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1. [**What is Selenium WebDriver?**](#_bookmark21)

[WebDriver (](#_bookmark21)[3.141.59](https://mvnrepository.com/artifact/org.seleniumhq.selenium/selenium-java/3.141.59)[); is a web automation framework and allows you to execute your tests in different browsers. (November 2018)](#_bookmark21)

[**65. Which methods do WebDriver interface have?**](#_bookmark22)

[getCurrentUrl();getTitle();close();quit();getWindowHandles();getWindowHan dle();switchTo(); manage();navigate();getPageSource();](#_bookmark22)

1. [**What are the advantages of Selenium?**](#_bookmark22)

[Selenium is open source and free to use without any licensing cost It supports multiple languages like Java, Ruby, Python, C#...](#_bookmark22)

[It supports multi-browser testing](#_bookmark22)

[It has a good number of resources and helping community](#_bookmark22)

[It supports many operating systems like Windows, Mac, Linux Interact with the web application](#_bookmark22)

1. [**What are the disadvantages of Selenium?**](#_bookmark22)

[Selenium supports only web-based applications, does not support windows- based application](#_bookmark22)

[No built-in reporting tool, it needs third party tools for report generation activity](#_bookmark22)

[Cannot work with graphics, captchas, barcodes, shapes It does not support file upload facility](#_bookmark22)

[Hard to master, requires developer level knowledge Hard to write good locators](#_bookmark22)

[Hard to synchronize](#_bookmark22)

1. [**What are the limitations of Selenium?** We cannot test desktop application We cannot test web services](#_bookmark22)

[We must use external libraries and tools for performing tasks like testing framework (TestNG, JUnit), reading from external files (Apache POI for excel)](#_bookmark22)

[Automating Captcha is not possible using Selenium It does not support file upload facility](#_bookmark22)

1. [**What types of testing do you automate with Selenium?**](#_bookmark22)

[*functional tests (positive/negative, UI) smoke tests*](#_bookmark22)

[*regression tests integration tests end to end testing data driven*](#_bookmark22)

1. [**What we don't do with selenium?**](#_bookmark22)

[*Performance, load, stress testing (These tests are done by experts trained in these*](#_bookmark22)

[*tools)*](#_bookmark22)

[*Pure database testing (if we only test the DB itself),*](#_bookmark22)

[*Unit tests..., look and feel based testing (color, shapes, etc.), static testing*](#_bookmark22)

[**18. What is framework?**](#_bookmark22)

[In test automation, framework is the blueprint of test automation.](#_bookmark22)

[It includes your folder structures, where to save you function library, test results, test data, resources.](#_bookmark22)

[It is essential because when you are working on automation project everyone will have a guideline to follow and our script will be easier to maintain.](#_bookmark22)

1. [**What is Selenium Framework**](#_bookmark22)
   * [Framework is the blueprint of test automation. It includes your folder structures, where to save you function library, test results, test data, resources. There are mainly 3 types of frameworks created by Selenium WebDriver to automate test cases:](#_bookmark22)

[***Data Driven Framework***](#_bookmark22)

* + [All our test data is generated from some external files.](#_bookmark22)
    - [excel or](#_bookmark22)
    - [scenario outline in feature file or](#_bookmark22)
    - [TestNG Data Provider](#_bookmark22)
  + [Selenium WebDriver is a great tool to automate web-based applications. But it does not support read and write operations on excel files. Therefore, we use third party APIs like Apache POI.](#_bookmark22)

[***Keyword Driven Framework***](#_bookmark22)

* + [Keyword driven testing is a scripting technique that uses data files to contain the keywords related to the application being tested.](#_bookmark22)
  + [Keywords are written in some external files like excel file. Java code will call this file and execute test cases.](#_bookmark22)

[***Hybrid Driven Framework***](#_bookmark22)

* + [A combination of the DDF and KDF is commonly said to be HDF.](#_bookmark22)
  + [Both the test data and test action are kept in external files.](#_bookmark22)

[**44. Components of Selenium?**](#_bookmark22)

[***Selenium IDE*** implemented as a Chrome and Firefox extension, and allows you to record, edit, and debug tests.](#_bookmark22)

[***Selenium RC*** to write automated web application UI tests in any programming language](#_bookmark22)

[***Selenium WebDriver*** execute your tests against different browsers](#_bookmark22)

[***Selenium GRID*** run your tests on different machines against different browsers in parallel.](#_bookmark22)

1. [**Challenges with Selenium?**](#_bookmark26)
   * [***Sync issue***](#_bookmark26)
   * [Sync issue or I would say timeout issue is one of the most challenging tasks in any test automation tool. If we do not handle sync issue, then most of the script will fail. In one of the test surveys, it as found that 80% of scripts fail due to improper sync while performing actions.](#_bookmark26)
   * [We can avoid this by using smart wait, which is present in Selenium like implicit wait, explicit wait, fluent wait](#_bookmark26)
   * [***Smart locators*** –locating elements](#_bookmark26)
   * [As we all know that locators are the core part of any scripting, and We need to keep on enhancing our XPath and CSS for script stability because if XPath and CSS are not proper then it fails in upcoming releases.](#_bookmark26)
   * [We should always write dynamic or custom XPath or class which can make our script more stable.](#_bookmark26)
   * [***Pop up handling***](#_bookmark26)
   * [In many applications, you will find random pop keeps coming and their behavior is not persistence, so we also must take care of these unwanted pop up which stops our execution.](#_bookmark26)
2. [**Implicit Wait vs Explicit Wait?**](#_bookmark22)

[***Implicit wait*** is a wait which waits for a specified time while locating an element before throwing “NoSuchElementException”. As by default selenium tries to find elements immediately without any wait. So, it is good to use implicit wait. This wait applied to all elements of the current driver instance.](#_bookmark22)

[***Explicit wait*** is a wait which is applied to a particular webelement until the ExpectedCondition specified is met.](#_bookmark22)

[Implicit wait is simply; if condition is met before the timeout, it will continue to next step, if condition is not met within timeout throw "No Such Element" exception.](#_bookmark22)

[Explicit wait sometimes we need to wait for a certain event/condition such as element is visible, clickable, enabled.](#_bookmark22)

[*driver.manage().timeouts().implicitlyWait(5,TimeUnit.SECONDS); webDriverWait wait = new WebDriverWait (driver, 5);*](#_bookmark22)

[*wait.until (ExpectedConditions.visibilityOf(element);*](#_bookmark22)

1. [**What is fluentWait?**](#_bookmark22)

[With Fluent wait you can set how frequently Selenium should check back if condition is not met. It is done with parameter PollingEvery.](#_bookmark22)

[Subtype of explicit wait but you can override the conditions Wait<WebDriver>wait=newFluentWait<Webdriver>(driver).withTimeout(5,ti](#_bookmark22)

[meUnit.seconds).pollingEvery(100,timeunit.milliseconds).ignoring(NoSuchElementE xception.class);](#_bookmark22)

1. [***What are various ways of locating an element in Selenium?***](#_bookmark24)

[*Id Name*](#_bookmark24)

[*ClassName Xpath*](#_bookmark24)

[*CSS*](#_bookmark24)

[*LinkText PartialLinkText TagName*](#_bookmark24)

1. [**Why can't I find the element?**](#_bookmark22)

[Locator changed There is an iframe](#_bookmark22)

[Waiting time: page is loading slowly, or Element is dynamic: locator Page is not fully loaded/opened](#_bookmark22)

[Page changes and that element does not exist anymore](#_bookmark22)

1. [**What is Xpath?**](#_bookmark22)

[Xpath is used to find the location of any element on a webpage using html structure.](#_bookmark22)

[We could navigate through elements and attributes in an XML document to locate web Elements such as textbox, button, checkbox, Image ext... in Webpage](#_bookmark22)

1. [**How do you handle dynamic elements?**](#_bookmark22)

[Find the static part of the id and write a locator (xpath or css) --> And then use Startswith, contains, EndsWith](#_bookmark22)

[*contains () --> //\*[contains(@name=`btn`)] startwith( ) --> //label[startwith(@id, `message`)] text () --> //td[text () = `usedId`]*](#_bookmark22)

[*or & and --> //input [@type = `submit` AND @name = `login`]*](#_bookmark22)

1. [**How can we move to parent element using xpath?**](#_bookmark22)

[Using (/..), /*parent::* and *//ancestor::* expression in xpath, we can move to parent element](#_bookmark22)

1. [**How can we move to the nth child element using xpath?**](#_bookmark22)
   * [using square brackets with index position](#_bookmark22)
     + [For ex: div[2] will find the second div element](#_bookmark22)
   * [using position () method](#_bookmark22)
     + [For ex: div[position()=2] will find the second div element](#_bookmark22)
2. [**Difference between xpath and css selector?**](#_bookmark22)

[With xpath, we can search elements backward or forward, while css works only in forward direction](#_bookmark22)

[Xpath can work with text, css cannot work](#_bookmark22)

[Xpath has more combination and can search by index, css cannot search by index, but css is working faster than xpath](#_bookmark22)

[**27. How to find all links in the page?**](#_bookmark22)

[*List<WebElement> list = driver.findElements(By.tagName(“a”));*](#_bookmark22)

1. [**Difference between following and following-sibling?**](#_bookmark22)

[Following-sibling will return only elements related to the parent, where following will return all matching elements after parent in HTML](#_bookmark22)

1. [**What does "ancestor:: tagname" doing?**](#_bookmark22)

[The ancestor axis selects all ancestor elements (parent, grandparent, great- grandparents, etc.) of the current node.](#_bookmark22)

1. [**What does "preceding:: tagname" doing?**](#_bookmark22)

[The preceding axis selects all nodes that come before the current node in the document, except ancestor, attribute nodes, and namespace nodes.](#_bookmark22)

[**63 What to do if you have a lot of spaces on the left or right side of your text in HTML?**](#_bookmark23)

[you can use normalize-space function. //\*[normalize- space(text())='Something']](#_bookmark23)

1. [**n’th child element using XPath?**](#_bookmark23)
   1. [using square brackets with index position div[2] will find the second div element](#_bookmark23)
   2. [using position ( ) method](#_bookmark23)

[div[position()=2] will find the second div element](#_bookmark23)

1. [**verify the position of the WebElement on the page?**](#_bookmark23)
   * [WebElement class has a get Location method with returns the top left corner of the element](#_bookmark23)

[*element.getLocation();*](#_bookmark23)

1. [**How do you find elements in POM?**](#_bookmark22)

[@FindBy(id = " ")](#_bookmark22)

[public WebElement name;](#_bookmark22)

1. [**How to you travel between siblings?**](#_bookmark22)

[<div id="player" class="style-scope ytd-watch-flexy">](#_bookmark22)

* 1. [<div id="header" class="style-scope ytd-item-section-renderer"></div>](#_bookmark22)
  2. [<div id="spinner-container" class="style-scope ytd-item-section-](#_bookmark22)

[1 and 2 is siblings so we can move from 1 to 2 using following-sibling::div](#_bookmark22)

[*//div[@id='columns']//div[@id='primary']/following-sibling::div*](#_bookmark22)

[1 and 2 is siblings so we can move from 2 to 1 using preceding-sibling::div](#_bookmark22)

[*//div[@id='secondary']/preceding-sibling::div*](#_bookmark22)

[**114. Some Xpath sample with and-or?**](#_bookmark22)

[< input type='submit' name='btnLogin' value='Login'>](#_bookmark22)

[< input type='reset' name='btnReset' value='RESET'>](#_bookmark22)

[***Sample with and***](#_bookmark22)

[//input[@type='submit' and @name='btnLogin']](#_bookmark22)

[***Sample with or***](#_bookmark22)

[//input[@type='submit' or @name='btnLogin']](#_bookmark22)

[***Sample with or***](#_bookmark22)

[//input[@type='submit' and @name='btnReset']](#_bookmark22)

[**129. List the locator performance?**](#_bookmark23)

1. [ids are the safest, fastest locator option and should always be your first](#_bookmark23)

[choice](#_bookmark23)

1. [CSS and name faster than xpath](#_bookmark23)
2. [xpath locators most flexible in order to build reliable web element](#_bookmark23)

[locators very slow locator since in order to locate the element it needs to traverse the whole DOM of the page which is a time-consuming operation.](#_bookmark23)

[**20. What is the key class in Selenium?**](#_bookmark23)

[Gives us option for pressing keys from keyboard Keys.ENTER](#_bookmark23)

[MUST BE PASSED TO SendKeys() method](#_bookmark23)

[*sendkeys(“charger” + keys.ENTER)*](#_bookmark23)

[**21. What if there is a dynamic popup that comes up randomly?**](#_bookmark23)

[Use try/catch with alert](#_bookmark23)

[**23. How do you handle JavaScript alerts (browser pop ups)?**](#_bookmark23)

[If the alert on the browser comes from JavaScript, we use the Alert class.](#_bookmark23)

[*Alert alert = driver.switchTo.alert();*](#_bookmark23)

[***alert.accept(); alert.dismiss(); alert.sendKeys(); alert.getText();***](#_bookmark23)

1. [**Do you use JavaScriptExecutor?**](#_bookmark23)

[Yes, in particularly I use JavaScript click method and scrollintoview methods. We can send JS commands to the browser with using this class](#_bookmark23)

[*JavaScriptExecutor jsExecutor=(JavaScriptExecutor)driver; executeScript();* performs the command](#_bookmark23)

[Inside the parameter is where you put JS code](#_bookmark23)

[You can also put 2 parameters is. executeScript(“js code”,element);](#_bookmark23)

* + [Used for scrolling (selenium is not good with scrolling, you can say a challenge is when I was working on terms and condition page, where you have to read the page before clicking on continue.](#_bookmark23)
  + [When I tried using selenium and actions class it didn't work, so I used](#_bookmark23)

[**JavaScriptExecutor** and clicking an element.](#_bookmark23)

[**24. How to handle multiple frames?**](#_bookmark23)

[Frames used to embed a html page into another](#_bookmark23)

[**Steps**](#_bookmark23)

[parameter](#_bookmark23)

[Locate the iframe](#_bookmark23)

[Switch to another iframe with driver.switchTo().frame();](#_bookmark23)

[.frame() --> takes string, Integer, webElement, name or id directly as](#_bookmark23)

[driver.switchTo().frame(webElement); driver.switchTo().frame();](#_bookmark23)

[Now you are in the 2nd frame, if you want to find an element outside of the 2nd frame (that you’re currently on) throws NosuchElementException](#_bookmark23)

[If you need to switch back to previous frame ***driver.switchTo().parentFrame()*** --> Goes one level up ***driver.switchTo().defaultcontent()*** --> Goes to the very top](#_bookmark23)

[Can switch using count](#_bookmark23)

[***driver.switchTo(0)*** --> Counts anything that is not the default frame These methods might give you different results based on what browser you are](#_bookmark23)

[using.](#_bookmark23)

[**28. Difference between isDisplayed(), isEnabled(), and isSelected() methods in selenium WebDriver?**](#_bookmark23)

[***isDisplayed***() > verify the presence of a web element within the web page. If found > true, If not found > false](#_bookmark23)

[***isEnabled***() > verify if the web element is enabled or disabled within the web page. primarily used with buttons](#_bookmark23)

[***isSelected***() > verifies if the web element is selected or not, used with radio buttons, dropdowns and checkboxes.](#_bookmark23)

[**29. How to check if an element is present/visible/enable/ and to check text present?**](#_bookmark23)

[**To check Element Present:** *if(driver.findElements(By.xpath("value")).size() != 0){ System.out.println("Element is Present");*](#_bookmark23)

[*}else{*](#_bookmark23)

[*System.out.println("Element is Absent");} Or:*](#_bookmark23)

[*if(driver.findElement(By.xpath("value"))!= null){ System.out.println("Element is Present");*](#_bookmark23)

[*}else{*](#_bookmark23)

[*System.out.println("Element is Absent"); }*](#_bookmark23)

[**To check Visible:** *if(driver.findElement(By.cssSelector("a > font")).isDisplayed()){ System.out.println("Element is Visible");*](#_bookmark23)

[*}else{*](#_bookmark23)

[*System.out.println("Element is InVisible"); }*](#_bookmark23)

[**To check Enable:** *if(driver.findElement(By.cssSelector("a > font")).isEnabled()){ System.out.println("Element is Enable");*](#_bookmark23)

[*}else{*](#_bookmark23)

[*System.out.println("Element is Disabled"); }*](#_bookmark23)

[**To check text present:** *if(driver.getPageSource().contains("Text to check")){ System.out.println("Text is present");*](#_bookmark23)

[*}else{*](#_bookmark23)

[*System.out.println("Text is absent"); }*](#_bookmark23)

1. [**How check the multiple selected values in dropdown?**](#_bookmark23)

[*Select carsList = new Select(el)*](#_bookmark23)

[*carList.getSelectedOptions(): //returns the the selected options a list (List<webelement>)*](#_bookmark23)

[*for each: carList.getSelectedOptions()*](#_bookmark23)

1. [**How check the selected value in dropdown?** *Select carsList = new Select(el) carList.getFirstSelectedOption()*](#_bookmark23)

[*assertequals(“some text”,carList.getFirstSelectedOption().getText() )*](#_bookmark23)

1. [**How to work with dropdown without the select tag?**](#_bookmark23)

[If the dropdown list has no select tag, we cannot use the select class](#_bookmark23)

[Treat the dropdown list and its options as separate elements, locate every element separately](#_bookmark23)

[To select an option:](#_bookmark23)

* 1. [Find and click on the list](#_bookmark23)
  2. [Find and click on the option](#_bookmark23)

1. [**What is the syntax for uploading a file?**](#_bookmark23)

[*Public void fileUpload(String path){ WebELement upload = driver.findELement; Upload.sendKeys(path)}*](#_bookmark23)

[We need to locate the upload button in html. The element will have tag input.](#_bookmark23)

[Then we do sendKeys by passing the path to file which we want to upload](#_bookmark23)

1. [**Sometimes sendKeys/path does not work. What would you do?**](#_bookmark23)

[Building a dynamic path for a file inside our project Path to the project location:](#_bookmark23)

* + [*String projectDir= System.getProperty(“user.dir”) // project directory String file= “src/test/resources/test\_data/myfile.txt”; Element.sendKeys(projectDir+file);*](#_bookmark23)

1. [**How to input text in the text box without calling the sendKeys()?**](#_bookmark23)

[Use JavaScript Executor](#_bookmark23)

[*JavascriptExecutor JS = (JavascriptExecutor)webdriver;*](#_bookmark23)

[To enter username](#_bookmark23)

[*JS.executeScript(“document.getElementById(‘User’).value=*](#_bookmark23) *’*[*www.google.com*](http://www.google.com/)[*’”);*](#_bookmark23)

[To enter password](#_bookmark23)

[*JS.executeScript(“document.getElementById(‘pass’).value=’ tester’”);*](#_bookmark23)

1. [**What exceptions do you know in Selenium?**](#_bookmark23)

[I often get ***NoSuchElementException***](#_bookmark23)

[**How we handle NoSuchElementException**](#_bookmark23)

[Check if locator is correct Check if timing is correct](#_bookmark23)

[Check if element is hidden inside an iframe](#_bookmark23)

[***StaleElementException***](#_bookmark23)

[The element has been deleted entirely.](#_bookmark23)

[The element is no longer attached to the DOM.](#_bookmark23)

[**How we handle StaleElementException;**](#_bookmark23)

* 1. [Element is not attached to DOM à ‘try catch block’ within ‘for loop’](#_bookmark23)
  2. [Refresh the page and try again for the same element.](#_bookmark23)
  3. [Wait for the element till it gets available](#_bookmark23)

[***TimeOutException***](#_bookmark23)

1. [**How do you verify if text exists?**](#_bookmark23)

[***VerifyTextPresent*** à returns TRUE if the specified text string was FOUND somewhere in the page; FALSE if otherwise.](#_bookmark23)

[***VerifyTextNotPresent*** à returns TRUE if the specified text string was NOT FOUND anywhere in the page; FALSE if it was found.](#_bookmark23)

1. [**How do you find a text in a webpage?**](#_bookmark23)

[//tagname[contains(text(),’text’)] contains certain test](#_bookmark23)

[//tagname[.=’text’] contains exact text sometimes doesn't work Selenium](#_bookmark23)

1. [**How to handle Web Tables/grid?**](#_bookmark23)

[We use xpath for tables: table/tbody/tr[1]/td[1]](#_bookmark23)

[Table tag used for table data is arranged in a grid format](#_bookmark23)

[</tr> tr tag used to indicate a row, applies to whole column td tag to indicate a column in a row Example:](#_bookmark23)

[Some tables have tbody Used to indicate the data of the table, usually does not include column names ( th )](#_bookmark23)

1. [**How do you make sure that all you team members are using the same Selenium version?**](#_bookmark23)

[As a team, we can utilize Maven, which gives version and build control for team perspective. We have the same version in pom.xml file.](#_bookmark23)

1. [**What is effective POM.xml?**](#_bookmark22)

[The Effective POM does not exist on your filesystem per se, it's generated on- the-fly whenever your run a Maven build.](#_bookmark22)

1. [**What is a dependency and how do you handle them in your framework?**](#_bookmark22)

[Dependency is just a Jar file which will be added to the classpath while executing the tasks. I update the dependencies in the POM.xml. I am using dependencies in my framework because of compatibility issues.](#_bookmark22)

[For example, if the Selenium WebDriver version which I have integrated to my framework is not supportive, I can simply update the dependency file version.](#_bookmark22)

1. [**What is a plugin? How do you add plugins in Maven?**](#_bookmark22)

[Maven is a plugin execution framework, where every task is done by plugins. A plugin generally provides a set of goals, which can be executed. Maven Plugins are generally used to:](#_bookmark22)

[*create jar file create war file compile code files unit testing of code*](#_bookmark22)

[*create project documentation create project reports*](#_bookmark22)

1. [**How do you press enter in selenium?**](#_bookmark22)
   1. [*driver.findElement(By.id("Value")).sendKeys(Keys.RETURN);*](#_bookmark22)
   2. [*driver.findElement(By.id("Value")).sendKeys(Keys.ENTER);*](#_bookmark22)
2. [**How do you pass text into a textbox in alert pop up?**](#_bookmark22)

* [*Alert alert = driver.switchTo().alert();*](#_bookmark22)
* [*alert().sendKeys("Text");*](#_bookmark22)

1. [**How do you double click in selenium?**](#_bookmark22)

* [*Actions actions = new Actions(driver);*](#_bookmark22)
* [*WebElement elementLocator = driver.findElement(By.id("ID"));*](#_bookmark22)
* [*actions.doubleClick(elementLocator).perform();*](#_bookmark22)

1. [**How to scroll up selenium?**](#_bookmark22)

[*jse.executeScript("window.scrollBy(0,-250)", "");*](#_bookmark22)

[OR,](#_bookmark22)

[*jse.executeScript("scroll(0,-250);"); "");*](#_bookmark22)

[**53 How do you hover over a WebElement?**](#_bookmark82)

[*Actions actions = new Actions(driver);*](#_bookmark82)

[*WebElement menuOption*](#_bookmark82)

[*=driver.findElement(By.xpath(".//div[contains(text(),'Music')]")); actions.moveToElement(menuOption).perform();*](#_bookmark82)

1. [**A selenium developer finds an element within a frame object and wants to work with the element. What is mandatory for the developer to do before initiating the element object?**](#_bookmark22)

[We need to find out the locator of the iframe Then switch to the iframe through locator](#_bookmark22)

* + [driver.switchTo().frame("a077aa5e");](#_bookmark22)

[Then we need to find out the locator of the element to be worked on](#_bookmark22)

* + [driver.findElement(By.xpath("xyz")).click();](#_bookmark22)

1. [**Soft Assert meaning?**](#_bookmark22)

[In scenarios where you want the test execution to continue even after the failure of a test step, you should make use of Soft Assert in Selenium WebDriver.](#_bookmark22)

[Unlike hard asserts, soft asserts do not throw any exception on the failure of the assert and continue to the next step even after encountering an assert.](#_bookmark22)

* 1. [Create an object SoftAssert softAssert = new SoftAssert();](#_bookmark22)
  2. [Dont forget assertAll method at the end, otherwise failed tests will show as passed. softAssert.assertAll();](#_bookmark22)

1. [**How you can skip executing specific scenario in cucumber?**](#_bookmark22)

[using "not @---" AND ~ tag in test runner file.](#_bookmark22)

1. [**Can we use and/or in your test runner file for tags?**](#_bookmark22)

[Yes](#_bookmark22)

[**64. Where you use set interface in your framework?**](#_bookmark22)

[handling windows, assigning their GUID to set.](#_bookmark22)

1. [**What utility classes do you have?**](#_bookmark22)

[AlertHelper, BrowserFactory, ConfigurationReader, Driver, DBUtility, ExcelUtility, GridHelper, SelectHelper, WaitHelper, BrowserHwindowHelper.](#_bookmark22)

1. [**What methods do you have in WaitHelper class?**](#_bookmark22)

[waitForVisibility -exp wait, waitForClickablility -exp wait, waitForPageToLoad](#_bookmark22)

[-exp wait, fluentWait, wait -Thread.sleep](#_bookmark22)

1. [**What methods do you have in AlertHelper class?**](#_bookmark22)

[AcceptAlert, DismissAlert, getAlertText, isAlertPresent, AcceptAlertIfPresent.](#_bookmark22)

1. [**What do you have in BrowserFactory class?**](#_bookmark22)

[Im setting up my browsers there.](#_bookmark22)

1. [**What do you have in Driver class?**](#_bookmark22)

[I'm using singleton here and making my Driver constructor private so other classes can’t create an object of it. and with help of getInstance() method I'm accesing the driver.](#_bookmark22)

1. [**What do you have in DBUtility class?**](#_bookmark22)

[with help of this class I'm connecting to SQL Database, openConnection(), closeConnection().](#_bookmark22)

1. [**What do you have in ExcelUtility class?**](#_bookmark22)

[with help of this class, I'm connecting to excel file. setExcelFile(), getCellData().](#_bookmark22)

1. [**What do you have in SelectHelper class?**](#_bookmark22)

[selectCheckBox(), SelectUsingVisibleValue(), getAllDropDownValues().](#_bookmark22)

1. [**What do you have in BrowserWindowHelper class?**](#_bookmark22)

[switchToWindow(), switchToParentWindow(), switchToParentWithChildClose(),switchToFrame().](#_bookmark22)

1. [**What methods do Action Class have?**](#_bookmark22)

[***Mouse Actions***: build(), click(), clickAndHold(), contextClick(), doubleClick(),dragAndDrop(), moveToElement(), perform(), release().](#_bookmark22)

[***Keyboard Actions***:sendKeys(), keyUp(), keyDown()](#_bookmark22)

1. [**How do you handle multiple windows/tabs in selenium?**](#_bookmark25)
   * [Get the handle of the parent window using the command:](#_bookmark25)

[String parentWindowHandle = driver.getWindowHandle();](#_bookmark25)

* + [Print the window handle of the parent window.](#_bookmark25)
  + [Find the element on the web page using an ID which is an element locator.](#_bookmark25)
  + [Open multiple child windows.](#_bookmark25)
  + [Iterate through child windows.](#_bookmark25)
  + [Get the handles of all the windows that are currently open using the](#_bookmark25)

[command:](#_bookmark25)

[Set<String> allWindowHandles = driver.getWindowHandles(); which returns the set of handles.](#_bookmark25)

* + [Use the SwitchTo command to switch to the desired window and also pass the](#_bookmark25)

[URL of the web page.](#_bookmark25)

1. [**How to handle cookies?**](#_bookmark22)

* [driver.manage().getCookies(); // Return The List of all Cookies](#_bookmark22)
* [driver.manage().getCookieNamed(arg0); //Return specific cookie according to name](#_bookmark22)
* [driver.manage().addCookie(arg0); //Create and add the cookie](#_bookmark22)
* [driver.manage().deleteCookie(arg0); // Delete specific cookie](#_bookmark22)
* [driver.manage().deleteCookieNamed(arg0); // Delete specific cookie according Name](#_bookmark22)
* [driver.manage().deleteAllCookies(); // Delete all cookies](#_bookmark22)

1. [**What Is Return Type Of Sendkeys (), click(), clear()?**](#_bookmark23)

[Return type is Void.](#_bookmark23)

1. [**Selenium Grid**](#_bookmark23)

* [The main role of the Selenium Grid (SG) is remote execution. Selenium Grid is a selenium-standalone.jar file that we must run from command line. Then we must create network. Network should have one Hub and at least one or more Node.](#_bookmark23)
* [Hub ==> Machine that receives commands from your driver and responsible for nodes.](#_bookmark23)
* [Node==> Machine(s) that execute tests](#_bookmark23)
* [For both hub and nodes, we don't have to have Maven or IntelliJ on it. Those should only have Java and browsers what we want to use.](#_bookmark23)
* [We create hub and nodes remotely by using our computer. However, after configuring the Selenium Grid setup, hub is going to drive all the nodes. All hub and nodes might be virtual or physical machines.](#_bookmark23)
* [We can use some websites to setup Selenium Grid such as SauceLabs and BrowserStack web site. It only makes Selenium Grid setup issues very easy. These are not free applications.](#_bookmark23)
* [There are some differences between SG and test parallelization. Parallel testing is executed on the same machine, we only launch more than one browser and decrease the time of execution. However, SG is network of devices that can run your test with multiple machines. For this purpose, there are two main elements. First one is called HUB and second type is NODE. SG executes the test cases in different machines which is called node. In SG there can be only a single hub which controls what the nodes is going to execute. So, Hub is something like a queen bee and the nodes are like worker bee. Nodes execute whatever Hub says.](#_bookmark23)
* [You can executes test cases in very different combination which involves different type of OS (Mac OS, Windows, Linux), different browsers types, different platforms (computers (real or virtual machines), mobile devices(IOS or Android devices)). We specify these options through Selenium Remote's Capabilities.](#_bookmark23)
* [Hub is the central point where you load your tests into. There should be only a single hub. It clarifies which device is going to run in which configuration in terms of OS, browser, etc. Node runs the tests; Hub just manages nodes. Hub is the Point of Contact for your framework. Browser is going to be launched in node device, not in hub (If you use AWS or any other remote device).](#_bookmark23)
* [Nodes are Selenium instances that will execute the test that you load on the](#_bookmark23) hub. Nodes can be parameterized through json.
* Every node runs on different VM/server. Connection happens based on IP address of the HUB. Node can be run on the same machine as hub. Sometimes there can be some network issues such as:
* port not available,
* port may be closed,
* firewall does not allow to connect,
* browser version issues (some browser versions do not work on some version

of OS).

1. [**Maximize & Resize**](#_bookmark23)
   * [To maximize the size of browser window:](#_bookmark23)

[*driver.manage().window().maximize();*](#_bookmark23)

* + [To resize browser Window:](#_bookmark23)

[- Create object of Dimensions class *Dimension newD = new Dimension(480,620); driver.manage().window().setSize(newD);*](#_bookmark23)

1. [**Dropdown in Selenium?**](#_bookmark23)

[Select class is used to deal with drop down list in selenium. To create a select object we need to pass a webElement as constructor. That element must have the select tag](#_bookmark23)

* [select by Index: Takes a int param, selects based on the index 0 based.](#_bookmark23)
* [select by visible text: takes a string, select based on the text displayed.](#_bookmark23)
* [select by value: takes a string parameter selects based on the value attribute of the option.](#_bookmark23)

1. [**Windows/OS popups?**](#_bookmark23)
   * [Selenium doesn’t support windows-based apps, it is an automation testing tool that supports only web application testing. We could handle windows-based popups in Selenium using some third-party tools such as AutoIT, Robot class](#_bookmark23)
   * [driver.getWindowHandle() —>This will handle the current window that uniquely identifies it within this driver instance.](#_bookmark23)
   * [driver.getWindowHandles() —> To handle all opened windows](#_bookmark23)
2. [**Download in Selenium**](#_bookmark23)
   * [Selenium itself cannot verify file downloads, can click on download link but can't go outside the browser and open the downloaded file.](#_bookmark23)
   * [Other tools need to be used for that Robot and AutoIT.](#_bookmark23)
3. [**Headless Browser**](#_bookmark23)
   * [Headless browser is a browser that does not open, it runs as a background service /program.](#_bookmark23)
   * [I can do headless testing. One option is that in the runner class there is Dry keyword within the Cucumber Options. I make it “true” to run headless browser testing.](#_bookmark23)
   * [Another way; I have a driver class that can open different browsers including headless browsers.](#_bookmark23)
4. [**sendKeys(“text” + Keys.ENTER)**](#_bookmark23)
   * [To press Enter key using Selenium WebDriver,](#_bookmark23)
   * [We need to use Selenium Enum keys with its constant Enter WebElement button = driver.findElement(By.xpath(“xpath”)); button.sendKeys(“some text” + Keys.ENTER);](#_bookmark23)
5. [**How to Drag And DROP?**](#_bookmark23)

[*Actions action = new Actions(driver); action.clickAndHold(driver.findElement(By.id("item")))*](#_bookmark23)

[*.moveToElement(driver.findElement(By.id("destination")))*](#_bookmark23)

[*.release().build()*](#_bookmark23)

[*.perform();*](#_bookmark23)

1. [**How to use Excel?**](#_bookmark23)

[*FileInputStream ExcelFile = new FileInputStream(path); excelWBook = new XSSFWorkbook (ExcelFile); excelWSheet = excelWBook.getSheet(sheetName);*](#_bookmark23)

[*cell = excelWSheet.getRow(rowNum). getCell(colNum);*](#_bookmark23)

1. [**What is webelement? A class, or an interface, or something else?**](#_bookmark23)

[WebElement is an interface. WebElement represents an HTML element. HTML documents are made up by HTML elements.](#_bookmark23)

1. [**What is singleton driver?**](#_bookmark23)

[Singleton Driver: My frameworks use a singleton pattern to share the webdriver instance between different classes. (Singleton Design Pattern: private constructor, private object and public getDriver method to create only and only a single driver and share with all classes)](#_bookmark23)

1. [**How to Launch a Browser Using Selenium Webdriver?**](#_bookmark23)

[System.setProperty("webdriver.chromedriver", "path of the exe file\\chromedriver.exe");](#_bookmark23)

[System is a final class](#_bookmark23)

[setProperty is a method accepts 2 parameters Or in maven with the Boni Garcia dependency:](#_bookmark23)

[// WebDriverManager.chromedriver().setup(); To launch Firefox Driver:](#_bookmark23)

[WebDriver driver = new FirefoxDriver();](#_bookmark23)

1. [**What Happens If You Mix Both Implicit Wait and Explicit Wait In A Selenium Script?**](#_bookmark23)

[As per the official Selenium documentation, it is suggested not to mix both Implicit waits and Explicit Waits. Mixing both can cause unpredictable wait times.](#_bookmark23)

[Implicit wait is defined only once in the code. It will remain same throughout the driver object instance.](#_bookmark23)

[Explicit wait is defined whenever it is necessary in the code. This wait will call at the time of execution. It is a conditional wait.](#_bookmark23)

1. [**How to handle hidden elements in selenium webdriver?**](#_bookmark23)

[*JavascriptExecutor jse=(JavascriptExecutor)driver; jse.executeScript("document.getElementsByClassName(ElementLocator).click();*](#_bookmark23)

[*");*](#_bookmark23)

1. [**How to scroll down in a different way?**](#_bookmark23)
   1. [*actions.moveToElement(webelement w)*](#_bookmark23)
   2. [*actions.sendKeys(Keys.PAGE\_DOWN).build().perform();*](#_bookmark23)
   3. [*JavaScriptExecutor jse = (JavaScriptExecutor) driver; jse.executeScript("window.scrollDown(0,1000)"); jse.executeScript(argument[0].scrollIntoWindow;,webelement w) jse.executeScript("arguments[0].scrollIntoView();", webelement w);*](#_bookmark23)
2. [**SINGLETON DESIGN PATTERN:**](#_bookmark117)

[When we develop a class in such a way that it can have only instance at any time, is called Singleton design pattern. It is very useful when you need to use same object of a class across all classes or framework. Singleton class must return the same instance again if it is instantiated again.](#_bookmark117)

[To create a singleton class, we need to do following steps:](#_bookmark117)

* 1. [Declare constructor of class as private so that no one instantiate class outside](#_bookmark117)

[of it.](#_bookmark117)

* 1. [Declare a static reference variable of class. Static is needed to make it available](#_bookmark117)

[globally.](#_bookmark117)

* 1. [Declare a static method with return type as object of class which should check if class is already instantiated once.](#_bookmark117)

[This is because of singleton pattern. It will not create object of class again if already initialized once.](#_bookmark117)

[==>Singleton is used for creating only instances of WebDriver, but you can have a factory for creating e.g. an instance of a page object class or instance of, say, Person class.](#_bookmark117)

1. [**How can we improve our framework?**](#_bookmark23)

[If some method repetitive like Thred.Sleep()](#_bookmark23)

[or we don’t need to page factory in for every pages just we can put it in base page and extends from another pages](#_bookmark23)

[We can put delete cookies or scroll down in the base Page and we can invoke them from another classes](#_bookmark23)

[This provides a clean code, independent framework and easy to maintain](#_bookmark23)

1. [**CREATING SELENIUM GRID HUB**](#_bookmark23)
   1. [Create a folder on your desktop](#_bookmark23)
   2. [Go to https://selenium.dev/downloads/](#_bookmark23)
   3. [Click "Latest stable version 3.141.59" and download the latest "selenium- server-standalone-3.141.59.jar" file, save it in the folder you created on your desktop, keep it and do not delete.](#_bookmark23)
   4. [Go to https://chromedriver.chromium.org/ and download latest chrome driver version (or any type of browser)](#_bookmark23)
   5. [Click "Latest stable release: ChromeDriver 80.0.3945.36" and download it, save in the same folder and unzip it](#_bookmark23)
   6. [Run Hub through opening Terminal in your grid folder which is on desktop (open terminal, type cd then drag grid folder and drop into terminal)](#_bookmark23)
   7. [Type on terminal ==> java -jar selenium-server-standalone-3.141.59.jar -role](#_bookmark23)

[hub](#_bookmark23)

* 1. [Then hit enter ==> now the hub is running if you see --> "Selenium Grid hub](#_bookmark23)

[is up and running" on terminal](#_bookmark23)

* 1. [Open chrome browser and go to "http://localhost:4444/" and click "console" to see grid console](#_bookmark23)
  2. [Default port is 4444. But you can change the port, if you need ==> "java -jar selenium-server-standalone-3.141.59.jar -role hub -port 7777" (just in case).](#_bookmark23)

[**CREATING NODE**](#_bookmark23)

* 1. [Without closing first terminal window, open another terminal window ==> Because hub is running in the other terminal window](#_bookmark23)
  2. [Navigate to grid folder again on terminal (cd + path of grid folder) ==> We are gonna use this terminal for node creation](#_bookmark23)
  3. [Type on terminal ==> "java - Dwebdriver.chrome.driver="/Users/yoll/Desktop/grid/chromedriver" -jar selenium- server-standalone-3.141.59.jar -role node -hub http://localhost:4444/grid/register"](#_bookmark23)

[We type this line because we are going to launch chrome as browser. It will vary for different browser types.](#_bookmark23)

* 1. [If you see the notice on terminal, it means you have connected the node to the hub ==> "The node is registered to the hub and ready to use".](#_bookmark23)
  2. [Refresh the chrome browser and see Grid Console on chrome is linked with the new node.](#_bookmark23)
  3. If you want to create more nodes; you may repeat the same ways. Once you create on Terminal; refresh the chrome browser and you will see the recent node on web page as well.

\* Download the selenium server jar in node machine as well if you are using different machine as node.

***ADDING SETUP FOR DRIVER CLASS IN SELENIUM PROJECT***

* 1. In Driver Class, we need to use RemoteWebDriver to connect with grid. RemoteWebDriver is a super class of ChromeDriver, FirefoxWebDriver, etc. and it requires two parameters.

DesiredCapabilities cap=new DesiredCapabilities(); cap.setBrowserName("chrome");

cap.setPlatform(Platform.MAC); ==> you can set any type of OS or browser... ChromeOptions options=new ChromeOptions();

options.merge(cap);

String hubUrl = "http://192.168.1.94:4444/wd/hub";

WebDriver driver=new RemoteWebDriver(new URL(hubUrl), options); Driver Class calls Hub and then Hub calls Nodes.

Hub will know which node to use. Because we have already connected them on terminal.

Node runs the tests; hub just manage nodes. Hub is the Point of Contact for your framework.

IOT close the hub ==> Ctrl + C on terminal.

1. [**CREATING NEW MAVEN PROJECT**](#_bookmark23)
   1. [Create a new Maven Project as regular way.](#_bookmark23)
   2. [However, when I tried to run my first program it gave me a compile error like: Java error: compiler does not support version 5.](#_bookmark23)

[Open IntelliJ Preferences/Build, Execution/Compiler/Java Compiler and replace "Target Bytecode Version" with 8 or higher.](#_bookmark23)

* 1. [After running test case you can check some information from terminal.](#_bookmark23)

1. [**LINKING SELENIUM GRID WITH JENKINS**](#_bookmark122)
   1. [Create a new EC2 on AWS for Jenkins](#_bookmark122)
   2. [Click "connect" on top of page.](#_bookmark122)
   3. [Click "Download Remote Desktop File"](#_bookmark122)
   4. [Double click to this page in your downloads folder](#_bookmark122)
   5. [Windows Remote Desktop Application will be launched automatically for Mac. (I think nothing to do for Windows)](#_bookmark122)
   6. [Enter username and password as above.](#_bookmark122)
   7. [Copy selenium\_grid.zip file into windows machine desktop and extract all files and double click to "windows\_start\_hub\_and\_node" file. It will launch two different terminals, one for hub and one for nodes. Instead of typing all codes to launch and set hub and nodes, it helps to set up quickly. We can also use this zip file even working in company. It is easy and useful, keep it in somewhere to you later.](#_bookmark122)
   8. [Go to AWS console --> EC2 --> Click on Selenium Grid -->](#_bookmark122)
   9. [Go to Driver class in your project and insert EC2 URL as we did before above. URL: ==> http://ec2-3-91-241-154.compute-1.amazonaws.com:8081 (It is different for each AWS EC2 machine)](#_bookmark122)
   10. [Come to Jenkins web site again. You create a new job. All steps are the same as what we did before. There is no special thing. The most important thing is you will use the git URL which contains the setup according to Selenium Grid. Because we prepared everything on AWS EC2 machine and in our Selenium Driver Class. Jenkins is only going to use that git URL, the rest is the same.](#_bookmark122)
2. [**What is parameterization of scenario?**](#_bookmark124)

[Scenario outline is way of the parameterization of scenario. When the same scenario needs to be executed for multiple sets of data, we use scenario outline. Test steps remain same.](#_bookmark124)

[**115. What other tools I can use to automate the BROWSER?**](#_bookmark126)

[I think selenium is the best one, but I heard some tool also using for automating](#_bookmark126)

[browser like Lambda, Ranorex, TestComplete.](#_bookmark126)

[Selenium, Katalon Studio, UFT, TestComplete](#_bookmark126)

[**117. What is difference between finding element using a method vs using findBy annotation?**](#_bookmark23)

[FindElement: This is one of the abstract methods, should be used to find the single web element and return type is single web element.](#_bookmark23)

[@Findby: This is one Annotation in Page factory model and used to locate one or more WebElements using a single criterion.](#_bookmark23)

[**118. How did you conduct Batch Testing in your project?**](#_bookmark23)

[When I run multiple script, with Automation Tool, that is called batch testing. I conduct Batch Testing using TestNG Testing Framework using @Groups annotation. In Cucumber I am using the @Tags options for running the batch of test cases.](#_bookmark23)

1. [**In a web element search, selenium developer wants the program to wait for**](#_bookmark23) **a**[**n element to show up and looks for it repeatedly for a specified amount of time before messaging what’s called “NoSuchElementException”. Which Selenium**](#_bookmark23) **w**[**ait option does the developer need to use to achieve this?**](#_bookmark23)

[FluentWait](#_bookmark23)

[ExplicitWait can also be used: ExpectedConditions.presenceOfElementLocated()](#_bookmark23)

1. [**Talking about HTML reporting during the interview?**](#_bookmark23)

[I use maven cucumber reporting. It shows pass/fail statuses for each scenario.](#_bookmark23)

[It also captures screenshots if test scenario fails.](#_bookmark23)

1. [**In some cases, maximize() will not work > so what will be the way around?**](#_bookmark23)

[Actions or change version.](#_bookmark23)

[*ChromeOptions options = new ChromeOptions(); options.addArguments("startmaximized");*](#_bookmark23)

[**124. Explain to me your test execution flow with cucumber.**](#_bookmark23)

[Runner > Feature file > Scenario > Step def > POM](#_bookmark23)

[**125. What verification point available in Selenium?**](#_bookmark23)

[In Selenium WebDriver, there is no built-in features for verification points, it totally depends on external Assertion frameworks such as TestNG or Junit.](#_bookmark23)

[**128. How do you like Selenium version 3? Is Selenium 3 drastically different from Selenium 2?**](#_bookmark23)

[Selenium 3 has bug fixes from selenium 2 also it is more mobile automation focused.](#_bookmark23)

[Mozilla have made changes to Firefox that mean that from Firefox 48 you must use their geckodriver to use that browser, regardless of whether you're using Selenium 2 or 3.](#_bookmark23)

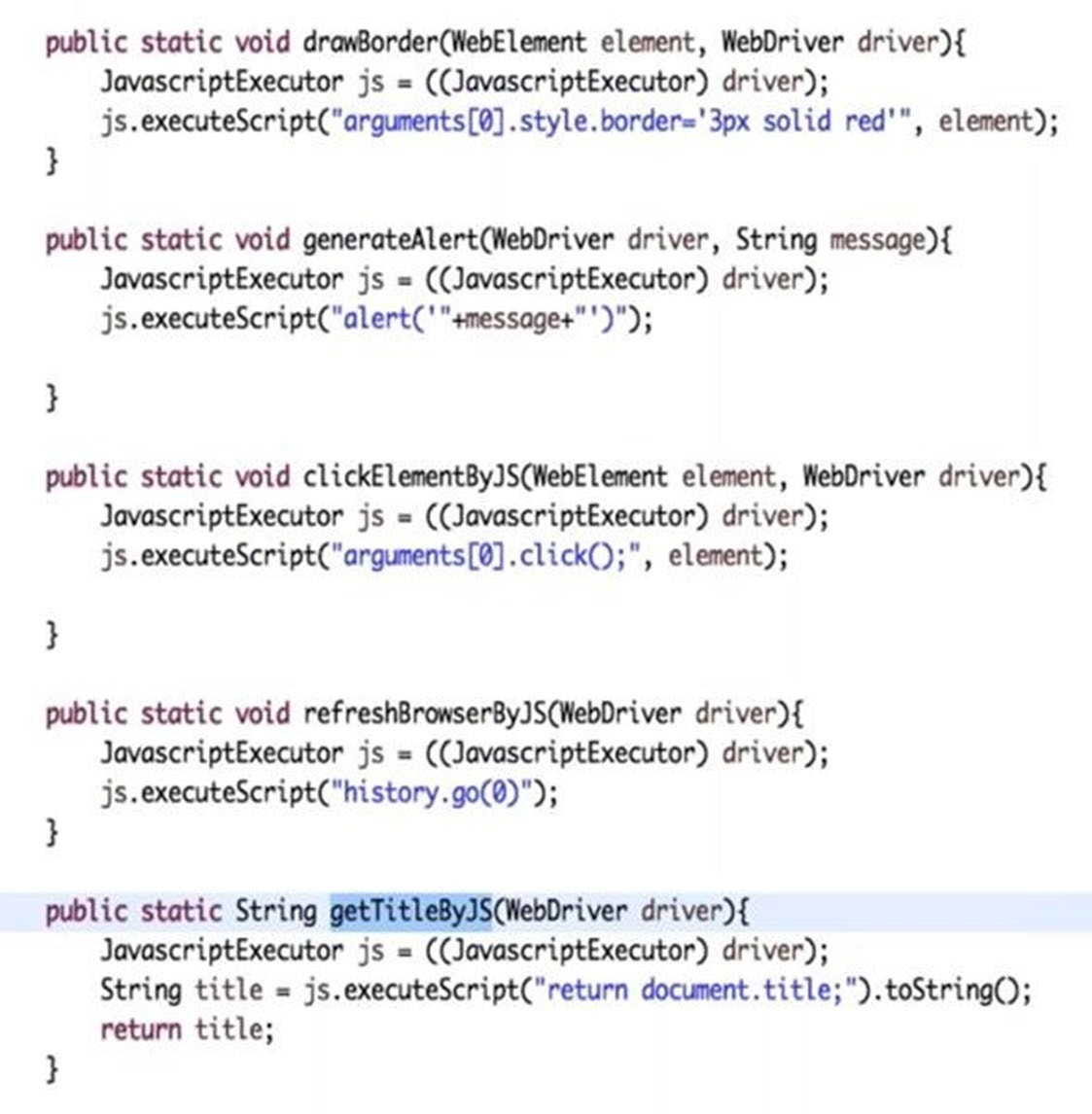
[**130. What is JavaScript Executor used for?**](#_bookmark23)

[JavaScriptExecutor is an Interface that helps to execute JavaScript through](#_bookmark23)

[Selenium Webdriver. It provides “executescript” & “executeAsyncScript” methods.](#_bookmark23)

[We use JavaScript executor interface where we are not able to get the locator because of JavaScript. In some webside drop down or pop-ups maintain by JavaScript not html.](#_bookmark23)

* [If drop down not working properly](#_bookmark23)
* [or if the locator doesn’t work](#_bookmark23)
* [or web page rendered is very long](#_bookmark23)
* [or click button is not work](#_bookmark23)
* [or if we need generate alert pop window](#_bookmark23)
* [or if need to scroll down or up web page in selenium we can use](#_bookmark23) J[avaScript executor.](#_bookmark23)



1. [**Give me the syntax for an actions class action.** *WebElement el = driver.findElement(By…..) Actions actions = new Actions (driver) actions.doubleClick(el).perform*](#_bookmark23)
2. [**HOW DO YOU RUN TEST CASES ON MULTIPLE BROWSERS?**](#_bookmark23)

[If it is TestNG I use parallel and thread-count attributes. Otherwise, I can use selenium grid with Jenkins](#_bookmark23)

[If I am using Junit, I use sauce lab and after version of Junit 5 with the help of](#_bookmark23) s[ure-fire plugin we can do parallel testing. Only we need to add parallel, and thread](#_bookmark23) c[ount tags inside sure fire plugin in POM.xml file](#_bookmark23)

[*<groupId>org.apache.maven.plugins</groupId>*](#_bookmark23)

[*<artifactId>maven-surefire-plugin</artifactId>*](#_bookmark23)

[*<version>2.7.1</version>*](#_bookmark23)

[*<threadCount>5</threadCount>*](#_bookmark23)

1. [**How do you run multiple test cases at a time?**](#_bookmark23)

[We can use include and exclude keyword in testNG.XML and run whatever we want or not.](#_bookmark23)

[Or we can use groups keyword](#_bookmark23)

[for cucumber we must use tags under runner class. We define the annotations inside the future files before scenario or before feature keyword](#_bookmark23)

[we can group some file and run them. @Test(groups={"hello"}) we can enable or disable some file and run them](#_bookmark23)

1. [**What is Page object Model, Page factory and Object repository?**](#_bookmark23)

[POM is a design pattern which is commonly used in Selenium for Automating](#_bookmark23)

[the Test Cases.](#_bookmark23)

[According to the page object model, we have maintained a class under the pages package for every webpage.](#_bookmark23)

[The main purpose of pages is to segregate selenium code based on pages.](#_bookmark23)

[To do that We should keep our tests and element locators separately, this will keep code clean and easy to understand and to manage.](#_bookmark23)

[The benefit here is that, if the page UI changes, then the tests need not to be changed, only the code within the page object needs to be changed. After that, all the changes that support new UI are in one place. That’s why locators and test scripts are stored separately.](#_bookmark23)

1. [**HOW MANY DIFFERENT REPORT TYPES YOU CAN GET FROM TESTNG AND CUCUMBER?**](#_bookmark23)

[TestNG -Json, xml, extendreport](#_bookmark23)

[Cucumber - Json, xml, extendreport ,default and HTML report](#_bookmark23)

[**138. Where do you use synchronization in your framework?**](#_bookmark23)

[Synchronization meaning when two or more components involved to perform any action, we expect these components to work together with the same pace. The co- ordination between these components to run parallelly is called Synchronization.](#_bookmark23)

[Implicit and explicit wait are sample for synchronization.](#_bookmark23)

1. [**WHAT IS PARAMETERIZED? HOW TO PARAMETERIZE TEST CASES?**](#_bookmark23)

[Parameterized test means to execute the same test repeatedly using different values. Execute a single test method multiple times with different parameters.](#_bookmark23)

[To use Junit 5 parameterized tests, we need to import the junit-jupiter- params artifact from Junit Platform. That means when using Maven, we’ll add the](#_bookmark23) f[ollowing to our pom.xml:](#_bookmark23)

[*<groupId>org.junit.jupiter</groupId>*](#_bookmark23)

[*<artifactId>junit-jupiter-params</artifactId>*](#_bookmark23)

[*<version>5.4.2</version>*](#_bookmark23)

1. [**HOW CAN YOU READ DATA FROM TABLE?**](#_bookmark23)

[Each table has rows and columns so first I have found number of row and column. One more thing we need to read data from table Is generating Xpath for each cell of column.](#_bookmark23)

[Highlighted string Is common for both cell's xpath. Only changing Is row number Inside tr node. So here we can pass Row\_count variable's value Inside tr node. Same way, look at bellow given xpath syntax of 1st and 2nd cells of 1st row.](#_bookmark23)

[Highlighted string Is common for both cell's xpath. Only changing Is column number Inside td node. So here we can pass Col\_count variable's value Inside td node.](#_bookmark23)

[And then we must use for loop for row and column to retrieve data.](#_bookmark23)

[Note: if table is static number of column and rows are fixed. So we can use specific row and column inside of the locator like below](#_bookmark23)

[*WebElement cell = driver.findElement(By.xpath("//table/tbody/tr[2]/td[3]")); System.out.println("Data for Row 2 and Column 3 is "+cell.getText()+".");*](#_bookmark23)

[In a dynamic table (rendered at run time) – rows & columns might vary with every page load. Hence it is recommended to first count the rows & columns, then iterate through it. Below code identifies all the rows & store it in the ‘rows’ list. Next we calculate the number of rows using size() method & store it in the ‘rows\_count’ variable.](#_bookmark23)

[*List rows = Table.findElements(By.tagName("tr")); rows\_count = rows.size();*](#_bookmark23)

[*List columns = rows.get(i).findElements(By.tagName("td")); col\_count = columns.size();*](#_bookmark23)

[How will you iterate through a web table? Simple! Outer loop iterates through all the rows one at a time and inner loop through all the columns (cells) within each row. getText () method is used to fetch a cell’s value.](#_bookmark23)

[*List columns = rows.get(i).findElements(By.tagName("td")); col\_count = columns.size();*](#_bookmark23)

*for(int j=0; j&lt; col\_count; j++){ cellText = columns.get(j).getText(); System.out.print(cellText+" ");} System.out.println(""); }*

1. [**How do you download a file and give a location which you want to save?**](#_bookmark23)

[*public class DownloadPDF { static WebDriver driver;*](#_bookmark23)

[*public static void main(String[] args) throws InterruptedException { WebDriverManager.chromedriver().setup();*](#_bookmark23)

[*String downloadFilePath = "/Users/zaur88/Desktop/"; HashMap<String, Object> chromePref = new HashMap<String, Object>(); chromePref.put("profile.default\_content\_settings.popups", 0); chromePref.put("download.default\_directory", downloadFilePath); System.out.println(chromePref);*](#_bookmark23)

[*ChromeOptions options = new ChromeOptions(); options.setExperimentalOption("prefs", chromePref); driver = new ChromeDriver(options); driver.get("https://*](#_bookmark23)[*www.seleniumhq.org/download/*](http://www.seleniumhq.org/download/)[*");*](#_bookmark23)

[*driver.findElement(By.xpath("//tr[2]//td[6]//a[1]")).click(); Thread.sleep(3000);*](#_bookmark23)

[*driver.close();}}*](#_bookmark23)

1. [**HOW DO YOU PARAMETERIZE YOUR TEST CASES IN YOUR FRAMEWORK?**](#_bookmark23)

[Cucumber:](#_bookmark23)

[By using regular expression in feature file ==> when user enters <myusername> and <my password>](#_bookmark23)

[Configuration.properties file TestNG:](#_bookmark23)

[By using "parameter" key word in pom.xml file and using it in my @Test annotation to call the value of this parameters.](#_bookmark23)

[Configuration.properties file](#_bookmark23)

1. [**HOW DO YOU DO TEST USING EXCEL FILES IN JAVA?**](#_bookmark23)

[I use Apache POI libraries to read and write from excel file, I add the Apache poi dependencies to my pom file. To connect I use following classes](#_bookmark23)

[FileInputStream from Java. it is used to create connection to the file. We pass the file path as constructor to it.](#_bookmark23)

[WorkBook is a class that represents the excel file. We create Workbook object using the FileInputStream object.](#_bookmark23)

[Sheet represents a single sheet from the excel file. We create sheet using Workbook object. We can create worksheet using the 0 based index.](#_bookmark23)

[*public String readExcel(String path, String sheetName, int rowNum, int colNum)*](#_bookmark23)

[*{*](#_bookmark23)

[*try {*](#_bookmark23)

[*FileInputStream file = new FileInputStream(path); Workbook book = WorkbookFactory.create(file); Sheet sheet = book.getSheet(sheetName);*](#_bookmark23)

[*Cell cell = sheet.getRow(rowNum).getCell(colNum); String cellData = cell.toString();*](#_bookmark23)

[*return cellData;*](#_bookmark23)

[*} catch (Exception e) {*](#_bookmark23)

[*throw new RuntimeException(e);}}*](#_bookmark23)

1. [**CAN I NAVIGATE BACK AND FORTH IN A BROWSER IN SELENIUM WEBDRIVER?**](#_bookmark23)

[We use navigate method (navigate is an abstract method of Webdriver interface) to navigate back and forth in a browser. It has methods to move back, forward as well as to refresh a page.](#_bookmark23)

[*driver.navigate().to(“url”);* – to launch a new web browser window and navigate to the specified URL](#_bookmark23)

[*driver.navigate().forward();* – to navigate to the next web page with reference to the browser’s history](#_bookmark23)

[*driver.navigate().back();* – takes back to the previous webpage with reference to the browser’s history](#_bookmark23)

[*driver.navigate().refresh();* – to refresh the current web page thereby reloading all the web elements](#_bookmark23)

1. [**HOW CAN YOU PUT IN PRIORITY IN CUCUMBER?**](#_bookmark23)

[@Cucumber.Options(](#_bookmark23)

[features={"login.feature", "smoketest.feature"})](#_bookmark23)

1. [**HOW DO YOU IMPLEMENT DATA DRIVEN TESTING IN YOUR FRAMEWORK?**](#_bookmark23)

[***For Junit***](#_bookmark23)

[Cucumber Scenario outline --> Cucumber](#_bookmark23)

[Excel file with the help of Apache POI --> Cucumber/JUnit Data comes from Database Oracle data base](#_bookmark23)

[***For TestNG***](#_bookmark23)

[@DataProvider annotation --> TestNG](#_bookmark23)

[Excel file with the help of Apache POI --> TestNG](#_bookmark23)

1. [**SOME IMPORTANT NOTES**](#_bookmark23)

[Before and after class in hook comes from cucumber not Junit. Distinct, from, where, order by, group by, having are some clause We need body for put, post and Patch](#_bookmark23)

[Parallel testing occurs from de console not Automatically happen.](#_bookmark23)

[For reduce de code redundancy I am creating collection and use it for another request](#_bookmark23)

[By using Outh1 Authentication create 2 tokens but Outh2 create new token for every request](#_bookmark23)

[POJO -JSON there are 2 ways](#_bookmark23)

[Address ad=new Adress(3,”dd”,”ee”,4);](#_bookmark23)

[Put them inside of the Map and given, When, then](#_bookmark23)

[Depends on the developer but generally when we use the Post, we are getting 201 status code, for get 200, for put, patch, and delete 204.](#_bookmark23)

[Fetaures in Cukes runner start with src,glue start with com.](#_bookmark23)

[There are default-cucumber reports and cucumber.json report in cukesrunner but in failedrunner there is no json report](#_bookmark23)

[Parallel test can execution After cucumber 4 and Junit 5(should be add Maven- sure-plugin in POM.xml)](#_bookmark23)

[We can do parallel execution with singleton because there are one instance Parallel execution means every feature files (each one has lot of test cases)](#_bookmark23)

[executed in different browser at the same time.](#_bookmark23)

[Alert, javascriptexecutor, map, set, list, Mydriver, Webelement are interface Action is class](#_bookmark23)

[In singleton design pattern, driver should be private and static.](#_bookmark23)

1. [**How does Selenium handle blink pages?**](#_bookmark23)

[You can hide it using Chrome Options. Try adding arguments like this before opening the url:](#_bookmark23)

[*ChromeOptions options = new ChromeOptions(); options.addArguments("disable-blink-features=AutomationControlled"); ChromeDriver driver = new ChromeDriver(options);*](#_bookmark23)

1. [**Why do we need to handle cookies?**](#_bookmark23)

[Each cookie is associated with a name, value, domain, path, expiry, and the status of whether it is secure or not. To validate a client, a server parses all of these values in a cookie.](#_bookmark23)

[When testing a web application using selenium web driver, we may need to create, update or delete a cookie.](#_bookmark23)

[For example, when automating Online Shopping Application, we many need to automate test scenarios like place order, View Cart, Payment Information, order confirmation, etc.](#_bookmark23)

[If cookies are not stored, we will need to perform login action every time before we execute above listed test scenarios. This will increase your coding effort and execution time.](#_bookmark23)

[The solution is to store cookies in a File. Later, retrieve the values of cookie from this file and add to it your current browser session. As a result, you can skip the login steps in every Test Case because your driver session has this information in it.](#_bookmark23)

[The application server now treats your browser session as authenticated and directly takes you to your requested URL.](#_bookmark23)

[**56. How do you use collection in your Cucumber framework?**](#_bookmark23)

[When using Data Tables in Cucumber, I utilize Collection Framework. To handle the data passed from Datatable, I use List of Maps in step definitions.](#_bookmark23)

[*@When("User enters Credentials to LogIn")*](#_bookmark23)

[*public void user\_enters\_testuser and\_Test(DataTable data) { List<Map<String, String>> maps = data.asMaps(String.class, String.class); for (Map<String, String> map: maps) { Assert.assertTrue(driver.findElement(By.linkText(map.get("Tab Name"))).isDisplayed());}*](#_bookmark23)

[SELENIUM GRID](#_bookmark157)

#### [JDBC](#_bookmark154)

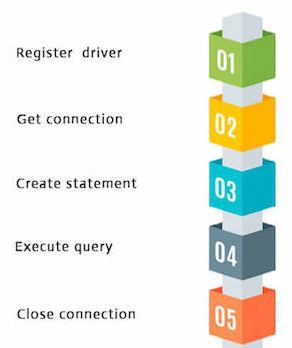
[EXCEL](#_bookmark156)

[DOWNLOAD](#_bookmark158)

[MAIN](#_bookmark1)

# [SQL Server- Steps to Connect](#_bookmark155)

## [MAIN](#_bookmark155)



1. [Load and Register the Database **Driver**](#_bookmark155)
   1. [Depending on which database you are using: MySQL, Oracle, Postgres etc.](#_bookmark155)

[**Class**.***forName***("com.**microsoft**.**sqlserver**.jdbc.SQLServerDriver");](#_bookmark155)

1. [Establish **Connection**.](#_bookmark155)
   1. [Connection con=DriverManager.*getConnection*("jdbc:sqlserver://34.235.0.4:1433; databaseName=MealBDb", "username", "password");](#_bookmark155)
2. [Create Statement Object](#_bookmark155)
   1. [Statement st= con.createStatement();](#_bookmark155)
3. [**Execute** the Statement](#_bookmark155)
   1. [ResultSet rs= st.executeQuery("Select \* from dbo.Expenses");](#_bookmark155)

# [SQL Server- Retrieving Data from DB](#_bookmark1)

## [MAIN](#_bookmark1)



[1. **Retrieve** the data from statement object](#_bookmark1)

[To access the resultset object, we use a method called **next();**](#_bookmark1)

[while(resultset.next()) {](#_bookmark1)

[expenseNameFromDb = resultset.getString("Name");](#_bookmark1)

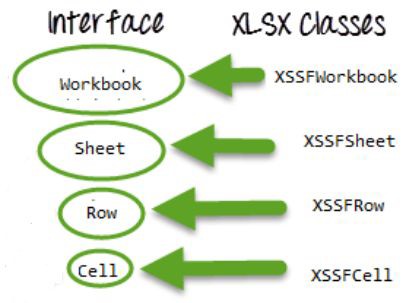
[System.*out*.println(expenseNameFromDb);](#_bookmark1)

[}](#_bookmark1)

# [APache POI - Excel](#_bookmark1)

[Below are the Apache POI Interfaces and Classes we use to interact with Excel Files](#_bookmark1)

## [MAIN](#_bookmark1)



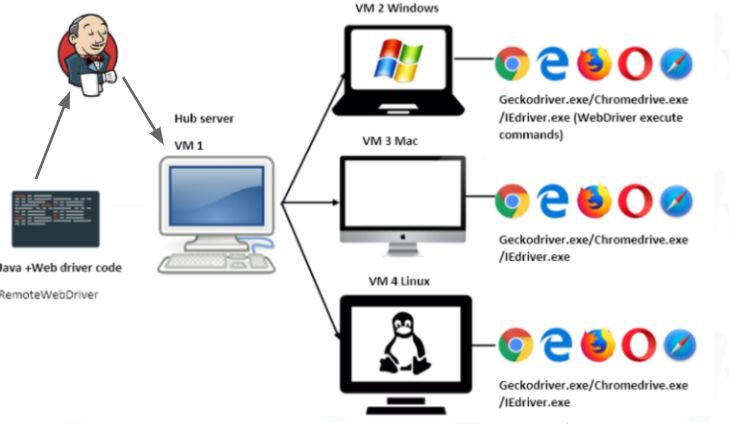
* [**XSSFWorkbook**: Is a class representation of **XLSX ﬁle**](#_bookmark1)
  + [This class implements **Workbook** interface](#_bookmark1)
* [**XSSFSheet**: Is a class representing a **sheet** in an XLSX ﬁle.](#_bookmark1)
  + [Implements Sheet interface](#_bookmark1)
* [**XSSFRow**: Is a class representing a **row** in the sheet of XLSX ﬁle](#_bookmark1)
  + [Implements Row interface](#_bookmark1)
* [**XSSFCell**: Is a class representing a **cell** in a row of XLSX ﬁle.](#_bookmark1)
  + [Implement Cell interface](#_bookmark1)

# [Read Data From Excel File](#_bookmark1)

* [Create an object of FileInputStream class to read excel ﬁle](#_bookmark1)
  + [FileInputStream fis = new FileInputStream("C:\\mydata.xlsx");](#_bookmark1)
* [Create object of XSSFWorkbook class](#_bookmark1)
  + [XSSFWorkbook workbook = new XSSFWorkbook(fis);](#_bookmark1)
* [Create object of XSSFWorksheet class](#_bookmark1)
  + [XSSFSheet sheet = workbook.getSheetAt(0);](#_bookmark1)
* [Access a given row:](#_bookmark1)
  + [XSSFRow *row* = sheet .getRow(1);](#_bookmark1)
* [Access a given cell:](#_bookmark1)
  + [XSSFCell *cell* = *row*.getCell(1);](#_bookmark1)
  + [String value = cell.getStringCellValue();](#_bookmark1)
* [Alternatively:](#_bookmark1)
  + [String value = sheet .getRow(1).getCell(1).getStringCellValue();](#_bookmark1)

[MAIN](#_bookmark1)

# [Grid Conﬁguration](#_bookmark1)

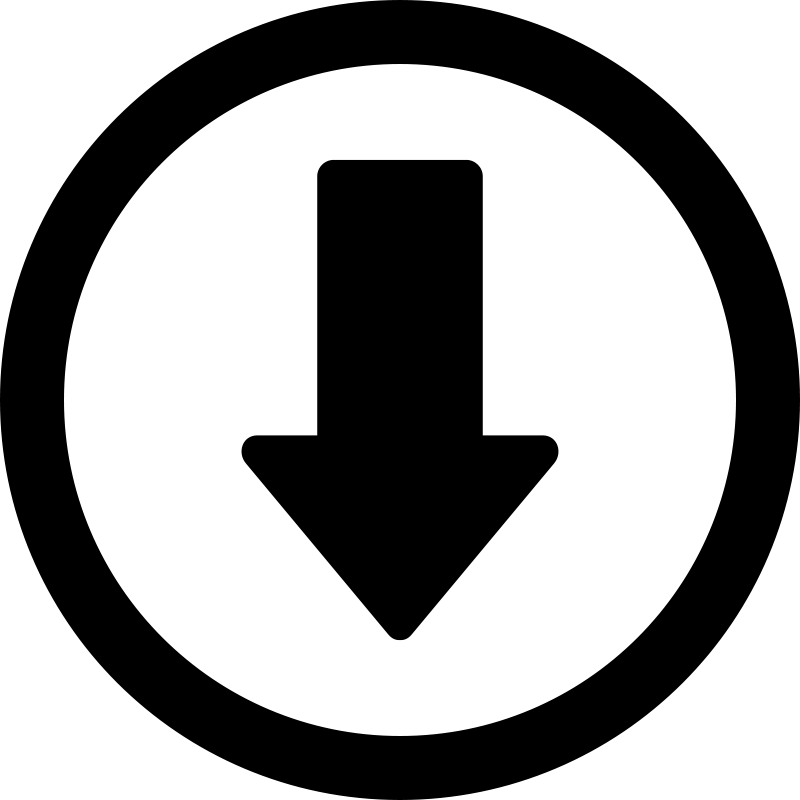


* [We conﬁgure our BrowserFactory Class with options called RemoteDriver](#_bookmark1)
  + [We pass IP address of the Selenium Grid Hub as desired capability](#_bookmark1)
  + [ChromeOptions chrOptions = new ChromeOptions() ;](#_bookmark1)
  + [*driver* = new RemoteWebDriver( new URL("http://34.235.0.4:4444/wd/hub" ), chrOptions) ;}](#_bookmark1)
* [We can trigger build from **Jenkins** by selecting Remote ChromeDriver as parameter](#_bookmark1)
* [This way Jenkins will start the execution using Selenium Grid on that provided IP address.](#_bookmark1)
* [Tests will get executed on the nodes.](#_bookmark1)

[MAIN](#_bookmark1)

# [Download](#_bookmark1)

[**MAIN**](#_bookmark1)

* [Selenium can’t download ﬁle by default, since clicking on download prompts browser window to show up.](#_bookmark1)
  + [Selenium cannot interact with browser download popup.](#_bookmark1)
  + [Therefore extra conﬁguration needed on browser level, to bypass that step.](#_bookmark1)
* [We use browser options (Chrome or Firefox) to set default ﬁle download location and disable download popup.](#_bookmark1)
* [For chrome disabling download popup is no longer needed.](#_bookmark1)

[WebDriverManager.*chromedriver*().setup();](#_bookmark1)

[HashMap<String, Object> chromePrefs = new HashMap<String, Object>(); chromePrefs.put("profile.default\_content\_settings.popups", 0); chromePrefs.put("download.default\_directory", System.*getProperty*("user.dir")+"\\src\\test\\resources\\testData\\Downloads"); ChromeOptions options = new ChromeOptions(); options.setExperimentalOption("prefs", chromePrefs);](#_bookmark1)

[driver = new ChromeDriver(options);](#_bookmark1)

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[METHOD, CLASS](#_bookmark174)

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**COLLECTION FRAMEWORK HIERARCHY**

**LIST**

**ArrayList**

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**ArrayList<Integer> array = new ArrayList<>(); *-unsynchronized/ Non Thread Safe***

array.add(17); ***-ordered, has index***

array.add(15); ***-less memory***

array.add(17); // accepts duplicate values ***-faster random access***

array.add(**null**);

array.add(**null**); // accepts multiple null values [17, 15, 17, null, null]

**List**

**LinkedList<String> list = new LinkedList<>(); *-faster at insertion, removing***

list.add("Baku"); ***-more memory***

list.add("Toronto"); ***-unsynchronized/Non Thread Safe*** list.add("Toronto");// accepts duplicate values -***implements List and Deque interface*** list.add(**null**);

list.add(**null**); // accepts multiple null values [Baku, Toronto, Toronto, null, null]

**Vector<String> vector = new Vector<>();**

**Vector**

vector.add("Roma"); ***-similar to ArrayList***

vector.add("Inter"); ***-synchronized/Thread Safe*** vector.add("Roma");// accepts duplicate values ***-slower than ArrayList*** vector.add(**null**);

vector.add(**null**); // accepts multiple null values [Roma, Inter, Roma, null, null]

**Stack <Integer> stack = new Stack<>();**

**Stack**

stack.push(2); ***-subclass of Vector***

stack.add(1); ***-LIFO principle***

stack.add(1); // accepts duplicate values ***-push(), pop(), peek(), search()***

stack.add(**null**); ***-synchronized/Thread Safe***

stack.add(**null**); // accepts multiple null values [2, 1, 1, null, null]

**QUEUE**

**PriorityQueue PriorityQueue <Integer> queue = new PriorityQueue<>();** queue.add(**null**); // no null value, runtime NullPointerException

queue.add(1); ***-unsynchronized/Non Thread Safe***

queue.add(25); ***-sorted by ascending order***

queue.add(1); // accepts duplicates ***-FIFO***

[1, 1, 25]

**DEQUE *=> extends to QUEUE***

**ArrayDeque**

**ArrayDeque <Integer> queue = new ArrayDeque<>();**

queue.add(null); // no null value, runtime NullPointerException queue.add(1); ***-implements Deque***

queue.add(-5); ***-unsynchronized/Non Thread Safe***

queue.add(25); ***-element can be added and removed***

queue.add(45); ***from head and tail***

queue.add(45); // accepts duplicates ***-insertion order***

[1, -5, 25, 45, 45]

**SET**

**HashSet**

#### [MAIN](#_bookmark164)

**HashSet<Integer> hashSet = new HashSet<>();**

hashSet.add(5); ***-random order***

hashSet.add(5); // accepts no duplicate ***-unsynchronized/Non Thread Safe***

hashSet.add(1);

hashSet.add(**null**); // accepts only one null value; hashSet.add(**null**);

[null, 1, 5]

**LinkedHashSet**

**LinkedHashSet <String> linkedHash = new LinkedHashSet<>();** linkedHash.add("Juventus"); ***-maintains insertion order*** linkedHash.add("Juventus");// accepts no duplicate ***-unsynchronized/Non Thread Safe*** linkedHash.add("Milan");

linkedHash.add(**null**);

linkedHash.add(**null**); // accepts only one null value [Juventus, Milan, null]

**TreeSet**

**TreeSet <Integer> treeSet = new TreeSet<>();**

treeSet.add(5); ***-sorted by ascending order***

treeSet.add(5); // accepts no duplicate ***-unsynchronized/Non Thread Safe***

treeSet.add(1);

treeSet.add(**null**); // no null value, runtime NullPointerException [1, 5]

**MAP**

**HashMap**

**HashMap<Integer, String> map = new HashMap<>();**

map.put(1, "Baku"); ***-maintains no order***

map.put(**null**, null); // accepts only one null key ***-unsynchronized/Non Thread Safe***

map.put(**null**, "Baku");// updates the null key map.put(2, **null**); // accepts multiple null value

{null=Baku, 1=Baku, 2=null}

**Hashtable**

**Hashtable<Integer, Integer> table = new Hashtable<>();**

table.put(1, 2); ***-maintains no order***

table.put(**null**, **null**);// no null key, no null value ***-synchronized, Thread Safe***

table.put(1, 3); // updates the key

table.put(5, **null**); // runtime NullPointerException table.put(**null**, 2); // runtime NullPointerException

{1=3}

**TreeMap TreeMap<Integer, Integer> treeMap = new TreeMap<>();** treeMap.put(**null**, 1); // no null key, runtime NullPointerException

treeMap.put(1, **null**); // accepts multiple null values ***-maintains ascending order*** treeMap.put(2, **null**); // accepts multiple null values ***-unsynchronized/Non Thread Safe*** treeMap.put(2, 5); // updates the value

{1=null, 2=5}

**LinkedHashMap**

**LinkedHashMap <Integer, String> linkedMap = new LinkedHashMap<>();** linkedMap.put(**null**, "Cuba");// accepts only one null key ***-maintains insertion order*** linkedMap.put(**null**, "USA"); // updates the value ***-unsynchronized/Non Thread Safe*** linkedMap.put(5,"Canada");

linkedMap.put(2, **null**);

linkedMap.put(3, **null**); // accepts multiple null values

{null=null, 5=Canada, 2=null, 3=null}

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1. [What is literal in java?](#_bookmark182)

[Any constant value which can be assigned to the variable is called as literal.](#_bookmark182)

[For example: String name="Tom" , int count=8; Here Tom and 8 are literals.](#_bookmark182)

[A regular expression is a sequence of characters that forms a search pattern. When you search for data in a text, you can use this search pattern to describe what you are searching for.](#_bookmark182)

[A regular expression can be a single character, or a more complicated pattern.](#_bookmark182)

[Regular expressions can be used to perform all types of text search and text replace operations.](#_bookmark182)

[Java does not have a built-in Regular Expression class, but we can import the java.util.regex package to work with regular expressions. The package includes the following classes:](#_bookmark182)

[Pattern Class - Defines a pattern (to be used in a search) Matcher Class - Used to search for the pattern](#_bookmark182)

[PatternSyntaxException Class - Indicates syntax error in a regular expression pattern](#_bookmark182)

[Expression Description](#_bookmark182)

[**[abc]** Find one character from the options between the brackets](#_bookmark182)

[**[^abc]** Find one character NOT between the brackets](#_bookmark182)

[**[0-9]** Find one character from the range 0 to 9](#_bookmark182)

1. [What is the difference between expression and statement in Java?](#_bookmark184)

[Expressions consist of variables, operators that evaluates to a single value.](#_bookmark184)

[Statements are everything that make up a complete unit of execution.](#_bookmark184)

[A Statement consists of expressions.](#_bookmark184)

[For Example: b + 1 is an expression while a = b + 1; is a statement.](#_bookmark184)

1. [Which data types can be used with variables in a switch statement?](#_bookmark184)

[Variables used in a switch statement can only be a string, enum, byte, short, int, or char.](#_bookmark184)

1. [What is the difference between = and == ?](#_bookmark184)

[We use = to assign a value to a variable or a variable to another variable but == is used to check whether two values or objects are equals to each other](#_bookmark184)

1. [What are the JDK, JRE and JVM?](#_bookmark184)

[JDK (Java Development Kit) is a software development environment to develop Java applications. It contains JRE and development tools. It physically exists.](#_bookmark184)

[JRE (Java Runtime Environment) is a set of software tools which are used for developing Java applications. It is used to provide the runtime environment. It physically exists. It contains a set of libraries that JVM uses at runtime.](#_bookmark184)

[JVM (Java Virtual Machine) is a virtual machine because it doesn't physically exist. It is used to run Java byte code.](#_bookmark184)

[JRE = JVM + libraries to run Java application. JDK = JRE + tools to develop Java Application.](#_bookmark184)

1. [What is Array?](#_bookmark178)

[An array is a container object that holds a fixed number of](#_bookmark178) v[alues of a single type. The length of an array is established when the](#_bookmark178) a[rray is created. After creation, its length is fixed. Each item in an](#_bookmark178) ar[ray is called an element, and each element is accessed by its](#_bookmark178) n[umerical index. Index numbering begins with 0. For example: 9th](#_bookmark178) el[ement in an array isat index 8.](#_bookmark178)

1. [Advantage of Java Array](#_bookmark178)

[Code Optimization: It makes the code optimized, we can retrieve or sort the dataeasily. Random access: We can get any data located at any index position.](#_bookmark178)

1. [Disadvantage of Java Array](#_bookmark178)

[Size Limit: We can store only fixed size of elements in the array. It doesn't grow itssize at runtime. To solve this problem, collection framework is used in java.](#_bookmark178)

[15. How are variables named in Java?](#_bookmark182)

[Variable name can contain letters, numbers, \_ and $.](#_bookmark182)

[It can start with letter, $, and \_ but cannot start with a number. It cannot contain white spaces. If variable name is one word, it starts with lowercase but if it is multiple words it is written with](#_bookmark182)

[camel case.](#_bookmark182)

[20. Explain me what happens when code is compiled in Java?](#_bookmark184)

[Compile means source code in \***.java** file converted into byte codes and storedin \***.class** file with the same name as .java file.](#_bookmark184)

[For example: when **cars.java** file is compiled, source code is converted to bytecodes and stored in **cars.class** file.](#_bookmark184)

[22. What is the difference between "else if" and "else"?](#_bookmark184)

[ELSE IF is a conditional statement performed after an if statement to add extra conditions to the code. And we can use multiple ELSE IF condition in the same if- else block. ELSE IF condition is executed when IF statement is false.](#_bookmark184)

[ELSE statement is used after IF and ELSE IF statements and only executes IF and all existed ELSE IF statements are false. Both ELSE and ELSE IF are optional.](#_bookmark184)

[25. Define Class in Java.](#_bookmark175)

[A class in Java is a blueprint which includes all your data. A class contains fields (variables) and methods to describe the behavior of an object. Classes are located Java package. Java have some built in classes which we can use. (For example: String). And we can also create our own classes to write code in it.](#_bookmark175)

[30. Is JDK required on each machine to run a Java program?](#_bookmark184)

[JDK is Java Development Kit and is required **only** for development and JDK **isn't** required to run a Java program on a machine. Only JRE is required.](#_bookmark184)

1. [What is identifier in Java?](#_bookmark182)

[The names of variables, methods or classes are called identifiers in Java.](#_bookmark182)

1. [How to check if an integer array has duplicate element or not?](#_bookmark178)

[We should use loop for it. First, we compare the first element of array with the other elements, then the second element, then the third element. By this way we compare allelements with each other to find if array has duplicate element or not.](#_bookmark178)

1. [What is the difference between a local variable and an instance variable?](#_bookmark168)

[In Java, a **local** variable is typically used inside a method, constructor, or a blockand has only local scope. Thus, this variable can be used only within the scope of a block. The best benefit of having a local variable is that other methods in the class won’t be even aware of that variable.](#_bookmark168)

[Whereas an **instance** variable in Java, is a variable which is bonded to its object itself. These variables are declared within a class, but outside a method. Every object of that class will create its own copy of the variable while using it. Thus, any changes made to the variable won’t reflect in any other instances of that classand will be bound to that instance only.](#_bookmark168)

1. [Difference between Object and Class?](#_bookmark175)

[Class is a blueprint or template which you can create as many objects as you like. Object is a member or instance of a class](#_bookmark175)

[Class is declared using class keyword, Object is created](#_bookmark175) t[hrough new keyword mainly. A class is a template for objects. A class defines object properties includinga valid range of values, and a default value. A class also describes object behavior. An object is a member or an "instance" of a class and has states and behaviors in which all its properties have values that you either explicitly define or that are defined by default settings. Class - A class can be defined as a template/blueprint that describes the behavior/state that the object of its type of support. If we compare them there are many differences but let me tell you some of them which are important to know.](#_bookmark175)

[There are many ways to create object in java such as **new** keyword, **newInstance**() method, **clone**() method, **factory**() method and deserialization. There is only one way to define class in java using class keyword.](#_bookmark175)

[Object is created many times as per requirement. Class is declared once.](#_bookmark175)

[Object is an instance of a class. Class is a blueprint or](#_bookmark175) t[emplate from whichobjects are created.](#_bookmark175)

[Object is a physical entity. Class is a logical entity.](#_bookmark175)

[For Example: Class: Human Object: Man, Woman](#_bookmark175)

[Class: Fruit Object: Apple, Banana, Mango, GuavaClass: Food Object: Pizza, Burger, Samosa](#_bookmark175)

1. [List the three steps for creating an Object for a class?](#_bookmark175)

[An Object is first **declared**, then **instantiated** and then it is](#_bookmark175)

[initialized.](#_bookmark175)

1. [**Define Packages in Java and why we use packages?**](#_bookmark184)

[In Java, package is a collection of related types of classes and interfaces which are bundled together as they are related to each other. Use of packages helps developers/testers to modularize the code and group the code for proper re-use. Packages are used in Java to prevent naming conflicts, to control access, to group the classes, to make searching/locating and usage of classes, interfaces easier. Once code has been packaged in Packages, it can be imported in other classes and used.](#_bookmark184)

1. [What is method in Java?](#_bookmark175)

[A method is a set of code to perform an operation. A method is referred to by name and can be called (invoked) at any point in a program simply by utilizing the method's name. Think of a method as a subprogram that acts on data and often returns a value. Each method has its own name, return type, access modifier.](#_bookmark175)

1. [What's the purpose of Static methods and static variables?](#_bookmark175)

[When there is a requirement to share a method or a variable between multiple objects of a class instead of creating separate copies for each object, we use static keyword to make a method or variable shared for all objects. We can reach a static method or variable by using class name of that method or variable.](#_bookmark175)

1. [Is String a data type in Java?](#_bookmark182)

[String is not a primitive data type in Java. When a string is created in java, it's actually an object of Java.Lang.String class that gets created. After creation of this string object,all built-in methods of String class can be used on the string object.](#_bookmark182)

1. [Why are Strings in Java called as Immutable?](#_bookmark182)

[In java, string objects are called immutable as once value has been assigned to astring, it can't be changed and if changed, a new object is created.](#_bookmark182)

[In below example, reference str refers to a string object having value "Value one". String str="Value One";](#_bookmark182)

[When a new value is assigned to it, a new String object gets created and the reference is moved to the new object.](#_bookmark182)

[str="New Value";](#_bookmark182)

1. [Do you know typecasting? What is casting?](#_bookmark184)

[Auto-boxing → is converting a primitive value into an object of](#_bookmark184)

[the corresponding wrapper class int i=10; Integer n=i; Integer num=200;](#_bookmark184)

[Un-boxing → is a process when you take Wrapper class object](#_bookmark184)

[and convert to primitive.](#_bookmark184)

[Integer num2=new Integer(400); int i=num2;](#_bookmark184)

[Assigning a value of one type to a variable of another type is known as Type Casting. double price=19.99;](#_bookmark184)

[int a=(int)price;](#_bookmark184)

1. [Explain the details of main Java method](#_bookmark175)

[public − it is the access modifier.](#_bookmark175)

[static − it allows main to be called without instantiating a particular instance of a class.](#_bookmark175)

[void − it is return type and means no value is returned](#_bookmark175)

[by main. program. class String](#_bookmark175)

[main − this method is called at the beginning of a Java String args[ ] − args parameter is an instance array of](#_bookmark175)

1. [What are the primitives and wrapper classes?](#_bookmark184)

[Primitives are data types in Java. There is total of **8 primitive data types in Java: byte, short, int, long, float, double, char, boolean.**](#_bookmark184)

[Every primitive data type has a class dedicated to it and these are knownas wrapper classes. **These classes wrap the primitive data type into an object** of that class.](#_bookmark184)

[51. What is the restriction imposed on a static method or a static block of code?](#_bookmark175)

[A static method should not refer to instance variables without creating an instance and cannot use "this" operator to refer the instance.](#_bookmark175)

[53. Differentiate between static and non-static methods in Java.](#_bookmark175)

[***Static Method*:**](#_bookmark175)

[The static keyword must be used before the method name It is called using the class (className.methodName)](#_bookmark175)

[They can’t access any non-static instance variables or](#_bookmark175)

[methods](#_bookmark175)

[***Non-static Method*:**](#_bookmark175)

[No need to use the static keyword before the method name It can be called like any general method](#_bookmark175)

[It can access any static method and any static variable without creating an instance of the class.](#_bookmark175)

1. What is the difference between equals () and == in Java?

Both equals () and "==" operator in Java is used to compare objects to check equalitybut the main difference is equals () is a method but the == is an operator. Another notable difference is that

== operator is used to compare both primitive and objects while equals () method is only used for objects comparison.

When we compare two objects with == operator, it compares reference or memory location of objects in the heap, whether they point to the same location or not. If thepoint same location in heap, it returns true, otherwise it returns false.

When we compare two non-primitive data types with == operator, it checks theirvalue. If both have the same value, it will return true, otherwise it returns false.

If we compare two objects with equals() method, it checks their contents. If both have the same contents, it returns true, otherwise it returns false.

We cannot use equals() method to compare non-primitive data types.

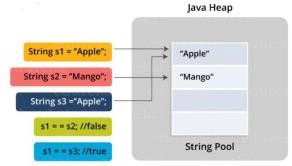
1. [What is Heap and Stack in Java?](#_bookmark182)

[**Heap** is a section of memory which contains Objects and may](#_bookmark182) a[lso contain reference variables. Instance variables are created in](#_bookmark182) t[he heap.](#_bookmark182)

[**Stack** in java is also section of memory which contains](#_bookmark182) m[ethods, local variables, and reference variables. They contain](#_bookmark182) m[ethod specific values which are short-lived. This is the temporary memory where variable values are stored when their methods are](#_bookmark182) i[nvoked.After the method is finished, the memory containing those](#_bookmark182) v[alues is cleared to make roomfor new methods.](#_bookmark182)

1. [What is Java String Pool?](#_bookmark182)

[Java String pool refers to a collection of Strings which are stored in heap memory. In this,whenever a new object is created, String pool first checks whether the object is already present in the](#_bookmark182)



[pool or not. If it is present, then the same reference is returned to the variableelse new object will be created in the String pool and the respective reference will be returned.](#_bookmark182)

1. [How garbage collection works in Java?](#_bookmark184)

[In java, Garbage Collection is a process of destroying unused objects to free up space in heap memory. When an object is not referenced any more, garbage collection takesplace, and the object is destroyed automatically. For automatic garbage collection java calls either System.gc() method or Runtime.gc() method.It is automatically in Java, which means you don’t have to worry about unused memory.](#_bookmark184)

[Garbage collection is run by JVM, and we don’t know when it runs. We can also request JVM to run Garbage Collector by using: System.gc(); It may or may not runwe cannot force it.](#_bookmark184)

1. [What are the various access modifiers for Java classes?](#_bookmark184)

[In Java, access modifiers are the keywords used before a class/method/variablename which defines the access scope.](#_bookmark184)

[The types of access modifiers for classes are:](#_bookmark184)

[**Public**: Class, Method, Field is accessible from anywhere.](#_bookmark184)

[**Protected**: Method, Field can be accessed from the same class to which they belong or from the sub-classes, and from the class of same package, but not from outside.](#_bookmark184)

[**Default**: Method, Field, class can be accessed only from the same package and not from outside of its native package.](#_bookmark184)

[**Private**: Method, Field can be accessed from the same class to which they belong.](#_bookmark184)

[We cannot use private or protected modifier with a top--level class. We should also keep in mind that local variables cannot be public, private, or protected in Java.](#_bookmark184)

1. [What is Encapsulation and how did you use it?](#_bookmark169)

[Encapsulation is a concept in Object Oriented Programming, and 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.](#_bookmark169)

[In my project I created multiple POJO/BEAN classes in order to manage test data and actual data. ▪ EX: I take JSON from API response and convert to object of my POJO class all variables are private with getters and setters.](#_bookmark169)

[Partial example of Encapsulation I can achieve in my framework through POMclasses, where I declare the data members as private, and initialization of data members will be done using Constructor to utilize those in methods.](#_bookmark169)

1. 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. We mark variables private to keep them secure and by using getter and setter methods we assign and get value of variables

1. [What's the default access specifier for variables and methods of a class?](#_bookmark175)

[Default access specifier for variables and method means variables and methods areaccessible from any other classes in the same package, classes in other packages cannot access those variables and methods.](#_bookmark175)

1. [What is Polymorphism?](#_bookmark169)

[Polymorphism is a very important concept in OOP because; it enables to change the behavior of the applications in the run time based on the object on which the invocation happens. By Polymorphism, one object can have different forms](#_bookmark169)

[Two types → **Compile Time which is Static and Run Time Polymorphism** which is related with child and parent class.](#_bookmark169)

[Polymorphism is implemented using the concept of **Method overloading and method overriding**. This can only happen when the classes are **under the parent and child** relationship using inheritance.](#_bookmark169)

1. [Difference between Polymorphism and Inheritance?](#_bookmark169)

[Inheritance is used to define the relationship between two classes. It is like Father-Son relationship like in the real world. In Java, we have Parent class (also known as super class) and child class (also known as subclass). Like the real- world, Child inherits Parents qualities.](#_bookmark169)

[A child class can reuse all the codes written in Parent class and only write code for behavior which is different than the Parent.](#_bookmark169)

[Inheritance is meant for code reuse.](#_bookmark169)

[On the other hand, Polymorphism is the ability of objects to behave in multiple forms.](#_bookmark169)

[It is classified as overloading and overriding.](#_bookmark169)

[By the way, they are related to each other, because Inheritance makes Polymorphism possible. It is not possible to write polymorphic code without any relationship between two classes.](#_bookmark169)

[***Dynamic Polymorphism → Overriding Static Polymorphism → Overloading***](#_bookmark169)

1. [Difference between method Overloading and method Overriding?](#_bookmark169)

[**First and most** important difference between overloading and overriding is that, in case of overloading, method name must be the same, but the parameters must be different; in case of overriding, method name and parameters must be the same.](#_bookmark169)

[**Second major** difference between method overloading and overriding is that.](#_bookmark169)

[We can overload method in the same class but method overriding occurs in two classes that have inheritance relationship.](#_bookmark169)

[We cannot override static, final, and private method in Java, but we can overload static, final, and private method in Java.](#_bookmark169)

[In method overloading, return type can be same or different.](#_bookmark169)

[In method overriding, return type must be the same type.](#_bookmark169)

[In method overloading access modifier of that method does not play any role, but in overriding, access modifier of child method should be same or larger than parent version of that method. For Example: If parent method is public, child method can only be public, cannot be protected, default or private.](#_bookmark169)

1. [What is the difference of final vs finalize vs finally?](#_bookmark184)

[final → is a keyword and used to apply restrictions on class, method, and variable.](#_bookmark184)

[final Class CAN'T be Inherited final Method CAN'T be Overridden](#_bookmark184)

[final Variable value CAN'T be changed. It is constant.](#_bookmark184)

[finally → is a block and used to place important code, it will be](#_bookmark184)

[executed whether exception handled or not](#_bookmark184)

[finalize() → is a method and used to perform clean-up processing before Object is Garbage collected.](#_bookmark184)

[74. What is method hiding in Java?](#_bookmark175)

[Since the static method cannot be overridden in Java, but if you declare the same static method in subclass then that would hide the method from the superclass. It means, if you call that method from subclass then the one in the subclass will be invoked but if you call the same method from superclassthen the one in superclass will be invoked. This is known as method hiding in Java.](#_bookmark175)

[76. Can we pass an object of a subclass to a method expecting an object of the super class?](#_bookmark175)

[Yes, you can pass that because subclass and superclass are related to each other by Inheritance which provides IS-A property. I mean Banana is a Fruitso you can pass banana if somebody expect fruit.](#_bookmark175)

[80. What are the rules of method overriding in Java?](#_bookmark172)

[Overriding method cannot throw higher exception than overridden one, but that's only true for checked exception.](#_bookmark172)

[Overriding method cannot restrict access of overridden method e.g., if original method is public then overriding method must be public.](#_bookmark172)

[But it can expand access e.g., if original method is protected than overriding method can be protected or public.](#_bookmark172)

[89. Where and how can you use a private constructor?](#_bookmark175)

[Private constructor is used if you do not want other classes to instantiate theobject and to prevent subclassing.](#_bookmark175)

[96. Difference between Arrays and ArrayList in Java?](#_bookmark178)

[Array is a part of core Java programming and has special syntax. ArrayList is part of collection framework and implement List interf ace](#_bookmark178)

[Major difference is that; Array is a fixed length data structure, so we cannot change the length of Array once it was created, but ArrayList is resizable.](#_bookmark178)

[The other major one is that Array can contain both primitives and objects. ArrayList can only contain objects. It cannot contain primitive types.](#_bookmark178)

[Also, we can compare Array and ArrayList on how to calculate the length of Array or size of ArrayList. We use length for an Array, we use size() method for an ArrayList.](#_bookmark178)

97.Why we use List interface? What are classes implementing List interface?

A java List is a “ordered” collection of elements. This ordering is a zero-based index. It does not care about duplicates. Apart from methods defined in Collection interface, it does have its own methods also which helps to manipulate the collection based on index location of element. The classes implementing List interface are: Stack, Vector, ArrayList and LinkedList.

1. [How would you convert an ArrayList to Array and an Array to ArrayList?](#_bookmark178)

[An Array can be converted into an ArrayList by making use of the asList() method provided by the Array class. It is a static method that accepts List objects as a parameter.](#_bookmark178)

[int[] num={1,2,3,4,5};](#_bookmark178)

[Arrays.asList(num);](#_bookmark178)

[Whereas an ArrayList can be converted into an Array using the toArray() method of the ArrayList class.](#_bookmark178)

[List<Integer> list=new ArrayList<>(); int[] arr=list.toArray();](#_bookmark178)

1. [What is the Stack class in Java and what are the methods provided by Stack class?](#_bookmark178)

[Java Stack class is an important part of the Java Collection framework and is based on the basic principle of last-in-first-out. In other words, the elements are added as well as removed from the](#_bookmark178)

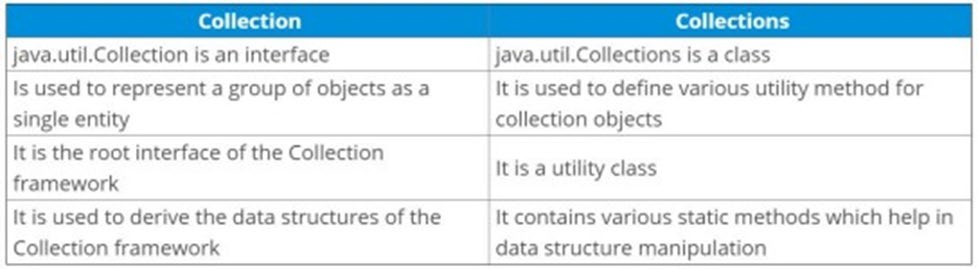
[rear end. The action of adding an element to a stack is called push while removing an element is referred to as pop. Following methods are specific for Stack class:](#_bookmark178)

1. [Compare Queue and Stack](#_bookmark178)

[Queue works based on FIFO (First-In-First-Out) principle, but Stack works based on LIFO (Last-In-First-Out) principle.](#_bookmark178)

[In Queue insertion and deletion takes place from two opposite ends but In Stack Insertion and deletion takes place the same end.](#_bookmark178)

[Queue is an Interface and used with LinkedList or PriorityQueue classes but Stack itself is a class and extends to Vector class.](#_bookmark178)

1. [How can you compare Collection and Collections?](#_bookmark178)

[**113. Which one you will prefer between Array and ArrayList for storing object and why?**](#_bookmark178)

[Though ArrayList is also backed up by array, it offers some usability advantage over array in Java. Array is fixed length data structure, once created you cannot change its length.On the other hand, ArrayList is dynamic, it automatically allocate a new array and copies content of old array, when it resizes.](#_bookmark178)

[Another reason of using ArrayList over Array is support of Generics. Array doesn't support Generics, and if you store an Integer object on a String array, you will only be going to know about it at runtime, when it throws ArrayStoreException.](#_bookmark178)

[On the other hand, if you use ArrayList, compiler and IDE will catch those errors on the spot. So, if you know the size in advance and you don't need re-sizing than use array, otherwise use ArrayList.](#_bookmark178)

[115.What is the difference between peek(), poll() and remove() method of the Queue interface?](#_bookmark178)

[Both poll() and remove() methods are used to remove the head object of the Queue. The main difference lies when the Queue is empty.](#_bookmark178)

[If the Queue is empty then the poll() method will return null. While in similar case, remove() method will throw NoSuchElementException .](#_bookmark178)

[peek() method retrieves but does not remove the head of the Queue. If the queue is empty then the peek() method also returns null.](#_bookmark178)

1. [How to remove repeated elements from ArrayList?](#_bookmark178)

[First, we need to copy all the elements of ArrayList to LinkedHashSet. Why we choose LinkedHashSet? Because it removes duplicates and maintains the insertion order.](#_bookmark178)

[Then we make the ArrayList empty by using clear () method. Then copying all the elements of LinkedHashSet (non-](#_bookmark178)

[duplicate elements) to the ArrayList by using addAll() method.](#_bookmark178)

1. [What are the primary interfaces in the java collections framework?](#_bookmark178)

[Java Collections Framework comprises of five primary interfaces.](#_bookmark178)

[Collection Interface – Most of the collections in Java inherit from the Collection interface. It is the core of the collections framework and stays at the root of Collection’s hierarchy.](#_bookmark178)

[Set Interface – It is a mathematical interpretation of Set which doesn’t allow duplicate entries. Also, a set doesn’t define an order for the elements and hence doesn’t support the index-based search.](#_bookmark178)

[Queue Interface – This interface follows the principles of a queue and stores elements in the same order as they enter. Operations like addition will take place at the rear and removal from the front.](#_bookmark178)

[List Interface – A list is an extended form of an array. Lists are ordered and can also contain duplicate elements. Not only it allows the index-based search, but insertion can also be done independently of the position.](#_bookmark178)

[Map Interface – Map is a two-dimensional data structure which stores data in the form of Key-Value pair. The map is necessarily a set and can’t have duplicate elements.](#_bookmark178)

1. [What are the Different Ways to Sort a List of Objects?](#_bookmark178)

[Following methods can be applied to perform sorting.](#_bookmark178)

* + [To sort an array of objects, you can use Arrays.sort()](#_bookmark178)

[method.](#_bookmark178)

* + [When you need to sort a collection of objects, then use](#_bookmark178)

[Collections.sort() method.](#_bookmark178)

1. [**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](#_bookmark178)

[the end, then ArrayList should be used.](#_bookmark178)

1. [What is the difference between throws and throw?](#_bookmark168)

[Throws is used to declare an exception, which means it works like the try-catch block.](#_bookmark168)

[is used in method declaration.](#_bookmark168)

[is followed by exception class names.](#_bookmark168)

[you can declare multiple exception with throws throws declare at method it might throws Exception](#_bookmark168)

[used to handover the responsibility of handling the exception occurred in the method to the caller method.](#_bookmark168)

[Throw](#_bookmark168)

[is used in the method body to throw an exception throw is followed by an instance variable](#_bookmark168)

[you cannot declare multiple exceptions with throw](#_bookmark168)

[The throw keyword is used to handover the instance of the exception created by the programmer to the JVM manually.](#_bookmark168)

[throw keyword is mainly used to throw custom exceptions.](#_bookmark168)

[Example](#_bookmark168)

[***class*** *Test {*](#_bookmark168)

[***public static void*** *main(String args[]) { policyAge(15); }*](#_bookmark168)

***public static void*** *policyAge(****int*** *age) {*

***try*** *{*

***if*** *(age > 18) {*

*System.****out****.println(****"You are eligible for an auto***

***policy"****);*

*}* ***else*** *{*

***throw new*** *ArithmeticException(****"User is younger than 18***

***years old and not eligible to have policy"****); }*

*}* ***catch*** *(Exception e) { System.****out****.println(e.getMessage()); } }*

1. [What is a main method? Why do we need one in java? Do we have to have a main method in java?](#_bookmark175)

[Main method is the starting point of an application. JVM starts execution by invoking the main method of some specified class, passing it a single argument, which is an array of strings. Whenever I execute a program, the main() is the first function to be executed. I can call other functions from main to execute them. It is not mandatory to have main method in Java, without main() my Java code will compile but won’t run.](#_bookmark175)

1. [What is constructor?](#_bookmark175)

[A constructor in java is a block of code like a method. Constructor is called when an instance of a class is created. A constructor is a special method whosetask is to initialize the object of its class. **Constructors cannot be abstract, final,static.**](#_bookmark175)

[Rules to create constructor:](#_bookmark175)

[Constructor name class name must be same. Constructor do not have any return type.](#_bookmark175)

[Constructor may or may not have parameters.](#_bookmark175)

1. [Use of constructor in class](#_bookmark175)

[The primary use of constructor is to initialize the instance and/or class variables. Constructors are special function which are called automatically when I create object of the class.](#_bookmark175)

[Once I create object of the class, all the variables get initialized and I do not need to write extra code for initialization of variables.](#_bookmark175)

[128. What is difference between constructor and method?](#_bookmark175)

[Constructor must not have return type whereas method must have returntype.](#_bookmark175)

[Constructor name same as the class name whereas method may or may not the same class name.](#_bookmark175)

[Constructor will be called automatically whenever object is created whereasmethod invoke explicitly.](#_bookmark175)

[Constructor compilers provide default constructor whereas method compiler does not provide.](#_bookmark175)

1. [What is inheritance and benefits of it?](#_bookmark169)

[The process of acquiring properties (variables) &methods (behaviors) from oneclass to another class is called inheritance.](#_bookmark169)

[We are achieving inheritance concept by using extends keyword. Alsoknown as is-a relationship.](#_bookmark169)

[Extends keyword is providing relationship between two classes.](#_bookmark169)

[The main objective of inheritance is code extensibility whenever we areextending the class automatically code is reused.](#_bookmark169)

1. [Types of Inheritance?](#_bookmark170)

[**Single Inheritance** - single base class and single derived class.](#_bookmark170)

[**Hierarchical Inheritance** - when a class has more than one childclasses (sub classes)](#_bookmark170)

[**Multilevel Inheritance** - single base class, single derived class, and multiple intermediate base classes.](#_bookmark170)

[**Multiple Inheritance** - multiple classes and single derived classes(Possible through interface only)](#_bookmark170)

[**Hybrid Inheritance** - combination of both Single and Multiple Inheritance (Possible through interface only)](#_bookmark170)

1. [Usage of inheritance in real time project](#_bookmark169)

[In our current Cucumber framework, we have BaseClass where we initialize and read Property file, initialize WebDriver interface. And after we extend the BaseClass in other classes such as Pages, Tests and Utility Class.](#_bookmark169)

1. [How do you use override/overload in your framework?](#_bookmark2)

[Selenium WebDriver provides an interface WebDriver, which consists of abstract methods getDriver() and closeDriver(). So any implemented class with respect to browser can override those methods as per their functionality, like ChromeDriver implements the WebDriver and can override the getDriver() and closeDriver().](#_bookmark2)

1. [What is the difference between a class and interface? Give an Example of interface from your framework](#_bookmark173)

[Class will contain concrete methods Class is extended](#_bookmark173)

[We can create an Object of the class](#_bookmark173)

[Class can inherit only one Class and can implement many interfaces](#_bookmark173)

[Interface](#_bookmark173)

[Interface will have Interface keyword. Interface will contain only abstract methods We cannot create object of interface Interface needs to be implemented](#_bookmark173)

[Class can extend many interfaces](#_bookmark173)

[We need to provide implementation to all methods when we implementinterface to the class](#_bookmark173)

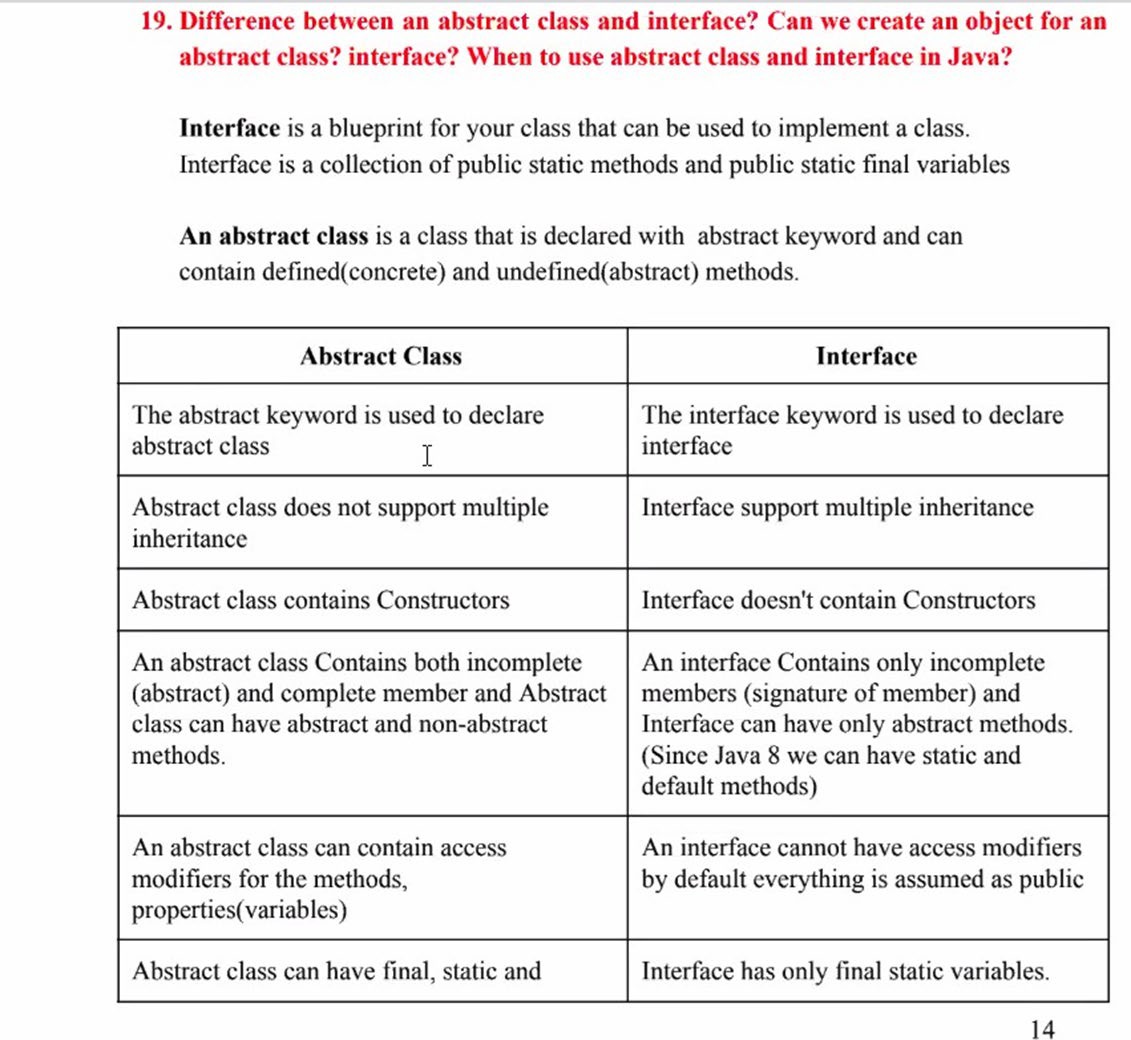
[*WebDriver driver = new ChromeDriver();*](#_bookmark173)

[WebDriver itself is an Interface. I am initializing Chrome browser using Selenium WebDriver. It means I am creating a reference variable (driver) of the interface (WebDriver) and creating an Object. Here WebDriver is an Interface and ChromeDriver is a class.](#_bookmark173)

1. [Difference between abstract class and interface? When to use abstract class and interface in Java?](#_bookmark172)

[An abstract class is good if you think you will plan on using inheritance since it provides a common base class implementation to derived classes.](#_bookmark172)

[An abstract class is also good if you want to be able to declare non-public members. In an interface, all methods must be public.](#_bookmark172)



1. [Difference between Instance Variable and Static Variable?](#_bookmark168)

[Static variables are declared with the “static” keyword in a class, but outside a method, constructor, or a block. Whereas, Instance variables are declared in a class,without the “static”. To access instance variables, I need to create an object of theClass it belongs to whereas static variables can be accessed without object creationby the class name.](#_bookmark168)

[Static variables also known as Class variables only have one copy that is shared by all the different objects of a class, whereas every object has its own personal copy of an instance variable.](#_bookmark168)

[Instance variables across different objects can have different values and when I make changes to the instance variable, they don't reflect in other instances of that class whereas class variables across different objects canhave only one value.](#_bookmark168)

[Static variables are created when the program starts and destroyed when the program stops. Instance variables are created when an object is created withthe use of the keyword 'new' and destroyed when the object is destroyed.](#_bookmark168)

1. [What is Static keyword in Java?](#_bookmark168)

[Static keyword means that the variable or method belongs to the class and shared between all instances.](#_bookmark168)

[Using static keyword, we can access class variables and method without object reference](#_bookmark168)

[Static methods cannot call/refer non-Static members](#_bookmark168)

1. [Where did you use Static in your framework?](#_bookmark168)

[In my utility package I have a class where I store common methods, such as wait, switch between frames, clicking on buttons, selecting values from drop down. Those methods are written using static keyword and I can easily access them in ourprogram.](#_bookmark168)

[Example:](#_bookmark168)

[*public static WebElement waiting(WebElement element) { WebDriverWait wait = new WebDriverWait(driver, 30); return wait.until(ExpectedConditions.elementToBeClickable(element))*](#_bookmark168)

*;* [*}*](#_bookmark168)

1. [What the difference is between wait and sleep in java?](#_bookmark184)

[Both wait() and sleep() methods are used to pause the execution of current thread for some period of time.](#_bookmark184)

[sleep()](#_bookmark184)

[is a method which is used to pause the process for few seconds or the time we want to](#_bookmark184)

[usage - just to put thread on sleep for time- synchronization wait()](#_bookmark184)

[method, thread goes in waiting state and it won’t come back automatically until we call the notify() or notifyAll(). usage - is normally done on condition, Thread wait until a condition is true, so we use it for for multi-thread-synchronization.](#_bookmark184)

[147. What is Map/HashMap? How did you use it in your framework?](#_bookmark178)

[Java Map Interface. A map contains values on the basis of key,](#_bookmark178)

[i.e. key and value pair. Each key and value pair is known as an entry. A Map Contains unique keys. A Map is useful if I have to search, update or delete elements on the basis of a key.](#_bookmark178)

[Example 1:](#_bookmark178)

[In my current Cucumber framework, I work with map object whenever Iuse Cucumber tables.](#_bookmark178)

[Example 2:](#_bookmark178)

[Whenever I store external data in excel, I bring data in a test, in a form of key andvalue pair.](#_bookmark178)

[In framework I can verify each month using HashMap → Use key for eachnumber from 1-12 and each number has a value in months](#_bookmark178)

[149. How to print all values from ArrayList?](#_bookmark178)

[//Using for loop](#_bookmark178)

[***for*** *(****int*** *i=0; i<names.size();i++) { System.****out****.println(names.get(i)); }*](#_bookmark178)

[//Using for each loop](#_bookmark178)

[***for*** *(String value: names) { System.****out****.println(value); }*](#_bookmark178)

[//Using Iterator](#_bookmark178)

[*Iterator<String> it=names.iterator(); //create/initialize Iterator*](#_bookmark178)

[***while****(it.hasNext()) { String name=it.next();*](#_bookmark178)

[*System.****out****.println(name); }*](#_bookmark178)

[//Using while loop](#_bookmark178)

[***int*** *count=0;* ***while****(names.size()>count) { System.****out****.println(names.get(count)); count++; }*](#_bookmark178)

[151. How to print all values from HashSet?](#_bookmark178)

[*//* enhanced *loop*](#_bookmark178)

[***for*** *(Object obj : hSet) { System.out.println(obj); }*](#_bookmark178)

[*//Using Iterator*](#_bookmark178)

[*Iterator itr = hSet.iterator();* ***while*** *(itr.hasNext()) { Object words = itr.next(); System.****out****.println(words); }*](#_bookmark178)

[154. Types of exceptions you have faced in your project Handling of Exceptions](#_bookmark168)

[***Checked Exceptions*** - are the exceptions that are checked at compile time.](#_bookmark168)

[**ClassNotFoundException** - Class not found](#_bookmark168)

[**InstantiationException** - Attempt to create an object of an abstract class or interface](#_bookmark168)

[**FileNotFoundException** - Attempt to open file that does not exist or open file to write but have only reading permission ***Unchecked Exceptions*** - are the exceptions that are not checked at compile time, they are Runtime Exceptions.](#_bookmark168)

[**ArithmeticException** - Arithmetic error, such as divide-by-](#_bookmark168)

[zero.](#_bookmark168)

[**ArrayIndexOutOfBoundsException** - Array index is out-of-](#_bookmark168)

[bounds.](#_bookmark168)

[**NullPointerException** - Invalid use of a null reference.](#_bookmark168)

[**IllegalArgumentException** - Illegal argument used to invoke a method.](#_bookmark168)

1. [Which catch block will get executed if you get ArithmeticException?](#_bookmark168)

[Only the catch block encountered first on the call stack that satisfies the conditionfor the exception will be executed for that exception, rest will be ignored.](#_bookmark168)

1. [What is Singleton?](#_bookmark184)

[A singleton class is a class that can have only one object (an instance of the class) at a time. After first time, if we try to instantiate the Singleton class, thenew variable also points to the first instance created. So whatever modifications we do to any variable inside the class through any instance, it affects the variable of the single instance created.](#_bookmark184)

[Singleton pattern restricts the instantiation of a class and ensures that only one instance of the class exists in the java virtual machine.](#_bookmark184)

[The singleton class must provide a global access point to get the instance of the class.](#_bookmark184)

[Singleton pattern is used for logging, drivers’ objects](#_bookmark184)

1. [How do you update an integer element in Arraylist?](#_bookmark178)

[We use set() method to update an element in the Arraylist. We need to pass a new value and the index of the elements that we want to update to the set() method.](#_bookmark178)

[*List<Integer>numbers = new ArrayList<Integer>(); numbers.add(7);*](#_bookmark178)

[*numbers.add(9); numbers.set(1,13);*](#_bookmark178)

[Set method will update the value of the element in index 1.](#_bookmark178)

[New value will be 13 insteadof 9.](#_bookmark178)

1. What was the purpose of adding functional interface to Java? Why do we need to have a function like this in Java?

A functional interface is an interface that contains only one abstract method and can have any number of default methods. They can have only one functionality to exhibit so we use it only for one purpose.

For example: The Predicate interface which came in Java 8 has an abstract method that we use in lambda expressions. The major benefit of Predicate functional interfacesis that we can use lambda expressions to instantiate them and avoid using bulky anonymous class implementation.

Runnable, ActionListener, Comparable are some of the examples of functionalinterfaces.

1. What is the Iterator interface and how to use it?

‘Iterator’ is an interface which belongs to the collection framework. It allows us to iterate over the elements in a collection to obtain or remove them. All Java collection classes provide iterator() method which returns the instance of Iterator.

ArrayList<String> cars = new ArrayList<String>(); cars.add("Volvo");

cars.add("BMW");

cars.add("Ford");

// get the iterator

Iterator<String> it = cars.iterator();

//loop through collection and print all elements while(it.hasNext()) { System.out.println(it.next());}

1. How do you use Collection interface in your framework?

I use subclasses of collection interface to work with data. As a part of mytesting, we retrieve data from the database and validate it. So, I use classes like ArrayList, or Hashset ect. Let me give some examples: Let’s say, I retrieve a column fromthe database and add its data to HashSet to make sure that I keep only unique ones. Later I iterate that list and validate the data.

Or I get all the elements in a dropdown of my application and assign it to ArrayList then I compare those elements with my expected result.

1. [What is abstract class?](#_bookmark172)

[A class that is declared using the “abstract” keyword is known as an abstract class. It canhave abstract methods (methods without body) as well as concrete methods (regular methods with body). But having abstract methods is not mandatory for abstract classes. Abstract class has following features:](#_bookmark172)

[Abstract class cannot be instantiated. (we cannot create object from Abstract class)](#_bookmark172)

[Only way to use abstract classes is by inheriting.](#_bookmark172)

[Abstract classes can have abstract methods. If it has abstract methods, Concrete class must provide implementations for all abstract methods. Otherwise, it will not compile Abstract methods in abstract class cannot be private and static and final because they cannot be overridden.](#_bookmark172)

1. [What is reflection in Java?](#_bookmark184)

[Java Reflection makes it possible to inspect classes, interfaces, fields, and methods atruntime, without knowing the names of the classes, methods etc. at compile time. It is alsopossible to instantiate new objects, invoke methods and get/set field values using reflection.](#_bookmark184)

[Java Reflection is quite powerful and can be very useful. For instance, Java Reflectioncan be used to map properties in JSON files to getter / setter methods in Java objects, likeJackson, GSON, Boon etc. does. Or Reflection can be used to map the column names of a JDBCResultSet to getter / setter methods in a Java object.](#_bookmark184)

[Class The getClass() method is used to get the name of the class to which an object belongs.](#_bookmark184)

[Constructors The getConstructors() method is used to get the public constructors of the class to which an object belongs.](#_bookmark184)

[Methods The getMethods() method is used to get the public methods of theclass to which an object belongs.](#_bookmark184)

[Fields](#_bookmark184)

1. [What do you know about Unix shell?](#_bookmark184)

[A Shell provides you with an interface to the Unix system. It gathers input from you andexecutes programs based on that input. When a program finish executing, it displays that program's output. Shell is an environment in which we can run our commands, programs, and shell scripts.There are different flavors of a shell, just](#_bookmark184)

[as there are different flavors of operating systems.](#_bookmark184)

[Each flavor of shell has its own set of recognized commands and functions. In Unix,there are two major types of shells −](#_bookmark184)

[Bourne shell − If you are using a Bourne-type shell, the $ character is the defaultprompt.](#_bookmark184)

[C shell − If you are using a C-type shell, the % character is the default prompt.](#_bookmark184)

1. [How do you add values to HashMap?](#_bookmark178)

[The put() method of HashMap is used to insert a mapping into a map. This means we can insert a specific key and the value it is mapping into a particular map. If anexisting key is passed, then the previous value gets replaced by the new value. If a new pair is passed, then the pair gets inserted as a whole.](#_bookmark178)

[Note: Null Key will be added to the zero index or 1st bucket.](#_bookmark178)

[Example:](#_bookmark178)

[*HashMap<Integer, String> HashMap = new HashMap<Integer, String>();HashMap.put(1, "Yoll");*](#_bookmark178)

[*HashMap.put(2, "Academy");*](#_bookmark178)

1. [How does Java check the equality between 2 objects? Explain the logic (He wanted to hear about the hashcodes)](#_bookmark184)

[All Java classes implement the Object class by default. The Java Object class providesthe two important methods to compare two objects in Java, i.e. equals() and hashCode()method.](#_bookmark184)

[The equals() method of the Object class compares the equality of two objects. The twoobjects will be equal if they share the same memory address.](#_bookmark184)

[If the two objects are equal according to the equals() method, then invoking thehashCode() method on these two objects must produce the same integer value.](#_bookmark184)

[Each Java object is associated with the unique hash code. The hash code is managed by a hash-based data structure, such as HashTable, HashSet, etc.](#_bookmark184)

[Remember: When we override the equals() method, it is necessary to override the hashCode() method, also. If we don't override it and implement logic for it will returnfalse for the same object value.](#_bookmark184)

1. [Can java hashCode produce the same value for different strings?](#_bookmark184)

[Yes this is possible, because one of the contracts between equals() & hashCode() methodof Object class is, If two object are not equal according to equals() method then there is no guarantee that their hashCode will be same, the hashCode may/may not be equal. i.e, if obj1.equals(obj2) return false then obj1.hashCode()==obj2.hashCode() may/may not return true. Example:](#_bookmark184)

[String str1 = "FB"; String str2 = "Ea";](#_bookmark184)

[System.out.println(str1.equals(str2));// false System.out.println(str1.hashCode() == str2.hashCode()); //](#_bookmark184)

[true](#_bookmark184)

1. [How to use methods and variables from abstract class without extending this class.](#_bookmark172)

[Since we cannot instantiate an abstract class, you cannot access its instance methods too.](#_bookmark172)

[We can call only static methods of an abstract class (since an instance is not required).](#_bookmark172)

[The only way to access the non-static method of an abstract class is to extend it,implement the abstract methods in it (if any) and then using the subclass object you need to invoke the required methods.](#_bookmark172)

[Note: We can use Reflections With Subclass of Abstract class to reachout to the methods and fields of Abstract class.](#_bookmark172)

[172. What was added to the interface in Java 8.](#_bookmark172)

[All the methods of interfaces are public & abstract by default. Java 8 allows the interfaces to have default and static methods. The reason we have default methods in interfaces is to allow the developers to add new methods to the interfaces without affecting the classes thatimplement these interfaces.](#_bookmark172)

[It seems that the abstract classes are the same as the interface in java 8. However, this is not entirely true, even though we can now have concrete methods (methods with body) ininterfaces just like abstract class, this doesn’t mean that they are the same. There are still few differences between them, one of them is that abstract classes can have constructor while in interfaces we can’t have constructors.](#_bookmark172)

[The purpose of interface is to provide full abstraction, while the purpose of abstract classis to provide partial abstraction. This still holds true. The interface is like a blueprint foryour class, with the introduction of default methods you can simply say that we can addadditional features in the interfaces without affecting the end user classes.](#_bookmark172)

1[73. StringBuffer vs. StringBuilder?](#_bookmark182)

[The most important difference between String and](#_bookmark182) S[tringBuffer/StringBuffer in Java is that String object is immutable whereas StringBuffer/StringBuilder objectis mutable.](#_bookmark182)

[Once String Object is created, I cannot change it and every time](#_bookmark182) I [try to change the value of the String, there is a new String Object](#_bookmark182) g[etting created. Forexample, I cannot reverse string directly, only through using StringBuffer class.](#_bookmark182)

[There are **2 ways to make String mutable:**](#_bookmark182)

[by using **StringBuffer**](#_bookmark182)

[by using **StringBuilder**.](#_bookmark182)

[The StringBuffer and StringBuilder Class are mutable means I](#_bookmark182) c[an change the valueof it without creating a new Object. Objects of](#_bookmark182) S[tringBuilder and StringBuffer Classes are stored inside heap memory**.**](#_bookmark182)

[177. What is mutable and immutable?](#_bookmark182)

[Immutable means once I create a String object, it is not possible to performmodifications on existing object. (String object is fixed object).](#_bookmark182)

[StringBuffer and StringBuilder are mutable which means once I create a StringBuffer/ StringBuilder object, I can then perform modifications onexisting](#_bookmark182)

[182. Can you explain Exception?](#_bookmark168)

[An exception is an unwanted or unexpected event, which occurs during the runtime or compile time.](#_bookmark168)

[There are 2 exceptions](#_bookmark168)

[***Checked exception***](#_bookmark168)

[It occurs in compile time.](#_bookmark168)

[For handle checked exception we have to use try and catch](#_bookmark168)

[block](#_bookmark168)

[Try block gets executed when exception is checked, catch](#_bookmark168)

[block gets executed if the exception is unchecked](#_bookmark168)

[Some of the most common checkedException like, ClassNotFoundException, fileNotFoundException, IOException](#_bookmark168)

[***UnChecked exception***](#_bookmark168)

[It occurs runtime](#_bookmark168)

[Some of the most common UncheckedException like NullPointerException, ArrayIndexOutOfBound, IndexOutOfBoundException, NoSuchElementException, Arithmetic exception](#_bookmark168)

[Throwable is parent for all exceptions. Exception is also parent class for checked and unchecked exception.](#_bookmark168)

[185. What are the advantages of map?](#_bookmark178)

[Map Interface: accepts key and value, both key and value does not support primitives. Key cannot be duplicated, Value can be duplicated](#_bookmark178)

[***put (key, value):*** inserts key and value objects to the map](#_bookmark178)

[***get(key):*** retrieves the value of the given key remove (Key): removes the given key object and its value](#_bookmark178)

[***size ():*** returns the size of the map](#_bookmark178)

[***containsKey (Key):*** verifies if the given Key is existing in the map. returns boolean](#_bookmark178)

[***containsValue (Value):*** verifies if the given value is existing in the map. returns boolean](#_bookmark178)

[***keySet ():*** returns all the keys as Set Interface](#_bookmark178)

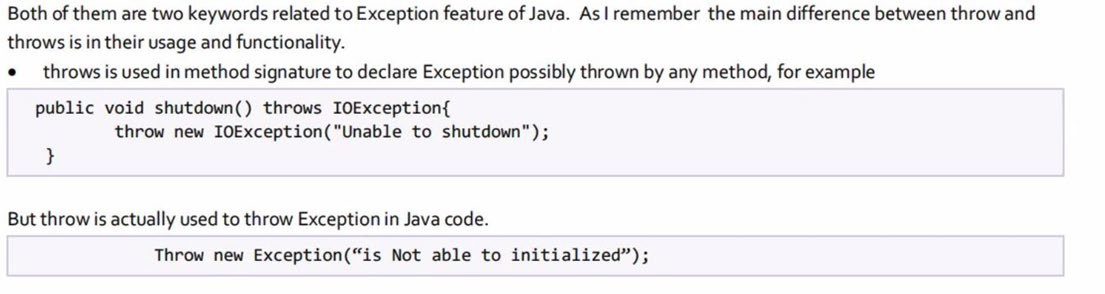
[***clear ():*** removes everything, size will become 0](#_bookmark178)

1. [Difference between an exception and an error?](#_bookmark168)

[Both java.lang.Error and java.lang.Exception classes are sub classes of java.lang. Throwable class](#_bookmark168)

[In general Errors (unchecked exception) are which nobody can control or guess when it happened, on the other hand Exception can be guessed and can be handled.](#_bookmark168)

[Errors which are mainly caused by the environment in which application is running. For](#_bookmark168)

[example, OutOfMemoryError occurs when JVM runs out of memory.](#_bookmark168)

1. [In a text file we have employee name and employee salary. We want to read this file and store it in a HashMap. How do we do this?](#_bookmark178)

[Map<String, Integer> map3 = new HashMap<> (); map3.put ("A", 100);](#_bookmark178)

[map3.put ("B", 10);](#_bookmark178)

[map3.put ("C", 9);](#_bookmark178)

[map3.put ("D", 54);](#_bookmark178)

1. [Tell me about collection framework and when you use them? (EACH OF THEM-MAP, SET, LIST…)](#_bookmark178)

[List: If I want to store list of data and if I want to access specific index then I use List Set: If I want to store list of data, I can use SET. I can not access specific data by index](#_bookmark178)

[Map: If there is a key, value relationship I use map. For example, if I want to display username and password then I can use Map<String, Integer>map=……or if I want to display currency with the rate, I can use map.](#_bookmark178)

[193. What is String?](#_bookmark182)

[String is a sequence of the character. String is immutable and String is a class.](#_bookmark182)

[196. If you want a concatenate you will use Stringbuilder or String?](#_bookmark182)

[It is better to use StringBuilder class because it is mutable. Everytime we modify string, It just updates existing object in heap, does not create new object. However, String is immutable. If you concat a string It keeps old one and also create new one in heap. That’s why StringBuilder is better to use if you modify a string multiple time](#_bookmark182)

1. [HashMap and its methods and where we use it?](#_bookmark178)

[HashMap is a type of map which does not maintain the order of elements and it may have one null key and multiple null values.](#_bookmark178)

[For automation we use HashMap a lot. For Example:](#_bookmark178)

[When we retrieve data from SQL database, we add retrieved data to HashMap. Column name added as key and Value in the table added as value to map.](#_bookmark178)

[Or](#_bookmark178)

[In Framework we keep our credential (URL, database URL, Username, Password) in XML file. And we read that xml file and convert it to HashMap and pass it oor Java Methods to run script.](#_bookmark178)

[Or](#_bookmark178)

[In API testing, we get more elements from some services in response. So, in order to validate them we need json paths of those elements. So, I keep all json paths of all elements in an HashMap. Like I add element name as key and jsonpath of that element as value to the HashMap](#_bookmark178)

1. [What is the string class. why it is distinctive from others?](#_bookmark175)

[String class is a default final class of Java. And it used a lot in Java. Internally String is an object, but it can be used like a primitive. There is an internal " String pool" that keeps track of String objects for you.](#_bookmark175)

[String is immutable in Java which means every time we modify a string object it creates a new object in heap. That’s why, it is preferred to use StringBuilder if you will modify a string object multiple time](#_bookmark175)

1. [How to test a Vending Machine.](#_bookmark184)

[First, we must know what kind of vending machine we are going to test. We must know all the requirements before testing it.](#_bookmark184)

[There are several vending machines as you know. Some of them has several features but some of them just a few. Some of them accept credit cart, some of them accept just coin. Some of them has cash dispenser some of them not. Some of them has display bar like product name or price and other than that some of them lot of buttons like contain product code. as you see there are lot of functionality.](#_bookmark184)

* 1. [Click on appropriate coin denomination button. For example, if you click on a quarter, then it should deposit a quarter.](#_bookmark184)
  2. [For every quarter that is deposited, the display amount should increase by quarter. (25, 50, 75 etc..)](#_bookmark184)
  3. [In the same way, if you select a 1 $ should need a dollar.](#_bookmark184)
  4. [If you click on any dispense button on the machine with out depositing sufficient funds, then nothing should happen.](#_bookmark184)
  5. [But with enough funds, the dispense button is clicked, then the item should dispense that item.](#_bookmark184)
  6. [If you deposit more money that required for a particular item, then after dispensing that item, the remaining amount will be returned.](#_bookmark184)
  7. [If you insert a $ bill and click on coin return, the exact change should be returned.](#_bookmark184)

[Normally the vending machine should have the following options.](#_bookmark184)

[A dispens button](#_bookmark184)

[A button with “coin return” A dispenser](#_bookmark184)

[Dispenser for coin return A coin slotter](#_bookmark184)

[A bill slotter](#_bookmark184)

1. [Syntax of lambda expression?](#_bookmark184)

[public class Main {](#_bookmark184)

[public static void main(String[] args) {](#_bookmark184)

[ArrayList<Integer> numbers = new ArrayList<Integer>(); numbers.add(5);](#_bookmark184)

[numbers.add(9); numbers.add(8); numbers.add(1);](#_bookmark184)

[numbers.forEach( (n) -> { System.out.println(n); } );](#_bookmark184)

[}](#_bookmark184)

[**L**ambda Expressions were added in Java 8.](#_bookmark184)

[A lambda expression is a **short block of code** which t**akes in parameters**](#_bookmark184) **and returns a** [**value**. Lambda expressions are s**imilar to methods, but they do not need a**](#_bookmark184) **name and they** [**can be implemented right in the body** of a method.](#_bookmark184)

[**Expressions are limited**. They have to immediately return a value, and they](#_bookmark184) cannot contain [variables, assignments or statements such as if or for. In order to do](#_bookmark184) more complex [operations, a code block can be used with curly braces. If the lambda](#_bookmark184) expression needs to [return a value, then the code block should have a return statement.](#_bookmark184)

1. [What is validation and verification?](#_bookmark184)

[Validation is the process of checking whether the specification captures the customer's needs.](#_bookmark184)

[Validation Requirement + design](#_bookmark184)

[Verification is the process of checking that the software meets](#_bookmark184)

[the specification.](#_bookmark184)

[Verification Coding + testing](#_bookmark184)

1. [What are different ways to create an object in java?](#_bookmark175)

[Employee emp1 = new Employee();](#_bookmark175)

[Employee emp2 = Employee.class.newInstance();-by newinstance](#_bookmark175)

[Employee emp4 = (Employee) emp3.clone();-by clone](#_bookmark175)

1. [What is the inner class in java?](#_bookmark175)

[Java inner class or nested class is a class which is declared inside the class or interface. We use inner classes to logically group classes and interfaces in one place so that it can be more readable and maintainable.](#_bookmark175)

1. [Are JavaScript and Java the same?](#_bookmark184)
   * [Java is an OOP programming language while Java Script is an OOP scripting language.](#_bookmark184)
   * [Java creates applications that run in a virtual machine or browser while JavaScript code is run on a browser only.](#_bookmark184)
   * [Java code needs to be compiled while JavaScript code are all in text.](#_bookmark184)
   * [They require different plug-ins.](#_bookmark184)
2. [What types of collections/data structures you have used?](#_bookmark178)

[Depending on the data that I am working with, I use Arrays, Lists, Sets, Maps.](#_bookmark178)

1. [Java Collection Framework](#_bookmark178)

[Two types of Collection](#_bookmark178)

* + [java.util.Collection - interface from Set and List extend (not implement)](#_bookmark178)
  + [Set (Unique things) - DOES NOT ALLOW DUPLICATES. Classes that Implement Set;](#_bookmark178)
  + [HashSet- not ordered, no index, no duplicates](#_bookmark178)
  + [Unordered and Unsorted](#_bookmark178)
  + [LinkedHashSet - ordered, no index, no duplicates](#_bookmark178)
  + [SortedSet](#_bookmark178)
  + [TreeSet - Elements will be in ascending order, according to the natural order of the elements](#_bookmark178)
  + [Can also customize constructor to implement your own rules of the natural order](#_bookmark178)
  + [List (list of things) - cares about the index. Classes that implement List;](#_bookmark178)
  + [LinkedList - Ordered by index position and elements are doubly linked to one another](#_bookmark178)
  + [It is a good choice for implementing stack and queue](#_bookmark178)
  + [Iterates more slowly than ArrayList but fast insertion and deletion](#_bookmark178)
  + [Vector -Same as ArrayList BUT vector methods are synchronized (thread-safe)](#_bookmark178)
  + [ArrayList - Fast iteration and Fast random access and ordered (by index)](#_bookmark178)
  + [Also unsorted (but can invoke Collections.sort() to sort it) java.util.Collections - a class that holds static utility methods for use with collections; Includes add, remove, contains, size, and iterator, etc.](#_bookmark178)
  + [Map (things with unique ID) -Important: none of the Map- related classes and interfaces extend form Collection.](#_bookmark178)

[The implementation classes of Map are thought of “collections”, not Collection. Classes that](#_bookmark178)

implement Map;

* + HashTable

Same as HashMap BUT HashTable methods are synchronized (REMEMBER. ONLY METHODS ARE SYNCHRONIZED, NOT CLASSES OR VARIABLES)

HashTable won't let you have anything NULL (NO NULLS AT ALL)

* + LinkedHashMap
  + Maintains insertion order (or optionally, access order)
  + Slower than HashMap for adding/removing elements but FASTER ITERATION
  + HashMap- Unsorted and Unordered & Allows one null KEY and

multiple null values in a collection

* + KeySet ()
  + Map.keySet() - returns a set of Keys
  + Map.keySet().size - return # of keys
  + SortedMap -TreeMap
  + The implementation classes of Set, List, and Map can NEVER be both sorted but unordered, can be all other combinations.

1. [What kind of java exceptions do you know? and what kind of selenium exceptions do you know?](#_bookmark168)

[***Java Exceptions:***](#_bookmark168)

[NullPointerExceptions: When you modify null string object IOException: (Input Output Exception) thrown when you](#_bookmark168)

[work a file](#_bookmark168)

[ClassCastException: Thrown when you cast a data type to other type in wrong way](#_bookmark168)

[ArithmeticException: When you divide an integer by zero](#_bookmark168)

[***Selenium Exceptions***:](#_bookmark168)

[ElementNotVisibleException: If selenium tries to find an element but the element is not visible within the page](#_bookmark168)

[NoAlertPresentException: If a user tries to handle an alert box but the alert is not present.](#_bookmark168)

[NoSuchAttributeException: While trying to get attribute value but the attribute is not available in DOM.](#_bookmark168)

[NoSuchElementException: This exception is due to accessing an element which is not available on the page.](#_bookmark168)

[WebDriverException: Exception comes when a code is unable to initialize WebDriver.](#_bookmark168)

1. [How do you combine two strings?](#_bookmark182)

[By using (+) operator](#_bookmark182)

[By using concatenate method (concat()). String strconcat3=strconcat2.concat(strconcat);](#_bookmark182)

[By StringBuffer or By StringBuilder](#_bookmark182)

[String strconcat= new StringBuilder().append("cengiz").append("alabacak").toString();](#_bookmark182)

1. [Write a code using arrays LET’S say you have an array of numbers and you want to print them in ascending order.](#_bookmark178)

[*Collection.sort();*](#_bookmark178)

1. [**HOW TO GET EXTENSION OF FILE ON JAVA?**](#_bookmark184)

[I didn’t use it in my project but I know we can get it by getextension() methods.](#_bookmark184)

[*File file = new File("/Users/pankaj/java.txt");*](#_bookmark184)

[*Path in File class System.out.println("File extension is: "+getFileExtension(file));*](#_bookmark184)

1. [Difference between RuntimeException and CheckedException in Java?](#_bookmark168)

[Exception is divided in two categories Runtime (unchecked) Exception and CheckedException.](#_bookmark168)

[Main difference between RuntimeException and CheckedException is that it is mandatory to provide try-catch to handle CheckedException while in case of RuntimeException is not mandatory.](#_bookmark168)

[Some of the most common Exception like NullPointerExceptio, ArrayIndexOutOfBound, ClassNotFoundException, IOException.](#_bookmark168)

[First, I want to remind that Java Exceptions are divided in two categories RuntimeException also known as unchecked](#_bookmark168)

[Exception and checked (compile time) Exception.](#_bookmark168)

[Main difference between RuntimeException and checked Exception is that it is mandatory to provide try catch or try finally block to handle checked Exception and failure to do so will result in compile time error, while in case of RuntimeException this is not mandatory.](#_bookmark168)

[Some of the most common Exception like NullPointerException, ArrayIndexOutOfBoundException are unchecked and they are descended from java.lang.RuntimeException.](#_bookmark168)

[Popular example of checked Exceptions are ClassNotFoundException and IOException and that's the reason you need to provide a try catch finally block while performing file operations in Java as many of them throws IOException.](#_bookmark168)

[If you I ask my opinion, I think Checked Exceptions makes our code code UGLY by adding boiler plate code in for of try-catch finally block.](#_bookmark168)

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2. [**What is Iterator and difference between for each loop?**](#_bookmark184)

[Iterator works with ArrayList and not array. It will help us Iterate through the elements.](#_bookmark184)

[Difference is with iterator you can make changes (remove item) to the list while iterating.](#_bookmark184)

[within for each loop we cannot make changes to our list.](#_bookmark184)

1. [How to convert float to String?](#_bookmark182)
2. [**What is the difference between pass-by-value and pass- by-reference? pass by value & pass by reference?**](#_bookmark184)

[Passing by value means that the value of the function parameter is copied into another location of your memory, and when accessing or modifying the variable within your function, only the copy is accessed/modified, and the original value is left untouched. Passing by value is how your values are passed on most of the time. Passing by reference means that the memory address of the variable (a pointer to the memory location) is passed to the function. This is unlike passing by value, where the value of a variable is passed on. In the examples, the memory address of myAge is 106. When passing myAge to the function increaseAgeByRef, the variable used within the function (age in this example) still points to the same memory address as the original variable myAge (Hint: the & symbol in front of the function parameter is used in many programming](#_bookmark184)

[languages to get the reference/pointer of a variable).](#_bookmark184)

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[**What is Software Testing?**](#_bookmark14)

[Process of executing a program or application with the intent of finding software bugs using functional and automation tools](#_bookmark14)

[Process of validating/verifying a software program/application Testers should test to break approach, not test to pass.](#_bookmark14)

[**What is Software Requirements Specification?**](#_bookmark14)

[A software requirements specification is a document which acts as a contract between the customer and the supplier.](#_bookmark14)

[This SRS contains all the requirement of the end user regarding that application. SRS can be used as a communication medium between the customer and the supplier.](#_bookmark14)

[The developer and tester prepare and examine the application based on the requirements written in the SRS.](#_bookmark14)

[The SRS document is prepared by the Business Analyst by taking all the requirements for the customer.](#_bookmark14)

[**Software Development Life Cycle (SDLC) - What is SDLC?**](#_bookmark14)

[SDLC defines the phases in building of software or application.](#_bookmark14)

[***Project Planning***](#_bookmark14)

[***Requirement Gathering*** (Gathering information used to plan project, Identifying risks)](#_bookmark14)

[***Design*** (How the application will be built)](#_bookmark14)

[***Coding*** (developing) (Based on requirements, developers will write the application)](#_bookmark14)

[***Testing***](#_bookmark14)

[***Production*** (deployment) (Releasing product)](#_bookmark14)

[***Maintenance*** (Making sure product is stable, looking at customer report on bugs and fixing it)](#_bookmark14)

1. [**STLC?**](#_bookmark14)
   * [Requirement Analysis](#_bookmark14)
   * [Planning](#_bookmark14)
   * [Case development](#_bookmark14)
   * [Environment setup](#_bookmark14)
   * [Execution](#_bookmark14)
   * [Cycle closure](#_bookmark14)

[Requirement Analysis: During requirement phase, we study the requirements from a testing point of view to identify the testable requirements and we try to grasp the functionalities of the application.](#_bookmark14)

[Test Planning: The most important deliverable is the test plan. In this document, we cover the scope of the test, the test strategy, testing types and tools to be implemented, roles and responsibilities.](#_bookmark14)

[Test case development: During this phase, we generate test cases for each functionality, covered in RTM, have them reviewed by PO and Developers just to make sure we are on the same page. we also write the automation scripts we are going to automate the cases.](#_bookmark14)

[Test Environment Setup: Test environment decides the software and hardware conditions under which a work product is tested. Test environment set-up is one of the critical aspects of testing process and can be done in parallel with Test Case Development Stage.](#_bookmark14)

[Test Execution: During this phase, we carry out the testing based on the test plans and the test cases we prepared. Bugs will be reported back to the development team for correction and retesting will be performed. Finally, Test cases are updated with the results, defects are reported. Each item on RTM should be completed at the end of this step.](#_bookmark14)

[Cycle closure: We Prepare Test closure report and end the current cycle and prepare for the upcoming tests.](#_bookmark14)

[**What is the difference between STLC and SDLC?**](#_bookmark14)

[STLC is part of SDLC. It can be said that STLC is a subset of the SDLC set.](#_bookmark14)

[STLC is limited to the testing phase where quality of software or product ensures. SDLC has vast and vital role in complete development of a software or product.](#_bookmark14)

[However, STLC is a very important phase of SDLC and the final product or the software cannot be released without passing through the STLC process.](#_bookmark14)

[STLC is also a part of the post-release/ update cycle, the maintenance phase of SDLC where known defects get fixed, or a new functionality is added to the software.](#_bookmark14)

[**What is requirement?**](#_bookmark14)

[Requirements convey the expectation of users for the software or product.](#_bookmark14)

[Process to gather requirements from client, analyze and document them is known as requirement engineering.](#_bookmark14)

[Goal of requirement engineering is to develop and maintain sophisticated and descriptive SRS ‘System Requirements Specification’ Document](#_bookmark14)

[**Where is the requirement coming from?**](#_bookmark14)

[Customers give requirements for the application](#_bookmark14)

[Talk to the End-users the person that will be using this application the most Talk to Partners –](#_bookmark14)

[Talk to Domain Experts – coders and developers that have already build this application similar before or someone that is an expert the type of product being built](#_bookmark14)

[Industry Analysts and Information about competitors](#_bookmark14)

[**How to tell if the requirement is good or bad?**](#_bookmark14)

[Requirement must be (SMART)](#_bookmark14)

[***Specific*** → User should be able to login. Authorized user with valid username and password should](#_bookmark14)

[be able to login](#_bookmark14)

[***Measurable*** →User should be able to login very fast (in 2 second after clicking the login button).](#_bookmark14)

[***Attainable Realistic***](#_bookmark14)

[***Testable*** →User should be able to download the receipt very fast (in 2 second)](#_bookmark14)

[**Why do we test?**](#_bookmark14)

[To build bug free application. To satisfied end user and client.](#_bookmark14)

[To build great product to generate more revenue.](#_bookmark14)

[**What is tester’s main responsibility?**](#_bookmark14)

T[o find a bug as early as possible. Make sure most of the bug gets fixed.](#_bookmark14)

T[o satisfy the end user and client buy delivering bug free and user-friendly application.](#_bookmark14)

[**What is testing hierarchy?**](#_bookmark14)

[***Unit testing*** → Developers test each module or block of code during development. ***Component Testing*** → Component is a standalone functionality that can work by itself. Ex. Amazon Buyer Functionality, Seller Functionality, Prime Video Functionality.](#_bookmark14)

[***Integration Testing*** → Combine all the Functionalities. When I integrate them, can I still use all of the functions? Make sure they all still work.](#_bookmark14)

[***System Testing*** → End-to-End testing. Test everything from beginning to end.](#_bookmark14)

[***Acceptance Testing*** → Hire a UAT (User Acceptance Testing) Team or Business Analyst can also do Acceptance Testing.](#_bookmark14)

[After testing has been completed you have to get another team to do acceptance testing so they can confirm the QA teams testing was successful and have the product ready for the customer.](#_bookmark14)

[**What is risk-based testing?**](#_bookmark14)

[Since 100% testing is not possible, we must do risk analysis. Based on the analysis we must prioritize our testing activity and test high risk area first. For example:](#_bookmark14)

[the most critical functionalities the most often used functionalities](#_bookmark14)

[the most complicated functionalities etc.…](#_bookmark14)

[**How many environments you have?**](#_bookmark18)

[***Development Environment***](#_bookmark18)

[Unit testing -- Less stable than test environment](#_bookmark18)

[***Test Environment***](#_bookmark18)

[Manual testing happens here](#_bookmark18)

[Replicates the production environment exactly Changes are deployed in intervals](#_bookmark18)

[Automated smoke tests are running here](#_bookmark18)

[Runs against the test environment to make sure if the application is stable enough to perform other major testing activities.](#_bookmark18)

[Run every time changes are deployed to Test environment Can be ran in dev environment](#_bookmark18)

[Automation tests are running here Automated Integration tests run here](#_bookmark18)

[***Pre-production Environment*** UAT environment Demo happens here](#_bookmark18)

[load/performance testing happen here Changes are deployed in big intervals](#_bookmark18)

[Automated major regression tests here (before release)](#_bookmark18)

[Runs against the UAT environment](#_bookmark18)

[To find out if new changes result in any defects Runs after major bug fixes and every release This test is decided in test plan](#_bookmark18)

[Very stable](#_bookmark18)

[***Production environment***](#_bookmark18)

[This is an environment where end user sees the functionality](#_bookmark18)

[**What is unit testing? Have ever done unit testing?**](#_bookmark16)

[It is part of the white box testing. It’s done by the developers before they deploy the code from Development environment to QA environment.](#_bookmark16)

[Since it is performed by developers, I have never done unit testing yet. But I think I can learn it and do it if it is needed.](#_bookmark16)

[**What is component testing?**](#_bookmark14)

[Testing each component of the application separately. In application it could be one component. One component has stand-alone functionality. Ex. in amazon.com Seller functionality can be one component. Buyer can be another component. Also, Amazon prime videos can be another component.](#_bookmark14)

[**What is Integration Testing?**](#_bookmark14)

[Integration testing is black box testing. Integration testing focuses on the interfaces between units, to ensure that units work together to complete a specific task.](#_bookmark14)

[The purpose of integration testing is to confirm that different components of the application interact with each other.](#_bookmark14)

[Test cases are developed with the purpose of exercising the interfaces between the components. Integration testing is considered complete when actual results and expected results are the same. Integration testing is done after unit testing. There are mainly three approaches to do integration testing:](#_bookmark14)

[***Top-down Approach***- tests the components by integrating from top to bottom.](#_bookmark14)

[***Bottom-up approach*** - It takes place from the bottom of the control flow to the higher-level components](#_bookmark14)

***Big bang approach*** - in this are different module are joined together to form a complete system and then testing is performed on it.

**What is test coverage?**

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

[**Q#28. What is Acceptance testing?**](#_bookmark14)

[The Acceptance testing will be performed after QA testing. In my current project it is done](#_bookmark14)

[by UAT team. After UAT team performing the acceptance testing the code will go to production.](#_bookmark14)

[Development environment (where developers write code and perform unit testing) QA environment (where we test the application.)](#_bookmark14)

[UAT environment (after the code is tested QA environment it will be deployed to the UAT environment. UAT testing team will perform testing to make sure it fits the business requirement. It is also called staging environment.](#_bookmark14)

[Production environment (is when the end user can see the real application)](#_bookmark14)

[**Q#29. What is the difference between UAT (User Acceptance Testing) and SIT (System Integration Testing) testing?**](#_bookmark19)

[SIT: System testing is finding defects when the system undergoes testing, it is also known as end-to-end testing. In such type of testing, the application undergoes from beginning till the end.](#_bookmark19)

[UAT: User Acceptance Testing (UAT) involves running a product through a series of specific tests which determines whether the product will meet the needs of its users.](#_bookmark19)

[**Q#1. Agile Framework?**](#_bookmark14)

[Role: PO, SM, Team](#_bookmark14)

[Ceremonies: Sprint Planning, Daily Scrum, Sprint Review, Sprint Retro, Grooming Session Artifacts: Product backlog, - Sprint backlog, -Burnup chart](#_bookmark14)

[**Q#2. What is Agile?**](#_bookmark14)

[Agile is an iterative product development methodology that is an alternative to the waterfall methodology.](#_bookmark14)

[It is focused client process. So, it makes sure that the client is continuously involved during every stage.](#_bookmark14)

[Agile teams are extremely motivated and self-organized so it likely to provide a better result from the development projects.](#_bookmark14)

[The process is completely based on incremental progress. Therefore, the client and team know exactly what is complete and what is not. This reduces the risk in the development process.](#_bookmark14)

[It is useful for big project](#_bookmark14)

[Scrum: Team plans for amount of work for the next sprint](#_bookmark14)

[Kanban: No sprint planning, stories are picked up as is, but you still have everything else](#_bookmark14)

[**Q#3. Why do we need Agile? Waterfall and Agile?**](#_bookmark14)

[Because waterfall methodologies have following disadvantages.](#_bookmark14)

[Requirement cannot be changed or hard to change once the document is signed.](#_bookmark14)

[In waterfall before completing the one phase you can’t move to the next phase. For example, before the coding phase is completed testing cannot be started.](#_bookmark14)

[Customers can’t see what they are going to get until a very late stage in the development life](#_bookmark14)

[cycle.](#_bookmark14)

[It takes longer to go to the production. By the time the product goes to the market it might](#_bookmark14)

[be outdated already.](#_bookmark14)

[Agile has following advantages:](#_bookmark14)

[The change is welcomed. For example, after the sprint demo if a client does not like something, we can take their feedback and improve the product. Requirement change is OK.](#_bookmark14)

[Since it is an iterative development process, the development team can develop a piece of functionality, get feedback, and improve the next iteration. So, the product will be continuously improved.](#_bookmark14)

[Waste is eliminated in agile with the help of scrum master. For example, if I am blocked, I don’t have to wait and waste my time.](#_bookmark14)

[Since team members communicate with each other efficiently we can be more productive by preventing duplicated effort.](#_bookmark14)

[Waterfall emphasizes tools and platform, like C#\_.NET, but agile emphasizes people. You can have the best tool but at the end people are using those tools. I believed inspired people can make amazing products even though they have less money or less resources.](#_bookmark14)

1. [**Waterfall?**](#_bookmark14)

* [Waterfall methodology is the sequential method using for Software Development.](#_bookmark14)
* [You can not go back and must finish the phase before you move on.](#_bookmark14)

1. [**Relation between Agile and Scrum? What is Scrum?**](#_bookmark14)

* [Agile is the software development methodology that focuses on customer satisfaction by delivery shippable software frequently.](#_bookmark14)
* [Scrum is one of the many approaches to implement Agile.](#_bookmark14)
* [Scrum is an Agile framework.](#_bookmark14)
* [Scrum is suitable for certain type of projects where there are rapidly changing requirements.](#_bookmark14)
* [In simple words, Agile is the practice and scrum is the process to following this practice.](#_bookmark14)

[**Q#8. What are the responsibilities of a Scrum Master?**](#_bookmark14)

[Tracking and monitoring Understanding requirements properly Work to reach the project goal](#_bookmark14)

[Process checking master and quality master Protect the team from detachments Improving the performance of the team Lead the meetings and resolve issues Resolution of conflicts and impediments Communication and reporting](#_bookmark14)

[**Q#11. Shippable product/increment?**](#_bookmark14)

[The piece of the product is made, and it keeps getting added functionality form each sprint The increment must align to the development team’s Definition of Done](#_bookmark14)

[When the product increment is delivered, it needs to meet “Definition of Done” Acceptance criteria is fulfilled](#_bookmark14)

[Product owner accepts the user stories](#_bookmark14)

[The increment must be acceptable by the P.O](#_bookmark14)

[**Q#13. What is Verification and Validation?**](#_bookmark14)

[Verification happens during developing by testers and developers; it is a process of evaluating software at development phase and to decide whether the product of a given application satisfies the specified requirements.](#_bookmark14)

[Validation by testers; is the process of evaluating software at the end of the development process and to check whether it meets the customer requirements.](#_bookmark14)

[**Q#14. What is Definition of Ready?**](#_bookmark14)

[Acceptance Criteria is cleared/reviewed Point/hours are given](#_bookmark14)

[**Q#15. What is a User Story?**](#_bookmark14)

[(Note: basically, a user story is just a requirement) User story is a short simple description](#_bookmark14)

[of a minimum shippable product.](#_bookmark14)

[User stories are short and simple descriptions of capabilities. They are written from the](#_bookmark14)

[perspective of a user or customer of the system. Another word for user story is Requirement.](#_bookmark14)

[It normally looks like this: As <end-user> I want to do < action> So that I can <benefit>. As amazon user I should be able to login, so I can buy stuff online](#_bookmark14)

[**Q#16. You said “shippable”, what do you mean by that?**](#_bookmark14)

[Well, you can’t really say As a user I want to put my username in the username field.](#_bookmark14)

[So, I can write my username there. It must be complete functionality. Putting a username is not a shippable functionality. But able to login is a complete functionality. That is what I mean by shippable.](#_bookmark14)

[**Q#20. What is an Epic?**](#_bookmark17)

[Epic is a big user story that you cannot complete in one sprint.](#_bookmark17)

[For example, as a user I want to buy online so I don’t have to visit the local store. This story is too big, and it cannot be completed in one sprint. So, we can call it Epic instead of a user story. It should be divided to multiple user stories like:](#_bookmark17)

[As a customer I want to be able to login so I can view my account.](#_bookmark17)

[As a customer I want to be able to search for a product so I can buy them.](#_bookmark17)

[As a customer I want to be able to proceed to checkout so I can pay for the item that I am going to buy.](#_bookmark17)

[As a customer I want to be able to log out so I can protect my account.](#_bookmark17)

[As you can see< As a customer I want to be able to buy...> can be divided into multiple user stories. The team can pick one or more user stories in every sprint.](#_bookmark17)

[**Q#21. What are Acceptance criteria?**](#_bookmark14)

[Acceptance criteria is the way that we know the user story is successfully developed or not.](#_bookmark14)

[Statements of requirements that are described from the point of view of the user to determine when a story is ”done” and working as expected](#_bookmark14)

[3 parts examples](#_bookmark14)

[***Input*** - valid email address](#_bookmark14)

[***Process*** - marking messaging](#_bookmark14)

[***Outcome*** - marketing message design matches the specs provided by marketing](#_bookmark14)

[**Q#23. What kind of projects are suitable for the Agile Scrum methodology?**](#_bookmark14)

[The traditional methodology is suited for projects with predefined, clearly stated requirements while agile development methodology is suitable for projects with dynamic requirements where frequent changes in the product come up on a regular basis.](#_bookmark14)

[**Q#25. Describe scrum?**](#_bookmark14)

[***Scrum Team*** - Normally scrum teams have 5-9 team members. This is called development team which has Developers Tester and BA](#_bookmark14)

[***Product owner*** - He or she has the responsibility of delivering a whole concept of what to build and then convey the idea to the team. Also, they are the one who created a wish list for the project which is called product backlog. Product owners usually prioritize the product backlog item and come up with a sprint Backlog as well.](#_bookmark14)

[***Scrum master*** - He or she is responsible to move the team to the right direction and handle all needs of the team. Scrum master is the coordinator assures team productivity and follows agile principles. Also, if there are any issues and blockers scrum master is the point of contact to handle such matters](#_bookmark14)

[***Sprint Planning Meeting***- Here the Product Owner selects the Product Backlog Items (User Stories) from the Product Backlog. Most important User Stories at the top of the list and least important User Stories at the bottom. The Scrum Development Team decides and provides the effort estimation. For example, 4 hours up to 20 hours Etc.](#_bookmark14)

[***Sprint Demo*** - This is usually led by SME or test lead where we will have a demo for clients (Stakeholders) and showcase what was developed and answer any questions they have a quick walk through of what was built and also receive feedback.](#_bookmark14)

[***Sprint Retrospective*** – Here the scrum team meets and documents the lessons learned in the earlier sprint such as “What went well”, “What could be improved”. It helps the Scrum Team to avoid the mistakes in the next Sprints.](#_bookmark14)

[***Daily Scrum*** - Everyday we will have a 15-minute scrum meeting to answer following question:](#_bookmark14)

[What did he/she do yesterday What he/she will do today What are the impediments(blockers) faced](#_bookmark14)

[***Product backlog*** - The entire application that we want to develop and sort in user stories.](#_bookmark14)

[***Sprint Backlog*** - The items that we are going to develop in a specific sprint.](#_bookmark14)

[**9. What is ETL testing?**](#_bookmark14)

[The ETL or Extract, Transform, and Load process supports the movement of data from its source to storage (often a data warehouse) for future use in analyses and reports. And ETL testing ensures that nothing has been lost or corrupted along the way. (It’s okay to say that you are not familiar with this type of testing)](#_bookmark14)

1. [**What’s Requirements Traceability Matrix?**](#_bookmark14)

[Requirement Traceability Matrix (RTM) is a table (mostly a spreadsheet) that shows if each](#_bookmark14) r[equirement has a respective Test case/case to make sure if the requirement is covered for testing. Requirement Traceability Matrix helps to link the requirements, Test cases, and defects accurately.](#_bookmark14)

* + [Gives Overview of ALL the requirements](#_bookmark14)
  + [Shows how requirements are linked to Test Cases](#_bookmark14)
  + [Makes sure 100% coverage of requirements](#_bookmark14)
  + [Easy to prepare](#_bookmark14)
  + [No special tool is required](#_bookmark14)

[After finishing the project requirement traceability matrix (RTM) given to the end-client.](#_bookmark14)

B[ecause RTM is a basic traceability schema or spreadsheet for understanding.](#_bookmark14)

[**22. Why RTM is Important?**](#_bookmark14)

[The main agenda of every tester should be to understand the client’s requirement and make sure that the output product should be defect-free. To achieve this goal, every QA should understand the requirement thoroughly and create positive and negative test cases.](#_bookmark14)

[The traceability matrix is typically a worksheet that contains the requirements with its all- possible test scenarios and cases. Based on the Business Requirement Document (BRD) and Technical Requirement Document (TRD), testers start writing test cases.](#_bookmark14)

[Types of Traceability Test Matrix](#_bookmark14)

[*Forward traceability*](#_bookmark14)

[*Backward or reverse traceability*](#_bookmark14)

[*Bi-directional traceability (Forward + Backward)*](#_bookmark14)

1. [**What are the layers in the application?**](#_bookmark14)

[Environments. We have Dev, Test, UAT and Prod environments in our application. The work starts in Dev environment and makes it way to Production where customers see the application. Environments get more and more stable towards the production: Dev being the least stable and production being the most stable environment.](#_bookmark14)

1. [**What type of refinement do you do?**](#_bookmark14)

[We have backlog refinement meeting. During these meeting we go over all the user stories we have for upcoming sprint and refine those stories and bring clarification to any questions.](#_bookmark14)

1. [**What is Definition Of Done for you?**](#_bookmark14)

[I consider testing done when the following aspects have been met: 100% requirements coverage is achieved.](#_bookmark14)

[More than 95% of test coverage and 100% functional coverage is achieved. When we achieved the target time.](#_bookmark14)

[All showstopper and Major defect are identified, verified and closed.](#_bookmark14)

[Less than 5% minor defects are open, and if open work around is available. All defects are retested and closed.](#_bookmark14)

[All corresponding regression scenario of retested and closed defect are also tested. All critical test cases are passed](#_bookmark14)

[All test document and deliverables are prepared, reviewed and published across. Sign off is](#_bookmark14)

[given](#_bookmark14)

[**10. How would you find a good requirement?**](#_bookmark14)

[In my opinion in a good requirement the description and acceptance criteria should be written in a clear and understandable manner, should cover all the details and list the upcoming tasks.](#_bookmark14)

1. [**Explain Automation Life Cycle? Simply Explanation:**](#_bookmark14)

[Analyze the Application -> Select the tool -> Identify the scenarios -> Design test scripts -> Modify test scripts -> Run the test scripts -> Report defects](#_bookmark14)

[Detailed Explanation:](#_bookmark14)

1. [***Automation Feasibility Study***](#_bookmark14)

[Before kicking off implementing test automation, it is mandatory to analyze the feasibility of test the application under test (AUT). Whether AUT is a right candidate or not for the automation? Main focus:](#_bookmark14)

* + [Which test case/module can be automated and how we can automate them.](#_bookmark14)
  + [Which tools we can use for the application (like Selenium) and which tools will be best of our application](#_bookmark14)
  + [Consideration like Team size, effort and cost involved for tools which we will use.](#_bookmark14)

1. [***Test Planning/ Test Design***](#_bookmark14)

[This phase defines approach and any risks Following are the Test automation Framework available Cucumber framework](#_bookmark14)

[TestNG framework Data driven framework](#_bookmark14)

[Hybrid Framework (preferred method) Schedule](#_bookmark14)

[Number of resources](#_bookmark14)

[Mode of communication process Defining in-scope and out-of-scope](#_bookmark14)

1. [**Environment Setup/Test lab setup**](#_bookmark14)

[In this phase machine setup should be done (whether we are using local or remote machine).](#_bookmark14)

[In case of remote how many machines we will need.](#_bookmark14)

1. [**Test Script development/ Automation test case development**](#_bookmark14)

[In this phase we must start developing automation script and make sure all test scripts are](#_bookmark14) running fine and should be stable enough.

Start creating test script based on your requirement

Create some common method or function that we can reuse throughout your script

Make script easy, reusable, well-structured and well documented so if third person check the script then he/she can understand scripts easily.

Use better reporting so in case of failing we can trace our code while

1. **Test script execution**

In this phase we must execute all your test scripts. Some points to remember executing: Script should cover all the functional requirement as per test case.

Script should be stable so it should run in multiple environment and multiple browsers (depends on your requirement)

Can do batch execution also if possible so it will save time and effort. In case of failure your script should take screenshots.

If test case is failing due to functionality, we must raise a bug/defect.

1. **Generate test result / Analysis of result with**

Last phase of Automation test life cycle in which we gather test result and share team/client/stakeholders:

Result analysis, how much time automation takes

Report generation, Cucumber advance or Extend Reports Documenting the issues and knowledge gained Preparation of team/client/stakeholders’ presentation

[**20. What is Automation Testing? What are the benefits of Automation Testing?**](#_bookmark14)

[Automation Testing means using an automation tool to execute your test case suite. The automation software can also enter test data into the System Under Test, compare expected and actual results and generate detailed test reports.](#_bookmark14)

1. [Faster Feedback: Automated testing comes as a relief for validation during various phases of a software project. This improves communication among coders, designers, and product owners. It allows potential glitches to be immediately rectified. Automated testing assures higher efficiency of the development team.](#_bookmark14)
2. [Accelerated Results: Owing to the quick implementation of automated testing, plenty of time is saved even for intricate and enormous systems. This allows for the testing to be carried out repeatedly, delivering faster results each time with lesser effort and time.](#_bookmark14)
3. [Reduced Business Expenses: It is of no surprise that, while the initial investment may be on the higher side, automated testing saves companies many a penny. This is predominantly due to the sharp drop in the amount of time required to run tests. It contributes to a higher quality of work, thereby decreasing the necessity for fixing glitches after release and reduces project costs.](#_bookmark14)
4. [Testing Efficiency Improvement: Testing takes up a significant portion of the overall application development lifecycle. This goes to show that even the slightest improvement of the overall efficiency can make an enormous difference to the overall timeframe of the project. Although the setup time takes longer initially, automated tests eventually take up significantly lesser amount of time. They can be run virtually unattended, leaving the results to be monitored towards the end of the process.](#_bookmark14)
5. [Higher Overall Test Coverage: Through the implementation of automated tests, a greater number of tests can be executed pertaining to an application. This leads to a higher coverage that in a manual testing approach, would imply a massive team limited heavily with their amount of time. An increased test coverage leads to testing more features and a higher quality of application.](#_bookmark14)
6. [Reusability of Automated Tests: Due to the repetitive nature of test automation test cases, in addition to the relatively easy configuration of their setup, software developers can assess program reaction. Automated test cases are reusable and can hence be utilized through different approaches.](#_bookmark14)

[**21. Why does manual testing still exists, even though automation has been proven to be more efficient?**](#_bookmark14)

[When a new feature is implemented, initially, running a manual test is essential to ensure functionality meets acceptance criteria. For a test script to be properly automated, the exact test steps need to be manually executed and documented.](#_bookmark14)

[Manual testing also includes exploratory testing which enables testers to find weaknesses, and risks. This enables testers to determine which part of the application needs more testing. Manual testing is less expensive in the short-term. If you’re only testing a simple application once, and don’t expect lots of updates, manual testing doesn’t require you to invest in expensive tools or software. This is considered flexible and on-the-fly testing. Automation testing requires you to write, program, and review test cases for your software. But, if you only need to test one small change, you can high manually test it faster than it would take to automate. This is beneficial when a priority bug fix needs to go out to production immediately.](#_bookmark14)

[Manual testing provides the human element to make sure the feature is user- friendly. A manual tester could tell you that the contrast between a button and the background is too light, which makes it hard to see the button and understand what action needs to be taken. This type of user interface (UI) feedback is something automated testing wouldn’t find, making manual testing closer to the sort of feedback you might hear from actual customers. Manual testing is valuable early in the development of features and your can user interfaces because layout and controls are often changing (almost daily) in response to design considerations and user feedback. Being able to predict what users will or won’t like—things a computer can’t give feedback on—ahead of time influence your design and make it better from the bottom up.](#_bookmark14)

[Manual testing identifies bugs that can be found in areas users wouldn’t expect. Typically, these bugs are found by quality assurance teams who were looking for something other than the issue they found. Automation will not find errors it wasn’t scripted to find. It’s impossible to catch all bugs on the first round of testing, so manual testing is a faster “catch-all” for what could possibly be missed.](#_bookmark14)

[Manual testing is used to reproduce customer-found defects. This enables the quality](#_bookmark14) assurance engineer to duplicate the steps and provide detailed information to the developer about browser related issues or data issues that might not be found by automation.

Often, in an Agile environment, things are changing, and features are being enhanced.

This requires constant rewrites to the automation scripts and creates additional for the team. Manual testing does not need increased work to be able to adapt to new changes. Automation testing is a benefit to any company, but manual testing should never be replaced. Manual testing is always going to find things automation won’t find.

[**23. How do you measure your test coverage?**](#_bookmark14)

[To measure your coverage, the best way to make sure you have a test case for each functionality that is being developed. If your test cases cover everything then I consider this a good coverage, if not, then its fair coverage](#_bookmark14)

1. [**What is the difference between system testing and integration testing?**](#_bookmark14)

[For system testing, the entire system is checked,](#_bookmark14)

[whereas for integration testing, the interaction between the individual modules is tested.](#_bookmark14)

1. [**What are the Jira terms?**](#_bookmark14)

[Issue → We you need to do and fix](#_bookmark14)

[Types of Issue](#_bookmark14)

[*Story, Task, Bug, Epic*](#_bookmark14)

1. [**What's the difference epic and tickets?**](#_bookmark14)

[Epic are written by B.A(Whole product backlog), tickets are created by testers](#_bookmark14)

1. [**What types of Test cases?**](#_bookmark14)

[I cover different scenarios](#_bookmark14)

* + [Positive](#_bookmark14)
  + [Negative](#_bookmark14)
  + [Boundary Value Analysis](#_bookmark14)

1. [**What are the common UI test automation tools?**](#_bookmark14)
   * [Selenium](#_bookmark14)
   * [Cucumber](#_bookmark14)
   * [TestNG](#_bookmark14)
   * [Junit](#_bookmark14)
   * [Appium](#_bookmark14)
   * [Protractor](#_bookmark14)
2. [**TESTING TYPES, WE ARE RESPONSIBLE FOR ARE SMOKE, REGRESSION AND FUNCTIONAL TEST?**](#_bookmark14)

[***smoke test:*** main purpose is to check whether the server, front end, back end, environment and the all the main functionalities are up and running](#_bookmark14)

[***regression test***: the main purpose is to check if the recently built functionalities have an adverse effect to the rest of the application.](#_bookmark14)

[***major***: The regression with almost whole test cases.](#_bookmark14)

[minor: Once the sprint is over, I execute minor regression. let’s say 4 user stories is done in current sprint and 4 user stories last from the last sprint and now you can combine them and create a regression. it is up to you.](#_bookmark14)

[***Test Plan regression***](#_bookmark14)

[in Jira test plan is nothing but grouping tests (and labeling them) so that they are regression, smoke, or both. All you need to do is create a test plan name is Regression and add tests to this test plan by linking those tests with the test plan you have just created.](#_bookmark14)

1. **WHAT ARE THE ADVANTAGES AND DISADVANTAGES OF AUTOMATIONS?**

[Test automation can bring many benefits to your mobile app testing cycles, allowing you to build better apps with less effort. It is less time consuming as well! Many companies still run only manual tests because they don’t know how to properly integrate automated testing in their app development process.](#_bookmark14)

[Keep on reading to find out the top benefits of automated testing!](#_bookmark14)

[Automated testing means that a machine does, what a human used to do, quicker, with less errors, 24/7.](#_bookmark14)

[Then, machines started to take over all the repetitive and boring tasks. Humans quickly tend to lose concentration with that kind of work or to overlook things that weren’t right. Machines are more reliable and faster in this.](#_bookmark14)

[Benefits of automated testing](#_bookmark14)

1. [ROI](#_bookmark14)
   * [Let’s start from the beginning: the big initial investment. This may be a hold back for many, but it is proven that the return of that investment is a long-term one and it will also save time.](#_bookmark14)
2. [RUNNING TESTS 24/7:](#_bookmark14)
   * [No matter where you are in the world. You can start the tests when you leave the office and when you get back in the morning you can see the results and keep on working. You can even do that remotely if you don’t have a lot of devices or have the possibility to buy them.](#_bookmark14)
3. [FEWER HUMAN RESOURCES.](#_bookmark14)
   * [You don’t need a lot of people: you would need a test automation engineer to write your scripts to](#_bookmark14)

[automate your tests, instead of a lot of people doing boring manual tests over and over again.](#_bookmark14)

1. [REUSABILITY.](#_bookmark14)
   * [The scripts are reusable:](#_bookmark14)
     + [You don’t need write new scripts all the time, even if the version of the OS on the device changes](#_bookmark14)
     + [It allows you to redo the test exactly the same, without forgetting any steps](#_bookmark14)
2. [BUGS:](#_bookmark14)
   * [Automation helps you find bugs in the early stages of software development, reducing expenses and working hours to fix these problems as well.](#_bookmark14)
3. RELIABILITY:
   * Automated testing is more reliable and way quicker when running boring repetitive standardized tests which can not be skipped, ever, but may cause errors when manually tested.
4. SIMULTANEITY:
   * You can test more devices simultaneously resulting in comparative detailed reports generated in less time with the exact the same parameters, because the exact same scripts were run.
5. CONTINUITY:
   * Automated testing helps testers, such as automation engineers. They can see exactly what other engineers have done, what scripts he has already written and what tests have already been performed and what bugs were already found and fixed, through clear reports.
6. ADDITIONAL METHODS:
   * One of these methods is the stress test in which the capacities of the application and operational infrastructure will be tested to it’s limits with stress test, which can’t be done manually.
7. VOLUME:
   * Automated testing allows to run tests on thousands of mobile devices (more then 18000 devices). Testing all of them manually would be impossible!

In the end you will have a better-quality software which will be released earlier, with less problems and you have used less resources.

As largely know, there is usually always a downside to everything. So there are downsides to automated testing as well.

There are a few things that automated testing won’t do:

it won’t fix specific problems that users might have. When writing and testing the scripts there are just some scenarios that are being tested, not all of them. The main purpose of automated testing is to find bugs in simple operations, e.g., to log into the app, create a new account or send email when the password gets forgotten. That’s what automated tests do.

App crashes in specific scenarios must still be tested manually. As we know, machines are very advanced, but they are not smart, (yet!).

1. [**PERFORMANCE TESTING? What is Load testing?**](#_bookmark14)

[Load testing is performed to determine how many users the system can handle. What is Stress testing?](#_bookmark14)

[Stress testing is testing that checks the upper limits of your system by testing it under extreme loads. It is a non-functional testing technique.](#_bookmark14)

[When do you use Performance Testing?](#_bookmark14)

[Performance testing is done to check the performance of website servers, database, and network.](#_bookmark14)

* + [Performance testing is a testing method used to determine the speed of a computer, network, or devices.](#_bookmark14)

1. [**WHAT IS BUG CYCLE? Bug/ Defect Life Cycle**](#_bookmark14)

[Defect life cycle represent the flow of bug from one state to another. How does it change from one status to another status is denoted in defect life cycle](#_bookmark14)

[Defect Life Cycle Status:](#_bookmark14)

[***New***: This is given by QA, all new defect status will be given as New.](#_bookmark14)

[***Assigned***: Once the bug is posted by the tester, assigned to development team to address it but not yet resolved.](#_bookmark14)

[***Open***: The developer starts analyzing and works on the defect fix.](#_bookmark14)

[***Fixed***: When a developer makes a necessary code change and verifies the change, he or she can make bug status as “Fixed.”](#_bookmark14)

[***Re-test***: Tester does the retesting of the code at this stage to check whether the defect is fixed by the developer or not and changes the status to “Retest." Reopen: If the bug persists even after the developer has fixed the bug, the tester changes the status to "reopened". Once again, the bug goes through the life cycle. Closed: If the bug is no longer exists then tester assigns the status "Closed."](#_bookmark14)

[***Rejected***: If the developer feels the defect is not a valid defect, then it changes the defect to “rejected."](#_bookmark14)

[***Duplicate***: If the defect is repeated twice or the defect corresponds to the same concept of](#_bookmark14)

[the bug.](#_bookmark14)

[***Not a bug***: If it does not affect the functionality of the application then the status assigned to](#_bookmark14)

[a bug is "Not a bug”.](#_bookmark14)

[***Deferred***: If the present bug is not of a prime priority and if it is expected to get fixed in the next release or in the future.](#_bookmark14)

1. [**HOW TO WRITE TEST CASES IN DIFFERENT FORMAT?**](#_bookmark14)
   1. [Excel sheet](#_bookmark14)
   2. [Jira X-Ray](#_bookmark14)
   3. [Scenario with gherkin language](#_bookmark14)
2. [**FRAMEWORK CREATE STRATEGY?**](#_bookmark14)
   * [Setup resources folder and feature files in it](#_bookmark14)
   * [Setup my driver and conf.reader](#_bookmark14)
   * [Setup P.O.M xml](#_bookmark14)
   * [Setup runner and failed runner](#_bookmark14)
   * [Setup step definitions folder and class in it](#_bookmark14)
   * [Create Hook class in step definitions(optional) and put before and after methods.](#_bookmark14)
   * [In @Before method MyDriver.*get*().manage().window().maximize(); MyDriver.*get*().get(ConfigurationReader.*getProperty*(**"Url"**)); }](#_bookmark14)
   * [In @After method Put screenshot and MyDriver.close().](#_bookmark14)
   * [Setup basePages folder and Base page inside](#_bookmark14)
   * [Create class as much as scenario in basePages](#_bookmark14)
   * [Change dryrun true and run feature files](#_bookmark14)
   * [Copy unimplemented methods and paste step definitions class](#_bookmark14)
   * [Go related pages class and find and paste there @FindBy with locators](#_bookmark14)
   * [Create a constructor inside of the Base page and put inside reusable method like](#_bookmark14)
   * [MyDriver.*get*().manage().deleteAllCookies();](#_bookmark14)
   * [JavascriptExecutor js = (JavascriptExecutor) MyDriver.*get*(); js.executeScript(**"arguments[0].scrollIntoView(true)"**, link);](#_bookmark14)

[***public static void*** *Threadwait(){*](#_bookmark14)

[***try*** *{ Thread.sleep(3000);*](#_bookmark14)

[*}* ***catch*** *(InterruptedException e) {e.printStackTrace();}}*](#_bookmark14)

[***public*** *BasePage(){//it should be otherwise @FindBy cannot work*](#_bookmark14)

[*PageFactory.initElements(MyDriver.get(),* ***this****);}*](#_bookmark14)

[Crete method under each page related with @FindBy](#_bookmark14)

* + [Go step definitions and call related methods from pages](#_bookmark14)
  + Each page should be extended from Base page

[**UNIT TEST VS FUNCTIONAL TEST?**](#_bookmark14)

[Unit Tests are written from a **programmer’s perspective**. They are made to ensure that a particular method(or a unit) of a class performs a set of specific tasks.](#_bookmark14)

[Functional Tests are written from the **user's perspective**. They ensure that the system is functioning as usersare expecting. Functional testing is a Blackbox testing technique that is usually performed by the tester.](#_bookmark14)

[Unit Testing of software applications is done during the development (coding) of an application. UNIT Testingis defined as a type of software testing where individual units/components of a software are tested.](#_bookmark14)

How do you see yourself in the next three years (more leadership or technical role)?

I would like to get better at what I am doing, learn more tools, find most efficient ways of testing the application, and contributing to having a bug free application. Also, I would like to improve myself, get required training and try myself in leadership roles.

18. How would you compare recent project with previous ones?

I would say my previous project was less complicated than the current one. It had lots of static content, and it was an internal application. On the other side my current project is a user interfacing project. Millions of users see it. There is a lot of logic involved, and high number of scenarios to test. It heavily depends on data so there is a lot of maintenance work in automation suite.

20. What was something complex you worked on?

Recently we had a major change in the application which required checking all the numbers in the application to make sure nothing was affected. We had to develop automation suite which saved all the data to JSON files (in 2 different environments, one environment had new code and the other one had the old code) and compared the numbers.

7. How do you manage your work while working remotely?

I do my best to stay organized while working from home. I would say having good virtual communication with the team members have helped me a lot. Our scrum master makes sure to organize team activities every week. These activities are usually games which help the team to socialize and get to know each other better and share their own stories.

[2. Tell me about your relationship and interactions with Developers?](#_bookmark15)

[I work very closely with the developers since our work is connected to each other. They develop and we testers test and that’s how the new functionalities reach the production/end users. Whenever there is an issue with the functionality or environment, I let the developer know, create a defect, retest after it is fixed. I would say there is not a single day where I don’t communicate with our developers.](#_bookmark15)

[1. Do you determine what needs to be tested or not before pulling it into the sprint?](#_bookmark4)

[Not all the stories need to be tested during the sprint. There are usually some stories are dev only, or requires input of BA, PO, Tech Lead only. During the backlog refinement meeting the team makes sure none of the team members have more than they can take during the upcoming sprint. So, we do determine the stories that need to be tested in the upcoming sprint, and make sure the testers are confident in taking those stories.](#_bookmark4)

[4. Can you walk us through an example of a challenge your team faced recently, how did you embrace that challenge and how were you able to overcome it?](#_bookmark4)

[To meet the deadline, we rushed to release. During the install we came across a defect and rolled back our code. We failed and could not release. This taught us technical aspects we did not know before regarding the functionality we were trying to install. But we also learnt that rushing things for the sake of meeting the deadline might not always work for the team’s benefit.](#_bookmark4)

[8. Can you give an example of a feedback that you provided in a Retro Meeting that led to a positive change on your team?](#_bookmark4)

[We have been experiencing a lot of environment issues lately. And devs usually have limited time to triage it. I suggested the team to create a confluence page listing the issues we see and plan of action for each issue, e.g if app is down or if we are seeing a particular error, how to create an incident ticket or which support team to contact etc.](#_bookmark4)

[36. What do you do when you find a defect, but the developer says my code is WORKING? How do you handle conflict?](#_bookmark4)

[first, I want to explain what differences between defect and bug is. Defect is coding error, but bug is coding part that is not met with requirements.](#_bookmark4)

[Another thing is developer is my colleague. So, this is not personal we have to support each other.. Communication is the best way to solve problem.](#_bookmark4)

[when I faced like this situation first, I sit with the developer and explain one more time point of my view why this is defect or not based on acceptance criteria. And I listen his point of view and try to understand why developer does not agree with me.](#_bookmark4)

[if he/she convince me this is not a defect I don’t create any ticket but if still I am thinking this is defect, I create a ticket and email my concern to the po and cc to developer to solve the issue or conflict](#_bookmark4)

[10. Do you work with PO?](#_bookmark4)

[Yes, our PO attends all the meetings and contributes to the team’s work by meeting with the stakeholders and presenting the application to the stakeholders and potential customers. Also, PO makes some decisions for the team. Let’s say I found a bug; it is not a major issue. PO is the one who decides if we want to fix it or defer it or leave it for later sprint.](#_bookmark4)

[**44. HOW DO YOU CREATE/WRITE TEST CASES?**](#_bookmark4)

[First read User Story and make sure to understand,](#_bookmark4)

[Think about different scenarios from end user’s perspective.](#_bookmark4)

[in my team, we write test cases in Jira-xray tool, so I create a test ticket.](#_bookmark4)

* [Fill out test case description](#_bookmark4)
* [write steps, data and expected result and link it to the related user story.](#_bookmark4)
* [Test case ID will be given by Jira automatically. I may create pre-condition as well if need.](#_bookmark4)

[Q#24. What challenges have you had in an agile environment?](#_bookmark4)

[Changing of Requirements.](#_bookmark4)

[Not Enough Information on the Story Estimating Time for Completing Task](#_bookmark4)

[Waiting on Development to be completed before testing](#_bookmark4)

[Q#27. You are in the middle of a sprint and suddenly the product owner comes with a new requirement, what will you do?](#_bookmark4)

[In ideal cases, the requirement becomes a story and moves to the backlog. Then based on the priority, the team can take it up in the next sprint. But if the priority of the requirement is high, then the team will have to accommodate it in the sprint, but it must be very well communicated to the stakeholder that incorporating a story in the middle of the sprint may result in spilling over few stories to the next sprint.](#_bookmark4)

[3. What challenges did you overcome in your project? How did you do it?](#_bookmark4)

[Frequently changing requirements. Tried to overcome the challenges by prioritizing tasks, getting organized and completing tasks one by one.](#_bookmark4)

[2. What did you do which made you different from others in your current project?](#_bookmark4)

[Developed the automation regression suite further which covered more functionalities/scenarios of the application. It made regression testing easier and faster, also caught bugs in earlier stages.](#_bookmark4)

[9. Testing process in your current project?](#_bookmark4)

[Testing starts when I receive my user stories after sprint planning meeting. First, I analyze the user story and create subtasks. If a story requires only my input, I start working on it, if it needs the development work then I wait for the developers to complete their work. Till I receive the story from the developer I create my test cases, start working on my automation script. And as soon as I receive the story from the developer I do manual testing first, and then finish up with the automation. If I see any issues, I create a defect and assign it to the developer. When I complete my work, I move the story from “in progress” to “done”.](#_bookmark4)

[11. How do you create defect in your project (JIRA)?](#_bookmark4)

[I click on “Create” button, choose type “Bug”, put a title, and write a description of the defect.](#_bookmark4)

1. [What have you done to improve the performance of Selenium framework?](#_bookmark4)

[Create reusable component](#_bookmark4)

[Write optimized function with precise logic Follow coding standard](#_bookmark4)

[Write a locator to handle dynamic elements](#_bookmark4)

[Provide data in external files such as excel, txt, property files](#_bookmark4)

1. [How many changes do you need to make to manage your Selenium scripts? How do you maintain your test scripts and how frequently you have to modify them?](#_bookmark4)

[It all depends on the types of changes. As an example: If any of the WebElements change since I am maintaining POM design, I only need to update that 1 web element in that class page. However, if existing functionality changes, then whatever functions I have created needs to be updated as per new changes. Whenever there is new change and it fails the test, that is when I refine & modify my test scripts](#_bookmark4)

1. [Can you write US and AC?](#_bookmark4)

[In our company BA is the one writing the US and AC. But I help him whenever she needs clarification, especially with the technical aspects. I have never been put in a situation where I needed to write the user stories, but I have helped to revise, add clarification etc.](#_bookmark4)

[4. Did you encounter any Automation challenges and how did you solve them? What are the challenges you face when running automation scripts? Overall challenges?](#_bookmark4)

[Scenario 1: ***Maintenance of Web Elements***](#_bookmark4)

[When I just joined the company, we faced an issue with maintaining the elements. Framework was not properly structured and maintenance of it was taking more time than automation of new features. With the help of my team I implemented POM concept in our framework. I gave a demo of new design to the entire team and once it was approved, we continued our automation. As of now we have complete robust framework that is easily maintainable and understandable by any automation engineer that joins the team.](#_bookmark4)

[Scenario 2: ***Cross browser Testing issues***](#_bookmark4)

[In every project it is required to perform multi-browser testing to make sure that the functionality is working as expected with every browser to give equal user experience to all the wide range of Users. Our Selenium test scripts were executed properly in Chrome Browser, but in IE browser we faced so many issues like timeout problems/Synchronization problems...We found that IE Browser is slower than Chrome browser in Test case execution so we implemented both implicit and explicit wait for our scripts and changed some of the locator from xpath into the css. As we know Css path is faster than xpath so we just reduced the random failure and slowness of execution. On top of that since we work in Agile and we work closely with the developers,](#_bookmark4) whenever they were working on new features, I asked them to provide IDs for the elements.

Scenario 3: ***Dynamically changing elements on the web page***

To resolve that issue, we can go for XPath, where I can use contains or start with:

*//div[contains(@id,'post-body')] //div[starts-with(@id,'post- body')]*

I can also create my own custom XPath by using parents or preceding/following siblings:

*//label[text()='DateofBirth']/following-sibling::img[@class='ui- datepicker- trigger']*

Scenario 4: ***Stale Element Reference Exception***

In my current application, sometimes we were getting errors saying Stale Element Reference Exception for some specific elements. After analyzing failure issues, I implemented WebDriver waits and JavascriptExecutor to handle those errors.

Scenario 5: ***Working with dynamic values in WebTable***

[//Grab the table](#_bookmark4)

[WebElement table = driver.findElement(By.id("divListView"));](#_bookmark4)

[// Now get all the TR elements from the table](#_bookmark4)

[List<WebElement> allRows = table.findElements(By.tagName("tr"));](#_bookmark4)

[// And iterate over them, getting the cells for (WebElement row : allRows) {](#_bookmark4)

[List<WebElement> cells = row.findElements(By.tagName("td"));](#_bookmark4)

[// Print the contents of each cell for (WebElement cell : cells) { System.out.println(cell.getText());](#_bookmark4)

[if(cell.getText().contentEquals("required cell we want to click")){ cell.click();](#_bookmark4)

[Scenario 6: ***Working with frames***](#_bookmark4)

[In some application, for better visibility developers use frame concept in web pages. In this case, if your element exists in frames then we must switch to frame first then we must perform our operation.](#_bookmark4)

[In the scenario, if you know the total number of frames in the web page then using the index, you can easily switch. The index generally starts with zero so if you have only one frame then the index will be zero. If you do not know the total number of frames in the page, then you canuse findElementBytagname method. try { driver.switchTo().frame(indexnumber); } catch (NoSuchFrameException e) { System.out.println(e.getMessage()); }](#_bookmark4)

[In the scenario, if you know the name of frames in web page then using name also, you can easily switch](#_bookmark4)

[try { driver.switchTo().frame(“framename”);](#_bookmark4)

[} catch (NoSuchFrameException e){ System.out.println(e.getMessage()); }](#_bookmark4)

[Until you are inside the frame you can not perform any operation so once we are done with frame then switch To parent window: driver.switchTo().defaultContent(); This is overall for Selenium Scenario 7: ***Any reporting related capabilities, you need to depend on third party tools Selenium testing does not provide reporting functionality, so we need to depend on the third***- party tools Like TestNG for generating reports if we work with TestNG framework. If we work with Cucumber framework, we are using Cucumber reports for reports generation which we use Maven Sure-fire plugin for this.](#_bookmark4)

[Scenario 8: ***Selenium works only for Web Based application***](#_bookmark4)

1. [How would you handle test data in your framework? How do run tests using excel data?](#_bookmark4)

[Cucumber framework: Using Scenario Outline (Inbuilt mechanism to retrieve data), DataTable (Wrote logic to retrieve data in a form of List<Map>), and Excel (Reading using Apache POI and for loop)](#_bookmark4)

[TestNG: Using Excel (Apache POI and DataProvider) API: Used Json and XML files (apache common .io)](#_bookmark4)

1. [What type of tests have you automated? When do you do automation in your sprint? How many test cases have you automated per day?](#_bookmark4)

[Mostly, I have automated functional regression test (includes smoke sanity and regression) and we do in sprint automation of user stories. Also, in my previous projects when I was only part of the automation team, we were doing automation after sprint was over.](#_bookmark4)

[\* Ask them how they do automation in their company.](#_bookmark4)

[There is no right or wrong answer on the automation of test cases per day:](#_bookmark4)

[It is all depend on the functionality and complexity of the scenario.](#_bookmark4)

[I always follow coding standards and focus on the quality of my scripts not quantity.](#_bookmark4)

[Sometimes just finding a right locator and specify dynamic xpath takes time](#_bookmark4)

[Since I work in Agile environment some days will be spent attending sprint meetings.](#_bookmark4)

[When a developer fixes any bug, I jump on retesting that bug based on its priority and severity. On top of that when some of the team members have any challenges and need my help, I always try to help](#_bookmark4) them.

1. [What is smoke testing and how do you run it in your project? How many test cases are there and how often do you perform smoke testing?](#_bookmark4)

[Smoke Test is a process where the software build is deployed to QA environment and is verified to ensure the stability of the application. All the critical functionalities would be put to test here. Once the build clears the first state, it will be taken for further QA tests, and if the build fails the test, it would be rejected, and QA team would revert it back to a previously accepted version or reject it completely. A major benefit of running a smoke test is that it provides quick feedback within a matter of few minutes and testers don’t have to wait hours to get results. In simple terms, we are verifying whether the important features are working and there are no showstoppers in the build that is under testing. Our smoke test is integrated with Jenkins and since Jenkins is a web-based application, anyone can access it by using its URL. We provide following arguments:](#_bookmark4)

[Execute: Runner.exe in the framework, with arguments in runner file for Cucumber and in pom.xml for TestNG.](#_bookmark4)

[Environment in which we need do the smoke test Browser: Chrome is default](#_bookmark4)

[Suite: smoke test. Suite](#_bookmark4)

[And then whenever there is a code push, someone in the team (does not have to be a QA person) – they can click on the build button by selecting the environment to trigger the smoke test on that specific environment. Runner.exe also creates a nice result file with the test cases](#_bookmark4) details execution. Jenkins sends the smoke test result to the entire team members and in case of issues, developers can investigate that immediately.

1. [What is Regression testing and how do you run it in your project? How many test cases are there and how often do you perform Regression testing?](#_bookmark4)

[Regression testing is a type of software testing where testers verify whether the previous functionality of the application is working fine, and the new changes have not introduced any new bugs.](#_bookmark4)

[When do we perform Regression testing: Bug fix](#_bookmark4)

[New feature added Changes in existing feature Performance issue fix](#_bookmark4)

[Main purpose of Regression testing is to check the stability of the existing functionality with new features being implemented in a sprint. Regression testing is crucial stage for the product and is especially useful for the developers to identify the stability of the product with respect to changes or new requirements. From Automation perspective, Automation of regression Test Cases is the highest priority in the projects. Regression testing is a very heavy process which requires a lot of effort, time, and preparation. Currently in my project we have almost 1200 test cases in our regression suite from which close to 75%-80% are automated. As we follow Agile, our releases scheduled after every other sprint.](#_bookmark4)

[For Cucumber: whenever we write test cases in our future files we add @Regression tags for each scenario and later through the runner class we execute those tagged scenarios. For TestNG: we have regression TestNG XML in that we add regression related test cases.](#_bookmark4)

[Regression can also be triggered from Jenkins. Meanwhile, I also](#_bookmark4) perform manual test case execution for automated scenarios and on top on that I always try to perform ad hoc testing.

Once execution is done, I will analyze results for any failed test cases. I will identify whether test cases fail was due to environment performance issues, script related issue or application issues.

Once I know that script failed due to the application issues, I will retest that test cases and try to reproduce the bug and verify it against requirements. Once I confirm the bug, I will log it into the Jira application providing description of the bug with severity and priority level, steps to recreate and appropriate screenshots.

[25. What are the challenges that you faced in Agile METHODOLOGIES?](#_bookmark4)

[People’s behavioral change:](#_bookmark4)

[Lack of skilled product owners from the business side: Lack of dedicated cross-functional teams:](#_bookmark4)

[To many changes during project](#_bookmark4)

[24. How would you decrease regression test’s run time from 10 hours to 2 hours?](#_bookmark4)

[we can use multiple options with parallel testing we can use headless browser](#_bookmark4)

[we can use selenium grid or saucelab with maximum threads (maximum browsers)](#_bookmark4)

[61. Can you tell me about the defect life Cycle in your company?](#_bookmark4)

[In my company we use Jira for project management and bug tracking tool. So, when I found a bug, it meanssomehow the expected result is not matching with actual result.](#_bookmark4)

[Then what I do I make sure that it’s real defect. First, I double check my test scripts whether they are ok. OnceI am sure it is defect/bug then contact with the responsible developer and tell him/her about the test results. If he fixed immediately that is ok. If he consents that is a bug, then I open a ticket from Jira and assign it to related developer. If we have a conflict, I go to QA lead and discuss what to do.](#_bookmark4)

[On Jira ticket I add all screenshots and to help him to understand how it is look like.](#_bookmark4)

[Then he takes care about it. when he accepts it s a defect and needs to fix it then he fixes it.](#_bookmark4)

[After fixing he deploys the code and I re-test it again. If it is passed this time, it means we are good to go, closethe defect life cycle. But if it is still failed then I reopen it.](#_bookmark4)

[After everything is ok then I am closing the cycle.](#_bookmark4)

[67. What do you do until the code arrives in your environment?](#_bookmark4)

[Our framework is generated based on BDD using Page Object Model and we are also using Cucumber testing tool which supports BDD. Until the code arrives my environment, just by analyzing the user stories and acceptance criteria I can prepare the feature file with the scenario, step definition class with the methods, and page class with the WebElements. All I need is the code and location of the WebElements. As soon as I receive the codes, I locate the WebElements and update my work. That is, it.](#_bookmark4)

[day 6 grooming meeting takes place whole team attends and we go into details about product backlog items, break epics into user stories and point them. Test execution takes place usually on days 7 and 8.](#_bookmark4)

[We start preparing report namely \*agile test report document\*. This document is generated by Jira Xray, in which you can find, the results of the automated test results and manual test results as well. In addition, you can see how many test cases were executed, how many of them automated and how many of them manually executed. Information about the detected defects if they are fixed or deferred. (If there is no time to fix the defect, then I set up a meeting with the business and if business approves that defect is labeled as \*known issue and deferred. This is valid for defects found in minor features, which has almost no impact on the whole system.) Ready to sprint demo, we present the output of the sprint Retro meeting where we discuss what went well and what could go](#_bookmark4)

better.

[A good test case should be:](#_bookmark4)

[Typically, test cases should be small, isolated, and atomic. Test cases should be easy to understand, and stepsshould be executed fast. They should be independent with each other & fail/pass independently from one another. Fairly, each good test should have defined its expected result.](#_bookmark4)

[Definition of done](#_bookmark4)

* [properly tested](#_bookmark4)
* [potentially shippable](#_bookmark4)
* [all previous regression tests pass](#_bookmark4)
* [regression tests for new functionality](#_bookmark4)
* [run automatically with every build](#_bookmark4)
* [code has been written by pairs, or at least reviewed by other team members](#_bookmark4)
* [messy, poorly designed, and duplicate code has been removed through refactoring](#_bookmark4)
* [**41. WHAT IS A DIFFERENCE BETWEEN TEST CASE, TEST**](#_bookmark4)

[**SCENARIO AND TEST PLAN?**](#_bookmark4)

* [What is test plan: Set of software testing scope and activities. Test objectives, scope, strategy, resources, tools, and schedules are all defined within the plan.](#_bookmark4)
* [What is test cases: A test case is a set of conditions. A test case usually contains.](#_bookmark4)
* [Title, Description, Test steps, expected result, actual result](#_bookmark4)
* [What is test execution: A test execution is the process of executing the code and comparing the expected and actual result.](#_bookmark4)
* [What is test Scenario: A Test Scenario is defined as any functionality that can be tested. User story, test cases, test execution and bug report need to be linked to the test plan.](#_bookmark4)
* [3. How often do you find bugs?](#_bookmark4)
* [It is hard to give a statistic, but I would say 4-5 bugs per sprint. I come across more bugs when there is a new and major change in the application.](#_bookmark4)
* [**40. HOW MANY TEST CASES YOU WRITE EVERYDAY?**](#_bookmark4)

[Depends on the complexity of the test cases. Between 2 or 3.](#_bookmark4)

[“What Would Your Boss Say About You?”](#_bookmark4)

["He would describe me as personable and kind since I am always asking people how they are doing. But more than that, he would also say that I am a quick learner. I find that I catch onto new projects and systems quite easily, And I am happy to pass that knowledge onto others so that we can all work well together for our shared end goals."](#_bookmark4)

[“How Would Your Colleagues/Coworkers Describe You?”](#_bookmark4)

[“My friends would describe me as someone who takes initiative and isn’t afraid to make decisions. I’m often the one to suggest or decide on a plan when other people are indecisive. They’d also say that I’m confident and relaxed under pressure. I’m usually the one to stay calm and think through a problem logically, even if things are a bit stressful.”](#_bookmark4)

[NEGATIVE that your boss would say about you:](#_bookmark4)

[“My boss would say that I’m better as an individual contributor than a leader, since I haven’t formally led a team yet in my career, and only did a little bit of project leadership in my last role. It’s something I’m beginning to work on, though. In my last position, I had the opportunity to train two new team members, and both became successful tester by the end of the year in our department.”](#_bookmark4)

[“Tell me about a time you made a mistake.”](#_bookmark4)

[“Early in my career, I missed a bug that ended up costing us some money. There were a lot of factors that contributed to this, but ultimately, I was the one who dropped the ball. From that experience, I went back and thought hard about what I could’ve controlled and what I would’ve changed. It turns out that I was not nearly as organized as I thought I was. I sat down with my boss, asked for suggestions on how to improve my organizational skills, and a few months later I was able to score an even bigger account for the department.”](#_bookmark4)

["How do you stay organized?"](#_bookmark4)

["Over the years I've noticed how important it is to keep track of your time at work. Although multitasking is beneficial in many ways, I've learned that when it comes to challenging work, it is better to focus on one project at a time rather than try to do too many things at once.](#_bookmark4)

[When I'm working on a tight deadline, I start my day by making a list of priorities. Then I approach the most challenging work first, then move onto other tasks that don't require the same level of concentration. This helps me work more efficiently throughout the rest of the day. I also make a point to silence my phone and turn off email notifications during deep work to help me avoid distractions."](#_bookmark4)

[“What are you passionate about?”](#_bookmark4)

[“As a software tester, I’m passionate about creating truly beautiful,](#_bookmark4) ef[ficient products to make people’s experience with technology memorable.](#_bookmark4) On[e of the things I loved about my last job was witnessing the results of my](#_bookmark4) te[am’s work and watching as our months of work yielded positive user](#_bookmark4) fe[edback.](#_bookmark4)

[What are your pet peeves?](#_bookmark4)

[It bothers me when an office’s schedule is really disorganized, because in my experience, disorganization can cause confusion, which can hurt the motivation of the team. As a person who likes things to be orderly, I try to help keep my team on task while also allowing for flexibility.”](#_bookmark4)

[“How do you like to be managed?](#_bookmark4)

[“I enjoy having my hands in a lot of different projects, so I like working with managers who allow their employees to experiment, be independent, and work cross-functionally with other teams. At the same time, I really welcome it when a boss provides me with support, guidance, and coaching. No one can do anything alone, and I believe when managers and employees collaborate and learn from one another everyone comes out on top.”](#_bookmark4)

["What Makes You Unique?"](#_bookmark4)

["I've always been an extremely determined learner, especially with new technology and new skills that can help me be more effective at my job. In a new environment, I typically work with my supervisor to find out exactly what the company needs from me so I can initiate projects and tasks that help the organization achieve important objectives."](#_bookmark4)

[Leadership skills](#_bookmark4)

R[elationship Building](#_bookmark4) Ag[ility & Adaptability](#_bookmark4) De[cision-Making](#_bookmark4) C[onflict Management](#_bookmark4) N[egotiation](#_bookmark4)

[QUESTIONS](#_bookmark4)

[What improvements or changes do you hope that a new candidate will bring to this position?](#_bookmark4)

[Would you like me to do anything differently than the previous people who have held this job? If so, what?](#_bookmark4)

[What are a couple of things I could do to quickly become a top contributor in the organization?](#_bookmark4)

[How would you describe the company culture?](#_bookmark4)

[What avenues are available within the company directly after this position?](#_bookmark4)

[How will you judge my success? What will need to happen in the first six months for me to know I have met your expectations.](#_bookmark4)

[Does the company have any traditions that you enjoy, or think are interesting to share?](#_bookmark4)

[What’s the most unique thing about working in this company? What steps do you take to keep employees highly motivated? What are some reasons people like working here?](#_bookmark4)

[What types of team events do you do together?](#_bookmark4)

[Do you ever do joint events with other teams or departments in the company? In what area could your team use some improvement?](#_bookmark4)

[What are the current goals the company is focused on and how does this team support those goals?](#_bookmark4)

[How do you ensure that each team member is doing quality work?](#_bookmark4)

How long have you been with the company and what made you decide to come here?

What have you found to be the biggest challenge in working here?

How did you develop your career in this organization? Do you feel someone entering the company today would have similar opportunities?

When will I hear back from you?

[TEST CASE DESIGN TECHNIQUES?](#_bookmark301)

[We use it to have a best coverage.](#_bookmark301)

1. [**Boundary Value Analysis** (BVA) if our boundary between 1 -](#_bookmark301) 50, [we will test 0 and 51](#_bookmark301)
2. [**Equivalence Partitioning** (EP) if our value is between 1 - 500,](#_bookmark301) in[stead of going to check 1 by 1, we will divide it to pieces, like -100 to](#_bookmark301) 0, [0 - 100, 500-600. And we will choose only one value between these](#_bookmark301)

r[anges.](#_bookmark301)

1. [**Decision Table Testing** True, False technique](#_bookmark301)
2. [**State Transition Diagrams** – Requirement says that if user](#_bookmark301) e[nters password 3rd time wrong, account must be blocked. By using this](#_bookmark301) te[chnique, we will check all steps. If customer is entering password right,](#_bookmark301) h[e should be able to login and do some operation.](#_bookmark301)
3. [**Error Guessing** we must guess the error with entering error](#_bookmark301) va[lues. It all depends analytical thinking of QA.](#_bookmark301)

[BEST PRACTICES FOR WRITING QUALITY TEST CASES?](#_bookmark301)

[. A TEST CASE is a set of actions executed to verify a particular feature or functionality of your software application. A Test Case contains test steps, test data, precondition, postcondition developed for specific test scenario to verify any re uirement. The test case includes specific variables or conditions, using which a testing engineer can compare expected and actual results to determine whether a software product is functioning as per the](#_bookmark301)

[re uirements of the customer.](#_bookmark301)

[Test case](#_bookmark301)

[needs to be simple](#_bookmark301)

[create with end user mind Avoid test case repetition Ensure coverage](#_bookmark301)

[HOW DO I WRITE AND MANAGE TEST CASES?](#_bookmark301)

[In my last project I was using cucumber framework. As you know in cucumber, we are using feature files. Future files contain multiple scenarios. And for each scenario I was writing test case.](#_bookmark301)

[After I look at User story, depends on acceptance criteria I can Write my test cases.](#_bookmark301)

[We organize them in Excel, then we map them with RTM and Jira with X-ray plugin. I create test cases according to the requirement and Acceptance criteria, following the Boundary Value Analysis and Error Guessing.](#_bookmark301)

HOW TO WRITE SOFTWARE TEST CASES?

[Step 1: Test Case ID](#_bookmark301)

[Test cases should all have unique IDs to represent them.](#_bookmark301)

[Step 2: Test Description](#_bookmark301)

[Description should detail what unit, feature, or function is being tested or what is being verified.](#_bookmark301)

[Step 3: Assumptions and Pre-Conditions](#_bookmark301)

[Any conditions to be met before test case execution. One example would be requiring a valid Outlook account for a login.](#_bookmark301)

[Step 4: Test Data](#_bookmark301)

[This relates to the variables and their values in the test case. In the example of an email login, it would be the username and password.](#_bookmark301)

[Step 5: Steps to be executed](#_bookmark301)

[These should be easily repeatable steps as executed from the end user’s perspective.](#_bookmark301)

[Step 6: Expected Result](#_bookmark301)

[result expected after the test case step execution. Upon entering the right login information, the expected result would be successful](#_bookmark301)

[Step 7: Actual Result and Post-Conditions](#_bookmark301)

[As compared to the expected result, we can determine the status of the test case.](#_bookmark301)

[Step 8: Pass/Fail](#_bookmark301)

[Determining the pass/fail status depends on how the expected result and the actual result compare to each other.](#_bookmark301)

[HOW TO IMPROVE SKILLS DESIGNING TEST CASES AND MAKE SURE A HIGH COVERAGE RATE?](#_bookmark301)

[Test designing is successful when the requirements are analyzed and understood completely. To ensure 100% test coverage is achieved, we should not miss out on creating test cases for any requirements and from time to time we can check ourselves with the help of a](#_bookmark301) [Traceability](https://www.softwaretestinghelp.com/requirements-traceability-matrix/) [matrix](https://www.softwaretestinghelp.com/requirements-traceability-matrix/)[.](#_bookmark301)

[WHAT IS A TEST SUITE?](#_bookmark301)

[Test suites allow us to categorize test cases in ways that align with any analysis or planning needs. Like a bookshelf to organize our test cases on.](#_bookmark301)

[WHAT IS A TEST PLAN?](#_bookmark301)

[A document describing the scope approach, resources, and schedule of testing activities. A detail how to test will proceed, who will do testing, what will be tested, how much time test will take place and what uality level test will be performed. How do test? What do test? When you test?](#_bookmark301)

[Scope](#_bookmark301)

[Roles and responsibility - A, developers, Manager Test methodology - Agile](#_bookmark301)

[Test deliverable, Test plan, Test case, Bug reports Resources and environment - Testing tools tracking tool,](#_bookmark301)

[automation tool](#_bookmark301)

[WHAT IS THE IMPORTANCE OF TEST PLAN?](#_bookmark301)

[Help people outside the test team such as developers, business managers,](#_bookmark301) c[ustomers ***understand the details of testing***.](#_bookmark301)

[Test Plan ***guides our thinking***. It is like a rule book, which needs to be](#_bookmark301) f[ollowed.](#_bookmark301)

I[mportant aspects like test estimation, test scope, Test Strategy are documented in Test Plan, so it can be reviewed by Management Team](#_bookmark301) a[nd re-used for other projects.](#_bookmark301)

[TEST PLAN VS TEST STRATEGY.](#_bookmark301)

[A **test plan is a formal document** comes from requirement documents. It describes in detail, the scope of testing and the different activities performed during testing.](#_bookmark301)

[A test plan is ***specific to a particular project.***](#_bookmark301)

[It is ***prepared by the test lead*** or test manager.](#_bookmark301)

[It ***describes the whole testing activities in detail*** – the techniques used, schedule, resources, etc.](#_bookmark301)

[Test plans can be changed or updated. It is about the ***details and specifics***.](#_bookmark301)

[But a **test strategy is a high-level document** describing the way testing will be carried out in an organization. It is providing a systematic approach to the software testing process.](#_bookmark301)

[A test strategy is usually ***for a complete organization***. It is generally ***prepared by the project manager***.](#_bookmark301)

[It describes the ***high-level test design techniques*** to be used, environment specifications, etc.](#_bookmark301)

[Test strategy is ***usually not changed***.](#_bookmark301)

[It is more about ***general approaches and methodologies***.](#_bookmark301)

[HOW DO YOU DEFINE GOOD AUTOMATION IMPLEMENTATION?](#_bookmark301)

[-Prioritizing the Test before automating](#_bookmark301)

[-Creating highly reliable test cases](#_bookmark301)

[-Sharing reports to stake holders](#_bookmark301)

[-reduce time to develop](#_bookmark301)

[GOOD TEST AUTOMATION FRAMEWORK:](#_bookmark301)

[-***Reusable methods*** or page classes](#_bookmark301)

[-***Data driven*** - test data like URLs and usernames, passwords, are maintained in properties file or Excel files. No hard code.](#_bookmark301)

[-***Explicit waits*** - Thread sleep delays everywhere in test scenarios and reduces the performance.](#_bookmark301)

[-Variable ***names should be meaningful***](#_bookmark301)

[-Use design ***pattern like POM***](#_bookmark301)

[-Use ***reporting mechanisms***](#_bookmark301)

[-Test should be ***independent*** when executing](#_bookmark301)

[-***Screenshots*** if failures.](#_bookmark301)

[HOW DO YOU MAKE SURE THAT THE TEST DATA IS GOOD ENOUGH?](#_bookmark301)

[Data must be **realistic**](#_bookmark301)

[**Accurate**: for whatever data described, it needs to be accurate.](#_bookmark301)

[**Relevant**: data should meet the requirements for the intended use.](#_bookmark301)

[**Complete**: data should not have missing values or miss data records.](#_bookmark301)

[**Timeliness**: data should be up to date.](#_bookmark301)

[**Consistent**: data should have the data format as expected and can be cross reference-able with the same results.](#_bookmark301)

[Boundary Condition Dataset: Test data meeting boundary value conditions](#_bookmark301)

[Equivalence Partition Data Set: Test data qualifying your equivalence partitions.](#_bookmark301)

[Decision Table Data Set: Test data qualifying your decision table testing strategy](#_bookmark301)

[State Transition Test Data Set: Test data meeting your state transition testing strategy](#_bookmark301)

[HOW WOULD YOU FIND A GOOD REQUIREMENT(Testable)?](#_bookmark301)

[In my opinion in a good requirement the description and acceptance criteria should be](#_bookmark301)

[***Clear*** - A requirement should not contain ambiguity or vague terms that are open to interpretation.](#_bookmark301)

[***Measurable-*** A requirement should be measurable in the sense of making every quantifiable feature have an actual quantity, or range, as opposing to containing qualifying terms such as "fast," "many," or "high." ***Complete-***A requirement should contain all relevant information on the core functionality that it captures, and it should not contain more than a single functionality.](#_bookmark301)

[STEPS TO AUTOMATE?](#_bookmark301)

1. [Learn the functionality](#_bookmark301)
2. [Reading requirements](#_bookmark301)
3. [Knowledge transfer session with B.A](#_bookmark301)
4. [Ask teammates](#_bookmark301)
5. [Making sure I understand each step properly](#_bookmark301)
6. [Manually test it](#_bookmark301)
7. [Understand expected results](#_bookmark301)
8. [Automate it](#_bookmark301)
9. [Create POM pages](#_bookmark301)
10. [Add necessary elements/methods I am going to use and add PageFactory design pattern](#_bookmark301)
11. [Create a driver class with Singleton pattern](#_bookmark301)
12. [Validate the tests using TestNG Assertions](#_bookmark301)

[HOW DO YOU DECIDE WHETHER TO AUTOMATE AND WHAT WOULD YOU AUTOMATE?](#_bookmark301)

[The first thing I do to separate which cases are most essential to the business I work for. The involved risk is high, we should automate that test case.](#_bookmark301)

[If the test run is repetitive, we should automate it. Large data sets are usually automated.](#_bookmark301)

[The regression test, smoke test, and sanity test should be automated.](#_bookmark301)

[If we save Time](#_bookmark301)

[WHAT TEST CASES CANNOT BE AUTOMATED?](#_bookmark301)

[It's most appropriate to use automation tests when I'm going to save time and resources by doing so. If I analyze a case and determine that I can execute the tests more quickly by doing it manually, I avoid doing automation tests](#_bookmark301)

[**Subjective test cases** — test cases that are not testing a clear function —will still need to be done manually.](#_bookmark301)

[**Usability testing** – “How easy is the application to use?”](#_bookmark301)

[One-time testing](#_bookmark301)

[“**ASAP**” testing – “We need to test NOW!” (Hotfix)](#_bookmark301)

[**Ad hoc/random testing** – based on intuition and knowledge of application](#_bookmark301)

[**Device Interface testing**](#_bookmark301)

[HOW TO ORGANIZE TESTS IN JIRA?](#_bookmark301)

[Use the test sets issues >> on **Issue Type**, select **Test Set**.](#_bookmark301)

[Use the test repository >> To create a test repository, create a new folder:](#_bookmark301)

[HOW TO PREPARE DATA THAT WILL ENSURE MAXIMUM TEST COVERAGE?](#_bookmark301)

1. [**No data:** Run your test cases on blank or default data. See if proper error messages are generated.](#_bookmark301)
2. [**Valid data set:** Create it to check if the application is functioning as per requirements and valid input data is properly saved in database or files.](#_bookmark301)
3. [**Invalid data set:** Prepare invalid data set to check application behavior for negative values, alphanumeric string inputs.](#_bookmark301)
4. [**Illegal data format:** Make one data set of illegal data format. The system should not accept data in an invalid or illegal format. Also, check proper error messages are generated.](#_bookmark301)
5. [**Boundary Condition dataset:** Dataset containing out of range data. Identify application boundary cases and prepare data set that will cover lower as well as upper boundary conditions.](#_bookmark301)
6. [**The dataset for performance, load, and stress testing:** This data set should be large in volume.](#_bookmark301)

[This way creating separate datasets for each test condition will ensure complete test coverage.](#_bookmark301)

[IF I HIRE YOU AND ASK YOU TO COME AND START AUTOMATION, HOW WOULD YOU DO IT?](#_bookmark301)

1. [Analyze application](#_bookmark301)
2. [Choose tools](#_bookmark301)
3. [Find Automation tool experts](#_bookmark301)
4. [Create and Execute Manual Test Cases](#_bookmark301)
5. [Analyze test cases to determine those which are best suited for automation](#_bookmark301)
6. [Create Smoke Test and present to the team](#_bookmark301)
7. [Create a test automation Framework](#_bookmark301)
8. [Develop an Execution Plan](#_bookmark301)
9. [Write Scripts](#_bookmark301)
10. [Reporting](#_bookmark301)
11. [Maintenance of Scripts](#_bookmark301)

[Tell me about your reporting systems? Where do you store the test results/reports?](#_bookmark301)

[We are using TestNG Reports/Cucumber reports. Reporting plays key role in any project end of the day everyone is interested to see your reports not the code.](#_bookmark301)

[Cucumber Reports](#_bookmark301)

[***Graphical representation***: It will convey the statistical results like](#_bookmark301)

[% passed / failure status](#_bookmark301)

[***Consolidated view***: Detailed execution status in numbers will be displayed.](#_bookmark301)

[***Error Analysis***: It will help the user to analyze and debug the issue. User can access the test data and Test evidence from report, which are most important aspects while fixing the bugs.](#_bookmark301)

[**TestNG Reports** TestNG library brings a very convenient reporting feature. Once we execute the tests, TestNG generates a test output folder at the root of the project. It combines two kinds of reports.](#_bookmark301)

[***Detailed Report*** - report in the <index.html> file. It combines the detailed information like the errors, test groups, execution time, step-by- step logs, and TestNG XML file.](#_bookmark301)

[***Summary Report*** - it is the trimmed version and informs about the no. of “Passed”/ “Failed”/ “Skipped” cases. You can see it from the](#_bookmark301)

[<emailable- report.html> file.](#_bookmark301)

[***Extent Report*** - it is an open-source reporting library used to create visually attractive reports for Selenium tests using JUnit and TestNG. It produces HTML-based documents that offer several advantages like pie charts, graphs, screenshots addition, and test summary.](#_bookmark301)

[HOW DO YOU DETERMINE SCOPE YOUR PROJECT?](#_bookmark421)

[Precise customer requirement Project Budget](#_bookmark421)

[Product Specification](#_bookmark421)

[Skills & talent of your test team](#_bookmark421)

[WHAT IS DOD FOR YOU?](#_bookmark301)

[I consider testing done when the following aspects have been met:](#_bookmark301)

[***100% requirements coverage*** is achieved.](#_bookmark301)

[More than ***95% of test coverage and 100% functional coverage is***](#_bookmark301) ***a***[***chieved***.](#_bookmark301)

[When ***we achieved the target time***.](#_bookmark301)

[All ***major defects are identified, verified, and closed***.](#_bookmark301)

[Less than ***5% minor defects are open***, and if open work around is](#_bookmark301) a[vailable. All defects are retested and closed.](#_bookmark301)

[All corresponding regression scenario of retested and closed](#_bookmark301) de[fect are also tested. All critical test cases are passed](#_bookmark301)

[All test document and deliverables are prepared, reviewed, and published across. Sign off is given](#_bookmark301)

[**HOW TO WRITE A TEST PLAN**](#_bookmark301)

1. [***Analyze the product***](#_bookmark301)

[Who will use the website? What is it used for?](#_bookmark301)

[How will it work?](#_bookmark301)

[What is software/ hardware the product uses?](#_bookmark301)

1. [***Design the Test Strategy***](#_bookmark301)
   1. [Define Scope of Testing](#_bookmark301)

[The components of the system to be tested are defined as “in scope”](#_bookmark301)

[The components of the system that will not be tested also need to be clearly defined as being “out of scope.”](#_bookmark301)

[**2.2** Identify Testing Type](#_bookmark301)

* 1. [Document Risk & Issues](#_bookmark301)

[Risk is future’s uncertain event with a probability of occurrence and a potential for loss. When the risk happens, it becomes the ‘issue’.](#_bookmark301)

* 1. [Create Test Logistics Who will test?](#_bookmark301)

[When will the test occur?](#_bookmark301)

1. [***Define the Test Objectives***](#_bookmark301)

[List all the software features (functionality, performance, GUI, API…) which may need to test.](#_bookmark301)

[Define the target or the goal of the test based on above features](#_bookmark301)

1. [***Define Test Criteria***](#_bookmark301)

[Test Criteria is a standard or rule on which a test procedure or test judgment can be based. There’re 2 types of test criteria.](#_bookmark301)

[**-Suspension Criteria**](#_bookmark301)

[Specify the critical suspension criteria for a test. If the suspension criteria are met during testing, the active test cycle will be suspended until the criteria are resolved.](#_bookmark301)

[Test Plan Example: If your team members report that there are 40% of test cases failed, you should suspend testing until the development team fixes all the failed cases.](#_bookmark301)

**-Exit Criteria**

It specifies the criteria that denote a successful completion of a test phase. The exit criteria are the targeted results of the test and are necessary before proceeding to the next phase of development. Example: 95% of all critical test cases must pass.

1. ***Resource Planning***

It is a detailed summary of all types of resources required to complete project task. Resource could be human, equipment and materials needed to complete a project

1. ***Plan Test Environment***

A testing environment is a setup of software and hardware on which the testing team is going to execute test cases. The test environment consists of real business and user environment, as well as physical environments, such as server, front end running environment.

1. ***Schedule & Estimation***
2. ***Determine Test Deliverables***

It is a list of all the documents, tools and other components that must be developed and maintained in support of the testing effort.

[ARE THERE SPECIFIC TOOLS YOU USE FOR TESTING? IF SO, HOW DO YOU CHOOSE WHICH TOOLS TO USE?](#_bookmark302)

[The first thing I do is determine which tests I want to run on cases. From there, I can decide which tools I want to use by researching which ones support the requirements of my project. I also look at my employer's budget and which resources we have at our disposal. There are some tools I prefer using, however, I'm open to any tool and often research new tools when beginning automation testing. My overall goal is to find tools that perform the tests I need them to within my company's budget.](#_bookmark302)

[How to handle a situation when you don’t have time for complete testing?](#_bookmark301)

[When we do not have enough time to test, we perform a Risk Analysis and determine which modules/areas of our AUT are prone to the highest risk and are critical to the success of the product and handle them first. Going the exploratory route instead of documenting the test cases is another way, but it is risky for sure.](#_bookmark301)

[How to handle the low-frequency issues during your testing?](#_bookmark301)

[By low frequency, I hope you mean the issues that cannot be reproduced consistently over time. If an issue is not coming up every time we repeat the same sequence of steps, we do some digging around to see if we can find any evidence to the occurrence of the bug (logs or failure messages) and if nothing else works, we report it all the same. As testers, we cannot leave anything without reporting.](#_bookmark301)

[How to coach a newer beginning in testing scope?](#_bookmark301)

[I provide the newcomers with all documentation, necessary accesses, arrange hands-on KT sessions, introduce them to the point of contact to all the components of the projects, give them small tasks to test their understanding and to eventually ease their way into the testing project.](#_bookmark301)

[Issue found when exploring an application- There are no limits to any of the fields in the create account page- What does this mean?](#_bookmark301)

[This could mean two things, one- it is a bug. Two- it might allow you to enter as many characters as you like but might perform the validation when submitting the page.](#_bookmark301)

[If you found that login does not have the missing “Forgot password” option- while Exploratory testing, how would you report it?](#_bookmark301)

[A bug is a bug, no matter how you find it. Reporting this issue is not going to be any different than reporting one that you found via a test case.](#_bookmark301)

[Where Did My Testing Time Go?](#_bookmark301)

[***Incorrect Estimation:***](#_bookmark301)

[***Unstable builds and other technical problems: Lack of agreement between all parties involved:***](#_bookmark301)

[How can testers get enough time for testing?](#_bookmark301)

[***Estimate accurately.***](#_bookmark301)

[***Take historical data into consideration – The Test Management tool is your best friend.***](#_bookmark301)

[How long did the earlier release test cycles take?](#_bookmark301)

[What kind of issues caused interruptions to the previous test cycle? How many runs did most test cases take before they passed?](#_bookmark301)

[What defects were reported?](#_bookmark301)

[What defects caused the testing to be interrupted?](#_bookmark301)

[***Ask these questions and plan accordingly in crunch time:***](#_bookmark301)

[Find out Important functionality is your project? Find out High-risk module of the project?](#_bookmark301)

[Which functionality is most visible to the user? Which functionality has the largest safety impact?](#_bookmark301)

[Which functionality has the largest financial impact on users?](#_bookmark301)

[Which aspects of the application are most important to the customer?](#_bookmark301)

[Which parts of the code are most complex, and thus most subject to errors?](#_bookmark301)

[Which parts of the application were developed in rush or panic mode?](#_bookmark301)

[What do the developers think are the highest-risk aspects of the application?](#_bookmark301)

[What kinds of problems would cause the worst publicity?](#_bookmark301)

[What kinds of problems would cause the most customer service complaints?](#_bookmark301)

[What kinds of tests could easily cover multiple functionalities?](#_bookmark301)

[***Use a Test Management tool. This will significantly reduce the amount of preparation, reporting and maintenance time and effort.***](#_bookmark301)

[Example of TEST CASE.](#_bookmark301)

[**Feature**: User downloads life insurance agreement functionality](#_bookmark301)

[Background:](#_bookmark301)

[Given user navigates to Sun Life Login Page](#_bookmark301)

[When user enters valid email/accessid and password and clicks on sign in button](#_bookmark301)

[Then user should be able to sign into Sun Life Homepage](#_bookmark301)

[Scenario:](#_bookmark301)

[Given the user clicks on myAccount button When user clicks on MyProducts button](#_bookmark301)

[Then user should be able to see all products in the dashboard that were purchased](#_bookmark301)

[And user should be able to click on a specific agreement](#_bookmark301)

[And user should be able to download insurance agreement after clicking on download Button](#_bookmark301)

[WHAT ARE THE ACCEPTANCE CRITERIA](#_bookmark434)

[It’s the conditions that a software product must meet to be accepted by a user, a customer, or other systems. They are unique for each user story and define the feature behavior from the end-user’s perspective.](#_bookmark434)

[ACCEPTANCE CRITERIA MAIN PURPOSES](#_bookmark301)

[***Clarifying the stakeholder’s*** requirements is a high-level goal.](#_bookmark301)

[Making the ***feature scope more detailed***. AC define the boundaries of user stories. They provide precise details on functionality that help the team understand whether the story is completed and works as expected.](#_bookmark301)

[***Describing negative scenarios***. Your AC may require the system to recognize unsafe password inputs and prevent a user from proceeding further. Invalid password format is an example of a so-called negative scenario when a user does invalid inputs or behaves unexpectedly. AC define these scenarios and explain how the system must react to them.](#_bookmark301)

[***Setting communication***. Acceptance criteria synchronize the visions of the client and the development team. They ensure that everyone has a common understanding of the requirements: Developers know exactly what kind of behavior the feature must demonstrate, while stakeholders and the client understand what’s expected from the feature.](#_bookmark301)

[***Streamlining acceptance testing***. AC are the basis of the user story acceptance testing. Each acceptance criterion must be independently testable and thus have clear pass or fail scenarios. They can also be used to verify the story via automated tests.](#_bookmark301)

[***Conducting feature evaluations***. Acceptance criteria specify what exactly must be developed by the team. Once the team has precise requirements, they can split user stories into tasks that can be correctly estimated.](#_bookmark301)

[What is Test Environment?](#_bookmark301)

[It is a platform, specifically build for implementing and executing the test cases on the software product. The environment for testing is created by integrating the required hardware and software along with proper network configuration and necessary settings.](#_bookmark301)

[Elements of the Test Environment](#_bookmark301)

[The software to be tested](#_bookmark301)

[The operating system, database, and testing server Test data](#_bookmark301)

[Network configuration](#_bookmark301)

[The device on which the software is to be tested – desktop or mobile devices](#_bookmark301)

[Test automation framework and relevant tools such as Selenium or Cypress](#_bookmark301)

[Relevant documentation – test scenarios, user manuals, business & customer requirements](#_bookmark301)

[Software to interface between system and applications](#_bookmark301)

[Importance of the Test Environment](#_bookmark301)

[let’s say a banking app upgrade is being tested. It wouldn’t exactly be the best practice to move around real money in real customer accounts to test its efficacy. However, with a test environment, QAs can perform all the actions they want, play with the app, and test the most rudimentary feature without worrying about real-world consequences.](#_bookmark301)

[Difference between Test Environment & Test Bed](#_bookmark301)

[***Test Environment***: - This is an environment where testers execute their tests. This environment is a collection of hardware and software. In other words, test environment includes hardware elements and the software environment in which we perform the tests. Here hardware environment indicates processor speed, ram etc.](#_bookmark301)

[***Test Bed:*** - Test bed is an execution or performance environment which is designed for the testing. This bed may contain operating system, configuration management for the products, hardware, network topology etc. Generally, we described in detail about the test bed when we prepare a test plan. In other words, we can say that a software tester selects the environment to run the test cases in the test bed.](#_bookmark301)

[Difference Between Test Case and Test Script](#_bookmark301)

[Test case is a step-by-step procedure that is used to test an application.](#_bookmark301)

[The test script is a set of instructions to test an application automatically.](#_bookmark301)

[Test Cases are used for manual testing environment.](#_bookmark301)

[Test Script is used in the automation testing environment.](#_bookmark301)

[The test case template includes Test ID, test data, test procedure, actual and expected results, etc.](#_bookmark301)

[In the Test Script, we can use different commands to develop a](#_bookmark301)

[script.](#_bookmark301)

[What is a Test Script?](#_bookmark301)

[Test Scripts means a line-by-line description containing the information about the system transactions that should be performed to validate the application or system under test.](#_bookmark301)

[Test case is a step-by-step procedure that is used to test an application whereas the test script is a set of instructions to test an application automatically.](#_bookmark301)

[Three ways to create test script are 1) Record/playback 2) Keyword/data-driven scripting, 3) Writing Code Using the Programming Language.](#_bookmark301)

[Your test script should be clear, and you should create a test script that should contain just one specific action for testers to take.](#_bookmark301)

[Using a test script is the most reliable approach to verify that nothing is skipped and that the results are true as the desire testing plan. Test Script Template is a reusable formatted document that contains pre-selected information important for creating a usable test](#_bookmark301)

[script.](#_bookmark301)

[What is Test Driven Development (TDD)?](#_bookmark301)

[The simple concept of TDD is to write and correct the failed tests before writing new code (before development). This helps to avoid duplication of code as we write a small amount of code at a time to pass tests. (Tests are nothing but requirement conditions that we need to test to fulfill them).](#_bookmark301)

[TDD Vs. Traditional Testing](#_bookmark301)

[With traditional testing, a successful test finds one or more defects. It is same as TDD. When a test fails, you have made progress because you know that you need to resolve the problem.](#_bookmark301)

[TDD ensures that your system meets requirements defined for it.](#_bookmark301)

[It helps to build your confidence about your system.](#_bookmark301)

[In TDD more focus is on production code that verifies whether testing will work properly. In traditional testing, more focus is on test case design. Whether the test will show the proper/improper execution of the application to fulfill requirements.](#_bookmark301)

[In TDD, you achieve 100% coverage test. Every single line of code is tested, unlike traditional testing.](#_bookmark301)

[The combination of both traditional testing and TDD leads to the importance of testing the system rather than perfection of the system.](#_bookmark301)

[In Agile Modeling (AM), you should “test with a purpose”. You should know why you are testing something and what level its need to be tested.](#_bookmark301)

[What is ‘Defect Triage’?](#_bookmark301)

[Defect triage is a process where each bug is prioritized based on its severity, frequency, risk, etc.](#_bookmark301)

[The goal of Bug Triage is to evaluate, prioritize and assign the resolution of defects.](#_bookmark301)

[Software Testing Metrics](#_bookmark302)

[Software Testing Metrics are the quantitative measures used to estimate the progress, quality, productivity, and health of the software testing process. The goal of software testing metrics is to improve the efficiency and effectiveness in the software testing process and to help make better decisions for further testing process by providing reliable data about the testing process.](#_bookmark302)

["We cannot improve what we cannot measure" and Test Metrics helps us to do the same.](#_bookmark302)

[Percentage test cases executed= (No of test cases executed/ Total no of test cases written) X 100](#_bookmark302)

[Tell me about yourself](#_bookmark299)

[First, I would like to thank you for giving me this opportunity and I really appreciate your time.](#_bookmark299)

[My name is Zaur and I have been in the QA field for about 7+ years. I have worked in both waterfall and agile methodologies.](#_bookmark299)

[I started off my career as a manual tester and then I gradually move to Automation. And for the past 6 years I have been working on web-based application as automation tester. Currently I’m in Sun Life Financial as a Sr Sdet.](#_bookmark299)

[As an automation engineer, I use java as the program language.](#_bookmark299)

[For management and Bug tracking tool: Jira, Xray For Testing tools Selenium, Cucumber, TestNG, Junit Build tools: I’m using Maven](#_bookmark299)

[Version control: I’m using git, GitHub](#_bookmark299)

[API Testing tools: I’m using Postman, RestAssured Libraries CI & CD tools: I’m using Jenkins](#_bookmark299)

[IDE: I’m using Eclipse, IntelliJ](#_bookmark299)

[About my project](#_bookmark299)

[My current project is with SunLife financial where I'm working on a life insurance application. With our application customers can find an investment and insurance advisor, can apply for multiple types of insurances such as health, life, mortgage insurances, get an insurance quote, etc.](#_bookmark299)

[Our last project was about creating a new online insurance calculator and new "Find an advisor" sections. Customers can go online and easily calculate their insurance payments and find an advisor closer to their places. I’m responsible for the testing of this functionality from UI and API perspective. I must ensure that data occurs correctly from the user side and requests are in good status. I make sure that related pages are working properly. That’s why I do my manual and automation testing to make sure we deliver good quality application. I also want to make sure end to end functionality working properly and I create dummy accounts and doing systems testing. And I am using jdbs library to automate database testing.](#_bookmark299)

[Role](#_bookmark299)

[As an automation engineer, I develop my ‘testing](#_bookmark299)

[framework’ based on POM (Page Object Model).](#_bookmark299)

[My role is to work on/test the stories assigned to me, create test cases, find data, do manual testing, create automation scripts, maintain the automation suite, check the smoke and regression results, fix any failures. Also create defects when there is an issue, retest after it is fixed, and close. Provide sign offs](#_bookmark299)

[Also, as a part of the Agile Scrum Team, I participate in the several meetings for the requirement reviews and provide valuable feedback to the BA. Lastly, I am cross-functional team member that is always willing to help my team in any way to achieve our sprint goal.](#_bookmark299)

[That is pretty much about my role as an automation engineer.](#_bookmark299)

[Main Responsibility as an SDET?](#_bookmark299)

[I would say what my main responsibility is to create automation scripts, test plans when needed, develop and maintenance of the automation framework. And configure the job in Jenkins to execute my smoke and regression tests.](#_bookmark299)

[**Tell me about your framework Cucumber framework**](#_bookmark299)

[I use ***Maven*** as a built tool and by help of the pom file, added all the dependencies and plugins that are required for my project.](#_bookmark299)

[To implement our framework applied Java as a programming language and hybrid model means the combination of POM using page factory and BDD for UI, and RestAssured libraries with BDD for API, as well as JDBC to connect with database.](#_bookmark299)

[**UI Part has 5 layers:**](#_bookmark299)

* [**Page Objects**: Contains code to control web application using Selenium. (Basically, created a separate Java class for each page of my application where I store the elements of that page as well as related methods/functions.)](#_bookmark299)
* [**Step Definitions**: Contains Java method binding of Gherkin steps and call to page objects.](#_bookmark299)
* [**Feature Files**: Contains test scenarios and scenario outlines written in Gherkin language.](#_bookmark299)
* [**Utilities:** Created multiple utility classes with reusable methods to keep my code organized, clean and easy maintainable. Example: ***Hooks, Driver, ConfigReader, ExcelUtility, Alert, Wait, Select and Browser Helpers*** etc.](#_bookmark299)

[**Test Runner**: Contains the test execution information. We can run the project by using Junit Runner or directly from Maven or from Jenkins. In my runner class using @RunWith and Cucumber options from JUnit, I specify configurations of my tests.](#_bookmark299)

[**API Part has 4 layers: Step Definitions:**](#_bookmark299)

[**Feature Files:**](#_bookmark299)

[**Utilities**: FileUtils (read, write and update files like json and xml) ConfigRader, Base64Utils (encrypt and decrypt password, URLs etc), RestRequestMethods, Token Builder/Token Generator (Created methods to generate token for my rest request.)](#_bookmark299)

[**Test Runner**: BTW I have common runner’s folder which includes UI and API runner classes.](#_bookmark299)

[Other Tools and Functions:](#_bookmark299)

[**Config\_Properties**: Stored Base URLS, Endpoints and API Keys for API Automation.](#_bookmark299)

**Target**: All Cucumber Html and advanced reports will be generated successfully in target folder.

**Version Control**: We are using GIT for storing all the scripts at a centralized repository.

**Jenkins**: We are using Jenkins for Continuous Integration. We execute the test scripts on daily basis or whenever a code is pushed to the production. Test scripts are also executed based on schedule. (Ex: Smoke test, Regression test).

[Can you describe your daily activity?](#_bookmark299)

[Our sprint is 2 weeks long, the first Monday we have our Sprint Planning at 9:30 am, where we make sure all the team is understanding the requirements and acceptance criteria. After that I'm working on creating test data, test cases, working on my tasks, and working on automation scripts.](#_bookmark299)

[The rest of the days in the morning I check the smoke test result and emails. We have Daily Scrum at 9:30, and keep working on my scripts, manual, pushing my code at the end of the day.](#_bookmark299)

[In the middle of the sprint, we have a Grooming session where we prepare for the next sprint.](#_bookmark299)

[We have release once a sprint. We have it after the Demo meeting. And on Friday, at the end of the sprint we have our Retro meeting and work on the code that was left in previous sprints.](#_bookmark299)

[Team Structure](#_bookmark299)

[My team consist of adaptive, cross-functional, and self- organized individuals that highly motivated and knowledgeable. We have 11people in my team. 2 weeks long sprint.](#_bookmark299)

[5 developers (Pradeep, Suzan, Dima, Orkhan, Rahul)](#_bookmark299)

[2 Testers (me, Joshua), 1QA Lead- 1 SM (Leyla) - 1 PO (John) - 1 BA (Brian)](#_bookmark299)

[Why do you want work for us?](#_bookmark299)

[I carried out some research into your company before submitting my resume and I was attracted to your company values, what you stand for and how you have ambitious plans. Its important for me to work for company that does things to a high standard and wants to continually improve and develop. As someone who also has high standards, I believe both your goals and my own aspirations will be a perfect match.](#_bookmark299)

[How do you prioritize your workload?](#_bookmark299)

["Time to time we have multiple conflicting priorities where it can be difficult to know what is most important and urgent. I work out an important/urgent scale for rating tasks so that it is clear what takes the highest priority. Sometimes I get help from our team lead or PO for rating.](#_bookmark299)

[If something is important and urgent, it gets highest priority. Important but not urgent is next, and urgent but not important is next, then not important, and not urgent is last.](#_bookmark299)

[If I need to get in details, I follow up following steps. Collect a list of all my tasks and make a to-do list](#_bookmark299)

[Identify ***URGENT vs IMPORTANT*** >> Most of the tasks are important but only some of them are time sensitive.](#_bookmark299)

[Assess value >> Estimate the time, effort and resources needed for each task](#_bookmark299)

[Know when to cut >>Mostly can’t get to everything on my list. After I prioritize my tasks and look at my estimates, I cut the remaining tasks from my list and focus on the priorities that I must and can complete for the day. Then I take a deep breath, dive in and be ready for everything.](#_bookmark299)

[If regression fails, who is responsible?](#_bookmark299)

[We need to go and check why it fails. We don't have a particular person who gets all responsibility for it. We all go ahead and analyze the reason. Sometimes it can fail due to some script issues (if element path changed, for example) and then we just update it and rerun it, sometimes fails for timing issues. But sometime there could be a real issue. When it's a real issue we talk to dev and PO about it. Creating a bug and PO decides when it should be fixed. I didn't have any crazy failures during regression, when it did fail because of some bug, I just created issue and the next sprint or after the next sprint they bring it to fix it.](#_bookmark299)

[WHAT IS THE BRANCHING STRATEGY IN YOUR PROJECT?](#_bookmark299)

[In my project we have master, dev, and branches for each tester. We do not work on the master branch, we only merge using pull request. Our smoke tests run based off master branch. We have developed branch we can push our changes. Each tester works on a separate branch of their own. We always push to our branch, once we complete a story, we create a pull request to merge to master. Next story, use the same branch again. In the sprint we update the develop based on how many stories we did. We push the changes from develop to master one every sprint. Before we change the master, we make sure that our code is stable.](#_bookmark299)

[WHAT DO YOU LIKE THE MOST ABOUT TESTING?](#_bookmark299)

[An important role](#_bookmark299)

[How many testers get recognized in an organization? I’m unsure if the clients recognize our hard work but one thing is true. Without our sincere efforts and knowledge, a high-quality product cannot be delivered to the client. We protect the business from suffering a poor reputation, so we are an important part of the business.](#_bookmark299)

[A challenging role](#_bookmark299)

[As a](#_bookmark299) [Software QA](https://www.hitekschool.com/)[, we may have to come across constant puzzles and problems. our job involves fixing new problems that arise every day. As a tester, there are many chances that there will be a new challenge every day.](#_bookmark299)

[Breaking the thoughts of others](#_bookmark299)

[Unless a Software QA tests the module, others may not come to know the bug. When others think that the product is working perfectly fine, the tester can just break through and find out the problems that may not be visible to a developer or user.](#_bookmark299)

[Unlimited learning capabilities](#_bookmark299)

[There’s always a scope to learn as a tester. There’s always more to learn in a testing career. Continuous learning leads to a successful career.](#_bookmark299)

[BIGGEST ACCOMPLISHMENT?](#_bookmark299)

[I would say performing testing properly on time at expected quality level within budget is my most important first achievement.](#_bookmark299)

[Being able to adapt myself to the work and other people and to finish my job without causing negative impact is my next achievement.](#_bookmark299)

[Keep on improving my knowledge and skills regarding Software Quality which is my next big achievement.](#_bookmark299)

[Being able to guide the team which direction we should go, and properly shape the team toward right direction is also my great achievement.](#_bookmark299)

[HOW WOULD YOU DEAL WITH CONFLICT WITH A](#_bookmark299)

[**CO‐WORKER?**](#_bookmark299)

[I would seek to resolve the conflict immediately for the sake of our working relationship and fore the sake of the team. If you leave conflict, it can grow develop into something much worse. I would speak to my co worker in private to get to the bottom of the problem and I would suggest a way forward that we were both comfortable with. We both might need to compromise, but I would certainly push the idea that the conflict we were experiencing was counter productive to our combined team goals.](#_bookmark299)

[TECHNICAL CHALLENGES](#_bookmark299)

[Dynamic elements: UI](#_bookmark299)

[**Situation**: When I joined the company and started doing UI automation, I noticed that in most cases it was very difficult to locate elements on the page since there were no reusable attributes. I had to spend extra time trying to locate it with the help of css and xpath. Also, CSS and xpath work slower as we know so it increases time of test execution. On our retrospective meetings I proposed to make more reusable attributes for the page’s elements such as id, name, class. Eventually, developers allocated some time to add more reusable ids and names in our DOM structure.](#_bookmark299)

[**Result**: After that locating an element on the page became much faster and easier.](#_bookmark299)

[Flag concept: API](#_bookmark299)

[**Situation**: In API feature files, I use scenario outlines quite often. With the help of it my scenario will be executed multiple times, but with different combinations of values. Whenever we run the scenario outline it will execute all the previous given, when, then steps in each case. If let’s say we have a post request and create a new record so each time of executing this case we would have to create a new record, if we have 20 elements then it means that 20 records would be created to validate each of the elements.](#_bookmark299)

[I did some research, and I found the flag concept. Basically, the concept is to set and another example which will be our condition flag (can have true and false parameters), and if it is set to true then it will execute only true. I tried it myself and it worked perfectly, so I proposed this concept. We submit a request, and we can run the last steps as many times as the number of elements and each time we can validate it.](#_bookmark299)

[Bugs that I found.](#_bookmark299)

1. [Term Insurance covers till 85years. And only 2 of term life insurance has online quote options. And both covers for 10 or 20years. To apply for this insurance person should be between 18 and 69 years old. When person who is already 70 years old tried to get online quote, instead of calculating for whole life insurance, it was calculating for term life insurance.](#_bookmark299)
2. [When person who was smoking applied for insurance, it was returning price for non smokers. Which was very critical for our company.](#_bookmark299)
3. [And one of the most important bugs that I found was for whole life insurance. So monthly price didn’t change even though I was changing coverage amount.](#_bookmark299)
4. [Searching advisor functionality wasn’t working correctly. So, when I tried to search advisers by last name filtration, it wasn’t filtering, but instead it was returning all advisers.](#_bookmark299)

[Non-technical challenges](#_bookmark299)

[**Last-Minute Changes to Requirements**](#_bookmark299)

[Tried to overcome the challenges by prioritizing tasks, getting organized and completing tasks one by one. It must be made clear before the project begins that last-minute changes to software may not be fully tested within predetermined deadlines.](#_bookmark299)

[Inadequate information on user stories](#_bookmark299)

[if the product owner does not have clarity on user journeys, they cannot communicate it to the QAs. The QAs, in turn, cannot create test cases that will comprehensively test the website or app for flaws in user experience.](#_bookmark299)

[Deadlines](#_bookmark299)

[When developers don’t deploy their code on time, our tester team doesn’t have enough time for completion. And the upper management keeps asking for us for completion. - Some of my team members simply focus on task completion and not on the test coverage and quality of work. - So, at the Retro Meeting, I suggested that we should work very closely with the developer and make sure that we are communicating daily. - And the developers prioritize the important tasks and work on them first. Any scenarios left, would be pushed to the next sprint since it is not as important as the other ones. - Lastly, I try to prioritize my work and follow my test lead and manager whatever they see is more important I start with that.](#_bookmark299)

[Understand requirements](#_bookmark299)

[Sometimes it can be challenging to understand requirements. Even though we have grooming sessions where we talk and analyze acceptance criteria, clarify unclear requirements. Sometimes when we start writing test cases or during execution some of the questions may come up again. In that case I usually communicate with everyone who can relate to that story to make it clearer for me, such as developers, business analyst.](#_bookmark299)

[Why should we hire you?](#_bookmark299)

[I believe you should hire me because I have the necessary skills and qualities to come into the job and make an immediate impact. I will learn the project quickly and I will start contributing to the team goals in as fast time as possible. By hiring me you will be getting a loyal, trustworthy, and hardworking team member who will put the goals of the company above everything else.](#_bookmark299)

[Why did you apply to this JOB?](#_bookmark299)

[“My current job activities match with the job description. Therefore, I see myself easily transitioning to your company since I have similar day to day activities, and it could be a great opportunity for me.](#_bookmark299)

[Where do you see yourself in the future?](#_bookmark299)

[“I want to learn as much as possible and be more technical. I want to learn multiple programming languages as well to help the organization I am working for.”](#_bookmark299)

[What would you do in the first 30 days of starting?](#_bookmark299)

[I would concentrate on three things. In first week, I will get done all the paper works, getting the machines and necessary access to the project, databases etc.](#_bookmark299)

[Then I will have to learn the company culture. Boarding process.](#_bookmark299)

[I must learn also more about my projects and my teammates.](#_bookmark299)

[I think, understanding what the project is doing, it is very important if I want to be more productive.](#_bookmark299)

[When have you had a disagreement with your PO, BA, SM?](#_bookmark299)

[Following a team meeting I disagreed with a proposal that PO had put forward. I decided to speak with him in private to offer an alternative suggestion. I explained to him, in a respectful and professional manner, the reasons why I disagreed with him and that I thought there might be some mileage in exploring the option I had come up with. He listened to my suggestion but decided not to go ahead with them, which I totally respected. I think it's always good to say if you disagree with something, providing you put the needs of the company first and you do it with respect and professionalism.](#_bookmark299)

[Are you a risk taker?](#_bookmark299)

[I'm a risk taker, but only when the benefits far outweigh the risks. If ever I was going to take a risk at work, I would weigh up the pros and cons and decide whether the risk was worth taking. I believe a company can only grow and develop if it takes calculated risks, but I would never do anything to put your company in jeopardy.](#_bookmark299)

[Tell me something you didn't like about your last job?](#_bookmark299)

[There wasn't much that I didn't like about my current job, although I did feel we could have achieved a lot more as a company if we would have tried. The business is very good at what it does, but I always felt we could have done more to boost company revenue. Having said that, it is a great place to work, and I’m really enjoying my time there. I worked alongside lots of positive people, and I was continually learning in the role, which is important to me.](#_bookmark299)

[What motivates you?](#_bookmark299)

[I'm motivated by several things. I'm currently saving up for a deposit to buy my first house, so I'm motivated by that. I know the only way I will achieve that goal is if I work hard, I do a good job for my employer and I achieve long term stable employment. I'm also motivated at work by continuous improvement. If I'm working in a positive environment alongside other like-minded people who are all trying to do a good job, improve and develop, then I feel motivated and happy.](#_bookmark299)

[Describe yourself in 3 words. My strengths.](#_bookmark299)

[I would describe myself as loyal, self motivated and commercially aware. Being a loyal employee means you can trust me to do a good job and to always be a good role model for your company. Being self motivated means, you will never have to pick me up for not doing my job properly either on time or to the necessary standard. Being commercially aware means that I respect the fact that the only way your business will thrive is if people like me do a good job for your company and I also seek to improve and develop year on year.](#_bookmark299)

[What is your greatest weakness?](#_bookmark299)

[My weakness is I find it hard to say no to people. For example, even I don't have the capacity to take on extra work, I still end up saying yes to people because I don’t want to let them down. However, I'm trying to improve myself in this area and before I say yes to things, I'm now starting to take the time to consider my own workload and the capacity I must take on extra duties.](#_bookmark299)

[My other weakness is the fact I sometimes have trouble asking people for help. I tend to try and figure things out for myself because I take pride in my work. However, I appreciate that’s not the most efficient way of working and I'm trying to improve myself in this are as well.](#_bookmark299)

[How do you respond to stress and pressure?](#_bookmark299)

[I see stress as part of everyday working life, and I fell I/m at my best when the pressure is on. If we are working to a tight deadline, then I enjoy the challenge of getting my tasks completed on time so the team can meet its objectives. I cope with stress and pressure by keeping fit, by remaining calm at work and by ensuring I plan and organize my work well in advance. Prioritize which tasks are important, draw a list of tasks and deadline s and work solidly and put extra hours to get the task done within the set time frame.](#_bookmark299)

[Term life and permanent life.](#_bookmark299)

[***Term insurance has 4 subtypes***](#_bookmark299)

1. [Sun Life Go simplified. We created Online quote(calculator) functionality for it.](#_bookmark299)
2. [SunSpectrum Term.](#_bookmark299)
3. [Sun Life Go Term. We created Online quote(calculator) functionality for it.](#_bookmark299)
4. [SunTerm](#_bookmark299)

[***Permanent life insurance has 3 subtypes.***](#_bookmark299)

1. [Whole life.](#_bookmark299)
   1. [SunLife Go Guaranteed Life Insurance. We created Online quote(calculator) functionality for it.](#_bookmark299)
   2. [Suspectrum Permanent Life II.](#_bookmark299)
2. [Participating life.](#_bookmark299)
   1. [Sun Par Protector II. 2.2. Sun Par Accumulator II.](#_bookmark299)

[2.3. Sun Par Accelerator.](#_bookmark299)

1. [Universal life.](#_bookmark299)
   1. [SunSpectrum Universal Life II.](#_bookmark299)
   2. [SunUniversalLife II.](#_bookmark299)

[How do you implement inheritance?](#_bookmark172)

[In my TestBase class there is a parametrized constructor which takes a parameter from Properties class. And I extend this class in all my required classes, to get the properties from the configuration.properties file. In that I keep all my URI, passwords, usernames. And I use inheritance in my Step Definition classes, so they are extending to POM classes and inherit all the reusable methods from there.](#_bookmark172)

[***public class TestBase { public Properties property; public TestBase() {***](#_bookmark172)

[***try {***](#_bookmark172)

[***property = new Properties();***](#_bookmark172)

[***String path = "src/test/resources/api- config.properties";***](#_bookmark172)

[***File file = new File(path); FileInputStream fis = new***](#_bookmark172)

[***FileInputStream(file);***](#_bookmark172)

[***property.load(fis);***](#_bookmark172)

[***} catch (IOException e) { e.printStackTrace();}}***](#_bookmark172)

[**how do you implement polymorphism *Set<Integer> set1 = new HashSet<>(); Set<Integer> set2 = new LinkedHashSet<>(); List<Integer> mySet = new ArrayList<>(); WebDriver driver = new ChromeDriver(); WebDriver driver = new FirefoxDriver();***](#_bookmark172)

[how do you implement overloading](#_bookmark172)

[***Assert.assertEqual(expectedTitle, actualTitle);***](#_bookmark172)

[***Assert.assertEqual(expectedTitle, actualTitle, "Title not matched");***](#_bookmark172)

[***WebDriver driver = new ChromeDriver();***](#_bookmark172)

[***WebDriver driver = new ChromeDriver(new ChromeOptions().setHeadless(true));***](#_bookmark172)

[***wait.until(ExpectedConditions.elementToBeClickable(We bElement webElement));***](#_bookmark172)

[***wait.until(ExpectedConditions.titleIs(“cengiz”)); FindBy(we can use with 8 different type of locators)***](#_bookmark172)

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[***Set<Integer> set1 = new HashSet<>(); Set<Integer> set2 = new LinkedHashSet<>();***](#_bookmark172)

[***set1.add(4); ==> HashSet overrides add() method from Collection Interface***](#_bookmark172)

[***Set2.add(8); ==> LinkedHashSet overrides add() method from Collection Interface***](#_bookmark172)

[***System.out.println is overriding. WebDriver driver1 = new ChromeDriver(); WebDriver driver2 = new FirefoxDriver();***](#_bookmark172)

[***Driver1.get("xxxxxx"); ChromeDriver overrides get/findElement/getCurrentURL/etc. methods from WebDriver Interface.***](#_bookmark172)

[***Driver2.get("xxxxxx"); FirefoxDriver overrides get/findElement/getCurrentURL/etc. methods from WebDriver Interface.***](#_bookmark172)

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[Abstract class is used in defining a common super class while writing Page Object Model layer of the framework. We usually create an abstract class named **PageBase** to have all common members for every page written in this class example getPageTitle().](#_bookmark172)

[Then each Page class (HomePage, LoginPage, DashboardPage etc.) inherit from BasePage. Sometimes one may need to change the behavior of methods implemented in superclass. So, subclass has freedom to override that method where we use polymorphism. This is how we use Abstract class in real projects.](#_bookmark172)

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[show the EmpId and FullName of all the employees working under Manager with id – ‘986’.](#_bookmark568) [show the different projects available from the EmployeeSalary table.](#_bookmark569)

[show the count of employees working in project ‘P1’.](#_bookmark570)

[find the maximum, minimum, and average salary of the employees.](#_bookmark571) [find the employee id whose salary lies in the range of 9000 and 15000.](#_bookmark572)

[show those employees who live in Toronto and work under manager with ManagerId – 321.](#_bookmark573)

[show all the employees who either live in California or work under a manager with ManagerId – 321.](#_bookmark574) [show all those employees who work on Project other than P1](#_bookmark575).

[display the total salary of each employee adding the Salary with Variable value.](#_bookmark576)

[show the employees whose name begins with any two characters, followed by a text “hn” and ending](#_bookmark577) with any [sequence show all the EmpIds which are present in either of the tables – ‘EmployeeDetails’ and](#_bookmark578) ‘EmployeeSalary’. [show common records between two tables.](#_bookmark579)

[show records that are present in one table but not in another table.](#_bookmark580)

[show the EmpIds that are present in both the tables – ‘EmployeeDetails’ and ‘EmployeeSalary.](#_bookmark581) [show the EmpIds that are present in EmployeeDetails but not in EmployeeSalary.](#_bookmark582)

[show the employee full names and replace the space with ‘-’.](#_bookmark583) [show the position of a given character(s) in a field.](#_bookmark584)

[display both the EmpId and ManagerId together.](#_bookmark585)

[show only the first name(string before space) from the FullName column of the EmployeeDetails table.](#_bookmark586) [upper case the name of the employee and lower case the city values.](#_bookmark587)

[find the count of the total occurrences of a particular character – ‘n’ in the FullName field.](#_bookmark588) [update the employee names by removing leading and trailing spaces.](#_bookmark589)

[Show all the employees who are not working on any project.](#_bookmark590)

[show employee names having a salary greater than or equal to 5000 and less than or equal to 10000.](#_bookmark591) [find the current date-time.](#_bookmark592)

[show all the Employees details from EmployeeDetails table who joined in the Year 2020.](#_bookmark593)

[show all employee records from EmployeeDetails table who have a salary record in EmployeeSalary](#_bookmark594) table. show [project-wise count of employees sorted by project’s count in descending order.](#_bookmark595)

[show employee names and salary records. Display the employee details even if the salary record is not](#_bookmark596) present [join 3 tables.](#_bookmark597)

[show all the Employees who are also managers from the EmployeeDetails table.](#_bookmark598)

[show duplicate records from EmployeeDetails (without considering the primary key – EmpId).](#_bookmark599) [remove duplicates from a table without using a temporary table.](#_bookmark600)

[show only odd rows from the table.](#_bookmark601) [show only even rows from the table.](#_bookmark602)

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[**What is SQL?**](#_bookmark482)

[SQL stands for Structured Query Language. It is the standard language for relational database management systems.](#_bookmark482)

[It is especially useful in handling organized data comprised of entities (variables) and relations between different entities](#_bookmark482) of the data.

[**What is a Database?**](#_bookmark482)

[A database is an organized collection of data, stored and retrieved digitally from a remote or local computer system. Databases can be vast and complex, and such databases are developed using fixed design and modeling approaches. Database: is a place where data is stored in organized manner. Consists of tables.](#_bookmark482)

[Tables are made of rows and columns. relational: Oracle 11g, , Sybase… non-relational: MongoDb.](#_bookmark482)

[What is DBMS?](#_bookmark482)

[Database Management System is a collection of programs that enables a user to s](#_bookmark482)tore, retrieve, [update, and delete information from a database.](#_bookmark482)

[**RDBMS?**](#_bookmark482)

[Relational Database Management System (RDBMS) means that tables in database are related using primary/foreign key relationship. Used to store, modify, and retrieve data in the database.](#_bookmark482)

[How are they related?](#_bookmark482)

[Primary Key (unique and not NULL) Foreign Key (duplicate and NULL)](#_bookmark482)

[**What is JDBC?**](#_bookmark482)

[Java Database Connectivity used to connect Databases and any Java applications.](#_bookmark482)

[Provides a call-level API for SQL-bases Database access. Connects Java Program with Database. No need to install it. Only dependency for a specific driver to use with your Database (Oracle). They are developed by DB manufacturers. Code written for one DB will work on another.](#_bookmark482)

[To connect to database, we need driver to work with our database; URL for our db and credentials.](#_bookmark482)

[**What are the popular Database Management Systems in the IT Industry?**](#_bookmark482)

[Oracle, MySQL, Microsoft SQL Server, PostgreSQL, Sybase, MongoDB, DB2, and Microsoft Access etc.,](#_bookmark482)

[**What type of database system you have expertise with?**](#_bookmark482)

[RDBMS, such as SQL and Oracle](#_bookmark482)

[**SQL vs MySQL?**](#_bookmark482)

[SQL is a standard language for retrieving and manipulating structured databases.](#_bookmark482)

[On the contrary, MySQL is a relational database management system, like SQL Server, Oracle, or IBM DB2, that is used to manage SQL databases](#_bookmark482)

[**What is a Primary key?**](#_bookmark482)

[It is a special relational database table column (or combination of columns) designated to uniquely identify all table records. It 's main features are: It must contain a unique value for each row of data. It cannot contain null values.](#_bookmark482)

[**What is a Composite PRIMARY KEY?**](#_bookmark482)

[Composite PRIMARY KEY is a primary key created on more than one column (combination of multiple fields) in a table.](#_bookmark482)

[**What is a foreign key?**](#_bookmark482)

[Is existence of PK in another table](#_bookmark482)

[Is a key used to link two tables together. It can accept Null Values We can have more than one Foreign Key in a table.](#_bookmark482)

[In the context of relational databases, a foreign key is a field (or collection of fields) in one table that uniquely identifies a row of another table or the same table. In simpler words,](#_bookmark482)

[the foreign key is defined in a second table, but it refers to the primary key or a unique key in the first table.](#_bookmark482)

[**Primary Key vs UNIQUE**](#_bookmark482)

[A table can have only one PRIMARY KEY whereas there can be any number of UNIQUE constrain. The PRIMARY KEY cannot contain null values whereas the Unique constrain can contain null values.](#_bookmark482)

[**HOW DID YOU USE SQL IN YOUR CURRENT PROJECT?**](#_bookmark482)

[Our web application uses Oracle database and I normally write queries to do Data validation. For example: I create data from UI](#_bookmark482)

[Or I send POST request from API then](#_bookmark482)

[I write query to verify that data was successfully and correctly inserted into database.](#_bookmark482)

[Our database consists of many tables, so most of the time, I need to write queries that involve joins.](#_bookmark482)

[**What are SQL constraints?**](#_bookmark485)

[SQL constraints are the set of rules that enforced some restriction while inserting, deleting,](#_bookmark485)

[or updating of data in the databases. ***NOT NULL*** - Ensures that a column cannot have a NULL value](#_bookmark485)

[***UNIQUE*** - Ensures that all values in a column are different](#_bookmark485)

[***PRIMARY KEY*** - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table](#_bookmark485)

[***FOREIGN KEY*** - Uniquely identifies a row/record in another table ***CHECK*** - Ensures that all values in a column satisfies a specific condition ***DEFAULT*** - Sets a default value for a column when no value is specified ***INDEX*** - Used to create and retrieve data from the database very quickly](#_bookmark485)

[**WHERE, ORDER BY, GROUP BY, HAVING**](#_bookmark482)

[WHERE clause in SQL is used to filter records that are necessary, based on specific conditions. WHERE is a row operation.](#_bookmark482)

[HAVING clause in SQL is used to filter records in combination with the GROUP BY clause.](#_bookmark482)

[It is different from WHERE, since WHERE clause cannot filter aggregated records. HAVING is a column operation. ORDER BY clause in SQL is used to sort the records based on some field(s) in ascending (ASC)](#_bookmark482)

[or descending order (DESC).](#_bookmark482)

[GROUP BY clause in SQL is used to group records with identical data and can be used in conjunction with some aggregation functions to produce summarized results from the database.](#_bookmark482)

[**What is CLAUSE in SQL?**](#_bookmark482)

[SQL CLAUSE helps to limit the result set by providing a condition to an SQL Query. A CLAUSE helps to filter the rows from the entire set of records. SQL CLAUSES are WHERE & HAVING.](#_bookmark482)

[**What is a query?**](#_bookmark482)

[A database query is a request for data or information from a database table or combination of tables. A database query can be either a select query or an action query.](#_bookmark482)

[**Order of SQL query?**](#_bookmark482)

* [SELECT- FROM- WHERE- GROUP BY- HAVING- ORDER BY](#_bookmark482)
* [Only the SELECT and FROM clauses are mandatory](#_bookmark482)

[**What is a Subquery?**](#_bookmark482)

[A subquery is a query within another query, also known as a nested query.](#_bookmark482)

[A subquery is used to return data that will be used in the main query as a condition to further restrict the data to b](#_bookmark482)e retrieved.

[*select \* from employees where salary>(select avg(salary) from employees);*](#_bookmark482)

[**What are the types of subqueries?**](#_bookmark482)

1. [***Correlated***: In a SQL database query, a correlated subquery is a subquery that uses values from the outer query to complete. Because a correlated subquery requires the outer query to be executed first,](#_bookmark482)

[the correlated subquery must run once for every row in the outer query. It is also known as a synchronized subquery.](#_bookmark482)

1. [***Non-Correlated***: A Non-correlated subquery is a subquery in which both outer query and inner query are independent to each other.](#_bookmark482)

[**When and why do we use ORDER BY Clause?**](#_bookmark482)

[The ORDER BY keyword is used to sort the result-set in ascending or descending order. The ORDER BY keyword sorts the records in ascending order by default.](#_bookmark482)

[To sort the records in descending order, use the DESC keyword.](#_bookmark482)

[*select empno, ename from emp order by 1 desc;*](#_bookmark482)

[**When and why do we use GROUP BY Clause?**](#_bookmark482)

[Group by clause is used to group the results of a SELECT query based on one or more columns. The GROUP BY s](#_bookmark482)tatement is often used [with aggregate functions (COUNT, MAX, MIN, SUM, AVG) to group the result-set by one or more columns.](#_bookmark482)

[*select count(\*), department\_id from employees where department\_id in(10,50,80,100,110,120,150) group by*](#_bookmark482) *department\_id having* [*count(\*)>5;*](#_bookmark482)

[**What is the difference between BETWEEN and IN condition operators?**](#_bookmark482)

[Both operators are used to find out the multiple values from the table. Difference between these operators is that th](#_bookmark482)e BETWEEN operator [is used to select a range of data between two values while The IN operator allows you to specify multiple values.](#_bookmark482)

[*select \* from emp where sal in (2000, 5000);*](#_bookmark482)

[*select \* from emp where sal between 2000 and 5000;*](#_bookmark482)

[**What is the difference between AND and OR operators?**](#_bookmark482)

[The AND and OR operators are used to filter records based on more than one condition: The AND operator dis](#_bookmark482)plays a record if all the [conditions separated by AND is TRUE. The OR operator displays a record if any of the conditions separated by OR](#_bookmark482) is TRUE.

[**What is the difference between the WHERE and HAVING clauses?**](#_bookmark482)

[WHERE clause is used for filtering rows and it applies on each row, while HAVING clause is used to filter groups in](#_bookmark482) SQL.

[One syntax level difference between WHERE and HAVING clause is that, WHERE is used before GROUP BY clause,](#_bookmark482) while HAVING is used [after GROUP BY clause.](#_bookmark482)

[*SELECT COUNT(\*), DEPTNO FROM emp WHERE DEPTNO IN(10,50,80,30,110,120,40) GROUP BY DEPTNO H*](#_bookmark482)*AVING COUNT(\*)>5;*

[**What is Cross-Join?**](#_bookmark482)

[Cross join produces a result set which is the number of rows in the first table multiplied by several rows in the second](#_bookmark482) table if no WHERE [clause is used along with Cross join. This kind of result is known as Cartesian Product. If suppose, Where clause is used](#_bookmark482) in cross join then [the query will work like an Inner join.](#_bookmark482)

[**What is Self-Join?**](#_bookmark482)

[A self-join is a join in which a table is joined with itself, especially when the table has a Foreign Key which references](#_bookmark482) its own Primary Key.

[**WHAT IS LEFT JOINT?**](#_bookmark482)

[The LEFT JOIN keyword returns all records from the left table (table1), and the matching records from the right table](#_bookmark482) (table2). The result [is 0 records from the right side if there is no match.](#_bookmark482)

[**WHAT IS RIGHT JOIN?**](#_bookmark482)

[The RIGHT JOIN keyword returns all records from the right table (table2), and the matching records from the left ta](#_bookmark482)ble (table1). The result [is 0 records from the left side if there is no match.](#_bookmark482)

[**WHAT IS FULL OUTER JOIN**](#_bookmark482)

[The FULL OUTER JOIN keyword returns all records when there is a match in left (table1) or right (table2) table rec](#_bookmark482)ords. [Tip: FULL OUTER JOIN and FULL JOIN are the same.](#_bookmark482)

[**WHAT IS THE DIFFERENCE BETWEEN JOINS AND UNIONS?**](#_bookmark482)

[JOINs join the COLUMNs, will have more columns at the end. we are joining the columns or two or more related tab](#_bookmark482)les.

[UNION joins the ROWs, joining different queries we are doing the join of ROWs, can be non-related tables, the](#_bookmark482) count, and the types [(constraints) of rows should match.](#_bookmark482)

[**What is the difference between an inner and outer join?**](#_bookmark482)

[An inner join returns rows when there is at least some matching data between two (or more) tables that are being c](#_bookmark482)ompared. [An outer join returns rows from both tables that include the records that are unmatched from one or both the tables](#_bookmark482).

[*select count(employee\_id), e.department\_id, department\_name from employees e inner join departments d on e.department\_id=d.department\_id group by e.department\_id, department\_name;*](#_bookmark482)

[*select count(employee\_id), e.department\_id, department\_name from employees e full outer join departments d on e.department\_id=d.department\_id group by e.department\_id, department\_name;*](#_bookmark482)

[**What is the difference between UNION and UNION ALL?**](#_bookmark482)

[UNION merges the contents of two structurally compatible tables into a single combined table.](#_bookmark482)

[UNION will omit duplicate records whereas and it will also sort the results where is UNION ALL will include duplic](#_bookmark482)ate records.

[The performance of UNION ALL will typically be better than UNION, since UNION requires the server to do the additi](#_bookmark482)onal work of removing [any duplicates.](#_bookmark482)

[*select first\_name, last\_name, email from employees union all select first\_name, last\_name, email from my\_tabl*](#_bookmark482)*e;* [*select first\_name from employees union select last\_name from employees;*](#_bookmark482)

[**Let’s say there are some null values in my table. How would you test those values?**](#_bookmark482)

[A field with a NULL value is a field with no value. NULL value cannot be compared with other NULL values. Hence, it](#_bookmark482) is not possible to test [for NULL values with comparison operators, such as =, <, or <>. For this, we must use the IS NULL operator.](#_bookmark482)

[*select \* from employees where commission\_pct is null; select \* from employees where commission\_pct is not null;*](#_bookmark482)

[**Are you familiar with functions in SQL? What type?**](#_bookmark482)

L[OWER, UPPER, and INITCAP MAX, MIN, AVG](#_bookmark482)

[*select \* from employees where hire\_date=(select min(hire\_date) from employees) union select \* from employees where hire\_date=(select max(hire\_date) from employees); select upper(country\_name) from countries where length(country\_name)>6;*](#_bookmark482)

[**Data Types in SQL**](#_bookmark482)

[number(num) - whole numbers up to num digits](#_bookmark482)

[number (num, num2) - num whole numbers up to num2 decimals char(num) - fixed length character/string](#_bookmark482)

[varchar2(num) - used for varying length data date - full date](#_bookmark482)

[currency - used for prices](#_bookmark482)

[**Aggregate functions in SQL?**](#_bookmark482)

S[QL Aggregate functions determine and calculate values from multiple columns in a table and return a single value.](#_bookmark482)

* [COUNT() : Returns number of table rows.](#_bookmark482)
* [MAX() : Returns the largest value among the records.](#_bookmark482)
* [MIN() : Returns smallest value among the records.](#_bookmark482)
* [AVG() : Returns the average value from specified columns.](#_bookmark482)
* [SUM() : Returns the sum of specified column values.](#_bookmark482)
* [FIRST() : Returns the first value.](#_bookmark482)
* [LAST() : Returns last value.](#_bookmark482)

[**What are string functions in SQL?**](#_bookmark482)

[SQL string functions are used primarily for string manipulation. Some of the widely used SQL string functions are LEN() – It returns the length of the value in a text field](#_bookmark482)

[LOWER() – It converts character data to lower case UPPER() – It converts character data to upper case SUBSTRING() – It extracts characters from a text field](#_bookmark482)

[LTRIM() – It is to remove all whitespace from the beginning of the string RTRIM() – It is to remove all whitespace at the end of the string](#_bookmark482)

[CONCAT() – Concatenate function combines multiple character strings together REPLACE() – To update the content of a string.](#_bookmark482)

[**CHAR and VARCHAR2 datatype in SQL**](#_bookmark482)

[Both VARCHAR & VARCHAR2 are Oracle data types that are used to store character strings of variable length. VARCHAR can store characters up to 2000 bytes while VARCHAR2 can store up to 4000 bytes.](#_bookmark482)

[VARCHAR will hold the space for characters defined during declaration even if all of them are not used whereas](#_bookmark482) VARCHAR2 will release [the unused space.](#_bookmark482)

[**What is the difference between DML & DDL Commands? DCL?**](#_bookmark482)

[**Data Definition Language** (DDL) - defining and dealing with database schemas and descriptions of how the data s](#_bookmark482)hould exist in database. [**Data Manipulation Language** (DML) - deals with data manipulation (used to retrieve, store, modify, delete, and u](#_bookmark482)pdate data in database). [**Data Control Language** (DCL) - deals with rights, permissions, and other controls of the database system.](#_bookmark482)

[**Transaction Control Language** (TCL) – deals with a transaction within a database.](#_bookmark482)

[**What are the different DDL commands in SQL?**](#_bookmark482)

[DDL commands are used to define or alter the structure of the database.](#_bookmark482)

[***CREATE***: To create databases and database objects](#_bookmark482)

[***ALTER***: To alter existing database objects](#_bookmark482)

[***DROP***: To drop databases and databases objects](#_bookmark482)

[***TRUNCATE***: To remove all records from a table but not its database structure](#_bookmark482)

[***RENAME***: To rename database objects](#_bookmark482)

[**What are the different DML commands in SQL?**](#_bookmark482)

[DML commands are used for managing data present in the database.](#_bookmark482)

[***SELECT***: To select specific data from a database ***INSERT***: To insert new records into a table ***UPDATE***: To update existing records](#_bookmark482)

[***DELETE***: To delete existing records from a table](#_bookmark482)

[**What are the different DCL commands in SQL?**](#_bookmark482)

[DCL commands are used to create roles, grant permission, and control access to the database objects.](#_bookmark482)

[***GRANT***: To provide user access ***DENY***: To deny permissions to users ***REVOKE***: To remove user access](#_bookmark482)

[**What are the different TCL commands in SQL?**](#_bookmark482)

[TCL commands are used to manage the changes made by DML statements.](#_bookmark482)

[***COMMIT***: To write and store the changes to the database](#_bookmark482)

[***ROLLBACK***: To restore the database since the last commit](#_bookmark482)

[**What is difference between DELETE, DROP and TRUNCATE?**](#_bookmark482)

[**Delete** command is a DML command, it is used to delete rows from a table. It can be rolled back.](#_bookmark482)

[**Truncate** is a DDL command, it is used to delete all the rows from the table and free the space containing the table.](#_bookmark482) It can’t be rolled back. [**Drop** is a DDL command, it removes the complete data along with the table structure (unlike truncate command](#_bookmark482) that removes only the [rows). All the tables’ rows, indexes, and privileges will also be removed.](#_bookmark482)

[**COMMIT – SAVEPOINT - ROLLBACK?**](#_bookmark482)

[Both ROLLBACK and COMMIT Commands are TCC (Transaction Control Commands), they have differences:](#_bookmark482)

[***COMMIT*** is used to save the changes permanently on the server ***ROLLBACK*** is used to undo the changes and restore previous state. ***SAVEPOINT*** name —> marks a save point](#_bookmark482)

[***ROLLBACK TO*** name —> rolls back changes to savepoint](#_bookmark482)

[**What is an Index?**](#_bookmark482)

[An index is used to speed up the performance of queries. It makes faster retrieval of data from the table. The index](#_bookmark482) can be created on one [column or a group of columns.](#_bookmark482)

[**What are all the different types of indexes?**](#_bookmark482)

1. [***Unique Index***: Unique Indexes helps maintain data integrity by ensuring that no two rows of data in a table have](#_bookmark482) identical key values. A [unique index can be applied automatically when a primary key is defined. It ensures that the values in the index key](#_bookmark482) columns are unique.
2. [***Clustered Index***: Clustered Index reorders the physical order of the table and search based on the key values. T](#_bookmark482)here will be only one c[lustered index per table.](#_bookmark482)
3. [***Non-Clustered Index***: Non-Clustered Index doesn’t alter the physical order of the table and maintains a logical o](#_bookmark482)rder of the data. Each t[able can have many non-clustered indexes.](#_bookmark482)

[**What is the difference between Cluster and Non-Cluster Index?**](#_bookmark482)

[Clustered Index:](#_bookmark482)

[It is used for easy retrieval of data from the database, and it is faster. One table can only have one clustered index](#_bookmark482)

[It alters the way records are stored in a database as it sorts out rows by the column which is set to be clustered in](#_bookmark482)dex. [Non-Clustered Index:](#_bookmark482)

[It is slower compared to the Clustered index. One table can have multiple non clustered index](#_bookmark482)

[It doesn’t alter the way it was sorted but it creates a separate object within a table which points back to the o](#_bookmark482)riginal table rows after [searching.](#_bookmark482)

[**SET OPERATORS (UNION, UNION ALL, MINUS, INTERSECT)**](#_bookmark482)

1. [Number of columns must be same](#_bookmark482)
2. [Data type should be same](#_bookmark482)
   * [UNION (returns combined rows from 2 independent queries and removes duplicates and sorts them)](#_bookmark482)
   * [UNION ALL (returns combined rows from 2 independent queries but DOES NOT remove duplicates or sort them)](#_bookmark482)
   * [MINUS (returns records from 1 query that are not present in 2 query)](#_bookmark482)
   * [INTERSECT (returns only common for both queries data)](#_bookmark482)

[**DATABASE SCHEMA**](#_bookmark482)

[DATABASE SCHEMA: is a chart that shows all the tables and how they are related to each other.](#_bookmark482)

[If there is no schema:](#_bookmark482)

1. [Oracle ===> SELECT table\_name FROM user\_tables;](#_bookmark482)
2. [MySQL ===> show tables;](#_bookmark482)

[What is Stored procedure?](#_bookmark482)

[A Stored Procedure is a collection of SQL statements that have been created and s](#_bookmark482)tored in the [database to perform a particular task. The stored procedure accepts input p](#_bookmark482)arameters and [processes them and returns a single value such as a number or text value or a](#_bookmark482) result set (set of [rows).](#_bookmark482)

[What is a Trigger?](#_bookmark482)

[A Trigger is a SQL procedure that initiates an action in response to an event (](#_bookmark482)Insert, Delete or [Update) occurs. When a new Employee is added to an Employee\_Details table, n](#_bookmark482)ew records will [be created in the relevant tables such as Employee\_Payroll, Employee\_Time\_Sheet](#_bookmark482) etc.,

[**What is a View in SQL?**](#_bookmark482)

[A view is like a subset of a table which is stored logically in a database. A view is a virtual table. It contains rows an](#_bookmark482)d columns like a real [table. The fields in the view are fields from one or more real tables. Views do not contain data of their own. They are u](#_bookmark482)sed to restrict access [to the database or to hide data complexity.](#_bookmark482)

[*CREATE VIEW view\_name AS SELECT column\_name1, column\_name2 FROM table\_name WHERE CONDITION;*](#_bookmark482)

[**Does View contain Data?**](#_bookmark482)

[No, Views are virtual structures.](#_bookmark482)

[**Difference Between View and Table?**](#_bookmark482)

[A view is a database object that allows generating a logical subset of data from one or more tables. A table is a database object or an entity that stores the data of a database.](#_bookmark482)

[The view depends on the table.](#_bookmark482)

[The table is an independent data object.](#_bookmark482)

[The view is utilized database space when a query runs. The table utilized database space throughout its existence. We can not add, update, or delete any data from a view.](#_bookmark482)

[We can easily add, update, or delete any data from a table. We can easily use replace option to recreate the view.](#_bookmark482)

[We can only create or drop the table. Aggregate data in views.](#_bookmark482)

[We can not aggregate data in views.](#_bookmark482)

[The view contains complex multiple tables joins.](#_bookmark482)

[In the table, we can maintain relationships using a primary and foreign key.](#_bookmark482)

[**COPY Data from one table into another**](#_bookmark482)

[Let’s assume that we have our employee table. We have to copy this data into another table. For this purpose, we c](#_bookmark482)an use the INSERT INTO [SELECT operator. Before we go ahead and do that, we would have to create another table that would have the same](#_bookmark482) structure as the given [table.](#_bookmark482)

[First create the second table with the same table structure with copied one. Then use the syntax:](#_bookmark482)

[Let’s say employee\_duplicate is New table employee is First table that we want to copy it into new table](#_bookmark482)

[*INSERT INTO employee\_duplicate SELECT \* FROM employee;*](#_bookmark482)

[**Database WHITEBOX and BLACKBOX TESTING**](#_bookmark482)

[***Database White Box testing involves:***](#_bookmark482)

* [Database Consistency and ACID properties](#_bookmark482)
* [Database triggers and logical views](#_bookmark482)
* [Decision Coverage, Condition Coverage, and Statement Coverage](#_bookmark482)
* [Database Tables, Data Model, and Database Schema](#_bookmark482)
* [Referential integrity rules](#_bookmark482)

[***Database Black Box testing involves:***](#_bookmark482)

* [Data Mapping](#_bookmark482)
* [Data stored and retrieved](#_bookmark482)
* [Use of Black Box testing techniques such as Equivalence Partitioning and](#_bookmark482)
* [Boundary Value Analysis (BVA)](#_bookmark482)

[**What is a relationship and what are they?**](#_bookmark482)

[Database Relationship is defined as the connection between the tables in a database. There are various database relat](#_bookmark482)ionships namely

1. [One to One Relationship](#_bookmark482)
2. [One to Many Relationship](#_bookmark482)
3. [Many to One Relationship](#_bookmark482)
4. [Self-Referencing Relationship](#_bookmark482)

[**UPDATING ROW - DELETE ROW?**](#_bookmark482)

[***UPDATING ROW***](#_bookmark482)

[Update TableName set ColumnName = value where condition; update scrumteam set firstname =‘Martin' where EmployeeID='1'; update scrumteam set lastname =‘Murtin' where firstname='Tom’;](#_bookmark482)

[***DELETING ROW***](#_bookmark482)

[delete from TableName where condition; delete from scrumteam where firstname='Jack'; delete from scrumteam where JobTitle='SDET';](#_bookmark482)

[**What is Normalization?**](#_bookmark482)

[Normalization is the process of table design to minimize the data redundancy.](#_bookmark482)

[**What are all the different Normalization?**](#_bookmark482)

[First Normal Form (1NF) Second Normal Form (2NF) Third Normal Form (3NF)](#_bookmark482)

[Boyce and Codd Normal Form (BCNF)](#_bookmark482)

[**What is Denormalization?**](#_bookmark482)

[Denormalization is a database optimization technique used to increase the performance of a database infrastru](#_bookmark482)cture. It involves in the [process of adding redundant data to one or more tables. In a normalized database, we store data in separate logic](#_bookmark482)al tables and attempt to [minimize redundant data.](#_bookmark482)

[**How to fetch values from TestTable1 that are not in TestTable2 without using NOT keyword?**](#_bookmark482)

[By using the except keyword SELECT \* FROM TestTable1 EXCEPT SELECT \* FROM TestTable2;](#_bookmark482)

[**What is Data warehouse?**](#_bookmark482)

[Data warehouse refers to a central repository of data from multiple sources of information. Those data are consoli](#_bookmark482)dated, transformed, and [made available for the mining as well as online processing.](#_bookmark482)

[**What is a Table in a Database?**](#_bookmark482)

A [table is a database object used to store records in a field in the form of columns and rows that holds data.](#_bookmark482)

[**What is a Field in a Database?**](#_bookmark482)

[A field in a Database table is a space allocated to store a particular record within a table.](#_bookmark482)

**What is a Record in a Database?**

A record (also called a row of data) is an ordered set of related data in a table.

[**What is a column in a Table?**](#_bookmark483)

[A column is a vertical entity in a table that contains all information associated with a specific field in](#_bookmark483) a table.

[**Describe SQL comments?**](#_bookmark484)

[Single Line Comments: Single line comments start with two consecutive hyphens (–) and ended](#_bookmark484) by the end of the line [Multi-Line Comments: Multi-line comments start with /\* and end with \*/. Any text between /\*](#_bookmark484) and \*/ will be ignored.

[**What is a temp table?**](#_bookmark484)

A [temp table is a temporary storage structure to store the data temporarily.](#_bookmark484)

**find names of employee start with ‘A’?**

*select \* from employees where emp\_name like 'a%’;*

**maximum salaries in each department?**

*select firstname, max(salary) from department d left outer join employee e on (d.department\_id = e.department\_id) group by department\_id;*

**duplicate names in employees?**

select first\_name, count (first\_name) from employees group by first\_name having (count(first\_name) > 1);

**CURRENT DATE and time in Oracle?**

*select current\_date from dual;*

**Select RANDOM ROWS from a table**

*select \* from table\_name sample(10);*

**HOW DO COUNT DUBLICATE IN SQL?**

*select first\_name, count(\*) from employees group by first\_name having count(\*) != 1; select salary, count (\*) from employees group by salary;*

**How we can get 10. Salary from table?**

*Select min(salary) from(select distinct salary from employees order by salary desc) where rownum<11;*

**How would you find a second highest salary from the table? Third highest?**

*select max(salary) from employees where salary < (select max(salary) from employees);*

*select max(salary) from employees where salary < (select max (salary) from employees where salary < (select max(salary) from employees));*

**Add a column to a table?**

*alter table table\_name add column\_name varchar (50);*

**How would you retrieve data that is in 2 different tables?**

Using join of two table base on condition we can retrieve data from two table

*select count(employee\_id), e.department\_id, department\_name from employees e inner join departments d on e.department\_id=d.department\_id group by e.department\_id, department\_name;*

**How would you avoid duplicate records in a SELECT query?**

*select distinct deptno from emp order by deptno;*

**show the EmpId and FullName of all the employees working under Manager with id – ‘986’.**

SELECT EMPID, FULLNAME FROM EMPLOYEEDETAILS WHERE MANAGERID = 986;

**show the different projects available from the EmployeeSalary table.**

SELECT DISTINCT(Project) FROM EmployeeSalary;

**show the count of employees working in project ‘P1’.**

SELECT COUNT (\*) FROM EmployeeSalary WHERE Project = 'P1';

**find the maximum, minimum, and average salary of the employees.**

SELECT Max (Salary), Min(Salary), AVG(Salary) FROM EmployeeSalary;

**find the employee id whose salary lies in the range of 9000 and 15000.**

SELECT EmpId, Salary FROM EmployeeSalary WHERE Salary BETWEEN 9000 AND 15000;

**show those employees who live in Toronto and work under manager with ManagerId – 321.**

SELECT EmpId, City, ManagerId FROM EmployeeDetails WHERE City='Toronto' AND ManagerId='321';

**show all the employees who either live in California or work under a manager with ManagerId – 321.**

SELECT EmpId, City, ManagerId FROM EmployeeDetails WHERE City='California' OR ManagerId='321';

**show all those employees who work on Project other than P1.**

SELECT EmpId FROM EmployeeSalary WHERE NOT Project='P1'; Or SELECT EmpId FROM EmployeeSalary WHERE Project <> 'P1';

**display the total salary of each employee adding the Salary with Variable value.**

SELECT EmpId, Salary+Variable as TotalSalary FROM EmployeeSalary;

**show the employees whose name begins with any two characters, followed by a text “hn” and ending with any sequence**

SELECT FullName FROM EmployeeDetails WHERE FullName LIKE ‘ hn%’;

**show all the EmpIds which are present in either of the tables – ‘EmployeeDetails’ and ‘EmployeeSalary’.**

SELECT EmpId FROM EmployeeDetails UNION SELECT EmpId FROM EmployeeSalary;

**show common records between two tables.**

SELECT \* FROM EmployeeSalary WHERE EmpId IN (SELECT EmpId from ManagerSalary);

**show records that are present in one table but not in another table.**

SELECT EmployeeSalary. \* FROM EmployeeSalary LEFT JOIN ManagerSalary USING (EmpId) WHERE ManagerSalary.EmpId IS NULL;

**show the EmpIds that are present in both the tables – ‘EmployeeDetails’ and ‘EmployeeSalary.**

SELECT EmpId FROM EmployeeDetails where EmpId IN (SELECT EmpId FROM EmployeeSalary);

**show the EmpIds that are present in EmployeeDetails but not in EmployeeSalary.**

SELECT EmpId FROM EmployeeDetails where EmpId Not IN(SELECT EmpId FROM EmployeeSalary);

**show the employee full names and replace the space with ‘-’.**

SELECT REPLACE(FullName, ' ', '-') FROM EmployeeDetails;

**show the position of a given character(s) in a field.**

SELECT INSTR(FullName, 'Snow') FROM EmployeeDetails;

**display both the EmpId and ManagerId together.**

SELECT CONCAT(EmpId, ManagerId) as NewId FROM EmployeeDetails;

**show only the first name(string before space) from the FullName column of the EmployeeDetails table.**

SELECT SUBSTRING(FullName, 1, CHARINDEX(' ',FullName)) FROM EmployeeDetails;

**upper case the name of the employee and lower case the city values.**

SELECT UPPER(FullName), LOWER(City) FROM EmployeeDetails;

**find the count of the total occurrences of a particular character – ‘n’ in the FullName field.**

SELECT FullName, LENGTH(FullName) - LENGTH(REPLACE(FullName, 'n', ''))FROM EmployeeDetails;

**update the employee names by removing leading and trailing spaces.**

UPDATE EmployeeDetails SET FullName = LTRIM(RTRIM(FullName));

**Show all the employees who are not working on any project.**

SELECT EmpId FROM EmployeeSalary WHERE Project IS NULL;

**show employee names having a salary greater than or equal to 5000 and less than or equal to 10000.**

SELECT FullName from EmployeeDetails where EmpId IN (select EmpId from EmployeeSalary where Salary BETWEEN 5000 AND 10000);

**find the current date-time.**

MySQL- SELECT NOW();

SQL Server- SELECT getdate();

Oracle- SELECT SYSDATE FROM DUAL;

**show all the Employees details from EmployeeDetails table who joined in the Year 2020.** SELECT \* FROM EmployeeDetails WHERE DateOfJoining BETWEEN '2020/01/01' AND '2020/12/31'; SELECT \* FROM EmployeeDetails WHERE YEAR(DateOfJoining) = '2020';

**show all employee records from EmployeeDetails table who have a salary record in EmployeeSalary table.**

SELECT \* FROM EmployeeDetails E WHERE EXISTS (SELECT \* FROM EmployeeSalary S WHERE E.EmpId = S.EmpId);

**show project-wise count of employees sorted by project’s count in descending order.**

SELECT Project, count(EmpId) EmpProjectCount FROM EmployeeSalary GROUP BY Project ORDER BY EmpProjectCount DESC;

**show employee names and salary records. Display the employee details even if the salary record is not present**

SELECT E.FullName, S.Salary FROM EmployeeDetails E LEFT JOIN EmployeeSalary S ON E.EmpId = S.EmpId;

**join 3 tables.**

SELECT column1, column2 FROM TableA JOIN TableB ON TableA.Column3 = TableB.Column3 JOIN TableC ON TableA.Column4 = TableC.Column4;

**show all the Employees who are also managers from the EmployeeDetails table.**

SELECT DISTINCT E.FullName FROM EmployeeDetails E INNER JOIN EmployeeDetails M ON E.EmpID = M.ManagerID;

**show duplicate records from EmployeeDetails (without considering the primary key – EmpId).**

SELECT FullName, ManagerId, DateOfJoining, City, COUNT(\*) from EmployeeDetails group by FullName, ManagerId, DateOfJoining, City HAVING COUNT(\*) > 1;

**remove duplicates from a table without using a temporary table.**

DELETE E1 FROM EmployeeDetails E1 INNER JOIN EmployeeDetails E2 WHERE E1.EmpId > E2.EmpId AND E1.FullName = E2.FullName AND E1.ManagerId = E2.ManagerId AND E1.DateOfJoining = E2.DateOfJoining AND E1.City = E2.City;

**show only odd rows from the table.**

SELECT \* FROM EmployeeDetails WHERE MOD (EmpId, 2) <> 0;

**show only even rows from the table.**

SELECT \* FROM EmployeeDetails WHERE MOD (EmpId, 2) = 0;

**create a new table with data and structure copied from another table.**

CREATE TABLE NewTable SELECT \* FROM EmployeeSalary;

**create an empty table with the same structure as some other table.**

CREATE TABLE NewTable SELECT \* FROM EmployeeSalary where 1=0;

**show top n records?**

SELECT \* FROM EmployeeSalary ORDER BY Salary DESC LIMIT N;

[What is Maven?](#_bookmark608)

[What are the main features of Maven?](#_bookmark609) [What is Maven Artifact?](#_bookmark610)

[A Maven build lifecycle and phases?](#_bookmark611) [What is a POM xml file?](#_bookmark612)

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[Tell me the command to install JAR file in local repository. **mvn**](#_bookmark615) **install**

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[How Maven handles and determines what version of dependency will be used when multiple versions of](#_bookmark623)

[an artifact are found?](#_bookmark623)

[What is the difference between Snapshot and Version?](#_bookmark624)

[What does it mean when you say Maven uses Convention over Configuration?](#_bookmark625)

How to run cucumber tests via maven ? **mvn test -Dcucumber.options="--tag @smoke”**

[**What is Maven?**](#_bookmark607)

[MAVEN is a **project build tool** for java projects. (Other build tools for java such as Gradle and Ant)](#_bookmark607)

[MAVEN **automates the process** of **creating, managing dependencies, compiling, testing, deploying** java applications.](#_bookmark607)

[Pom.XML file always located on home folder of the project. Maven automates the build process of Java projects. Each phase in the build process is known as **a Maven lifecycle or a Maven goal**.](#_bookmark607)

[Maven is also **responsible for dependencies**. We must download and add all .jar files we need for project if don't use Maven. Maven **automatically downloads** and adds into project. Dependencies helps us to easily add libraries and make project independent from IDE. We can run tests without IDE. (Jenkins execute tests by using Maven, not any IDE).](#_bookmark607)

[**What are the main features of Maven?**](#_bookmark607)

[***Simple to use***: Maven provides easy project settings that are based on genuine practices.](#_bookmark607)

[***Fast***: You can receive a fresh project or module that began in fewer seconds in Maven.](#_bookmark607)

[***Easy to learn***: Maven usage and commands are easy to learn across all projects.](#_bookmark607)

[***Dependency management***: Maven provides superior dependency management including automatic updates and trans](#_bookmark607)itive [dependencies.](#_bookmark607)

[***Multiple Projects***: You can easily work on multiple projects at the same time by using Maven.](#_bookmark607)

[***Huge Library***: Maven has a large and growing repository of libraries and metadata to use out of the box.](#_bookmark607)

[**What is Maven Artifact?**](#_bookmark607)

[An artifact is a file, **usually a JAR**, that gets deployed to a Maven repository.](#_bookmark607)

[A Maven build produces one or more artifacts, such as a compiled JAR and a "sources" JAR.](#_bookmark607)

[Each artifact has a group ID (usually a reversed domain name, like com.example.foo), an artifact ID (just a name), and a version](#_bookmark607) string. [The three together uniquely identify the artifact.](#_bookmark607)

[***<groupId>org.seleniumhq.selenium</groupId>***](#_bookmark607)

[***<artifactId>seleniumjava</artifactId>***](#_bookmark607)

[***<version>3.11.0</version>***](#_bookmark607)

[A project's dependencies are specified as artifacts.](#_bookmark607)

[**A Maven build lifecycle and phases?**](#_bookmark607)

[A Build Lifecycle can be defined as a well-defined sequence of phases. It clearly defines the order in which the goals are to be executed. Each build phase contains a sequence of goals. If one life cycle is executed, all build phases in that life cycle are executed. If a build phase is executed, all build phases before it in the pre-defined sequence of build phases are executed. **clean** — delete target directory](#_bookmark607)

[**validate** — validate, if the project is correct](#_bookmark607)

[**compile** — compile source code, classes stored in target/classes](#_bookmark607)

[**test** — run tests](#_bookmark607)

[**package** — take the compiled code and package it in its distributable format, e.g. JAR, WAR](#_bookmark607)

[**verify** — run any checks to verify the package is valid and meets quality criteria](#_bookmark607)

[**install** — install the package into the local repository](#_bookmark607)

[**deploy** — copies the final package to the remote repository](#_bookmark607)

[**What is a POM xml file?**](#_bookmark607)

[A file **that manages the whole project**. It includes **dependencies and plugins** needed for the project.](#_bookmark607)

[Maven **reads the pom.xml** file, then executes the goal. When you run a maven command, everything should be done through the pom.xml](#_bookmark607)

[**Can you tell me the default location of your local repository?**](#_bookmark607)

[***~/m2./repository.***](#_bookmark607)

[**What is a Maven Repository?**](#_bookmark607)

[A repository is a place i.e., a directory where all the project jars, library jar, plugins or any other project spe](#_bookmark607)cific artifacts are stored, [and this can be used by Maven easily. Local, Central, Remote.](#_bookmark607)

[**Tell me the command to install JAR file in local repository.**](#_bookmark607)

[***mvn install***](#_bookmark607)

[**What are the uses of Maven Plugins?**](#_bookmark607)

[***create jar file. create war file. compile code files. unit testing of code.***](#_bookmark607)

[***create project documentation. create project reports.***](#_bookmark607)

[**What is a goal in Maven terminology?**](#_bookmark607)

[A goal represents a specific task that contributes to the building and managing of a project. It is bound to zero or more build phases.](#_bookmark607) A [goal that is not bound to any build phase could be executed outside of the build lifecycle by invocating it directly.](#_bookmark607)

[**What are the types of Maven Plugins?**](#_bookmark607)

[***Build plugins*** −They come into picture during the build and should be configured in the <build/> element of p](#_bookmark607)om.xml

[***Reporting plugins*** −executed during the site generation and they should be configured in the <reporting/> ele](#_bookmark607)ment of the pom.xml

[**What would the command mvn clean do?**](#_bookmark607)

[This command deletes the target directory with all the build data before starting the build process.](#_bookmark607)

**What are the things that you must define for each external dependency?**

[External dependencies (library jar location) can be configured in pom.xml in same way as other dependencies](#_bookmark607) are configured. [First, ***specify groupId*** the same as the name of the library.](#_bookmark607)

[Then ***specify artifactId*** the same as the name of the library. Thirdly, ***specify scope*** as a system.](#_bookmark607)

[Lastly, ***specify the system path*** relative to the project location.](#_bookmark607)

[**What is the command to create a new project based on an archetype?**](#_bookmark607)

[***mvn archetype:generate***](#_bookmark607)

[**What does the build tool?**](#_bookmark607)

[Generates source code (if the auto-generated code is used) Generates documentation from source code](#_bookmark607)

[Compile source code](#_bookmark607)

[Packages compiled code into a JAR or ZIP file](#_bookmark607)

[Installs the packaged code in the local repository, server repository, or central repository](#_bookmark607)

[**How Maven handles and determines what version of dependency will be used when multiple versions of an artifact are found?**](#_bookmark607)

[If you find two dependency versions at the same depth in the dependency tree, then you use the first declared dependency. This is nothing but dependency mediation.](#_bookmark607)

[**What is the difference between Snapshot and Version?**](#_bookmark607)

[In the case of ***Version***, if Maven once downloads the mentioned version say data-service:1.0, it will never try to download a newer 1.0 available in the repository. To download the updated code, the data-service version is then upgraded to 1.1.](#_bookmark607)

[In the case of ***SNAPSHOT***, Maven will automatically fetch the latest SNAPSHOT (data-service:1.0-SNAPSHOT) every time the team builds its project.](#_bookmark607)

[**What does it mean when you say Maven uses Convention over Configuration?**](#_bookmark607)

[In the ***case of Configuration***, developers must create the build processes manually and they must specify each configuration in detail. But Maven uses convention where the developers need not create the build processes manually.](#_bookmark607)

[Also, for ***convention***, users do not need to specify the configuration in detail. Once a developer creates a project in Maven then Maven will automatically create a structure. Developers just must place the files appropriately. There is no need to specify any configuration details in pom.xml file.](#_bookmark607)

[What is Jenkins?](#_bookmark630)

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[WHAT ARE THE COMMANDS FOR EXECUTE OUR CODES IN JENKINS?](#_bookmark644) [JENKINS CUCUMBER REPORT](#_bookmark645)

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[How do you schedule in Jenkins? How will you schedule test to execute every 3 hours?](#_bookmark648) [How is code deployed to your environment?](#_bookmark649)

[What kind of tests can be done in Jenkins?](#_bookmark650)

[What layers of tests can be tested using Jenkins?](#_bookmark651) [How do you search by tags?](#_bookmark652)

[How do you maintain your tests job on Jenkins?](#_bookmark653)

[Scheduling the Jenkins Job](#_bookmark654)

[how do you trigger job using Jenkins?](#_bookmark642)

###### [MAIN](#_bookmark0)

[**What is Jenkins?**](#_bookmark627)

[Jenkins is an **open-source automation tool** written in Java with plugins built **for Continuous Integration** purposes. Jenkins is used to build and test your software projects continuously making it easier for developers to integrate changes to the project and making it easier for users to obtain a fresh build.](#_bookmark627)

[Jenkins is application that is hosted in some server. My company uses **AWS for hosting Jenkins**. Our Operations (DevOps) team set up the was instance, install Jenkins and other required tools.](#_bookmark627)

[Pipeline is a set of processes that take the code from version control and compile, build, test and deploy to production in automated fashion](#_bookmark627)

[**How do you create a maven job in Jenkins?**](#_bookmark627)

1. [Run Jenkins](#_bookmark627)
2. [Add Maven plugins](#_bookmark627)
3. [Create a Maven Job](#_bookmark627)
4. [Specify the location of your Selenium project for example provide the GitHub location](#_bookmark627)
5. [Click build](#_bookmark627)

[**How do you configure a job to send an email when Jenkins job execution is complete?**](#_bookmark627)

[Inside your Jenkins project, ***configure > Under Post-build Actions > Email Notification and enter your Email Address***](#_bookmark627)

[**How can you get the log of the reports in Jenkins?**](#_bookmark627)

[When you are at Jenkins Home > ***Manage Jenkins > System Log***](#_bookmark627)

[**What is freestyle job?**](#_bookmark627)

[Jenkins can be used to perform the typical build server work, such as doing continuous/official/nightly builds, run tests, or perform some repetitive batch tasks. This is called "free-style software project" in Jenkins. Freestyle build jobs are general-purpose build jobs, which provides a maximum of flexibility.](#_bookmark627)

[**How do you know if your Jenkins build failed?**](#_bookmark627)

[I click and open my Maven project under Build History. If the icon is in red color, it means the build failed. I can then click and view the details of the failed build and see console logs to view the details/reason of the failure.](#_bookmark627)

[**Production Pipeline**](#_bookmark627)

[Pipeline is a set of processes that take the code from version control and compile, build, test and deploy to production in automated fashion.](#_bookmark627)

[The pipeline breaks down the software delivery process into stages. Each stage is made of different tasks which can be carried out in parallel. When all tasks in a stage passes, next stage is triggered.](#_bookmark627)

[**Continuous Integration**](#_bookmark627)

* [CI is a development practice that requires developers to integrate code into a shared](#_bookmark627) repository [several times a day.](#_bookmark627)
* [Every time the software’s code is changed, it is built and tested automatically](#_bookmark627)

[**Continuous Delivery**](#_bookmark627)

[***Continuous Delivery*** is an automated build and execution of at unit and integration tests, performing code analysis, functional tests and deploying to any supported platform any time.](#_bookmark627)

[Each time a build or a set of code passes the tests, it’s automatically deployed out to a staging environment. In Continuous Delivery releasing to end users is a manual process. Continuous delivery involves human decision-making when it comes to deciding when to release the software to the customers.](#_bookmark627)

[**Continuous Deployment**](#_bookmark627)

* [Code changes are automatically built, tested, deployed, and prepared for a release to production](#_bookmark627)
* [Each check-in is then verified by an automated build, allowing teams to detect problems early.](#_bookmark627)

[**Create a Job Configuration on Jenkins?**](#_bookmark627)

[As a test engineer I only configured my smoke and regression tests on Jenkins. I have a cucumber + Junit+ maven framework. First, I click the New Item link and I write the name of the test, such as smoke-test.](#_bookmark627)

* 1. [***Source Code Management Section*** here we specify where to get the code from. we put the link to our GitHub repo and enter the credentials](#_bookmark627)
  2. [***Build Triggers*** I specify how often I run those tests. I choose Build periodically because I want to run in certain schedule. In my project, I run smoke tests every morning at 7 am. So, in the build trigger I entered daily option:](#_bookmark627)

[H 7 \* \* \* --> every day 7 in the morning](#_bookmark627)

* 1. [***Build Section*** Here I enter the details of the actual run. Since my project is based on maven, I choose option: invoke top-level maven targets then I choose which maven to run from the version dropdown. In the next field, I enter the maven goal: test. In this field we do not need to enter the word mvn. I also mention here which tag I want to run. So, the command will be:](#_bookmark627)

[***test -Dcucumber.options="--tags @smoke"***](#_bookmark627)

* 1. [***Add Post-build Actions*** In the post build actions, I configure what I want to after the ends. After each test I generate report and email to my team members.](#_bookmark627)

[For Report, I select cucumber reports plugin from the post-build actions to generate reports.](#_bookmark627)

[For email, I select Editable Email Notification option from the Post-build Actions to send emails to my team.](#_bookmark627)

[**How many environments do you have?**](#_bookmark627)

* [1. Dev enviroments](#_bookmark627)
* [2. QA/Test enviroment- this is where I test](#_bookmark627)
* [3. Staging enviroment](#_bookmark627)
* [4. Production](#_bookmark627)

[**How to set smoke test in Jenkins?**](#_bookmark627)

[After we put @smoke\_test annotations into projects, we just write command in BUILD where “invoke top-level maven targets” in Jenkins.](#_bookmark627)

[***test -Dcucumber.options="--tags @smoke\_test"***](#_bookmark627)

[**how do you trigger job using Jenkins?**](#_bookmark627)

[The steps for schedule jobs in Jenkins:](#_bookmark627)

1. [click on "Configure" of the job requirement](#_bookmark627)
2. [scroll down to "Build Triggers" - subtitle](#_bookmark627)
3. [Click on the checkBox of Build periodically](#_bookmark627)
4. [Add time schedule in the Schedule field, for example, @midnight](#_bookmark627)

[**What is Blue Ocean?**](#_bookmark627)

[is a project that rethinks the user experience of Jenkins, modelling and presenting the process of software delivery by surfacing information. that’s important to development teams with as few clicks as possible, while still staying true to the extensibility that is core to Jenkins.](#_bookmark627)

[**WHAT ARE THE COMMANDS FOR EXECUTE OUR CODES IN JENKINS?**](#_bookmark627)

[***mvn clean test -Dcucumber.options=”—tags@smoke\_test”***](#_bookmark627)

[In cucumber runner class tags can be different but we passed the syntax like above cukes runner will be overridden and smoke test will be executed.](#_bookmark627)

[clean test -P RegressinRunner - this is for parallel (our tests execute in more than one browser in Jenkins not local browser)](#_bookmark627)

[**JENKINS CUCUMBER REPORT**](#_bookmark627)

[Jenkins has Cucumber report plugin that can generate User Friendly report Only data Cucumber report plugin needs is Json format report](#_bookmark627)

[Once Cucumber report is generated, send the URL of the report to anyone who asks for the report](#_bookmark627)

[All the history of automation tests are stored in Jenkins. It shows dates and hours and other details.](#_bookmark627)

[If you need to see the automation report from past, you find it in Jenkins.](#_bookmark627)

[**What is Jenkins job?**](#_bookmark627)

[Everything is done by creating a job](#_bookmark627)

[A task that Jenkins performs based on its schedule Made of several steps](#_bookmark627)

[Can have a trigger that determines when it runs Reports the results of the run automatically](#_bookmark627)

[**How schedule a build in Jenkins?**](#_bookmark628)

[In Jenkins, under the job configuration we can define various build triggers.](#_bookmark628)

[Simple find the ‘Build Triggers’ section and check the ‘Build Periodically’ checkbox. With the periodically build you can schedule the build definition by the date or day of the week and the time to execute the build.](#_bookmark628)

[The format of the ‘Schedule’ textbox is as follows:](#_bookmark628)

[MINUTE (0-59), HOUR (0-23), DAY (1-31), MONTH (1-12), DAY OF THE WEEK (0-](#_bookmark628)

[7)](#_bookmark628)

[**How do you do schedule in Jenkins? How will you schedule test to be executed every 3 hours?**](#_bookmark629)

[H 3\*\*\* If you want to schedule your build every day at 7h00, this will do the job: 0 7](#_bookmark629)

[\* \* \*](#_bookmark629)

[**How is code deployed to your environment?**](#_bookmark629)

[Devs write the code, test it then is deployed in Jenkins from dev to test environment What if it doesn't?](#_bookmark629)

[Talk to your developer and ask them to deploy it](#_bookmark629)

[**What kind of tests can be done in Jenkins?**](#_bookmark629)

[Jenkins can run any automated test.](#_bookmark629)

[***unit tests, smoke tests, integration tests, regression tests, sanity***](#_bookmark629)

[**What layers of tests can be tested using Jenkins?**](#_bookmark629)

[Testing different layers of the application is done with our test code.](#_bookmark629)

[Jenkins does not care if we are testing UI or database or API. it only kicks of the tests and sends reports.](#_bookmark629)

[So, if my automated test is a UI tests, it means Jenkins is running UI tests. or if it is a API tests, Jenkins is running API tests.](#_bookmark629)

[**How do you search by tags?**](#_bookmark629)

[***ctrl+H*** to open search tool in Eclipse and put the tag name in there and](#_bookmark629)

[**How do you maintain your tests job on Jenkins?**](#_bookmark629)

* [Our jenkins job is configured to get my automated tests from GitHub and run every day using Maven.](#_bookmark629)
* [In configuration, first I created a new job and gave name "smoke tests".](#_bookmark629)
* [Then I selected option git in the Source Code Management section and entered the path to my framework on](#_bookmark629)

[GitHub. And, also entered the git credentials.](#_bookmark629)

* [Next configuration is about build triggers where I chose option Build periodically and enter the time how often I want to run my tests.](#_bookmark629)
* [In the Build section, I choose option invoke top level maven command since my automation framework](#_bookmark629) is

[created using maven.](#_bookmark629)

* [In the section I enter the maven command (without the mvn part).](#_bookmark629)
* [So, its normal command to run my test using terminal is 'mvn test', in jenkins I only enter 'test'.](#_bookmark629)
* Here I also enter the tag I want to run using command line.

t**est -Dcucumber.options="--tags @smoke"**

* if I want to run regression tests, command is:

**test -Dcucumber.options="--tags @regression"**

* In the Post-build Actions, I do couple configuration,

1. I add Cucumber reports option. This is available because we have installed cucumber html reports plugin to

our jenkins. Cucumber reports plugin will generate html report for every build. Every time we run smoke tests on jenkins, we get a new report. and all reports for all build are saved.

1. I add email option as the next Post-build Actions. Here I configure it so that everyone in my agile team is notified about the test results.

**Scheduling the Jenkins Job**

[CRON Job > Scheduled automated task](#_bookmark629)

[That is the reason why Jenkins users use CRON time format.](#_bookmark629)

**Where do you see history of a GIT project repository?**

After we have created several commits, or if we have cloned a repository with an existing commit history, we’ll probably want to look back to see what has happened. The most basic and powerful tool to do this is the ***git log*** command.

**What is the difference between commit and push?**

***git commit***- records changes to the repository

***git push***- updates remote repository

**What is staging in GIT?**

The staging area is a file, generally contained in your Git directory, that stores information about what will go into your next commit. Its technical name in Git parlance is the “***index***”, but the phrase “***staging area***” works just as well.

**The basic Git workflow?**

1. You modify files in your working tree.
2. You selectively stage just those changes you want to be part of your next commit, which adds only those changes to the staging area.
3. You do a commit, which takes the files as they are in the staging area and stores that snapshot permanently to your Git directory.

**What is Git init command?**

The git init command ***creates a new Git repository***. It can be used to convert an existing, undersigned project to a Git repository or initialize a new, empty repository. Most other Git commands are not available outside of an initialized repository, so this is usually the first command we'll run in a new project.

**Difference between git init vs. git clone?**

**git init** and **git clone** can be easily confused. At a high level, they can both be used to "initialize a new git repository." However, git clone is dependent on git init. git clone is used to create a copy of an existing repository. Internally, git clone first calls **git init** to create a new repository. It then copies the data from the existing repository and checks out a new set of working files

[**What is the difference between 'git pull' and 'git fetch'?**](https://stackoverflow.com/questions/292357/what-is-the-difference-between-git-pull-and-git-fetch)

**git pull** tries to automatically merge after fetching commits. It is context sensitive, so all pulled commits will be merged into your currently active branch. git pull automatically merges the commits without letting you review them first.

**git fetch** gathers any commits from the target branch that do not exist in the current branch and stores them in your local repository. However, it does not merge them with your current branch. This is particularly useful if you need to keep your repository up to date but are working on something that might break if you update your files. To integrate the commits into your current branch, you must use git merge afterwards.

**Merge a Branch with Master Branch**

First, we must come in the branch which we want to merge the codes in. It means generally we should come into master branch in this case.

***git checkout master*** ==> now you are in master branch

***git pull origin master*** ==> We are pulling recent code from master branch on GitHub

***git merge develop -m "your message here"*** ==> to merge a develop branch into master branch

***git add .***

***git commit -m "final commit"***

***git push origin master >>>*** now when other team members pull master, they will see what you sent

***git rebase LoginFeatureBranch*** ==> This will merge Login with Master but closes the LoginFeatureBranch for good (completely).

**initialize a Git repo:**

***git init*** Everything starts from here. The first step is to initialize a new Git repo locally in your project root.

**push changes to a remote repo:**

***git push*** When all your work is ready to be saved on a remote repository, you can push all changes using the command:

### [MAIN](#_bookmark7)

[CHEAT SHEET](#_bookmark657)

**pull changes from a remote repo:**

***git pull*** If other team members are working on your repository, you can retrieve the latest changes made to the remote repository

**fetch remote repo changes:**

***git fetch*** will download the changes from a remote repo but will not perform a merge on your local branch (as git pull does that instead).

**add a file to the staging area:**

***git add filename***

**add all files in the staging area**

***git add .*** If you want to add all files in your project to the staging area, you can use a wildcard. and every file will be added for you.

**see changes using "git add -p":**

***git add -p*** opens a prompt and asks if you want to stage changes or not and includes other options.

**add a remote repository**

***git add remote https://repo\_here*** adds a remote repository to your local repository

**add only certain files to the staging area**

***git add fil\**** With the asterisk in the command below, you can add all files starting with 'fil' in the staging area.

**check a repository's status:**

***git status*** will show the status of the current repository including staged, unstaged, and untracked files.

**commit changes in the editor:**

***git commit*** A commit message is made up of a short summary of changes, an empty line, and a full description of the changes after it.

**commit changes with a message:**

***git commit -m "message "*** You can add a commit message without opening the editor. let’s you only specify a short summary for your commit message.

**commit changes (and skip the staging area):**

***git commit -a -m "message "*** You can add and commit tracked files with a single command by using the -a and -m options.

**see your commit history:**

***git log*** shows the commit history for the current repository:

**Returning to the latest version?**

// we need to type both

***git fetch origin***

***git reset --hard origin/master***

**see log stats:**

***git log --stat*** will cause the Git log to show some statistics about the changes in each commit, including line(s) changed and file names.

**see your commit history including changes:**

***git log -p*** shows the commit's history including all files and their changes:

**check the current commits log of a remote repo**

***git log origin/main*** Commit after commit, Git builds up a log. You can find out the remote repository log by using this command:

**merge a remote repo with your local repo:**

***git merge origin/main*** If the remote repository has changes you want to merge with your local, then will do that for you:

**get the contents of remote branches without automatically merging:**

***git remote update***

**revert unstaged changes:**

***git checkout filename***

**revert staged changes:**

***git reset HEAD filename git reset HEAD -p***

**create a new branch:**

***git branch branch\_name*** by default, you have one branch, the main branch. Git won't switch to it automatically – you will need to do it manually

**switch to a newly created branch:**

***git checkout branch\_name***

**list branches:**

***git branch >>*** It will show a list of all branches and mark the current branch with an asterisk and highlight it in green.

**create a branch and switch to it immediately:**

***git checkout -b branch\_name***

**delete a branch:**

***git branch -d branch\_name***

**merge two branches:**

***git merge branch\_name***

**check remote branches that Git is tracking:**

***git branch -r >>*** shows the name of all remote branches that Git is tracking for the current repository:

**push a new branch to a remote repo:**

***git push -u origin branch\_name*** Just remember to add -u to create the branch upstream:

**remove a remote branch:**

***git push --delete origin branch\_name\_here*** If you no longer need a remote branch, you can remove it

**check your Git configuration:**

***git config -l >>*** returns a list of information about your git configuration including username and email:

**setup your Git username:**

***git config --global user.name "Tester"***

**setup your Git user email:**

***git config --global user.email "***[***signups@fabiopacifici.com***](mailto:signups@fabiopacifici.com)***"***

**cache your login credentials:**

***git config --global credential.helper cache >>*** You can store login credentials in the cache, you don't have to type them in each time.

**see a specific commit:**

***git show commit-id>>*** Replace commit-id with the id of the commit that you find in the commit log after the word commit.

**rename files:**

***git mv oldfile newfile >>*** stages the changes, then it expects a commit message.

**ignore files:**

Create a .gitignore file and commit it.

**amend the most recent commit:**

***git commit –amend*** Note!!: fixing up a local commit with amend is great and you can push it to a shared repository after you've fixed it. But you should avoid amending commits that have already been made public.

**rollback the last commit:**

***git revert HEAD>>*** git revert will create a new commit that is the opposite of everything in the given commit.

**rollback an old commit:**

***git revert commit\_id\_here*** You can revert an old commit using its commit id. This opens the editor so you can add a commit message.

**see changes made before committing them using "diff”:**

You can pass a file as a parameter to only see changes on a specific file. git diff shows only unstaged changes by default.

We can call diff with the --staged flag to see any staged changes.

***git diff***

***git diff all\_checks.py*** ***git diff --staged***

**remove tracked files from the current working tree:**

***git rm filename>>*** expects a commit message to explain why the file was deleted.

**show the commit log as a graph:**

***git log –graph >>> to show as a graph***

***git log --graph –oneline >>commit messages to a single line***

**show the commit log as a graph of all branches:**

***git log --graph --oneline --all***

**abort a conflicting merge:**

***git merge --abort*** >>If you want to throw a merge away and start over, you can run the following command:

**see remote URLs:**

***git remote -v*** >>You can see all remote repositories for your local repository

**get more info about a remote repo:**

***git remote show origin***

**use Git rebase:**

***git rebase branch\_name\_here*** >>You can transfer completed work from one branch to another using git rebase.

**force a push request:**

***git push -f***

***git add .***

**Merging branch with master**

*--go to your second branch do next steps*

***git commit -m "your comment"***

*--go to your master branch*

***git merge "branchName"***

*--if its not merging we need to do*

***git commit -m "comment" again from master branch***

[Create a Repository](#_bookmark656)

[From scratch -- Create a new local repository](#_bookmark656)

[$ **git init [project name]**](#_bookmark656)

[Download from an existing repository](#_bookmark656)

[$ **git clone my\_url**](#_bookmark656)

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[$ **git diff HEAD**](#_bookmark656)

[Show the changes between two commit ids](#_bookmark656)

[$ **git diff commit! commit2**](#_bookmark656)

[List the change dates and authors for a file](#_bookmark656)

[$ **git blame [file]**](#_bookmark656)

[Show the file changes for a commit id and/or file](#_bookmark656)

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[$ **git branch -av**](#_bookmark656)

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[Create a new branch called new\_branch](#_bookmark656)

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[Delete the branch called my\_branch](#_bookmark656)

[$ **git branch -d my\_branch**](#_bookmark656)

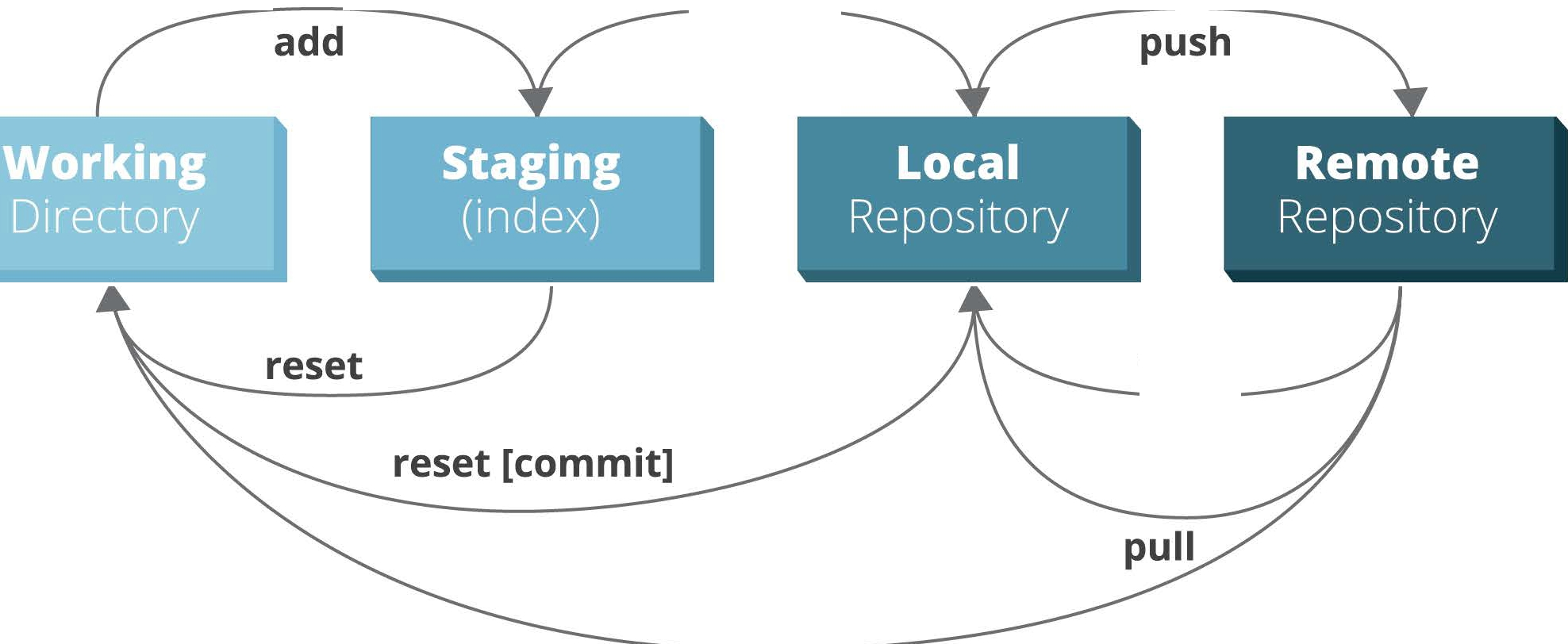
[Merge branch\_a into branch\_b](#_bookmark656)

[$ **git checkout branch\_b**](#_bookmark656)

[$ **git merge branch\_a**](#_bookmark656)

[Tag the current commit](#_bookmark656)

[$ **git tag my\_tag**](#_bookmark656)



[**commit**](#_bookmark656)

[**fetch**](#_bookmark656)

[Make a change](#_bookmark656)

[Stages the file, ready for commit](#_bookmark656)

[$ **git add [file]**](#_bookmark656)

[Stage all changed files, ready for commit](#_bookmark656)

[$ **git add.**](#_bookmark656)

[Commit all staged files to versioned history](#_bookmark656)

[$ **git commit -m "commit message"**](#_bookmark656)

[Commit all your tracked files to versioned history](#_bookmark656)

[**$git commit -am "commit message"**](#_bookmark656)

[Unstages file, keeping the file changes](#_bookmark656)

[$ **git reset [file]**](#_bookmark656)

[Revert everything to the last commit](#_bookmark656)

[$ **git reset --hard**](#_bookmark656)

[Synchronize](#_bookmark656)

[Get the latest changes from origin (no merge)](#_bookmark656)

[$ **git fetch**](#_bookmark656)

[Fetch the latest changes from origin and merge](#_bookmark656)

[$ **git pull**](#_bookmark656)

[Fetch the latest changes from origin and rebase](#_bookmark656)

[$ **git pull --rebase**](#_bookmark656)

[Push local changes to the origin](#_bookmark656)

[$ **git push**](#_bookmark656)

[Finally!](#_bookmark656)

[When in doubt, use git help](#_bookmark656)

[$ **git command --help**](#_bookmark656)

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| [**101**](#_bookmark659) | [Switching Protocols](#_bookmark659) |
| [**102**](#_bookmark659) | [Processing](#_bookmark659) |

1. [OK](#_bookmark659)
2. [Created](#_bookmark659)

##### [4XX Client Error Continued](#_bookmark659)

1. [Conflict](#_bookmark659)
2. [Gone](#_bookmark659)
3. [Length Required](#_bookmark659)
4. [Precondition Failed](#_bookmark659)
5. [Payload Too Large](#_bookmark659)
6. [Request-URI Too Long](#_bookmark659)

[**202**](#_bookmark659)

[**203**](#_bookmark659)

[**204**](#_bookmark659)

[**205**](#_bookmark659)

[**206**](#_bookmark659)

[**207**](#_bookmark659)

[**208**](#_bookmark659)

[**226**](#_bookmark659)

##### [3XX R](#_bookmark659)

[**300**](#_bookmark659)

[**301**](#_bookmark659)

[**302**](#_bookmark659)

[**303**](#_bookmark659)

[**304**](#_bookmark659)

[**305**](#_bookmark659)

|  |
| --- |
| [**edirectional**](#_bookmark659)  [Multiple Choices](#_bookmark659) |
| [Moved Permanently](#_bookmark659) |
| [Found](#_bookmark659) |
| [See Other](#_bookmark659) |
| [Not Modified](#_bookmark659) |
| [Use Proxy](#_bookmark659) |
| [Temporary Redirect](#_bookmark659) |
| [Permanent Redirect](#_bookmark659) |

[Accepted](#_bookmark659)

[Non-authoritative Information No Content](#_bookmark659)

[Reset Content](#_bookmark659)

[Partial Content Multi-Status Already Reported IM Used](#_bookmark659)

[**415**](#_bookmark659)

[**416**](#_bookmark659)

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[**444**](#_bookmark659)

[**451**](#_bookmark659)

[**499**](#_bookmark659)

[Unsupported Media Type Requested Range Not Satisfiable Expectation Failed](#_bookmark659)

[I'm a teapot Misdirected Request Unprocessable Entity Locked](#_bookmark659)

[Failed Dependency Upgrade Required Precondition Required Too Many Requests](#_bookmark659)

[Request Header Fields Too Large Connection Closed Without Response Unavailable For Legal Reasons](#_bookmark659)

[Client Closed Request](#_bookmark659)

##### [5XX Server Error](#_bookmark659)

[**307**](#_bookmark659)

|  |  |
| --- | --- |
| [**500**](#_bookmark659) | [Internal Server Error](#_bookmark659) |
| [**501**](#_bookmark659) | [Not Implemented](#_bookmark659) |
| [**502**](#_bookmark659) | [Bad Gateway](#_bookmark659) |
| [**503**](#_bookmark659) | [Service Unavailable](#_bookmark659) |
| [**504**](#_bookmark659) | [Gateway Timeout](#_bookmark659) |
| [**505**](#_bookmark659) | [HTTP Version Not Supported](#_bookmark659) |
| [**506**](#_bookmark659) | [Variant Also Negotiates](#_bookmark659) |
| [**507**](#_bookmark659) | [Insufficient Storage](#_bookmark659) |
| [**508**](#_bookmark659) | [Loop Detected](#_bookmark659) |
| [**510**](#_bookmark659) | [Not Extended](#_bookmark659) |
| [**511**](#_bookmark659) | [Network Authentication Required](#_bookmark659) |
| [**599**](#_bookmark659) | [Network Connect Timeout Error](#_bookmark659) |

[**308**](#_bookmark659)

|  |  |
| --- | --- |
| [**4XX Client Error**](#_bookmark659) | |
| [**400**](#_bookmark659) | [Bad Request](#_bookmark659) |
| [**401**](#_bookmark659) | [Unauthorized](#_bookmark659) |
| [**402**](#_bookmark659) | [Payment Required](#_bookmark659) |
| [**403**](#_bookmark659) | [Forbidden](#_bookmark659) |
| [**404**](#_bookmark659) | [Not Found](#_bookmark659) |
| [**405**](#_bookmark659)  [**406**](#_bookmark659) | [Method Not Allowed](#_bookmark659)  [Not Acceptable](#_bookmark659) |
| [**407**](#_bookmark659) | [Proxy Authentication Required](#_bookmark659) |
| [**408**](#_bookmark659) | [Request Timeout](#_bookmark659) |

[HTTP STATUS CODES](#_bookmark659)

[When a browser requests a service from a web server, an error may occur.](#_bookmark659)

[This is a list of HTTP status messages that might be returned.](#_bookmark659)

[**W**](#_bookmark660)[**hat is an API?**](#_bookmark669)

[An API (Application Programming Interface) is a software intermediary that enables two applications to communicate with each other. It comprises several subroutine definitions, logs, and tools for creating application software.](#_bookmark660)

[**What is API Testing?**](#_bookmark661)

[API Testing is a kind of software testing that determines if the developed APIs meet expectations regarding the functionality, reliability, performance, and security of the application. When we are doing something with API, it means that we are skipping UI and directly get the data/info from Web Services.](#_bookmark661)

[**What are the advantages of API Testing?**](#_bookmark662)

[It is **time effective** when compared to GUI Testing. API test automation requires less code so it can provide faster and better test coverage.](#_bookmark662)

[It helps us to **reduce the testing cost**. With API Testing we can find minor bugs before the GUI Testing. These minor bugs will become bigger during the GUI Testing. So, finding those bugs in the API Testing will be cost effective to the Company.](#_bookmark662)

[It is quite helpful in **testing Core Functionality**. We can test the APIs without a user interface. In GUI Testing, we need to wait until the application is available to test the core functionalities.](#_bookmark662)

[It helps us to **reduce the risks**, because each service is tested independently then we are doing integration of two services then do integration testing. So, we cover every risk-based scenario.](#_bookmark662)

[**Why is API testing considered as the most suitable form for Automation testing?**](#_bookmark662)

[It verifies all the functional paths of the system under test very effectively. It provides the most stable interface.](#_bookmark662)

[It is easier to maintain and provides fast feedback.](#_bookmark662)

[**What are the common API testing types?**](#_bookmark662)

[*Validation Testing* *Functional Testing* *UI testing*](#_bookmark662)

[*Load testing*](#_bookmark662)

[*Runtime/ Error Detection* *Security testing*](#_bookmark662)

[**My API testing role in my current project**](#_bookmark662)

[In terms of the API testing, I create all the required information on behalf of the customer and using the A](#_bookmark662)PI POST method I send [them to the database. I assert that the relevant information should be also visible at the UI part. Then using](#_bookmark662) API GET, PUT, DELETE [methods I verify that the implementation and end point are working correctly as expected and there are no](#_bookmark662) bugs. For this purpose.

1. [First, I check the API contract which is Swagger to make sure that end points are correct and to ensure th](#_bookmark662)at the implementation [is working as specified according to API documentation (Swagger).](#_bookmark662)
2. [Then I execute my API test via the POSTMAN (manual testing).](#_bookmark662)
3. [I write my Test Cases in the feature file using the Gherkin language. I mostly create the following test case groups:](#_bookmark662)

[Basic positive test](#_bookmark662)

[Extended positive testing with optional parameters and extra functionality. Negative testing with valid input (trying to add an existing username) Negative testing with invalid input (trying to add a username which is null)](#_bookmark662)

[Destructive testing (sending null, empty string, integer or other types, odd date format, deleting n](#_bookmark662)ecessary parameters)

[Security, authorization, and permission tests (sending valid or invalid access tokens to per](#_bookmark662)mitted or unpermitted [endpoints)](#_bookmark662)

1. [For each API request I need to check:](#_bookmark662)

[*the request and response body* whether those are as written on API documentation in terms of data](#_bookmark662) type and data structure.

[*HTTP status code*. For example, creating a resource should return 201 CREATED and unpermitted](#_bookmark662) requests should return [403 FORBIDDEN, etc.](#_bookmark662)

[*Response headers*. HTTP server headers have implications on both security and performance.](#_bookmark662)

[*Response body*. I check valid JSON body and correct field names, types, and values, including in erro](#_bookmark662)r responses.

[*authentication and authorization*](#_bookmark662)

[*Error messages*. I Check the error code coverage in case API returns any error](#_bookmark662)

[*Response time.*](#_bookmark662)

[**How can you test a webservice/API?**](#_bookmark662)

[To test an API, first I need basic information about that service. I need to know URI, headers (if](#_bookmark662) required), parameters (if required), [request schema (for POST call). I get these details from API documentation. If this is a new API](#_bookmark662) and documentation is not ready, I [ask developers to send me those details. Then first I test that service manually in Postman to m](#_bookmark662)ake sure if I can get a response from [that service. After I get a response, I check the status code of the response. It should be 2](#_bookmark662)00. If I get 200, I am sure that the [service/API is up and running then I start testing functionalities of that service. To test func](#_bookmark662)tionalities, I need to understand the [requirement. For example: For the POST call, some elements in the request schema are requir](#_bookmark662)ed and some elements are optional. [First, I test optional elements. I remove one of the optional elements and submit a request and](#_bookmark662) should be able to get a response. By [this way, I test all optional elements. Later I test required elements. I miss one of the required](#_bookmark662) elements in the request body and [send the request. I should get error code for each required element. Then I validate error cod](#_bookmark662)es. This is my negative scenario. By [this way I test headers. For example: My API requires a header: applicationID: If I pass the wro](#_bookmark662)ng application ID, I should not get a [response. Note: Usually first we test manually in postman to make sure functionality is wo](#_bookmark662)rking then we run our script. While [developers working on story, we must make our feature file, test script, test data ready. We](#_bookmark662) don't create test script/ feature file. [after developers deploy the story.](#_bookmark662)

[**How do you test rest API?**](#_bookmark662)

[I verify if each REST API endpoint is working as expected.](#_bookmark662)

[I send POST, PUT, GET, DETELE type of requests and verify response status code and response b](#_bookmark662)ody. [I also do positive and negative testing of API.](#_bookmark662)

[***When I do positive testing,***](#_bookmark662)

[I send valid request parameters, valid headers,](#_bookmark662)

[valid request JSON body to valid URL and verify that response status code is 200 and](#_bookmark662)

[JSON response body data is as expected.](#_bookmark662)

[***When I do negative testing,***](#_bookmark662)

[I send invalid request parameters, or invalid headers,](#_bookmark662)

[or invalid request JSON body and verify that response status code is not 200 and API respo](#_bookmark662)nse body contains error message. [(For example, there are 100 employees numbered from 1 to 100, I send 101 as an endpoint and I](#_bookmark662) should be able see 404 Not Found [The requested resource was not found.)](#_bookmark662)

[**What issues have you observed while performing API testing?**](#_bookmark662)

[***Absence of error handling mechanism*** - It returns the same error message for all required elements in](#_bookmark662) request body, if any of [them is missing.](#_bookmark662)

[***Redundancy of the functionalities***](#_bookmark662)

[***Missing required functionality in some cases*** - Some functionality has not been covered all requiremen](#_bookmark662)t. (Ex: System does not [filter result with date, but it works when you filter with account type)](#_bookmark662)

[***Passing incorrect argument to the input values*** - For some elements it accepts string value instead of inte](#_bookmark662)ger value or if you send [any random element in request body, application doesn't throw error for it.](#_bookmark662)

[**What kinds of bugs that API testing would often find?**](#_bookmark662)

[Incorrect handling of valid argument values- For some elements it accepts string value instead](#_bookmark662) of integer value or if you [send any random element in the request body, the application doesn't throw an error for it.](#_bookmark662)

[Response Data is not structured correctly- (JSON or XML) Missing or duplicate functionality](#_bookmark662)

[Improper errors/warning to a caller- It returns the same error message for all required elements in the req](#_bookmark662)uest body, if any of them [is missing.](#_bookmark662)

[Reliability Issues- Difficulty in connecting and getting a response from API Security Issues](#_bookmark662)

[Multi-threading issues](#_bookmark662)

[Performance Issues- API response time is very high](#_bookmark662)

[**Framework components of API testing?**](#_bookmark662)

[Create Maven Project with Cucumber and Rest Assured Dependencies. Define Project Structure with Cucumber Framework Setup](#_bookmark662)

[Create Feature File with the test case you want to Automate. Implement Smart Step Definition files with supported code Build Pojo classes for Serializing and Deserializing Json payload.](#_bookmark662)

[Implement logging into Framework to log request and response details. Develop End to End Functionality Test with all validations and Assertions. Define Global Properties and drive all the global variables from Properties file. Define Enum class with constants to centralize all resources details.](#_bookmark662)

[Implement Data driven Mechanism to drive data dynamically from Feature Files.](#_bookmark662)

[Implement Parametrization to run tests with multiple data sets using Cucumber Example Keyword. Add more tests and implement Tagging mechanism to run selected Tests from Test Runner File.](#_bookmark662)

Implement Pre and Post Conditions for tests with Cucumber hooks. Execute Complete Framework from Maven commands.

Implement maven driven global values into test for dynamic execution. Generate reports for test execution results.

Integrate the framework into Jenkins CI/CD tool.

Implement Parameterized Jenkin job to choose the global values at run time.

[**What must be checked when performing API testing?**](#_bookmark662)

[*Accuracy of data in request and response*](#_bookmark662)

[*Schema validation (Number or place of elements) HTTP status codes (200, 500 ...)*](#_bookmark662)

[*Data type, validations, order, and completeness (JSON, XML)*](#_bookmark662)

[*Authorization checks (if request is going through with or without correct/incorrect token/usernam*](#_bookmark662)*e/password )*

[*Error codes in case API returns (Error codes and error texts for each validation)*](#_bookmark662)

[**What is the best approach method to perform API testing?**](#_bookmark662)

[*Defining the accurate input parameters*](#_bookmark662)

[*Verifying the requests without required parameters or headers Defining the basic functionality and scope of the API program*](#_bookmark662)

[*Writing suitable API test cases and making use of testing techniques like equivalence class, boun*](#_bookmark662)*dary value, etc. to verify the* [*functionality*](#_bookmark662)

[*Test case execution*](#_bookmark662)

[*Testing result comparisons with the results expected*](#_bookmark662)

[*Verifying behavior* of API under conditions like the connection is not successful.](#_bookmark662)

[**What are differences between API Testing and UI Testing?**](#_bookmark662)

[API enables communication between two separate software systems. A software system implementin](#_bookmark662)g an API contains functions [or subroutines that can be executed by another software system.](#_bookmark662)

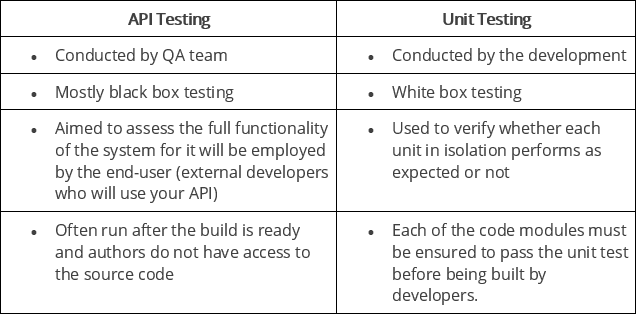
[UI (User Interface) testing refers to testing graphical interface such as how users interact with the app](#_bookmark662)lications, testing application [elements like fonts, images, layouts etc. UI testing basically focuses on look and feel of an application.](#_bookmark662)

[**What are differences between API Testing and Web Service?**](#_bookmark662)

[All Web services are APIs but not all APIs are Web services.](#_bookmark662)

[Web services](https://katalon.com/web-testing) [might not contain all the specifications and cannot perform all the tasks that APIs w](#_bookmark662)ould perform.

[A Web service uses only three styles of use: SOAP, REST and XML for communication whereas A](#_bookmark662)PI may be exposed to in multiple [ways. A Web service always needs a network to operate while APIs don’t need a network for ope](#_bookmark662)ration.

[**What are differences between API Testing and Unit Testing?**](#_bookmark662)

[**What are major challenges faced in API testing?**](#_bookmark662)

[*Selecting proper parameters and its combinations Categorizing the parameters properly*](#_bookmark662)

[*Proper call sequencing is required as this may lead to incomplete coverage in testing Verifying and validating the output*](#_bookmark662)

[*Due to absence of GUI, it is quite difficult to provide input values*](#_bookmark662)

[**Authorization vs Authentication?** authentication --> who are you authorization --> what rights do you have](#_bookmark662)

[***Authentication:***](#_bookmark662)

[It is the act of validating that users are who they claim to be. Passwords are the most common authent](#_bookmark662)ication factor—if a user [enters the correct password, the system assumes the identity is valid and grants access.](#_bookmark662)

[***Single- Factor Authentication***: This is the simplest form of authentication method which requires a passw](#_bookmark662)ord to grant user access [to a particular system such as a website or a network. In selenium, we used to enter username and pass](#_bookmark662)word like this (for basic [authentication)](#_bookmark662)

[***Two- Factor Authentication***: This authentication requires a two- step verification process which not only r](#_bookmark662)equires a username and [password, but also a piece of information only the user knows.](#_bookmark662)

[***Multi- Factor Authentication***: This is the most advanced method of authentication which requires two or](#_bookmark662) more levels of security [from independent categories of authentication to grant user access to the system. This form of authentica](#_bookmark662)tion utilizes factors that [are independent of each other to eliminate any data exposure. It is common for financial organizations, ban](#_bookmark662)ks, and law enforcement [agencies to use multiple- factor authentication.](#_bookmark662)

[***Authorization:***](#_bookmark662)

[Authorization occurs after your identity is successfully authenticated by the system, which therefore g](#_bookmark662)ives you full access to [resources such as information, files, databases, funds, etc. However, authorization verifies your rights](#_bookmark662) to grant you access to [resources only after determining your ability to access the system and up to what extent. In other wor](#_bookmark662)ds, authorization is the [process to determine whether the authenticated user has access to the resources.](#_bookmark662)

[***Basic Authentication***: HTTP Basic Authentication is rarely recommended due to its inherent secur](#_bookmark662)ity vulnerabilities. This [is the most straightforward method and the easiest. With this method, the sender places a username: pas](#_bookmark662)sword into the request [header. The username and password are encoded with Base64, which is an encoding technique that conv](#_bookmark662)erts the username and [password into a set of 64 characters to ensure safe transmission. This method does not require cookies, s](#_bookmark662)ession IDs, login pages, [and other such specialty solutions, and because it uses the HTTP header itself, there’s no need to hands](#_bookmark662)hakes or other complex [response systems. *Authorization: Basic bG9sOnNlY3VyZQ==*](#_bookmark662)

[***Bearer Token***: Bearer authentication (also called token authentication) is an HTTP authentica](#_bookmark662)tion scheme that involves [security tokens called bearer tokens. The name “Bearer authentication” can be understood as “give acc](#_bookmark662)ess to the bearer of this token.” The bearer token allows access to a certain resource or URL and most likely is a cryptic string, usually generated by the server in response to a login request. The client must send this token in the Authorization header when making requests to protected resources:

Authorization: Bearer <token> key = Authorization value = Bearer eyJhbGciOiJIUzI1NiJ9.

***API Keys:*** In REST API Security - API keys are widely used in the industry and have become some sort of standard; however, this method should not be considered a good security measure. In this method, a unique generated value is assigned to each first- time user, signifying that the user is known. When the user attempts to re-enter the system, their unique key (sometimes generated from their hardware combination and IP data, and other times randomly generated by the server which knows them) is used to prove that they’re the same user as before. Many API keys are sent in the query string as part of the URL, which makes it easier to discover for someone who should not have access to it. *Authorization: APIkey 1234567890abcdef.*

***OAuth (2.0):*** The previous versions of this spec, OAuth 1.0 and 1.0a, were much more complicated than OAuth 2.0. The biggest change in the latest version is that it’s no longer required to sign each call with a keyed hash. The most common implementations of OAuth use one or both tokens instead:

**access token** sent like an API key, it allows the application to access a user’s data; optionally, access tokens can expire.

**refresh token**: optionally part of an OAuth flow, refresh tokens retrieve a new access token if they have expired. OAuth2 combines Authentication and Authorization to allow more sophisticated scope and validity control.

OAuth 2.0 is the best choice for identifying personal user accounts and granting proper permissions. In this method, the user logs into a system. That system will then request authentication, usually in the form of a token. The user will then forward this request to an authentication server, which will either reject or allow this authentication. From here, the token is provided to the user, and then to the requester. Such a token can then be checked at any time independently of the user by the requester for validation and can be used over time with strictly limited scope and age of validity.

OAuth 2.0. allows authentication via 3rd party services, without sharing your password.

[**What’s the difference? OAuth 1.0 vs OAuth 2.0**](#_bookmark662)

[OAuth 2.0 no longer requires client applications to have cryptography. With OAuth 2.0, the app](#_bookmark662)lication can make a request using [only the issued token over HTTPS.](#_bookmark662)

[OAuth 2.0 signatures *are much less complicated*. No more special parsing, sorting, or encoding.](#_bookmark662)

[OAuth 2.0 Access *tokens are "short-lived*". Typically, OAuth 1.0 Access tokens could be stored for](#_bookmark662) a year or more. OAuth 2.0 has the [notion of refresh tokens.](#_bookmark662)

[OAuth 2.0 is meant to have a clean separation of roles between the server responsible for hand](#_bookmark662)ling OAuth requests and the server [handling user authorization. More information about that is detailed in the article.](#_bookmark662)

[**What are some architectural styles for creating a Web API?**](#_bookmark662)

[HTTP for client-server communication XML/JSON as formatting language](#_bookmark662)

[Simple URI as the address for the services Stateless communication](#_bookmark662)

[**What’s API test strategy?**](#_bookmark662)

[API testing involves APIs directly and checks whether the API meets expectations in terms of functionality,](#_bookmark662) reliability, performance, [and security of an application. My first concern is functional testing which ensures that the API functions](#_bookmark662) correctly.

[The main objectives in functional testing of the API are:](#_bookmark662)

[to ensure that the implementation is working correctly as expected - no bugs!](#_bookmark662)

[to ensure that the implementation is working as specified according to API documentation. to prevent regressions between code merges and releases.](#_bookmark662)

[I have four different process to implement.](#_bookmark662)

[**Checking API contract –SWAGER:**](#_bookmark662)

[An API is essentially a contract between the client and the server or between two applications. Before any](#_bookmark662) implementation test can [begin, it is important to make sure that the contract is correct.](#_bookmark662)

* [Endpoints are correct,](#_bookmark662)
* [Resource correctly reflects the object model (proper JSON/XML structure used in response),](#_bookmark662)
* [There is no missing functionality or duplicate functionality,](#_bookmark662)
* [Relationships between resources are reflected in the API correctly.](#_bookmark662)
* [Now, that we have verified the API contract, we are ready to think of what and how to test.](#_bookmark662)

[**Creating test cases**](#_bookmark662)

* [I mostly create:](#_bookmark662)
* [Basic positive test (happy paths)](#_bookmark662)
* [Extended positive testing with optional parameters and extra functionality.](#_bookmark662)
* [Negative testing with valid input (trying to add an existing username)](#_bookmark662)
* [Negative testing with invalid input (trying to add a username which is null)](#_bookmark662)
* [Destructive testing (sending null, empty string, integer or other types, odd date format, deleting n](#_bookmark662)ecessary parameters)
* [Security, authorization, and permission tests (sending valid or invalid access tokens to pe](#_bookmark662)rmitted or unpermitted [endpoints)](#_bookmark662)

[**Executing test cases**](#_bookmark662)

* [For each API request I need to verify:](#_bookmark662)
* I check Data accuracy: I check the request and response body whether those are as written on API documentation in terms of data type and data

structure.

* I check HTTP status code: For example, creating a resource should return 201 CREATED and unpermitted requests should return 403 FORBIDDEN, etc.
* I check Response headers: HTTP server headers have implications on both security and performance.
* I check Response body: Check valid JSON body and correct field names, types, and values - including in error responses.
* I check Authorization checks: Check authentication and authorization
* I check Error messages: Check the error code coverage in case API returns any error
* I check Response time: Implementation of response timeout

**Implementing different test flows**

***Single-step workflow***: Executing a single API request and checking the response accordingly. There is no reason to continue testing if these tests fail.

***Multi-step workflow***: Executing several requests: For example, we execute a POST request that creates a resource with id, and we then use this id to check if this resource is present in the list of elements received by a GET request. Then we use a PATCH endpoint to update new data, and we again invoke a GET request to validate the new data. Finally, we DELETE that resource and use GET again to verify it no longer exists.

***Combined API and UI test:*** This is mostly relevant to manual testing, where we want to ensure data integrity between the UI and API. We execute requests via the API and verify the actions through the UI or vice versa. The purpose of these integrity test flows is to ensure that although the resources are affected by different mechanisms the system still maintains expected integrity and consistent flow.

[**Who can use a Web API?**](#_bookmark662)

[Web API can be consumed by any clients which support HTTP verbs such as GET, PUT, DELETE, POST.](#_bookmark662) Since Web API services do [not require configuration, they can be easily used by any client. Even portable devices such as mobile](#_bookmark662) devices can easily use Web [API, which is undoubtedly the biggest advantage of this technology.](#_bookmark662)

[**Some common protocols used in API testing.**](#_bookmark662)

[Many protocols are now available to be used in API testing, such as REST, HTTP, and SOAP.](#_bookmark662)

[**What is the test environment of API?**](#_bookmark661)

[The test environment of API is a bit complete and requires the configuration of the database and s](#_bookmark661)erver, depending on the software [requirements. No GUI (Graphical User Interface) is available in this test form.](#_bookmark661)

[When the installation process is complete, API is verified for the proper operation. Throughout th](#_bookmark661)e process, the API called from the [original environment is set up with different parameters to study the test results.](#_bookmark661)

[**What are principles of an API test design?** **Setup**: Create objects, start services, initialize data, etc.](#_bookmark661)

[**Execution**: Steps to apply API or the scenario, including logging **Verification**: Oracles to evaluate the result of the execution **Reporting**: Pass, failed or blocked](#_bookmark661)

[**Clean up**: Pre-test state](#_bookmark661)

[**What is API documentation?**](#_bookmark662)

[The API documentation is a complete, accurate technical writing giving instructions on how to effectivel](#_bookmark662)y use and integrate with an [API. It has all the information needed to work with the API, and helps you answer all the API testing](#_bookmark662) questions with details on [functions, classes, return types, arguments, and examples and tutorials.](#_bookmark662)

[**What are API documentation templates that are commonly used?**](#_bookmark662)

[Swagger Miredot Slate FlatDoc](#_bookmark662)

[API blueprint RestDoc](#_bookmark662)

[**When writing API document, what must be considered?**](#_bookmark662)

[Source of the content Document plan or sketch Delivery layout](#_bookmark662)

[Information needed for every function in the document Automatic document creation programs](#_bookmark662)

[**What is REST?**](#_bookmark662)

[REST (Representational State Transfer) is an architectural style for developing web services which u](#_bookmark662)tilize the ubiquity of HTTP [protocol and uses HTTP method to define actions. It spins around resource where every component b](#_bookmark662)eing a resource that can be [accessed through a shared interface using standard HTTP methods.](#_bookmark662)

[In REST architecture, a REST Server provides access to resources and REST client accesses and makes](#_bookmark662) these resources available. [Here, each resource is identified by URIs or global IDs, and REST uses multiple ways to represent a resou](#_bookmark662)rce, such as text, JSON, and [XML. XML and JSON are nowadays the most popular representations of resources.](#_bookmark662)

[**What are RESTful Web Services?**](#_bookmark662)

[***SOAP*** (Simple Object Access Protocol) – an XML-based method to expose web services.](#_bookmark662)

[Web services developed in the ***REST*** style are referred to as RESTful web services. These web services](#_bookmark662) use HTTP methods to [implement the concept of REST architecture. A RESTful web service usually defines a URI, Uniform Resou](#_bookmark662)rce Identifier a service, [provides resource representation like JSON and a set of HTTP methods.](#_bookmark662)

[**What is a “Resource” in REST?**](#_bookmark662)

[REST architecture treats any content as a resource, which can be either text files, HTML pages, images, video](#_bookmark662)s, or dynamic business [information. REST Server gives access to resources and modifies them, where each resource is identified by](#_bookmark662) URIs/ global IDs.

[**What is the most popular way to represent a resource in REST?**](#_bookmark662)

[XML and JSON are the most popular representations of resources.](#_bookmark662)

[**Which protocol is used by RESTful Web services?**](#_bookmark662)

[RESTful web services use the HTTP protocol as a medium of communication between the client and th](#_bookmark662)e server.

[**What are some key characteristics of REST?**](#_bookmark662)

[REST is stateless, therefore the SERVER has no status (or session data)](#_bookmark662)

[With a well-applied REST API, the server could be restarted between two calls, since all data is transferr](#_bookmark662)ed to the server [Web service uses POST method primarily to perform operations, while REST uses GET for accessing res](#_bookmark662)ources.

[**What is messaging in RESTful Web services?**](#_bookmark662)

[RESTful web services use the HTTP protocol as a communication tool between the client and the server.](#_bookmark662) The technique that when [the client sends a message in the form of an HTTP Request, the server sends back the HTTP reply is](#_bookmark662) called Messaging. These [messages comprise message data and metadata, that is, information on the message itself.](#_bookmark662)

[**What are the core components of an HTTP request?**](#_bookmark662)

[HTTP methods like GET, PUT, POST, DELETE.](#_bookmark662)

[Uniform Resource Identifier (URI), which is the identifier for the resource on the server. HTTP Version.](#_bookmark662)

[Request Header, which carries metadata (as key-value pairs) for the HTTP Request message.](#_bookmark662) Metadata could be a client (or [browser) type, format supported by the client, format of a message body format, cache settings, and](#_bookmark662) so on.

[Request Body, which indicates the message content or resource representation.](#_bookmark662)

[**What are the most used HTTP methods supported by REST?**](#_bookmark662)

[GET is only used to request data from a specified resource. Get requests can be cached and bookmar](#_bookmark662)ked. It remains in the browser [history and has length restrictions. GET requests should never be used when dealing with sensitive d](#_bookmark662)ata.

[POST is used to send data to a server to create/update a resource. POST requests are never cached](#_bookmark662) and bookmarked and do not [remain in the browser history.](#_bookmark662)

[PUT replaces all current representations of the target resource with the request payload. DELETE removes the specified resource.](#_bookmark662)

[OPTIONS is used to describe the communication options for the target resource.](#_bookmark662)

[HEAD asks for a response identical to that of a GET request, but without the response body.](#_bookmark662)

[**Which purpose does the OPTIONS method serve for the RESTful Web services?**](#_bookmark662)

[The OPTIONS Method lists down all the operations of a web service supports. It creates read-only requests](#_bookmark662) to the server.

[**What is payload in RESTful Web services?**](#_bookmark662)

[The “payload” is the data you are interested in transporting. This is differentiated from the things](#_bookmark662) that wrap the data for transport [like the HTTP/S Request/Response headers, authentication, etc.](#_bookmark662)

[**What is the upper limit for a payload to pass in the POST method?**](#_bookmark662)

[<GET> appends data to the service URL. But its size shouldn’t exceed the maximum URL length. <POST>](#_bookmark662) doesn’t have any such [limit.](#_bookmark662)

[So, theoretically, a user can pass unlimited data as the payload to POST method. But, if we consider a real](#_bookmark662) use case, then sending [POST with large payload will consume more bandwidth. It’ll take more time and present performance ch](#_bookmark662)allenges to your server. [Hence, a user should act accordingly.](#_bookmark662)

[**What is the caching mechanism?**](#_bookmark662)

[Caching is just the practice of storing data in temporarily and retrieving data from a high-performance s](#_bookmark662)tore (usually memory) [either explicitly or implicitly. When a caching mechanism is in place, it helps improve delivery speed by sto](#_bookmark662)ring a copy of the asset [you requested and later accessing the cached copy instead of the original.](#_bookmark662)

[**SOAP or Rest APIs, which method to use?**](#_bookmark662)

[**>>SOAP is the heavyweight choice** for Web service access.](#_bookmark662)

[SOAP is not very easy to implement and requires more bandwidth and resources.](#_bookmark662)

[SOAP message request is processed slower as compared to REST and it does not use web caching mechan](#_bookmark662)ism.

[If the security is a major concern and the resources are not limited, then we should use SOAP web servic](#_bookmark662)es. Like if we are creating [a web service for payment gateways, financial and telecommunication related work, then we should go](#_bookmark662) with SOAP as here high [security is needed.](#_bookmark662)

[**>>REST is easier** to use for the most part and is more flexible. Since REST uses standard HTTP, it is ***much simpler***.](#_bookmark662)

[REST is ***easier to implement***, requires less bandwidth and resources.](#_bookmark662)

[REST ***permits many different data formats*** whereas SOAP only permits XML. REST allows better support for browser clients due to its support for JSON.](#_bookmark662)

[REST has better performance and scalability. REST reads can be cached, SOAP based reads cannot be cach](#_bookmark662)ed.

[If security is not a major concern and we have limited resources. Or we want to create an API that will](#_bookmark662) be easily used by other [developers publicly then we should go with REST.](#_bookmark662)

[If we need Stateless CRUD operations, then go with REST.](#_bookmark662)

[REST is commonly used in social media, web chat, mobile services, and Public APIs like Google Maps. REST services are meant to be called by the client-side application and not the end user directly.](#_bookmark662)

[**API / HTTP STATUS CODES?**](#_bookmark662)

[**1xx → Informational**](#_bookmark662)

[**2xx → Success (request was accepted successfully)**](#_bookmark662)

[200→ Ok 201→ Created](#_bookmark662)

[202→ Accepted 204→ No Content](#_bookmark662)

[**3xx → Redirection 4xx → Client Error**](#_bookmark662)

[400-Bad Request 401-Unauthorized 403-Forbidden](#_bookmark662)

[404-Not Found](#_bookmark662)

[405-Method not Allowed](#_bookmark662)

[**5xx → Server Error**](#_bookmark662)

[500-Internal server Error 502-Bad Gateway](#_bookmark662)

[501-Not implemented 503-Service Unavailable](#_bookmark662)

[**How do you validate status code = 200 in API?**](#_bookmark662)

[*assertEquals (200, response.getStatusCode());*](#_bookmark662)

[*assertEquals (200, actualStatusCode);*](#_bookmark662)

[*assertThat().statusCode (200);*](#_bookmark662)

[**How does API Authentication work in your application?**](#_bookmark662)

[I send a get request to special API endpoint by providing valid credentials, then it will return Authoriza](#_bookmark662)tion/Access token. [I use that token in my request header and access other API endpoints.](#_bookmark662)

[I send request with that access token in the header.](#_bookmark662)

[**What kind of authentication are you using in your project?**](#_bookmark662)

[I am using basic and bearer Authentication.](#_bookmark662)

[In bearer Authentication you are sending a request like username and password to the Authenticati](#_bookmark662)on server and then [Authentication server sent you a bearer token as a request, then you are sent another request by using this](#_bookmark662) bearer token and get [response from resources. (In API classes there are a method name is getToken().it provide us access token).](#_bookmark662)

[**ENDPOINT?**](#_bookmark662)

[URI: Uniform Resource Identifier.](#_bookmark662)

[The purpose: locate a resource on the server hosting the web service. Format: URI → <protocol>://<service-name>/<ResourceType>/ResourceID Base URI / resource? Parameters](#_bookmark662)

[Path Parameter (/): identify a resource Query parameter (?): sort or filter items](#_bookmark662)

[**API Gateway?**](#_bookmark662)

[API gateway is an API management tool between API user and services. It helps to achieve:](#_bookmark662)

* [Security](#_bookmark662)
* [Manage API traffic/calls](#_bookmark662)
* [Analyze API calls](#_bookmark662)
* [Allows to make changes in services without affecting API users.](#_bookmark662)

[**What are the differences between SOAP and REST?**](#_bookmark662)

[SOAP is a protocol. SOAP was designed with a specification. It includes a WSDL file which has the required](#_bookmark662) information on what the [web service does in addition to the location of the web service.](#_bookmark662)

[REST is an Architectural style in which a web service can only be treated as a RESTful service if it follows](#_bookmark662) the constraints of being:

[*Client Server Stateless Cacheable Layered System Uniform Interface*](#_bookmark662)

[SOAP cannot make use of REST since SOAP is a protocol and REST is an architectural pattern. REST can m](#_bookmark662)ake use of SOAP as the [underlying protocol for web services, because in the end it is just an architectural pattern.](#_bookmark662)

[SOAP only permits the XML format. But REST permits many different data formats. SOAP based reads cannot be cached. But REST reads can be cached.](#_bookmark662)

[SOAP is like custom desktop application, closely connected to the server. But REST client is just like a bro](#_bookmark662)wser and uses standard [methods. An application must fit inside it.](#_bookmark662)

[SOAP is slower than REST. REST is faster than SOAP.](#_bookmark662)

[SOAP runs on HTTP but envelopes the message. But REST uses the HTTP headers to hold meta information](#_bookmark662).

[**What is API chaining?**](#_bookmark662)

[Chaining API requests is a technique where you programmatically make multiple API requests to per](#_bookmark662)form a particular function, [with each request feeding subsequent requests.](#_bookmark662)

[**Explain URI, URL and URN.**](#_bookmark662)

[URL (Uniform Resource Locator) ==>](#_bookmark662) <https://www.google.com/index.html> [URN (Uniform Resource Name) ==>](#_bookmark662) [www.google.com/index.html](http://www.google.com/index.html)

[URI (Uniform Resource Identifier) ==>](#_bookmark662) [https://www.google.com/index.html.](https://www.google.com/index.html)

[**Difference between Query and Path parameters in rest services:**](#_bookmark662)

[***Query/Request Parameters*** -> is not part of URL and passed in key+value format those parameters](#_bookmark662) must be defined by API [developer](#_bookmark662)

[*http://34.223.219.142:1212/ords/hr/employees?limit=100*](#_bookmark662)

[***Path Parameters*** -> is a part of URL and followed by the end of full resource URL](#_bookmark662)

[*http://34.223.219.142:1212/ords/hr/employees/100*](#_bookmark662)

[**What are headers in HTTP?**](#_bookmark662)

[Header is a part of API request and response that handle metadata like Content type, cache, token, passwo](#_bookmark662)rd etc. As a tester we add [required username, password, token, API key, content type to the header part of request and send it. Af](#_bookmark662)ter I received response, I [validate content type of response as well which is coming as a part of response header.](#_bookmark662)

[I am using Accept. (ContentType.JSON) type checks what I am receiving should be in JSON or XML. I am using ContentType.(ContentType.JSON) checks what I am sending should be in JSON format.](#_bookmark662)

[**End to End Testing Scenarios: UI, API, DB?**](#_bookmark662)

[End to End Testing -> Involving Functionality Plus Each Layer of Application](#_bookmark662)

1. [Go to UI -> Add an Employee](#_bookmark662)
   1. [Go to DB and verify if employee is added and all data is matching](#_bookmark662)
   2. [API -> GET request and verify if employee is added successfully and all data is matching](#_bookmark662)

[-> makes changes in front end and verify in database and REST API.](#_bookmark662)

1. [Go to UI -> add an employee: check in UI search page.](#_bookmark662)
2. [POST an employee using REST API:](#_bookmark662)
   1. [send a GET request with API and verify](#_bookmark662)
   2. [Go to DB and verify if employee is added successfully and all data is matching](#_bookmark662)
   3. [Go to front end(website) and verify that data posted is displayed](#_bookmark662)

[-> makes changes using REST API then verify in DB and UI](#_bookmark662)

1. [INSERT an employee into database:](#_bookmark662)
   1. [run select statement in DB and verify what you inserted is there in tables](#_bookmark662)
   2. [send API GET request and verify JSON is matching data you inserted to DB](#_bookmark662)
   3. [Go to front end(website) and verify that data inserted to DB is displayed](#_bookmark662)

[-> make changes in DB using SQL and verify in REST API & front end.](#_bookmark662)

[**Test flows?**](#_bookmark665)

1. [***Single-step workflow***: Executing a single API request and checking the response accordingly. Suc](#_bookmark665)h basic tests are the minimal [building blocks we should start with, and there’s no reason to continue testing if these tests fail.](#_bookmark665)
2. [***multi-step workflow*** with several requests: For example, we execute a POST request that creates a](#_bookmark665) resource with id, and we then [use this id to check if this resource is present in the list of elements received by a GET request. Then](#_bookmark665) we use a PATCH endpoint to [update new data, and we again invoke a GET request to validate the new data. Finally, we DELETE th](#_bookmark665)at resource and use GET again [to verify it no longer exists.](#_bookmark665)
3. [***Combined API and UI test***: This is mostly relevant to manual testing, where we want to ensure data](#_bookmark665) integrity between the UI and [API. We execute requests via the API and verify the actions through the UI or vice versa. The purpos](#_bookmark665)e of these integrity test flows [is to ensure that although the resources are affected via different mechanisms the system still ma](#_bookmark665)intains expected integrity and [consistent flow.](#_bookmark665)

[**What are the core components of an HTTP Response?**](#_bookmark665)

1. [**Status/Response Code** – Indicates Server status for the resource present in the HTTP request. For ex](#_bookmark665)ample, 404 means resource [not found, and 200 means response is ok.](#_bookmark665)
2. [**Response Header** – Contains metadata for the HTTP response message stored in the form of key](#_bookmark665)-value pairs. For example, [content length, content type, response date, and server type.](#_bookmark665)
3. [**Response Body** – Indicates response message content or resource representation.](#_bookmark665)

[**Which API test cases are not automatable?**](#_bookmark662)

[Generally, in API testing 95% of test cases are automatable but still there are some test scenarios that are](#_bookmark662) not automatable.

1. [**Data restricted test cases**: You can use one data only once. Ex: For registration functionality you can use](#_bookmark662) the same phone number [or email only once.](#_bookmark662)
2. [**Some system related negative scenarios**:](#_bookmark662)
   1. [**One of the services is down**: To test of we are getting correct error code when system is down](#_bookmark662)
   2. [**Service is up but its database is down**: To test of we are getting correct error code](#_bookmark662)
   3. [**Service doesn't response in a specified time limit**. We test these scenarios with the help of d](#_bookmark662)evelopers.

[**How do you use Database in your API testing?**](#_bookmark662)

[Database is the place where an application takes or saves data it uses. Let me tell you two scenarios which I rec](#_bookmark662)ently tested.

[For one of the services, I pass an element named firstName in request. And the value of that element cannot](#_bookmark662) be more than 25 [spellings. If the length of the value is more than 25, then application will keep the first 25 and truncate the res](#_bookmark662)t of it. To test this [functionality, I passed a value with 40 spellings and submitted that request and went to the database, foun](#_bookmark662)d that record and [validated if application truncated the value before it saved it in the database.](#_bookmark662)

[When we submit a GET call, we get a response and service picks that response from its database and pas](#_bookmark662)s it to us. We have [an API that returns a list of payments. We can retrieve different results based on our search criteria. (Like we](#_bookmark662) can get payments [which were made between certain dates or made from/to certain companies etc.). By using API, I retrieve a list of](#_bookmark662) payments which [were made last two months. And I write a query to retrieve the same result from the database. Then I compare the](#_bookmark662) result of Database [and API response. They should match. If API response is different than Database response it means API doesn't](#_bookmark662) pick correct data [and it is a bug.](#_bookmark662)

[Rest Assured enables you to test REST APIs using java libraries.](#_bookmark662)

[Dependencies (pom.xml):](#_bookmark662)

[**io.RestAssured**: submit request & response **io.Cucumber**](#_bookmark662)

[**Cucumber-junit cucumber-java**](#_bookmark662)

[**Jackson-databind:** serialization & deserialization **Json-path:** read value of element with Json Path. **Json-schema-validator.**](#_bookmark662)

[**Junit.**](#_bookmark662)

Plugins (marketplace): maven-compiler plugin Maven-surefire-plugin

maven-cucumber-reporting plugin.

[**How do you validate your results in API testing?**](#_bookmark662)

[Status code is the first thing I need to check once I get the response. If status code starts with 200 then g](#_bookmark662)o a little bit deeper and [validate each element in the response, I got with their JSON/xpath. Then I can make sure that I am getting](#_bookmark662) all expected elements in [response and places of elements are correct.](#_bookmark662)

[**What types of API testing have you performed?**](#_bookmark662)

1. [I have tested each **API stand alone**: Submitted request and validated elements in response, status code, optio](#_bookmark662)nal and mandatory [elements in request.](#_bookmark662)
2. [I have performed **integration/end to end testing**. I imported data to the application with an API-pos](#_bookmark662)t call. Application [processed that data then with other API call I validated result.](#_bookmark662)
3. [I tested **negative scenarios**: If we get the correct error message when service is down, or service is up b](#_bookmark662)ut database of the [applications down etc.](#_bookmark662)
4. [I **submitted a POST call**, then I checked if the data I submitted in the request body was saved in the databas](#_bookmark662)e properly.

[**How to retrieve data from a response in API?**](#_bookmark662)

[When I perform API testing, I must validate all the elements that we are getting in response. So, after I get res](#_bookmark662)ponse, I validate each [element with its JSON path to make sure there is no missing element in response and the structure of resp](#_bookmark662)onse is correct. JSON [paths should be attached to the stories in Jira as a part of acceptance criteria. Those scenarios are a part of m](#_bookmark662)y regression.

[To read elements in a JSON file, I use the **read ()** method of **JSONPath** class which is coming from the jayway](#_bookmark662) library. [Code is like this: **JSONPath.read(response, "$. JSONPath").**](#_bookmark662)

[Another way is to use methods of rest Assured class: **response.then().extract().JSONPath().getString("JS**](#_bookmark662)**ONPath");**

[**Types of API?**](#_bookmark662)

[**Public or Open APIs**: It opens to the public and everyone can use it. Companies publicly expose informa](#_bookmark662)tion and functionalities of [one or various systems.](#_bookmark662)

[**Partner APIs:** Companies allows their business partners only to use those APIs for integration of s](#_bookmark662)oftware and/or facilitate [communications](#_bookmark662)

[**Private APIs**: are used internally only in a company. No other business partners or external users can u](#_bookmark662)se that APIs. [As an answer to the questions, in my current projects we have **27** APIs, and all are private.](#_bookmark662)

[**Explain what is REST and RESTFUL?**](#_bookmark662)

[REST represents Representational State Transfer; It is a relatively new aspect of writing web API.](#_bookmark662)

[RESTFUL is referred for web services written by applying the REST architectural concept. It focuses on sys](#_bookmark662)tem resources and how [state of resource should be transported over HTTP protocol to different clients written in different lang](#_bookmark662)uage. In RESTFUL web [service HTTP methods like GET, POST, PUT and DELETE can be used to perform CRUD operations](#_bookmark662)

[**Advantages of RESTful web services?**](#_bookmark662)

[RESTful web services are **platform independent**.](#_bookmark662)

[It **can be written in any programming language** and can be executed on any platform. It provides **different data format** like JSON, text, HTML, and XML.](#_bookmark662)

[It is **fast in comparison to SOAP** because there is no strict specification like SOAP. These **are reusable**.](#_bookmark662)

[**What is an HTTP request?**](#_bookmark662)

[An HTTP request is a program that the client makes to a name host located on a server. It works as a commu](#_bookmark662)nication interface or a [request-response protocol between a client and server. The primary use of the HTTP request is to access a](#_bookmark662) resource on the server. [To initiate the HTTP request, the client uses components of a URL (Uniform Resource Locator) that also in](#_bookmark662)cludes the information [needed to access the resource. .](#_bookmark662)

[**What is the main difference between Authorization and Authentication?**](#_bookmark662)

[In the authentication process, the identity of users is checked for providing the access to the system. While in authorization process, the person’s or user’s authorities are checked for accessing the resources. In the authentication process, users or persons are verified.](#_bookmark662)

[While in this process, users or persons are validated. It is done before the authorization process.](#_bookmark662)

[While this process is done after the authentication process. Authentication determines whether the person is user or not. While it determines What permission does the user have?](#_bookmark662)

[The authentication credentials can be changed in part as and when required by the user.](#_bookmark662)

[The authorization permissions cannot be changed by user as these are granted by the owner of the system](#_bookmark662) and only he/she has the [access to change it.](#_bookmark662)

[The user authentication is visible at user end.](#_bookmark662)

[The user authorization is not visible at the user end.](#_bookmark662)

[**Logging**](#_bookmark662)

[Understanding the behaviour of the test How the APIs are behaving](#_bookmark662)

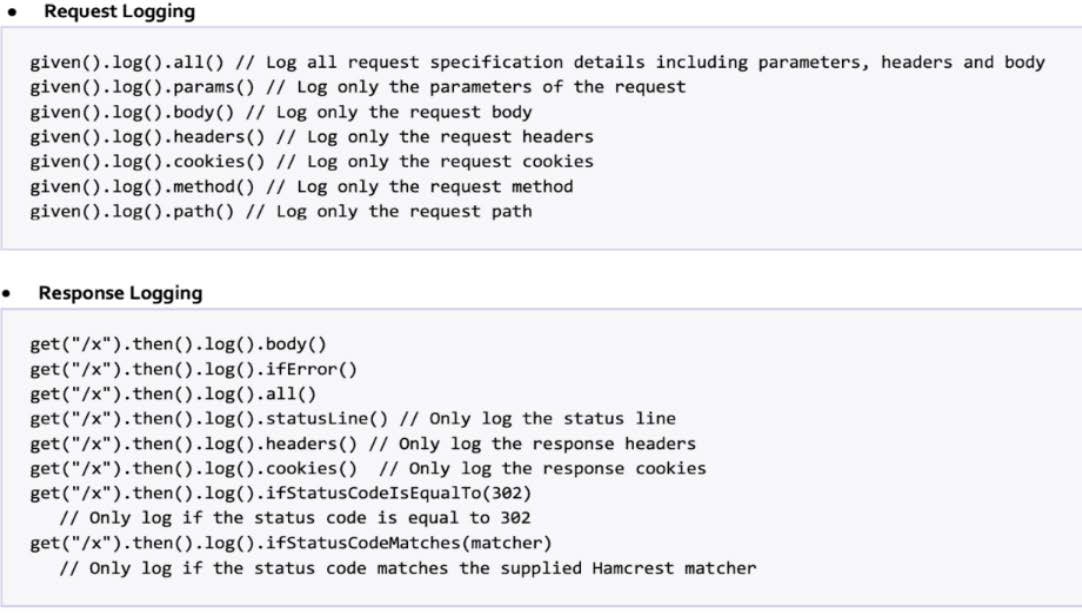
[How the request is made](#_bookmark662)

[How we received the response from API What the headers looks like](#_bookmark662)

[How the body looks like](#_bookmark662)

[What parameters are we providing to the request.](#_bookmark662)

[All this helps us in debugging the test code and to identify the reason for the failure of the test.](#_bookmark662)



[**JSON and GSON?**](#_bookmark662)

[JSON is a format which has key and values.](#_bookmark662)

[GSON is a Java library that can be used to convert Java Objects into their JSON representation. It can also b](#_bookmark662)e used to convert a JSON [string to an equivalent Java object.](#_bookmark662)

[GSON is a process of converting: from java to JSON (serialization) from JSON to java (deserialization.](#_bookmark662)

[**Types of assertions?**](#_bookmark662)

[*.and().assertThat()*](#_bookmark662)

[*.contentType("application/JSON")*](#_bookmark662)

[***Hamcrest Matchers***](#_bookmark662)

[***path()***](#_bookmark662)

[*String name = response.body().path("name[0]");*](#_bookmark662)

[***JSONPath*** *JSONPath JSONData = response.JSONPath(); JSONData.getInt("id");*](#_bookmark662)

[assertion using De-serialization with ***Collections*** (GSON --> JSON parser, object mapper)](#_bookmark662)

[*Map <String, Object> map = response.body().as(Map.class);*](#_bookmark662)

[***De-serialization with (POJO)*** *Spartan spartan1 = response.body().as(Spartan.class); Assert.assertEquals(spartan1.getName(),"Meta"); Assert.assertEquals(spartan1.getPhone(), "1234285464");*](#_bookmark662)

[***serialization***](#_bookmark662)

[*//Serialization Java object -> JSON body*](#_bookmark662)

[*Spartan spartan = new Spartan(101, "Mike", "Male", 2315462);*](#_bookmark662)

[*//converting custom class to JSON(serialization) String JSONBody = GSON.toJSON(spartan);*](#_bookmark662)

[**What is JSON?**](#_bookmark662)

[It is JavaScript Object Notation (is a minimal, readable format for structuring data.)](#_bookmark662)

[It is used primarily to transmit data between a server and web application, as an alternative to XML. A lightweight version of XML](#_bookmark662)

[In Key: Value format](#_bookmark662)

[Key is always in double quotes and value if string its double quotes and if numbers no quotes It is purely based on http protocol, - so it hits the link on the browser and see the results](#_bookmark662)

[JSON is based on JavaScript. The main difference from a JavaScript file is that JSON does not really stand](#_bookmark662) for any scripting. It is not [executable.](#_bookmark662)

[It contains states but not methods. It can have different property types like: String, Boolean, Integer. It ca](#_bookmark662)n have Arrays and Objects.

[**What is JSONPath?**](#_bookmark662)

[Another way to validate response body](#_bookmark662)

[It is an alternative to using XPath for easily getting the values from an object document.](#_bookmark662)

[used to navigate in a JSON document. Rest assured we can use the JSONpath as an operating object or as part of](#_bookmark662) the body () method [to extract values and verify.](#_bookmark662)

[JSONPath jasonPath=response.JSONpath();](#_bookmark662)

[JSON it's a data representational language, not a programming language. JavaScript natively supports JSON, bec](#_bookmark662)ause obviously JSON [is based on JavaScript. JSON is used for transferring data between server and client, client and server, server,](#_bookmark662) and server, etc...

[JSON is very light weight, language independent, easy to read and parse, plain text so it's human readable](#_bookmark662)

[Most of the languages have libraries that can parse from JSON to object (De-serialization) or from object to JS](#_bookmark662)ON (Serialization).

[**Serialization and Deserialization**](#_bookmark662)

[GSON is a Java serialization/deserialization library to convert Java Objects into JSON and back. GSON](#_bookmark662) was created by Google for [internal use and later open sourced.](#_bookmark662)

[Every language has their own library(libraries) to perform Serialization and Deserialization, in java we h](#_bookmark662)ave GSON, Jackson, etc. In [my project, we used GSON. Serialization and Deserialization not automatically means POJO->JSON JSON-](#_bookmark662)>POJO. It can be anything, [the main idea is converting POJO into streams of bytes and opposite.](#_bookmark662)

[***Serialization:***](#_bookmark662)

[Serialization in the context of GSON means mapping a Java object to its JSON representation. When we MAP a Java object to API JSON format (CONVERT JAVA OBJECT TO JSON).](#_bookmark662)

[Java object (POJO (Plain Old Java Object), BEANS) → MAP it to API JSON/XML](#_bookmark662)

[When we have an object from a class and MAP it to a JSON format in our RESTful API](#_bookmark662)

[***De-Serialization:***](#_bookmark662)

[It is converting a JSON file into Java Object.](#_bookmark662)

[Deserialization: API JSON/XML → MAP it to Java Object (JSON TO JAVA OBJECT)](#_bookmark662)

[**What’s POJO?**](#_bookmark662)

[POJO stands for Plain Old Java Object. It is an ordinary Java object. POJOs are used for increasing the](#_bookmark662) readability and re-usability [of a program.](#_bookmark662)

[Object which encapsulates Business Logic. has the same members as the database entity.](#_bookmark662)

[Pass request body to Put/Post:](#_bookmark662)

[Small request data: Create JSON content from Java Object Big request data: keep in external file and read it from there.](#_bookmark662)

[**What is Hamcrest Matcher for?**](#_bookmark662)

[Hamcrest is a framework for software tests. Hamcrest allows checking for conditions in your code via existi](#_bookmark662)ng matchers classes. It [also allows you to define your custom matcher implementations.](#_bookmark662)

[I use Hamcrest matchers with JUnit. You use the assertThat() statement followed by one or several matcher](#_bookmark662)s.

[Hamcrest is typically viewed as a third-generation matcher framework. The first generation used assert (l](#_bookmark662)ogical statement), but [such tests were not easily readable. The second generation introduced special methods for assertions, e.](#_bookmark662)g., assertEquals(). This [approach leads to lots of assert methods. Hamcrest uses assertThat method with a matcher expression to de](#_bookmark662)termine if the test was [successful.](#_bookmark662)

[**Challenge you faced during your last project**](#_bookmark662)

[API endpoints when endpoint validation was failed because there was a discrepancy in data types.](#_bookmark662)

[**What is web-services?**](#_bookmark662)

[Simply put, a web service is a resource that’s made available over the internet. Therefore, web services,](#_bookmark662) by definition, require a [network.](#_bookmark662)

[Web service is a standardized medium to generate communication between the client and server applicati](#_bookmark662)ons on the World Wide [Web.](#_bookmark662)

[Web services provide a common platform that allows multiple applications built on various programmin](#_bookmark662)g languages to have the [ability to communicate with each other.](#_bookmark662)

[Web service talks not only to the UI and database, but also it can talk to other web services to retrieve](#_bookmark662) some information. Like [google API, is very commonly used to validate email addresses or log in information in other websites. You](#_bookmark662) can log into eBay with [your Gmail where validation is done by Google.](#_bookmark662)

[Popular Web Services Protocols are SOAP, REST, and WSDL.](#_bookmark662)

[**What is XML?**](#_bookmark662)

[In computing, Extensible Markup Language (XML) is a markup language that defines a set of rules f](#_bookmark662)or encoding documents [in a format that is both human-readable and machine-readable.](#_bookmark662)

[**Stateless vs Stateful Protocols?**](#_bookmark662)

[Stateless Protocol does not require the server to retain the server information or session details. Stateful Protocol require server to save the status and session information.](#_bookmark662)

[In Stateless Protocol, there is no tight dependency between server and client. In Stateful protocol, there is tight dependency between server and client](#_bookmark662)

[Stateless Protocols works better at the time of crash because there is no state that must be restored,](#_bookmark662) a failed server can simply [restart after a crash.](#_bookmark662)

[Stateful Protocol does not work better at the time of crash because stateful server must keep the info](#_bookmark662)rmation of the status and [session details of the internal states.](#_bookmark662)

[Stateless Protocols handle the transaction very fast. Stateful Protocols handle the transaction very slowly. Stateless Protocols are easy to implement in Internet.](#_bookmark662)

[Stateful protocols are logically heavy to implement in Internet.](#_bookmark662)

[In Stateless Protocol the requests are not dependent on the server side and are self contained. In Stateful Protocol the requests are always dependent on the server side.](#_bookmark662)

[**Do you use any non-webservices API?**](#_bookmark662)

[I use Selenium API for browser, JDBC for database, and Rest Assured for API.](#_bookmark662)

[**Architecture of API application?**](#_bookmark662)

[Architecture is the design or map of an application. It shows the flow of data among functionalities/modul](#_bookmark662)es.

[***Monolithic*** application is independent single program where all modules are created together as a whole.](#_bookmark662)

[***Microservices*** design means creating a small application (services) for each module and those small applic](#_bookmark662)ations working together [in the backend.](#_bookmark662)

[**Microservices:**](#_bookmark662)

[Microservices is an architectural style that structures an application as a collection of services that are: Highly maintainable and testable](#_bookmark662)

[Loosely coupled Independently deployable](#_bookmark662)

[Organized around business capabilities Owned by a small team](#_bookmark662)

[The microservice architecture enables the rapid, frequent, and reliable delivery of large, complex applicati](#_bookmark662)ons. It also enables an [organization to evolve its technology stack.](#_bookmark662)

[Microservice is an architectural style for building applications. In microservices, application is bro](#_bookmark662)ken down to smaller [pieces/functionalities/services which act as separate/stand alone service.](#_bookmark662)

[Using microservices enables changing one service without affecting another one. Microserv](#_bookmark662)ices act as individual [applications/services and typically they have their own database.](#_bookmark662)

[**What does it mean to test micro services?**](#_bookmark662)

[Depending on the size of the project we can work on a team that only works on one microservice. Or w](#_bookmark662)e can be in a team that [handles multiple microservices.](#_bookmark662)

[Microservices are just web services. So, we treat them like any other web service while testing. To test](#_bookmark662) microservices we need [endpoints, API documentation, test cases/requirements and use tools like postman, rest assured, karate, et](#_bookmark662)c.

[In microservices, we do a lot of mocking. Mocking is imitating a service. We can do mocking with postman,](#_bookmark662) karate, etc.

[**How are you using Enum in your project?**](#_bookmark662)

[I am using content Type to make sure that my response type is JSON format](#_bookmark662)

[**How do you do UI, API, and Db testing in your framework?**](#_bookmark662)

[In my current project I have tests with UI, API, and db.](#_bookmark662)

[In some test cases even though I did not have API in test steps, I used API for test data creation. I used API, and dB when cleaning up the database after tests.](#_bookmark662)

[I used Selenium for UI, rest assured for API, jdbc for database.](#_bookmark662)

[**How do you handle environments in your projects?**](#_bookmark662)

[I have an Environment utility class which helped me handle the information related to 3 different environ](#_bookmark662)ments. This class loads [the information specific to each information from the properties file for that environment. I can pass the](#_bookmark662) environment type form [the main configuration.properties file or I can pass it from the command line. I created steps to auto gener](#_bookmark662)ate test data using API. [This way my test cases don’t have dependency on environment specific test data.](#_bookmark662)

[*baseURL=ConfigurationReader.getProperty(“passurlhere”);*](#_bookmark662)

[**How do you handle sensitive data in your framework?**](#_bookmark662)

1. [I passed sensitive data like database username and password from the terminal.](#_bookmark662)
2. [We used password encoders. We have the encoded version of the password saved in the properties file.](#_bookmark662) In the code we decode [the password before using it.](#_bookmark662)

[**What are SOAP Web services?**](#_bookmark662)

[The SOAP (Simple Object Access Protocol) is defined as an XML-based protocol. It is known for designing](#_bookmark662) and developing web [services as well as enabling communication between applications developed on different platforms using v](#_bookmark662)arious programming [languages over the Internet. It is both platform and language independent.](#_bookmark662)

[**When to use SOAP API?**](#_bookmark662)

[Use the SOAP API to create, retrieve, update, or delete records, like accounts, leads, and user-defined objects](#_bookmark662). With more than 20 [different calls, you can also use the SOAP API to manage passwords, perform searches, etc. by using the SOAP](#_bookmark662) API in any language [that supports web services.](#_bookmark662)

[**What are the elements of a SOAP message structure?**](#_bookmark662)

[It is a common XML document that contains the elements as a SOAP message](#_bookmark662)

[**Envelope**: It is an obligatory root element that translates the XML document and defines the beginning and](#_bookmark662) end of the message.

[**Header**: It is an optional item which contains information about the message being sent.](#_bookmark662)

[**Body**: It contains the XML data comprising the message being sent.](#_bookmark662)

[**Fault**: It provides the information on errors that occurred while during message processing.](#_bookmark662)

[**What are the syntax rules for a SOAP message?**](#_bookmark662)

[Must use encoded XML](#_bookmark662)

E[nvelope namespace must be used](#_bookmark662) E[ncoding namespace must be used](#_bookmark662) M[ust not consist of a DTD reference](#_bookmark662)

M[ust not have XML processing instruction](#_bookmark662)

[**What are advantages of SOAP?**](#_bookmark662)

[SOAP is both platform and language independent.](#_bookmark662)

[SOAP separates the encoding and communications protocol from the runtime environment.](#_bookmark662)

[Web service can retrieve or receive a SOAP user data from a remote service, and the source’s platform info](#_bookmark662)rmation is completely [independent of each other.](#_bookmark662)

[It uses XML to send and receive messages. It uses standard internet HTTP protocol.](#_bookmark662)

[SOAP acts as a protocol to move information in a distributed and decentralized environment. SOAP is independent of the transport protocol and can be used to coordinate different protocols.](#_bookmark662)

[**How do you send a get call in API in java?**](#_bookmark662)

[To send GET request, we need end point (URI) of that service and, I should know if that API required any H](#_bookmark662)eader or Params. Then [we need Java Rest Assured class.: *given().header(“key”, “value”).param(“key”, “value”).when().get(“URL”);*](#_bookmark662)

[**HOW TO SEND INPUT DATA IN GET?**](#_bookmark662)

[Using query parameters](#_bookmark662)

[**HOW TO SEND INPUT DATA IN POST?**](#_bookmark662)

[Using form parameters Body/Payload](#_bookmark662)

[There are two ways of passing request body to PUT or POST methods:](#_bookmark662)

1. [Keep request data in an **external file** and read that content to String then pass it to method](#_bookmark662)
2. [Create JSON content from Java Object](#_bookmark662)

[FileUtils class is an easy way to work with files. It allow you to read, write, copy the files.](#_bookmark662)

In order to use FileUtils class we need to add its dependency to pom.xml file

[**WHERE DO YOU STORE YOUR DATA?**](#_bookmark662)

[I have a where I keep the test data. We store request payloads in the JSON files. Also, in excel files of cucumb](#_bookmark662)er feature files.

[**Have you tested web services?**](#_bookmark666)

[We can test web services with soap (simple object access protocol) or rest API.](#_bookmark666)

[Postman is another API/ web services testing tool which comes with powerful HTTP client support.](#_bookmark666)

[**What are tools could be used for API testing?**](#_bookmark662)

[A few of common tools are Katalon Studio, Postman, SoapUI, APIgee, etc. While doing Unit and API tes](#_bookmark662)ting, both targets source [code.](#_bookmark662)

[**APIGEE Proxy**](#_bookmark662)

[Checks Authentication & Authorization Authentication: who are you.](#_bookmark662)

[Authorization: what rights do you have.](#_bookmark662)

[Happens after your identity is successfully authenticated by the system, and system gives you full access to re](#_bookmark662)sources (information, [files, databases, funds, etc.). It is the process to determine whether the authenticated user has access to the r](#_bookmark662)esources or not.

[Authorization verifies your rights to grant you access to resources only after successful Authentication.](#_bookmark662)

[**What is Postman?**](#_bookmark662)

[The Postman is a highly popular API testing tool that helps the development team create, share, and tes](#_bookmark662)t an API. The Postman tool [provides a GUI interface to the API and a command-line utility for experienced testers.](#_bookmark662)

[**Why do we use Postman?**](#_bookmark662)

[It is free to use software which is helpful for API testing It helps you to manage the end-to-end lifecycle of API](#_bookmark662)

[It offers Runtime Service that helps manage API collections, workspaces, environments, and different ex](#_bookmark662)amples. [You can also integrate Postman with CI/CD tools like Circle CI, Jenkins, etc.](#_bookmark662)

[It has a vast community forum that can easily address any technical issues you face while using the tool.](#_bookmark662)

[**Postman is available as a native desktop app for?**](#_bookmark662)

[Postman API testing tool is currently available for Mac, Windows (32-bit / 64-bit), and Linux (32-bit / 64](#_bookmark662)-bit).

[**What is the History tab in Postman?**](#_bookmark662)

[All the request you send in Postman appears under the History tab of the sidebar. It is very much like br](#_bookmark662)owser history, which you [can clear whenever you want.](#_bookmark662)

[**What is a collection in Postman?**](#_bookmark662)

[A collection in Postman enables you to group similar requests. It also allows you to systematically arrange the](#_bookmark662) requests into folders.

[**What is the meaning of the term environment in Postman?**](#_bookmark662)

[The environment in Postman is a set of key-value pairs. Postman allows you to build multiple environ](#_bookmark662)ments and switch among [them with a click of a button.](#_bookmark662)

[**Which kind of encoding does Postman accepts for authorization credentials?**](#_bookmark662)

[Postman only accepts Base64 encoding, which is provided inbuilt in Postman. Otherwise, it would benefit](#_bookmark662) when you use 3rd party [websites that help you to convert the credentials into base64.](#_bookmark662)

[**Why saving your work in the Postman cloud is not advisable?**](#_bookmark662)

[You should not save your work in Postman as your business details do not remain confidential. Moreov](#_bookmark662)er, saving your on-Postman [cloud may cause a security breach as it requires sign-in. Therefore, saving your work in the Postman cl](#_bookmark662)oud is not advisable.

[**What are the main disadvantages of Postman?**](#_bookmark662)

[Postman cannot process more than 1000 API requests.](#_bookmark662)

[It is not easy to manage the collections and requests in a massive size project.](#_bookmark662)

[Postman is not an ideal API tool for workspace management in the form of code as there can be lots of](#_bookmark662) code duplication while [handing the dynamic API requests.](#_bookmark662)

[**How do you do API validations?** Validate API call (request) Validate response from DB](#_bookmark662)

[API Validation:](#_bookmark662)

[Validate Json Schema](#_bookmark662)

[Actual JsonObject vs Expected Json Object (compare 2 json object)- Hashmap.](#_bookmark662)

[DB validation:](#_bookmark662)

[Expected connecting DB vs actual get API call](#_bookmark662)

[**Swagger?**](#_bookmark662)

[Swagger is a tool for API documentation.](#_bookmark662)

[Describes the structure of your APIs, description of API endpoints. You can test API manually in Swagger.](#_bookmark662)

[**How do you do basic authentication?**](#_bookmark662)

[I get the URL, username, and password from Swagger ui, enter them as query parameters, use get request](#_bookmark662) to generate an access [token.](#_bookmark662)

[**How do you use bearer token?**](#_bookmark662)

[After generating the access token, in the headers, I choose authorization as the key and enter the bearer to](#_bookmark662)ken as the value.

[**How do you create collections in Postman?**](#_bookmark662)

[By selecting + in the left bar. We can add authorization, pre-request script, variables, and tests as well to the](#_bookmark662) collections.

[**How do you group requests from different environments in Postman?**](#_bookmark662)

[We can create different environments in Postman (by clicking environment on the left side) and conduct](#_bookmark662) our validations there.

[**What are the Limits of API Usage?**](#_bookmark662)

[Many APIs have a certain limit set up by the provider. We must try to estimate our usage and understand h](#_bookmark662)ow that will impact the [overall cost of the offering. Whether this will be a problem depends in large part on how data is leveraged. G](#_bookmark662)etting caught by a quota [and effectively cut-off because of budget limitations will render the service (and any system or process de](#_bookmark662)pending on it) virtually [useless.](#_bookmark662)

[**What is HTTP, FTP, SMTP?**](#_bookmark662)

[The Hypertext Transfer Protocol (HTTP). HTTP works as a request-response protocol between a client and](#_bookmark662) server. [FTP=File transfer protocol. We use it for transfer file](#_bookmark662)

[SMTP=Simple Mail Transfer Protocol. It uses for sending or receiving email Postman support only HTTP, S](#_bookmark662)OAPUI support HTTP, [FTP, SMTP.](#_bookmark662)

[**Additional notes**](#_bookmark662)

[Big companies use database in a very simple way. Because SQL is very slow language. It doesn't have OOP c](#_bookmark662)oncept. So, instead of [doing manipulation in database, companies would rather to do in Web Services. Because they use Java, Python](#_bookmark662), C++ in web service [layer and those are much faster than SQL.](#_bookmark662)

[JDBC is an API. It is enables Java to interact with the Oracle Database.](#_bookmark662)

[Applications such as Uber and Waze pay some money to google and get the permission to access google map](#_bookmark662)s API to use in their [own application. This communication is provided by API.](#_bookmark662)

[Or Google use other newspapers to publish news on Google news. Google simply connects to these news sour](#_bookmark662)ces (CNN, Fox, New [York Times) by using API.](#_bookmark662)

[**How often are the APIs changed and, more importantly, deprecated?**](#_bookmark662)

[APIs can and do change for various reasons, sometimes abruptly, and hence REST APIs do not differ fr](#_bookmark662)om traditional integration [methods in this respect. If an API call is out of date and disappears, your procedure will interrupt, and it is i](#_bookmark662)mportant to understand [how often the APIs you depend on change or are deprecated.](#_bookmark662)

[**Popular Authentication Techniques-**](#_bookmark662)

[Password-Based Authentication Passwordless Authentication](#_bookmark662)

[2FA/MFA (Two-Factor Authentication / Multi-Factor Authentication) Single sign-on (SSO)](#_bookmark662)

[Social authentication](#_bookmark662)

[**Popular Authorization Techniques-**](#_bookmark662)

[Role-Based Access Controls (RBAC) SON web token (JWT) Authorization SAML Authorization](#_bookmark662)

[OpenID Authorization OAuth 2.0 Authorization](#_bookmark662)

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[regular expression in testing.xml file to search @Test methods containing” smoke”](#_bookmark831)keyword? [What is the use of @Test(threadPoolSize=someInteger)?](#_bookmark832)

[How to do parallel testing with Junit?](#_bookmark833) [What is the TestNG framework?](#_bookmark834)

1. [What is TestNG?](#_bookmark788)
   * [TestNG is an automation testing framework in which NG stands for "Next Generation". TestNG is inspired from JUnit which uses the annotations (@).](#_bookmark788)
   * [TestNG is a testing framework](#_bookmark788)
   * [Centralized controller: manage and run different test cases then create reports, logs](#_bookmark788)
   * [Optional execution: we can skip some test cases](#_bookmark788)
2. [What are assertions in TestNG?](#_bookmark788)
   * [We ran the test and the title test case failed. It will not affect the other test cases, so we don't want our script to stop.](#_bookmark788)

* [***Assert***](#_bookmark788)
  + [It Asserts that the condition is true. If it isn't, an AssertionError is thrown, and that scenario is marked as failed.](#_bookmark788)
* [***SoftAssert***](#_bookmark788)
  + [Soft Assert does not throw an exception when an assert fails and would continue with the next step after the assert statement.](#_bookmark788)

1. [Difference between JUnit and TestNG?](#_bookmark788)
   * [Annotations.](#_bookmark788)
     + [**JUnit**: @Test, @BeforeClass, @AfterClass, @**Before**, @**After**, @**Ignore**](#_bookmark788)
     + [**TestNG**: @Test, @**BeforeTest**, @BeforeClass, @**BeforeSuite**, @**BeforeMethod**, @**AfterTest**, @AfterClass, @**AfterSuite**, @**AfterMethod**](#_bookmark788)
   * [Both are testing framework to help us run automation scripts.](#_bookmark788)
   * [TestNG provides html report](#_bookmark788)
   * [TestNG has @Dataprovider annotation](#_bookmark788)
   * [In TestNG, we can do parallel testing, but JUnit doesn't support parallel test.](#_bookmark788)
   * [TestNG and JUnit both have parameterize testing, but TestNG parameterized test configuration is very easy to configure with help of @DataPrivider](#_bookmark788)
2. [Cross Browser and Parallel Test?](#_bookmark788)
   * [My previous project I used testng.xml file.](#_bookmark788)
   * [Basically, inside the suite there are 3 keys (name, thread count, parallel) and I created 2 different tests, one of them is for Chrome and the other one is for Firefox.](#_bookmark788)
   * [There is also parameter annotation and includes name and value; name is browser and value are Chrome.](#_bookmark788)
3. [What are the different ways to produce reports for TestNG results?](#_bookmark788)

[The TestNG library brings a very convenient reporting feature. Once I execute my tests, TestNG generates a test output folder at the root of the project. It combines two kinds of reports.](#_bookmark788)

[**Detailed Report** -You can find this report in the](#_bookmark788)

[<index.html> file. It combines the detailed information like the errors, test groups, execution time, step-by-step logs and TestNG XML file.](#_bookmark788)

[**Summary Report**- It is the trimmed version and informs about the no. of “Passed”/”Failed”/”Skipped” cases. You can see it from the <emailable-report.html> file. It’s an email friendly report which you can embed and share with the stakeholders.](#_bookmark788)

[**Listener**- is defined as an interface that modifies the default TestNG behavior. As the name suggests Listeners "listen" to the event defined in the selenium script and behave accordingly. It is used in selenium by implementing Listeners Interface. It allows customizing TestNG reports or logs.](#_bookmark788)

1. [What are some advantages of using the TestNG framework?](#_bookmark788)
   * [TestNG is an open-source framework that helps create test cases in a systematic way.](#_bookmark788)
   * [TestNG has more annotations which makes the test case creation easy.](#_bookmark788)
   * [When using TestNG, priorities of the tests and the sequence of execution can be defined.](#_bookmark788)
   * [Grouping is possible with TestNG.](#_bookmark788)
   * [TestNG generates HTML reports (Selenium Webdriver cannot generate the test reports alone, TestNG helps SW to achieve this).](#_bookmark788)
   * [Data parameterization is possible using TestNG.](#_bookmark788)
2. [What is the difference between @BeforeMethod and @BeforeTest?](#_bookmark788)

[@**BeforeMethod** It will be called before every method annotated with @Test, if you have 10 @Test methods it will be called 10 times.](#_bookmark788)

[@**BeforeTest**: It will be called Only one time before any test methods, no matter how many methods annotated with @Test, it will be called only one time.](#_bookmark788)

1. [What is a suite file?](#_bookmark788)

[In a Selenium TestNG project, I use testng.xml file to configure the complete test suite in a single file.](#_bookmark788)

1. [How to create and run testng.xml?](#_bookmark788)

[In the TestNG framework, I need to create a testng.xml file to create and handle multiple test classes. I configure my test run, set test dependency, include, or exclude any test, method, class, or package and set priority etc. in the xml file.](#_bookmark788)

1. [What is the importance of the testng.xml file?](#_bookmark788)
   * [Allows to include or exclude the execution of test methods and test groups](#_bookmark788)
   * [Allows to pass parameters to the test cases](#_bookmark788)
   * [Allows to add group dependencies](#_bookmark788)
   * [Allows to add priorities to the test cases](#_bookmark788)
   * [Allows to configure parallel execution of test cases](#_bookmark788)
2. [How do you pass values from an xml file and execute tests using them?](#_bookmark788)
   * [TestNG allows users to pass values to test methods as arguments by using parameter annotations through testng.xml file.](#_bookmark788)
   * [@Parameters annotation can be placed on any method that has a @Test, @Before/After annotation.](#_bookmark788)

[*public class TestParameters { @Parameters({ "browser" }) @Test*](#_bookmark788)

[*public void testCaseOne(String browser) { System.out.println("browser passed as :- " + browser);*](#_bookmark788)

[*}*](#_bookmark788)

[*password) {*](#_bookmark788)

[*@Parameters({ "username", "password" }) @Test*](#_bookmark788)

[*public void testCaseTwo(String username, String*](#_bookmark788)

[*System.out.println("User Name is " + username); System.out.println("Parameter is " + password);}}*](#_bookmark788)

1. [How will you control data using XML?](#_bookmark788)

[The XML parameters are mapped to the Java parameters in the same order as they are found in the annotation, and TestNG will issue an error if the numbers don't match.](#_bookmark788)

[In testng.xml, parameter values can be set at both suite and test level. If I have two parameters with the same name, the one defined in will have the precedence.](#_bookmark788)

[*<!DOCTYPE suite SYSTEM "*](#_bookmark788)[*http://testng.org/testng-*](http://testng.org/testng-)

[*1.0.dtd">*](#_bookmark788)

[*<suite name="Parameterization Test Suite">*](#_bookmark788)

[*<test name="Testing Parameterization">*](#_bookmark788)

[*<parameter name="browser" value="Firefox"/>*](#_bookmark788)

[*<parameter name="username" value="testuser"/>*](#_bookmark788)

[*<parameter name="password" value="testpassword"/>*](#_bookmark788)

[*<classes>*](#_bookmark788)

[*class name="com.parameterization.TestParameters" />*](#_bookmark788)

[*</classes>*](#_bookmark788)

[*</test>*](#_bookmark788)

[*</suite>*](#_bookmark788)

1. [How to skip/exclude/block particular Test method/Class from execution in TestNG?](#_bookmark788)

[I skip/exclude a particular test method/class by using](#_bookmark788)

[**Exclude** tag in my testng.xml](#_bookmark788)

[<suite name="Sample Test Suite" >](#_bookmark788)

[<test name="Exclude Test" >](#_bookmark788)

[<classes>](#_bookmark788)

[<class name="AddTestCase">](#_bookmark788)

[<methods>](#_bookmark788)

[<include name="addDepartment" />](#_bookmark788)

[**<exclude name="addEmployee" />**](#_bookmark788)

[</methods>](#_bookmark788)

[</class>](#_bookmark788)

[</classes>](#_bookmark788)

[</test>](#_bookmark788)

[</suite>](#_bookmark788)

1. [How do you run multiple TestNG Suite Files?](#_bookmark788)

[I have to configure my testng.xml file](#_bookmark788)

[<?xml version="1.0" encoding="UTF-8"?>](#_bookmark788)

[<!DOCTYPE suite SYSTEM "](#_bookmark788)<http://testng.org/testng->

[1.0.dtd">](#_bookmark788)

[<suite name="MultipleSuite">](#_bookmark788)

[<suite-files>](#_bookmark788)

[**<suite-file path="regression.xml"></suite-file>**](#_bookmark788)

[**<suite-file path="smoke.xml"></suite-file>**](#_bookmark788)

[**<suite-file path="sanity.xml"></suite-file>**](#_bookmark788)

[</suite-files>](#_bookmark788)

[</suite>](#_bookmark788)

1. [How to disable a test case in TestNG?](#_bookmark788)

[To disable a test case, I use the parameter enabled = false on the @Test annotation.](#_bookmark788)

[*@Test(enabled = false)*](#_bookmark788)

[After version 6.13 we can use @Ignore annotation to achieve the same thing, as well as Disable whole package, class, and child classes.](#_bookmark788)

1. [How do you set test case priority in TestNG?](#_bookmark788)

[I use the priority attribute to the @Test annotations. In case priority is not set then the test scripts execute in alphabetical order.](#_bookmark788)

[*@Test*](#_bookmark788)

[*public void firstTest() { System.out.println("First Test");} @Test(priority = 1) // Assigning the Priority public void secondTest() { System.out.println("Second Test");}*](#_bookmark788)

1. [How to run a group of test cases using TestNG?](#_bookmark788)

[TestNG allows me to perform groupings of test methods using “groups”](#_bookmark788)

[*@Test(****groups={"Smoke","Regression"})*** *public void helloTest1() {*](#_bookmark788)

[*System.out.println("This test belongs to group 1");} @Test****(groups= {"Regression"})***](#_bookmark788)

[*public void helloTest2() {*](#_bookmark788)

[*System.out.println("This test belongs to group 2");}*](#_bookmark788)

1. [How to make a test dependent on another?](#_bookmark788)

[I can enforce TestNG’s dependency feature using the “**dependsOnMethods**” attribute to declare dependencies of a test method.](#_bookmark788)

[*@Test*](#_bookmark788)

[*public void stepOne() { System.out.println("Executing stepOne");} @Test(****dependsOnMethods = { "stepOne" }****) public void stepTwo() {*](#_bookmark788)

[*System.out.println("Executing stepOne->stepTwo");} @Test(****dependsOnMethods = { "stepOne", "stepTwo"***](#_bookmark788)

[***}****)*](#_bookmark788)

[*public void stepThree() {*](#_bookmark788)

[*System.out.println("Executing stepOne->stepTwo-*](#_bookmark788)

[*>stepThree");}*](#_bookmark788)

1. [How to execute the same test multiple times?](#_bookmark788)

[I use the **invocationCount** attribute with @Test method itself @Test(***invocationCount=10***) // This method will we executed 10 times](#_bookmark788)

1. [How to run test cases in parallel using TestNG?](#_bookmark788)

[I use “**parallel**” attribute in testng.xml to accomplish parallel test execution in TestNG](#_bookmark788)

[***tests*** – All the test cases inside <test> tag of testng.xml file will run parallel](#_bookmark788)

[***classes*** – All the test cases inside a java class will run parallel methods – All the methods with @Test annotation will execute parallel](#_bookmark788)

[***<suite name="SmokeSuite" parallel="methods">***](#_bookmark788)

1. [**How can you create a data driven framework using TestNG?** Data Driven framework is focused on separating the test scripts logic and the test data from each other. It allows me to create test automation scripts by passing different sets of test data. The test data set is kept in the external files or resources such as MS](#_bookmark788)

[Excel Sheets, MS Access Tables, SQL Database, XML files etc.](#_bookmark788)

1. [What will be the logic behind fetching data from a data provider and inserting it on UI?](#_bookmark788)

[Data-driven concept is achieved by @DataProvider annotation in TestNG. The @Test method that wants to receive data from this DataProvider needs to use a DataProvider name equals to the name of this annotation.](#_bookmark788)

[If you want to provide the test data, the DataProvider way, then we need to declare a method that returns the data set in the form of a two dimensional object array Object [][].](#_bookmark788)

[*@Test(****dataProvider="getData")***](#_bookmark788)

[*public void test1(String UID, String PWD) { System.out.println("testing using "+ UID+" and*](#_bookmark788)

[*"+PWD);}*](#_bookmark788)

[***@DataProvider***](#_bookmark788)

[*public Object[][] getData() { Object[][] data=new Object[2][2]; data[0][0]="UID 1";*](#_bookmark788)

[*data[0][1]="PWD 1";*](#_bookmark788)

[*data[1][0]="UID 2";*](#_bookmark788)

[*data[1][1]="PWD 2";*](#_bookmark788)

[*return data; }*](#_bookmark788)

Example: DataProvider Scenario with Excel

Functions to read Excel:

*public void openExcel(String xlPath, String sheetName)*

*{*

*try {*

*fis = new FileInputStream(xlPath);*

*wb = new XSSFWorkbook(fis); sheet = wb.getSheet(sheetName);*

*} catch (FileNotFoundException e) { e.printStackTrace();*

*} catch (IOException e) { e.printStackTrace();}}*

*public String getExcelData(int rowNum, int cellNum) { String*

*cellValue=sheet.getRow(rowNum).getCell(cellNum).toString(); return cellValue;}*

*public int rowCount() {*

*int rowNum=sheet.getLastRowNum(); return rowNum;}*

*public int columnCount() {*

*return sheet.getRow(0).getLastCellNum();}*

Example: Creating DataProvider

*@DataProvider(name="Employee Details") public Object[][] getData(){*

\*Open excel, get count of rows and columns, Loop through all rows and columns and get value of each cell, Value from each cell will store into Object[][]

*ExcelUtility obj=new ExcelUtility();*

*yee");*

*obj.openExcel("./TestData/OrangeHRMData.xlsx","AddEmplo*

*int rows=obj.rowCount(); int cols=obj.columnCount();*

*Object[][] data=new Object[rows][cols]; for(int i=1; i<=rows; i++) {*

*for (int j=0; j<cols; j++) {*

*String value=obj.getExcelData(i, j); data[i-1][j]=value;}}*

*return data;}*

Example: Calling DataProvider in Specific Test

*@Test(dataProvider="Employee Details")*

*public void addingEmployee(String fName, String lName, String uName, String pwd) {*

*AddEmployee employee = new AddEmployee(); CommonMethods.enterValue(employee.firstName,*

*fName); lName);*

*uName); pwd);*

*CommonMethods.enterValue(employee.lastName,*

*CommonMethods.click(employee.chxLoginDetails); CommonMethods.enterValue(employee.userName,*

*CommonMethods.enterValue(employee.password,*

*CommonMethods.enterValue(employee.confPwd, pwd); CommonMethods.click(employee.btnSave);}*

1. [What is a TestNG Listener? How did you use it?](#_bookmark788)

[TestNG provides the @Listeners annotation which listens to every event that occurs in a cod Using TestNG listeners we could generate logs and customize TestNG Reports. Listeners enable us to capture console errors and take screenshots when tests fail.](#_bookmark788)

[Listeners → is an interface that modifies the default TestNG behavior.](#_bookmark788)

[Most popular Listeners are: ***IAnnotationTransformer IInvokedMethodListener ISuiteListener ITestListener >>>***](#_bookmark788)

[**OnStart**- method is called when any Test starts. **onTestSuccess**- method is called on the success of any Test. **onTestFailure**- method is called on the failure of any Test. **onTestSkipped**- method is called on skipped of any Test. **onTestFailedButWithinSuccessPercentage**- method is](#_bookmark788)

[called each time Test fails but is within success percentage.](#_bookmark788)

[**onFinish**- method is called after all Tests are executed.](#_bookmark788)

1. [How do you get a screenshot on failure?](#_bookmark788)

[Using the ITestListener interface and method onTestFailure, I can capture a screenshot of my failed test case.](#_bookmark788)

[Create method in common methods](#_bookmark788)

[*public static void takeScreenshot(String testName) { TakesScreenshot ts=(TakesScreenshot) driver;*](#_bookmark788)

[*File src= ts.getScreenshotAs(OutputType.FILE); try {*](#_bookmark788)

[*FileUtils.copyFile(src,new File("path"+testName+System.currentTimeMillis()+".png"));*](#_bookmark788)

[*} catch (IOException e) {*](#_bookmark788)

[*System.out.println("Exception while taking screenshot"+e.getMessage());}}*](#_bookmark788)

[Call method in Listener class](#_bookmark788)

[*public class Listener implements ITestListener{ @Override*](#_bookmark788)

[*public void onTestFailure(ITestResult result) { System.out.println("Test case failed:*](#_bookmark788)

[*"+result.getName());*](#_bookmark788)

[*OHRMLogin.takeScreenshot(result.getName());}}*](#_bookmark788)

[Specify Listeners in .xml file](#_bookmark788)

[*<?xml version="1.0" encoding="UTF-8"?>*](#_bookmark788)

*<!DOCTYPE suite SYSTEM "*[*http://testng.org/testng-*](http://testng.org/testng-)

*1.0.dtd">*

*<suite name="Suite" parallel="methods">*

*<listeners>*

*<listener class-*

*name="com.interview.Listeners"></listener>*

*</listeners>*

*<test name="Test">*

*<class name="com.interview.TestNgInterview" />*

*</classes>*

*</test>*

*</suite>*

1. [How to run parallel tests in TestNG?](#_bookmark788)

[Parallel Testing is a technique where you want to run multiple tests simultaneously in different threads to reduce the execution time. It allows us to run multiple tests at the same time across multiple environments instead of running tests one by one or in sequential order. Hence, it is called a parallel test execution in selenium.](#_bookmark788)

[Parallel testing helps us to run classes, test methods, tests in parallel. We can reduce the execution time as tests will get executed simultaneously by using parallel test execution.](#_bookmark788)

* 1. [We can run TestNg methods, classes, tests parallelly by using xml file](#_bookmark788)

[*---****methods***](#_bookmark788)

[***<suite name="Parallel Test Suite" parallel="methods" thread-count="3"> <test name="Test Methods">***](#_bookmark788)

[*<classes>*](#_bookmark788)

[*<class name="parallelTesting.TestMethodparallelExecution"/> </classes>*](#_bookmark788)

[*</test>*](#_bookmark788)

[*</suite>*](#_bookmark788)

[*---****classes***](#_bookmark788)

[***<suite thread-count="3" name="Parallel Test Suite" parallel="classes"> <test name = "Test Classes">***](#_bookmark788)

[*<classes>*](#_bookmark788)

[*<class name = "parallelTesting.ClassOne"/>*](#_bookmark788)

[*<class name = "parallelTesting.ClassTwo"/>*](#_bookmark788)

[*</classes>*](#_bookmark788)

[*</test>*](#_bookmark788)

[*</suite>*](#_bookmark788)

[*---****tests***](#_bookmark788)

[***<suite thread-count="3" name="Parallel Test Suite" parallel="tests"> <test name ="ClassOne">***](#_bookmark788)

[*<classes>*](#_bookmark788)

[*<class name = "parallelTesting.ClassOne"/> </ classes>*](#_bookmark788)

[*</test>*](#_bookmark788)

[*<test name = "ClassTwo">*](#_bookmark788)

[*<classes>*](#_bookmark788)

[*<class name = "parallelTesting.ClassTwo"/> </ classes>*](#_bookmark788)

*</test>*

*</suite>*

* 1. We can run single method parallely multiple times by using threadPoolSize, invocationCount

public class SingleMethodMultiThread { @Test(threadPoolSize=3,

invocationCount=3,timeOut=1000)

public void test1() {

System.out.println("From Test 1 :"+ Thread.currentThread().getName()+ " Thread id:"

+Thread.currentThread().getId());))

1. [**How to handle parallel execution and multithreading in TestNG?**](#_bookmark788)

[By using the “**parallel**” attribute we can execute our classes, test methods, and tests in parallel for Test Suite in the testng.xml file. The parallel attribute for on the <suite> tag can accept one of the following values:](#_bookmark788)

[*<suite name = “Parallel Test Suite” parallel = “****methods****” thread-count = “4”>*](#_bookmark788)

[*<suite name = “Parallel Test Suite” parallel = “****classes****” thread-count = “4”>*](#_bookmark788)

[*<suite name = “Parallel Test Suite” parallel = “****tests****” thread-count = “4”>*](#_bookmark788)

[*<suite name = “Parallel Test Suite” parallel = “****instances****” thread- count= “4”>*](#_bookmark788)

* 1. [**parallel = “methods**”: TestNG will run all the methods in parallel annotated with @Test annotation in separate threads. Dependent methods will also run-in separate threads in the specified order.](#_bookmark788)
  2. [**parallel = “classes “:** TestNG will run all the test methods in the same class in the same thread but in a separate thread each Java class will get run.](#_bookmark788)
  3. [**parallel = “Tests “:** TestNG will run all the test cases or test methods in the same <test> tag in the same thread but in different threads, each <test> tag will get run.](#_bookmark788)
  4. [**parallel = “instances “:** TestNG will run all the test cases in the same instance in the same thread, but in different threads two methods on two different instances will get run.](#_bookmark788)

1. [How to run TestNG scenarios multiple times?](#_bookmark788)

[We can run single method parallelly multiple times by using threadPoolSize, invocationCount](#_bookmark788)

[*public class SingleMethodMultiThread { @Test(****threadPoolSize=3,***](#_bookmark788)

[***invocationCount=3,timeOut=1000****)*](#_bookmark788)

[*public void test1() {*](#_bookmark788)

[*System.out.println("From Test 1 :"+*](#_bookmark788)

[*Thread.currentThread().getName()+ " Thread id:"+Thread.currentThread().getId());))*](#_bookmark788)

1. [What is Parallel Testing and Why is it important?](#_bookmark788)

[Parallel testing or parallel execution, as the name suggests, is a process of running the test case parallelly rather than one after the other. In parallel testing, the program’s multiple parts (or modules) execute together, saving the testers a lot of time and effort. The operating system’s functionalities do this, but as a user, we need to trigger parallel execution through TestNG.](#_bookmark788)

[As an example, you can think of having software with two different versions and running them in parallel with the help of TestNG. Parallel execution would give us the correct idea of the stability and performance of the software much faster than running serially. Parallel testing is used heavily with Selenium because of the importance of cross-browser testing in the market today. If we have so many browsers with a different version, we can just create a browser matrix and run the tests parallelly, saving us a ton of resources such as time.](#_bookmark788)

1. [Advantages of Parallel Testing?](#_bookmark788)

* [Reduces Time: Running the tests in parallel reduces the overall execution time.](#_bookmark788)
* [Allow Multi-Threaded Tests: Using the parallel execution in TestNG, we can allow multiple threads to run simultaneously on the test case providing independence in the execution of different components of the software.](#_bookmark788)

1. [Disadvantages of Parallel Testing?](#_bookmark789)

* [Fails On Dependent Modules: Parallel testing allows independent running of modules simultaneously. Due to this, we cannot go ahead with modules that are dependent on each other, and this occurs quite frequently while testing. So, either we run serially or dissolve independence, which takes extra time and effort.](#_bookmark789)
* [Knowledge Of Program Flow: The tester should be well- versed with the flow of the program to create parallel testing modules. A slight interdependency can bring down the whole test case execution. The tester should also know which modules to run in multiple threads and which ones to run in the same threads etc.](#_bookmark789)

1. [Where can we apply Parallel Test execution in TestNG?](#_bookmark790)

* [***Methods***: This will run the parallel tests on all @Test methods in TestNG.](#_bookmark790)
* [***Tests***: All the test cases present inside the <test> tag will run with this value.](#_bookmark790)
* [***Classes***: All the test cases present inside the classes that exist in the XML will run in parallel.](#_bookmark790)
* [***Instances***: This value will run all the test cases parallelly inside the same instance](#_bookmark790)

1. [How can we use TestNG listeners?](#_bookmark790)

* [Using <listeners> element in testng.xml](#_bookmark790)
* [Using @Listeners annotation at class level](#_bookmark790)
* [Adding listeners through TestNG addListener()API](#_bookmark790)
* [Through java.util.ServiceLoader mechanism](#_bookmark790)

1. [Give an example adding listeners in testng.xml? → very](#_bookmark790)

[**important**](#_bookmark790)

[*1.0.dtd">*](#_bookmark790)

[*<!DOCTYPE suite SYSTEM "*](#_bookmark790)[*http://testng.org/testng-*](http://testng.org/testng-)

[*<suite name="Listeners TestSuite">*](#_bookmark790)

[*<listeners>*](#_bookmark790)

[*<listener class-*](#_bookmark790)

[*name="com.testng.listeners.SuiteListener"></listener>*](#_bookmark790)

[*<listener class-*](#_bookmark790)

[*name="com.testng.listeners.TestListener"></listener>*](#_bookmark790)

[*<listener class-*](#_bookmark790)

[*name="com.testng.listeners.MethodListener"></listener>*](#_bookmark790)

[*</listeners>*](#_bookmark790)

[*<test name=" Yoll Academy Application Test 1">*](#_bookmark790)

[*<classes>*](#_bookmark790)

[*<class name="com.testng.testcases.TestYoll"></class>*](#_bookmark790)

[*</classes>*](#_bookmark790)

[*</test>*](#_bookmark790)

[*</suite>*](#_bookmark790)

1. [Give an example adding listeners using TestNG @Listeners](#_bookmark790)

[**annotation? →important**](#_bookmark790)

[*@Listeners(ExtentReportsListener.class)*](#_bookmark790)

[*public class Test7 extends ExtentReportsListener { ExtentTest test;*](#_bookmark790)

[*@Test*](#_bookmark790)

[*public void method1() { System.out.println("Actual Test"); Assert.assertTrue(true); test.log(LogStatus.INFO,"method1 started"); test.log(LogStatus.PASS," Test passed");} @Test*](#_bookmark790)

[*public void method2() { System.out.println("Actual Test 2"); Assert.assertTrue(false); test.log(LogStatus.INFO,"method2 started"); test.log(LogStatus.FAIL," Test Failed");}}*](#_bookmark790)

1. [Annotations in TestNG?](#_bookmark790)

[**Hierarchy => BeforeSuite > BeforeTest > BeforeGroups > BeforeClass > BeforeMethod>Test**](#_bookmark790)

* [@**Test** - actual test. Run in alphabetical order. By default, priority=0. If we add priority, they will run in that order (lowest-](#_bookmark790)

[>highest).](#_bookmark790)

* [@**AfterMethod** - methods with this annotation always run after the test method. Will execute after each method. Doesn’t matter if test passes or fails {close browser, log out, delete test data, report close connections}](#_bookmark790)
* [@**BeforeMethod** - executes before each method {prepare test data, set path, open browser, create connections, initialize classes, open url, login}](#_bookmark790)
* [@**BeforeClass** - executes once in the beginning {prepare test data, set path, open browser, create connections, initialize classes, open url}](#_bookmark790)
* [@**AfterClass** - executes once in the end {close browser, log out, delete test data, report close connections}](#_bookmark790)
* [(**enable = true/false**) —> true: executes the test case, false: ignore the test case](#_bookmark790)
* [(**timeout = int milliseconds**) —> The maximum number of milliseconds a test case should take](#_bookmark790)
* [(**priority = int level**) —> deciding order of execution](#_bookmark790)
* [(**description = “text”**) —> is used for the test description](#_bookmark790)
* [(**expectedexception = Exception**) —> is used for unchecked exceptions](#_bookmark790)
* [**DependsOnMethods** = “**test method name**” You can add multiple test names. If the first one fails, the 2nd test won't run at all](#_bookmark790)
* [(**invocationCount = int count**) —> decides how many times the test cases should be executed:](#_bookmark790)

1. [Difference between @Factory and @DataProvider annotations?](#_bookmark790)

* [@Factory executes all the test methods present inside a test class using a separate instance of the class with different set of data.](#_bookmark790)
* [@Factory is declared in a different class from the @BeforeClass and @TestMethod. So, @BeforeClass runs everytime whenever a data object called from the class where @Factory in it.](#_bookmark790)
* [@DataProvider is a test method that uses DataProvider will be executed the specific methods multiple number of times based on the data provided by the DataProvider.](#_bookmark790)

[@DataProvider is declared in the same class with @BeforeClass, @TestMethod. So, @BeforeClass runs only one time.](#_bookmark790)

* [By using @DataProvider annotation, we can create a Data Driven Framework.](#_bookmark790)

1. [Rerun failed test cases in TestNG and JUnit](#_bookmark790)

[**By using TestNG**](#_bookmark790)

* 1. [After the first run of an automated test run. Right click on Project - click on Refresh](#_bookmark790)
  2. [A folder will be generated named “test-output” folder. Inside “test-output” folder, you could find “testng-failed.xml”](#_bookmark790)
  3. [Run “testng-failed.xml” to execute the failed test cases](#_bookmark790)

[again.](#_bookmark790)

* + - [If you have three test cases and all the test cases are](#_bookmark790)

[executed successfully, that means you are not able to see this folder under the test-output folder. This folder will appear only when if there is a test case that failed. Then run](#_bookmark790)

[this file, it will run only failed test cases.](#_bookmark790)

[By using JUnit](#_bookmark790)

* [First, I add this line to the cukesrunner, in the plugins option: "***rerun:target/rerun.txt***" rerun creates a text file with list of failed scenarios target/rerun.txt --> location and file name](#_bookmark790)
* [Second, I create a new runner class](#_bookmark790)
  1. [Right click on runners package](#_bookmark790)
  2. [New --> java class](#_bookmark790)
  3. [Name: FailedTestRunners.java](#_bookmark790)
  4. [OK](#_bookmark790)
* [Then I add the features options to the new runner file as like: features="@target/rerun.txt" This means, run all the scenarios listed in the rerun.txt file](#_bookmark790)
* [I also change the report file path to avoid overriding the success reports.](#_bookmark790)
* [Then I add the Cukes runner and the failed test runner to the pom file inside <include> tag.](#_bookmark790)

1. [How to run Cucumber with TestNG?](#_bookmark790)

* [Add cucumber-testng maven dependency to pom.xml file (version 6.14.3)](#_bookmark790)
* [Make CukesRunner extend to AbstractTestNGCucumberTests](#_bookmark790)
  1. [cucumber-testing - > pom.xml](#_bookmark790)
  2. [CukesRunner extends AbstractTestNGCucumberTests{}](#_bookmark790)

1. [Excel in Framework](#_bookmark790)

* [Apache POI Used to read data from external sources such as excel, csv, text files.](#_bookmark790)
* [1st dependency is used to connect to Microsoft files.](#_bookmark790)
* [2nd - to connect to new office.](#_bookmark790)
* [I past the excel file in the ‘resources’ directory. Then I create a class and 3 objects:](#_bookmark790)

1. [How to write regular expression in testing.xml file to search @Test methods containing” smoke” keyword?](#_bookmark791)

* [Regular expression to find @Test method containing keyword “smoke” is a mentioned below](#_bookmark791)

[***<include name = “.\*smoke.\*”/>***](#_bookmark791)

1. [What is the use of @Test(threadPoolSize=someInteger)?](#_bookmark788)

* [The threadPoolSize attribute tells to from a thread pool to run the test method through multiple threads](#_bookmark788)
* [Note: this attribute is ignored if invocation count IS NOT SPECIFIED](#_bookmark788)

1. [How to do parallel testing with Junit?](#_bookmark788)

[if we use JUNIT, we can use maven plugins to run tests in parallel. in maven there is a plugin : maven-surefire-plugin. in this plugin we can specify how many threads we want to open at the same time.](#_bookmark788)

[*<parallel>classes</parallel>*](#_bookmark788)

[*<threadCount>5</threadCount>*](#_bookmark788)

[We also have to make some changes in Driver class. We need to use "ThreadLocal<WebDriver> driverPool" instead of "WebDriver driver". Because "WebDriver" generates only a single WebDriver object, whereas "ThreadLocal<WebDriver>" generates multiple browser to run parallel testing.](#_bookmark788)

[*ThreadLocal<WebDriver> driverPool = new ThreadLocal<>();*](#_bookmark788)

1. [What is the TestNG framework?](#_bookmark788)

[TestNG is a testing framework designed to simplify a broad range of testing needs from Unit Testing to Integration Testing. It is an open-source test automation framework for Java.](#_bookmark788)

[Whats Cucumber?](#_bookmark837)

[what are the most important things in Cucumber, what makes it unique?](#_bookmark838) [Reports in cucumber?](#_bookmark839)

[What is Gherkin?](#_bookmark840)

[What are the components of the Cucumber BDD framework?](#_bookmark841) [What does @CucumberOptions do?](#_bookmark842)

[How to run Cucumber with JUnit?](#_bookmark843)

[DDT - Data Driven Testing in Cucumber?](#_bookmark845)

[What happens if you run your runner class with no tags?](#_bookmark846) [What are Hooks in cucumber?](#_bookmark847)

[How do you take screenshots in cucumber?](#_bookmark848) [What is Background?](#_bookmark849)

[Scenario Outline vs Scenario?](#_bookmark850)

[How do I use cucumber scenario for DDT?](#_bookmark851) [Data driven approach.](#_bookmark852)

[Framework Tools: Cucumber BDD framework?](#_bookmark853) [Framework Tools: TestNG?](#_bookmark854)

[How does your framework generate reports?](#_bookmark855) [How to run tests selectively cucumber?](#_bookmark856)

[What do you use for logging?](#_bookmark857)

[How to rerun the failed tests again in Cucumber?](#_bookmark858)

[What are the basic requirements to run Cucumber Web test cases?](#_bookmark859) [What are the primary keywords in Cucumber?](#_bookmark860)

[How do you comment the code in Cucumber?](#_bookmark861) [Difference between Selenium and Cucumber.](#_bookmark862) [Difference between TDD and BDD.](#_bookmark863)

[What do you mean by profile in Cucumber?](#_bookmark864) [How Behavioral Driven Development works?](#_bookmark865)

[What is a test harness in the context of Cucumber?](#_bookmark866)

[What are some of the prerequisites that you should consider while building a Selenium Cucumber automation application?](#_bookmark867)

[How to see your reports in cucumber?](#_bookmark868) [dryRun in Cucumber?](#_bookmark869)

[Re-run Failed Tests in JENKINS](#_bookmark870) [What is Page Factory?](#_bookmark871)

[@RunWith & @CucumberOptions?](#_bookmark872) [How to use POJO in cucumber?](#_bookmark873)

[How does feature file work?](#_bookmark874) [Parallel Test in Cucumber](#_bookmark875)

[HOW YOU RUN YOUR TEST IN CUCUMBER FROM TERMINAL?](#_bookmark876)

[Why did you pick Cucumber instead of Karate in your API framework?](#_bookmark877)

#### [MAIN](#_bookmark9)

[**Tell me about Cucumber, how did you guys decide to start using Cucumber?**](#_bookmark836)

* [Cucumber is a testing tool which is used in Behavior Driven Development.](#_bookmark836)
* [Cucumber works with JUNIT and TESTNG. Cucumber is good for nontechnical people, easy reading, saves time, re-usability, maintainable, default report, easy to create smoke tests, regression using tags.](#_bookmark836)
* [One of its wonderful main features is the ability to execute plain text functional description (written in language named Gherkin) as automated tests.](#_bookmark836)
* [Writing BDD tests in Ubiquitous language, a language structured around the domain model and used by all team members including developers, testers, BAs, etc.](#_bookmark836)
* [Cucumber BDD testing tool builds bridges between the technical and nontechnical members of a software team.](#_bookmark836)
* [Finally, Cucumber is an Automated Acceptance Test Tool which running tests written in a Behavior Driven Development (BDD) style.](#_bookmark836)

1. [**Tell me what are the most important things in Cucumber, what makes it unique?**](#_bookmark836)
   * [Features file, Step Defs, Runner Classes, Hook Class, Tags](#_bookmark836)
2. [**Reports in cucumber?**](#_bookmark836)

[In my framework I can generate html and JSON reports. My reports have](#_bookmark836)

[detailed steps and the screenshot for failures in the HOOK Class.](#_bookmark836)

* [***Default cucumber html reports***. —> this is a default reporter meaning I do not need to do anything in the pom file to get this. We get this report every time when we run the cukesRunner. It does not depend on terminal or maven. Even if I run it by right clicking the cukesRunner or clicking on that green thingy, we still get the report.](#_bookmark836)
* [***Json Report***: It does not make sense to read this json report ffor us. It is mostly used from any other computer-based system such as Jenkins or Cucumber HTML Report. Those are using that '.json' reporting file in order to generate their own reports.](#_bookmark836)
* [***maven-cucumber-reporting*** —> this is a plugin in pom file. I have to add this plugin info to my pom file to make it work. We also need to add JSON option into the cukesRunner under the plugin. This report shows more metrics, pass, fail rates, enables sorting by tags. To generate this plugin, we always must run using terminal or maven](#_bookmark836)
* [***Extent Reports***: ExtentReports is a logger style API written for Java which allow to create HTML reports.](#_bookmark836)

[Go to mvn repository and search for 'extentreports' and copy and the dependency into](#_bookmark836)

[pom.xml file.](#_bookmark836)

1. [**What is Gherkin?**](#_bookmark836)
   * [Language used by feature files](#_bookmark836)
   * [Gherkin keywords are: Feature, Scenario, Given, Then, When, And, But, Background, Scenario Outline](#_bookmark836)
2. [**What are the components of the Cucumber BDD framework?**](#_bookmark836)
   * [1. Feature files](#_bookmark836)
     + [Consists of scenarios that test a certain feature or functionality](#_bookmark836)
     + [Feature is module or functionality while scenarios are the test](#_bookmark836)

[cases of user stories that belong to the feature](#_bookmark836)

* + [2. Runner class](#_bookmark836)
    - [A class that runs the tests, generates codes for step definition](#_bookmark836)
    - [Runner](#_bookmark836)
      * [I have a feature location that shows where my features](#_bookmark836)

[are located](#_bookmark836)

[definitions are located.](#_bookmark836)

* [Also have glue, which shows the folder name where step](#_bookmark836)
  + [3. Step definition](#_bookmark836)
    - [A class that made of actual implementation code for the steps listed](#_bookmark836)

[in feature file.](#_bookmark836)

* + - [Make sure the step definition is in the same package as Runner, or](#_bookmark836)

[child package (not parent or sibling)](#_bookmark836)

1. [**What does @CucumberOptions do?**](#_bookmark836)
   * [Tag used to customize the running of the cucumber tests](#_bookmark836)
   * [Inside @CucumberOptions you can add:](#_bookmark836)
     + [dryRun → enables step code generation, when set to true.](#_bookmark836)
     + [Plugin](#_bookmark836)

[scenario, method info.](#_bookmark836)

* [“Pretty”](#_bookmark836)
  + [Adds more info in the console > Gives you tag,](#_bookmark836)
  + ["html:target/cucumber report" > Generates html](#_bookmark836)

[report located in target/cucumber report folder “json:target/cucumber.json](#_bookmark836)

* + - [Tags](#_bookmark836)
      * [Tags must be in feature path](#_bookmark836)
      * [Can add multiple tags...tags= “@Dog, @Cat”](#_bookmark836)
    - [Features location of where feature files are](#_bookmark836)
    - [Glue where to look for step definition steps.](#_bookmark836)

1. [**How to run Cucumber with JUnit?**](#_bookmark844)

[Add cucumber **JUnit** dependency](#_bookmark844)

[Adding @RunWith (Cucumber.class) on top of Runner class](#_bookmark844)

1. [**DDT - Data Driven Testing in Cucumber?**](#_bookmark836)

* [Test data is separated from code and stored into external sources:](#_bookmark836)
  + [Cucumber Examples table](#_bookmark836)
  + [Excel files, CSV files](#_bookmark836)
  + [Database](#_bookmark836)
* [If the amount of data is not that huge, then I use Cucumber Scenario outline with Examples table.](#_bookmark836)
* [And other times I maintain test data in Excel files, and I use Apache POI](#_bookmark836)

[library to read and write data](#_bookmark836)

* [If data comes from a database, or I need to do database validation, I use SQL](#_bookmark836)

[queries along with JDBC library in java.](#_bookmark836)

1. [**What happens if you run your runner class with no tags?**](#_bookmark836)

[All the feature files will run from top to bottom but only the feature files that are in the @CucumberOptions](#_bookmark836)

1. [**What are Hooks in cucumber?**](#_bookmark836)

[Cucumber hook allows us to better manage the code workflow and helps us to reduce the code redundancy. We can say that it is an unseen step, which allows us to perform our scenarios or tests.](#_bookmark836)

[Class that uses](#_bookmark836)

* [@**Before** → runs before each cucumber scenario](#_bookmark836)
* [@**After** → runs after each scenario (It will always run no matter if](#_bookmark836)

[scenario passes or fails)](#_bookmark836)

[Class must be in same package as stepdefinition I implemented screenshots in the @after hook Hook Class will not run if dryRun=true](#_bookmark836)

[I use Scenario as a parameter in my @after hook](#_bookmark836)

1. [**How do you take screenshots in cucumber?**](#_bookmark836)

[In my @After hook, I use a code:](#_bookmark836)

[*public void tearDown(Scenario scenario) { if (scenario.isFailed()) {*](#_bookmark836)

[*final byte[] screenshot = ((TakesScreenshot) Driver.getInstance().getDriver()).getScreenshotAs(OutputType.BYTES);*](#_bookmark836)

[*scenario.embed(screenshot, "image/png"); } Driver.getInstance().removeDriver(); }*](#_bookmark836)

1. [**What is Background?**](#_bookmark836)

[Background in Cucumber is used to define a step or series of steps that are common to all the tests in the feature file. It allows you to add some context to the scenarios for a feature where it is defined. A Background is much like a](#_bookmark836)

[scenario containing several steps.](#_bookmark836)

1. [**Scenario Outline vs Scenario?**](#_bookmark836)

[Scenario in cucumber runs once.](#_bookmark836)

[Scenario Outline is Used for data driven testing](#_bookmark836)

[Have the same cucumber steps but we provide data after the scenario as a table using keyword examples](#_bookmark836)

1. [**How do I use cucumber scenario for DDT?**](#_bookmark836)

[In my current project I use Scenario Outline](#_bookmark836)

[In my scenario feature file, whenever I’m using a variable as a data driven, I](#_bookmark836)

[use “<variable>”](#_bookmark836)

[*| variable | column name|*](#_bookmark836)

[*| data1. | row1 |*](#_bookmark836)

[*| data 2 | row 2 |*](#_bookmark836)

[*| data3 | row3 |*](#_bookmark836)

1. [**Data driven approach?**](#_bookmark836)

[Test data is separated from code and stored into external sources: Cucumber Examples table, Excel files, CSV files, Database.](#_bookmark836)

[In my current project I achieve this by using Cucumber Scenario outline with Examples table.](#_bookmark836)

[If data comes from a database, or I need to do database validation, I use SQL](#_bookmark836)

[queries along with JDBC library in java.](#_bookmark836)

[In past projects I’ve also stored test data in Excel files, and I use Apache POI](#_bookmark836)

[library to read and write data](#_bookmark836)

1. [**Framework Tools: Cucumber BDD framework?**](#_bookmark836)

[*Junit, Cucumber, Java, Maven*](#_bookmark836)

[*Selenium, HTML reporting with screenshots Log4j Rest Assured*](#_bookmark836)

[*Git, Jenkins*](#_bookmark836)

1. [**Framework Tools: TestNG?**](#_bookmark836)

[*Java, Maven, TestNG,*](#_bookmark836)

[*Selenium, Extend Reports with screenshots Log4J Rest Assured*](#_bookmark836)

[*Git, Jenkins*](#_bookmark836)

1. [**How does your framework generate reports?**](#_bookmark836)

[Our Cucumber BDD framework generates HTML reports.](#_bookmark836)

[The report shows the pass/fail coverage for feature files, tags, steps](#_bookmark836)

[The report contains all the steps for each test The report has screenshots for failures](#_bookmark836)

1. [**How to run tests selectively cucumber?**](#_bookmark836)

[By using tags](#_bookmark836)

1. [**What do you use for logging?**](#_bookmark836)

[I use Log4J for logging. I always log important steps in the test execution. That](#_bookmark836)

[helps me to debug when there is a failure.](#_bookmark836)

[Log4J is not a replacement for HTML reports.](#_bookmark836)

[***<artifactId>log4j</artifactId>***](#_bookmark836)

[***<version>1.2.17</version>***](#_bookmark836)

1. [**How to rerun the failed tests again in Cucumber?**](#_bookmark836)

* [We must report all the failed tests using rerun option. When we run tests, all the failed scenarios will be reported in the rerun.txt file.](#_bookmark836)
* [I create another FailCukesRunner class will only runs tests listed in the](#_bookmark836)

[rerun.txt file.](#_bookmark836)

* [I add both runners in the pom.xml file and run tests using maven from terminal. Then my pom file runs the main CukesRunner first, after that it runs the failed test runner second.](#_bookmark836)
* [We use the re-run option in the CukesRunner.](#_bookmark836)
  + [I add the rerun to cukesRunner.](#_bookmark836)
  + [This option will create a file with a list of failed tests](#_bookmark836)
* [I create a second runner class which points to file with a list of failed tests](#_bookmark836)
* [I add the second runner in the pom file.](#_bookmark836)

1. [**What are the basic requirements to run Cucumber Web test cases?**](#_bookmark836)

[We need the following minimum requirements to successfully run a Cucumber Web test case:-](#_bookmark836)

[The compiler and the development kit for the programming language we will](#_bookmark836)

[be using. Example: JDK and JRE for using Java as our programming language.](#_bookmark836)

[An IDE (Integrated Development Environment) wherein we can write our code. Example: Eclipse.](#_bookmark836)

[Build tools to do tasks such as compiling code, packaging code to a jar, creating source code. Example: Maven, Gradle.](#_bookmark836)

1. [**What are the primary keywords in Cucumber?**](#_bookmark836)

[**Feature**: The Feature keyword's aim is to collect relevant scenarios and](#_bookmark836)

[provide a high-level description of a software feature.](#_bookmark836)

[Rule: The Rule keyword is used to express a single business rule that should](#_bookmark836)

[be followed. It adds to the information about a feature.](#_bookmark836)

[**Example**: This is a practical illustration of a business rule. It comprises a series of steps.](#_bookmark836)

[**Given**: The given steps are used to describe the system's initial context - the](#_bookmark836)

[scenario's scene. It usually refers to an event that occurred in the past.](#_bookmark836)

[**When**: When describing an occurrence or an action, When is employed. It could be a user interacting with the system or an event generated by another system. **Then**: Then steps are employed to indicate an anticipated outcome, or result.](#_bookmark836)

[**Background**: A background helps you to give the situations that follow it some context. It can have one or more Given steps, which are executed prior to each scenario but after any Before hooks.](#_bookmark836)

1. [**How do you comment the code in Cucumber?**](#_bookmark836)

[For Step Definition File, if you're using Java as a platform, start your comments with "/."](#_bookmark836)

[In the case of a feature file, we only need to type # before starting our comment.](#_bookmark836)

1. [**Difference between Selenium and Cucumber.**](#_bookmark836)

[Open-source testing tools, Selenium and Cucumber are both used for](#_bookmark836)

[functional testing. However, there are some distinctions between them.](#_bookmark836)

[Cucumber is a behavior-driven development automation tool that may be used with Selenium. Selenium is a web browser automation tool for web projects (or Appium).](#_bookmark836)

[Cucumber is used for acceptance testing, while Selenium is used for automated UI testing.](#_bookmark836)

[Technical teams (SDETs/programmers) favour Selenium, while non- technical teams often choose Cucumber (business stakeholders and testers).](#_bookmark836)

[Cucumber isn't required for Selenium to work. Cucumber's step-definition implementation is based on Selenium or Appium.](#_bookmark836)

[The script creation with Selenium is complicated, whereas Cucumber is straightforward.](#_bookmark836)

1. [**Difference between TDD and BDD.**](#_bookmark836)

[Test-Driven Development (TDD) is a method of developing software that is driven by tests. This means that the developers must first write the test cases before writing the code. BDD is an acronym for behavior-driven development. It's a behavior- based development approach.](#_bookmark836)

[TDD tests are developed in a variety of programming languages, including Java, .NET, Python, Ruby, and others. Given-When-Then steps are used to write BDD tests in a human-readable fashion. Non-technical people may read and comprehend these tests as well.](#_bookmark836)

[The scope is the key distinction between TDD and BDD. TDD is a development methodology. BDD, on the other hand, is a collaborative methodology.](#_bookmark836)

[When a test fails because the specified function does not exist, TDD recommends writing the simplest code possible to pass the test, then reworking to remove duplication, and so on. Creating an executable specification that fails because the feature isn't available, then writing the simplest code possible to make the spec pass in BDD. This process is repeated until a release candidate is ready to be delivered. The test cases are written by the developers in TDD. Users or testers write automated specifications in BDD, which are then wired to the code under test by](#_bookmark836)

[developers.](#_bookmark836)

[Because TDD tests are written in specific programming languages, they are difficult to interpret by non-programmers. Non-programmers can read BDD tests since they are written in a human-readable format.](#_bookmark836)

1. [**What do you mean by profile in Cucumber?**](#_bookmark836)

[When testing a feature, cucumber profiles make it simple to define groupings of tests in a feature file so that we can choose to execute only a subset of them rather than all of them. It was created to help people save time. In a cucumber.xml file, the user can reuse commonly used cucumber flags.](#_bookmark836)

1. [**How Behavioral Driven Development works?**](#_bookmark836)

[***Behaviour Description***: We list down the features of our application first in the feature file.](#_bookmark836)

[***Making the Step Definition file***: The mapping between each step of the scenario defined in the feature file and a code of the function to be executed is stored in the steps definition file.](#_bookmark836)

[***Testing and running***: We run the test cases to check if we pass. In general, a lot of failures are observed before achieving the final code.](#_bookmark836)

1. [**What is a test harness in the context of Cucumber?**](#_bookmark836)

[The test harness in Cucumber helps in separating the task of establishing the context and interacting with the browser from cleaning up the step definition files. It gathers the stubs, drivers, and other tools needed to enable test execution automation in testing.](#_bookmark836)

[The following is the purpose of the test harness: -](#_bookmark836)

[*To run a set of tests either within the framework or with the help of the test*](#_bookmark836)

[*harness*](#_bookmark836)

[*To enter data into the program being tested. Debugging becomes more flexible and supported. To record the outputs of the software under test*](#_bookmark836)

[*To keep track of the test results (pass/fail) for each test.*](#_bookmark836)

[*Aids developers in determining code coverage at the code level.*](#_bookmark836)

[The advantages of the test harness are as follows: -](#_bookmark836)

[*As a result of automation, productivity increases.*](#_bookmark836)

[*Improved software quality because of automation allows us to be more productive.*](#_bookmark836)

[*Tests can be scheduled.*](#_bookmark836)

[*Can handle complex conditions that testers have a hard time simulating.*](#_bookmark836)

1. [**What are some of the prerequisites that you should consider while building a Selenium Cucumber automation application?**](#_bookmark836)

[We consider the following before building a Selenium Cucumber automation application: -](#_bookmark836)

[*Determine the type of application you'll be testing. Is it a Web app, a mobile app, or a desktop application?*](#_bookmark836)

[*Is there a need for backend testing? Databases or SDKs, for example. Is it necessary to run the app through an internationalization test?*](#_bookmark836)

[*It must include a report that allows you to track down a problem with minimal*](#_bookmark836)

[*effort.*](#_bookmark836)

[*It must be able to generate parametrization tests automatically.*](#_bookmark836)

[*Any setup-related settings or global attributes should be defined in a config file. To segregate the functionality, use abstraction at every level.*](#_bookmark836)

1. [**How to see your reports in cucumber?**](#_bookmark836)

* [Our Cucumber BDD framework generates default HTML reports.](#_bookmark836)
* [The report shows the pass/fail coverage for feature files, tags, steps](#_bookmark836)
* [The report contains all the steps for each test. The report has screenshots for failures](#_bookmark836)
* [My framework generates cucumber reports in the target folder which contains the reports. When we run the tests on Jenkins, Jenkins saves the report of every run. Home page of the Jenkins job always points to the last run reports. All the reports for previous runs can be found under the build number.](#_bookmark836)

[Go to target folder](#_bookmark836)

[Open with system explorer](#_bookmark836)

[Go to target>cucumberreport>index shows the tests you ran.](#_bookmark836)

1. [**dryRun in Cucumber?**](#_bookmark836)

* [dryRun is used when we want to generate step definitions without running tests. If it is true, browser will not open, only the codes will be executed.](#_bookmark836)

1. [**Re-run Failed Tests in JENKINS**](#_bookmark836)

* [In Jenkins there are plugin that rerun the failed tests Unit cases.](#_bookmark836)
* [So, you can configure your Maven build execution on Jenkins using the](#_bookmark836)

[option:](#_bookmark836)

[***Dsurefire.rerunFailingTestsCount=2***](#_bookmark836)

1. [**What is Page Factory?**](#_bookmark836)

* [Page Factory is an inbuilt Page Object Model concept for Selenium WebDriver which is very optimized.](#_bookmark836)
* [It allows separation of Page Object Repository and Test Methods.](#_bookmark836)
* [Page Factory class is a class that is used to initialize the page object classes.](#_bookmark836)
* [It provides @FindBy annotation to find the WebElements.](#_bookmark836)
* [Without using the PageFactory.initElements, page object class with not](#_bookmark836)

[work as expected, for example @FindBy will not work.](#_bookmark836)

1. [**@RunWith & @CucumberOptions?**](#_bookmark836)

[*@RunWith(Cucumber.class) //RunWith comes from JUnit and triggers the execution of the test*](#_bookmark836)

[*@CucumberOptions(*](#_bookmark836)

[*plugin = {"html:target/default-cucumber-reports", //to generate report in html format*](#_bookmark836)

[*"json:target/cucumber.json", //to generate report in JSON format "rerun:target/rerun.txt" //this is for the failed test report},*](#_bookmark836)

[*features = "src/test/resources/com/vytrack/features/", //path to feature file glue = "com/vytrack/step\_definitions", //path to step definitions classes*](#_bookmark836)

[*tags = "@wiper",*](#_bookmark836)

[*dryRun = false //it can be true or false. When dryRun=true, Hook Class and any browser will not run.)*](#_bookmark836)

[*public class CukesRunner {*](#_bookmark836)

[*}*](#_bookmark836)

1. [**How to use POJO in cucumber?**](#_bookmark836)

* [I Create contactBean class](#_bookmark836)

[I Add all private variables](#_bookmark836)

[I Add the getter/setters methods](#_bookmark836)

* [I Create bean feature file](#_bookmark836)
* [I Create a table with first row containing the variables in the contactBean](#_bookmark836)

[class](#_bookmark836)

[I Add values under the table](#_bookmark836)

[I Implement method with parameter (List<ContactBean>contacts)](#_bookmark836)

* [I write the Scenario: Create contact Given I logged into suiteCRM When I save a new contact:](#_bookmark836)

[| firstName | lastName | officePhone | cellphone | email |](#_bookmark836)

[| Steve | Gates | 3456758888 | 1234329999 |](#_bookmark836)

[SteveGates@gmail.com](mailto:SteveGates@gmail.com) [|](#_bookmark836)

[Then I should see contact information for "Steve Gates"](#_bookmark836)

1. [**How does feature file work?**](#_bookmark836)
   * [Feature → description of what is being tested.](#_bookmark836)
     + [@tags, Sample feature file](#_bookmark836)
     + [Background runs before both scenarios](#_bookmark836)
   * [Scenario → description of the scenario being test](#_bookmark836)
     + [Given I am on the login page](#_bookmark836)
     + [And I enter username and password](#_bookmark836)
     + [When I click on the submit button](#_bookmark836)
     + [Then I should be able to see the Dashboard page](#_bookmark836)
   * [Given → a precondition](#_bookmark836)
   * [When → condition that triggers the expected result](#_bookmark836)
   * [Then —> expected condition](#_bookmark836)
2. [**Parallel Test in Cucumber**](#_bookmark836)

* [I use maven-surefire-plugin. This plugin executes tests in parallel. In this plugin configuration, we indicate which runner files we want to run. We can also indicate how may simultaneous tests we want to run.](#_bookmark836)

[**How to run?**](#_bookmark836)

* [We can execute tests in parallel in our framework only by running tests as a maven command](#_bookmark836)
* [mvn verify command runs the tests and generate reports](#_bookmark836)
* [mvn clean verify first deletes the target folder, then runs tests, then generates reports](#_bookmark836)

1. [**HOW YOU RUN YOUR TEST IN CUCUMBER FROM TERMINAL?**](#_bookmark836)

[Mvn verify -Dcucumber.options “--tag@smoke”-all scenario or test cases start with @smoke](#_bookmark836)

[Mvn verify -Dfile=“RegressionRunner.Java”-just run this file Mvn verify -Dbrowser=“chrome”-just run with chrome](#_bookmark836)

1. [**Why did you pick Cucumber instead of Karate in your API framework?**](#_bookmark836)

[I know automation with Karate is easy especially with non-technical people in teams however we install/download all software’s from company antifactory, and Karate is not existed there since it has never used before in our company and also, we already had a Selenium Automation Framework with Cucumber to automate GUI stories and we decided to use the same framework to automate API scenarios. Moreover, some of the scenarios are the combination of GUI and API so in my project, it is not a good idea to have separate frameworks with different tools.](#_bookmark836)

[**SQL**](#_bookmark10)

[~~-~~ **eg**](#_bookmark10)

[**CHEATSHEET**](#_bookmark10)

[Sources](#_bookmark10)

[W3S.Chools.com DataQt,u?s(.io](#_bookmark10)

[II **l!I**](#_bookmark10)



[DELETE](#_bookmark10)

[OCLITT AOlt lt),l.tl\1-](#_bookmark10)

[coll• • t.M110';](#_bookmark10)

[Examples](#_bookmark10)

["](#_bookmark10)

[Commands/ Clauses Joins](#_bookmark10)

[-l!"l -"](#_bookmark10)

[SELECT SdKtdatafromdatabase FROM Sp«jty tabl•-.w"te pullln1 from WHERE q ytol"l'Wthao::wtjtjan](#_bookmark10)

[AS RffiarMcolurrw1or with•s JOIN ComblM r&wsfrOffl 2 or more tables.](#_bookmark10)

[ANO Combine querymndltlons, Allmui.tbe met](#_bookmark10)

[OR ComblM que,yconditi<M'ls. One tl''lUtbe Met](#_bookmark10)

[LIMIT Umltrows rtturnff,SffillsoFOOi&TOP](#_bookmark10)

[**IN** Sf)((if't MultipleV111uet1/dle,t us.intWH.ERE](#_bookmark10)

[**CASE** Rewrnonlueon a sl)Kffiedrondl00'1](#_bookmark10)

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[LIKE Seird'Ifewpa.tutnsIn column COMMIT Writt tt n1.0dat11bl$e AOUBAClC Undoit tnnSktlon blodt](#_bookmark10)

[AlTtRTABl£ A6d/Remowcolumns ffom ble UPDATE Upd:netabledata](#_bookmark10)

[CREAlt CrHteTA8l£,OATABASE,INOEXor VIEW](#_bookmark10)

[DELETE Deltttrovnfrotn table](#_bookmark10)

[INSERT AddSfflC1e row to table](#_bookmark10)

[DROP DcltW:TABLE,DATABASE.or INOO(](#_bookmark10)

[GROUPBY Group dataintOIO&Jcal$tts](#_bookmark10)

[OROE:RBY order oftesult. UseDESC to revtrseordff](#_bookmark10)

[HAVING Same-WHEFI(bu't tittfft lf0Up$](#_bookmark10)

[COUNT Countnumberof rows SUM Returnsumof column AVG Return werae,e*o1*column **MIN** R urnminvalueof OOlumn **MAX** Returnm.x *v ue*ofoolumn](#_bookmark10)

[Data Definition Language](#_bookmark10)

[**LIIIIID.Jl!ll'li.**](#_bookmark10)

[**UlfUl!ll'li.**](#_bookmark10)

[**ffi**](#_bookmark10)

[**(9**](#_bookmark10)

[•](#_bookmark10)

[**Ll!WIIJl!ll'li.**](#_bookmark10)

[1 FULLOVDI\1cu..rn\_](#_bookmark10)

[Order Of Execution](#_bookmark10)

[Seka.allcolumnwithfllte,..applied](#_bookmark10)

[SELECT • FROII tb l WHERE col > 5;](#_bookmark10)

[Se14<t flnt10rowsfor twocolumns](#_bookmark10)

[SELECT coll, col2 FROM tbl UMIT lt;](#_bookmark10)

[klect .allc.olumn1 with multlpl• fllten](#_bookmark10)

[SELECT • FROM tb\](#_bookmark10)

[WHERE coll > 5 OR cot2 < 2;](#_bookmark10)

[Select.allrowsf1"6m col1 &.c:ollordffln1ll)'c:ol1](#_bookmark10)

[SELECT coll, co12 FROM tb l OROER BY l i](#_bookmark10)

[ltetum c:ountof rows Int.ablo](#_bookmark10)

[SELECT COUNT(•)](#_bookmark10)

[FR.c»t tbli](#_bookmark10)



[SELECT **Slit(** oo\1 J](#_bookmark10)

[FR.OM tbl;](#_bookmark10)

[lltetum m•• value for col1](#_bookmark10)

[SELECT **MAX(** coll)](#_bookmark10)

[FROM tb\;](#_bookmark10)

[Compute summaryst.all b)1' roupln1 col2](#_bookmark10)

[SELECT AVG(co\l) FROM tbl](#_bookmark10)

[GROUP BY co\2;](#_bookmark10)

[CREATE](#_bookmark10)

[CREATI: IMT l'l)O,ltabn•:](#_bookmark10)

[WATl!TAall'tffllb\1(](#_bookmark10)

[tel t.](#_bookmark10)

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[hb\tl'lattco\U;](#_bookmark10)

[AL.TEA](#_bookmark10)

[i\l.l\*el'ty'rMlh COU.co\S;](#_bookmark10)

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[DROP](#_bookmark10)

[IDJIOPl)AlAaA.S( tflblH;](#_bookmark10)

[DROP TAHU "fJ•blo;](#_bookmark10)

[**0** FROM](#_bookmark10)

[**0** WHERE](#_bookmark10)

[**0** GROUPBY](#_bookmark10)

[Combine *d t•*from 2 ta.blu usln1IfftJoin](#_bookmark10)

[SELECT • FROl4 tb\l AS ti LEFT JOIN](#_bookmark10)

[tb\2 AS t2 *OH* t2.coll • tl.coll;](#_bookmark10)



[SELECT coll,](#_bookmark10)

[COUNT(\*) AS total FROM tbl](#_bookmark10)

[Data Manipulation Language](#_bookmark10)

[UPDATE INSERT](#_bookmark10)

[**0** HAVING](#_bookmark10)

[**0** SELECT](#_bookmark10)

[GROUP BY co l1](#_bookmark10)

[HAVING COUNT(•) > llj](#_bookmark10)

[lmpl4!m•nt.atlonor CASls1.at•ment](#_bookmark10)

[SELECT coll,](#_bookmark10)

[Ufl'OA.Tt l'l)ITMl\t](#_bookmark10)

[SfT<o\l • S6](#_bookmark10)

[WIER£ coll - ·s-Ul\lllf:](#_bookmark10)

[INSERT 000 "t'fabb (coll, coll)](#_bookmark10)

[*VAUit$*•n\uel", 'v•lue2'l:](#_bookmark10)

[SELECT](#_bookmark10)

[SELECT c:o\l, c:o\2](#_bookmark10)

[AWN N\e;](#_bookmark10)

[**0 ORDERBY**](#_bookmark10)

[**0** LIMIT](#_bookmark10)

[CASE](#_bookmark10)

[WHEN coll > 11ntEN '110re than 11' WHEN coll < 11 TNEN "less than 11' ELSE '11'](#_bookmark10)

[END AS Newco\UMH811e](#_bookmark10)

[FROM tb\;](#_bookmark10)

[Object](#_bookmark180)

[1](#_bookmark180)

[**Error** [](#_bookmark180)

[**ThreadDeath VirtualMachineError IOError**](#_bookmark180)

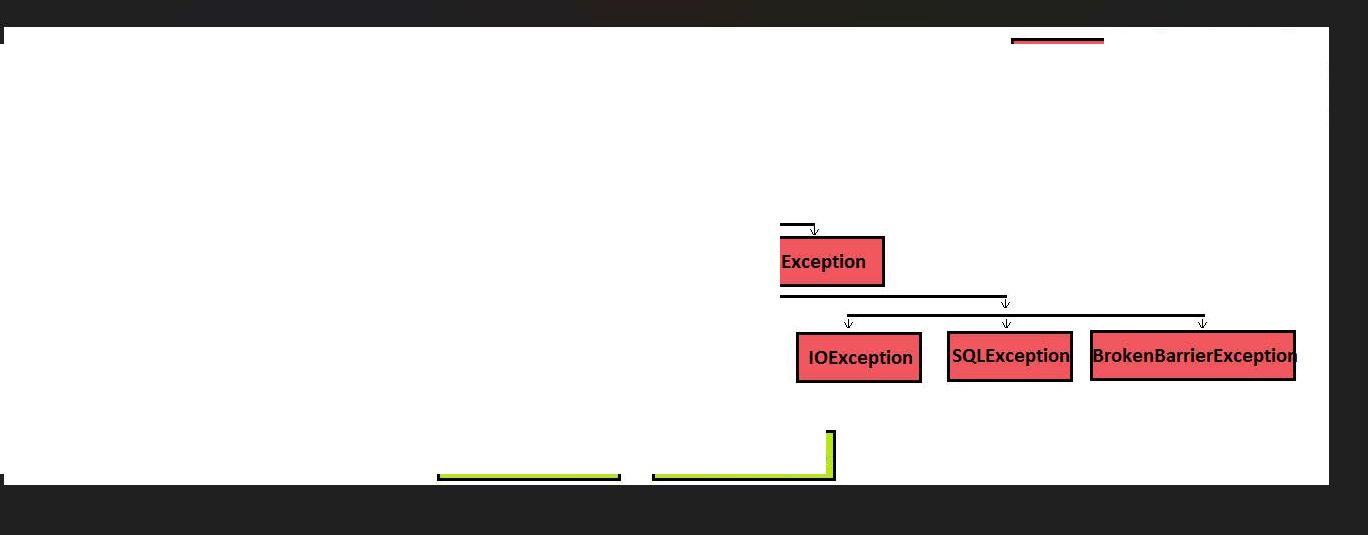
[**RuntimeException**](#_bookmark180)

checked exception\

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unchecked exception\ Runtime exception



[**OutOfMemoryError StackOverflowError**](#_bookmark180)

[**NullPointerException ArithmeticException**](#_bookmark180)