that thing
- HAS-A relationships are based on usage
  - Ex: class A HAS -A B if code in Class A has a reference to an instance of class B
  - Public Horse{
  - Private Halter myHalter;
  - Public void jump(){
  - Sysout"im jumping"
- You are calling a Halter instance variable to use jump method that is coming from horse class - what this does is that it means that Horse HAS-A Halter
- Horse class has a Halter, because Horse declares an instance variable of type Halter. When code invokes tie() on the Horse object's Halter instance variable
  - }

Abstract class have constructors while interface don't have one

## How to reverse a string in place?

```
public static void main(String args[])
```

```
{ String number = "1234";
```

```
System.out.println("original String: " + number);
```

```
String reversed = inPlaceReverse(number);
```

```
System.out.println("reversed String: " + reversed); }
```

```
public static String inPlaceReverse(final String input)
```

```
{ final StringBuilder builder = new StringBuilder(input); int length = builder.length();
```

```
for (int i = 0; i < length / 2; i++) { final char current = builder.charAt(i);
```

```
final int otherEnd = length - i - 1;
```

```
builder.setCharAt(i, builder.charAt(otherEnd));  
  
// swap builder.setCharAt(otherEnd, current);  
  
} return builder.toString(); }
```

## SQL

Relational Database terms

Capabilities for SQL select statements

- **Projection**
  - Select the **columns** in a table that are returned by a query
- **Selection**
  - Selects the **rows** in a table that are returned by a query
- **Join**
  - Brings together data that is stored in **different tables** by specifying the link between them

**Tuple**- a single row

**Table** - relation

**Column** - attribute

**Field** - found at the intersection of a row and a column

- A field with no value in it is called a null value

**SQL** - Structured query language

- Provide statements for a variety of tasks
  - Querying data
  - Inserting, updating, deleting rows in a table
  - Creating, replacing, altering, and dropping objects
  - Controlling access to the database and its objects
  - Database consistency and integrity

**DML** - Data manipulation

- Select
- Insert
- Update
- Delete
- Merge

**DDL** - Data Definition language

- Create
- Alter
- Drop
- Rename
- Truncate
- Comment

## **DCL -**

- Grant
- Revoke

## **Transaction Control (Manages the changes made by DML statements)**

- Commit
- Rollback
- Savepoint

## **SQL Developer**

- Table>Rows/Record/Columns
- Development environment (manual testing the database using the queries)
- 2.1 -2009
- 3.0 - 2011
- Release 4.0 - 2013(latest)
- Has a Migration release(1.2)
  - provides users with a single point to browse data in third-party DB and to migrate from these DB to Oracle
- Supports Window, Linux and Mac OS x

## **SQL clause**

- Select
- from

## **Writing SQL Statements**

- Keywords are uppercased while columns and table names are lowercase
- Statements are not case-sensitive
- Clauses are usually placed on separate lines
- Keywords cannot be abbreviated or split across lines

## **Executing SQL statements**

- Run Script (f5)

## **Arithmetic Expressions**

- **You use the operators in any clause (except the From clause)**
- With Date and Timestamp - can only use addition and subtraction
- Add (+)
- Subtract (-)
- Multiply (\*)
- Divide (/)
- You can use arithmetic operators in any clause of a SQL statement (except the FROM clause)
- With Date and timestamp you can only use addition/subtraction

## **Rules of precedence:**

1. Multiplication and division occur before addition and subtraction
2. Operators goes from left to right
3. Parentheses override the rules

## **Constraints**

- **Can't be null**

- **Primary key**
- **Not null**

### Null value

- A value that is unavailable, unassigned, unknown, or inapplicable
- Null is not the same as zero or a blank space
  - **Zero is a number**
  - **Blank space is a character**
- columns of any data type can contain nulls **but some constraints (not null and primary key)** prevents nulls from being used in the column.
- If any column value in an arithmetic expression is null, the result is null. If you try to divide a number by 0, you get an error. If you try to divide a number by null, result is null

### Column Alias

- Renames a column heading
- The alias heading appear in all uppercase (" for lowercase or special)
- **As** keyword between column name and alias (only in the select clause for As keyword)
- If you are using spaces or special character, or case-sensitive **requires double quotation marks**
- For numbers you need double quotation if number is first in the nickname
  - Otherwise you don't need double quotation

### Concatenation operator

- Links columns or character strings to other columns
- Using || (works with single quotation, not double)
  - To add space use single quotation
- Creates a resultant column that is a character expression
- Can also concatenate date expressions with other expressions or column
- Null values with concatenation operator
  - If you concatenate a null value with a character string, the result is a character string
    - LAST\_NAME || NULL results in LAST\_NAME values

### Literal Character Strings.

- **Character, date and number**
- Use single quotation with character literal and date values
  - SELECT last\_name || ' is a '||job\_id AS "Employee Details" FROM employees;
- Number you don't need quotation

### Alternative quote(q) operator

- Specify your own quotation mark delimiter.

Select any delimiter. •

- Can use these either {},[],(),<>
- Increase readability and usability.

```
SELECT department_name || ' Department' || q['s Manager Id: ]' || manager_id AS
"Department and Manager" FROM departments;
```

- To use the single quote in the concatenation



## How to find table Schema of SQL oracle

```
select table_name  
from user_tables;
```

### Distinct

- You can specify multiple columns after the DISTINCT qualifier. The DISTINCT qualifier affects all the selected columns, and the result is every distinct combination of the columns.
- Distinct should be **IMMEDIATELY after the select keyword**
- Will it print null?
  - Yes, it will be the first one

### Describe

- Display the structure of a table
- Ex: DESCRIBE employees
- Null indicates that the values for this column may be unknown. NOT NULL indicates that a column must contain data. Type displays the data type for a column.
- NUMBER(p,s) Number value having a maximum number of digits p, with s digits to the right of the decimal point
  - Ex number (4,2)
    - 2 means there 2 digits after decimal points (ex: 3.01)
- VARCHAR2(s) Variable-length character value of maximum size s
- DATE Date and time value between January 1, 4712 B.C. and December 31, A.D. 9999.
- CHAR(s) Fixed-length character value of size s

### Where clause

- Condition (true/false/unknown value)
- **The WHERE clause follows the FROM clause.**
- The WHERE clause can compare values in columns, literal, arithmetic expressions, or functions.
- It consists of three elements: • Column name • Comparison condition • Column name, constant, or list of values
- You cannot use column alias in the WHERE clause.

### Character String and Dates

- Character strings and date values are enclosed with single quotation marks. •
- Character values are case-sensitive and date values are format-sensitive. •
- The default date display format is DD-MON-RR.
- SELECT last\_name, job\_id, department\_id FROM employees WHERE last\_name = 'WHALEN';
- SELECT last\_name FROM employees WHERE hire\_date = '17-FEB-96' ;

### Comparison operator

- These operator are used in conditions that compare one expression to another value or expression.
- Used in the where clause
  - = - equals to

- > - greater than
- >= - greater or equal to
  - < - less than
- <= - less or equal to
- <> -not equal (!= and ^= same thing)

Between....And...

- SELECT last\_name, salary FROM employees WHERE salary BETWEEN 2500(lower limit) AND 3500(higher limit) ;
- **MUST SPECIFY LOWER LIMIT FIRST**

### In (membership condition)

- Set of OR conditions
- Use the IN operator to test for values in a list:
- SELECT employee\_id, last\_name, salary, manager\_id FROM employees WHERE manager\_id IN (100, 101, 201) ;
- If characters or dates are used in the list, they must be enclosed with single quotation marks (").
- Query: select first name from employees whose name are Andy and Alex
- select first\_name
- from employees
- where first\_name in ('Andy','Alex')
- order by first\_name;
- **What happens if Alex is not in the table?**
  - **Prints only Andy and nothing else**

### Like

- Operator that performs wildcard searches of valid search string values
- Search conditions can contain either literal characters or numbers:
  - % denotes zero or many characters
  - \_ denotes one character
  - SELECT first\_name FROM employees WHERE first\_name **LIKE 'S%'**
- Combining wildcard characters
  - You can combine the two wildcard characters (%,\_ ) with literal characters for pattern matching
  - Select last\_name
  - From employees
  - Where last\_name **like '\_o%'**;
- **Escape identifier**
  - You can use the Escape identifier to search for the actual % and \_ symbols
  - select employee\_id, last\_name, job\_id
  - from employees
  - where job\_id **like '%SA\\_%' Escape '\'**;

## Is Null

- Operator and tests for nulls with the **Is Null** operator
- Select last\_name, manager\_id
- From employees
- Where manager\_id **is null**;
- **You cannot test with =, b.c a null cannot be equal or unequal to any value**

## Logical Operators

### And

- Returns true if both component conditions

### Or

- Returns True if either component condition is true

### Not

- Returns true if the condition is false
- select employee\_id, last\_name, job\_id, salary
- from employees
- where job\_id **not** in ('IT\_PROG','FI\_ACCOUNT');
  
- The NOT operator can also be used with other SQL operators, such as **BETWEEN, LIKE AND NULL**
  - Where job\_id **not in** ('AC\_ACCOUNT', 'AD\_VP')
  - Where salary **not between** 10000 and 15000
  - Where last\_name **not like** '&A%'
  - Where commission\_pct **is not null**

## Order of Precedence

| Operator | Meaning                       |
|----------|-------------------------------|
| 1        | Arithmetic operators          |
| 2        | Concatenation operator        |
| 3        | Comparison conditions         |
| 4        | IS [NOT] NULL, LIKE, [NOT] IN |
| 5        | [NOT] BETWEEN                 |
| 6        | Not equal to                  |
| 7        | NOT logical condition         |
| 8        | AND logical condition         |
| 9        | OR logical condition          |

**You can use parentheses to override rules of precedence.**

ORACLE

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### Rules of Precedence

The rules of precedence determine the order in which expressions are evaluated and calculated. The table in the slide lists the default order of precedence. However, you can override the default order by using parentheses around the expressions that you want to calculate first.

ACCINNO -easy way to remember

1. Arithmetic
2. Concatenation
3. Comparison
4. (Not )null,like, in
5. Not between
6. Not equal to
7. Not logical
8. And
9. Or

**Or, And** order precedence

Query: select the row if an employee is a president and earns more than \$15,000, or if the employee is a sales representative”

```
select last_name, job_id, salary
from employees
```

```
where job_id='SA_REP'  
or job_id='AD_PRES'  
and salary>15000;
```

Query: Select the row if an employee is a president or a sales representative, and if the employee earns more than \$15,000

```
select last_name, job_id, salary  
from employees  
where (job_id='SA_REP'  
or job_id='AD_PRES')  
and salary>15000;
```

### Order By clause

- Sorting rows
- ASC (by default) - ascending (small to big)
- DESC - descending (big to small)
- **Order By MUST BE LAST CLAUSE in the select statement**
- If the Order By clause is not used, **THE SORT ORDER IS UNDEFINED**
- You can also use **NULLS FIRST** or **NULLS LAST** to specify whether returned rows **containing null values should appear first or last** in the ordering sequence

```
Select first_name
```

```
From employees
```

```
Order by first_name desc nulls last;
```

```
Sorting (ascending)
```

- Date values are displayed with the earliest value first (01-JAN-92 is displayed before 01-JAN-95)
- **Null values** are displayed **last for Ascending** sequences and **first for Descending** sequences
- Can use column alias in order by

### Sorting using column's numeric position:

```
Select last_name, job_id, department_id, hire_date
```

```
from employees
```

```
order by 3;
```

- 3 is hire\_date

### Sorting by multiple columns:

```
Ex: Select last_name, department_id, salary
```

```
from employees
```

```
order by department_id, salary desc;
```

- Sorts department\_id ascending
- Sorts salary descending

## Substitution variable (will talk about later)

### Functions

- Functions sometimes take arguments and Always return a value

### Single-row SQL functions

- Operate on **single rows only**
- Return one result per row
  - For each row, it returns one result
- Types of single-row functions
  - Character
  - Number
  - Date function
    - All date functions return a value of the DATA data type except the MONTHS\_BETWEEN function, which returns a number
  - Conversion
  - General
- Can be used in SELECT, WHERE AND ORDER BY clause;Can be nested
- Accepts arguments that can be a column or an expression

### Character functions

- **Case-conversion functions**
  - LOWER
    - Converts alpha character values to lowercase
    - Example:select lower('HAAA')
    - FROM EMPLOYEES;
  - UPPER
    - Converts alpha character values to uppercase
    - Example: select upper('haaa')
    - from employees;
  - INITCAP
    - Uppercase for the first letter of each word; all other letters in lowercase
    - Example: select initcap('haa ha')
    - from employees;
- **Character-manipulation functions**
  - CONCAT(m,n)
    - Concatenates first character value to second character value; same as concatenation operator( || )
      - If m is negative, the count starts from the end of the character value
      - If n is omitted, all characters to the end of the string are returned

- SUBSTR(string,m,n)
  - Returns specific characters from starting character position, m,n characters long
- LENGTH
  - Returns # of characters in the expression
- INSTR(m,n)
  - Returns the numeric position of a named string
    - Optionally you can provide a position m to start searching and the occurrence n of the string
    - M and n default to 1
- LPAD|RPAD
  - Returns an expression left-padded to length of n characters with a character expression
  - Returns an expression right-padded to length of n characters with a character expression
- TRIM
  - Trim leading or trailing characters (or both) from a character string
    - If trim\_character or trim\_source is a character literal, must use single quotation marks
- REPLACE
  - Searches a text expression for a character string and , if found, replaces it with a specified replacement string.

## Character-Manipulation Functions

These functions manipulate character strings:

| Function                                 | Result         |
|------------------------------------------|----------------|
| CONCAT('Hello', 'World')                 | HelloWorld     |
| SUBSTR('HelloWorld', 1, 5)               | Hello          |
| LENGTH('HelloWorld')                     | 10             |
| INSTR('HelloWorld', 'W')                 | 6              |
| LPAD(salary, 10, '*')                    | *****24000     |
| RPAD(salary, 10, '*')                    | 24000*****     |
| REPLACE<br>( 'JACK and JUE', 'J', 'BL' ) | BLACK and BLUE |
| TRIM('H' FROM 'HelloWorld')              | elloWorld      |

ORACLE

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### Character-Manipulation Functions

CONCAT, SUBSTR, LENGTH, INSTR, LPAD, RPAD, and TRIM are the character-manipulation functions that are covered in this lesson.

- CONCAT: Joins values together (You are limited to using two parameters with CONCAT.)
- SUBSTR: Extracts a string of determined length
- LENGTH: Shows the length of a string as a numeric value
- INSTR: Finds the numeric position of a named character
- LPAD: Returns an expression left-padded to the length of *n* characters with a character expression
- RPAD: Returns an expression right-padded to the length of *n* characters with a character expression
- TRIM: Trims leading or trailing characters (or both) from a character string (If *trim\_character* or *trim\_source* is a character literal, you must enclose it within single quotation marks.)

**Note:** You can use functions such as UPPER and LOWER with ampersand substitution. For example, use UPPER('&job\_title') so that the user does not have to enter the job title in a specific case.



## Number Functions

- Round(column|expression, n)
  - Rounds value to a specified decimal
  - If n is omitted, no decimal places (if n is negative, numbers to the left of decimal are rounded)
  - Round (45.926,2) = 45.93
- Trunc
  - Truncates value to a specified decimal
  - If n is omitted, n defaults to zero
  - Trunc (45.926,2) = 45.92
- Mod
  - Returns remainder of division
  - Mod(1600, 300) =100

## Working with Dates

- Default date display format is **DD-MON-RR**
- Sysdate function
  - Returns date and time

Select **sysdate**

From dual;

## Arithmetic with Dates

### Arithmetic with Dates

Because the database stores dates as numbers, you can perform calculations using arithmetic operators such as addition and subtraction. You can add and subtract number constants as well as dates.

You can perform the following operations:

| Operation        | Result         | Description                            |
|------------------|----------------|----------------------------------------|
| date + number    | Date           | Adds a number of days to a date        |
| date - number    | Date           | Subtracts a number of days from a date |
| date - date      | Number of days | Subtracts one date from another        |
| date + number/24 | Date           | Adds a number of hours to a date       |

Select last\_name, (sysdate-hire\_date)/7 as weeks

From employees

Where department\_id=90;

- **Date-Manipulation Functions** (all date functions return DATE data type **EXCEPT MONTHS\_BETWEEN**, WHICH IS A NUMERIC VALUE)
  - MONTHS\_BETWEEN(date1,date2)

- Find the number of months between date1 and date2
- If date1 is later than date2, the result is positive
- If date1 is earlier than date2, result is negative
  - # of months between two dates
- ADD\_MONTHS(date,n)
  - Adds n number of calendar months to date
    - Value of n must be an integer and can be negative
  - Add calendar months to date
- NEXT\_DAY(date, 'char')
  - Next day of the date specified of the week following date
- LAST\_DAY(date)
  - Last day of the month
- ROUND(date,['fmt'])
  - Returns date rounded to the unit that is specified by the format mode fmt
    - If fmt is omitted, date is rounded to the nearest day
- TRUNC (date,['fmt'])
  - Returns date with the time portion of the day truncated to the unit that is specified by the format model fmt
    - If fmt is omitted, date is truncated to the nearest day

### Multiple-row functions (group functions)

- Return one result per set of rows
  - For each set of rows, returns one result

#### Group functions

- Operate on sets of rows to give one result per group

#### Type of Group Functions (ignores null values)

- AVG
- COUNT
  - count(\*)
    - Returns number of rows
      - Includes duplicated rows
      - Includes null values
  - count(expr)
    - Returns # of rows with **non-null values**
- MAX
- MIN
- SUM
- VARIANCE
- STDDEV

## Group Functions and Null Values

### Creating Groups of Data

- Group by clause

### Types of Joins

#### Natural joins

- Natural join clause
  - Based on all columns in the two tables that have the same name.
  - It selects rows from the two tables that have equal values in all matched columns
    - If names change, query will stop working
    - If new columns are added, query may stop working
    - If columns have diff data type, an error is returned.
  - Highly NOT RECOMMENDED to use natural join
- Using clause
- On clause

### Inner Join

#### Outer joins:

- Left outer join
  - Matching data and non-matching data from **left** table (this means that **right** side values will be null)
- Right outer join
  - Matching data and non-matching data from **right** table (this means that **left** side values will be null)
- Full outer join
  - Matching data and non-matching data from **both** tables

#### Cross joins

- Combines the tables and multiply total rows of each table
  - Example- table A has 20 rows and table B has 5 rows
  - Cross join will give you 100 rows

### Set operators

- **Union**
- **Union all**
- **Minus**
- **Intersect**
- Rules to follow;
  - Need 2 independent queries
  - **Same number of columns** in Select statement
  - Same data type in same order

- If first is first\_name,salary
  - Second should be first\_name,salary
  - If second is salary,first\_name =**wont work since data type is different**

### Union

- Retrieves data from multiple queries
- **Removes duplicates and sorts the result**
- **Removes null values**

(select department\_id, department\_name  
from departments)

### union

(select employee\_id, last\_name  
from employees);

- You can have 2 more independent queries
  - Just put union

### Union all

- Returns combined rows from 2 independent queries
  - Keeps duplicates and result is unsorted

### Minus

- Returns records from the 1st query that is **NOT** in the 2nd query
- FIRST QUERY DECIDES
- It will take results of 1st query and compare with 2nd query and show only records that do not appear in 2nd query.
  - **It will help you find difference between two queries - Minus Operator**
- First query - **Wooden Spoon, Apples, Bananas, Cucumber**
- Second query- Apples, Bananas, Kiwi, Squash
- Result = Wooden Spoon, Cucumber

Query: Display emp ids, dep ids, dep names for all employees and departments

### Minus

Display emp ids, dep ids, dep names for all employees and departments only for departments that have employees

(select e.employee\_id, e.department\_id, d.department\_name  
from employees e full outer join departments d  
on e.department\_id=d.department\_id)

### Minus

(select e.employee\_id, e.department\_id, d.department\_name  
from employees e join departments d  
on e.department\_id=d.department\_id);

## Data Migration from DataBase1(MYSQL) to DataBase2(Oracle)

- Same database schema in both
- TableA in MYSQL
- TableB in ORACLE
- How do you make sure the two tables have same exact columns

Select \* from TableA

### MINUS

Select \* from TableB;

- **If same data then nothing should show up in results**
- **If there's a difference, those records will show**

### Intersect

- Only keeps **rows in common** in both queries
- If there's duplicates it will get rid of it
- 1st query: A,B,C
- 2nd query:A,C,D
- Result: A,C

```
Select employee_id, last_name
from employees
where employee_id in (100,104,105)
```

### intersect

```
Select employee_id, last_name
from employees
where employee_id in (100,104,106);
```

DML( Testers will usually do this one)

- Select
- Insert
- Update
- Delete

DDL

- Create
- Alter
- Drop
- Rename
- Truncate
- Comment

DCL

- Grant
- Revoke

Transaction (used sometimes whenever we need to update and delete)

- Commit

- Rollback
- Savepoint

Do you have experience with SQL?

- Yes I have worked with relational databases and i am very comfortable with DDL and DML commands

Create - creates table

**create table** Stud

```
(
  Student_id number(5)primary key,
  last_name varchar2(30) not null,
  course_id number(4) null
);
```

Then do **describe Stud**

- Shows you the details of the Stud table

Do: **Select table\_name**

**from user\_tables;**

- Shows you all the existing tables

**Insert**

**insert** into Stud

values(200,'Jones',101);

Update command is used to update records

**(BE CAREFUL USING UPDATE. MUST NEED A CONDITIONAL STATEMENT OR YOU UPDATE EVERYTHING IN THE TABLE**

- There something called **Database triggers**, if you make changes to one record, it will also make changes to other tables

**Update stud**

set course\_id=102

where last\_name='Jones';

**Rollback** - returns back before insert

- Its like Ctrl-z

**Savepoint** - saves a point

**Commit:** when used, you cannot rollback before the commit statement

```
rollback;  
insert into Stud  
values(200,'Jones',101);  
commit;  
--savepoint  
savepoint before_delete;  
Delete - delete data from database table
```

```
delete from stud  
where student_id=200;
```

```
rollback to savepoint before_delete;
```

The trick is to **commit** first then **savepoint** then **rollback to savepoint name**  
**\*\*\*DDL you can rollback but DML you CANNOT rollback**

Drop vs Truncate

- Both are Data Definition language commands
- **Drop** removes data and table as well
- **Truncate** removes all data but keeps the empty table
- Neither of them can be rolled back

**Truncate** table Stud

- Gets rid of all data in the table but keeps table

**Drop** table Stud

- Removes data and table

**Alter vs update**

- **Alter** changes database structure
  - Changing tablename
  - Data types
- **Update** updates a row of data
  - Deals with data

## HOW TO FIND nth LOWEST SALARY.

We need to use correlated subquery.

```
SELECT * FROM employees e1
WHERE n= (SELECT COUNT(DISTINCT(salary)) FROM employees e2
WHERE e1.salary <= e2.salary);
```

## API

What is **API**?

- Application Programming Interface
  - A messenger that takes requests from one application(client side) (DB) and translate it to another application(server side)(Database)

**What is Web Services?**

- API going through internet
- Can be ran via internet or locally

**What WebServices do you use in your project?**

- I use Restful which is Representational State of Transfer and it communicates with XML and JSON but my current project uses JSON

**What is JSON?**

- It is JavaScript Object Notation
- Basically a lightweight version of XML
- In Key: Value format
- Key is always in double quotes and value if string its double quotes and if numbers no quotes
- It is purely based on http protocol - so it hits the link on the browser and see the results

**How and where are you sending request?**

- Since i am using Rest, it has endpoints. My developers create public urls and requests are sent to that url

**Do you use any non-web services API**

- I use Selenium API for browser, JDBC for database, and RestAssured for API

**How do you test API in your project?**

- In my current project we are testing not only our companies api but other external api. For example we use linkedIN api to easily transfer the authorized end user's info to our database. As a tester we send a API request and verify the status code, response body and checking the endpoints of the api url is working as expected
  - For example in my project, I also do Positive/Negative testing of API



- Positive - i am sending valid requests, headers, parameters, and json body and verify that response is 200/201
- Negative- i am sending invalid requests, headers, parameters, and body, expecting to the status to not be 200

### **Do you have API documentation website for your API?**

- Yes we use swagger for our api documentation and this is where the description and guidelines of API endpoints are

### **Can All API endpoints use all of the Http protocols?**

- It depends, My API developer decides if that url works with GET,POST,PUT, or DELETE requests

### **How do you manually test your API?**

- I use Postman - it is a REST API client tool that test the REST API URL

### **What are the types of Request in Rest API?**

- There are Get,Post,Put, and Delete requests
- Get read data
- Post creates data
- Put updates data
- Delete deletes data

### **What are headers in REST API?**

- I am using Accept.(Content Type.JSON) type - checks what I am receiving should be in JSON or XML format
- And ContentType.(Contenttype.Json) - checks what i am sending should be in JSON format

### **What is RestAssured Library?**

- A non web service api that's BDD format and helps integrate java code using deserialization and serialization to extract data from the json and transform it into a java object in order to store, verify, and validate the data to the expected one.

### **How are you using Enum in your project?**

- I am using content Type to make sure that my response type is JSON format

### **What methods are you using to verify the size of the response data?**

- I use Matchers from Hamcrest
  - hasItems()
  - equalTo()

### **What is JsonPath?**

Another way to validate response body

-JsonPath j=response.jsonpath;

### **How would I write a method where I need parameter with limit of 100 and path parameter of employee id = 100?**

- I would write ;
- .and().params("limit",100)
- .and().pathParams("employee\_id", 110)

## How would I use Response interface?

### Reporting

Mvn Verify will run tests even if it fails (it ignores the failure)

- Waits for all the test to finish
- It ignores failure b.c we have this in our build configuration  
`<testFailureIgnore>true</testFailureIgnore>`
- 
- Verify is a Maven lifecycle that comes after test

Mvn test will stop running the test if something fails

The original html report we get is not that great, we need statistical data

Ex; "html:target/cucumber-report"

- Like how many test are pass/failing percentages

We going to use **Cucumber Sandwich (this is a dependency file in pom xml)** for more statistical data reporting

In cukesrunner add; "json:target/cucumber.json"

- It's a html report from a JSON file
  - How this report works is the Json file is used to generate the report
- Version 3.15 (from the vid)
- Add a new build xml in pom (its already in your pom file, the one called TestProject)
  - You will only get this json reporting(cucumber report with graphs and statistics. This report will be only local for YOU to see, not for Jenkins) ONLY if you execute MVN Verify
  - BUT YOU WILL ALWAYS GET A **JSON FILE(different from cucumber report)** AFTER RUNNING THE TEST, EVEN W.O VERIFY
    - This JSON file is very important for Jenkins - for the cucumber report plugin
- TestProject build:
- `<id>execution</id>`
- `<phase>verify</phase>` - this is why html (json) report will only generate when using verify
- `<goals>`
- `<goal>generate</goal>`
- `</goals>`
- The report will also give you a json file
- To run tests using verify, right click pom file and click on maven build...
  - You can also add parameters (like runner variable and value which is the xml file)
- Type in goals: verify

To run this in the command line

- Go to location of pom file and type **mvn verify**
- Syntax is `mvn<lifecycle/goal>`

Order of Execution using mvn verify

1. Run against the pom file
2. Pom file runs the xml file
3. Xml runs the cukesrunner file
4. Cukesrunner runs the cucumber feature file/test

Does json cucumber report show screenshot?

## Jenkins

- Continuous Integration and Deployment tool
- 3 components of Jenkins
  1. Code change
    - a. Devs makes changes to the application code
  2. Test
    - a. CI tool automatically picks up the changes and tests the application
  3. Deploy
    - a. CI tool deploys the application with changes

### What is Jenkins job

- Everything is done by creating a job
  - A task that Jenkins performs based on its schedule
  - Made of several steps
  - Can have a trigger that determines when it runs
  - Reports the results of the run automatically

### What is continuous Integration?

- Every time the software's code is changed, it is built and tested automatically

### What is continuous deployment?

- Code changes are automatically built, tested, deployed, and prepared for a release to production

### Do you maintain Jenkins?

- It is done by Special Team, environment team, architecture team
- But i provide them information of my tests and configuration info and also the emails to send notifications.
  - Git path
  - Mvn code ; goals - compile, or verify -drunner=xml, etc
  - Time schedule for certain tests

If you run your regression test on jenkins, how do you execute it if it automatically runs?

### What goes in the regression test?

- Depends on the team, test plan, scope, and business value

### How many jobs in Jenkins?

- I personally set up 2-3 jobs for automated tests
  - 1 for smoke

- Smoke is running daily 2,3 times a day , making sure that all environments are up and running
- Full regression (running manual and automated tests)?
  - Before each production release(after 3 sprints)
  - Only very stable test cases are stored in full regression
  - Updating functionality
- Minor regression
  - Runs at the end of sprint
  - Tests that are related to certain modules and functionalities
  - I use tags to specify which module to run

### How is code deployed to your environment?

- Devs write the code, test it then is deployed in jenkins from dev to test environment
- What if it doesn't?
  - Talk to your developer and ask them to deploy it

### How do you search by tags?

- You can use ctrl-h to open search tool in **Eclipse** and put the tag name in there and what kind of file it is, like feature.file

### Selenium Grid

- Gives you the ability to run your automated tests in different browsers(and their different versions) and platforms(basically Operating systems and their versions.Window, Linux, Mac) VISGRID
- This tool is useful if you have lots of Tests (over 500)
- Instead of doing WebDriver driver=new Chromedriver()
  - Do **WebDriver driver=new RemoteWebDriver(url,capabilities)**
    - Contains 2 parameters in constructors
- **How does Selenium Grid work?**
  - Grid is a set up that consists of Hub and nodes
  - **Hub** is a central machine that all nodes connect to
    - **Has IP address and port number**, Then you link the Hub to Nodes
  - Has a main machine which is called a Hub and multiple nodes (the machines that actually run your tests)
  - The order of execution is;
    - Your code>remote driver>Selenium Hub>Selenium nodes (might be multiple ones)
      - You asked your Selenium Hub to run your tests
        - Then selenium hub will find a node that is linked to the hub and run your test from there
      - You can have as many nodes as you want but only one hub

### How do you set up your selenium grid?

- Hub is a different server machine and each node is a separate server machine
- Our hub and nodes will be set up in **Amazon AWS Ec2 machines (ideally)**

- You can ask your hub to run tests and then the hub will find a node and run your test from there
- We can also have hub and multiple nodes in same machine or server
- Each node registers to the HUB with a certain configuration and HUB is aware of the browser available on the node
- When a request comes to the HUB for a specific browser(with Desired capabilities object), the HUB, if found a match for the requested browser, redirects the call to \*that\* particular GRID Node and then a session is established bidirectionally and execution starts

### **Where are the cross browser/platform running?**

- It is running in Amazon AWS machine where Jenkins is installed. But normally, company jenkins is used by developers team, devops, deployment team, and QA automation team
  - It is not recommended there
- Ideally is Jenkins>Github>Maven>Runner class>Selenium Hub and run in one of the nodes that is configured in different server
  - In your hooks class, instead of having you webDriver point to a local driver, change it to a **RemoteDriver()**; and have it point to the cloud machine that has the hub

### **- What are the challenges in multi browser testing?**

- Something is not clicking
- Not visible
- Some items look different in one browser than another browser

### **- What browsers are you testing?**

- Chrome
- FireFox
- IE/Edge
- Safari
- Opera

### **- How do you automate multi browser testing?**

1. Change the browser to something else in my properties file in my framework
  - When I want to run my tests in different browser
    - Ex; "Browser=chrome" to "Internet Explorer"
  - **This method works if your tests are less than 500 tests**
2. In my framework, I implemented Selenium Grid and I can run tests in different cloud machines using different browsers

### **What to do with failed tests?**

- Look at the automation execution report
- Find out the reason of failure
- Try to do steps manually, if manual is passing then automation issue
  - So you fix,re-run and see if its passing

- If its application issue
  - Create a defect
    - While the defect is being fixed, i am testing manually using **Ad-hoc test**
    - If the defect is not a **showstopper** then you run other tests and automate
      - If it is, you have to wait, cant do any further testing
    - When rerunning, i use @ReRun tag to test only the test you want to rerun

### What is Ad-Hoc test?

- Performed without proper planning and documentation
- Defects found using this method are hard to replicate since there no test cases aligned for those scenarios
- Performed after formal test execution

### SauceLabs - cloud Grid service. Access to multiple Platforms with multiple browsers

- Provides cloud machine so you can run a lot of
- Does parallel testing well

### How to test with SauceLabs?

Usually, we do `WebDriver driver=new FireFoxDriver();`

Now we going to do;

- `DesiredCapabilities caps=DesiredCapabilities.firefox();`  
`caps.setCapability("platform","Windows 7");`  
`caps.setCapability("version","38.0");`

`WebDriver driver=new RemoteWebDriver(new`

`URL("http://YOUR_USERNAME:YOUR_ACCESS_@ondemand.saucelabds.com:80/wd/hub",caps)`

### Steps to run your tests in saucelabs/Any ready selenium Grid

1. Create desiredCapabilities object and specify with type of OS, browser you want your tests to run. Used with selenium Grid.
  - a. `DesiredCapabilities caps=DesiredCapabilities.firefox();`  
`caps.setCapability("platform","Windows 7");`  
`caps.setCapability("version","38.0");`

### 2. Create RemoteWebDriver with **HUB url**:

`WebDriver driver=new RemoteWebDriver(new URL(URLOFHub),caps);`

### 3. Create sauceLabsDemo class

- In `@BeforeTest`
  - `DesiredCapabilities(comes from Selenium)`  
`caps=DesiredCapabilities.firefox();(chooses which browser)`  
`caps.setCapability("platform","Windows 7");`  
`caps.setCapability("version","38.0");`

String

`URL="http://YOUR_USERNAME:YOUR_ACCESS_@ondemand.saucelabds.com:80/wd/hub"`

- This is Selenium Hub address

**URI= unified resource identifier**

**URL=unified resource locator**

**How do you report using SauceLabs?**

- I link to my JIRA server

**How do you set up Selenium Grid in AWS?**

1. 2 cloud servers (Ec2)
  - a. 1 will be HUB
  - b. 1 will be node
2. In machine 1, download **Selenium StandAloneServer**
  - a. It is needed in order to run Remote Selenium WebDriver
    - i. A lot of configuration
    - ii. Use command line
      1. Set up HUB; java -jar selenium-server-standalone-3.5.3.jar - role hub
        - a. <http://localhost:444/grid/console>
      2. Set up node1
        - a. Java -jar selenium-server-standalone-3.5.3.jar -role node - hub <http://localhost:4444/grid/register>
      3. Node2
        - a. Java -jar selenium-server-standalone-3.5.3.jar -role node -hub <http://localhost:4444/gird/register> -port 7777

**3. You can also use Visgrid**

- a. Download in machine 1
  - i. Open jar file
    1. Set max session to 10
    2. Start hub
    3. Port 4444 (where your hub is. You can change it but remember it)
  - ii. Click Create node
    1. Choose a browser for the node
    2. Type in number of instances
    3. Click Add
      - a. Open browser in ec2 machine
      - b. Type: localhost:4444 (this is seleniumGrid hub) (Now we just powered up our HUB)
      - c. Click on console
      - d. Refresh the page
      - e. Now it Show nodes ( all in the same machine)
      - f. Add another node(now it will show 2 nodes)
  - iii. Now go to another machine and create nodes from there and link it to HUB
  - iv. Before going to machine 2
    1. Go to aws console
    2. Go to the instance that hold your hub
      - a. Click on security groups = launch wizard

- b. Go to inbound
  - i. Add the port number of hub (which is 4444) and save it
- v. Go to machine 2
  - 1. Download same jar file of visgrid you used for 1st machine
  - 2. Download jdk ( in order to open the file)
  - 3. Open jar> start hub>create node>click Override HUB(we dont need this hub since we have another one on the first machine)>add machine 1 ip address and port number: 4444>add

### How do you run your tests in multiple threads parallely?

- Thread is like one process or instance of application run
- 4 ways
- 1. We can create multiple cukesrunner with different tags
  - a. Ex. cukesrunner has tag “@Test”
  - b. Smokerunner has @smoke
  - c. Regression runner has @Regression
- 2. Create testng xml and add those runner class under one test
  - a. Add all 3 runners in one xml
  - b. Then next to verbose=2(on top of xml file) add “parallel=“classes” thread-count=“10”>
- 3. Then make sure our driver opens a remote WebDriver that is point to hub
  - a. Add the code in driver class
- 4. Run the testng xml by itself or using maven.

### Linux Commands (case-sensitive)

- **reboot**
  - reboots system
- **man**
  - Gives you instruction of the command
  - Ex: “**man reboot**”
- **mkdir**
  - Creates directory(folder)
- **cd**
  - Change directory
- **ls**
  - List directory content
- **pwd**
  - Print name of the current working directory
  - Gives you exact location
  - Ex: /home/Andy/Desktop
- **ll**



- Long list format
  - **ls -la**
    - Prints files and hidden file
  - **clear**
    - Clear screen
  - **cd ..**
    - Goes to the parent file (not the root file)
  - **cd /**
    - Goes to the parent root file
  - **cd ~**
    - Goes to the home of the user file
  - **grep**
    - Prints a line matching a pattern
  - **df -h**
    - Prints the disk space usage
  - **top**
    - Displays linux tasks (like task manager)
  
  - **How to create an account**
    - User
      - **useradd Andy**
    - Group
      - **groupadd Cybertek**
  - Adding a user into group
    - **useradd -G Cybertek Andy**
- id Andy**
- prints details for this individual (shows it Andy has cybertek)
- Configuration/changing the network
- **vi /etc/sysconfig/network**
  - **crontab**
    - Sets a timer for your file to run (build schedule like jenkins)
  - Setting permissions
    - **chmod**
      - Change file mode bits
      - Order is owner, group , others
        - If the file is folder, d is in the front
        - If not a folder there is no d
    - **chmod 777**
      - r- read
      - w-write
      - x-execute
      - rwxrwxrwx (777)
      - Gives access to owner,group, and others

- Very dangerous
- Do not use
- Chmod 644
  - -rw-r--r--
  - Give access to owner (read and write),group(read only),others(read only)
  - Default access
  - Standard
- How to find an file using grep (if you know the name of file)
  - grep 'name of test failed file' /home/Andy/Test1/TestScenario (location) > /home/Alex/AutomationFile
    - Now the file is inside this location; /home/Alex/AutomationFile
  - Find any file that has ' name'
  - **grep 'fail scenario' \***

### SingleTon

```
public class InstanPage { private static InstanPage instance=null;
private WebDriver driver; private InstanPage(){ } public WebDriver
openBrowser(){ driver=new FirefoxDriver(); }
driver.manage().window().maximize(); return driver; } public static
InstanPage getInstance(){ if(instance==null){ instance = new
InstanPage(); } return instance; } }
```

## Soft Skill Interview questions

### General Introductory / Behavioural Questions:

#### **1. Why did you choose software quality analysis as a profession/ career?**

I have always looked at products from a user's perspective. If it is not designed to give the user a seamless experience, it is not a good quality product. User friendliness and ease of use of any product, including software applications, has always inspired me.

Because of that personality trait, I enjoy looking for the loophole in any product. I love breaking things down analytically and thinking out of the box to see if there are any gaps that were not thought through. This love of building perfect products made me select quality analysis as my profession/ career.

#### **2. Describe your typical day at work**

My day at work typically starts with making a "to-do" list of thing i need to work on that day. A list might include but not be limited to , any of the following:

- Check my email (confirm is there any meeting that i need to attend)

- Attending Daily scrum meeting or any knowledge transfers meeting.
- Continue work on task, reading requirements to better understand which kinds of test cases i need to build
- Writing automation scripts in scenarios where there is a need for automation
- Executing the testing and coordinating with developers to check the defects that i have found
- Meeting with the development team to communicate the daily defect log and plan around fixing and retesting defects.

### **3. Where do you see yourself 5 years from now ?**

I would like to get some hands-on experience in conducting business within the IT industry. I would like to learn as much as possible to be more technical competitive person. Ideally, I'd like to become a real software developer in Testing field.

(Note: Some managers are already under stress. They are not comfortable to hire the person that is smarter than themselves. So you have to know how to make them comfortable by let them feel that you are

technically good, but you will be Zero thread to their position. )

#### **4. Are you a team player or a lone wolf?**

I have been in both kinds of situations. While I feel teamwork is really necessary to boot the enthusiasm, and productivity, I am also comfortable working by myself. From my experience, things like brainstorming, going over user stories and scenarios and plugging gaps in user stories or acceptance criteria need a lot of teamwork. However, there are things like documentation, preparing presentations, data analysis which are best done alone in the start.

#### **5. Do you like working in small teams or big teams?**

I have had chance to work in teams as big as more than 12 testers, and also in small teams of 4 or 5. While each situation has its pros and cons, I feel comfortable and work well either way.

For example, with a big team, you have more resources and a better division of labor. However, the coordination is challenging and chaotic

Similarly, small teams can be nimble and are suitable for agile style development. However, the scope has to be limited because of team size, and often the staff is stretched thin and must work long hours.

## **6. Have you work under pressure?**

I'm not strange to working under pressure. Good pressure- such as having a lot of assignments / tasks to work on or and upcoming deadline help me to stay motivated and productive. Of course, there are time when too much pressure can lead to stress; However, I can prioritize my job and meeting deadlines which prevents me from feeling stressed often during the work. For example, when developer couldn't deploy the code on time, as a automation tester we shouldn't do nothing and wait. In that situation , I read acceptance criteria/ requirement,analyze scenarios and create the test case or write my pseudocode. So once it's done my 70% of job is done also, therefore , I can meet my deadline or finish my job according to deadline.

This is how i handle my stress or avoiding unnecessary stress by simple prioritize , focus on and get the job done.

## **7. Why did you apply for this position? Or Why should we hire you ?**

I feel that your vacancy ideally fits my work experience,skills and qualifications. Therefore, I will be able to make significant contribution to your company as well as fulfill my potential.

I would like to work for a company where i feel i can make a real difference. After did some research about your company I have discovered that it has a excellent reputation. I was also greatly impressed by your companies mission statement, values and culture. I feel strongly that your is a organization that I would like to work for and be associated with.

I believe your company will help me to develop my career in the direction that want it to go.

I think I would be a perfect candidate and compatible fit for this position.

## **8. Why are you looking for a change now ?**

I have worked at my present employer for X number of years, and it has been a great journey. I still love my job and am very good at it. However, I have hit a ceiling in terms of development here, and I am looking for an opportunity to face new challenges, achieve certain key career aspirations and grow within the industry. When I read your job description, it immediately piqued my interest as it seems like a perfect match for my skills, and a great opportunity to add value to your organization.

## **9. What are your strengths and weaknesses as a QA?**

Strengths:

- QAs have input into the entire software development process. Verifying software is just one aspect of the role- but most end users aren't interested in what any applications can do for them. I have the ability to get a very clear understanding of the business requirements along with business logic much before starting the test strategy.
- Quick learning
- Communication skills
- Work under pressure or handle stress



## Weaknesses

In the pass my greatest weakness was that i was very critical of my own work. I always thought in order to produce excellent and error-free work, have to go each and every detail, while this is beneficial to my job performance but it is possible to go to extremes. I have also found that I can easily waste time checking and rechecking the same stuff. For example, when i found defect , it is great for reproduce 2-3 times to confirm that is a bug or not. But what I did is I do recreate bug 6-7 times with using different test data or environment. But then i realized this is just waste of time. So now I'm always making a conscious effort to trust myself and my quality focus more on other task.

### **10. Do you have any questions for me?**

Yes , I do have couple questions, Can you tell me about the team structure and who I will be working with? What are the challenge that your team facing now?

## **Basic QA questions**

## **1.What is Software Development Life Cycle?**

The systems (or software) development life cycle (SDLC) is a conceptual model used in project management that describes the stages involved in an information system development project from an initial feasibility study through maintenance of the completed application.

It includes the following different stages:

- 1.Requirement
- 2.Design phase
- 3.Coding
- 4.Testing
- 5.Release (Production)
- 6.Maintenance

## **2. What is Software Testing Life Cycle?**

The testing of software has its own life cycle. It starts with study and analyzing the requirements.STLC refers testing process which has specific steps to be executed in a definite sequences to ensure that the quality goals have been met.

It included the following different stages:

- 1.Requirement Analysis
- 2.Test plan
- 3.Test development (writing a test case , review test case)

- 4. Test execution
- 5. Test closure.

### **3. What is Requirement document?**

In other words, all the expected functionalities out of the application are documented in terms of “**Requirements**” and this document is called a **Requirement document**. It is also called an SRS document, which stands for **System Requirement Specification Document**.

### **4. What is a Module?**

A “Module” is a software component that has a specific task. It can be a “link” which can go inside to its component detail.

### **5. What is Build?**

When each of the different modules of software is prepared, they are put in a single folder by Configuration Management Team(CMT) and it is called the build. In other word, the developers put their code in the share location (folder) and all those code (modules) are combined together so that it is a complete application that works.

### **6. What is meant by the Build Deployment?**

When the Build so prepared by the CMT is sent to different Test Environments, it is called the Build Deployment.

## **7. How do you test the application if the requirements are not available?**

If requirement document is not available for an application, a test plan can be written based on assumptions made about the application. Assumptions that are made should be well documented in the test plan. (Bookish answer).

A-1 If the requirement is not available we have to do our best to gather as much information as possible from the end-users, client and similar applications from competitors. Based on our research we can still test the application. For example if we have to test an e-commerce application without requirement we can analyze amazon.com to gather basic requirements and perform our testing accordingly.

A-1.2 When we do not have any formal document (e.g. FSD, BRD, SRS) available for reference, we can get help from earlier versions of the application, defects description and comments, wireframes, etc. It is always a good idea to include some members on the team who have good domain knowledge. We can also talk directly with developers and business analysts, who help us understand application behavior. We can create reference documents for the testing team, which will help new team members to become productive quickly.

A-2.3 In my current company , while I was working on any production defect ticket which is not including any Acceptance Criteria (requirement).In that case, I go to developer desk discuss about root cause scenarios and take a note, analyze it , create a test case , execute them make sure the issue is fixed then complete my testing.

### **8. What is peer review ?**

Peer review is process for finding any error or defect on various documents , it is conducted by team members . the purpose of peer review is find the defect as early as possible before it is deployed to next step.

### **9. Who approves test case?**

The approver of test cases varies from one organization to the next. In some organizations, the team lead/QA lead may approve the test cases while another approves them by team members through peer review

### **10. How can you tell when enough test cases have been created to test a system or module?**

That is a reason we need to have RTM(Requirement Traceability Matrix) we can tell how many requirement has been covered by test cases and how many still left from RTM . In other words, it is a document that maps and traces user requirement with test cases. The main purpose

of Requirement Traceability Matrix is to see that all test cases are covered so that no functionality should miss while doing Software testing.

### **11. What is a test plan ? who writes test plans**

A document describing the detailed approach to test the software and what the eventual workflow will be. It consists of features to be tested, features not to be tested, approach, entry criteria, exit criteria, test environment, training needs, resources, roles and responsibilities, risks and contingency plan.

What are the tasks involved in Test Planning?

1. Understand and analyze the requirements
2. Risk analysis
3. Test Strategy Implementation
4. Test Estimations
5. Team formation
6. Test Plan documentation
7. Configuration Management planning
8. Traceability Matrix
9. Define Test Environment set up

Test Lead prepares Test Plan

## **12. Who creates the test strategy? What are the main contents that you would include in it?**

The test manager creates the test strategy. It is a company-level document the template for which is typically recommended by the PMO or an equivalent shared services group. It is then customized for the project by the test manager based on the unique considerations for the particular application. The typical things I would include in a test strategy document are :

- Types of testing
- Steps that we need to complete before testing
- The testing approach, including details like number of users, creation of test cases, execution approach, ownership, etc.
- QA timelines
- Testing process with actors and daily steps.
- Documents to be prepared with respective formats.

## **13. Does test strategy and test plan define the same purpose?**

Yes, the end purpose of test strategy and test plan is same i.e. to work as a guide or manual to carry out the software testing process, but still they both differ

## **14. What is test case and who creates test cases?**

It is documentation which describes step by step how to perform testing. it includes: test case ID, test case name ,pre-condition, step description, test data, expected result and actual result and pass/fail. Testers will create test cases.

### **15. What is the differences between test scenario, test case and test script?**

Test scenario is a description of user's multiple actions that might face when using the applications. It is about what to test. It is high level of test cases.

Test script in software testing is a set of instructions that will be performed on the system under test to test that the system functions as expected. This terminology mostly used for automation testing

Test case is documentation which specifies input values, expected output and the preconditions for executing the test. This terminology mostly used for manual testing. It is about how to test . It's a layout of the low-level details on how to test the scenario

### **16. What is the validation and verification ?**

Verification is the process, to ensure that whether we are building the product right i.e., to verify the requirements which we have and to verify whether we are developing the product accordingly or not. Activities involved here are Inspections, Reviews, Walk-throughs.



Validation is the process, whether we are building the right product i.e., to validate the product which we have developed is right or not. Activities involved in this is Testing the software application.

**17. What is the difference between verification and validation approach of software testing?**

Verification is done throughout the development phase on the software under development whereas validation is performed over final product produced after the development process with respect to specified requirement and specification.

**18. What Is Entry And Exit Criteria In Software Testing?**

Entry criteria – It is a process that should run when a system begins. It includes the following artifacts.

SRS (Software Requirement Specification)

FRS (Functional Requirement Specification)

Test-Case

Test-plan

Test strategy

Exit Criteria – It signals when the testing should complete and when should the product be ready to release. It includes the following artifacts.

Test Summary Report

Metrics

Defect Analysis report

**19. In a long term project, many times the requirements change. Do the test plans also change along with the requirements?**

Most times, yes. If requirements change, the design documents and specifications( for that particular module which implements the requirements) will also change. Hence, the test plan and test cases only for that portion would also need to be updated. This is because “Resource Allocation” is one section of the test plan. We would need to write new test cases, review, and execute the test cases. Hence, resource allocation would have to be done accordingly. As a result, the test plan would change.

**20. What are some common problems you have observed in projects that might make testing challenging? Also provide ways in which you have overcome these challenges.**

Some common problems in software development process that might make testing challenging are:

Inaccurate or incomplete requirements:

There are many reasons why requirements can be inaccurate or incomplete. This directly affects the development and subsequently the testing. Sometimes the requirements might not be at a level of detail to tie back to

granular test case. In such situations, the test team has to take the best guess on what the outcome of a test case should be, and this can make it ambiguous and problematic when the product goes to UAT. To resolve this, a tester should also behave like BA. Whenever you find requirement where a clear test case cannot be defined, or enough detail is not available, you should speak up and request the BA to get the missing information. This will consume time, but will make sure that the product you deliver is what the users really want.

Unrealistic schedule:

Unrealistic schedule and a short time allocated for testing. There are ways to handle this. One way is to ensure that the test cases are clearly prioritized so that we can test out the high and medium cases first. Alternatively, we can also do less documentation and more ad hoc testing to cover the key features of the system in the time that has been provided.

**21. What would you do if the defect you reported could not be reproduced by the development team, even after repeatedly adding more details to the defect?**

I assume the screenshots of the defect are already provided in this situation. The only alternative would be to create a video and upload it with the defect.

However, there are times when the bug has resulted from a totally random situation which cannot be recreated. In such a

situation, I will note it separately and continue testing to see if it happens again. If not, it can be included as a low priority, low probability defect.

**22. How will you resolve a conflict between developer and tester where tester wants the defect to be fixed, while developer does not consider it to be a defect?**

The testers and developers look at the requirement from a different perspective. So my approach is to look at the requirement from the customer's perspective and make the decision.

I can give an example from a recent project. This project involves a lot of online forms that a user has to fill. These forms have hundreds of fields, and a user has to select one or more values from hundreds of choices from drop-down list. However, I realized while testing that a drop -down is not user friendly at all if you are going to select multiple values from a set of hundreds of values. A multi-select box is a much better option. The developer did not think it was a bug because they built it exactly as per the requirement specification. However, it would not have worked for an end user. When I explained this to them, they saw value in it, and it was finally recorded as a defect.

**23. Please give an example each of high priority-low severity, low priority-high severity, and low priority-low severity defect.**

Low priority-low severity:

Any misspelling, font size or color.

Low priority-high severity:

Company logo color not as expected. Or written by lower case.

High priority-high severity:

Application login functionality is not work.

#### **24. Distinguish between priority and severity.**

Priority defines the business need to fix or remove identified defect whereas severity is used to describe the impact of a defect on the functioning of a system

#### **25. Which parameter tells the importance of fixing the defect from a customer's perspective.?**

Defect priority is the parameter user to assess the importance of the defect fix from the user/customer's perspective. The higher the priority, the more important it is to fix the defect.

#### **26. Explain the difference between bug severity and bug priority?**

Severity : Bug/Defect severity can be defined as the impact of the bug on the application. It can be Critical, Major or Minor. In simple words, how much effect will be there on the system

because of a particular defect

Priority : . Main focus on how soon the defect should be fixed. It gives the order in which a defect should be resolved. Developers decide which defect they should take up next based on the priority. It can be High, Medium or Low.

Development team takes up the high priority defects first rather than of high severity. Generally, severity is assigned by Tester / Test Lead & priority is assigned by Developer/Team Lead/Project Lead.

**27. What should be the approach when there is very little time given for testing, and you have to complete the testing within that short time frame?**

Check with the BA and developers to decide on the high priority test cases. Execute high priority test cases first.

Ad hoc testing always yields good results in less time. The key here is to assign different areas of the application to different team members to perform ad hoc testing.

**28. What is bug triage?**

Bug triaging is the determination of how important the bug is with respect to other bugs identified in the system. The steps involved would be :

- Analyze the bug

- Step appropriate bug priority

- Assign bug to proper bug owner

Adjust bug severity if needed

Move defects to deferred state if needed.

### **29. What is a latent defect?**

A latent defect is an existing defect which has not caused failure because a particular set of conditions never occurred simultaneously

### **30. What is the responsibility of the tester when a bug was not caught during testing but was found by the client during UAT?**

When a client reports any bug to the development team, it's a major drawback of the system which leaves the client with a negative impression of the delivered system. In such a case, the tester should reproduce the client-reported bug in his/her system. If it is not reproduced in the local systems, but only produced in the client's system, it should be labeled as an inconsistent bug. We can mark the bug as inconsistent and temporarily close the bug.

### **31. What are the functional testing types?**

Unit testing

Smoke testing

Sanity testing

Integration testing

System testing

Regression testing

UAT (user acceptance testing)

### **32.What are different Test Levels?**

There are 4 test levels  a.

- Unit/Component
- Integration testing  c
- System Testing  d
- Acceptance Testing

### **33.What is the difference between Re-testing and Regression Testing?**

Re-Testing is done to verify defect fixes and

Regression testing is done to check if the defect fixes have disturbed existing functionality that was working fine before making the changes.

### **34.Why non-functional testing is equally important to functional testing?**

Functional testing tests the system's functionalities and features as specified prior to software development process. It only validates the intended functioning of the software against the specified requirement and specification but the performance of the system to function in the unexpected



circumstances and conditions in real world environment at the users end and to meet customer satisfaction is done through non-functional testing technique. Thus, non-functional testing looks after the non-functional traits of the software.

### **35. Which is a better testing methodology: black-box testing or white-box testing?**

Both black-box and white-box testing approach have their own advantages and disadvantages. Black-box testing approach enables testers to externally test the system on the basis of specified requirement and specification and does not provide the scope of testing the internal structure of the system, whereas white-box testing methodology verify and validates the software quality through testing of its internal structure and working.

### **36. If black-box and white-box, then why gray box testing?**

Gray box testing is a third type of testing and a hybrid form of black-box and white-box testing approach, which provides the scope of externally testing the system using test plans and test cases derived from the knowledge and understanding of internal structure of the system. □

### **37. Difference between static and dynamic testing of software.**

The primary difference between static and dynamic testing approach is that the former does not involves the execution of code to test the system whereas latter approach requires the code execution to verify and validate the system quality.

### **38. List out various methodologies or techniques used under static testing.**

1. Inspection
2. Walkthroughs
3. Technical reviews
4. Informal reviews
5. Peer reviews

### **39. Smoke and Sanity testing are used to test software builds. Are they similar??**

Although, both smoke and sanity testing is used to test software builds but smoke testing is used to test the initial build which are unstable whereas sanity tests are executed on relatively stable builds which had undergone multiple time through regression testing.

#### **40. Why exploratory testing is preferred and used in the agile methodology?**

As agile methodology requires the speedy execution of the processes through small iterative cycles, thereby calls for the quick, and exploratory testing which does not depend on the documentation work and is carried out by tester through gradual understanding of the software, suits best for the agile environment.

#### **41. What is positive and negative testing?**

Positive testing is the activity to test the intended and correct functioning of the system on being fed with valid and appropriate input data whereas negative testing evaluates the system's behavior and response in the presence of invalid input data.

#### **42. How system testing is different to acceptance testing?**

System testing is done with the perspective to test the system against the specified requirements and specification whereas acceptance testing ensures the readiness of the system to meet the needs and expectations of a user.

#### **43. What is the importance of database testing?**

Database is an inherited component of a software application as it works as a backend system of the application and stores different types of data and information from multiple sources. Thus, it is crucial to test the database to ensure integrity, validity, accuracy and security of the stored data.

**44.What are the tasks involved in Test Design phase?**

- i. Creating Test scenarios
- ii. Test case documentation
- iii. Test data collection

**45.What is Requirement Traceability Matrix?**

Document showing the relationship between Requirements and Test Cases.

**46.Who prepares and updates Traceability Matrix?**

Test Lead or Team Lead creates Traceability Matrix and Testers update Traceability Matrix throughout the STLC.

**47. What is Software Quality Assurance (SQA)?**

Software quality assurance is an umbrella term, consisting of various planned process and activities to monitor and control the standard of whole software development process so as to ensure quality attribute in the final software product.

**48. What is Software Quality Control (SQC)?**

With the purpose similar to software quality assurance, software quality control focuses on the software instead to its development process to achieve and maintain the quality aspect in the software product.

**49. What is Software Testing?**

Software testing may be seen as a sub-category of software quality control, which is used to remove defects and flaws present in the software, and subsequently improves and enhances the product quality.

**50. Whether, software quality assurance (sqa), software quality control (sqc) and software testing are similar terms?**

No, but the end purpose of all is same i.e. ensuring and maintaining the software quality.

**51. Then, what's the difference between QA, QC and Testing?**

SQA is a broader term encompassing both SQC and testing in it and ensures software development process quality and standard and subsequently in the final product also, whereas testing which is used to identify and detect software defects is a subset of SQC. □

## **52. Why entry criteria and exit criteria is specified and defined?**

Entry and exit criteria is defined and specified to initiate and terminate a particular testing process or activity respectively, when certain conditions, factors and requirements is/are being met or fulfilled. □

## **53. What is a software testing artifact?**

Software testing artifact or testing artifact are the documents or tangible products generated throughout the testing process for the purpose of testing or correspondence amongst the team and with the client. □

## **54. Why there is a bug/defect in software?**

A bug or a defect in software occurs due to various reasons and conditions such as misunderstanding or requirements, time restriction, lack of experience, faulty third party tools, dynamic or last time changes, etc.

## **55. How to categorize bugs or defects found in the software?**

A bug or a defect may be categorized on the priority and severity basis, where priority defines the need to correct or remove defect, from business perspective, whereas severity states the need to resolve or

eliminate defect from software requirement and quality perspective.

**56. What is bug life cycle?**

Bug or Defect life cycle describes the whole journey or the life of a defect through various stages or phases, right from when it is identified and till its closure.

**57. Difference between error, defect and failure.**

In the software engineering, error defines the mistake done by the programmers. Defect reflects the introduction of bugs at production site and results into deviation in results from its expected output due to programming mistakes. Failure shows the system's inability to execute functionalities due to presence of defect. i.e. defect explored by the user.

**58. How testing is different with respect to debugging?**

Testing is done with the purpose of identifying and locating the defects by the testing team whereas debugging is done by the developers to fix or correct the defects

**59.What are the different approaches to perform software testing?**

Generally, there are two approaches to perform software testing viz. Manual testing and Automation. Manual testing involves the execution of test cases on the software manually by the tester whereas automation process involves the usage of automation framework and tools to automate the task of test scripts execution.□

**60. What is the advantage of automation over manual testing approach and vice-versa?**

In comparison to manual approach of testing, automation reduces the efforts and time required in executing the large amount of test scripts, repetitively and continuously for a longer period of time with accuracy and precision.

However, 100% automation testing is impossible.Manual testing is still necessary. The advantage of manual testing is, Manual testing can be done on all kinds of applications, application must be tested manually before it is automated, it is preferred in the projects where the requirements change frequently and the products where the GUI changes constantly,it allows tester to perform adhoc testing , exploratory testing.



## **61. Difference between ad-hoc testing and exploratory testing?**

Both ad-hoc testing and exploratory testing are the informal ways of testing the system without having proper planning & strategy. However, in ad-hoc testing, a tester is well-versed with the software and its features and thereby carries out the testing whereas in exploratory, he/she gets to learn and explore more about the software during the course of testing and thus tests the system gradually along with software understanding and learning throughout the testing process. □

## **62. When, what and why to automate?**

Automation is preferred when the execution of tests needs to be carried out repetitively for a longer period of time and within the specified deadlines. Further, an analysis of ROI on automation is desired to analyse the cost-benefit model of the automation. Preferably functional, regression and functional tests may be automated. Further, tests which requires accuracy and precision, and is time-consuming may be considered for automation, including data driven tests also.

## **63. What are the challenges faced in automation?**

Some of the common challenges faced in the automation are

1. Initial cost is very high along with the maintenance costs. Thus, requires proper analysis to assess ROI on automation.
2. Increased complexities.
3. Limited time.
4. Demands skilled tester, having appropriate knowledge of programming.
5. Automation training cost and time.
6. Selection of right and appropriate tools and frameworks.
7. Less flexible.
8. Keeping test plans and cases updated and maintained

**64. Which is better approach to perform regression testing: manual or automation?**

Automation would provide better advantage in comparison to manual for performing regression testing. □

**65. Which part of the regression test should be automated?**

**Or**

**66. When do you choose automated testing over manual testing?**

If the test cases are high priority test cases  
if the functionality is critical functionality  
if the test cases are part of smoke test  
If the test case are too long and too difficult to execute  
on manually  
The regression test cases based on the priority .  
we should automated test cases as much as possible.

**67.what type of testing only done by manual or not automated**

1. Dynamically changing functionality
2. Test cases that require more Human interaction
3. We can not capture content of an Image
4. Look and Feel of Web Application.
5. one time testing.

**68. Whether a software application can be 100% tested?**

No, as one of the principles of software testing states that exhaustive testing is not possible.

### **69. When to start and stop testing?**

Basically, on the availability of software build, testing process starts. However, testing may be started early with the development process, as soon as the requirements are gathered and available. Moreover, testing depends upon the requirement of the software development model like in waterfall model, testing is done in the testing phase, whereas in agile testing is carried out in multiple and short iteration cycle. □ Testing is an infinite process as it is impossible to make a software 100% bug free. But still, there are certain conditions specified to stop testing such as:

- Deadlines
- Complete execution of the test suites and scripts.
- Meeting the specified exit criteria for a test.
- High priority and severity bugs are identified and resolved.
- Complete testing of the functionalities and features.

### **70. Brief out different forms of risks involved in software testing.**

Different types of risks involved in software testing are budget risk, technical risk, operational risk, scheduled risk and marketing risk

**71. What constitutes a test case?**

A test case consists of several components. Some of them are test suite id, test case id, description, pre-condition, test procedure, test data, expected results, test environment.

**72. Why and how to prioritize test cases?**

Due to abundance of test cases for the execution within the given testing deadline arises the need to prioritize test cases. Test prioritization involves the reduction in the number of test cases, and selecting & prioritizing only those which are based on some specific criteria.

**73. What are the roles and responsibilities of a tester or a QA engineer?**

A QA engineer has multiple roles and is bounded to several responsibilities such as defining quality parameters, describing test strategy, executing test, leading the team, reporting the defects or test results.

**74. Whether test coverage and code coverage are similar terms?**

No, code coverage amounts the percentage of code covered during software execution whereas test coverage concerns with the test cases to cover specific functionality and requirement.

**75. List out different types of documentation/documents used in the software testing.**

- a. Test plan
- b. Test scenario
- c. Test cases
- d. Traceability Matrix
- e. Test Log and Report

**76. If an application is in production, and one module of code is modified, is it necessary to retest just that module or should all of the other modules be tested as well?**

It is a good idea to perform regression testing and to check all of the other modules as well. At the least, system testing should be performed.

### **77. What is a negative test case?**

Negative test cases are created based on the idea of testing in a destructive manner. For example, testing what will happen if inappropriate inputs are entered into the application

### **78. Explain random testing.**

Random testing involves checking how the application handles input data that is generated at random. Data types are typically ignored and a random sequence of letter, numbers, and other characters are inputted into the data field

### **79. Define smoke testing.**

A1-Smoke testing is a form of software testing that is not exhaustive and checks only the most crucial components of the software but does not check in more detail. (bookish way)

A2- In my current project we run smoke test to make sure if the application is stable enough to perform other major testing activities.

- Smoke testing is used to test all areas of the application without going into too deep.
- A smoke test always use an automated test or a written set of tests. It is always scripted.
- Smoke testing is designed to include every part of the application in a not thorough or detailed way.
- Smoke testing always ensures whether the most crucial functions of a program are working, but not bothering with finer details.

## **80. What steps are involved in sanity testing?**

Sanity testing is very similar to smoke testing. It is the initial testing of a component or application that is done to make sure that it is functioning at the most basic level and it is stable enough to continue more detailed testing.

- Sanity testing is a narrow test that focuses on one or a few areas of functionality, but not thoroughly or in-depth.
- A sanity test is usually unscripted.
- Sanity testing is used to ensure that after a minor change a small part of the application is still working.
- Sanity testing is a cursory testing, which is performed to prove that the application is functioning according to the specifications. This level of testing is a subset of regression testing.

## **8. What is the difference between system testing and integration testing?**

For system testing, the entire system as a whole is checked, whereas for integration testing, the interaction between the individual modules are tested.



# Agile

## 1. What is Agile?

Agile software development refers to a group of software development methodologies based on iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams

## 2. What kind of Agile methodology did you use in your previous project?

Scrum is a subset of Agile. It is a lightweight process framework for agile development, and the most widely-used one.

- A “process framework” is a particular set of practices that must be followed in order for a process to be consistent with the framework. (For example, the Scrum process framework requires the use of development cycles called Sprints, the XP framework requires pair programming, and so forth.)
- “Lightweight” means that the overhead of the process is kept as small as possible, to maximize the amount of productive time available for getting useful work done.

### **3.Can you describe me the scrum?**

Scrum is very commonly used Agile framework for software development. There are several roles in Scrum:

**Product owner:** product owner is the one who created wish list to the project which is called product backlog. Product owner usually prioritizes the product backlog item and comes up with sprint backlog.

**Scrum master:** he or she is responsible to move the team to the right direction. Coaching the team to be more agile and more productive. If we have any blocker, he or she is go to person to remove our blocker.

**Team:** normally scrum development team have 4-9 team members including testers and developers.

#### **Events:**

**Sprint planning meeting:** Sprint planning is a collaborative effort involving a ScrumMaster, who facilitates the meeting, a Product Owner, who clarifies the

details of the product backlog items and their respective acceptance criteria, and the Entire Agile Team, who define the work and effort necessary to meet their sprint commitment.

**Daily standup** : everyday we will have daily stand up meeting to answer following questions:

- What did you do yesterday?
- What are you going to do today?
- Is there any blockers?

**Sprint Review Meeting.** In Scrum, each sprint is required to deliver a potentially shippable product increment. ... So at the end of each sprint, a sprint review meeting is held. During this meeting, the Scrum team shows what they accomplished during the sprint. Typically this takes the form of a demo of the new features.

**Sprint retrospective meeting** : The purpose of the Sprint Retrospective is to improve the practices, teamwork and environment for the next Sprint based on how the previous Sprint went. In the meeting discuss about following topics:

- What went well?
- What did not going well?
- What needs to be improve?

**Product backlog-** The entire application that we want to develop

**Sprint backlog**- the list of items that we are going to develop in a specific sprint

#### **4.How do you describe a scrum team?**

For me the team is a group of people who are sharing the same goal, moving to the same direction, who trust each other and who will effectively communicate and collaborate with each other to build great product.

#### **5.What is your challenge in scrum ?**

Since scrum emphasizes cross functional team ( it means developer should be able to test and testers should be able to develop). It is hard to be part of development team as a traditional QA tester. Because generally QAs don't know how to write code. That is why I have to keep myself very competitive person. Whenever i have time I am learning more coding .

#### **6.How long is your sprint?**

In my current project it is 4 weeks / 2 weeks. How long your sprint here? (you can ask back , remember you should not act like an ATM. They generally forget people Only answering questions. Try to make conversation.)

#### **7.What is user story?**

In software development and product management, a user story is an informal, natural language description of one or more features of a software system. A user story is a tool used in Agile software development to capture a description of a software feature from an end-user perspective. A user story describes the type of user, what they want and why. A user story helps to create a simplified description of a requirement.

### **8.What is an epic?**

An Epic Can be defined as a big chunk of work that has one common objective. It could be a feature, customer request or business requirement. ... These details are defined in User Stories. An epic usually takes more than one sprint to complete.

### **9.What is Acceptance Criteria?**

Acceptance criteria define what must be done to complete an user story. They specify the boundaries of the story and are used to confirm when it is working as intended . For example, for user story < As a customer I want to be able to search a product so I can buy them.> We can have following acceptance criteria for above user story:

1. Customer should be able to search by product name.
2. Customer should be able to search by product ID

3. User should be able to sort the search result by  
(hot selling, price,rating,trending)

If all of the conditions are met, then we know the story is successfully developed. We also write test cases based on acceptance criteria.

### **10.What is parking lot?**

In Agile it means this:

In the meeting when you have a problem that is not really relevant to other people we should not keep discussing that item in the meeting because we are wasting other people's time.<Let's make it **parking lot** item> means whoever is interested in that issue can talk after current meeting.

### **11.What is rat hole?**

Since there is a lot of communication going on in agile team, team has to discuss a lot of stuffs. But sometimes the discussion will last too long for one topic and it is not really productive. We will say it is < **rat hole**> it means we should not keep talking about that issue too long and move forward.

### **12.What are the advantages and disadvantages of Agile Model?**

**Advantages of Agile Model:**

- 1. Success rate of the project very high compared to any other models.
- 2. Can adopt changes in requirements at any point of time.
- 3. Working software is delivered frequently.
- 4. It emphasizes on responding to change rather than extensive planning and documentation.
- 5. It is recommended for Product Development.

**Disadvantages of Agile Model:**

- 1. Expensive Model as more number of resources are required.
- 2. Complex in Managing.
- 3. There is lack of emphasis on necessary designing and documentation.
- 4. The project can easily get taken off track if there is any communication gap.

### **13. What is Scrum Model?**

Scrum is an iterative and incremental agile software development methodology for managing software development. □ In this model, System is divided into small parts known as Sprints. The duration of each sprint can range from one week to three weeks. At the end of the sprint, team members and stakeholders meet to assess the progress of the project and identify further plan of action. This assessment helps in taking stalk of the current state and rework the line of work and complete the project on time and not just speculate or predict the further outcome.

### **14. Why is Agile Model so popular than other SDLC models?**

Agile Model is popular because of its flexibility in adopting changes in requirements and at the same time delivering software in shortest possible time. For example, after the sprint review / demo, if client does not like something we can take their feedback and improve the product. **Requirement change is ok.**

Since it is iterative development process, the development team can developed piece of functionality, get feedback and improve next iteration. So the product will be continuously improve.

Waste is eliminated in agile with the help of scrum master. For example, if I am blocked I don't have to wait and waste my time. Since team members communicates with each other efficiently we can be more productive by preventing duplicated effort.





# ===== SELENIUM =====

## OOPS in Automation Framework

- ABSTRACTION
- INTERFACE
- INHERITANCE
- POLYMORPHISM
- METHOD OVERLOADING
- METHOD OVERRIDING
- ENCAPSULATION

### **ABSTRACTION**

In Page Object Model design pattern, we write locators (such as id, name, xpath etc.,) in a Page Class. We utilize these locators in tests but we can't see these locators in the tests. Literally we hide the locators from the tests. Abstraction is the methodology of hiding the implementation of internal details and showing the functionality to the users.

Learn more on [Abstraction](#)

### **INTERFACE**

Basic statement we all know in Selenium is WebDriver

```
driver = new FirefoxDriver();
```

WebDriver itself is an Interface. So what this means is that WebDriver driver = new FirefoxDriver(); we are initializing Firefox browser using Selenium WebDriver. It also means we are creating a reference variable (driver) of the interface (WebDriver) and creating an Object. Here WebDriver is an Interface as mentioned earlier and FirefoxDriver is a class.

An interface in Java looks similar to a class but both the interface and class are two different concepts. An interface can have methods and

variables just like the class but the methods declared in interface are by default abstract. Learn more on [Interface here](#).

## **INHERITANCE**

We create a Base Class in the Framework to initialize WebDriver interface, WebDriver waits, Property files, Excels, etc., in the Base Class. We extend the Base Class in other classes such as Tests and Utility Class. Extending one class into other class is known as Inheritance. Learn more on [Inheritance here](#).

## **POLYMORPHISM**

The combination of overloading and overriding is known as Polymorphism. Polymorphism allows us to perform a task in multiple ways.

Polymorphism is the ability of an object to take on many forms. The most common use of polymorphism in OOP occurs when a parent class reference is used to refer to a child class object.

- DYNAMIC POLYMORHISM -

OVERRIDING

- STATIC POLYMORHISM - OVERLOADING

Learn more on [Polymorphism here](#).

## **METHOD OVERLOADING**

We use implicit wait in Selenium. Implicit wait is an example of overloading. In Implicit wait we use different time stamps such as SECONDS, MINUTES, HOURS etc., A class having multiple methods with same name but different parameters is called Method Overloading

Learn more on [Overloading here](#).

## **METHOD OVERRIDING**

We use a method which was already implemented in another class by changing its parameters.

Declaring a method in child class which is already present in the parent class is called Method Overriding. Examples are get and navigate methods of different drivers in Selenium.

Learn more on [Overriding with examples here](#)

## **ENCAPSULATION**

All the classes in a framework are an example of Encapsulation. In POM classes, we declare the data members using @FindBy and initialization of data members will be done using Constructor to utilize those in methods. Encapsulation is a mechanism of binding code and data together in a single unit.

Learn more on [Encapsulation here](#)

I would like to discuss some other topics which we use in Automation Framework.

### **WEB ELEMENT:**

Web element is an interface used to identify the elements in a web page.

### **WEBDRIVER:**

WebDriver is an interface used to launch different browsers such as Firefox, Chrome, Internet Explorer, Safari etc.,

### **FIND BY:**

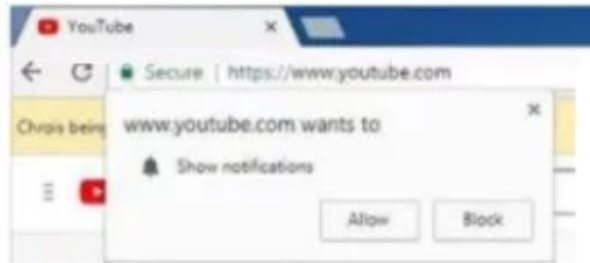
FindBy is an annotation used in Page Object Model design pattern to identify the elements.

### **FIND ELEMENT:**

Find Element is a method in POM to identify the elements in a web page.

[Learn Java](#) – A customized post for Selenium Automation Testers

## - How to handle browser (chrome) notifications in Selenium?



In Chrome, we can use ChromeOptions as shown below.

```
1 ChromeOptions options = new ChromeOptions();
2 options.addArguments("disable-infobars");
3 WebDriver player = new ChromeDriver(options);
```

## - What is the use of @Listener annotation in TestNG?

TestNG listeners are used to configure reports and logging. One of the most widely used listeners in TestNG is *ITestListener* interface. It has methods like *onTestStart*, *onTestSuccess*, *onTestFailure*, *onTestSkipped* etc.

### [Practical Example](#)

## - How to run a group of test cases using TestNG?

TestNG allows you to perform sophisticated groupings of test methods. Not only can you declare that methods belong to groups, but you can also specify groups that contain other groups. Then TestNG can be invoked and asked to include a certain set of groups (or regular expressions) while excluding another set.

Groups are specified in your `testng.xml` file and can be found either under the `<test>` or `<suite>` tag. Groups specified in the `<suite>` tag apply to all the `<test>` tags underneath.

```
1 @Test (groups = { "smokeTest", "functionalTest" })
2 public void loginTest(){
3 System.out.println("Logged in successfully");
4 }
```

[View Complete Post](#)

## - What is Parameterized testing in TestNG?

Parameterized tests allow developers to run the same test over and over again using different values.

There are two ways to set these parameters:

- with `testng.xml` - [Practical Example](#)
- with Data Providers - [Practical Example](#)

## - How to set test case priority in TestNG?

We use `priority` attribute to the `@Test` annotations. In case priority is not set then the test scripts execute in alphabetical order.

```
1 package TestNG;
2 import org.testng.annotations.*;
3 public class PriorityTestCase{
4     @Test(priority=0)
5     public void testCase1() {
6         system.out.println("Test Case 1");
7     }
8     @Test(priority=1)
9     public void testCase2() {
10        system.out.println("Test Case 2");
11    }
12 }
```

Output:

```
1 Test Case 1
2 Test Case 2
```

## - How to create and run TestNG.xml?

In TestNG framework, we need to create **TestNG XML** file to create and handle multiple test classes. We do configure our test run, set test dependency, include or exclude any test, method, class or package and set priority etc in the XML file.

[For Complete Post](#)

## - What is TestNG Assert and list out some common Assertions supported by TestNG?

TestNG Asserts help us to verify the condition of the test in the middle of the test run. Based on the TestNG Assertions, we will consider a

successful test only if it is completed the test run without throwing any exception. Some of the common assertions supported by TestNG are

- assertEquals(String actual,String expected)
- assertEquals(String actual,String expected, String message)
- assertEquals(boolean actual,boolean expected)
- assertTrue(condition)
- assertTrue(condition, message)
- assertFalse(condition)
- assertFalse(condition, message)

#### - **What are the annotations available in TestNG?**

@BeforeTest  
@AfterTest  
@BeforeClass  
@AfterClass  
@BeforeMethod  
@AfterMethod  
@BeforeSuite  
@AfterSuite  
@BeforeGroups  
@AfterGroups  
@Test

#### - **How to delete Browser Cookies with Selenium Web Driver?**

```
1 driver.Manage().Cookies.DeleteAllCookies();
```

#### - **How to achieve Database testing in Selenium?**

JDBC is a SQL level API that allows us to execute SQL statements. It creates a connectivity between Java Programming Language and the database.

Using JDBC Driver we can ..

- i. Establish a Database connection
- ii. Send SQL Queries to the Database
- iii. Process the results

## - **What is Continuous Integration? CI**

Continuous Integration is a development practice which aims to make sure the correctness of a software. After each commit, a suite of tests run automatically and test the software to ensure whether the software is running without any breaks. If any test fails, we will get immediate feedback say "build is broken" or "Build failed" In simple words, continuous integration is a process of verifying the correctness of a software. We can schedule the test suite execution using these CI Tools.

## **What is desired capabilities?**

In Selenium we use desired capabilities to handle SSL certificates in chrome browser We need to create an instance of DesiredCapabilities

```
public class SauseLabsDemo {

    WebDriver driver;

    public static final String USERNAME = "comal";
    public static final String ACCESS_KEY = "33b65d51-1b82-4ed3-8a21-654d70da8bed";
    public static final String URL = "https://" + USERNAME + ":" + ACCESS_KEY + "@ondemand.sauceLabs.com:443/wd/hub";

    @BeforeTest
    public void setUp() throws MalformedURLException {
        DesiredCapabilities caps = DesiredCapabilities.firefox();
        caps.setPlatform(Platform.SIERRA);
        caps.setCapability("version", "latest");

        driver = new RemoteWebDriver(new URL(URL), caps);
    }
}
```

## - **How to Highlight Element Using Selenium WebDriver?**

By using JavaScript Executor interface, we could highlight the specified element

```
@Test
public void highlightElement() {
    System.setProperty("webdriver.gecko.driver", "D:\\Selenium Environment\\Drivers\\geckodriver.exe");
    //Instantiating driver object
    WebDriver driver = new FirefoxDriver();
    //To launch gmail.com
    driver.get("https://www.gmail.com");
    //Collects the webelement
    WebElement element = driver.findElement(By.xpath("//*[@id='Email']"));
    //Create object of a JavascriptExecutor interface
    JavascriptExecutor js = (JavascriptExecutor) driver;
    //use executeScript() method and pass the arguments
    //Here i pass values based on css style. Yellow background color with solid red color border.
    js.executeScript("arguments[0].setAttribute('style', 'background: yellow; border: 2px solid red;');", element);
}
}
```



## Practical Example

### - How To Perform Drag And Drop Action in Selenium WebDriver?

Selenium provides "Actions" class to handle drag and drop

## Practical Example

```
public class ActionsClass {  
  
    @Test  
    public void actionsClass() throws InterruptedException{  
        System.setProperty("webdriver.chrome.driver", "D:\\Selenium Environment\\Drivers\\chromedriver.exe");  
        WebDriver driver = new ChromeDriver();  
        //Create an object 'action'  
        Actions action = new Actions(driver);  
        //navigate to the required url where we could do drag and drop action  
        driver.get("http://jqueryui.com/droppable/");  
        //WebDriverWait is used to wait for a frame to be available. Once it is available we switch to the frame to achieve our ta  
        WebDriverWait wait = new WebDriverWait(driver, 5);  
        wait.until(ExpectedConditions.frameToBeAvailableAndSwitchToIt(By.cssSelector("#demo-frame")));  
        //To get source locator  
        WebElement sourceLocator = driver.findElement(By.cssSelector("#draggable"));  
        //To get target locator  
        WebElement targetLocator = driver.findElement(By.cssSelector("#droppable"));  
        //dragAndDrop(source, target) method accepts two parameters source and locator.  
        //used dragAndDrop method to drag and drop the source locator to target locator  
        action.dragAndDrop(sourceLocator, targetLocator).build().perform();  
    }  
}
```

### - How To Perform Double Click Action In Selenium WebDriver?

We use Actions class to do Double click action in selenium.

## Practical Example

```
public class ActionsClass {  
  
    @Test  
    public void doubleClick() throws InterruptedException{  
        System.setProperty("webdriver.chrome.driver", "D:\\Selenium Environment\\Drivers\\chromedriver.exe");  
        WebDriver driver = new ChromeDriver();  
        //Open the required URL where you could do double click action  
        driver.get("http://api.jquery.com/dblclick/");  
        //Maximize the browser  
        driver.manage().window().maximize();  
        //As per the above URL we need to switch to frame. The targeted element is in the frame  
        driver.switchTo().frame(0);  
        //Create the object 'action'  
        Actions action = new Actions(driver);  
        //Find the targeted element  
        WebElement ele = driver.findElement(By.cssSelector("html>body>div"));  
        //Here I used JavascriptExecutor interface to scroll down to the targeted element  
        ((JavascriptExecutor) driver).executeScript("arguments[0].scrollIntoView();", ele);  
        //used doubleClick(element) method to do double click action  
        action.doubleClick(ele).build().perform();  
        //Once clicked on the element, the color of element is changed to yellow color from blue color  
        //driver.close();  
    }  
}
```

### - How To Perform Right Click Action (Context Click) In Selenium WebDriver?

We use Actions class in Selenium WebDriver to do Right-Click (Context Click) action.

## Practical Example

```

public class ActionsClass {
    @Test
    public void textInCaps() throws InterruptedException{
        //Instantiating the WebDriver interface.
        System.setProperty("webdriver.chrome.driver", "D:\\Selenium Environment\\Drivers\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        //Open the required URL
        driver.get("http://swinsl.github.io/jquery-contextMenu/demo.html");
        //To maximize the browser
        driver.manage().window().maximize();
        //Create an object 'action' of an Actions class
        Actions action = new Actions(driver);
        By locator = By.cssSelector(".context-menu-one");
        //Wait for the element. Used Explicit wait
        WebDriverWait wait = new WebDriverWait(driver, 5);
        wait.until(ExpectedConditions.presenceOfElementLocated(locator));
        WebElement rightClickElement=driver.findElement(locator);
        //contextClick() method to do right click on the element
        action.contextClick(rightClickElement).build().perform();
        WebElement getCopyText =driver.findElement(By.cssSelector(".context-menu-icon-copy"));
        //getText() method to get the text value
        String GetText = getCopyText.getText();
        //To print the value
        System.out.println(GetText);
        //To close the browser
        driver.close();
    }
}

```

## - How To Scroll Web Page Down Or UP Using Selenium WebDriver?

JavaScript **scrollBy()** method scrolls the document by the specified number of pixels.

### Practical Example

```

package softwareTestingMaterial;

import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.testng.annotations.Test;

public class HandleScroll {
    @Test
    public void scrollDown(){
        System.setProperty("webdriver.gecko.driver","D://Selenium Environment//Drivers//geckodriver.exe");
        WebDriver driver = new FirefoxDriver();
        driver.navigate().to("https://www.softwaretestingmaterial.com");
        //to perform Scroll on application using Selenium
        JavascriptExecutor js = (JavascriptExecutor) driver;
        js.executeScript("window.scrollTo(0,250)", "");
    }
}

```

## - How To Resize Browser Window Using Selenium WebDriver?

To resize the browser window to particular dimensions, we use 'Dimension' class to resize the browser window.

```

import org.openqa.selenium.Dimension;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;
import org.openqa.selenium.chrome.ChromeOptions;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.firefox.FirefoxOptions;
import org.openqa.selenium.remote.DesiredCapabilities;
import org.testng.annotations.Test;

public class ResizeBrowser {

    @Test
    public void launchBrowser() {
        System.setProperty("webdriver.gecko.driver", "D://Selenium Environment//Drivers//geckodriver.exe");
        WebDriver driver = new FirefoxDriver();
        driver.navigate().to("http://www.SoftwareTestingMaterial.com");
        System.out.println(driver.manage().window().getSize());
        //Create object of Dimensions class
        Dimension d = new Dimension(480,620);
        //Resize the current window to the given dimension
        driver.manage().window().setSize(d);
        System.out.println(driver.manage().window().getSize());
    }
}

```

## - How to switch between frames in Selenium?

By using the following code, we could switch between frames.

```
driver.switchTo().frame();
```

## - How to Upload a file in Selenium WebDriver?

By Using send keys method



```

1 package softwareTestingMaterial;
2 import java.io.IOException;
3
4 import org.openqa.selenium.By;
5 import org.openqa.selenium.WebDriver;
6 import org.openqa.selenium.WebElement;
7 import org.openqa.selenium.firefox.FirefoxDriver;
8 public class Upload {
9     public static void main(String[] args) throws IOException {
10         //Instantiation of driver object. To launch Firefox browser
11         WebDriver driver = new FirefoxDriver();
12         //To open URL "http://softwaretestingmaterial.com"
13         driver.get("http://softwaretestingmaterial.blogspot.com/2015/10/sample-web-page-to-test.html");
14         //Locating 'browse' button
15         WebElement browse =driver.findElement(By.id("uploadfile"));
16         //pass the path of the file to be uploaded using Sendkeys method
17         browse.sendKeys("D:\\SoftwareTestingMaterial\\UploadFile.txt");
18         //'close' method is used to close the browser window
19         driver.close();
20     }
21 }

```

## - How can you use the Recovery Scenario in Selenium WebDriver?

By using "Try Catch Block" within Selenium WebDriver Java tests.

```
1 try {  
2     driver.get("www.SoftwareTestingMaterial.com");  
3 }catch(Exception e){  
4     System.out.println(e.getMessage());  
5 }
```

## - What are the advantages of Page Object Model Framework?

**Code reusability** – We could achieve code reusability by writing the code once and use it in different tests.

**Code maintainability** – There is a clean separation between test code and page specific code such as locators and layout which becomes very easy to maintain code. It enhances test maintenance and reduces code duplication.

**Object Repository** – Each page will be defined as a java class. All the fields in the page will be defined in an interface as members. The class will then implement the interface.

**Readability** – Improves readability due to clean separation between test code and page specific code

## - What is the difference between Page Object Model (POM) and Page Factory?

**Page Object** is a class that represents a web page and hold the functionality and members.

**Page Factory** is a way to initialize the web

elements you want to interact with within the page object when you create an instance of it.

### - **What is Page Factory?**

As you know 'Page Object Model' is a way of representing an application in a test framework. For every 'page' in the application, we create a Page Object to reference the 'page' in the other hand 'Page Factory' is one way of implementing the 'Page Object Model'.

### - **What is Page Object Model in Selenium? POM**

Page object model (POM) can be used in any [kind of framework](#)

A page object is an object-oriented class that serves as an interface to a page of your Application Under Test(AUT). The tests then use the methods of this page object class whenever they need to interact with the User Interface (UI) of that page. The benefit is that if the UI changes for the page, the tests themselves don't need to change, only the code within the page object needs to change.

### - **How you build Object Repository in your project?**

-

When a user records a test, the objects and its properties are captured by default in an Object Repository. QTP uses this Object Repository to play back the scripts. Coming to Selenium, there is no default Object Repository concept. It doesn't mean that there is no Object Repository in Selenium. Even though there is no default one still we could create our own. In Selenium, we call objects as locators (such as ID, Name, Class Name, Tag Name, Link Text, Partial Link Text, XPath, and CSS). Object

repository is a collection of objects. One of the ways to create Object Repository is to place all the locators in a separate file (i.e., properties file). But the best way is to use Page Object Model. In the Page Object Model Design Pattern, each web page is represented as a class. All the objects related to a particular page of a web application are stored in a class.

- **List some scenarios which we cannot automate using Selenium WebDriver?**

1. Bitmap comparison is not possible using Selenium WebDriver(photos = Bitmap)
2. Automating Captcha is not possible using Selenium WebDriver
3. We can not read bar code using Selenium WebDriver

- **How to handle Ajax calls in Selenium WebDriver?**

AJAX sends HTTP requests from the client to server and then process the server's response without reloading the entire page.

When you click on a submit button, the required information may appear on the web page without refreshing the browser. Sometimes it may load in a second and sometimes it may take longer. We have no control over loading time. The best approach to handle this kind of situations in selenium is to use dynamic waits

1. **titleIs()** – The expected condition waits for a page with a specific title.

```
1 wait.until(ExpectedConditions.titleIs("Deal of the Day"));
```

2. **elementToBeClickable()** – The expected condition waits for an element to be clickable i.e. it should be present/displayed/visible on the screen as well as enabled.

```
1 wait.until(ExpectedConditions.elementToBeClickable(By.xpath("xpath")));
```

3. **alertIsPresent()** – The expected condition waits for an alert box to appear.

```
1 wait.until(ExpectedConditions.alertIsPresent() != null);
```

4. **textToBePresentInElement()** – The expected condition waits for an element having a certain string pattern.

```
1 wait.until(ExpectedConditions.textToBePresentInElement(By.id("title"), "text to be found"));
```

- **Is it possible to automate the captcha using Selenium?**

No, It's not possible to automate captcha and bar code reader.

- **How do you read test data from excels?**

To handle excel files we use Apache POI in Selenium WebDriver. As we all know Selenium supports only Web browser automation. We need to get the help of third party API like Apache POI to handle (read and write) excel files using Selenium WebDriver.

List of JAVA INTERFACES AND CLASSES IN APACHE POI FOR READING XLS AND XLSX FILE

| INTERFACE | XLS CLASS    | XLSX CLASS   |
|-----------|--------------|--------------|
| Workbook  | HSSFWorkbook | XSSFWorkbook |
| Sheet     | HSSFSheet    | XSSFSheet    |
| Row       | HSSFRow      | XSSFRow      |
| Cell      | HSSFCell     | XSSFCell     |

- **What is JavaScriptExecutor and in which cases JavaScriptExecutor will help in Selenium automation?**

Let me give you an example in general, we click on an element using click () method in Selenium.

For example:

- 1 - driver.findElement(By.id("Id Value")).click();

Sometimes web controls don't react well against selenium commands and we may face issues with the above statement (click ()). To overcome such kind of situation, we use JavaScriptExecutor interface.

Package:

```
1 import org.openqa.selenium.JavascriptExecutor;
```

Syntax:

```
JavascriptExecutor js = (JavascriptExecutor) driver;  
js.executeScript(Script,Arguments);
```

Some scenarios we could handle using this Interface are :

1. To type Text in Selenium WebDriver without using send Keys() method
2. To click a Button in Selenium WebDriver using JavaScript
3. To handle Checkbox
4. To generate Alert Pop window in selenium
5. To refresh browser window using Javascript
6. To get innertext of the entire webpage in Selenium
7. To get the Title of our webpage
8. To get the domain
9. To get the URL of a webpage
10. To perform Scroll on an application using Selenium
11. To click on a SubMenu which is only visible on mouse hover on Menu
12. To navigate to different page using Javascript

**- How to read a JavaScript variable in Selenium WebDriver?**



By using JavascriptExecutor

```
// To initialize the JS object.  
JavascriptExecutor JS = (JavascriptExecutor) webdriver;  
// To get the site title.  
String title = (String)JS.executeScript("return document.title");  
System.out.println("Title of the webpage : " + title);
```

## - How to find more than one web element in the list?

```
1 // To store the list  
2 List <WebElement> eleList = driver.findElements(By.xpath("xpath"));  
3 // To fetch the size of the list  
4 int listSize = eleList.size();  
5 //for loop  
6 for (int i=0; i<listSize; i++)  
7 {  
8     // Clicking on each link  
9     links.get(i).click();  
10    // Navigating back to the previous page that stores the links  
11    driver.navigate().back();  
12 }
```

## - How to handle hidden elements in Selenium WebDriver?

```
1 (JavascriptExecutor(driver)).executeScript("document.getElementsByClassName(ElementLocator).click");
```

We can handle hidden elements by using JavaScript Executor.

## - How can we handle windows-based pop up?

Selenium doesn't support windows-based applications. It is an automation testing tool which supports only web application testing. We could handle windows-based popups in Selenium using some third-party tools such as AutoIT, Robot class until now I have not used those tools but I am looking forward to learning if needed.

## - How can we handle web-based pop-up?

To handle alerts popups, we need to do switch to the alert window and call Selenium WebDriver Alert API methods.

we use **Alert** Interface.

The **Alert** Interface provides some methods to handle the popups

We need to Import a package **org.openqa.selenium.Alert** to handle the alerts in Selenium.

```
driver.switchTo().alert();
```

**To get a handle to the open alert:**

```
1 Alert alert = driver.switchTo().alert();
```

**To Click on OK button:**

```
1 alert.accept();
```

**To click on Cancel button.**

```
1 alert.dismiss();
```

**To get the text which is present on the Alert.**

```
1 alert.getText();
```

**To enter the text into the alert box**

```
1 alert.sendKeys(String stringToSend);
```

**To Authenticate by passing the credentials**

```
1 alert.authenticateUsing(Credentials credentials)
```

Practical Example.

- **How to mouse hover on a web element using WebDriver?**

By using Actions class

```
1 WebElement ele = driver.findElement(By.xpath("xpath"));
2 //Create object 'action' of an Actions class
3 Actions action = new Actions(driver);
4 //Mouseover on an element
5 action.moveToElement(ele).perform();
```

- **How to capture Screenshot in Selenium WebDriver?**

Selenium provides an interface called *TakesScreenshot* which has a method *getScreenShotAs* which can be used to take a screenshot of the application under test.

```
about:blank
1 package softwareTestingMaterial;
2
3 import java.io.File;
4 import org.apache.commons.io.FileUtils;
5 import org.openqa.selenium.OutputType;
6 import org.openqa.selenium.TakesScreenshot;
7 import org.openqa.selenium.WebDriver;
8 import org.openqa.selenium.firefox.FirefoxDriver;
9 import org.testng.annotations.Test;
10
11 public class CaptureScreenshot {
12
13     @Test
14     public static void captureScreenMethod() throws Exception{
15         System.setProperty("webdriver.gecko.driver", "D://Selenium Environment//Drivers//geckodriver.exe");
16         WebDriver driver = new FirefoxDriver();
17         driver.manage().window().maximize();
18         driver.get("https://www.softwaretestingmaterial.com/capture-screenshot-using-selenium-webdriver");
19         File screenshotFile = ((TakesScreenshot)driver).getScreenshotAs(OutputType.FILE);
20         FileUtils.copyFile(screenshotFile, new File("D:\\SoftwareTestingMaterial.png"));
21         driver.close();
22         driver.quit();
23     }
24 }
```

## How to select a value in a dropdown?

By using *Select* class

```
about:blank
1 WebElement mySelectElement = driver.findElement(By.name("dropdown"));
2 Select dropdown = new Select(mySelectElement);
3 dropdown.selectByVisibleText(Text);
4 dropdown.selectByIndex(Index);
5 dropdown.selectByValue(Value);
```

### Types of Select Methods:

- i. **selectByVisibleText** Method
- ii. **selectByIndex** Method
- iii. **selectByValue** Method

### Types of DeSelect Methods:

- i. **deselectByVisibleText** Method
- ii. **deselectByIndex** Method
- iii. **deselectByValue** Method
- iv. **deselectAll** Method

## - How to find whether an element is displayed on the web page?

In selenium WebDriver to verify if an element is displayed like buttons, drop boxes, checkboxes, radio buttons, labels we use...

### 1. **isDisplayed()**

```
1 boolean elePresent = driver.findElement(By.xpath("xpath")).isDisplayed();
```

### 2. **isSelected()**

```
1 boolean eleSelected= driver.findElement(By.xpath("xpath")).isSelected();
```

### 3. isEnabled()

```
boolean eleEnabled= driver.findElement(By.xpath("xpath")).isEnabled();
```

#### - What is the difference between driver.findElement() and driver.findElements() commands?

The difference between driver.findElement() and driver.findElements() commands is-

- findElement() returns a single WebElement (found first) based on the locator passed as parameter. Whereas findElements() returns a list of WebElements, all satisfying the locator value passed.
- Syntax of findElement()-  
WebElement textbox=driver.findElement(By.id("textBoxLocator"));  
Syntax of findElements()-  
List <WebElement> elements = element.findElements(By.id("value"));
- Another difference between the two is- if no element is found then findElement () throws NoSuchElementException whereas findElements() returns a list of 0 elements.

#### - What is the difference between driver.close() and driver.Quit() methods?

<sup>1</sup> Purpose of these two methods (driver.close and driver.quit) is almost same. Both allow us to close a browser but still, there is a difference.

*driver.close()*: To close current WebDriver instance

*driver.quit()*: To close all the opened WebDriver instances

#### - What is the difference between driver.getWindowHandle() and driver.getWindowHandles() in Selenium WebDriver?

*driver.getWindowHandle()* – It returns a handle of the current page (a unique identifier)

*driver.getWindowHandles()* – It returns a set of handles of the all the pages available.

#### - What are the ways to refresh a browser using Selenium WebDriver?

There are multiple ways to refresh a page in selenium

- Using `driver.navigate().refresh()` command as mentioned in the question 45
- Using `driver.get("URL")` on the current URL or using `driver.getCurrentUrl()`
- Using `driver.navigate().to("URL")` on the current URL or `driver.navigate().to(driver.getCurrentUrl());`
- Using `sendKeys(Keys.F5)` on any textbox on the webpage

## - Difference between Test Strategy and Test Plan

| Test Plan                                                                                                                                                                                                                                         | Test Strategy                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• A test plan for software project can be defined as a document that defines the scope, objective, approach and emphasis on a software testing effort</li> </ul>                                           | <ul style="list-style-type: none"> <li>• Test strategy is a set of guidelines that explains test design and determines how testing needs to be done</li> </ul>                                                       |
| <ul style="list-style-type: none"> <li>• Components of Test plan include- Test plan id, features to be tested, test techniques, testing tasks, features pass or fail criteria, test deliverables, responsibilities, and schedule, etc.</li> </ul> | <ul style="list-style-type: none"> <li>• Components of Test strategy includes- objectives and scope, documentation formats, test processes, team reporting structure, client communication strategy, etc.</li> </ul> |
| <ul style="list-style-type: none"> <li>• Test plan is carried out by a testing manager or lead that describes how to test, when to test, who will test and what to test</li> </ul>                                                                | <ul style="list-style-type: none"> <li>• A test strategy is carried out by the project manager. It says what type of technique to follow and which module to test</li> </ul>                                         |

|                                                                                                                                                         |                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Test plan narrates about the specification</li> </ul>                                                          | <ul style="list-style-type: none"> <li>• Test strategy narrates about the general approaches</li> </ul>                                                                       |
| <ul style="list-style-type: none"> <li>• Test plan can change</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>• Test strategy cannot be changed</li> </ul>                                                                                           |
| <ul style="list-style-type: none"> <li>• Test planning is done to determine possible issues and dependencies in order to identify the risks.</li> </ul> | <ul style="list-style-type: none"> <li>• It is a long-term plan of action. You can abstract information that is not project specific and put it into test approach</li> </ul> |
| <ul style="list-style-type: none"> <li>• A test plan exists individually</li> </ul>                                                                     | <ul style="list-style-type: none"> <li>• In smaller project, test strategy is often found as a section of a test plan</li> </ul>                                              |
| <ul style="list-style-type: none"> <li>• It is defined at project level</li> </ul>                                                                      | <ul style="list-style-type: none"> <li>• It is set at organization level and can be used by multiple projects</li> </ul>                                                      |

### How can we maximize browser window in Selenium?

To maximize browser window in selenium we use *maximize()* method. This method maximizes the current window if it is not already maximized

```
driver.manage().window().maximize();
```

```
driver.manage().window().maximize();
```

### - How to fetch the current page URL in Selenium?

To fetch the current page URL, we use *getCurrentURL()*

```
1 driver.getCurrentUrl();
```

### - Can I navigate back and forth in a browser in Selenium WebDriver?

We use Navigate interface to do navigate back and forth in a browser. It has methods to move back, forward as well as to refresh a page.

**driver.navigate().forward();** – to navigate to the next web page with reference to the browser's history

**driver.navigate().back();** – takes back to the previous webpage with reference to the browser’s history

**driver.navigate().refresh();** – to refresh the current web page thereby reloading all the web elements

**driver.navigate().to("url");** – to launch a new web browser window and navigate to the specified URL

- **What is the difference between *driver.get()* and *driver.navigate.to("url")*?**

*driver.get()*: To open an URL and it will wait till the whole page gets loaded

*driver.navigate.to()*: To navigate to an URL and It will not wait till the whole page gets loaded

- **What is the alternative to *driver.get()* method to open an URL using Selenium WebDriver?**

Alternative method to *driver.get("url")* method is *driver.navigate.to("url")*

- **How to pause a test execution for 5 seconds at a specific point?**

By using **java.lang.Thread.sleep(long milliseconds)** method we could pause the execution for a specific time. To pause 5 seconds, we need to pass parameter as 5000 (5 seconds)

```
1 Thread.sleep(5000)
```

- **How to press ENTER key on text box In Selenium WebDriver?**

To press ENTER key using Selenium WebDriver, We need to use Selenium Enum Keys with its constant ENTER.

```
1 driver.findElement(By.xpath("xpath")).sendKeys(Keys.ENTER);
```

- **How to submit a form using Selenium WebDriver?**

We use "submit" method on element to submit a form

```
1 driver.findElement(By.id("form_1")).submit();
```

- **How to click on a hyperlink using Selenium WebDriver?**

We use click() method in Selenium to click on the hyperlink

```
1 driver.findElement(By.linkText("Software Testing Material Website")).click();
```

## - How to get an attribute value using Selenium WebDriver?

By using `getAttribute(value)`;

It returns the value of the attribute passed as a parameter.

HTML:

```
1 <input name="nameSelenium" value="valueSelenium">SoftwareTestingMaterial</input>
```

Selenium Code:

```
1 String attributeValue = driver.findElement(By.name("nameSelenium")).getAttribute("value");
2 System.out.println("Available attribute value is :"+attributeValue);
3 Output: valueSelenium
```

## - How to get a text of a web element?

By using `getText()` method

about:blank

```
1 package softwareTestingMaterial;
2 import org.openqa.selenium.By;
3 import org.openqa.selenium.WebDriver;
4 import org.openqa.selenium.chrome.ChromeDriver;
5 import org.testng.annotations.Test;
6 public class TestTestTest {
7
8     @Test
9     public void testmethod(){
10         System.setProperty("webdriver.chrome.driver", "D:\\Selenium Environment\\Drivers\\chromedriver.exe");
11         WebDriver driver = new ChromeDriver();
12         driver.get("https://www.google.com");
13         String availableText = driver.findElement(By.xpath("//*[@id='gbw']/div/div/div[1]/div[1]/a")).getText();
14         System.out.println("Text Available is :"+availableText);
15     }
16 }
```

## - How to clear the text in the text box using Selenium WebDriver?

By using `clear()` method

about:blank

```
1 WebDriver driver = new FirefoxDriver();
2 driver.get("https://www.gmail.com");
3 driver.findElement(By.xpath("xpath_of_element1")).sendKeys("Software Testing Material Website");
4 driver.findElement(By.xpath("xpath_of_element1")).clear();
```

## - How to input text in the text box without calling the `sendKeys()`?

```
1 // To initialize js object
2 JavascriptExecutor JS = (JavascriptExecutor)webdriver;
3 // To enter username
4 JS.executeScript("document.getElementById('User').value='SoftwareTestingMaterial.com'");
5 // To enter password
6 JS.executeScript("document.getElementById('Pass').value='tester'");
```

## - How to input text in the text box using Selenium WebDriver?

By using `sendKeys()` method



```
i about:blank
1 WebDriver driver = new FirefoxDriver();
2 driver.get("https://www.gmail.com");
3 driver.findElement(By.xpath("xpath")).sendKeys("Software Testing Material Website");
```

### - What is Fluent Wait In Selenium WebDriver?

In My experience FluentWait can define the maximum amount of time to wait for a specific condition and frequency with which to check the condition before throwing an *"ElementNotVisibleException"* exception.

#### Syntax

```
i about:blank
1 Wait wait = new FluentWait(WebDriver reference)
2 .withTimeout(timeout, SECONDS)
3 .pollingEvery(timeout, SECONDS)
4 .ignoring(Exception.class);
5
6 WebElement foo=wait.until(new Function<WebDriver, WebElement>() {
7 public WebElement apply(WebDriver driver) {
8 return driver.findElement(By.id("foo"));
9 }
10 });
```

#### Example

```
1 Wait wait = new FluentWait<WebDriver>(driver)
2 .withTimeout(45, TimeUnit.SECONDS)
3 .pollingEvery(5, TimeUnit.SECONDS)
4 .ignoring(NoSuchElementException.class);
```

### - What is WebDriver Wait In Selenium WebDriver?

WebDriverWait is applied on a certain element with defined *expected condition* and *time*. This wait is only applied to the specified element. This wait can also throw an exception when an element is not found.

This are some Conditions that can be used in Explicit Wait

1. alertIsPresent()
2. elementSelectionModeToBe()
3. elementToBeClickable()
4. elementToBeSelected()
5. frameToBeAvaliableAndSwitchToIt()
6. invisibilityOfTheElementLocated()

7. invisibilityOfElementWithText()
8. presenceOfAllElementsLocatedBy()
9. presenceOfElementLocated()
10. textToBePresentInElement()
11. textToBePresentInElementLocated()
12. textToBePresentInElementValue()
13. titleIs()
14. titleContains()
15. visibilityOf()
16. visibilityOfAllElements()
17. visibilityOfAllElementsLocatedBy()
18. visibilityOfElementLocated()

```

1 //WebDriverWait wait = new WebDriverWait(WebDriverReference,Timeout);
2 WebDriverWait wait = new WebDriverWait (driver, 20);
3 wait.until(ExpectedConditions.VisibilityofElementLocated(By.xpath("//button[@value='Save Changes']")));

```

---

```

package waits;
import java.util.concurrent.TimeUnit;
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.ExpectedConditions;
import org.openqa.selenium.support.ui.WebDriverWait;
public class ExplicitWaits {
    public static void main(String[] args) {
        //To create a new instance of Firefox Driver
        WebDriver driver = new FirefoxDriver();
        //To open a website "Software Testing Material"
        driver.get("http://www.SoftwareTestingMaterial.com");
        //To maximize the browser window
        driver.manage().window().maximize();
        //This waits up to 15 seconds before throwing a TimeoutException or if it finds the element will return it in 0 - 15 seconds
        WebDriverWait wait = new WebDriverWait (driver, 15);
        //Title of the webpage is "Software Testing Material - A site for Software Testers"
        wait.until(ExpectedConditions.titleIs("Software Testing Material - A site for Software Testers"));
        //If the above condition met then the browser will be closed
        //To close the browser
        driver.close();
        //Change the title "Software Testing Material - A site for Software Testers" as "xyz" in the script and try
        //You will face an exception - Exception in thread "main" org.openqa.selenium.TimeoutException: Timed out after 20 seconds waiting for title to be "Software Testing
    }
}

```

## Practical example

### - **What is Implicit Wait In Selenium WebDriver?**

Implicit waits tell to the WebDriver to wait for a certain amount of time before it throws an exception. Once we set the time, WebDriver will wait for the element based on the time we set before it throws an exception. The default setting is 0 (zero). We need to set some wait time to make WebDriver to wait for the required time.

## Practical example

```
about:blank
1 driver.manage().timeouts().implicitlyWait(Timeout, TimeUnit.SECONDS);

1 package waits;
2 import java.util.concurrent.TimeUnit;
3 import org.openqa.selenium.WebDriver;
4 import org.openqa.selenium.firefox.FirefoxDriver;
5 public class ImplicitWaits {
6     public static void main(String[] args) {
7         //To create a new instance of Firefox Driver
8         WebDriver driver = new FirefoxDriver();
9         //Implicit Wait - Here the specified Implicit Wait time frame is 15 seconds.
10        //It waits 15 seconds of time frame for the element to load.
11        //It throws an exception, if the element is not loaded within the specified ti
12        driver.manage().timeouts().implicitlyWait(15, TimeUnit.SECONDS);
13        //To open a website "Software Testing Material"
14        driver.get("http://www.SoftwareTestingMaterial.com");
15        //To maximize the browser window
16        driver.manage().window().maximize();
17        //To close the browser
18        driver.close();
19    }
20 }
```

### - What are the types of waits available in Selenium WebDriver?

In Selenium we could see three types of waits such as Implicit Waits, Explicit Waits and Fluent Waits.

- Implicit Waits – [Click to view detailed post](#)
- Explicit Waits – [Click to view detailed post](#)
- Fluent Waits – [Click to view detailed post](#)

### - What are the different exceptions you have faced in Selenium WebDriver?

Some of the exceptions I have faced in my current project are

1. ElementNotVisibleException
2. StaleElementReferenceException

#### **Element Not visible Exception:**

This exception will be thrown when you are trying to locate a particular element on webpage that is not currently visible even though it is present in the DOM. Also sometimes, if you are trying to locate an element with the xpath which associates with two or more element.

#### **Stale Element Reference Exception:**

A stale element reference exception is thrown in one of two cases, the first being more common than the second. The two reasons for Stale element reference are

1. The element has been deleted entirely.
2. The element is no longer attached to the DOM.

We face this stale element reference exception when the element we are interacting is destroyed and then recreated again. When this happens the reference of the element in the DOM becomes stale. Hence we are not able to get the reference to the element.

Some other exceptions we usually face are as follows:

- WebDriverException
- IllegalStateException
- TimeoutException
- NoAlertPresentException
- NoSuchWindowException
- NoSuchElementException

- **Explain the line of code *WebDriver driver = new FirefoxDriver();* ?**

1 `WebDriver driver = new FirefoxDriver();`

'*WebDriver*' is an interface and we are creating an object of type *WebDriver* instantiating an object of *FirefoxDriver* class.

- **What are the verification points available in Selenium?**

In Selenium *WebDriver*, there is no built-in features for verification points. It totally depends on our coding style. some of the Verification points are

- To check for page title
- To check for certain text
- To check for certain element (text box, button, drop down, etc.)

- **What are Soft Assert and Hard Assert in Selenium?**

**Soft Assert:** Soft Assert collects errors during `@Test` Soft Assert does not throw an exception when an assert fails and would continue with the next step after the assert statement.

**Hard Assert:** Hard Assert throws an *AssertException* immediately when an assert statement fails and test suite continues with next `@Test`

- **What is the difference between Assert and Verify in Selenium?**

**Assert:** In simple words, if the assert condition is true then the program control will execute the next test step but if the condition is false, the execution will stop and further test step will not be executed.

**Verify:** In simple words, there won't be any halt in the test execution even though the verify condition is true or false.

- **What is the difference between Absolute Path and Relative Path?**

Absolute XPath starts from the root node and ends with desired descendant element's node. It starts with top HTML node and ends with input node. It starts with a single forward slash(/) as shown below.

```
1 /html/body/div[3]/div[1]/form/table/tbody/tr[1]/td/input
```

Relative XPath starts from any node in between the HTML page to the current element's node(last node of the element). It starts with a double forward slash(//) as shown below.

```
1 //input[@id='email']
```

- **What is the difference between "/" and "//"**

**Single Slash "/"** – Single slash is used to create XPath with absolute path i.e. the XPath would be created to start selection from the document node/start node.

**Double Slash "//"** – Double slash is used to create XPath with relative path i.e. the XPath would be created to start selection from anywhere within the document.

- **What is an XPath?**

XPath is used to locate the elements. Using XPath, we could navigate through elements and attributes in an XML document to locate web elements such as textbox, button, checkbox, Image etc., in a web page.

- **What are the Locators available in Selenium?**

In Selenium WebDriver, there are 8 different types of locators:

1. ID – [Practical example](#)
2. ClassName – [Practical example](#)
3. Name – [Practical example](#)
4. TagName – [Practical example](#)
5. LinkText – [Practical example](#)
6. PartialLinkText – [Practical example](#)
7. XPath – [Practical example](#)
8. CSS Selector – [Practical example](#)

Click here to see the detailed post on [Locators](#).

#### - **When do you use Selenium Grid?**

Selenium Grid can be used to execute same or different test scripts on multiple platforms and browsers concurrently so as to achieve distributed test execution

#### - **What are the advantages of Selenium Grid?**

It allows running test cases in parallel thereby saving test execution time.

It allows multi-browser testing

It allows us to execute test cases on multi-platform

#### - **What is a hub in Selenium Grid?**

A hub is a server or a central point that controls the test executions on different machines.

#### - **What is a node in Selenium Grid?**

Node is the machine which is attached to the hub. There can be multiple nodes in Selenium Grid.

### ===== MAVEN INTERVIEW QUESTIONS =====

#### - **What are the tasks which are performed by Maven?**

All the problems which are mentioned above are simplified by Maven and it performs various tasks which are as follows:

- A project can be easily built when using Maven.
- A uniform build process is provided by Maven.
- All the information regarding the project is provided by Maven. Information like- log document, cross-referenced sources, mailing list, dependency list, unit test reports, etc.

- New features of Maven are easy to migrate.
- Apache Maven helps in managing the following attributes-
- Builds
- Documentation
- Reporting
- SCM's
- Releases
- Distribution

- **How do you know the version of mvn you are using?**

Type the following command –

---

```
mvn -version
```

- **What are the phases of a Maven Build Lifecycle?**

Following are the phases –

- **validate** – validate the project is correct and all necessary information is available.
- **compile** – compile the source code of the project.
- **test** – test the compiled source code using a suitable unit testing framework. These tests should not require the code be packaged or deployed
- **package** – take the compiled code and package it in its distributable format, such as a JAR.
- **integration-test** – process and deploy the package if necessary into an environment where integration tests can be run.
- **verify** – run any checks to verify the package is valid and meets quality criteria.
- **install** – install the package into the local repository, for use as a dependency in other projects locally.
- **deploy** – done in an integration or release environment, copies the final package to the remote repository for sharing with other developers and projects.

- **What would this command do *mvn clean dependency:copy-dependencies package*?**

This command will clean the project, copy the dependencies and package the project (executing all phases up to *package*).

- **What is the default location for your local repository?**

~/m2./repository.

- **What is the command to install JAR file in local repository?**

mvn install

- **How can you build your project offline?**

Use the command –

---

```
mvn o package.
```

## ===== API INTERVIEW =====

### - What is an API?

In simple words, API stands for **A**pplication **P**rogramming **I**nterface. API acts as an interface between two software applications and allows the two software applications to communicate with each other

### - Name some of the common protocols used in API Testing?

Some of the protocols using in API Testing are as follows:

- HTTP
- REST

### - What are the HTTP methods for restful API?

| HTTP Method | CRUD                  |
|-------------|-----------------------|
| GET         | Read                  |
| PUT         | Update/Replace        |
| PATCH       | Partial Update/Modify |
| DELETE      | Delete                |

### - Difference between SOAP and REST?

#### **SOAP:**

1. SOAP is a protocol through which two computers communicate by sharing XML document
2. SOAP supports only XML format
3. SOAP does not support caching
4. SOAP is slower than REST
5. SOAP is like custom desktop application, closely connected to the server
6. SOAP runs on HTTP but envelopes the message

#### **REST:**

1. REST is a service architecture and design for network-



based software architecture

2. REST supports different data formats
3. REST supports caching
4. REST is faster than SOAP
5. REST client is just like a browser and uses standard methods An application has to fit inside it
6. REST uses the HTTP headers to hold meta information

**- What are the common tests that are performed on APIs?**

Some of the common tests we perform on APIs are as follows.

1. Verify whether the return value is based on input condition. Response of the APIs should be verified based on the request.
2. Verify whether the system is authenticating the outcome when the API is updating any data structure
3. Verify whether the API triggers some other event or request another API
4. Verify the behavior of the API when there is no return value

**- What are the advantages of API Testing?**

- API Testing is time effective when compared to GUI Testing. API test automation requires less code so it can provide faster and better test coverage.
- API Testing helps us to reduce the testing cost. With API Testing we can find minor bugs before the GUI Testing. These minor bugs will become bigger during the GUI Testing. So finding those bugs in the API Testing will be cost effective to the Company.
- API Testing is language independent.
- API Testing is quite helpful in testing Core Functionality. We can test the APIs without a user interface. In GUI Testing, we need to wait until the application is available to test the core functionalities.
- API Testing helps us to reduce the risks.

**- What exactly needs to be verified in API Testing?**

Basically, on API Testing, we send a request to the API with the known data and we analyze the response.

1. Data accuracy
2. HTTP status codes

3. Response time
3. Error codes in case API returns any errors
4. Authorization checks
5. Nonfunctional testing such as performance testing, security testing

- **List some most used templates for API documentation?**

Some of the API documentation templates are as follows.

- Swagger
- FlatDoc
- RestDoc
- API blueprint
- Slate
- Miredot
- Web service API Specification.

- **What are the main challenges faced in API testing?**

Some of the challenges we face while doing API testing are:

- Selecting proper parameters and its combinations
- Categorizing the parameters properly
- Proper call sequencing is required as this may lead to inadequate coverage in testing
- Verifying and validating the output
- Due to absence of GUI it is quite difficult to provide input values

- **What are the types of bugs we face when performing API testing?**

Issues observed when performing API testing are

- Stress, performance, and security issues
- Duplicate or missing functionality
- Reliability issues
- Improper messaging
- Incompatible error handling mechanism
- Multi-threaded issues

- Improper errors
- **Name some most commonly used HTTP methods?**

Some of the HTTP methods are

**GET:** It enables you to retrieve data from a server

**POST:** It enables you to add data to an existing file or resource in a server

**PUT:** It lets you replace an existing file or resource in a server

**DELETE:** It lets you delete data from a server

**PATCH:** It is used to apply partial modifications to a resource

**OPTIONS:** It is used to describe the communication options for the target resource

**HEAD:** It asks for a response identical to that of a GET request, but without the response body

- **Can you use GET request instead of PUT to create a resource?**

No, GET request only allows read only rights. It enables you to retrieve data from a server but not create a resource. PUT or POST methods should be used to create a resource.

- **What is the difference between PUT and POST methods?**

PUT and POST methods are sometimes confused in regards to when each should be used. Using POST request, our intent is to create a new object on the server whereas with PUT request, our intent is to replace an object by another object. POST should be used when the client sends the page to the server and then the server lets the client know where it put it. PUT should be used when the client specifies the location of the page

- **Explain API testing approach.**
  - Write appropriate test cases for the APIs and use testing techniques like boundary value analysis, equivalence class, etc. for verifying the functionality.
  - Verify the calls of the combination of two or more value added parameters.
  - Define the scope and basic functionality of the API program.
  - Define the accurate input parameters.
  - Test case execution and comparison of the results with expected results.
  - Determining API behavior under conditions like the connection with files, etc.

- **Explain in brief the different types of output observed of an API.**

The main consideration is returning correct results under any type of conditions. Mainly, the output or results observed of an API are divided into three sections as follows:

- Returning the result status values as 'Pass' or 'Fail'.
- Result as data or any specific information.
- An event where the call to any API function will initiate the call to another API function.

- **Differentiate API testing and Unit Testing.**

The difference between API testing and Unit testing can be understood from the below table:

| UNIT testing                                                                                           | API Testing                                                                                           |
|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Unit testing is usually performed by testers where every functionality is tested separately.           | API testing is performed by the testers for end to end testing of the functionality.                  |
| As they have the limited scope of testing, thus basic functionalities are only considered for testing. | As they have the broader scope of testing, all issues that are functional are considered for testing. |
| It is a form of white box testing.                                                                     | It is a form of black box testing.                                                                    |
| Usually, unit testing is done before the code is included in the build.                                | API testing is performed after the build is ready for testing.                                        |
| The Source code is involved in this form of testing.                                                   | Source code is not involved in this form of testing.                                                  |

## ===== SQL INTERVIEW =====

### What is the difference between GUI Testing and Database Testing?

- GUI Testing is AKA User Interface Testing or Front-end testing  
Database Testing is AKA back-end testing or data testing.
- GUI Testing deals with all the testable items that are open to the user to interaction such as Menus, Forms etc. Database Testing deals with all the testable items that are generally hidden from the user.
- The tester who is performing GUI Testing doesn't need to know Structured Query Language

The tester who is performing Database Testing needs to know Structured Query Language

- GUI Testing includes invalidating the text boxes, check boxes, buttons, drop-downs, forms etc., majorly the look and feel of the overall application

Database Testing involves in verifying the integrity of data in the front end with the data present in the back end. It validates the schema, database tables, columns, indexes, stored procedures, triggers, data duplication, orphan records, junk records. It involves in updating records in a database and verifying the same on the front end.

- **What is a Table in a Database?**

A table is a database object used to store records in a field in the form of columns and rows that holds data.

- **What is a Field in a Database?**

A field in a Database table is a space allocated to store a particular record within a table.

- **What is a column in a Table?**

A column is a vertical entity in a table that contains all information associated with a specific field in a table.

- **What is RDBMS?**

RDBMS stands

for **R**elational **D**atabase **M**anagement **S**ystem. RDBMS is a database management system (DBMS) that is based on the relational model. Data from relational database can be accessed using Structured Query Language (SQL)

- **What are the different types of SQL commands?**

SQL commands are segregated into following types:

- DDL – Data Definition Language
- DML – Data Manipulation Language
- DQL – Data Query Language
- DCL – Data Control Language
- TCL – Transaction Control Language

- **What are the different DDL commands in SQL?**

DDL commands are used to define or alter the structure of the database.

- CREATE: To create databases and database objects
- ALTER: To alter existing database objects
- DROP: To drop databases and databases objects
- TRUNCATE: To remove all records from a table but not its database structure
- RENAME: To rename database objects

- **What are the different DML commands in SQL?**

DML commands are used for managing data present in the database.

- SELECT: To select specific data from a database
- INSERT: To insert new records into a table
- UPDATE: To update existing records
- DELETE: To delete existing records from a table

- **What are the different TCL commands in SQL?**

TCL commands are used to manage the changes made by DML statements.

- COMMIT: To write and store the changes to the database
- ROLLBACK: To restore the database since the last commit

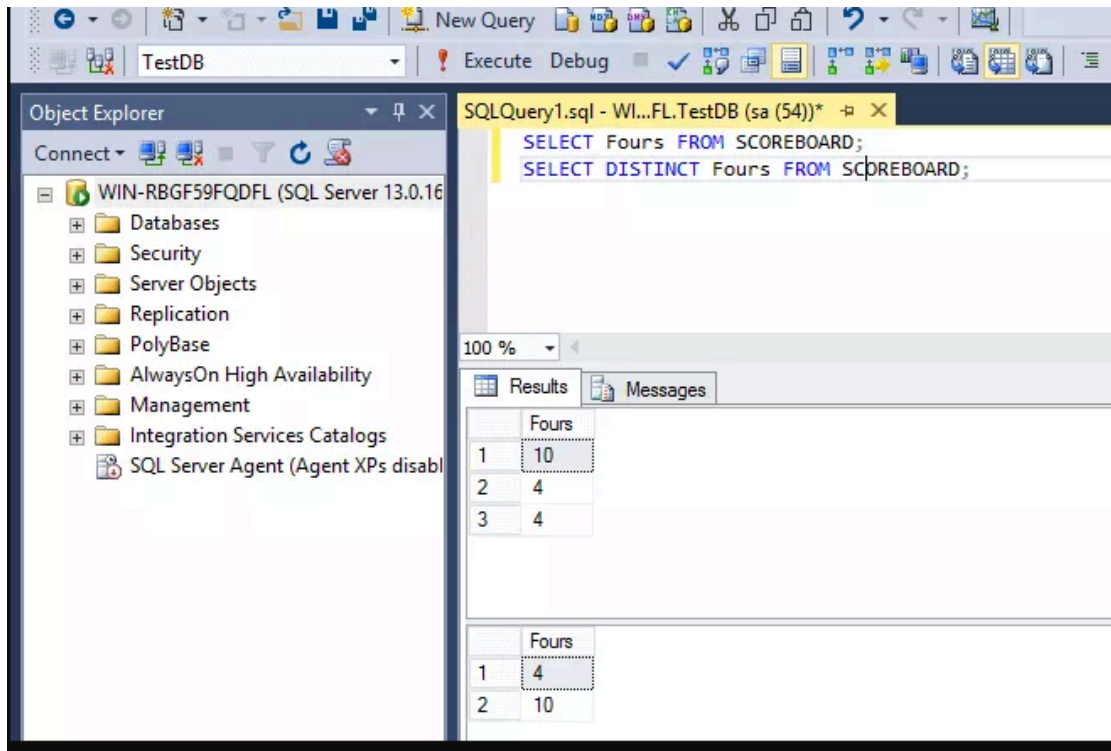
- **What is a Subquery ?**

A Subquery is a SQL query within another query. It is a subset of a Select statement whose return values are used in filtering the conditions of the main query.

- **How to avoid duplicate records in a query?**

The SQL SELECT DISTINCT query is used to return only unique values. It eliminates all the duplicated values.

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## Syntax:

```
1 SELECT DISTINCT column_name, column_name FROM table_name;
```

## Example:

```
1 SELECT DISTINCT Fours FROM SCOREBOARD;
```

- **What is the difference between Rename and Alias?**  
 'Rename' is a permanent name given to a table or column  
 'Alias' is a temporary name given to a table or column.

### - What is a Join?

Join is a query, which retrieves related columns or rows from multiple tables.

### - What are the different types of joins?

Types of Joins are as follows:

- INNER JOIN
- LEFT JOIN

- RIGHT JOIN
- OUTER JOIN

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### - **What is the difference between an inner and outer join?**

An inner join returns rows when there is at least some matching data between two (or more) tables that are being compared.

An outer join returns rows from both tables that include the records that are unmatched from one or both the tables.

#### - **What are SQL constraints?**

SQL constraints are the set of rules that enforced some restriction while inserting, deleting or updating of data in the databases.

#### - **What are the constraints available in SQL?**

Some of the constraints in SQL are – Primary Key, Foreign Key, Unique Key, SQL Not Null, Default, Check and Index constraint.

#### - **What is a Primary Key?**

A *PRIMARY KEY* constraint uniquely identifies each record in a database table. All columns participating in a primary key constraint must not contain NULL values.

#### - **Can a table contain multiple *PRIMARY KEY*'s?**

The short answer is no, a table is not allowed to contain multiple primary keys but it allows to have one composite primary key consisting of two or more columns.

#### - **What is a Composite *PRIMARY KEY*?**

Composite *PRIMARY KEY* is a primary key created on more than one column (combination of multiple fields) in a table.

#### - **What is a *FOREIGN KEY*?**

A *FOREIGN KEY* is a key used to link two tables together.



A *FOREIGN KEY* in a table is linked with the *PRIMARY KEY* of another table.

- **Can a table contain multiple *FOREIGN KEY*'s?**

A table can have many *FOREIGN KEY*'s.

- **What is the difference between *UNIQUE* and *PRIMARY KEY* constraints?**

There should be only one *PRIMARY KEY* in a table whereas there can be any number of *UNIQUE* Keys. *PRIMARY KEY* doesn't allow *NULL* values whereas Unique key allows *NULL* values.

- **What is a *NULL* value?**

A field with a *NULL* value is a field with no value. A *NULL* value is different from a zero value or a field that contains spaces. A field with a *NULL* value is one that has been left blank during record creation. Assume, there is a field in a table is optional and it is possible to insert a record without adding a value to the optional field then the field will be saved with a *NULL* value.

- **What is the difference between *NULL* value, Zero, and Blank space?**

As I mentioned earlier, Null value is field with no value which is different from zero value and blank space.

*Null value* is a field with no value.

*Zero* is a number

*Blank space* is the value we provide. The ASCII value of space is CHAR(32).

- **How to Test for *NULL* Values?**

A field with a *NULL* value is a field with no value. *NULL* value cannot be compared with other *NULL* values. Hence, It is not possible to test for *NULL* values with comparison operators, such as =, <, or <>. For

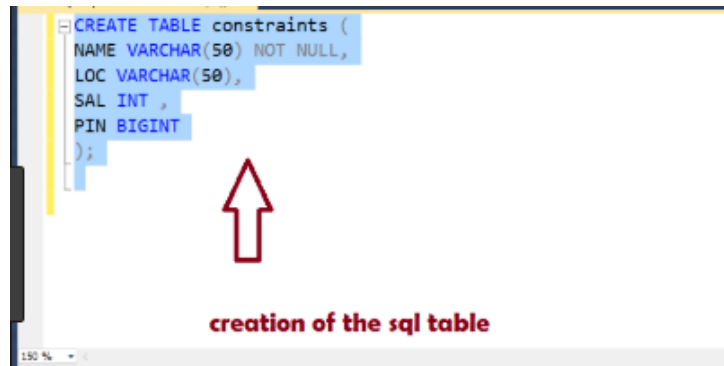
this, we have to use the *IS NULL* and *IS NOT NULL* operators.

```
1 SELECT column_names FROM table_name WHERE column_name IS NULL;
```

```
1 SELECT column_names FROM table_name WHERE column_name IS NOT NULL;
```

- **What is SQL NOT NULL constraint?**

*NOT NULL* constraint is used to ensure that the value in the field cannot be a NULL



The screenshot shows a SQL script in a code editor. The script is: `CREATE TABLE constraints ( NAME VARCHAR(50) NOT NULL, LOC VARCHAR(50), SAL INT, PIN BIGINT );`. A red arrow points to the `NOT NULL` constraint on the `NAME` column. Below the code, the text "creation of the sql table" is written in red.

- **What is the difference between Union and Union All command?**

**Union:** It omits duplicate records and returns only distinct result set of two or more select statements.

**Union All:** It returns all the rows including duplicates in the result set of different select statements.

Performance wise Union All is faster than Union, Since Union All doesn't remove duplicates. Union query checks the duplicate values which consumes some time to remove the duplicate records.

If you run **Union** query.

```
1 SELECT * FROM Table1
2 UNION
3 SELECT * FROM Table2
```

**Output:** Total 19 records

If you run **Union all** query.

```
1 SELECT * FROM Table1
2 UNION ALL
3 SELECT * FROM Table2
```

**Output:** Total 20 records

- **What is the difference between Having and Where clause?**

Where clause is used to fetch data from a database that specifies particular criteria whereas a Having clause is used along with 'GROUP BY' to fetch data that meets particular criteria specified by the Aggregate functions. Where clause cannot be used with Aggregate functions, but the Having clause can.

- **What are aggregate functions in SQL?**

SQL aggregate functions return a single value, calculated from values in a column. Some of the aggregate functions in SQL are as follows

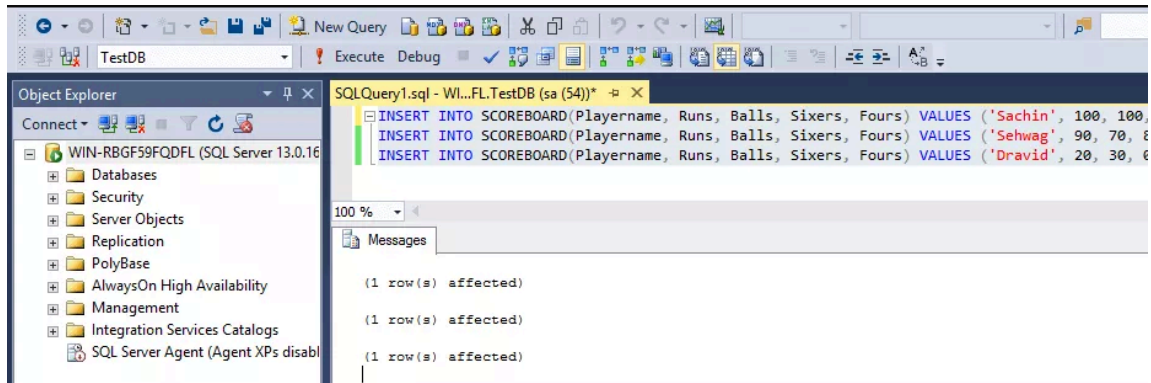
- AVG() – This function returns the average value
- COUNT() – This function returns the number of rows
- MAX() – This function returns the largest value
- MIN() – This function returns the smallest value
- ROUND() – This function rounds a numeric field to the number of decimals specified
- SUM() – This function returns the sum

- **What are string functions in SQL?**

SQL string functions are used primarily for string manipulation. Some of the widely used SQL string functions are

- LEN() – It returns the length of the value in a text field
- LOWER() – It converts character data to lower case
- UPPER() – It converts character data to upper case
- SUBSTRING() – It extracts characters from a text field
- LTRIM() – It is to remove all whitespace from the beginning of the string
- RTRIM() – It is to remove all whitespace at the end of the string
- CONCAT() – Concatenate function combines multiple character strings together
- REPLACE() – To update the content of a string.

- **How to add new Employee details in an Employee\_Details table with the following details Employee\_Name: John, Salary: 5500, Age: 29?**



- **How to add a column 'Salary' to a table Employee\_Details?**

```
1 ALTER TABLE Employee_Details ADD (Salary);
```

- **Write an SQL Query to select all records from the table?**

```
1 Select * from table_name;
```

- **How To Get List of All Tables From A DataBase?**

```

1 USE TestDB
2 GO
3 SELECT * FROM sys.Tables
4 GO

```

- **Write the command to remove all Players named Sachin from the Players table.**

```
1 DELETE from Players WHERE Player_Name = 'Sachin'
```

- **How to get each name only once from an employee table?**

By using the DISTINCT keyword, we could get each name only once.

```
1 SELECT DISTINCT employee_name FROM employee_table;
```

- **How to rename a column in the output of SQL query?**

```
1 SELECT column_name AS new_name FROM table_name;
```

- **Write an SQL Query to find an Employee\_Name whose Salary is equal or greater than 5000 from the below table Employee\_Details.**

| 1 | Employee_Name | Salary |
|---|---------------|--------|
| 2 |               |        |
| 3 | John          | 2500   |
| 4 | Emma          | 3500   |
| 5 | Mark          | 5500   |
| 6 | Anne          | 6500   |
| 7 |               |        |

Syntax:

```
1 SELECT Employee_Name FROM Employee_Details WHERE Salary >= 5000;
```

Output:

| 1 | Employee_Name | Salary |
|---|---------------|--------|
| 2 |               |        |
| 3 | Mark          | 5500   |
| 4 | Anne          | 6500   |
| 5 |               |        |

**How to get unique records from a table?**

By using DISTINCT keyword.

```
1 SELECT DISTINCT Col1, Col2 from Table1
```

# ===== JAVA =====

## JAVA INTERVIEW QUESTIONS

### **List any five features of Java?**

Some features include Object Oriented, Platform Independent, Robust, Interpreted, Multi-threaded

### **Why is Java Architectural Neutral?**

It's compiler generates an architecture-neutral object file format, which makes the compiled code to be executable on many processors, with the presence of Java runtime system.

### **How Java enabled High Performance?**

Java uses Just-In-Time compiler to enable high performance. Just-In-Time compiler is a program that turns Java bytecode, which is a program that contains instructions that must be interpreted into instructions that can be sent directly to the processor.

### **Why Java is considered dynamic?**

It is designed to adapt to an evolving environment. Java programs can carry extensive amount of run-time information that can be used to verify and resolve accesses to objects on run-time.

### **What is Java Virtual Machine and how it is considered in context of Java's platform independent feature?**

When Java is compiled, it is not compiled into platform specific machine, rather into platform independent byte code. This byte code is distributed over the web and interpreted by virtual Machine JVM on whichever platform it is being run.

### **List two Java IDE's?**

Netbeans, Eclipse, etc.

List some Java keywords unlike C, C++ keywords?

Some Java keywords are import, super, finally, etc.

### **What do you mean by Object?**

Object is a runtime entity and it's state is stored in fields and behavior is shown via methods. Methods operate on an object's internal state and serve as the primary mechanism for object-to-object communication.

### **Define class?**

A class is a blue print from which individual objects are created. A class can contain fields and methods to describe the behavior of an object.

### **What kind of variables a class can consist of?**

A class consist of Local variable, instance variables and class variables.

**What is a Local Variable?**

Variables defined inside methods, constructors or blocks are called local variables. The variable will be declared and initialized within the method and it will be destroyed when the method has completed.

**What is a Instance Variable?**

Instance variables are variables within a class but outside any method. These variables are instantiated when the class is loaded.

**What is a Class Variable?**

These are variables declared with in a class, outside any method, with the static keyword.

**What is Singleton class?**

Singleton class control object creation, limiting the number to one but allowing the flexibility to create more objects if the situation changes.

**What do you mean by Constructor?**

Constructor gets invoked when a new object is created. Every class has a constructor. If we do not explicitly write a constructor for a class the java compiler builds a default constructor for that class.

**List the three steps for creating an Object for a class?**

An Object is first declared, then instantiated and then it is initialized.

**What is the default value of byte datatype in Java?**

Default value of byte datatype is 0.

**What is the default value of float and double datatype in Java?**

Default value of float and double datatype in different as compared to C/C++. For float its 0.0f and for double it's 0.0d

**When a byte datatype is used?**

This data type is used to save space in large arrays, mainly in place of integers, since a byte is four times smaller than an int.

**What is a static variable?**

Class variables also known as static variables are declared with the static keyword in a class, but outside a method, constructor or a block.

**What do you mean by Access Modifier?**

Java provides access modifiers to set access levels for classes, variables, methods and constructors. A member has package or default accessibility when no accessibility modifier is specified.

**What is protected access modifier?**

Variables, methods and constructors which are declared protected in a superclass can be accessed only by the subclasses in other package or any class within the package of the protected members' class.

### **What do you mean by synchronized Non Access Modifier?**

Java provides these modifiers for providing functionalities other than Access Modifiers, synchronized used to indicate that a method can be accessed by only one thread at a time.

### **According to Java Operator precedence, which operator is considered to be with highest precedence?**

Postfix operators i.e [] . is at the highest precedence.

### **Variables used in a switch statement can be used with which datatypes?**

Variables used in a switch statement can only be a string, enum, byte, short, int, or char.

### **When parseInt method can be used?**

This method is used to get the primitive data type of a certain String.

### **Why is String class considered immutable?**

The String class is immutable, so that once it is created a String object cannot be changed. Since String is immutable it can safely be shared between many threads ,which is considered very important for multithreaded programming.

### **Why is StringBuffer called mutable?**

The String class is considered as immutable, so that once it is created a String object cannot be changed. If there is a necessity to make alot of modifications to Strings of characters then StringBuffer should be used.

### **What is the difference between StringBuffer and StringBuilder class?**

Use StringBuilder whenever possible because it is faster than StringBuffer. But, if thread safety is necessary then use StringBuffer objects.

### **Which package is used for pattern matching with regular expressions?**

java.util.regex package is used for this purpose.

### **java.util.regex consists of which classes?**

java.util.regex consists of three classes – Pattern class, Matcher class and PatternSyntaxException class.

### **What is finalize method?**

It is possible to define a method that will be called just before an object's final destruction by the garbage collector. This method is called finalize, and it can be used to ensure that an object terminates cleanly.

### **What is an Exception?**



An exception is a problem that arises during the execution of a program. Exceptions are caught by handlers positioned along the thread's method invocation stack.

### **What do you mean by Checked Exceptions?**

It is an exception that is typically a user error or a problem that cannot be foreseen by the programmer. For example, if a file is to be opened, but the file cannot be found, an exception occurs. These exceptions cannot simply be ignored at the time of compilation.

### **Explain Runtime Exceptions?**

It is an exception that occurs that probably could have been avoided by the programmer. As opposed to checked exceptions, runtime exceptions are ignored at the time of compilation.

### **Which are the two subclasses under Exception class?**

The Exception class has two main subclasses : IOException class and RuntimeException Class.

### **When throws keyword is used?**

If a method does not handle a checked exception, the method must declare it using the throws keyword. The throws keyword appears at the end of a method's signature.

### **When throw keyword is used?**

An exception can be thrown, either a newly instantiated one or an exception that you just caught, by using throw keyword.

### **How finally used under Exception Handling?**

The finally keyword is used to create a block of code that follows a try block. A finally block of code always executes, whether or not an exception has occurred.

### **What things should be kept in mind while creating your own exceptions in Java?**

While creating your own exception –

- All exceptions must be a child of Throwable.
- If you want to write a checked exception that is automatically enforced by the Handle or Declare Rule, you need to extend the Exception class.
- You want to write a runtime exception, you need to extend the RuntimeException class.

### **Define Inheritance?**

It is the process where one object acquires the properties of another. With the use of inheritance the information is made manageable in a hierarchical order.

### **When super keyword is used?**

If the method overrides one of its superclass's methods, overridden method can be invoked through the use of the keyword super. It can be also used to refer to a hidden field.

### **What is Polymorphism?**

Polymorphism is the ability of an object to take on many forms. The most common use of polymorphism in OOP occurs when a parent class reference is used to refer to a child class object.

### **What is Abstraction?**

It refers to the ability to make a class abstract in OOP. It helps to reduce the complexity and also improves the maintainability of the system.

### **What is Abstract class?**

These classes cannot be instantiated and are either partially implemented or not at all implemented. This class contains one or more abstract methods which are simply method declarations without a body.

### **When Abstract methods are used?**

If you want a class to contain a particular method but you want the actual implementation of that method to be determined by child classes, you can declare the method in the parent class as abstract.

### **What is Encapsulation?**

It is the technique of making the fields in a class private and providing access to the fields via public methods. If a field is declared private, it cannot be accessed by anyone outside the class, thereby hiding the fields within the class. Therefore encapsulation is also referred to as data hiding.

### **What is the primary benefit of Encapsulation?**

The main benefit of encapsulation is the ability to modify our implemented code without breaking the code of others who use our code. With this Encapsulation gives maintainability, flexibility and extensibility to our code.

### **What is an Interface?**

An interface is a collection of abstract methods. A class implements an interface, thereby inheriting the abstract methods of the interface.

### **Give some features of Interface?**

It includes –

- Interface cannot be instantiated
- An interface does not contain any constructors.
- All of the methods in an interface are abstract.

### **Define Packages in Java?**

A Package can be defined as a grouping of related types, classes, interfaces, enumerations and annotations providing access protection and name space management.

### **Why Packages are used?**

Packages are used in Java in-order to prevent naming conflicts, to control access, to make searching/locating and usage of classes, interfaces, enumerations and annotations, etc., easier.

### **What do you mean by Multithreaded program?**

A multithreaded program contains two or more parts that can run concurrently. Each part of such a program is called a thread, and each thread defines a separate path of execution.

### **What are the two ways in which Thread can be created?**

Thread can be created by: implementing Runnable interface, extending the Thread class.

### **What is an applet?**

An applet is a Java program that runs in a Web browser. An applet can be a fully functional Java application because it has the entire Java API at its disposal.

### **An applet extend which class?**

An applet extends `java.applet.Applet` class.

### **Explain garbage collection in Java?**

It uses garbage collection to free the memory. By cleaning those objects that is no longer reference by any of the program.

### **Define immutable object?**

An immutable object can't be changed once it is created.

### **Explain the usage of this with constructors?**

It is used with variables or methods and used to call constructor of same class.

### **Explain Set Interface?**

It is a collection of element which cannot contain duplicate elements. The Set interface contains only methods inherited from Collection and adds the restriction that duplicate elements are prohibited.

### **Explain TreeSet?**

It is a Set implemented when we want elements in a sorted order.

### **What is Comparable Interface?**

It is used to sort collections and arrays of objects using the `collections.sort` and `java.util`. The objects of the class implementing the Comparable interface can be ordered.

## **Difference between throw and throws?**

It includes:

- Throw is used to trigger an exception where as throws is used in declaration of exception.
- Without throws, Checked exception cannot be handled where as checked exception can be propagated with throws.

## **Explain the following line used under Java Program –**

```
public static void main Stringargs[]Stringargs[]
```

The following shows the explanation individually –

- public – it is the access specifier.
- static – it allows main to be called without instantiating a particular instance of a class.
- void – it affirms the compiler that no value is returned by main.
- main – this method is called at the beginning of a Java program.
- String args[ ] – args parameter is an instance array of class String

## **Define JRE i.e. Java Runtime Environment?**

Java Runtime Environment is an implementation of the Java Virtual Machine which executes Java programs. It provides the minimum requirements for executing a Java application;

## **What is JAR file?**

JAR files is Java Archive files and it aggregates many files into one. It holds Java classes in a library. JAR files are built on ZIP file format and have .jar file extension.

## **What is a WAR file?**

This is Web Archive File and used to store XML, java classes, and JavaServer pages. which is used to distribute a collection of JavaServer Pages, Java Servlets, Java classes, XML files, static Web pages etc.

## **Define JIT compiler?**

It improves the runtime performance of computer programs based on bytecode.

## **What is the difference between object oriented programming language and object based programming language?**

Object based programming languages follow all the features of OOPs except Inheritance. JavaScript is an example of object based programming languages.

## **What is the purpose of default constructor?**

The java compiler creates a default constructor only if there is no constructor in the class.

### **Can a constructor be made final?**

No, this is not possible.

### **What is static block?**

It is used to initialize the static data member, It is executed before main method at the time of classloading.

### **Define composition?**

Holding the reference of the other class within some other class is known as composition.

### **What is function overloading?**

If a class has multiple functions by same name but different parameters, it is known as Method Overloading.

### **What is function overriding?**

If a subclass provides a specific implementation of a method that is already provided by its parent class, it is known as Method Overriding.

### **Difference between Overloading and Overriding?**

Method overloading increases the readability of the program. Method overriding provides the specific implementation of the method that is already provided by its super class parameter must be different in case of overloading, parameter must be same in case of overriding.

### **What is final class?**

Final classes are created so the methods implemented by that class cannot be overridden. It can't be inherited.

### **What is NullPointerException?**

A NullPointerException is thrown when calling the instance method of a null object, accessing or modifying the field of a null object etc.

### **What are the ways in which a thread can enter the waiting state?**

A thread can enter the waiting state by invoking its sleep method, by blocking on IO, by unsuccessfully attempting to acquire an object's lock, or by invoking an object's wait method. It can also enter the waiting state by invoking its deprecated deprecated suspend method.

How does multi-threading take place on a computer with a single CPU?

The operating system's task scheduler allocates execution time to multiple tasks. By quickly switching between executing tasks, it creates the impression that tasks execute sequentially.

### **What invokes a thread's run method?**

After a thread is started, via its start method of the Thread class, the JVM invokes the thread's runmethod when the thread is initially executed.

### **Does it matter in what order catch statements for FileNotFoundException and IOException are written?**

Yes, it does. The FileNotFoundException is inherited from the IOException. Exception's subclasses have to be caught first.

### **What is the difference between yielding and sleeping?**

When a task invokes its yield method, it returns to the ready state. When a task invokes its sleep method, it returns to the waiting state.

### **Why Vector class is used?**

The Vector class provides the capability to implement a growable array of objects. Vector proves to be very useful if you don't know the size of the array in advance, or you just need one that can change sizes over the lifetime of a program.

How many bits are used to represent Unicode, ASCII, UTF-16, and UTF-8 characters?

Unicode requires 16 bits and ASCII require 7 bits. Although the ASCII character set uses only 7 bits, it is usually represented as 8 bits. UTF-8 represents characters using 8, 16, and 18 bit patterns. UTF-16 uses 16-bit and larger bit patterns.

### **What are Wrapper classes?**

These are classes that allow primitive types to be accessed as objects. Example: Integer, Character, Double, Boolean etc.

### **What is the difference between a Window and a Frame?**

The Frame class extends Window to define a main application window that can have a menu bar.

### **What is the difference between static and non-static variables?**

A static variable is associated with the class as a whole rather than with specific instances of a class. Non-static variables take on unique values with each object instance.

### **What is Serialization and deserialization?**

Serialization is the process of writing the state of an object to a byte stream. Deserialization is the process of restoring these objects.

### **What are use cases?**

It is part of the analysis of a program and describes a situation that a program might encounter and what behavior the program should exhibit in that circumstance.

### **Explain the use of subclass in a Java program?**

Sub class inherits all the public and protected methods and the implementation. It also inherits all the default modifier methods and their implementation.

**How to add menushortcut to menu item?**

If there is a button instance called b1, you may add menu short cut by calling b1.setMnemonic'F'F', so the user may be able to use Alt+F to click the button.

**Can you write a Java class that could be used both as an applet as well as an application?**

Yes, just add a main method to the applet.

**What is the difference between Swing and AWT components?**

AWT components are heavy-weight, whereas Swing components are lightweight. Heavy weight components depend on the local windowing toolkit. For example, java.awt.Button is a heavy weight component, when it is running on the Java platform for Unix platform, it maps to a real Motif button.

**What's the difference between constructors and other methods?**

Constructors must have the same name as the class and can not return a value. They are only called once while regular methods could be called many times.

**Is there any limitation of using Inheritance?**

Yes, since inheritance inherits everything from the super class and interface, it may make the subclass too clustering and sometimes error-prone when dynamic overriding or dynamic overloading in some situation.

**When is the ArrayStoreException thrown?**

When copying elements between different arrays, if the source or destination arguments are not arrays or their types are not compatible, an ArrayStoreException will be thrown.

Can you call one constructor from another if a class has multiple constructors?

Yes, use this syntax.

**What's the difference between the methods sleep and wait?**

The code sleep20002000; puts thread aside for exactly two seconds. The code wait20002000, causes a wait of up to two second. A thread could stop waiting earlier if it receives the notify or notifyAll call. The method wait is defined in the class Object and the method sleep is defined in the class Thread.

**When ArithmeticException is thrown?**

The ArithmeticException is thrown when integer is divided by zero or taking the remainder of a number by zero. It is never thrown in floating-point operations.

**What is a transient variable?**

A transient variable is a variable that may not be serialized during Serialization and which is initialized by its default value during de-serialization,

### **What is synchronization?**

Synchronization is the capability to control the access of multiple threads to shared resources. synchronized keyword in java provides locking which ensures mutual exclusive access of shared resource and prevent data race.

### **What is the Collections API?**

The Collections API is a set of classes and interfaces that support operations on collections of objects.

### **Does garbage collection guarantee that a program will not run out of memory?**

Garbage collection does not guarantee that a program will not run out of memory. It is possible for programs to use up memory resources faster than they are garbage collected. It is also possible for programs to create objects that are not subject to garbage collection.

### **The immediate superclass of the Applet class?**

Panel is the immediate superclass. A panel provides space in which an application can attach any other component, including other panels.

### **Which Java operator is right associative?**

The = operator is right associative.

### **What is the difference between a break statement and a continue statement?**

A break statement results in the termination of the statement to which it applies switch,for,do,orwhileswitch,for,do,orwhile. A continue statement is used to end the current loop iteration and return control to the loop statement.

### **If a variable is declared as private, where may the variable be accessed?**

A private variable may only be accessed within the class in which it is declared.

### **What is the purpose of the System class?**

The purpose of the System class is to provide access to system resources.

### **List primitive Java types?**

The eight primitive types are byte, char, short, int, long, float, double, and boolean.

### **What is the relationship between clipping and repainting under AWT?**

When a window is repainted by the AWT painting thread, it sets the clipping regions to the area of the window that requires repainting.



**Which class is the immediate superclass of the Container class?**

Component class is the immediate super class.

**What class of exceptions are generated by the Java run-time system?**

The Java runtime system generates RuntimeException and Error exceptions. Under what conditions is an object's finalize method invoked by the garbage collector?

The garbage collector invokes an object's finalize method when it detects that the object has become unreachable.

**How can a dead thread be restarted?**

A dead thread cannot be restarted.

**Which arithmetic operations can result in the throwing of an ArithmeticException?**

Integer / and % can result in the throwing of an ArithmeticException.

**Variable of the boolean type is automatically initialized as?**

The default value of the boolean type is false.

**Can try statements be nested?**

Yes

**What are ClassLoaders?**

A class loader is an object that is responsible for loading classes. The class ClassLoader is an abstract class.

**What is the difference between an Interface and an Abstract class?**

An abstract class can have instance methods that implement a default behavior. An Interface can only declare constants and instance methods, but cannot implement default behavior and all methods are implicitly abstract. An interface has all public members and no implementation.

**What will happen if static modifier is removed from the signature of the main method?**

Program throws "NoSuchMethodError" error at runtime.

**What is the default value of an object reference declared as an instance variable?**

Null, unless it is defined explicitly.

**Can a top level class be private or protected?**

No, a top level class can not be private or protected. It can have either "public" or no modifier.

**Why do we need wrapper classes?**

We can pass them around as method parameters where a method expects an object. It also provides utility methods.

### **What is the difference between error and an exception?**

An error is an irrecoverable condition occurring at runtime. Such as OutOfMemory error. Exceptions are conditions that occur because of bad input etc. e.g. FileNotFoundException will be thrown if the specified file does not exist.

### **Is it necessary that each try block must be followed by a catch block?**

It is not necessary that each try block must be followed by a catch block. It should be followed by either a catch block or a finally block.

### **When a thread is created and started, what is its initial state?**

A thread is in the ready state as initial state after it has been created and started.

### **What is the Locale class?**

The Locale class is used to tailor program output to the conventions of a particular geographic, political, or cultural region.

### **What are synchronized methods and synchronized statements?**

Synchronized methods are methods that are used to control access to an object. A synchronized statement can only be executed after a thread has acquired the lock for the object or class referenced in the synchronized statement.

### **What is runtime polymorphism or dynamic method dispatch?**

Runtime polymorphism or dynamic method dispatch is a process in which a call to an overridden method is resolved at runtime rather than at compile-time. In this process, an overridden method is called through the reference variable of a superclass.

### **What is Dynamic Binding?**

Binding refers to the linking of a procedure call to the code to be executed in response to the call. Dynamic binding means that the code associated with a given procedure call is not known until the time of the call at run-time.

### **Can constructor be inherited?**

No, constructor cannot be inherited.

### **What are the advantages of ArrayList over arrays?**

ArrayList can grow dynamically and provides more powerful insertion and search mechanisms than arrays.

### **Why deletion in LinkedList is fast than ArrayList?**

Deletion in linked list is fast because it involves only updating the next pointer in the node before the deleted node and updating the previous pointer in the node after the deleted node.

### **How do you decide when to use ArrayList and LinkedList?**

If you need to frequently add and remove elements from the middle of the list and only access the list elements sequentially, then LinkedList should be used. If you need to support random access, without inserting or removing elements from any place other than the end, then ArrayList should be used.

### **What is a Values Collection View ?**

It is a collection returned by the values method of the Map Interface, It contains all the objects present as values in the map.

### **Where and how can you use a private constructor?**

Private constructor is used if you do not want other classes to instantiate the object and to prevent subclassing.

### **What is type casting?**

Type casting means treating a variable of one type as though it is another type.

### **Describe life cycle of thread?**

A thread is a execution in a program. The life cycle of a thread include –

- Newborn state
- Runnable state
- Running state
- Blocked state
- Dead state

### **What is the range of the short type?**

The range of the short type is  $-2^{15}$  to  $2^{15} - 1$ .

### **Does Java allow Default Arguments?**

No, Java does not allow Default Arguments.

### **Which number is denoted by leading zero in java?**

Octal Numbers are denoted by leading zero in java, example: 06

### **Which number is denoted by leading 0x or 0X in java?**

### **Where import statement is used in a Java program?**

Import statement is allowed at the beginning of the program file after package statement.

Explain suspend method under Thread class>

It is used to pause or temporarily stop the execution of the thread.

### **Explain isAlive method under Thread class?**

It is used to find out whether a thread is still running or not.

### **What is currentThread?**

It is a public static method used to obtain a reference to the current thread.

### **Explain main thread under Thread class execution?**

The main thread is created automatically and it begins to execute immediately when a program starts. It is a thread from which all other child threads originate.

### **Life cycle of an applet includes which steps?**

Life cycle involves the following steps –

- Initialization
- Starting
- Stopping
- Destroying
- Painting

### **Why is the role of init method under applets?**

It initializes the applet and is the first method to be called.

### **If System.exit 00; is written at the end of the try block, will the finally block still execute?**

No in this case the finally block will not execute because when you say System.exit 00; the control immediately goes out of the program, and thus finally never executes.

### **Can a class declared as private be accessed outside its package?**

No, it's not possible to be accessed outside its package.

### **What are the restrictions imposed on a static method or a static block of code?**

A static method should not refer to instance variables without creating an instance and cannot use "this" operator to refer to the instance.

### **Can an Interface extend another Interface?**

Yes an Interface can inherit another Interface, for that matter an Interface can extend more than one Interface.

### **Which object oriented concept is achieved by using overloading and overriding?**

Polymorphism

It calls to the no-args constructor as the first statement.

### **Can a double value be cast to a byte?**

Yes, a double value can be cast to a byte `b = (byte) double d = 232.232`

===== LOGIC INTERVIEW QUESTIONS  
=====



"Suppose you had eight identical balls. One of them is slightly heavier and you are given a balance scale. What's the fewest number of times you have to use the scale to find the heavier ball?"

**Answer:** For convenience sake, let's name the balls 1-8. First we weigh {1,2,3} on the left and {4,5,6} on the right. There are three scenarios which can arise from this.

If the left side is heavier, then we know that one of 1, 2 or 3 is the heavier ball. Weigh {1} on the left and {2} on the right. By doing this, we will know if 1 or 2 is heavier. If they balance out, then 3 is the heavier one.

If the right side is heavier, then we know that either 4, 5 or 6 is the heavier ball. Weigh {4} on the left and {5} on the right. By doing this we will know if 4 or 5 is heavier. If they balance out, then 6 is the heavier one.

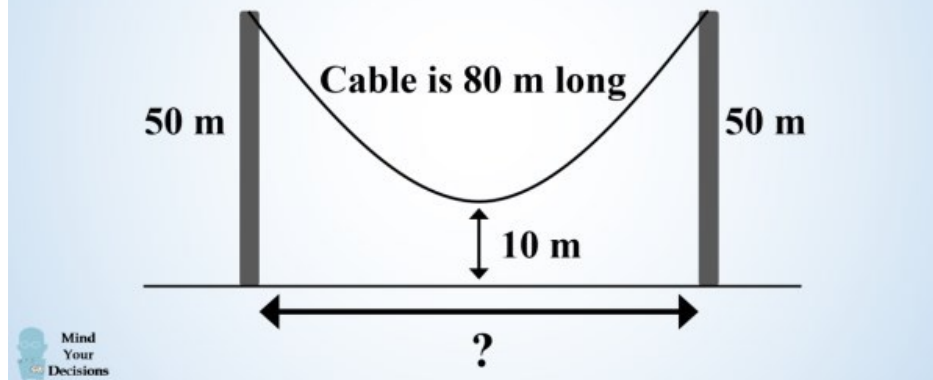
If {1,2,3} and {4,5,6} balance out, then we know either 7 or 8 is the heavier one. Weigh both of them to find out which one is heavier.



If you had an infinite supply of water and a 5 quart and 3 quarts pails, how would you measure exactly 4 quarts? and What is the least number of steps you need?

1. Fill 5p
2. Transfer 3quart of 5 to 3p
3. Make empty 3p
4. Transfer remaining 2quart of 5p to 3p
5. Fill 5p
6. Transfer 1quart of 5p to 3p

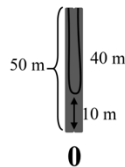
## Amazon Interview Question: How Far Apart Are The Poles?



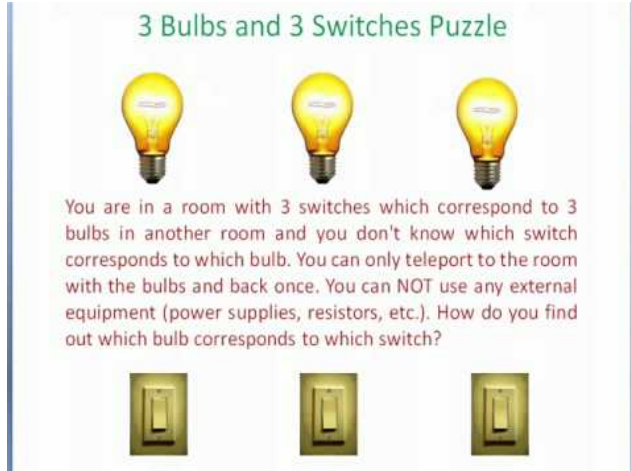
A cable of 80 meters (m) is hanging from the top of two poles that are both 50 m from the ground. What is the distance between the two poles, to one decimal place, if the center of the cable is 10 m above the ground?

Answer: If the cable is 80 m, then half of it is 40 m. But notice 40 m from the top of a 50 m pole is already 10 m above the ground. The cable therefore is hanging directly downward! The cable has to be doubled back upon itself, and the two poles must be coincident and 0 m apart!

(b) 10 m above ground



- **You are in a room with 3 switches which correspond to 3 bulbs in another room and you don't know which switch corresponds to which bulb. You can only enter the room with the bulbs once. You can NOT use any external equipment (power supplies, resistors, etc.). How do you find out which bulb corresponds to which switch?**



Answer: Turn on switch A for 1 minute. Turn it off.  
Turn on switch B.  
Enter the room with the bulbs.  
The hot bulb is A  
The lit bulb is B  
The dark bulb is C

You have 50 bikes with a tank that have the capacity to go 100 kilometers...



Using these 50 bikes, how far can you go?

**Answer:** Take all the bikes 50 kilometers first. Then, take all the gas from half the bikes, and pour them into the other half. You now have 25 bikes with full tanks.

Then travel another 50 kilometers, and repeat. This way, you can travel 350 kilometers total.



You have 1,000 bottles of juice...



One contains poison and tastes bitter. How do you find it in the smallest number of sips?

**ANSWER: It's 10 sips.**

Take one drop from 500 of the bottles, and take a sip.

If it tastes bitter, it's in one of those 500 bottles.

Then do the same for 250 bottles, then 125 bottles, and so on and so forth...

Until you find the exact bottle that's the poison.

## The Apples And Oranges Brain Teaser

There are 3 boxes. One box has only apples, one has only oranges, and the last has both apples and oranges.



All of the boxes are labeled incorrectly, and you must fix them. You can't peek in the boxes, but you can ask for a sample from any box.

What's the minimum number of samples you need to label the boxes correctly?

***There are three boxes, one contains only apples, one contains only oranges, and one contains both apples and oranges. The boxes have been incorrectly labeled such that no label identifies the actual contents of the box it labels. Opening just one box, and without looking in the box, you take out one piece of fruit. By looking at the fruit, how can you immediately label all of the boxes correctly?***

**Answer:** it's easier to draw it out.

There are only 2 possible combinations when all labels are tagged incorrectly.

All you need to do is pick one fruit from the one marked "Apples + Oranges".

If it's Apple, then change "Apple + Orange" to "Apple"

The "Apple" one change to "Orange"

The "Orange" one change to "Apple + Orange"

If it's Orange, then change "Apple + Orange" to "Orange"

The "Apple" one change to "Apple + Orange"

The "Orange" one change to "Apple"