

INTERVIEW QUESTIONS

Tell me about your self?

==== TELL ME ABOUT YOUR SELF?====

As of today I have experience in all layers of testing. I have expertise in various tools like Java, TestNG, Maven, Selenium, Jenkins, AWS, GIT, JIRA, Postman, Rest-Assured, JDBC, SQLDeveloper among others.

I have experience writing **manual test** cases implementing screen shots as evidence of my testing.

I have worked with various projects and met deadlines within time, As a team player I have successfully developed and implemented various Testing methods and approaches.

My experience in testing covers back end, API, and UI using the latest tools in my company.

I have participated in various ceremonies such as Planning meeting, Grooming, retrospective and Demo meetings. I am currently in Agile environment and I am experienced in waterfall as well.

Currently my team mates describe me as someone who can complete a task and achieve goals within time frame at the same time I like to enjoy working and collaborate with my team mates to achieve the same goal.

==== TELL ME ABOUT YOUR SELF? SHORT ANSWER====

I have 7 years of experience as test automation engineer and I have strong understanding of software development life cycle both waterfall and agile

I am mainly doing test automation however when its needed I am doing manual testing so I am a cross-functional team member at my current project and actually every single project I worked before.

I have successfully developed and implemented thousands of test scripts for web applications by using data driven behavior driven, hybrid framework

I am good at core **JAVA**. Selenium web driver, **CUCUMBER**, **JENKINS**, **MAVEN**, **TESTNG** And also I have experience with **JDBC**, **RestApi**, **Postman** among other testing tools.

Tell them about your latest tools you are using as well as your certifications, your achievements ..

==== Tell me about your-self ====

In my current project, I'm a senior test automation engineer and I have a good understanding of Software Development Life Cycle for Waterfall and Agile.

I have Java certification and AWS certification.

I have experience in Web based applications like healthcare, insurance, and banking industries.

I am experienced building a framework from scratch using **DATA DRIVEN**, **BEHAVIOR DATA DRIVEN FRAMEWORK (BDD)**.

I am using core **JAVA** as my main programming language, **SELENIUM**, **MAVEN**, **CUCUMBER**, **JENKINS**, and **JIRA** for User Interface (UI)

I am also good at REST API test automation using postman and **REST ASSURED LIBRARY** in Java.

As far as my backend testing and I am familiar with **SQL queries** and **JDBC library**.

I am detailed oriented, self-driven, and big communicator.

Explain about the tools you are using in your current project and tools you have learned. Give them details so later they don't ask

===== TELL ME ABOUT YOUR SELF =====

- * Currently I am a Test Automation Engineer and
- * I have a Strong Understanding of Software Development Life Cycle
- * For both **WATERFALL** and **AGILE**.
- * I have experience in various Web Based Applications, for different industries, like (**Banking**), and (**insurance**).
- * When I started my career I was **Manual Tester**, my interest to grow in this field opened new opportunities for me. Not only I learned new Testing tools but I became more experienced on my field.
- * I can build a framework from scratch using **Data Driven**, **Behavior Driven Framework**, I can also adapt to any existing frameworks.
- * I have also successfully developed and implemented thousands of test scripts for various Web applications.
- * As far as my technical Skills for front end testing I am good at **Core JAVA**, **Selenium WebDriver**, **Cucumber**, **Jenkins**, **Maven**, **TestNG**.
- * And I also have good understanding of **RESTful API**, Using **RestAssured** library and **Postman** as manual testing tool.
- * As far as my back end Testing goes I am familiar with **SQL** and **JDBC** library for front end testing, and I have profound knowledge in the production and execution of high level **SQL queries** using **SQL developer** as my environment tool.
- * As far as my personality goes I am detailed oriented Self-driven, Responsible **team player** and culture oriented. And because I understand the requirement for this job and the expectations I can be a good fit for your organization.

You can have different sizes in teams go based on your comfort to explain.

Tell me about Your Team

==== TELL ME ABOUT YOUR TEAM ====

My team consist of 9 people:

- 3 **developers**
- 3 **automation testers** (including myself)
- 1 **business analyst**
- 1 Scrum master
- 1 Product Manager

==== TELL ME ABOUT YOUR TEAM ====

My team consist of 9 people:

- 4 **developers**
- 2 **automation testers** (including myself)
- 1 **business analyst**
- 1 Product Manager

1 Scrum Master works with different teams

Framework

===== Describe me your Framework =====

MY Framework is 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 runs my smoke Test, 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 type and i use **TestNG** testing tool to control the flow and assert data, after formatting data to **java**, in order to find defects

We also have **Driver class** in utility package that uses **singleton pattern** to create and use only one universal **WebDriver**

For my **FRONT END UI testing** I use **selenium WebDriver**, and in my framework i am using **Page object model** as my design pattern.

I also use **Page Factory design pattern** to instantiate my WebElements using @FindBy which is easier and convenient.

BACK END (Api) I am using **REST-ASSURED library** in order for the process of **Deserialization** and **serialization** to occur.

that way you store **JSON response** into a java collection data structure (I normally produce high level **POJOS** and **map objects**) and assert the data with the expected value (also stored in java data structure)

I also have an API utility class with reusable codes and method where one line creates a POJO.
I use **postman** for manual testing first BEFORE I implement my test in my FRAMEWORK

For **DATABASE testing** I manually use **sql developer** for producing sql queries and

For **AUTOMATION** I use **JDBC library** to integrate java by getting a **CONNECTION** from oracle database

===== TELL ME ABOUT YOUR FRAMEWORK =====

My framework is based on **Behavior Driven Development (BDD)** it uses **Page Object Model** which increases reusability and maintainability of the framework.

Then we are using **Maven** to manage and centralize my dependencies plugins for **POM.XML**. We are also using **Apache POI** with excel spreadsheets.

Then we are using **testNG** as testing Engine. **Jenkins** for our continuous integration and and **GIT** for our source code management.

We are also using **restAssure** for working with **API**, **postman** for manual testing,

And for Backend Testing I am using **JDBC connections statement** and **resultSet**. For database testing I manually use **SQL developer** for producing High level **SQL Queries**.

===== SHORT FRAMEWORK =====

About my framework as I mention we are using **Behavior driven framework**

By using cucumber with java and to structure my code I use Page Object model
To keep it clean and understandable

Then we are using **Maven** as management tool. We are also using Apache POI with
excel spreadsheets

Then we are using **testNG** as testing Engine. **Jenkins** for our continuous integration
and and **GIT** for our source code management.

We are also using **restAssure** for working with **API**, **postman** for manual testing
And for Backend Testing I am using **JDBC connections statement** and **resultSet**.
And finally **Sql developer** for queries.

==== TELL ME ABOUT YOUR DAILY ACTIVITY ==

My start my day at 9am by reviewing my emails and
smoke test results and make sure the application is stable.

I also check my schedule if there is any important tasks
or meeting to attend through out the day.

Then, I attend my daily stand up meeting (10:30am) with
my scrum team for about 15 minutes.

After my meeting is over, I go back to my desk and
continue/start automating test cases from the day before.

Any other given day I go to different ceremonies,
meetings or trainings. This is how my days go at work.

= WHY ARE YOU LOOKING FOR A JOB =

*I enjoy working at my company as well as
automating. Unfortunately, my current contract
is coming to an end and because I have a great
communication with my manager he told me to
seek new opportunities.

* Therefore, I'm looking for new challenges and
room to continue growing in my career path.

== WHAT IS YOUR ROLE IN YOUR TEAM ==

As an automation tester, I developed **test plans** from the requirement documents and also
perform various types of testing like regression, and smoke testing.

I am responsible for checking smoke test and make sure that environment is up and running
first thing in the morning.

If there are any issues with it, I analyze:

if there is a service issue, I immediately contact the service department
if is about my scripts I debug the scripts
if it is a defect, I reproduce it and log the defect in **JIRA**

Most of my time, I spend my time automating test cases from user stories using Selenium
WebDriver.

As part of an **AGILE SCRUM** team, I participate in several meetings for requirement reviews,
and provide valuable feedback to the BA.

Lastly, I consider myself cross-functional team member that is always willing to help my team
in any way to achieve our spring goal.

(That is pretty much about my role as an automation engineer in my current project).
Also I was assigned some tasks as Test lead for Small projects where I had to deliver high end

Day To Day
Activity /
Why are you looking
For a job?

What's your Role in
Your Team?

Challenges

=====CHALLENGES=====

The problems that I mostly faced is lack of communication between team mates.

1. One of my biggest challenges that I faced in my current project is **COMMUNICATION** with developers. Every time, I find a bug, developers disagree to accept it. Most of times, we have to ask our Business Analyst for deeper clarification about requirements itself. Because of the communication issues and misunderstanding of requirements, now we spend extra 10 minutes or so in our grooming for requirement clarification because that is the key for the project success. Now, that is solved. My team works more efficiently.
2. Because we are **AGILE** environment, our work is always under time constraint. When the code is not deployed in time to our environment, our testing team usually doesn't have enough time for completion. When the upper management keep asking for completion, some of our team members simply focuses on task completion and not on the test coverage rather the quality of work. So, in our the sprint grooming I suggested that we should work closely with the team and make sure that we are communicating on daily bases. This would assure that our team prioritize the important tasks first and work on them efficiently.

Tell me about Your Sprint

== TELL ME ABOUT YOUR SPRINT ==

My current sprint is 2 weeks and we have release every 3 months(quarterly)

*In my current project, **PLANNING** starts **MONDAYS**.

*We also do **GROOMING** the same day as **PLANNING** since we work in an Agile environment (**MONDAYS**).

*Our sprint starts every other **TUESDAY** and we have **DAILY STAND UP** meetings for 15 minutes (what did you do yesterday, what am working on today, and what is your blocker?).

*We also have **RETRO/DEMO** meetings and our Production Deployment is **FRIDAY** at the end of QUARTER.

*On any other given day, we have other meetings to go to or trainings to attend like AWS. However, my scrum master would notify me or send an email about any meetings.

In my current project we have planning for 2 days Thursday and Friday all day. We plan for our next release, During this Planning we have scrum of scrums and we also groom the stories in high level.

Daily Stand up we just talk about the current story that we are working on, and if we are facing any issues and also we mention when you will finish it. (estimate time)

As a team we have Retrospective meeting normally our team does it on a Friday, but if we are busy we reschedule for any other given day. And in retro we go over what we did bad what we can improve and what went well.

Tell me about your Weakness / strength

===== TELL ME YOUR WEAKNESS =====

One of my weakness is that I am afraid of **Failure**, As a team member I always want to be able to back up my team mates at the same time I like to perform at my best. Thats why when ever we have projects I am always ahead trying to understand and at the same time ask questions about the User Stories. I like to keep my skills up to date so that I don't fall behind and I don't let my team down. Thats why I am participating in meetings, events, I got to technology seminars to learn about new tools.

===== WHAT IS YOUR STRENGTH =====

One of my greatest strength is that I have strong **work ethic**. When I am working on a project, I **commit** to meet deadlines. to Deliver User Story that meets **Acceptance** criteria.

For instance, on my current project we had **User Stories** to deliver and my Team mate had to fly back to her country as an emergency and she was working on 3 stories. What I did is I took over those stories so that our sprint would not be affected by her absence.

===== WEAKNESS =====

* One of My weakness is my lack of participation and getting noticed. When I started my role in this company It was a little hard to get noticed by my team because we did not share a good communication. So to fix this matter, what I did is I proposed that we should all communicate more during daily stand ups and also during meetings. I also spoke to my team so we can all sit in a open space office so we can communicate better rather than sending emails and getting late responses.

===== STRENGTH =====

One of my **Strengths** is my **determination** and **dedication**. If you speak to my team or my even my manager they will always say that I am always pushing to finish our goals for the sprint. And that is because I want to **flourish** my teams **capacity** and **ability** not only complete all of our tests in a specific time but to push against our limits and become more than we were.

I am dedicated and goal oriented basically if our product owner gives us a task to complete with a due date. I make sure that I prioritize all the stories that I am working on to **ensure** that all the user stories are not only completed but they have been completed with **quality**.

Reports

REPORTS

- * Our reports are saved in **AWS** dashboard and in database if needed we pull out any report
- * when we run the automation its saved in **AWS** it is configured. When we run our test we have special command to run our script in the **terminal**. When we run it it creates a table in **database** which generates a number in case we need that number normally if my team lead asks me to show my test script I have proof that **I** have automated successfully.
- Report its saved in **Oracle** Database which is in the virtual machine. Only QA has access to that Database;

SMOKE TEST

SMOKE TEST

*Our automation framework is set up to run with **JENKINS**

We run our **Smoke** and **Regression** test. It runs every day and we get reports.

When ever we have new feature we just put our **team tag**, regression tag or smoke test. Once Jenkins kicks off the **smoke** test every morning, if something goes wrong My team gets a report and if am there early I make sure to fix it.

Selenium Interview Questions

OOPS Automation Framework

== What is 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.

Points to remember:

1. Abstract classes may or may not include abstract methods
2. If a class is declared abstract then it cannot be instantiated.
3. If a class has abstract method then we have to declare the class as abstract class
4. When an abstract class is subclassed, the subclass usually provides implementations for all of the abstract methods in its parent class. However, if it does not, then the subclass must also be declared abstract.

== What is 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.

Points to remember:

1. Java interface represents IS-A relationship similar to Inheritance
2. Interface cannot be instantiated same like abstract class
3. Java compiler adds public and abstract keywords before the interface methods
4. Java compiler adds public, static and final keywords before data members
5. Interface extends another interface just like a Class extends another Class but a class implements an interface.
6. The class that implements interface must implement all the methods of that interface.
7. Java allows you to implement more than one interface in a Class

== What is 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.

Multi-Level Inheritance

Super Class

methodA()

Sub Class 1

methodA() -> from A

methodB()

→ Level 1

Sub Class 2

methodA() -> from A

methodB() -> from B

methodC()

→ Level 2

== What is 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 POLYMORPHISM - OVERRIDING
- STATIC POLYMORPHISM - OVERLOADING

```
public class Demo
{
    public static void main(String[] args) {
        Animal a1 = new Cat();
        a1.makeNoise(); //Prints Meowoo

        Animal a2 = new Dog();
        a2.makeNoise(); //Prints Bark
    }
}
```

Exceptions In Selenium WebDriver

1

- Explain the different exceptions in Selenium WebDriver?
- What is exception test in Selenium?

TimeoutException	Thrown when command does not complete in enough time
NoSuchElementException	Thrown when Element with given attribute is not found
ElementNotVisibleException	Thrown when Element is present in DOM but not visible
StaleElementException	Thrown when Element is deleted or is no longer attached to DOM
Exception Test	@Test(expectedException = NoSuchElementException.class)

Excel Sheets

2

- Have you used Excel Sheet in your project?

Excel Sheet is used as Data Source for tests and also contains Data Set for DataDriven Testing

Data Source

- Application URL for all environments
- User name and Passwords for different environments
- Test Cases to be executed

Data Driven Test

- Data for different iterations

POM Page Object Model

4

- What is POM (Page Object Model)?

- What are it's advantages?

- Page Object Model is a design pattern to create Object Repository for web UI elements.
- Each web page in the application should have corresponding page class.
- Page class will find the WebElements of that web page and also contains Page methods which perform operations on those WebElements.

Advantages:-

- Keep operations and flows in UI separate from Verification – clean & easy to understand code
- Object Repository independent of Test Cases – multiple tests use same Object Repository
- Reusability of code

Page Factory

5

→ What is Page Factory?

- Page Factory is an inbuilt Page Object Model concept for Selenium WebDriver which is very optimized
- Separation of Page Object Repository and Test Methods
- Page Factory Class provides @FindBy annotation to find WebElements
- **@FindBy** can accept `tagName`, `partialLinkText`, `name`, `linkText`, `id`, `css`, `className` & `xpath` as attributes

Waits Implicit Explicit

6

→ What are the different types of WAIT statements in Selenium WebDriver?

→ How do you achieve synchronization in WebDriver?

Implicit Wait

- Instructs the web driver to wait for some time by polling the DOM.
- Once you have declared implicit wait it will be available for the entire life of web driver instance. By default ,the value will be 0. If you set a longer default, then the behavior will poll the DOM on a periodic basis depending on the browser/driver implementation.

Explicit Wait - Instructs the execution to wait for some time until some condition is achieved.

Conditions:

- `elementToBeClickable`
- `elementToBeSelected`

Wait for visibility

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→ Write a code to wait for a particular element to be visible on a page.

→ Write a code to wait for an alert to appear.

```
WebDriverWait wait=new WebDriverWait(driver, 20);
Element = wait.until(ExpectedConditions.visibilityOfElementLocated(By.xpath( "<xpath">")));

```

```
WebDriverWait wait=new WebDriverWait(driver, 20);
Element = wait.until(ExpectedConditions.alertIsPresent());

```

Java Script Executor

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→ What is the use of JavaScript Executor?

JavaScriptExecutor is an interface which provides mechanism to execute Javascript through selenium driver. It provides "executeScript" & "executeAsyncScript" methods, to run JavaScript in the context of the currently selected frame or window

```
JavascriptExecutor js = (JavascriptExecutor) driver;
js.executeScript(SCRIPT, Arguments);
```

JavaScript
Scroll
down

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→ How to scroll down a page using JavaScript in Selenium?

→ How to scroll down to a particular element?

```
((JavascriptExecutor) driver).executeScript("window.scrollBy(0,500)");
((JavascriptExecutor) driver).executeScript("arguments[0].scrollIntoView()", element);
```

Actions
move
mouse
click and
hold drag
and drop

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→ How to handle keyboard and mouse actions using Selenium?

- Handling special keyboard and mouse events are done using the **Advanced User Interactions API**.
- It contains the **Actions** and the **Action Classes** that are needed for executing these events.
- Commonly used keyboard and mouse events provided by the Actions class.

Method

`clickAndHold()`
`dragAndDrop()`
`source, target()`

Description

Clicks (without releasing) at the current mouse location.
Performs click-and-hold at the location of the source element, moves to the location of the target element, then releases the mouse.

Keys.enter
Keys.shift
Alt/shift/
control

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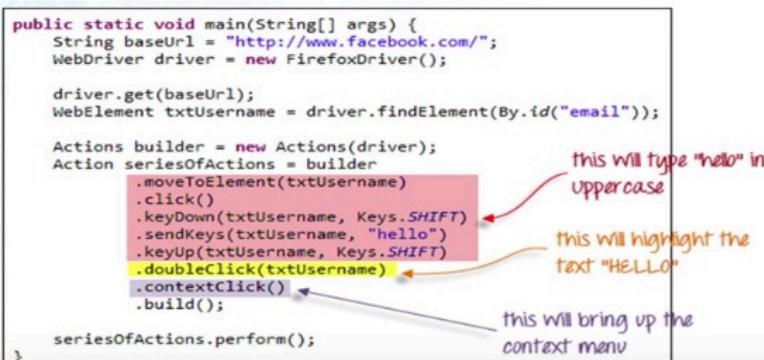
→ How to send ALT/SHIFT/CONTROL key in Selenium WebDriver?

```
public static void main(String[] args) {
    String baseUrl = "http://www.facebook.com/";
    WebDriver driver = new FirefoxDriver();

    driver.get(baseUrl);
    WebElement txtUsername = driver.findElement(By.id("email"));

    Actions builder = new Actions(driver);
    Action seriesOfActions = builder
        .moveToElement(txtUsername)
        .click()
        .keyDown(txtUsername, Keys.SHIFT)
        .sendKeys(txtUsername, "hello")
        .keyUp(txtUsername, Keys.SHIFT)
        .doubleClick(txtUsername)
        .contextClick();
    .build();

    seriesOfActions.perform();
}
```



Screenshots in Selenium

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→ How to take screenshots in Selenium WebDriver?

```
public class ScreenshotTest {
    public static void main(String args[]){
        WebDriver driver=new FirefoxDriver();
        driver.get("http://www.google.com");
        File scrFile = ((TakesScreenshot)driver).getScreenshotAs(OutputType.FILE);
        try {
            FileUtils.copyFile(scrFile, new File("D:\\savescreen.png"));
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```

Size browser Maximize

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→ How to set the size of browser window using Selenium?

`driver.manage().window().maximize();` - To maximize the window

`System.out.println(driver.manage().window().getSize());`
`Dimension d = new Dimension(420,600);`
`driver.manage().window().setSize(d);` - To resize the current window to the given dimension

`((JavascriptExecutor)driver).executeScript("window.resizeTo(1024, 768);");` - To set window to a particular size

Drop Down

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→ How to handle a dropdown in Selenium WebDriver?
 → How to select a value from dropdown?

```
<select id="mySelect">
<option value="option1">France</option>
<option value="option2">Italy</option>
<option value="option3">Spain</option>
</select>
```

`WebElement mySelectElement = driver.findElement(By.id("mySelect"));`
`Select dropdown= new Select(mySelectElement);`
 OR
`Select dropdown = new Select(driver.findElement(By.id("mySelect")));`

1. `dropdown.selectByVisibleText("Italy");`
2. `dropdown.selectByIndex(2);`
3. `dropdown.selectByValue("option3")`

Switch to
new
window
new tab

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→ How to switch to a new window (new tab) which opens up after you click on a link?

```
driver.switchTo().window(<windowName>);  
driver.switchTo().frame(<iframeName>);  
driver.switchTo().alert();
```

```
If window name is not available  
String handle= driver.getWindowHandle();  
for (String handle : driver.getWindowHandles()) {  
    driver.switchTo().window(handle);}
```

Fetch an
attribute
from
element

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→ How can you fetch an attribute from an element?

→ How to retrieve typed text from a textbox?

```
WebElement eLogin = driver.findElement(By.name("Login"));  
String LoginClassName = eLogin.getAttribute("classname");
```

```
WebElement eLogin = driver.findElement(By.name("Login"));  
String LoginText = Login.GetText();
```

Upload
file

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→ How do you upload a file using Selenium WebDriver?

```
<input type="file" name="uploaded_file" size="50" class="pole_plik">
```

```
element = driver.find_element_by_id("uploaded_file")  
element.send_keys("C:\myfile.txt")
```

Authentica
tion pop
up

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→ Explain how you will login into any site if it is showing any authentication popup for password and username?

```
WebDriverWait wait = new WebDriverWait(driver, 10);  
Alert alert = wait.until(ExpectedConditions.alertIsPresent());  
alert.authenticateUsing(new UserAndPassword(**username**, **password**));
```

broken
links in a
page

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→ Explain how you can find broken links in a page using Selenium WebDriver?

- Hyperlinks have anchor tags <a>
- Get value of 'href' for all anchor tags on page from page source
- Send a http request to each href
- Analyze response to be equal to 200 - OK

select
frame by
index

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→ Which technique should you consider using throughout the script "if there is neither frame id nor frame name"?

If neither id nor name is present for frame, then select frame by Index.

Example:-

Select a frame by its (zero-based) index. That is, if a page has three frames, the first frame would be at index "0", the second at index "1" and the third at index "2". Once the frame has been selected, all subsequent calls on the WebDriver interface are made to that frame.

```
driver.switchTo().frame(int arg0);
```

Why
testng.xml

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→ What is the significance of testng.xml?

A **test suite** is a collection of test cases.

In TestNG, we cannot define a suite in testing source code, but it is represented by one XML file, as suite is the feature of execution. It also allows flexible configuration of the tests to be run.

A suite can contain one or more tests and is defined by the <suite> tag.

- Allows execution of multiple test cases from multiple classes
- Allows parallel execution
- Allows execution of test cases in groups where a single test can belong to multiple groups

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→ What is parameterization in TestNG?

→ How to pass parameters using testng.xml?

TestNG allows to define parameters in the testng.xml file and then reference those parameters in Test Cases.

```
public class ParameterizedTest1{  
    @Test  
    @Parameters("myName")  
    public void parameterTest(String myName) {  
        System.out.println("Parameterized value is : " + myName);  
    }  
}
```

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→ What is parameterization in TestNG?

→ How to pass parameters using testng.xml?

```
<?xml version="1.0" encoding="UTF-8"?>  
<!DOCTYPE suite SYSTEM "http://testng.org/testng-1.0.dtd" >  
<suite name="CustomSuite">  
    <test name="CustomTest">  
        <parameter name="myName" value="John"/>  
        <classes>  
            <class name="ParameterizedTest1" />  
        </classes>  
    </test>  
</suite>
```

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→ How to skip a method or a code block in TestNG?

TestNG provides parameter to @Test annotation to enable or disable a test

@Test(enabled = false)
@Test(enabled = true)
Default value is true

Soft Assertion

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- What is soft assertion in Selenium?
- How can you mark a test case as failed by using soft assertion?

- Soft Assertions are customized error handler provided by TestNG
- Soft Assertions do not throw exceptions when assertion fails and continue with next test step
- Used for multiple assertions

To mark a test as failed with soft assertions call **assertAll()** method at the end of the test

TestNG dependencies

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- How does TestNG allow you to state dependencies?

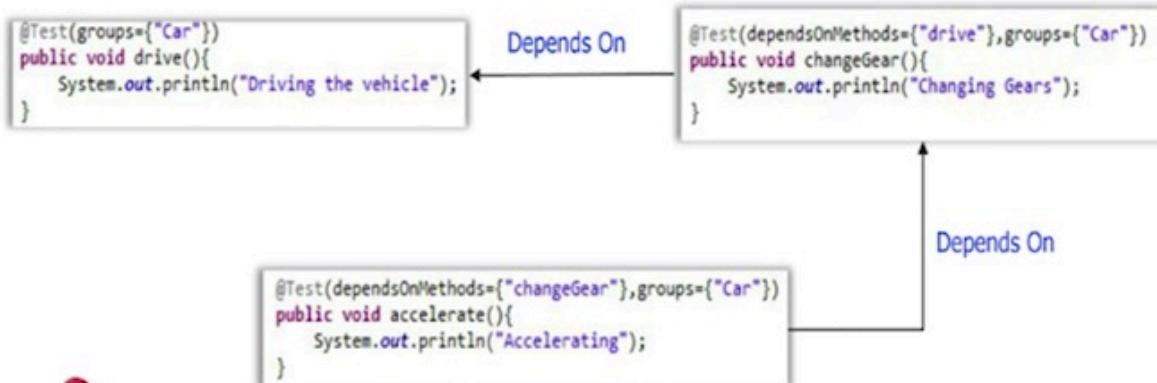
Dependency is a feature in **TestNG** that allows a **test** method to depend on a single or a group of **test** methods.

Method **dependency** only works if the "depend-on-method" is part of the same class or any of the inherited base class (i.e. while extending a class).

```
@Test(dependsOnMethods = { "initEnvironmentTest" })
```

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- Explain it with an example.



Group Test in TestNG

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→ Explain what is Group Test in TestNG?

```
@Test(groups={"Bike"})
public void onMaxSpeed(){
    System.out.println("Vehicle on Max Speed");
}
```

```
@Test(groups={"Car", "Bike"})
public void drive(){
    System.out.println("Driving the vehicle");
}
```

```
@Test(groups={"Car", "Bike"})
public void accelerate(){
    System.out.println("Accelerating");
}
```

```
@Test(groups={"Car", "Bike", "Audi"})
public void drifting(){
    System.out.println("Drifting Vehicle");
}
```

Different types of Frameworks

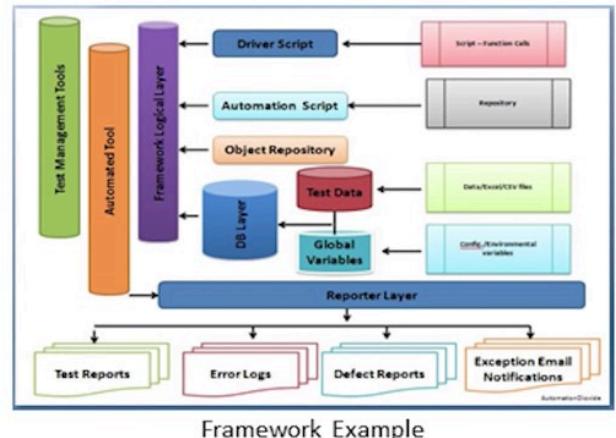
30

→ What are different types of frameworks?

→ Which files can be used as data source for different frameworks?

- Data Driven Framework
- Keyword Driven Framework
- Hybrid Framework

Dataset can be provided using excel, xml, text, csv, etc type of file



Override

Overload

==== 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.

Overriding

```
class Dog{
    public void bark(){
        System.out.println("woof ");
    }
}
class Hound extends Dog{
    public void sniff(){
        System.out.println("sniff ");
    }
    public void bark(){
        System.out.println("bowl");
    }
}
```

==== 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

Normally A class having multiple methods with same name but different parameters is called Method Overloading

Overloading

```
class Dog{
    public void bark(){
        System.out.println("woof ");
    }
}
//overloading method
public void bark(int num){
    for(int i=0; i<num; i++)
        System.out.println("woof ");
}
```

Encapsulation

==== Method 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.

```
class Account{
    private int account_number;
    private int account_balance;

    public void show Data(){
        // code to show data
    }

    public void deposit(int a){
```

Run Group Of Test In TestNG

* How to run a group of test cases using TestNG?

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 }
```

In my current project I use implicit wait at the beginning of my test normally I have it On my @Before so that when I execute my test It waits until it loads.

Implicit wait

```
@Before
public void setUp(Scenario scenario) {
    WebDriver driver = Driver.getDriver();
    driver.manage().timeouts().implicitlyWait(30, TimeUnit.SECONDS);
    driver.manage().window().fullscreen();
}
```

In my current project I use explicit wait to force a wait on a specific object or condition instead of every object.

Explicit Wait

```
public static WebElement waitForVisibility(WebElement element, int timeToWaitInSec) {
    WebDriverWait wait = new WebDriverWait(Driver.getDriver(), timeToWaitInSec);
    return wait.until(ExpectedConditions.visibilityOf(element));
}
```

In my current project to handle Frames I use 3 important parameters inside the frame such as : id, name, frame webElement

Syntax:

Frames

inside the frame you can enter parameters such as: id, name, frame WebElement

```
driver.switchTo().frame(id)
```

In my current project in order to switch windows from 1st to 2nd or 3rd I develop a Java Collection Set Object in which I store the method Driver.getWindowHandles(); then I use Iterator with .next() method to switch windows. Once I am in the correct window I store it in a String, then I use the method: Driver.switchTo().window("3rdwindow").

3rd window

Syntax:

```
Set<String> window = Driver.getWindowHandles();
String a = window.iterator();
a.next(); <---- 1st window
a.next(); <---- 2nd window
String 3rdwindow = a.next(); <---- 3rd Window
```

Driver.switchTo().window("3rdwindow").

Locators

In Selenium

- In Selenium WebDriver we have :

ID, name, classname, Xpath, Css, PartialLinkText, LinkText

```
● className(String className) : By - org.openqa.selenium.By.className(String className)
● cssSelector(String selector) : By - org.openqa.selenium.By.cssSelector(String selector)
● id(String id) : By - org.openqa.selenium.By.id(String id)
● linkText(String linkText) : By - org.openqa.selenium.By.linkText(String linkText)
● name(String name) : By - org.openqa.selenium.By.name(String name)
● partialLinkText(String linkText) : By - org.openqa.selenium.By.partialLinkText(String linkText)
● tagName(String name) : By - org.openqa.selenium.By.tagName(String name)
● xpath(String xpathExpression) : By - org.openqa.selenium.By.xpath(String xpathExpression)
```

- **Xpath syntax:** // tagname[@id='value']
- **Css syntax:** tag name[id=value]

Contains Regular Expression Xpath

- If I see some dynamic attributes I use regular expression for Xpath
And this is how I use it

< id="uil23 23"

// tagname[contains(id*='uil2')]

Contains Regular Expressing CSS

- If I see a dynamic attribute I use css with the following to help me identify my locator
And I use:

< id="uil23 23"

Tag name[id*='uil']

FirefoxDriver
interface or
class?

Is FirefoxDriver a class or an Interface?

FirefoxDriver is a java class and it implements a WebDriver Interface.

Dynamic
Polymorphism

Its consider a Dynamic Polymorphism.

WebDriver

Dynamic binding (also know as)

ChromeDriver

FirefoxDriver

Stale
ElementRefere
nce Exception

What is StaleElementReferenceException?

Stale element is when an old element is no longer available.

Normally the reason is one: the element has been deleted entirely.

Two: the element is no longer attached to the DOM.

How did I overcome this issue is one: I tried refreshing the page and try again for the same element.

Two: If the element is not attached to DOM then I try using try-catch block within for loop.

Three: wait for the element until it gets available. I use Selenium waits.

Framework
from scratch?

Have you created framework from Scratch?

Beginner: No I did not get a chance to create framework from scratch. I have used the framework which is already available. My contribution is mostly in creating test cases by using the existing framework.

Experienced Tester: I have contributed in developing framework from scratch, I have designed with the tools I am experience.

How many test
cases have
you
automated?

How many test cases you have automated per day?

It depends on test case scenario complexity, I did automate 2-5 test scenarios per day when the complexity is limited. Sometimes just 1 or fewer test scenarios in a day when the complexity is high.

Assert and
verify

difference between assert and verify in selenium?

When **Assert** fails the test is aborted, so when assertion fails all test steps after that line of code are skipped.

When **verify** command fails the test will continue executing but it will log the failure regardless is true or false.

What is Soft Assert and Hard Assert in Selenium?

Hard Assert: it throws an `AssertionError` immediately when an assert statement fails and

FirefoxDriver
interface or
class?

Its consider a Dynamic Polymorphism.

Dynamic binding (also know as)

WebDriver

ChromeDriver

FirefoxDriver

Dynamic
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automated?

Assert and
verify

Test Priority in TestNG?

```

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 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.

TestNG Assertions

Create TestNG.xml

- 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.

- 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)
- assertFalse(condition, message)
- assertFalse(condition)
- assertFalse(condition, message)

Database Testing

- 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

CI-CD

- 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.

Build Pipeline: CI Pipeline



Desire Capabilities

What is desired capabilities?

In Selenium we use desired capabilities to handle SSL certificates in chrome browser

```

public class SauceLabsDemo {
    WebDriver driver;

    public static final String USERNAME = "comal";
    public static final String ACCESS_KEY = "3b65d51-1b82-4ed3-8a21-654d70da8bed";
    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);
    }
}
```

Maven Build Lifecycle

Different Phases in Maven Build Lifecycle

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.
package	Take the compiled code and package it in its distributable format.
verify	Run any checks on results of integration tests to ensure quality criteria are met.
install	Install the package into the local repository, for use as a dependency in other projects locally.
deploy	Copy the final package to the remote repository for sharing with other developers and projects.

Maven Build Phases

- These lifecycle phases are executed sequentially to complete the default lifecycle.
- We want to specify the maven `package` command, this command would execute each default life cycle phase in order including `validate`, `compile`, `test` before executing `package`.
- We only need to call the last build phase to be executed.

Abstraction?

Interface?

PARALLEL Execution

Sauce labs

SELENIUM GRID AUTOMATION

SAUCE LABS

* In my current project I am using sauce labs for parallel testing in different platforms as well as browsers like Chrome, Firefox, Internet Explorer, Safari and others. The steps for my parallel testing are....

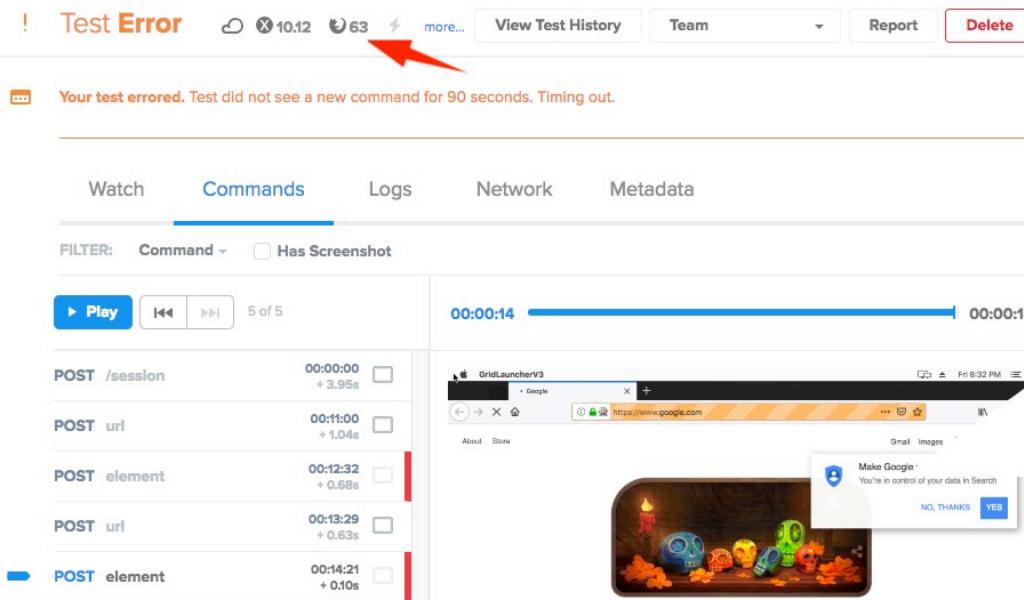
First I need to make sure that I have the ACCESS_KEY which is provided in my documentation. This key is available for my team. Second I make sure to enter Username specified for this account. Then I verify that my method to connect to sauce labs has the proper credentials.

When I am doing my testing I call on my method from our utility class for sauce labs connection. Inside that method I have Desire Capabilities which specifies what browser I want to run, also my platform and my set capability which will call on the latest version of the machine. I can give you an example if you allow me:

Example:

```
public class SauceLabsDemo {  
  
    WebDriver driver;  
  
    public static final String USERNAME = "AdmiralCoder";  
    public static final String ACCESS_KEY = "072e6fe7-8cb3-4eba-81c1-6cb6104d0541";  
    public static final String URL = "https://" + USERNAME + ":" + ACCESS_KEY +  
    "@ondemand.saucelabs.com:443/wd/hub";  
  
    @BeforeTest  
    public void setUp() throws MalformedURLException {  
        DesiredCapabilities caps = DesiredCapabilities.chrome();  
        caps.setPlatform(Platform.SIERRA);  
        caps.setCapability("version", "latest");  
  
        driver = new RemoteWebDriver(new URL(URL), caps);  
    }  
  
    @Test  
    public void testGoogle() throws InterruptedException {  
        driver.get("https://google.com");  
        driver.findElement(By.id("q")).sendKeys("Java programming" + Keys.ENTER);  
        System.out.println(driver.getTitle());  
        Assert.assertTrue(driver.getTitle().startsWith("Java programming"));  
    }  
}
```

SAUCE LABS REPORT FAILED TEST



The screenshot shows the Sauce Labs Test History interface. At the top, there's a navigation bar with icons for cloud, device (10.12), user (63), and more, followed by buttons for View Test History, Team, Report, and Delete. Below this, a message says "Your test errored. Test did not see a new command for 90 seconds. Timing out." The main area has tabs for Watch, Commands (which is selected), Logs, Network, and Metadata. Under Commands, there's a table with columns for Command, Duration, and Status. The table shows five commands: POST /session, POST url, POST element, POST url, and POST element. The last command is highlighted with a blue bar. To the right of the table is a timeline showing the execution of these commands over 14 seconds. Below the timeline is a screenshot of a browser window showing a Google search results page with a "Make Google" pop-up.

Command	Duration	Status
POST /session	00:00:00 + 3.95s	Success
POST url	00:11:00 + 1.04s	Success
POST element	00:12:32 + 0.68s	Success
POST url	00:13:29 + 0.63s	Success
POST element	00:14:21 + 0.10s	Success

Selenium GRID

Selenium GRID

In my current project I am using selenium Grid for parallel execution we have method in our driver class that calls on executing in different platforms and browsers. Because selenium is grid is managed by me I make sure to have a small regression that is performed every week for my current user stories that I am working on. For that I use selenium grid with the help of one of our EC2 virtual machines. Inside my virtual machine I have set up VSGRID for my nodes and hubs. Currently I am only testing in 2 nodes and 10 different hubs. Because our project is not very complex I make sure this set up is always working. Let me give you an example on how I set up my selenium grid.

Example:

I have a method in my Driver class that calls on my selenium Grid which contains DesiredCapabilities, set platform, and the remoteWebDriver which calls on my ec2 virtual machine location and the setting for my Desire capabilities

Let me go more into detail for example:

```
public static WebDriver getDriver() {
    if (driver == null) {
        switch (ConfigurationReader.getProperty("browser")) {
            case "chrome":
                WebDriverManager.firefoxdriver().setup();
                driver = new FirefoxDriver();
                DesiredCapabilities caps = DesiredCapabilities.chrome();
                caps.setPlatform(Platform.ANY);
                try {
                    driver = new RemoteWebDriver(new URL("http://54.145.29.46:4444/wd/
hub"), caps);
                } catch (MalformedURLException e) {
                    // TODO Auto-generated catch block
                    e.printStackTrace();
                }
                break;
            case "firefox":
                WebDriverManager.chromedriver().setup();
                driver = new ChromeDriver();
                break;
            default:
                WebDriverManager.firefoxdriver().setup();
                driver = new FirefoxDriver();
        }
    }
    return driver;
}
```

#1 way

```
public class JDBCConnection {
    String oracleDbUrl = "jdbc:oracle:thin:@ec2-52-70-143-199.compute-1.amazonaws.com:1521:xe";
    String oracleDbUsername = "hr";
    String oracleDbPassword = "hr";

    @Test(enabled=false)
    public void oracleJDBC() throws SQLException {
        Connection connection=DriverManager.getConnection(oracleDbUrl, oracleDbUsername,
        oracleDbPassword);
        //Statement statement=connection.createStatement();
        Statement
        statement=connection.createStatement(ResultSet.TYPE_SCROLL_INSENSITIVE,ResultSet.CONCUR_READ_ONLY);
        ResultSet resultSet = statement.executeQuery("select * from countries");

        resultSet.last();
        int rowsCount = resultSet.getRow();
        System.out.println("Number of rows:" + rowsCount);

        resultSet.first();
        while(resultSet.next()) {
            System.out.println(resultSet.getString(1)+"-"+resultSet.getString("country_name")
            +"-"+resultSet.getInt("region_id"));
        }
        resultSet.close();
        statement.close();
        connection.close();
    }
}
```

#2nd way simple explanation

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 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.

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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 whereas throws is used in declaration of exception.
- Without throws, Checked exception cannot be handled whereas 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 are 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.

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 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 run method 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.

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 cluttered and sometimes error-prone when dynamic overriding or dynamic overloading in some situations.

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.

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,orwhile switch,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.

List primitive Java types?

The eight primitive types are byte, char, short, int, long, float, double, and boolean.

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 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.

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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.

instance and cannot use "this" operator to refer 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 call 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

API testing

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Tests perform on API

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API INTERVIEW QUESTIONS

Q #1) What is API Testing?

API is a collection of routines, tools, protocols that together are required for building the software application. Any system software or application software which consists of multiple APIs can perform Application Programming Interface (API) testing.

This form of testing includes interaction between various or says multiple APIs as well as the interaction between API and application program. The procedure mainly includes making API calls using software and observing system response after receiving output.

Q #2) Enlist some common tests that are performed on APIs.

There can be multiple reasons for performing API testing.

Let us see some common test examples, where this form of testing is used to verify:

- Any data structure updated by API which requires proper validation.
- Input condition based return values.
- Call to another API or if any other event is triggered or some interruption is raised.
- The return values which can also be null or wrong results.
- Modification of some resources like an update of the database, process killing, etc.

Api Test Environment

API Testing

Approach

Q #3) What is API test environment?

Setting up a test environment of API is a complex method where the configuration of the server and database is done as per the requirement of the software application. Graphical user interface (GUI) is not available in this form of testing.

After installation, API is checked for its proper functioning. In this process initial environment that invokes API is being set up with a defined set of parameters so that test results can be examined.

Q #4) Explain API testing approach.

Mentioned below are the factors which determine the approach:

- Write appropriate test cases for the APIs and use testing techniques like boundary value analysis, equivalence class, etc. for verifying the

Tools for

API Testing

- 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.

API
documenta

tion

Api testing Methods

Q #7) What are the tools used for API testing?

Best API Testing tools:

The different tools used for API testing are enlisted below:

- SOAPUI
- Runscope
- LOADUI
- Automated API testing
- Curl

There are few more others than these listed above tools which are used for API

Q #11) Name some most used templates for API documentation.

Enlisted below are some free templates which makes API documentation much easier and simple:

- Slate
- FlatDoc
- Swagger
- API blueprint
- RestDoc
- Miredot

API Challenges

Q #13) What are the testing methods that come under API testing?

API testing generally involves following testing methods:

- Unit testing and Functional testing
- Load testing for testing the performance under load.
- Discovery testing for listing, creating and deleting the number of calls that has been documented in API.
- Usability testing and Reliability testing for obtaining consistent results.

- Security testing and Penetration testing for validating all types of authentication.
- Automation testing for creating and executing scripts that require API calls execution regularly.
- End to end Integration testing and Web UI testing.
- API documentation testing for determining its efficiency and effectiveness.

Q #15) What all challenges are included under API testing?

- The first and foremost challenge is selecting an appropriate parameter and then its combination.
- Parameter categorization
- Proper sequencing of call is required as this may lead to inadequate coverage in testing.
- Output verification and validation
- Another important challenge is providing input values, which is very difficult as GUI is not available in this case.
- Inconsistent or absence of error handling mechanism
- Repetition or redundancy of the functionalities
- Missing required functionality in some cases
- Passing incorrect argument to the input values
- Improper messaging
- Stress and performance issues
- Reliability issues with respect to connection with other APIs
- Multithreading and improper handling issues.

- 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 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

- **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

JAVA TECHNICAL QUESTIONS

- Reverse int Array

```
public class reverseArray {  
    public static void main(String... args) {  
        int[] array = {2, 3, 45, 2, 1, 4, 5, 3};  
        System.out.println("array is " + Arrays.toString(array));  
        reverse(array);  
        System.out.println("reverse array is " + Arrays.toString(array));  
    }  
  
    private static void reverse(int[] array) {  
        int maxIndex = array.length - 1;  
        int halfLength = array.length / 2;  
        for (int i = 0; i < halfLength; i++) {  
            int temp = array[i];  
            array[i] = array[maxIndex - i];  
            array[maxIndex - i] = temp;  
        }  
    }  
}
```

Result:

```
array is [2, 3, 45, 2, 1, 4, 5, 3]  
reverse array is [3, 5, 4, 1, 2, 45, 3, 2]
```

API Interview Questions?

Request / Response

- What is request and response in API?

- Lets say we have an example for log in we will carry your username and password, then we will get the response type weather log in information is in correct or not
- Request -> what front end sends
- Response -> what it receives back

Endpoints

Rest is Stateless which means client data is not stored on the server it uses HTTP protocol

- What are end points in API?

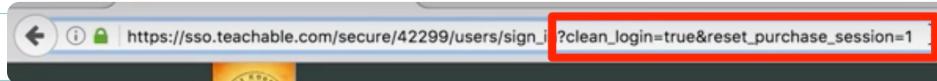
- Lets say we have complete Address
 - Home Number
 - Street Address
 - City
 - Zip
 - State
 - Country
- In order to talk to a server to request information you need URI, Resources, Parameters
 - URI -> Street Address



- Resources -> Specific Page



- Parameters -> data to filter resources when we want to get specific data from the resource



CRUD / HTTP

- HTTP what is it and what keywords are you familiar with? Also known as CRUD (application). "Create, Read, Update, Delete"

- Get -> Read -> reading the information
- Post -> Create -> New Information
- Put -> Update -> modifying existing information
- Delete -> Delete -> delete information from server

API

- What are Headers in API?

- It contains information for full request and response.

	Headers	Preview	Response	Timing
General	Request URL: https://lh3.googleusercontent.com/-6Ef4Maugp5c/AAAAAAAIAI/AAAAAAAABtNlbDi6SCS7KirCcB72fi-s0xVBtKaw/s32-c-mo/photo.jpg Request Method: GET Status Code: 200 (from memory cache) Remote Address: 172.217.8.1:443 Referrer Policy: no-referrer-when-downgrade			

- It contains Request and Response information

	Request Headers	Response Headers
Request Headers	Provisional headers are shown Referer: https://notifications.google.com/ User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_13_3) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/69.0.3497.100 Safari/537.36	access-control-allow-origin: * access-control-expose-headers: Content-Length alt-svc: quic=":443"; ma=2592000; v="44,43,39,35" cache-control: public, max-age=86400, no-transform content-disposition: inline;filename="" content-length: 425 content-type: image/png date: Sat, 27 Oct 2018 01:13:13 GMT expires: Sun, 28 Oct 2018 01:13:13 GMT server: fife status: 200 timing-allow-origin: * vary: Origin x-content-type-options: nosniff x-xss-protection: 1; mode=block

API Interview Questions?

Request / Response

- What is the most important thing you verify when doing API testing?
 - One the status code
 - Action response (completed, success, error)
 - Then other few details
- This is the most important things you verify when doing RestAPI testing aside from testing data

HTTP CODES

 Headers are valid

 200 OK 125.40 ms

 Headers are valid

 404 Not Found 63.00 ms

Endpoints

- How do you test rest API?

- In my current project when I test the API what I do is verify that each end Rest API end point is working as expected
- I send POST, PUT, GET, DELETE type of requests and verify response status code and response body.
- Currently I am performing positive and negative testing of API.

API GET METHOD and ABSTRACT CLASS used in Get API Method

```

public void get(String url) throws ClientProtocolException, IOException {
    CloseableHttpClient httpClient = HttpClients.createDefault();
    HttpGet httpget = new HttpGet(url); // http get request
    CloseableHttpResponse closeableHttpResponse = httpClient.execute(httpget); // hit the GET
    URL
    // a. getting status code
    int statusCode = closeableHttpResponse.getStatusLine().getStatusCode();
    System.out.println("Status Code --->" + statusCode);

    // b. getting JSON format String
    String responseString = EntityUtils.toString(closeableHttpResponse.getEntity(),
    "UTF-8");

    JSONObject responseJson = new JSONObject(responseString);
    System.out.println("Response JSON from API --->" + responseJson);

    // c. getting all headers from API
    Header[] headersArray = closeableHttpResponse.getAllHeaders();
    HashMap<String, String> allHeaders = new HashMap<String, String>();

    for (Header header : headersArray) {
        allHeaders.put(header.getName(), header.getValue());
    }

    System.out.println("Headers Array --->" + allHeaders);
}
}
=====
```

CloseableHttpClient : This is a Abstract class that is used in API when you connect to a HttpClient
`HttpClients.createDefault();` = will create 1 client connection it will return one
`closeableHttpClient object.`

Database Testing

DataBase Testing

• HOW DO YOU TEST THE DATABASE?

- in my current project I am testing the database by using DatabaseConnection Method (in my method I have 3 parameters for url userID and password) when I call on this. Method I execute my database for any testing needed. For manual Testing I Use SQL Developer for Queries.
- Let me give you one simple example:
- I will have my URL, User ID and password

Explain your Database Testing Approach and Provide examples

• ----- Example -----

```

String oracleDbUrl = "jdbc:oracle:thin:@ec2-52-70-143-199.compute-1.amazonaws.com:1521:xe";
String oracleDbUsername = "hr";
String oracleDbPassword = "hr";

@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 rsMdata = resultSet.getMetaData();

    int colCount = rsMdata.getColumnCount();

    while(resultSet.next()) {
        Map<String, Object> rowMap = new HashMap<>();

        for(int col = 1; col <= colCount; col++) {
            rowMap.put(rsMdata.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();
}

```

SQL QUERIES

Sql Queries
Toad
SQL Developer

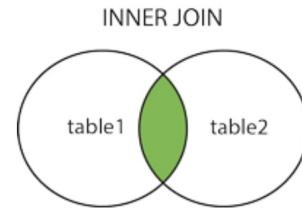
SQL

INNER JOIN Syntax

JOINS
Inner Join

```
SELECT column_name(s)
FROM table1
```

```
INNER JOIN table2 ON table1.column_name = table2.column_name;
```



Examples:

Table ORDERS

OrderID	CustomerID	EmployeeID	OrderDate	ShipperID
10308	2	7	1996-09-18	3
10309	37	3	1996-09-19	1
10310	77	8	1996-09-20	2

Table CUSTOMERS

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico

```
SELECT Orders.OrderID, Customers.CustomerName
FROM Orders
INNER JOIN Customers ON Orders.CustomerID =Customers.CustomerID;
```

Result:

Number of Records: 196

OrderID	CustomerName
10308	Ana Trujillo Emparedados y helados
10309	Hungry Owl All-Night Grocers
10310	The Big Cheese
10311	Du monde entier
10312	Die Wandernde Kuh
10313	QUICK-Stop
10314	Rattlesnake Canyon Grocery
10315	Island Trading
10316	Rattlesnake Canyon Grocery

Left Join SQL

LEFT JOIN

```
SELECT column_name(s)
FROM table1
LEFT JOIN table2 ON table1.column_name = table2.column_name;
```

Examples:

Table Customers

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
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QUERY:

```
SELECT Customers.CustomerName, Orders.OrderID
FROM Customers
LEFT JOIN Orders
ON Customers.CustomerID=Orders.CustomerID
ORDER BY Customers.CustomerName;
```

Result:

Number of Records: 213

CustomerName	OrderID
Alfreds Futterkiste	null
Ana Trujillo Emparedados y helados	10308
Antonio Moreno Taquería	10365
Around the Horn	10355
Around the Horn	10383
B's Beverages	10289
Berglunds snabbköp	10278
Berglunds snabbköp	10280
Berglunds snabbköp	10384
Blauer See Delikatessen	null
Blondel père et fils	10265

Right Join SQL

Right JOINS

```

SELECT column_name(s)
FROM table1
RIGHT JOIN table2 ON table1.column_name = table2.column_name;
    
```

Examples:

Table ORDERS

OrderID	CustomerID	EmployeeID	OrderDate	ShipperID
10308	2	7	1996-09-18	3
10309	37	3	1996-09-19	1
10310	77	8	1996-09-20	2

Table EMPLOYEES

EmployeeID	LastName	FirstName	BirthDate	Photo
1	Davolio	Nancy	12/8/1968	EmplD1.pic
2	Fuller	Andrew	2/19/1952	EmplD2.pic
3	Leverling	Janet	8/30/1963	EmplD3.pic

QUERY:

```

SELECT Orders.OrderID, Employees.LastName, Employees.FirstName
FROM Orders
    
```

RIGHT JOIN Employees

```

ON Orders.EmployeeID = Employees.EmployeeID
ORDER BY Orders.OrderID;
    
```

Result:

10257	Peacock	Margaret
10258	Davolio	Nancy
10259	Peacock	Margaret
10260	Peacock	Margaret
10261	Peacock	Margaret
10262	Callahan	Laura
10263	Dodsworth	Anne
10264	Suyama	Michael
10265	Fuller	Andrew
10266	Leverling	Janet

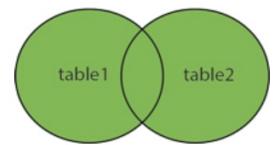
Full Join SQL

FULL JOINS

```
SELECT column_name(s)
FROM table1
```

```
FULL OUTER JOIN table2 ON table1.column_name = table2.column_name;
```

FULL OUTER JOIN



Examples:

Table CUSTOMERS

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico

Table ORDERS

OrderID	CustomerID	EmployeeID	OrderDate	ShipperID
10308	2	7	1996-09-18	3
10309	37	3	1996-09-19	1
10310	77	8	1996-09-20	2

QUERY:

```
SELECT Customers.CustomerName, Orders.OrderID
FROM Customers
FULL OUTER JOIN Orders ON Customers.CustomerID=Orders.CustomerID
ORDER BY Customers.CustomerName;
```

CustomerName	OrderID
Alfreds Futterkiste	
Ana Trujillo Emparedados y helados	10308
Antonio Moreno Taquería	10365
	10382
	10351

SELF JOIN

FULL JOINS

```
SELECT column_name(s)
FROM table1 T1, table1 T2
WHERE condition;
```

Examples:

Table CUSTOMERS

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico

QUERY:

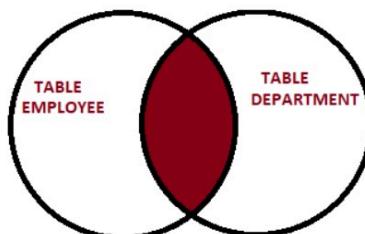
```
SELECT A.CustomerName AS CustomerName1, B.CustomerName AS
CustomerName2, A.City
FROM Customers A, Customers B
WHERE A.CustomerID <> B.CustomerID
AND A.City = B.City

ORDER BY A.City;
```

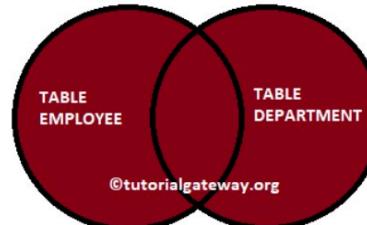
Result:

Number of Records: 88		
CustomerName1	CustomerName2	City
Cactus Comidas para llevar	Océano Atlántico Ltda.	Buenos Aires
Cactus Comidas para llevar	Rancho grande	Buenos Aires
Océano Atlántico Ltda.	Cactus Comidas para llevar	Buenos Aires
Océano Atlántico Ltda.	Rancho grande	Buenos Aires
Rancho grande	Cactus Comidas para llevar	Buenos Aires
Rancho grande	Océano Atlántico Ltda.	Buenos Aires
Furia Bacalhau e Frutos do Mar	Princesa Isabel Vinhoss	Lisboa
Princesa Isabel Vinhoss	Furia Bacalhau e Frutos do Mar	Lisboa
Around the Horn	B's Beverages	London
Around the Horn	Consolidated Holdings	London

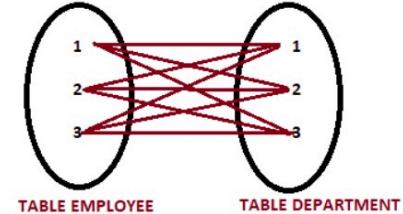
INNER JOIN EXAMPLE



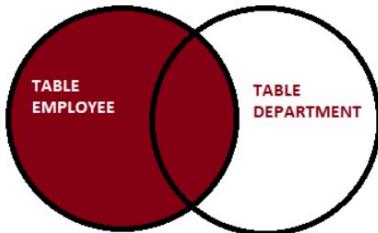
FULL JOIN EXAMPLE



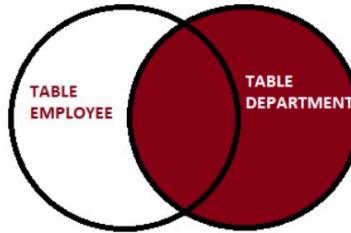
CROSS JOIN EXAMPLE



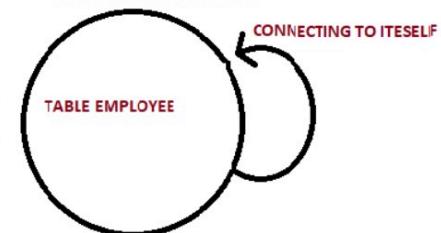
LEFT JOIN EXAMPLE



RIGHT JOIN EXAMPLE



SELF JOIN EXAMPLE



SQL-DEVELOPER QUERIES

-- write a query that will print the count of employees working in department id 10

```
select count(*)  
from employees  
where department_id=100;
```

-- write a query that will return employee first name and salary records. return employee

-- details even if the salary record is not present for the employee

```
select e.first_name, s.manager_id  
from employees e join departments s  
on e.department_id = s.department_id;
```

-- query to fetch all employees who are also managers from employees table

```
select distinct e.first_name, e.employee_id, m.manager_id  
from employees e  
inner join employees m  
on e.employee_id = m.manager_id;
```

-- Get employee details from employee table

-- whose employee name are not "John" and "Roy"

```
select * from employees  
where first_name not in ('John','Roy');
```

-- Get first name, last name and department id from employees

-- who work on department id 100 and first name Starts with J.

```
select first_name, last_name, DEPARTMENT_ID  
from employees  
where DEPARTMENT_ID=100  
and FIRST_NAME like 'J%';
```

-- Get department,no of employees in a department,total salary with respect

-- to a department from employee table order by total salary descending

```
select department_id, count(first_name) employee_count, sum(salary) Total_Salary  
from employees group by DEPARTMENT_ID order by Total_Salary desc;
```

- **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 **Relational Database Management System**. 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.

- **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 filed cannot be a NULL

- 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

2

3

```
SELECT * FROM Table1
```

```
UNION
```

```
SELECT * FROM Table2
```

Output: Total 19 records

If you run **Union all** query.

1

2

3

```
SELECT * FROM Table1
```

```
UNION ALL
```

```
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.

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```

```
UNION
```

```
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```

Output: Total 19 records

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1

2

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```
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```

```
UNION ALL
```

```
SELECT * FROM Table2
```

Output: Total 20 records

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Getting & Creating Projects

Command	Description
<code>git init</code>	Initialize a local Git repository
<code>git clone ssh://git@github.com/[username]/[repository-name].git</code>	Create a local copy of a remote repository

Basic Snapshotting

Command	Description
<code>git status</code>	Check status
<code>git add [file-name.txt]</code>	Add a file to the staging area
<code>git add -A</code>	Add all new and changed files to the staging area
<code>git commit -m "[commit message]"</code>	Commit changes
<code>git rm -r [file-name.txt]</code>	Remove a file (or folder)

Branching & Merging

Command	Description
<code>git branch</code>	List branches (the asterisk denotes the current branch)
<code>git branch -a</code>	List all branches (local and remote)
<code>git branch [branch name]</code>	Create a new branch
<code>git branch -d [branch name]</code>	Delete a branch
<code>git push origin --delete [branchName]</code>	Delete a remote branch
<code>git checkout -b [branch name]</code>	Create a new branch and switch to it
<code>git checkout -b [branch name] origin/[branch name]</code>	Clone a remote branch and switch to it
<code>git checkout [branch name]</code>	Switch to a branch
<code>git checkout -</code>	Switch to the branch last checked out
<code>git checkout -- [file-name.txt]</code>	Discard changes to a file
<code>git merge [branch name]</code>	Merge a branch into the active branch
<code>git merge [source branch] [target branch]</code>	Merge a branch into a target branch
<code>git stash</code>	Stash changes in a dirty working directory
<code>git stash clear</code>	Remove all stashed entries

Sharing & Updating Projects

Command	Description
<code>git push origin [branch name]</code>	Push a branch to your remote repository
<code>git push -u origin [branch name]</code>	Push changes to remote repository (and remember the branch)
<code>git push</code>	Push changes to remote repository (remembered branch)
<code>git push origin --delete [branch name]</code>	Delete a remote branch
<code>git pull</code>	Update local repository to the newest commit
<code>git pull origin [branch name]</code>	Pull changes from remote repository
<code>git remote add origin ssh://git@github.com/[username]/[repository-name].git</code>	Add a remote repository
<code>git remote set-url origin ssh://git@github.com/[username]/[repository-name].git</code>	Set a repository's origin branch to SSH

Inspection & Comparison

Command	Description
<code>git log</code>	View changes
<code>git log --summary</code>	View changes (detailed)
<code>git diff [source branch] [target branch]</code>	Preview changes before merging

