Chapters:

Trying to figure out about selenium as automation tool

I aced Selenium in my Project

Getting to Core Java

I am the Architect

What to know about APIS

What is in the DB Testing/SQL

Being a Tester

Chapter 1

Trying to figure out about selenium as automation tool

1) What is Selenium?

Selenium is a open source automation testing tool used to validate web applications across different browsers and platforms. It supports multiple programming languages like Java, C#, Python etc. to create Selenium Test Scripts.

2) What are advantages of Selenium?

* Selenium is an Open-Source Tool, so it is free to use for automating our web applications
* It supports multiple programming languages and capable to operate on almost every operating system and range of browsers.
* It is independent of the language that the web Application is using.
* It has robust Element Locators.
* Selenium support integration of Open-source frameworks like TestNg, Junit with Maven and Jenkins.
* Selenium supports Web and Mobile Applications.

3) What are Limitations of Selenium?

* Selenium supports only web-based Applications.
* It has dependency on third party tools for complete benefit.
* Selenium has no official technical support team.
* Selenium has limited Support for Image based Testing, Captcha, and bar code readers.
* Selenium has no Built-in reporting Facility.
* Also, it has challenges with IE browser.

4) What are the different Components of Selenium framework?

* Selenium IDE – It is record and play tool which will record all the user actions and play them back. Its main disadvantage is that it can’t handle the dynamic web elements and difficult to maintain and pass multiple test data
* Selenium RC – Selenium Remote Control came before selenium web driver and it allows us to automate web application UI tests with the help of multiple programming languages like java, c#, python etc. Client libraries communicate with the selenium RC Server passing each selenium command for execution, then RC Server passes the selenium command to the browser using selenium-core javascript commands and browser executes them using its javascript interpreter
* Selenium Web driver - It is a collection of Native APIs that directly interacts with Browser, and they give more control and faster than RC APIs.
* Selenium Grid -It is the tool which can distribute tests across multiple browsers or different machines.

5) What is selense?

It is a set of commands in selenium used for running a test.

* Actions- used for performing interactions and operations with target elements.
* Accessors- used for storing values in a variable.
* Assertions- used as checkpoint.

6) What are the different types of Webdriver APIs supported in selenium?

|  |  |  |
| --- | --- | --- |
| GecoDriver | Firefox driver | Firefox |
| Microsoft Webdriver | Edge, internetExplorerDriver | IE |
| Google Chrome Driver | ChromeDriver | chrome |
| HTML Unit Driver | WebClient | Chrome, FF, IE |
| Open ChromeDriver | ChromeDriver | Opera |
| Safari Driver | SafariDriver | Safari |
| Android Driver | Android Driver | Android Browser |
| IOS Driver | IOS Driver | IOS Browser |
| EventFiring WebDriver | EventFiring WebDriver | All |

7) Explain selenium webdriver

* SearchContext is super most interface in selenium, which is extended by another interface webdriver.
* All abstract methods of search context and webdriver interfaces are implemented in remote webdriver class.
* All browser related classes such as firefoxdriver etc extends remotewebdriver class.
* If we use webdriver driver = new remote webdriver( new url desiredCapabilities Firefox());) we need to mention where selenium server is located and which web browser you want to use.
* For Selenium grid we must use remotewebdriver.

A whiteboard with writing on it

Description automatically generated with medium confidence

8) What is the use of creating reference variable 'driver' of type webdriver?

* If we create a reference variable driver of type webdriver then we could use the same driver variable to work with any browser of our choice such as IEdriver, SafariDriver etc.
* WebElement in selenium represents an HTML element. It basically represents a DOM element in a html element.

9) How to Launch different browsers using selenium webdriver?

* Webdriver is an interface, we need to create object of the required driver class such as firefoxdriver, chromedriver etc.
* example: WebDriver driver= new FirefoxDriver();

10) What are different types of Locators?

* By.id()
* By.name()
* By.xpath()
* By.cssSelector()
* By.tagname()
* By.className()
* By.linkText()
* By.PartialLinkText()

11) Which locator is best to use for identifying the webelement?

* ID is the best to use as id will be unique for any webelement in the DOM and to removes the duplicate element finding issue.
* The order of using locators most likely - ID>NAME>CSS>XPATH

12) Why is CSS selector better than xpath?

* xpath engines are different un each browser , hence makes them inconsistent. IE doesn't have a native engine, therefore selenium injects its own xpath engine for compatibility of its APIs.
* Xpath tend to become complex and hence make hard to read in my opinion.

13) What is the syntax of xpath and CSS?

* driver.findElement(By.xpath("//tag[@attribute='value']"))
* driver.findElement(By.css("tag[attribute='value']"))

14) What are relative and Absolute xpaths?

* Absolute Xpath is the direct way to find element. The disadvantage of absolute xpath is that for any change made in the path of the element then xpath will fail. It starts with root node or a single forward slash(/).
* Relative Xpath is a url that contains a portion of full path and it is alternatively referred as partial path/ non- absolute path.
* A Relative path is used to specify the location of a directory relative to another directory. A relative path starting from element you want to refer to and go from there.
* Absolute Xpath always starts with double forward slash, it directly interacts with current node of element. It is the shortest way to navigate to an element on a webpage.
* Absolute Xpath: /html/body/div/span
* Relative Xpath: //div[@class='value']//h4[1]

15) How to handle dynamic webelements using xpath?

* Using xpath with contains - //[contains(@type,'sub')] , //div[contains(tect(),'value')] OR/AND - //div[@type='submit' OR/AND @name='namevalue'] Starts with - //label[starts-with(@id,'message')] following - //[@type='text']//following::input[1]
* By using Ancestor keyword in the xpath - //[text()='value']//ancestor::div Child - //[@id='value']//child::li
* By using preceding keyword in the xpath - //[@type='value']//preceding::input following-sibling - //[@type='value']//following-sibling::input
* By using parent keyword in the xpath- //[@id='test']//parent::div Self - //[@type='value']//self::input
* By using Descendant keyword in the xpath - //\*[@id='value']//descendant::a

16) What is difference between xpath and CSS selector?

|  |  |
| --- | --- |
| Xpath | CSS |
| Easy to write and remember | Bit Complex |
| Various ways to find xpath | Less than xpath |
| Xpath engine is different in each browser | Same in all browsers |
| Can traverse backward and forward direction | Traverse only forward |
| In IE browser, xpath may not work. | Same for all browsers |
| Traversing the DOM in older browsers like IEs doesn't work | Doesn't support older versions |
| Success rate of finding elements using xpath is high | Low success rate |
| If element is one of its child, it is defined in xpath using '//' (//div//a//i) | In CSS white space is used( div a i) |
| ID is found using @ in xpath (//input[@id='email']) | # is used to find id in CSS(input[#id='email'] |
| Class is defined as [@class='test'] | Class is defined as '.' |

17) What are ImplicitWait and ExplicitWait?

* ImplicitWait tells the webdriver to wait before throwing exception NoSuchElement/elementnotVisible, wait until the stated time.
* Example - driver.Manage().Timeouts().ImplicitWait(10,Timeunit.seconds)
* In ExplicitWait before throwing exception it tells webdriver to wait till the specified condition is met or maximum time elapses.
* It is applied for specified test step in the test script, we must first create an instance for webdriver wait class to use
* Example - webdriverWait wait= new Webdriverwait (driver,timespan.fromseconds(30)); wait.until(expectedconditions.visibilityofallelementslocatedBy(By.Id(elementID));
* Explicit wait will make the webdriver wait for a specific webelement for the specified time where as implicit wait will make the webdriver wait for all webelements for the same specified time.

18) What is exception?

* Exceptions are events due to which Java programs ends abruptly without giving expected output. Java provides a framework where a user can handle exception.
* The process of handling exception is called exception handling. The class hierarchy of exception and error:

A picture containing text, whiteboard

Description automatically generated

Checked Exception - It is handled during compile time and it gives the compilation error if it is not caught and handled during compile time. Ex: filenotfoundexception, IOexception etc.

Unchecked Exception - Incase of unchecked exception, a compiler does not mandate to handle. The compiler ignores during compile time. Ex: ArrayIndexOutofBoundException

19) What is Error?

* When a scenario is fatal and the program can't recover then JVM throws an error. Errors can't be handled by try catch block.
* Even if the user tries to handle the error by using try catch block, it can't recover from error. Example: assertion error, Out of memory error.

20) What is difference between error and exception?

* Exceptions can be handled at the run time where as errors cannot be handled at the run time.

21) How to Handle Exception?

* Try and Catch block: It is generally used to handle exceptions.
* Throws Exception: Throws keyword is used to throw an exception rather than handling it . All checked exceptions can be thrown by methods.
* Finally Block: Finally block executes irrespective of execution of try-catch block and it execute immediately after try\catch block completes.

22) What are different types of exceptions?

* ElementNotVisibleException: when we try to locate a particular element on webpage that is not currently visible even through it is present in DOM. Also if we try to find element using xpath which associates with 2 or more elements.
* StaleElementReferenceException: Occurs when element has been deleted entirely, DOM has been refreshed, Navigation to another page, a frame or window switch , element is no longer attached to DOM. We face this when element we are interacting is destroyed and then recreated again. When this happens the reference of element in DOM becomes stale, hence we are not able to get reference to element. To avoid this we use dynamic xpath.
* WebDriver Exception: Webdriver is acting immediately after closing the browser.(comes when code is unable to initialize webdriver or we try to perform any action on the non-existing driver )
* IllegalStaleException: When we didn't specify the path of driver with system property.
* TimeOut Exception: This exception occurs when a commmand completion takes more than the wait time. If webdriver tries to find an element in webpage before page completely loads, then elementNotVisibleException is thrown. To avoid this exception wait commands are added. However if the componenets don't load even after wait, this exception occurs.
* To avoid this we can add explicit wait using Javascript executor untill page is loaded.
* webdriverwait wait= new webdriverwait(driver,Timespan.fromseconds(30)); wait.until((javascriptexecutor)webdriver).executescript("reurn document.readystate").equals("complete"));
* NosuchsessionExecption: This occurs when the browser is quit usiisng webdriver.quit. This can also happen due to web browser issues like crashes and webdriver can't excute any command using driver instance. To avoid this always choose stable version of browser to run selenium webdriver test cases.
* NosuchelementException: when webdriver is unable to find and locate elements. Happens when the incorrect element locator is used. To avoid this try giving wait command. Comes under not found exception class.
* NoSuchWindowException: It comes under not found exception class, this is thrown when web driver tries to switch to an invalid window. We should use window handles to get the set of active windows and then perform actions on the same to avoid this exception.
* NoSuchFrameException: Comes under Not found exception class. When webdriver is trying to switch to an invalid frame. to avoid this try to give wait command.
* NoalertPresentException: It is thrown when webdriver tries to switch to an alert which is not available. To avoid always use explicit or fluent wait for a particular time in all cases where an alert is expected.
* InvalidSelectorException: Subclass of nosuchelementexception. It occurs when a selector is incorrectly or syntactically invalid, commonly occurs when xpath locator is used. To avoid this, we should check the locator used before the locator is likely incorrect or syntax is wrong.
* ElementNotVisibleException: Subclass of elementnot interactable exception, this is thrown when webdriver tries to perform an action on an invisible web element, which can't be interacted with. To avoid this, we can use wait for element to get completely.
* ElementNotSelectableException: Comes under InvalidelementStateexception class, this indicates that the web element is present in web page but can't be selected. To avoid this we can add a wait command to wait until the element becomes clickable.

23) What are different methods to move back, forward and refresh browser in selenium?

* driver.navigate().forward();
* driver.navigate().back();
* driver.navigate().refresh();
* driver.navigate().to("url");

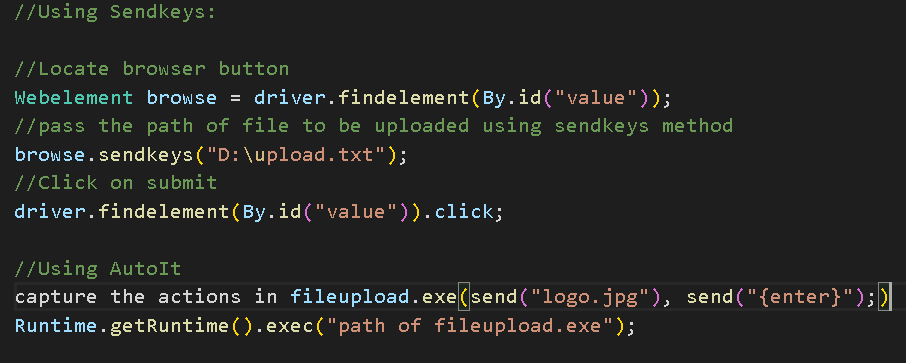
24) What is difference between driver.get() and driver.navigate().to?

* driver.get() refreshes the page also and waits for the page to load. hostory is not maintained in the case of driver.get() because of refresh.
* driver.navigate().to(url) maintains browser history or cookies to navigate back and forward and allows you moving back and forward in browser history. It doesn't wait till the page loads.

25) What is difference between driver.findelement() and driver.findelements()?

* Findelement() returns a single webelement where as findelements() returns a list of webelements.
* When no element is found findelement() throws nosuch element exception where as findelements returns a list of 0 elements.

26) How to handle file upload in selenium?



27) How to handle alert?

Alert interface provides methods to using in selenium for handling JavaScript alerts.

Text

Description automatically generated

28) How to switch to window in selenium?

Graphical user interface, text, application

Description automatically generated with medium confidence

29) What is difference between getwindowhandles() and getwindowhandle()?

* Getwindowhandles() is used to get the address of all open browsers and it returns datatype is set<string>
* Getwindowhandle is used to get address of current browser when the control is and its returntype is string data type.

30) How to select or switch to parent window?

Graphical user interface, text, application

Description automatically generated

31) How to handle frame in webdriver?

* An iframe (inline frame) is used to insert another document within the current HTML document.

Text

Description automatically generated

32) How to verify if the element is present in the webpage using selenium?

* iselementPresent(String locator)
* It takes locator as parameter and returns Boolean value.

33) How to check if the element is present and displayed in the web page using selenium?

* iselementDisplayed(String locator)
* It takes locator as parameter and returns Boolean value.

34) How to verify if the Button is enabled using selenium?

* isEnabled() can be used for verifying if the element is enabled or disabled

35) How to find the element which is active in selenium?

* driver.switchto().activeelement();

36) How to verify if the dropdown value is selected?

* Using isselected();

37) How to use JavaScript executor in selenium?

* It is a interface which provides a mechanism to execute Javascript through the selenium webdriver.
* It provides "executescript" and "executeAsyncScript" methods to run Javascript in context of currently selected frame or window.

Text

Description automatically generated with medium confidence

38) How to handle keyboard and mouse actions?

* We have advanced user interactions API for handling and it has action and actions classes.
* actions class has below methods
* clickandhold() - clicks (without releasing) the current mouse location.
* DragandDrop()- Performs click and hold at the location of the source element, moves
* Source,target- moves to the location of target element then releases the mouse.
* Perform() is used to execute the actions.

Graphical user interface, text, application

Description automatically generated

39) What are keyboard interface in selenium?

* SendKeys(keys to send) : sends a series of keystrokes onto the element.
* KeyDown(the key): sends a key press without release it.
* KeyUp(the key): performs a key release

40) What are Mouse interfaces in selenium?

* Click() - clicks on element
* Doubleclick()- Double clicks on the element
* ContextClick- performs a context click(right click) on the element
* ClickandHold- clicks and hold (release has to be used)
* Dragand DropBy(source,xoffset, yoffset)
* MoveByoffSet(x0ffset,yoffset)
* MovetoElement(toelement)

41) What are the methods available to implement the robot class in selenium?

* KeyPress(): Use this method when you want to press any key
* ex: robot.keyPress(keyEvent.VK\_UP)- will press up key on keyboard
* KeyRelease(): Use this method to release the pressed key on keyboard
* ex: robot.KeyRelease(keyEvent.VK\_CAPSLOACK)- will release the pressed caps lock key on key board.
* MouseMove()- robot.mouseMove(coordinates,get.x(),coordinates.get.y());
* MousePress()- robot.mousepress(Inputevent.button1\_MASK);
* MouseRelease()- robot.mouseRelease(InputEvent.button3\_DOWN\_MASK);

42) What are the methods available in selenium?

* Navigate Command: Navigate().to("url"), get("url"), navigate().back(), navigate().forward(), navigate().refresh()
* Resizing windows: set the size of window, the unit used is pixels.
* dimension d = new dimension(640,640);
* driver.manage().window(0.setsize(d);
* to maximize window - driver.manage().window().maximize();
* Delete Cookies: driver.manage().deleteallcookies();
* closing browser: close() - closes active window
* quit() - closes all windows
* Get methods : getcurrenturl(), getpagesource(), gettitle(), getwindowhandle(), getwindowhandles()
* Searching webelements - findelement(), findelements()
* Mouse Operations - actions act = new Actions(driver);
* act.movetoelement(driver.findelement("").build.perform();

43) How to handle a dropdown in selenium?

Text

Description automatically generated

44) What are verification points available in selenium?

* Verify and assert

45) What is difference between assert and verify?

* Assert- If the condition is true the the program control will execute the next step but if condition is false , execution will stop and further test step will not be executed.
* Verify- There willn't be any halt in test execution even though verify condition is true or false.
* Soft Assert - It collects errors during @Test and doesn't throw any exception when an assert fails and would continue with next step after assert statement.
* Hard assert- Throws assert exception immediately when an assert statement fails and test suite continues with next @Test.

46) How to take screenshot for the failed scenarios?

Text

Description automatically generated

47) How to check all the checkboxes in a page?

Text

Description automatically generated

48) What is Selenium Grid?

* It is the tool which can distribute tests across multiple browsers or different machines.
* It enables parallel execution of test cases, using this we can configure to run thousands of test cases concurrently on separate devices or browsers.

49) How to implement selenium grid?

* modify the driver() to removewebdriver (host , portno , platform , browser)
* Set the desired capabilities
* In the grid console, register hub with node and display available machines.

50) What is difference between driver.quit() and driver.close() commands?

Driver.quit() is used for closing all the open windows where as other one is used to close the active/current window

51) What are the selenium 4 changes?

* From selenium 4 , selenium server works not only in standalone, hub and node mode but also in distributed mode to make it easy to deploy any.
* Also new Selenium server supports OpenTelemetry and exposes a graph QL end point so that tracking down got easier.
* Selenium Webdriver APIs adopt W3C standardization.
* Finding elements in the web page are made easier by relative Locators which uses terms that made sense to humans like near, above, below, to\_left\_of, to\_right\_of.
* Provides authentication to websites with basic or digest authentication.
* Can intercept network Traffic.
* Easier way to open new Browser windows/Tabs (driver.switchTo().newWindow(WindowType.WINDOW/TAB))
* Capturing screenshot of particular web element (File srcfile = ((Takescreenshot)element).getscreenshotas(outputType.file)
* Deprecation of desired capabilities as Capabilities objects are now replaced with Options and we need to create an options object to use the driver class.(ChromeOptions options = new ChromeOptions(); options.setAcceptInsecureCerts("true"); options.setCapability("browserversion",latest) )
* Fluent Wait changes - withTimeOut, PollingEvery takes only one parameter ( Wait<webdriver> fluentwait = new FluentWait<Webdriver>(driver).withTimeOut(Duration.ofSeconds(120)).pollingEvery(Duration.ofMillis(2000).ignoring(NoSuchElementException.class);

Chapter 2

I aced Selenium in my Project

Which of the webdriver APIs is the fastest and Why?

HTML UnitDriver is the fastest of all as it doesn't execute in browser. It employs a simple https request - response mechanism for test cases execution.

What is the super Interface of Webdriver interface?

SearchContext

What is the syntax for CSS Selector in selenium?

* by id: css=tag#id
* by class: css=tag.classname
* by attribute: css=tag[attribute=value]
* by substring: css=tag[attribute^='prefix of string'] css=tag[attribute$='prefix of string']
* by inner text: css=tag:contains(text)

How to get css property of the webelement in selenium?

* driver.findelement(By.id("id")).getcssvalue("nameofattribute");

How to move to nth child element?

* Using xpath - div[n]
* Using css- div:nth-child(2)

What is Synchronization?

* It is a mechanism that involves 2 or more components that work parallel with each other.
* In test automation we have 2 components: Application under test, Test automation tool
* Both Components have their own speed and to make these 2 components move with same and desired speed, we should write our scripts in such a way that we will not encounter "element not found" errors.
* we have 2 categories of Synchronization - Unconditional, conditional
* In Unconditional Synchronization we specify timeout value only, the tool will wait until a certain amount of time and then proceed further.
* Examples are wait(), thread.sleep().
* Disadvantage of this is that even though the application is ready there is chance of unnecessary waiting time.
* In Conditional synchronization we specify a condition along with timeout values, so the tool waits and checks for the condition and then it come out if nothing happens.
* It is important to set timeout value in conditional synchronization as the tool should proceed further instead of making the tool to wait for a particular condition to satisfy.
* Examples are implicit wait, explicit wait.

What is FluentWait in selenium?

* It is used to define maximum time for the webdriver to wait for condition as well as frequency with which we want to check the conditions before throwing an exception.
* It checks for the webelement at regular intervals until the object is found or timeout happens.
* Wait wait = new FluenWait(driver).withTimeout(timeout,seconds).pollingEvery(timeout, seconds).ignoring(expection.class);
* Above is deprecated in selenium v3.11 and above
* Wait wait = new FluentWait(driver).withtimeout(30, Timeunit.seconds).pollingEvery(5,Timeunit.seconds).ignoring(NosuchElementException.class)

What is default polling time for explicit wait and implicit wait?

* 500 milliseconds for explicit wait.
* Implicit wait doesn't have any polling time.
* It waits for complete specified time so default polling time is 0.

What is difference between setsleep() and sleep()?

* Both are used to delay execution speed, setspeed setup speed that will apply a deplay time before every selenium operation setspeed("5000") - it waits for 5 seconds.
* Sleep() setup wait only for once when called in our selenium script sleep(5000) - it waits for 5 seconds.

How to make sure page is loaded using selenium?

Text

Description automatically generated

What is throwable?

* It is a parent class for error and exception.

What are causes of staleElementException?

* The referenced web element has been deleted completely.
* The referenced element is no longer attached to DOM

How to handle staleElementException?

* Refreshing the web page using navigate().refresh and then perform action on the webelement
* Using try catch block in the for loop with retry count or while loop condition
* Using expected conditions.refreshed in explicit wait condition (wait.until(expectedConditions.refreshed(Expectedconditions.stalenessOf("")))

How to throw custom exception?

Text

Description automatically generated with medium confidence

What is same-origin policy? How can we avoid it?

* It is introduced for security reasons
* It ensures that the content of our site will never be accessible by a script from another site.
* As per policy, any code loaded with browser can only operate within that websites domain..
* To avoid this same -origin policy, the proxy injection method is used
* In the proxy injection mode, selenium server tricks the browsers to be a real HTTP URL ,ie, it acts as a client-configured HTTP proxy, which sits between the browser and the application under test.(AUT) and then marks the AUT under a fictional URL.

A picture containing text, whiteboard

Description automatically generated

How many parameters can selenium commands have at minimum?

* 4 parameters - host, url, browser, port number

How to redirect browsing from a browser through same proxy?

* We have PROXY class to redirect browsing from a proxy.

Text

Description automatically generated

How to handle https website in selenium?

Graphical user interface, text, application

Description automatically generated

How to login to any site if it is showing any authentication popup?

* http:\\username:password@url

How to launch a batch file in selenium webdriver?

A screenshot of a computer

Description automatically generated with medium confidence

How to scroll down page using Javascriptexecutor?



How to scroll to particular element ?

Text

Description automatically generated

How to send text using JavaScript executor?

Text

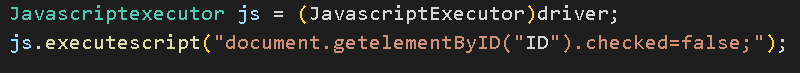
Description automatically generated

How to click button using JavaScript executor?

Text

Description automatically generated

How to click on checkbox using JavaScript executor?



How to generate alert popup using JavaScript executor?

Text

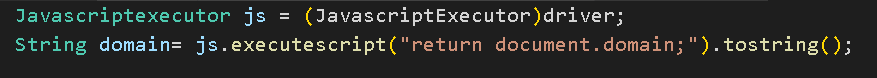
Description automatically generated

How to refresh browser window using JavaScript executor?

Graphical user interface, text

Description automatically generated

How to get domain in selenium using JavaScript executor?



How to get title in selenium using JavaScript executor?

Text

Description automatically generated

How to get url of webpage in selenium using JavaScript executor?

Text

Description automatically generated

How to navigate to url in selenium using JavaScript executor?

Text

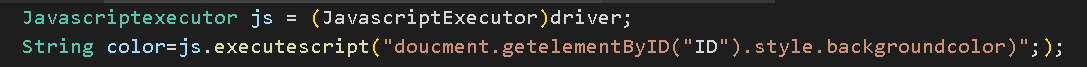
Description automatically generated

How to get the hidden element in selenium using JavaScript executor?

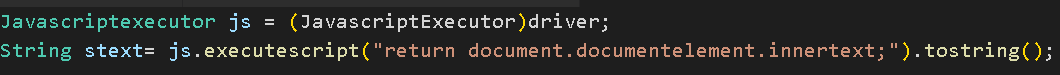
Graphical user interface, text

Description automatically generated

How to get background color of element in selenium?



How to get inner text in selenium using JavaScript Executor?



How to send enter/tab keys in web driver?

Text

Description automatically generated with medium confidence

How to type text in a new line inside a text area?



How to press shift + tab?

A picture containing text

Description automatically generated

How to enter Shift/ALT/Control Keys?

Text

Description automatically generated

What are different network protocols that selenium supports?

* http protocol
* No authentication - driver.get("http:\\url");
* Basic authentication - webdriver.get("https:\\"+username+":"+password+"@"+"url);
* Using Preferences:
* FirefoxProfile ff= new FirefoxProfile();
* ff.setPreference("network.http.phisy-userpass-length",255);
* driver = new Firefoxdriver(FF);
* driver.get("http:\\user:password@url");

How to handle SSL for Firefox in selenium?

Text

Description automatically generated

How to handle SSL for Chrome in selenium?

* Chrome had to set SSL options via desired capabilities

Text

Description automatically generated

How to handle SSL for Internet Explorer in selenium?

Text

Description automatically generated

How to identify tooltip by using web driver?

* We can test this by validating the text of the object as text of the object is used as tooltip text "title" of the object = tooltiptext
* StaticToolTip- Selenium can capture the static tooltip by calling getattribute('title') method.
* Dynamic Tooltip - This is usually created by iquery/javascript plugins. Using actions class we can get HTML(div tag) once we have mouse hover link.

Text

Description automatically generated

How to get all the values from table?

Text

Description automatically generated

How to take screenshot of particular web element

* Ashot is third party utility by Yandex supported by selenium Webdriver to capture the screenshot.

A screenshot of a computer

Description automatically generated

How to click on each link and navigate back?

Text

Description automatically generated

How to count the number of links in a page?

Text

Description automatically generated with low confidence

How to get all the links on a webpage?

Text

Description automatically generated

How to find broken links on a webpage?

* First collect all links on page based on tag
* Then send an http request for the link and read the http response code
* Based on the response code determine whether the link is valid or broken

Text

Description automatically generated

How are method overloading and method overriding implemented in selenium?

method overloading in selenium:

* implicit wait in selenium
* driver.manage().timeout().implicitwait(10,timeunit.seconds)
* driver.manage().timeout().implicitwait(10,timeunit.minutes)
* driver.manage().timeout().implicitwait(10,timeunit.hours)
* frames in selenium:
* using index: driver.switchto.frame();
* using framename: driver.switchto().frame(name)
* using webelement: driver.switchto().frame(webelement)

Method overriding in selenium:

* get and navigate methods, both are used for navigating to the url of webelement.

How to validate if the element is highlighted?

* Get the color of the element using getCssvalue("color")
* Now compare the value with the desired value, if both are equal the element is highlighted.

How to handle slider in selenium/ draganddrop in selenium?

* DragandDrop method can be used to drag the slider
* DragandDrop method with 2 parameters - Actions.dragAndDrop(Sourcelocator, Destinationlocator)
* DragandDrop method with 3 parameters - Actions.dragAndDropBy(Sourcelocator, x-axis pixel of Destinationlocator, y-axis pixel of Destinationlocator)

Text

Description automatically generated

How to enter text in selenium without using sendkeys()?

* By using javascriptexecutor: js.executeScript("arguments[0].setAttribute('value',"texttoenter", webelement)

How to handle ajax calls using selenium webdriver?

* AJAX means asynchronous javascript and xml, it allows the web page to retrieve small amounts of data from the server without reloading the entire page.
* AJAX sends http requests from the client to server and then process the server response without reloading the entire page, so normal wait commands will not work as the actual page is not refreshed.
* The best way is to use the dynamic waits like in explicit wait adding condition as wait.until(expectedconditions.elementtobeclickable), wait.until(ExpectedConditions.alertpresent), wait.unitl(expectedconditions.texttobepresentinelement)

What does build(), perform() methods mean in actions class?

* Build() method is used to create chain of actions or operations we want to perform
* perform() is used to execute chain of actions which are build using build()
* whenever using multiple actions always use build().perform() as it creates chain and excute them , if using only one action , can use perform() directly

What are the OOPs concepts implemented in Selenium Automation Framework?

* Abstraction: It provides us to hide the implementation of internal details and show the functionality to user. Example: in POM pattern , we write locators and the methods in page class and we utilize those those locators in the tests but we can't see implementation of the methods so here we are hiding the implementation of locators from the tests. In java abstraction is achieved by abstract class and interfaces.
* Interface: Webdriver driver = new Chromedriver() , here webdriver is the interface and chromedriver is the class implementing the interface.
* Inheritance: Once class acquiring the properties of anther class is called inheritance and in automation we create a base class to initialize the webdriver interface, webdriver waits, property files, excels etc and through out the framework we extend this base class in other classes like test and utility classes.
* Polymorphism: Method Overloading: implicit wait in selenium have different time stamps such as seconds, minutes, hours etc. Also action class and assert class are also examples of overloading
* Method Overriding: get and navigate methods of different drivers n selenium
* Encapsulation: Mechanism of binding code and data (variables) together in a single unit . all the classes in the framework are examples of encapsulation. Also in POM class we declare the data members using @FindBy and initialization of data members will be done using constructors to utilize those in methods

What are challenges faced in selenium while automating in the project?

You can put over all the challenges faced while automating your own project, I am putting here few of the challenges I faced in my experience.

* The first challenge is that as we know selenium can automate only web based applications, when I got the scenario to automate the application where I need to download the file and check in windows file explorer and unzipping it and opening particular file in the windows software and editing it and saving and zipping it. It needs lot of research and able to automate using the java inbuild libraries to handle windows explorer related validations and using autoIt tool for automating the scenarios related to validation of windows software
* One of the other scenarios is getting the history of the browser deleted before running the scenarios without using delete cookies and going the chrome settings and deleting the history
* While performing cross browser testing, many of the scenarios which passed in chrome failed in IE browser as the locators are not identified in the IE browser
* In the BDD Cucumber framework , implementation of skipping the failed steps and moving to the next step in the same scenario let me explore more and able to do it using plugins
* Also rerunning the failed scenarios without using testNG retry mechanism is also bit challenging

Chapter 3

Getting to Core Java

What is Static in Java?

* Static is the keyword is java used mainly for the memory management and used to create methods and fields that belong to the class rather than to the instance of the class.
* In java for using the variables and methods we create in the class, we need to create the object of the class and call the methods or variables.
* In Java objects are stored in the heap memory and static objects in the stack memory and When we create the object, the static methods or variables will not be part of this object of class and instead they are stored in the common memory of java so when ever we call these static objects they are loaded without the need of class object.
* So when ever we want to use the static objects , we need not to create object of the class and we can call them directly by name or using class name.

What can be made static in java?

* Variables, methods, blocks, nested classes.

What are the advantages of using static?

* As they are loaded along with the class and no need to create the object to call them, the memory usage is reduced.
* Also static fields can't be overridden so they add security.

Can the top level class be made static?

No the top level class in java can never be static because static keyword is meant for providing memory and executing the logic without creating objects, a class doesn't have a value logic directly. Instead static can be added for inner classes.

Can interface have static classes?

For nested classes we can have static in interface

Can interface have static methods in java?

* Interface in java have abstract methods so they can't be static and fields which are final and static
* From java 8 , we are allowed to by static methods in interface.

Can abstract class be static?

* No because abstract class contains abstract methods that should be implemented in derived classes.
* Static keyword in class mean all the methods in the class are static as well. but static methods can't be inherited or overridden so they can't be abstract.

Can a constructor be static?

* No, we know that static belongs to class rather than object of the class and constructor is called when an object is created for the class, so no use of static constructor.
* Another thing is that if we will declare static constructor then we can't access/ call the constructor from subclasses as static is allowed with in the class and not to the subclasses

Can static methods be overridden?

No static methods can't be overridden as they are class methods and hence access to them is always resolved during the compile time rather than run time and overriding is happening at run time. When we override a method, we won't get any compile time error, but it won't work in the same way as for non static methods so method will not be overridden will work according to the parent class.

Can static methods be overloaded?

yes static methods can be overloaded

Can abstract class have static methods?

Yes abstract class can have static methods, but can't create an abstract static method. So it will non abstract static method. reason is that we don't object instance to access a static method. so we need method to be defined with a certain functionality.

Why abstract and static not used together?

Static belong to the class, and when we use abstract its implementation is provided in other class. so both classes can't be used together.

Can i have static methods in interface?

From java 8 we can have the static methods in interface along with default methods. But these methods needs to be implemented rather than defined in the interface.

Can we set the webdriver to static?

web driver if set to static works fine and can be used in multiple classes with the single instance effectively. But when we do the parallel execution, the instance from both the threads try to modify the same browser and will create a problem. So it is recommended to keep webdriver non static

Can we have only static block in a class without main method?

Till java 6 it is possible, from java 7 main method is mandatory and without main method it will give the compilation error "Error: main method not found in the class"

Can we reference non static method from static context?

No static methods can be referenced from static context only. Accessing non static from static context give compilation error(can't make static reference to non static )

When is the static executed?

when the java code is compiled , its bit code is generated and bit code is used by the class loader to load into the previous memory in the runtime so static is always executed at a class loading.

What is the order of execution for static block, instance block and constructor?

static block -> instance block ->constructor

In which order the static is executed in a program

In the order in which they are written from top to bottom, if we have concept of inheritance involved the parent is loaded first followed by the child

Where is the static context stored?

In java with respect to memory management we have five components - stack , method area, heap, pc register, native area and static is stored in method area(meta space from java 7) and objects are stored in heap.

What are Examples of static usage?

Collections class/ math utility class in JDK, all the methods inside them are static , so to use we can call them by class name and apart from that string utils class is also static.

Do we need to initialize the static variables?

No need, if we doesn't initialize them, default values will be assigned to them

What is Constructor in Java?

* Constructor is a block of code or a special method used to initialize the object, it is called when the instance of the class is created.
* Every time an object is created using the new() keyword, at least one constructor is called.
* when we create an object in java for class we do as classA classa = new classA();
* Here classA() is the constructor which is default - so this is the special method which has name same as class name with no return type and it is used to initialize or assign values to the variables of the objects.
* So when where we create the object for the class, default constructor is called. even we can write the constructor in the class but java by default provides us the default constructor and if we don't mention constructor this default constructor will be called.

What are different types of constructors?

no-arg constructor and parameterized(private,copy) constructor.

Does constructor have return type?

No constructor will not have return type and by default it returns the current instance of the class.

What is the purpose of the default constructor?

Provide default values to the object like 0, null, etc depending on the type.

What is the use of parameterized constructor?

Used to provide different values to distinct objects. We can also provide the same values.

Can constructor perform other tasks instead of initialization?

* It can also be used for object creation, starting a thread, calling a method, etc.
* You can perform any operation in the constructor as you perform in the method.

Is there Constructor class in Java? – yes

What is the purpose of Constructor class?

It can be used to get the internal information of a constructor in the class. It is found in the java.lang.reflect package.

What are the different modifiers that can be used with constructors?

Constructor should have only public, private, protected keyword as modifier, if cant be static or final.

Can we overload the constructor?

Yes we can overload the constructor, by creating the parameterized constructor

Can we override the constructor?

No, as we have different superclass and subclass names, and the constructor name always will be same as class name. we can't override the constructor

What is constructor chaining?

* It is the process of calling one constructor from another constructor with respect to current object.
* Constructor chaining occurs through inheritance and a sub class constructor’s task is to call super class’s constructor first.
* This ensures that creation of sub class’s object starts with the initialization of the data members of the super class.
* There could be any numbers of classes in inheritance chain. Every constructor calls up the chain till class at the top is reached.

How is constructor chaining implemented?

* within same class: It can be done using this() keyword for constructors in the same class.
* from base class: by using super keyword to call constructor from the base class.

Why do we need constructor chaining ?

This process is used when we want to perform multiple tasks in a single constructor rather than creating a code for each task in a single constructor we create a separate constructor for each task and make their chain which makes the program more readable.

What is alternative of constructor chaining?

* When we want certain common resources to be executed with every constructor we can put the code in the init block.
* Init block is always executed before any constructor, whenever a constructor is used for creating a new object.

What is copy constructor?

* There is no copy constructor in java, however we an copy the values rom one object to another like copy constructor in C++.
* There are many ways to copy values of one object into another in java.
* By constructor, By assigning he values of one object into another, by clone() method of object class.
* Special type of constructor that is used to create a new object using the existing object of a class that we have created previously.
* It creates a new object by initializing the object with the instance of the same class.
* The Java Copy Constructor provides a copy of the specified object by taking the argument as the existing object of the same class.

How to create copy constructor?

* To create a copy constructor in Java, we need to first declare a constructor that takes an object of the same type as a parameter.
* After declaring a copy constructor, we need to copy each field of the input object of the class into the new object.

Text

Description automatically generated

What is the use of copy constructor?

* The Copy constructor is easier to use when our class contains a complex object with several parameters.
* Whenever we want to add any field to our class, then we can do so just by changing the input to the constructor.
* there is no need for any typecasting.
* Copy Constructors allow us to change the fields declared as final.
* Using a copy constructor, we can have complete control over object creation.

What is object cloning?

* It means creation of an exact copy of an object, it creates a new instance of the class of the current object and initializes all its fields with the exact values.
* This can be achieved by copy constructor , clone() method.

What is the use of Private constructor?

* A private constructor in Java ensures that only one object is created at a time.
* It restricts the class instances within the declared class so that no class instance can be created outside the declared class.
* Private constructors are used , when we want to make the class as singleton and more secure and restrict from creating more than one instance of the class object.

What is Singleton class?

* We can create only one instance of the class that means classaAobj1= new classA, and we can't create classA obj2= new classA
* Similar to static fields , the instance fields of the class will occur only for a single time.

how can we create a singleton class?

We can achieve this by using private constructor for the class, and creating the object of the class with static keyword in the class and creating the static method in the class which will return the object of the class

Text

Description automatically generated

What is the use of singleton class?

* Restricts the limit of number of object creation to only one which ensures there is access control to resources like db connection etc.
* Memory space wastage doesn't occur with the use of singleton class because it restricts the instance creation.
* Multi threaded and db applications mostly make use of singleton class for catching, logging, thread pooling, configuration setting etc.

Can the construction have the return type added and how does that work?

Construction can't have a return type and it is what it differentiates from the method.

Can a constructor have a final keyword?

Constructors can't be inherited, they are not subject to hiding or overriding, so there is no change of modifying and so sense of restricting the modification where there is no chance of modifying. And java constructors are internally final.

Can a method have name same as class name?

yes we can have method with the name same as class name.

Why main method need to be static?

For static methods we need not to create objects and main method is the first point of execution so the compiler looks for the main method and we can't have any object before this that means we can't call main method through the object as it is first line. so to not allow main method to create object we make them static

What happens when we remove static for main method?

It works fine for the compilation but while run time it can't find the method as it looks with the patter of static void main and string[] as arguments so it throws error.

Can we overload the main method?

Yes we can overload the main method but while running it considers only the method which as string[] as the arguments and executes that first

Can we override the main method?

No as the main method is static is can't be overridden.

What is the first argument of the String array in main() method?

empty,It does not have any element.

What is Concrete method?

The method which as its own implementation is called concrete method

What is abstract method?

The method which doesn't have its own implementation is abstract method.

What is Abstract class?

The class which have concrete and abstract methods which will be declared using the abstract keyword, and it is implemented by other class using 'extends' keyword.

Can we create the object for abstract class?

No we can't create the object for abstract class

What are the illegal combination of abstract class?

* Static abstract as static classes can't be overridden
* Final abstract as final class can't be changed
* Private abstract as this class needs to be implemented by other class and private restricts it

What is Interface in java?

* special class which contains only abstract methods and public static final varaibles. from java 8 we can have static and default methods also in interface.
* In order to declare a interface , 'interface' keyword is used. and it is implemented by other classes using 'implements' keyword.

What are the default members of interface?

* all the methods are by default public abstract methods
* all the variables are public static final

Can we create object or initiate the interface?

No we can't instantiate the interface, that mean we can't create object but reference can be called.

Can we write an interface without any member?

Through marker interface - example: random interface, serializable interface.

what is a marker or tagged interface ?

* It is the interface that has no methods or constants inside it, it provides run-time type information about objects so compiler and JVM have additional information about the object.
* The same can be achieved using Annotations.

What is difference between interface and abstract class?

* If we don't know anything about implementation and we just have requirement specifications we then go for interface. and if we are talking about implementation but not completely then we go for abstract class.
* we can't declare the methods in interface with the modifiers like private, protected, final, static, there is no restriction in for the modifiers in the methods of abstract class.
* we can't declare interface variable with the following modifiers: private, protected where as there is no restriction in abstract class
* In interface we need to initialize the variable at the time of declaration itself, where as in abstract class there is no need.
* In interface we can't declare instance and static block otherwise we get compile time error where as in abstract class we can declare an instance and static blocks.
* In interface we can't declare a constructor where as in abstract class we can declare and it will be executed at the time of child object creation

Can a class extend only one class?

yes

Can a class extend one or more interface?

No

Can an interface extends one or more interface?

Yes

Can an interface extends one or more class?

No

Can a class implement one or more class?

No

Can a class implement one or more interfaces?

Yes

Can an interface implement one or more class?

No

Can an interface implement one or more interface?

No

Can we define abstract class without abstract methods?

yes

why we use interface?

To achieve fully abstraction because through abstract class we can't achieve full abstraction.

Can we write an inner class in an interface?

Yes

Can we declare local inner class as abstract?

Yes

Can we use abstract keyword with constructor, instance , initialization block, and static initialization block?

No

Why final and abstract can't be used together?

Both are opposite in nature, we use final when we don't want the method to be changed and abstract is used when we want the method to be implemented in child class.

Where do we use abstract class and interface in selenium?

* In selenium framework we abstract certain functionalities for better code structure and maintainability and reusability. example: creating findandclick function and thescreenshot function and have their concrete implementation in class which implements its parent class.
* also public abstract class abstractwedrivereventlistener extends java.lang.object implments webdriverevenetlistner
* Interface example in selenium is webdriver

What are types of inheritance supported by java?

single, multilevel, hierarchical are supported by default and multiple and hybrid supported by interface

Why is multiple inheritance not supported in java?

* Multiple inheritance is concept of class inherit properties of mote than one parent class and java doesn't support.
* Because when there are methods with same signature on super class and sub class, on calling the methods compiler can't determine which class method to be called and even on calling which class method gets the priority.
* In java multiple inherence is achieved by using default methods in interface.by this a class can implement 2 or more interfaces which are having default methods with same signature and the implementation class should explicitly specify which method is to be used or it should override the default method.

What is Method Overloading and Method overriding?

* method overloading means class having multiple methods with the same name but the parameters count and type will vary
* method overriding means method in the parent class have same method in the child class and it is called at run time.

Can we overload by changing the return type?

no we can't , we get compile time error

Can you override a private method in Java?

no private methods can't be overridden and inner class is allowed to access private data members of outer class

What is runtime polymorphism ?

In the java at run time determines which method to be classes from the parent and child classes having same method

What is static binding and Dynamic binding?

when the type of object is determined at the compile type it is called static binding , if there is any final, static or private methods in a class there is static binding. and when the object is determined at the run time it is called dynamic binding

What is Wrapper class in java?

* it provides the mechanism to convert primitive into object and object to primitive and conversion of primitive to object is call autoboxing and vice verse for unboxing
* as java is object oriented programming and object is used everywhere so we need primitives to be converted to objects to use in java in cases like collections, serialization, synchronization and change the value in method
* primitive type Boolean, int, double, float, char, byte, short, long
* wrapper class: Boolean, character, byte, short, integer, long, float, double

what is difference between collection and collections?

* collection is an interface and collections is a class
* collection in java is the interface and root of java collection framework and most of the collections in java are inherited from this interface except map interface.
* collection - list, queue, set

List Interface in Java:

* contains ordered elements
* may include duplicates
* supports index based search and random access but elements can be easily inserted irrespective of position.
* extended by linked list, array list

Queue in Java:

* follows a FIFO approach
* elements adds at rear end and removes from front end
* Set in Java:
* doesn't define an order for elements
* doesn't support index based search
* doesn't allow duplicate values
* hashset class, linked hashset class and extends by sorted set interface, tree set class.

Map in Java:

* Represents a key value pair
* map interface doesn't implement collection
* it can only contain a unique key it can have duplicate values
* Array list in Java:
* it has dynamic resizing capability
* whenever the list is full, it can automatically resize to 50th of its original size.
* it is non synchronized.

LinkedList in Java:

* implements list and deque interface
* maintans the insertion order
* non synchronized
* doesn't support accessing elements randomly
* can use list iterator to iterate linked list elements

Vector in Java:

* synchronized and maintains insertion order
* thread safe and increases its size by doubling the array size
* it is legacy class

Hashset class:

* it implicitly implements a hashtable
* contains only unique elements
* only one null element can be added
* it is unordered as set

LinkedHashSet:

* ordered version of hashset which maintians a doubly linked list across all elements
* it preserves the insertion order

Sorted Set:

* All the elements are sorted set must implement the comparable interface.
* it is a set sorted in an ascending order

Tree set:

* uses a tree for storage
* objects in tree set are stored in a sorted and ascending order

what is difference between hashtable and hashmap and hashset?

Hashtable:

* it is synchronized in nature
* doesn't allow any null key or value

HashMap:

* It implements Map interface.
* it is non synchronized
* it allows only one null key but multiple null values
* It allows duplicate values but duplicate keys are not allowed
* It doesn't allow dummy values.
* It requires 1 objects during add operation.
* It uses Hashing technique for adding and storing mechanism
* It is comparatively faster than hashset because of hashing technique has been used here.
* It uses put() for insertion method.

HashSet:

* It implements set interface.
* It doesn't allow duplicates
* It allows dummy values
* It requires 2 objects during add operation.
* It uses Hashmap object technique for adding and storing mechanism
* It is comparatively slower than hashmap
* It have single null value
* It used add() for insertion method.

Which is preferred hash map or hash table?

Hash map is preferred most when there is no need of thread synchronization

Which map allows duplicate keys

MultiValuedmap

Sorted Map:

* implicitly implements the red black tree implementation
* can't store any null key

Why map doesn't extend the collection interface?

The map interface in java follows keyvalue pair structures where as collection interface is a collection of objects which are stored in a structured manner with a specified access mechanisim.The main reason map doesn't extend the collection interface is that add(ele) method of the collection interface doesn't support the key value pair like map interface's put(k,v) method.

What are the types of iterators?

* for set and linked list for iterating through them we need to use iteratorsthey are of 2 types fail fast and fail safe
* fail fast iterator throws concurrent modification exception when one thread is iterating iver collection object and other thread structurally modify collection either by adding or removing or modifying objects on underlaying collection.
* they are called fail fast because they try to immediately throw exception when they encountered failure
* fail safe iterator doesn't throw any exception if collection is modified structurely while one thread is iterating over it because they work on clone of collection instead of original collection and thats why they are called as fail safe iterator

Why hash table doesn't allow null and hashmap do?

* to successfully store and retrieve objects from hashtable the objects used as keys must implement the hash code method and equals methods.
* Since null is not an object it can't implement these methods.
* Hashmap is advanced version and improvement on hashtable.

Which one is faster arraylist or linkedlist?

ArrayList is fastest as it saves data according to indexes and it implements randomAccess interface provides the capability of random retrieval to arraylist where as linkedlist doesn't implement randomAccess interface.

Which is preferred to use - arraylist or linked list?

arraylist is preferred over linkedlist when there is no need to preserve order

How to sort a arraylist?

* collections.sort(list); - ascending order
* collections.sort(list,collections.reverseorder()); - descending order

What is synchronization and non synchronization in java?

* synchronization basically means only one thread can access methods of that particular class at a time ex: string buffer
* synchronized collection method returns a thread safe collection backed up by specified collection
* synchronizationlist method is similar to above and used to create a synchronized list
* synchronizedmap , synchronizedset, synchronizedsortedset
* synchronized collections acheove thread safe through intrinstic locking and the entire collections are locked
* intrinstic locking is implemented via synchronized blocks within the wrapped collections methods.
* it assure data conssitency / integrity in multi threaded env but also have penality of performance

Concurrent collections:

* acheive thread safety by dividing thier data into segments they too achieve thread safety
* Concurrent collections are much more performant than synchronized collections due to inherent advantages of concurrent thread access.
* Synchronized collection measn the class is thread safe and only one thread can access methods of that particular class at any given time ex: stringbuffer
* Nonsysnchronized collection mean than 2 or more threads can access the methods of that particular class at given time. it is thread safe

How to print the name of class?

system.out.println(this.getclass().getname())

What is difference between encapsulation and abstraction?

* Encapsulation means wrapping up a data under a single unit.
* it is the mechanism that binds together code and the data it manipulates.
* it is a protective shield that prevents the data from being accessed by code outside this shield.
* Technically in this, the variables or data of class is hidden from any other class and cab be accessed only through any member function of own class in which they are declared.
* It can also be called as data hiding.
* it can be achieved by declaring all the variables in the class as private and writing public methods in the class to set and get the values of variables.
* Data abstraction is the property by virtue of which only essential details are displayed to the user.
* the trivial or non essentials units are not displayed to the user.
* it will be implemented using abstract class and interface.

What is difference between string and string buffer ?

* string is immutable and string buffer is mutable
* string is slow and consumes more memory when you concat too many strings because everytime it creates a new instance whereas string buffer is fast and consumes less memory when you concat strings
* string class overrides the equals method of the object class. so two strings can be compared using equals() method where as stringbuffer doesn't override the equals() method of object class.

what is difference between Integer.valueOf() vs Integer.parseInt()

* integer.parseint() takes only string values where as other one takes both string and integer
* inter.parseint() returns primitive datatype int where as other one returns integer object

Which class is the superclass of all classes?

object is super class of any class by default

Why java is not 100% Object-oriented?

As it supports primitive datatypes like int, char etc which are not objects.

What is Java Package and which package is imported by default?

package is collection of classes and interfaces. by default java.lang package is imported.

What are access modifiers?

* private: accessible only to that particular and can't be accessed out of the class
* default: accessable only under the package level
* protected: accessable within package and outside package to only child classes
* public: accessable everywhere

What is the base class for all the classes in java?

lang.object class is root or super class of the class hierarchy.

What is difference between == and equals()?

== checks if both objects point to the same memory location where as equals evaluates to comparison of values in the objects

is null a keyword?

no it is literal and character string that is treated specially by the compiler if the compiler encounters it in a java source file.

Can we have try without catch block?

yes we can have and finally can be used where the block of code is executed even though the condition of try catch is not met

Can we have multiple public classes in a java source file?

no only one class among all the classes in the java file should be public. or else it throws compiler error

What is class level variable in java?

any variable declared with static modifier of which a single copy exists regardless of how many instances of class exist.

What is the default value for objects, string, Boolean, char ,integers ,double in java?

object is null, string is null, byte is 0, short is 0, int is 0, long is 0L, float is 0.0f, double is 0.0d, char is \u0000 and boolean is false

What is final and finally ,finalize difference?

final is keyword we use when we don't want the particular method or varaible not to be modfied. , finally is used along with try catch blocks to execute the code inspite of the condition, finalize is used to perform clean up processing just before object is garbage collected.

What does super keyword do?

it is reference variable which is used to refer immediate parent class object.

What is this keyword?

used to refer to the current instance of the object

What is break and continue statement?

break is used when we want to exit from the condition and continue is used to break one iteration (in the loop) if a specified condition occurs and continues with the next iteration in the loop.

what is difference between throw and throws and throwable?

* throw keyword is used to throw an exception explicitly throws keyword is used to declare one or more exceptions , separated by commas. Throwable is super class of errors and exceptions in Java, only instances of this class or its sub class are thrown by java virtual machine or by the throw statement.
* If we want to create custom exceptions, then the class should extend the throwable class

What is typecasting?

process of assigning a primitive data type's value to another primitive data type

What is array?

it is collection of items stored at contiguous memory locations

How to sort array?

arrays.sort(array);

What is difference between Error and Exception?

both are subclasses of throwable class , errors mostly occur at run time that they belong to an unchecked type, exceptions are the problems which can occur at runtime and compile time.

What are the examples of java exceptions?

Arithmetic exceptions, arrayindexoutofbound exceptions, classnotfound exception, filenotfoundexception, nullpointerexception, numberformatexceptions, Stringindexoutofboundexceptions.

What are string, string buffer and string builder in Java?

* In java we have 3 classes to represent sequence of characters and string is immutable and string buffer and string builder are mutable.
* String buffer is synchronized(thread safe) so 2 threads can't call the methods of string buffer simultaneously where as String builder is non-synchronized (not thread safe) and 2 threads can call the methods of string builder simultaneously.
* String builder is more efficient than string buffer.
* String can be used where the object is gonna remain constant through out the program and string builder can be used when we want string to access from single thread and string buffer when we want single to access from multiple threads.

How to convert string to string builder and string buffer and vice versa?

String to string builder and string buffer:

Text

Description automatically generated

What are oops concepts in Java?

* Object: An entity that has state and behavior is known as an object. An object can be defined as an instance of a class. It contains address and takes up some space inn memory.
* Class: It is Collection of objects. it can also be defined as blueprint from which we can create and individual object. it don't consume any space.
* Inheritance: When one object acquires all the properties and behaviors of a parent object. It provides code reusability and is used to achieve runtime polymorphism.
* Polymorphism: It basically means existing in different forms and in java that can be achieved by method overloading and method overriding.
* Abstraction: It means hiding internal details and showing functionality
* Encapsulation: It is wrapping and binding up all the code together into a single unit.

What is the usage of a blank final variable?

* It is final variable that is not initialized during declaration.
* Blank final variables are used to create immutable objects (objects whose members can't be changed once initialized).
* Values must be assigned in constructor.
* If we have more than one constructors or overloaded constructor in class, then blank final variable must be initialized in all of them.
* constructor chaining can be used to initialize the blank final variable.

programs:

How to get the count of number of objects initialized in class?

constructor is used to create objects and when we count the number of times constructor is called we can get count of number of objects initialize

Text

Description automatically generated

program to rotate array:

Text

Description automatically generated

Text

Description automatically generated

Program to reverse array:

Text

Description automatically generated

Program to concatenate 3 variables to one variable in Java

Graphical user interface, text

Description automatically generated

Program to iterate list

Text

Description automatically generated

program to iterate the array

Text

Description automatically generated

program to iterate the map:

Text

Description automatically generated

Program to print how many times each character is repeated in string

Text

Description automatically generated

Program to find the duplicate words in string:

Text

Description automatically generated

program to find the factorial of number

Text

Description automatically generated

Program to reverse a string:

Text

Description automatically generated

Program to swap two variables without temp value:

Text

Description automatically generated

Text

Description automatically generated

Program to print sum of diagonals of matrix:

Text

Description automatically generated

program to check string is palindrome

Text

Description automatically generated

program to check number is palindrome

Text

Description automatically generated

Chapter 3

What to know about APIS

What is URI in REST?

* Each resource in REST architecture is identified by its URI (Uniform Resource Identifier).
* URI is of the following format − <protocol>://<service-name>/<ResourceType>/<ResourceID> Purpose of an URI is to locate a resource(s) on the server hosting the web service.

What is end point in API?

* API endpoints are the specific digital location where requests for information are sent by one program to retrieve the digital resource that exists there
* Endpoints specify where APIs can access resources and help guarantee the proper functioning of the incorporated software.

What is Webservice?

* Web services are XML-based information exchange systems that use the Internet for direct application-to-application interaction. These systems can include programs, objects, messages, or documents
* A web service is a collection of open protocols and standards used for exchanging data between applications or systems.
* Software applications written in various programming languages and running on various platforms can use web services to exchange data over computer networks like the Internet in a manner similar to inter-process communication on a single computer. This interoperability (e.g., between Java and Python, or Windows and Linux applications) is due to the use of open standards.
* Components of Web Services - SOAP , UDDI,WSDL

How Does a Web Service Work?

* A web service enables communication among various applications by using open standards such as HTML, XML, WSDL, and SOAP
* XML to tag the data
* SOAP to transfer a message
* WSDL to describe the availability of service.

Explain different http methods?

* GET: It is used to retrieve information from the given server using a given URI. Requesting using GET should only retrieve data and should have no other effect on the data
* POST: It is used to send data to the server example - customer information , file upload etc using HTML forms
* PUT: It is used to replace all current representations of the target resources with the uploaded content.
* PATCH: It is used to make a partial update on a target resource with the uploaded content.
* DELETE: removes all current representation of the target resources given by uri

What is difference between PUT and POST and PATCH Requests?

Post request is non idempotent where as put request is idempotent that means when the same request is called multiple times for the put it always produce the same result where as POST request repeated will have side effects of creating the same resource multiple times. Patch request is used when we want to update the record partially whereas put will replace the record completely

What are the different types of API Authentication?

* Password-based authentication
* Multi-factor authentication
* Certificate-based authentication
* Biometric authentication
* Token-based authentication - oAuth1(Transport-independent, Founded in cryptography, especially digital signatures,Messages are each individually cryptographically signed,Basic signature workflow), oAuth2(Transport-dependent,Centered around bearer tokens,Much easier to work with,Much more flexible,Better separation of duties)

What are different types of status codes in API?

**Informational Responses (100-199)**

* 100 : **continue** (it states everything is okay so far and the client will continue the request or ignore the response if the request is already finished)
* 101: **Switching Protocol**(this is sent in response to an upgraded request header from the client and indicates the protocol the server is switching to)
* 102: **Processing**( it means server got the request and it is processing the request and no response is available yet)

**Successful Responses(200 - 299)**

* **200:OK**(The request is successful - GET request)
* **201:Created** (the request is successful and new resource is created successfully -POST/PUT request)
* **202:Accepted**(The request is received but not yet acted upon)
* **203:Non Authoritative Information**(This means the returned meta information is not exactly the same as from the available server, but is collected from local or third party copy)
* **204:No Content**(There is no content to send for this request, but the headers may be useful)

**ReDirection Messages(300-399)**

* **300:Multiple Choice**(the request has more possible response and the user should choose one of them )
* **301:Moved Permanently**(The url of the request is changed permanently)
* **302:Found**(this means the URI of the requested resource is changed temporarily)
* **304:Not Modified**(This is used for caching purpose and it tells the clients that the response has not been modified so the client can continue to use the same cached version of the response)

**Client errors (400-499)**

* **400:Bad Request**(the server could not understand the request due to invalid syntax)
* **401:Unauthorized**(this means client must authenticate itself to get the requested response- clients identity is unknown)
* **402:Payment Required**(this is reserved for future use with the aim of using it for digital payment systems)
* **403:Forbidden**(The client doesn't have access rights to the content(unauthorized) so the server is refusing to give the requested resources, unlike 401 the clients identity is known to the server)
* **404:Not Found**(The server can't find the requested resource)
* **405:Method not allowed**(the requests method is known by the server but is not supported by the target resource)

**Server errors(500-599)**

* **500:Internal Server Error**(the server has encountered a situation it doesn't know how to handle)
* **501:Not Implemented**(The request method is not supported by the server and can't be handled - the only methods that the server are required to support are GET and HEAD)
* **502:Bad Gateway**(This error response means that the server while working as a gateway to get a response needed to handle the request, got an invalid response)
* **503:Service Unavailable**(The service is not ready to handle the request, the common causes are a server that is down for maintenance or that is overloaded)
* **504:GateWayTimeout**(this means the server is acting as a gateway and cannot get a response in the time)

What are the different types of authorization methods used in REST API?

* Basic Authorization - have username and password which are provided along with the uri
* OAuth(1) - An open data protocol that provides a process for end user to authorize third party access to their server resources without sharing their credentials using user agent redirects
* OAuth(2) - It works by delegating user authentication to the user authentication to the service that hosts a user account and authorizing third-party applications to access that user account.

How to send GET/POST API request using REST Assured?

Text

Description automatically generated

How to validate the status code for the response?

Text

Description automatically generated

How to validate the headers of response?

Text

Description automatically generated

How to validate the response body values?

Text

Description automatically generated

Write code for the sending sample post request?

Endpoint:https://testingsite.com/register

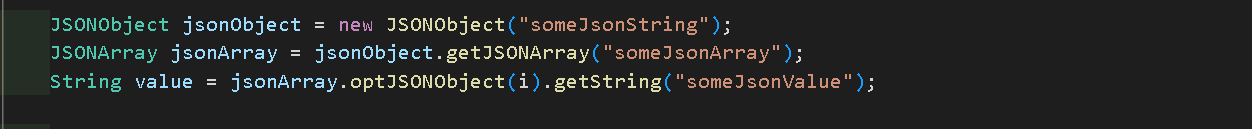
Request Body: { "firstname":"fname","middlename":"mname","lastname":"lname","email":"mail"}

Response: {"desc":"the user details", "region":"temp","Accountdetails":[{"country":"india","data":{"capital":"delhi","currency":"rupee"}}, {"country":"us","data":{"capital":"washington","currency":"rupee"}}]}

Text

Description automatically generated

How to convert the java object to JSON object?

 This is very slow and using jackson Library is much more fastest than this method  
**Using Jackson Library:**

writeValueasString() method in ObjectMapper() class is used to serialize the java object to JSON object.  
ReadValue() method in ObjectMapper class will deserialize a JSON content from given JSON content String.

Text

Description automatically generated

How to pass the json parameters to the request body?

* JSONObject class is available in org.json.simple package.
* add the json parameters as key value pair in the JSONObject
* JSONObject obj = new JSONObject();
* obj.put(key,value)
* To convert this map to string we use toJSONString method.
* obj.toJSONString()

Chapter 7

Being a Tester

How do you handle all the test activities in project from start to end?

The series of Test activities involves below:

* Gathering the Requirements through FD documents and analyzing the requirements.
* List the skills needed and plan training session if the team doesn't have the required skills.
* Participate in the FD Walk through meeting and clearing the queries if any on the requirements.
* Provide the test estimates for the testing frame.
* Organize the kick-off meeting.
* Prepare the test plan which consists of test strategy, testing objectives, resources required for testing, test schedule, test estimation and test deliverables and testing scope.
* Get the test cases development and review done and closed.
* Get the inputs on test data if any other external team is involved in creating test data.
* Track the closure of test cases execution and defects status.
* Make sure defects are closed either by resolved or deferred status.
* Make sure the test artifacts are attached and training documents are prepared.
* Have the RTM document and sign off documents.
* Once release is done, follow up of the incidents reported till the closure and also take the action items for the incidents reported.

How to do the Effective test planning?

* Scope the required tests.(functional testing, performance testing, security testing)
* Prepare the test strategy document (team size, skills, requirements list, test environment details) and making sure it is in the scope of testing and following the organizational standards.
* Make sure the testing tools are available and setup done.
* Estimate the test efforts and team(size, skills, schedule).
* Create test schedule (task, dependencies, assigned testers)
* Identify training requirements of the testers.
* Determine and procure test environment (hardware, software, and network)
* Identify the test metrics
* Prepare the test planning document which consists of scope of testing, assigned resources, test assumptions, constraints, dependencies) and reviewed and approved.

How to keep track of the testing progress?

* Communicate with the business and onshore and offshore team regularly
* Track the assigned tasks wrt software test plan and project schedule
* Report status to stake holders
* Share the test results to the business
* Get information on the latest releases and builds
* Inform and obtain issue resolution

How can you contribute to the test automation as a lead?

* Developing the framework and enhancing the framework.
* Review the test automation created by the testers
* Maintain the test automation suite of the project.
* Schedule and execute the test automation on project

What are the day to day activities as a lead?

* Mostly involved in the reviewing test cases and test automation code and incorporate the review comments
* Make sure test environment is working correctly
* Tracking the new and updated requirements in the project and modify testing artifacts accordingly
* Update the project status in the project management tool
* Administer the application under test
* Make sure the team has tasks assigned and working effectively and not facing impediments

How to manage the defects as a lead

* Review the debugs logged by team and make sure they are assigned in the respective dev team
* Track the status of the bug till the closure
* Assign the bugs for retest to respective testers

How do you motivate your team?

* Always be available and approachable to the team
* Plan, organize and lead team meeting and ensure action items are taken from the outcomes of the meeting
* Plan and organize trainings for the testers
* Review the status reports of the testers

What are the tasks involved at the beginning of the project?

Requirement gathering, planning, kick-off

What are the activities test planning process consists of ?

Scope, test strategy, estimation, schedule, test plan

What does test plan document comprises of?

It is the detailed document that contains test strategy, testing objectives, resources, test schedule, test estimation, test deliverables, testing scope.

What are the different test estimation techniques?

Estimation basically involves estimation of resources, time, human skills, cost

There are different techniques to provide estimations like Work breakdown structure(wbs) - breaking down test project into small pieces, Three point estimate - estimation method is based on statistical data, Functional point method - measure the size and give weightage to each function point.

How to do:

* divide the project into subtasks
* allocate resources for each task
* estimate efforts required to complete each task
* validate the estimate
* What are the best practices for estimation?
* Always add buffer time
* Account resource planning in estimate
* Use past experience as reference
* Stick to estimate

When the client reported more bugs in production, what actions you take as lead for testinG process to be more efficient?

* Tighten the acceptance criteria
* Add more negative test cases
* Increase the automation coverage on regression
* Modify the exit /stop condition
* Increase the test data combinations
* Add reviews for the test cases.

What are the test deliverables in testing ?

* Test strategy, test plan, test scenarios, test cases, test data, RTM, Test metrics, test incident report, test status report, test summary report, release notes, test closure report, defect/bug report, test incident report, User guide.
* Test strategy: high level document developed at the planning phase which consists of approach on how we do the testing, achieve the end point. It is derived from requirements. Test plan doc will be prepared keeping this document as base. it has scope, test approach, testing tools, industry standards, test deliverables, testing metrics, RTM , Risk and mitigation, reporting tool and test summary.
* Test Plan: Document which contains the plan for all testing activities to be done to deliver the product. it consists of test plan identifier, references, introduction, test items, features to be tested, features not to be tested, approach, pass/fail criteria, suspension criteria, test deliverables, testing tasks, environment needs, responsibilities, staffing and training needs, schedule, risks, approvals.
* Test summary report: it consists the summary of test activities and final test results.
* Test incident report: it consists of all incidents such as resolved or unresolved incidents which are found while testing the software.
* Test closure report: It gives the detailed analysis of bugs found, removed and discrepancies found in the software.
* Release notes: It will be sent to client , customer along with the build. it consists of list of new releases, bug fixes.

What are the different phases of SDLC:

* Planning and Requirement Analysis : Business Analyst and Project organizer set up meeting with client to gather all the requirements by understanding the objectives and expectations of the end user/client. Risk Identification and requirement understanding is done in this phase. INPUT: Customer/end user requirements OUTPUT: USR(User requirement specifications)
* Defining Requirements: In this phase all the requirements are clearly defined and documented and get approved from end user. INPUT: USR(User requirement specifications)

OUTPUT: SRS(System requirement specifications)

* Design: Based on the SRS document, product architects propose one or more approaches for product architecture and will be documented in DDS(Design Documentation specification). This DDS will be reviewed by important stakeholders and based on various factors like risk assessment, product robustness, design modularity, budget and time constraints the best design approach is selected. INPUT: SRS(System requirement specifications) OUTPUT: DDS(Design Document Specification) / TDD(Technical design document)
* Coding/Development: Actual development starts and product is built by developers following the coding guidelines. Programming language is chosen based on the type of software being developed. INPUT: DDS/TDD OUTPUT: Developed Software
* Testing: This refers to testing only stage of the product where the defects are reported ,tracked, fixed and retested until the product reaches the quality standards defined in SRS. INPUT: Developed Software, Test cases, Test Environment. OUTPUT: Quality Product, Test Deliverables
* Deployment and Maintenance: Product is released formally to the market/ end user and maintenance is provided for the end users. INPUT: Quality Product OUTPUT: Real time issues

What are the different Phases of STLC:

* Requirement Analysis: QA team gathers all the requirements and studies from the testing perspective to identify testable requirements and will connect with stakeholders or business team to understand the requirements in detail and clarify all the queries. requirements can be functional and non functional and also team checks the automation feasibility in this stage. INPUT: SRS Documents, Functional Documents OUTPUT: RTM, Automation feasibility report
* Test Planning: In this phase Senior QA Manager determines Test plan strategy along with efforts and cost estimates and resources , test environment, test limitations and test schedules. Test plan is also prepared and finalized. INPUT: RTM,SRS, Test Plan, test strategy templates OUTPUT: Test Plan and Test Strategy Documents, effort estimation document
* Test case Development : In this phase QA team works on activities of Test case and test script creation, review and rework. team also works on creation of test data in this phase. INPUT: Test Plan, Test Strategy Documents OUTPUT: Test cases/Scripts, test data
* Test Environment Setup: Test team will check the readiness(smoke test) of the given environment. INPUT: Test Environment OUTPUT: Smoke test results, test env with test data setup
* Test Execution: QA team executes the test scripts/test cases once the product is deployed. This phase involves test script execution, test script maintenance and bug reporting and retesting. INPUT: Test scripts/Test cases, Test env setup OUTPUT: Completed RTM with execution status, test cases updated with results, defect reports
* Test Closure : In this phase team works on test closure activities like test completion reporting, collection of test completion matrices and test results. Also testing team members meet, discuss and analyze testing artifacts to identify strategies that have to be implemented in future, taking lessons from current cycle INPUT: Test cycle results, incidents OUTPUT: Test closure report, Test metrics

What is interface testing?

* It is kind of software testing that checks the proper communication between two different software systems.
* Interface is the connection that integrates two components and interface can be API, web services, connection strings etc and testing of these connecting interfaces is called interface testing

What is Integration Testing?

* It is the process of testing the interface between 2 software units or module.
* Interface testing exposes faults in the interaction between integrated units. After unit testing of all modules integration testing is performed

What is difference between interface testing and integration testing?

* Interface testing is performed to test an interface to verify the expected result where as integration testing is done verify the end to end functionality of the integrated components.
* Interface testing is performed only on the code where as integration testing is performed on both code and GUI
* Interface testing is done n interfaces like API, Webservices etc where as integration testing is done on integrated components.

What are Black box, white box and grey box testing and differences?

Black Box Testing:

* In this testing, tester doesn't have any prior knowledge of the internal structure and source code of the software on which they perform testing.
* Testers need not to have any coding skills and in this testing, the main aim of tester is to interact with the user interface and test its functionality and to make sure that every input and output of the system meets the specified requirements.
* This is also called as Functional testing or specification based testing
* This testing in general are performed by independent testing teams from the end user point of view by testing expected outcomes for the invalid/valid inputs.
* This method of testing can be performed at every level of software testing like unit, integration, system, acceptance.
* Techniques: Decision table testing, error guessing , all pairing testing, equivalence partitioning

White Box Testing:

* In this testing, testers goal is to perform the analysis of the internal structure of software and the logic behind it.
* In testing needs string coding skills, full knowledge of the software and access to all source code nd architectural documents
* This is also called as Structural testing or logic-driven testing
* This is in general performed by developers as they check the statements and conditions, the code paths and dataflows to make sure there are no hidden errors or defect prone elements.
* This can be done at unit level as unit testing and also for integration and regression testing
* Techniques: control flow testing, data flow testing, branch testing

Grey Box Testing:

* This testing gives the advantages of both black box testing and white box testing methods while neutralizing most of the flaws through effective , balanced combining of the two.
* This method increases the coverage of testing techniques by focusing on all layers of the software tested regardless of its complexity.
* Tester should have skills to design test cases, also partial knowledge of the internal structure , including documentation on the data structure , architecture as well as functional specifications of the software.
* This is most useful at integration level.
* It is well suited for testing web applications because they doesn't have source code or binaries which makes them impossible to test using the white box method.
* Techniques: Matrix testing, regression testing, pattern testing

Is API Testing black box or white box testing?

Black box testing as tester need not to have knowledge of how API is constructed and will test with focus on input and output

Is automation testing black box or white box testing?

It can be both black box and white box testing depending on the scenarios in which automation is performed. It is black box as tester usually test he application without knowing the low level design or code of the application and sometimes automation test scripts need access to the db details hat are used in the application thus it can be type of white box testing as well.

What is difference between test strategy and test plan?

* Test plan document defines the approach, scope and intensity of efforts for software testing where as test strategy is a set of instructions which explains the test design and determine how the test should be performed.
* Test plan document can be changed but test strategy can't be changed
* Test plan happens independently where as test strategy is part of the test plan
* Test plan describes about the details where as test strategy describes about the general methodologies
* Test plan is done by test manager where as test strategy is done by task/Project manager
* Test plan is utilized at project level where as test strategy is utilized at association level for multiple projects
* Test plan has essential objective of how to test, when to test and who to test where as test strategy has essential objectives of what approach to pursue and which module to check.
* Components of test plan are test plan id, features to be tested, test techniques, testing tasks, features pass or fail criteria, test deliverables, responsibilities and schedules where as test strategy components as objectives, scope documentation formats, test processes, team reporting structure, client communication strategy etc.

What are the types of non functional testing?

* this is to test the non functional aspects like performance , usability, reliability etc.
* Non functional testing parameters are security, reliability, survivability, availability, usability, scalability, interoperability, efficiency, flexibility, portability, reusability.
* Types of non functional testing are performance testing, load testing, failover testing, compatibility testing, usability testing, stress testing, scalability testing, maintainability testing, volume testing, security testing, disaster recovery testing, compliance testing, portability testing, efficiency testing, documentation testing, recovery testing, localization testing, endurance testing, internationalization testing.

What is difference between smoke and sanity testing?

* Smoke testing is done to assure that the acute functionalities of program is working fine where as sanity is done to check bugs have been fixed after the build.
* Smoke is subset of acceptance testing where as sanity is subset of regression testing
* smoke testing is documented where as sanity is not documented
* smoke is either performed by either developers or testers where as sanity is done by testers
* Smoke testing may be stable or unstable where as sanity is stable
* Smoke testing scripted where as sanity is not scripted
* Smoke is done to measure the stability of the system / product by performing testing where as sanity is done to measure rationality of the system/product by performing testing
* Smoke testing is used to test all over function of the system where as sanity is used in the case of only modified or defect functions of system/product
* smoke can be performed manually or by automation tools where as sanity is done manually and can't be automated
* smoke is done when new product is build where as sanity is done after completion of regression testing.