SELENIUM

key Notes by **BHANU PRAKASH**

Java topics used in selenium:

1) java collections (list and set) (iterator, hasNext(), next(), size())
2) looping statements- for loop, foreach loop and while
3) Exception handling- try catch, throws
4) Methods of String class.
5) OOPS concepts-encapsulation, inheritance, abstraction, polymorphism.

Code optimization:-

The process of reducing number of statements but still getting the same output is called as code optimization.
Example:-

```
int i = 10;
int j = 20;
int k = i+ j;
System.out.println(k);
```

OR

```
int i = 10;
int j = 20;
System.out.println(i+j);
```

OR

```
int i = 10;
System.out.println(i+20);
```

OR

```
System.out.println(10+20);
```

Example:-

```
class Dog
{
String name = "Pinky";
}

Dog d1 = new Dog();
String n = d1.name;
int l = n.length();
System.out.println(l);
```

OR

```
Dog d1 = new Dog();
String n = d1.name;
System.out.println(n.length());
```

OR

```
Dog d1 = new Dog();
System.out.println(d1.name.length());
```

OR
System.out.println((new Dog()).name.length());

```
class Dog
{
static String name = "Blacky";
}

String n = Dog.name;
int l = n.length();
System.out.println(l);
```

OR

```
String n = Dog.name;
System.out.println(n.length());
```

OR

```
System.out.println(Dog.name.length());
```

Upcasting:-

```
Class A
{
	void testA()
	{
		System.out.println("A1");
	}

	void testB()
	{
		System.out.println("B1");
	}
}

Class B extends A
{
	void testC()
	{
		System.out.println("C2");
	}

	void testB()
	{
		System.out.println("B2");
	}
}

B b1 = new B();
b1.testA();//o/p A1
b1.textB();//o/p B2 as B() is overridden in class B
b1.testc();//o/p C2
```

```
A a1 = b1;
a1.testA();//o/p A1
a1.testB();//o/p B2
a1.testc();//compile time error as we cannot access the child class members using a parent class reference.
```

Converting child data type to parent data type is called as upcasting. Java supports auto upcasting (i.e A a1 = b1; here it is not needed to write A a1 = (A)b1)
After upcasting if we call any method that is present in both parent and child, then it will always execute method of child class (as it will be over ridden in child class).
After upcasting, we cannot call any method which is present only in the child class(it will be hidden).

```
interface A
{
	public void testA();
}

class B implements A
{
	public void testA()
	{
		System.out.println("A2");
	}
}

A a1 = new B();
a1.testA();//o/p is A2
```

Runtime polymorphism:-

The method/object behaves differently during runtime in different situations. this is called as runtime polymorphism. to acheive runtime polymorphism, we should perform following steps:-
1) Inheritance.
2) Method over riding.
3) Upcasting.

Example:-

```
interface A
{
	public void testA();
}

class B implements A
{
	public void testA()
	{
		System.out.println("B1");
	}
}
class C implements A
{
	public void testA()
	{
		System.out.println("C1");
	}
}
```

```
class Demo
{
	public static void main(String ar[])
	{

	}

	void testDemo(A a1)
	{
		a1.testA();
	}
}
```

In the above example, A is an interface which has an abstract method testA(), which is implemented in both class B and class C. The method testDemo(), accepts an argument of type A. Since A is parent for both B and C, for testDemo() method, we can pass the argument as an object of B class or an object of C class. Hence ouput of the testDemo() method, changes depending on the input argument which can be decided during runtime only. Example:- If we pass object of B class, we will get o/p as B1 else if we pass object of C class, the o/p will be C1.

Selenium:-

Selenium is a free and open source web application automation tool.
1) To use selenium for commercial purposes, we need not purchase any license. it can be free downloaded from "http://docs.seleniumhq.org/download"(selenium standalone server selenium-server-standalone-2.49.0.jar)
2) Selenium is open source i.e we can view/download/customize it. It is available at https://github.com/SeleniumHQ/selenium
3) Using selenium, we can automate web applications such as gmail, FB, linkedin,
4) Using selenium we can test the functionality of the application automatically.

Q. Can we do performance testing using selenium?
- No. We need to integrate selenium with jmeter

Q. What are the flavors of selenium?
- selenium core
- Selenium ide
- selenium rc- also called as selenium1
- selenium webdriver-also called as selenium 2

Q. What is latest version of selenium?
- 2.49.0

Q. Languages supported by selenium:-
- Java, C#, Ruby, python, JavaScript, perl, PHP, Objective-C, haskell, R, dart, Tcl

Q. Platforms supported by selenium:-
All platforms (UNIX does not have a browser and thus selenium cannot be used)

Assignments:-
Browsers supported by selenium:-

Q. What type of test case we select for automation?
1) Performance test cases
2) Unit test cases
3) Smoke test cases
4) **Regression test cases**
Answer: - Regression test case.

Q. Do we automate negative scenarios?

- Yes.

Q. Which type of test cases we should automate first?

- (Smoke)Sanity test cases first have to be automated.

Q. Can we do 100% automation?

- No because, we may have manual interventions(example:- authentication through bio metric scanner, capturing product details from the barcode scanner, captcha, OTP, Swiping a debit/credit card by swiping, verification of audio/video clips)
  https://www.actitime.com/download.php
  XAMP
  Apache mysql php

Installing selenium:-

- ✓ Go to the required folder and create a folder called "BSSW5".
- ✓ Open eclipse-->file-->switch workspace, select other.
- ✓ Browse and select newly created folder and click OK.
- ✓ It will restart the eclipse.
- ✓ Create a java project with the name "Automation".
- ✓ Copy selenium server standalone jar file.
- ✓ Right click on java project present in the eclipse and select paste.
- ✓ Right click on selenium jar file which is present inside java project. Go to build path and select "Add to build path".
- ✓ Create a package with the name "qspiders" under src.
- ✓ Then create a class with the name "Demo" and write the code as shown below and execute it.

```
package qspiders;
import org.openqa.selenium.firefox.FirefoxDriver;
public class Demo
{
	public static void main(String[] args)
	{
		FirefoxDriver f = new FirefoxDriver();
		f.close();
	}
}
```

Q. How selenium performs the action on the browser?

- By calling the native methods of the browser.

Q. Which protocol is used by selenium to communicate with the browser?

- JSON Wire(Java Script Object Notation)

Handling chrome browser:-

1) Go to "http://chromedriver.storage.googleapis.com/index.html?".
2) Click on the latest folder.(as of now 2.20)
3) Download the required zip file.
4) Unzip the file which will create a file with the name "chromedriver.exe"
5) Copy paste into required location.
6) Write the code as shown below and execute it.

```
package qspiders;
```

```
import org.openqa.selenium.chrome.ChromeDriver;
public class Demo
{
	public static void main(String[] args)
	{
	System.setProperty("webdriver.chrome.driver","D:\\Selenium\\Drivers\\chromedriver_win32\\chrome
driver.exe");
		ChromeDriver c = new ChromeDriver();
		c.close();
	}
}
```

Handling IE Browser:-

1) go to latest folder and download "IEDriverServer_win32_2.48.0.zip"
2) Unzip the file which will create a file with name "IEDriverServer_Win32_2.48.0.exe"
3) Copy paste in required folder.
4) Write code as shown below and execute:-

```
package qspiders;
import org.openqa.selenium.ie.InternetExplorerDriver;
public class Demo
{
	public static void main(String[] args)
	{
		System.setProperty("webdriver.ie.driver",
"D:/Selenium/Drivers/IEDriverServer_Win32_2.48.0/IEDriverServer.exe");
		InternetExplorerDriver i = new InternetExplorerDriver();
		i.close();
	}
}
```

Note:

Before executing the code, manually open IE browser.
Go to tools-->internet options.
Select the security tab.
Select "Enable protected mode" for all of internet, local intranet, trusted sites, and restricted sites.
Also ensure that browser zoom level is 100%.(ctrl+0 shortcut)

Q. Write a script to perform following steps on the user specified browser
1) Enter URL as http://www.google.com
2) Get the title and print it.
3) Close the browser.

```
package qspiders
import java.util.Scanner;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo
{
	public static void main(String[] args)
	{
		Scanner s = new Scanner(System.in);
		System.out.println("Browser?");
		String browser = s.next();
```

```
		if(browser.equals("GC"))
		{

	System.setProperty("webdriver.chrome.driver","D:\\Selenium\\Drivers\\chromedriver_win32\\chrome
driver.exe");
			ChromeDriver c = new ChromeDriver();
			c.testBrowser();
		}
		else
		{
			FirefoxDriver f = new FirefoxDriver();
			f.testBrowser();
		}
	}
	public static void testBrowser(WebDriver driver)
	{
		driver.get("http://www.google.com");
		String t = driver.getTitle();
		System.out.println(t);
	}
}
```

We do upcasting to achieve run time polymorphism, so that we can execute the same code(testBrowser()) on any browser.

Architecture of selenium:-

Bindings	WebDriver	Driver
java	API	Chrome driver
C#		IEDriver
Ruby		
python etc		

- Drivers is with respect to browsers
- Bindings are with respect to language in which code is written.
- Selenium supports multiple languages. For each language we have respective client binding which communicate with WebDriver API.
- WebDriver API uses browser specific drivers (chrome driver, IE driver etc) to perform the actions.

Architecture of webdriver:-

```
SearchContext (interface)
        ^
        |
  WebDriver(interface)
        ^
        |
 RemoteWebDriver(class)
```

FirefoxDriver, ChromeDriver classes extend the RemoteWebDriver class.

SearchContext is the super most interfaces in selenium which is extended by WebDriver interface. All the methods of these 2 interfaces, are implemented in RemoteWebDriver class and over ridden in respective browser classes (FirefoxDriver, ChromeDriver etc).
1) To run the script on any browser, we use upcasting.

2) We can upcast the object of the browser to any of its parent such as RemoteWebDriver or WebDriver or SearchContext.
3) It is a best practice to upcast the object to the maximum level possible. (may be SearchContext). But we should ensure that none of the required features are hidden. So, with respect to selenium WebDriver architecture, the best level to upcast is WebDriver as shown below
WebDriver driver = new FirefoxDriver();

```
package qsp;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo
{
	public static void main(String[] args)
	{
		WebDriver driver = new FirefoxDriver();
		driver.get("http://www.google.com");
		Thread.sleep(2000);
		driver.navigate().to("http://www.gmail.com");
		Thread.sleep(2000);
		driver.navigate().back();
		Thread.sleep(2000);
		driver.navigate().forward();
		Thread.sleep(2000);
		driver.navigate().refresh();
		Thread.sleep(2000);
		driver.quit();
}
```

Using the navigate() method, we can move forward and back. Using get() we cannot perform back and forward actions.
Q. How to open the page without using get()?

- Use navigate().to(URL) to open the page.

Q. What is the difference between get() and navigate()?

- Using get(), we can only enter the URL whereas using navigateTo(), we can enter URL, select back, select forward and refresh the page.

Q. Write a script to open google.com and verify that title of the page is "Google":

```
WebDriver driver = new FirefoxDriver();
driver.get("http://www.google.com");
String title = driver.getTitle();
If(title.equals("Google"))
{
	System.out.println("Pass");
}
else
{
	System.out.println("Fail");
}
```

Write a script to open google.com and verify that it is redirected to google.co.in

```
WebDriver driver = new FirefoxDriver();
```

```
driver.get("http://www.google.com");
String URL1 = driver.getTitle();
String URL2 = "google.co.in";
If(URL1.contains(URL2))
{
        System.out.println("Pass");
}
else
{
        System.out.println("Fail");
}
```

***Practice the methods of String class.

HTML:-

1) Before performing any action such as clicking and typing, we should specify the element on which the action needs to be performed.
2) Anything present on the web page is called as element such as textbox, button, link, checkbox, listbox etc.
3) These elements are created using HTML.
4) HTML stands for hyper Text Markup Language
5) We can use notepad itself to write HTML code by saving it we should specify the extension as ".html".

Example:- Open notepad and write code as shown below.

```
<html>
<body>
UN:<input type = "text" value = "admin">
PW:<input type = "password" value = "abc">
<input type = "button value = "Login"><br>
<input type = "checkbox">Remember
<a href = "http://www.google.com">Forgot pwd?</a>
</body>
</html>
```

Go to file and select save.
Navigate to required location and save the file with html extension. Double click on file which opens the page in browser.
Opening the html file in selenium

```
WebDriver driver = new FirefoxDriver();
Driver.get("/Users/guruprasadsr/Desktop/Hi.html");
```

Components of WebElement:-

Any element present in the web page contains following components.

1) Tag – Anything present after "<" Example: - html, body, input, a, br etc
2) Attribute: - Anything present after the tag till the ">" symbol. Example:- type, id, class, value, name etc
3) Text: - Anything present after the ">" symbol till the end of the tag. Example:- Forgot password?, Remember etc

Example: -

Qspiders

a is the tag, href = http://www.qspiders.com is the attribute and Qspiders is the text.

Locators:-

To find the element present on the page, we use locators. In selenium there are 8 types of locators. All are static

methods of By class. Locators are specified as argument for findElement(). Return type of findElement() is WebElement. WebElement is an interface. Following are the selenium locators.

1) By.tagName("str")
2) By.id("str")
3) By.name("str")
4) By.className("str")
5) By.linkText("str")
6) By.partialLinkText("str")
7) By.cssSelector("str")
8) By.xpath("str")

If the specified locator is matching with multiple elements, then findElement() returns the address of the first matching element.
If the specified locator is not matching with any of the elements, then find Element() will throw NoSuchEelementException.

CSS Classic Style Sheet:
CSS Selector is an expression it has the following syntax
tag[attributeName = 'attributeValue']

Example:-

```
<html>
<body>
        UN:<input type = "text">
        PWD:<input type = "password">
</body>
</html>
```

In the above web page to identify the password field, we cannot use id, name, className, linkText or partialLinkText because they are not available. We can use tagName but, it is duplicate with UN. In this scenario, we can use cssSelector
Example: -

```
WebDriver driver = new FirefoxDriver();
Driver.get("files:///Users/guruprasadsr/Desktop/D-Drive/Selenium/java_Tutorials/HTML/DemoUNPWD.html");
driver.findElement(By.tagname("input")).sendKeys("abcd");
driver.findElement(By.cssSelector("input[type='password']")).sendKeys("xyz");
```

If following error is displayed for sendKeys(), then change the compiler version of the eclipse to the latest version.
Error: -
The method sendkeys() in the type WebElement is not applicable for arguments (String).
Solution: -

1) Right click on java project and select properties.
2) Click on java compiler and select latest version such as 1.7 or 1.8 under the 'Compiler compliance level'.
3) Click on 'Ok'

Firebug and Firepath: -
To inspect the element when the right clicking is disabled, we can use Firebug. It is an add on for Mozilla Firefox browser. To install it

1) Open the Firefox browser.
2) Go to tools and select add ons.
3) Search for firebug.
4) Click install button of firebug.

- Go to the required webpage. Press f12 which opens firebug window. Click on inspect button. Then click on required element. In chrome and IE browsers, press f12 which opens developer tool bar. Click on

inspect button and then click on required element.

- To write CSS expression, we can use a tool called firepath. To install it, go to tools add ons and search for firepath. Click on install button of firepath.
- To write and check css expression, press f12 and click on firepath tab. Select CSS option.(by default it will be XPATH). Type the css expression and press enter, it will highlight the matching element.
- To write CSS in Google chrome: -
- Press f12. Then press control+f and type the css expression in the text box available at the bottom. Of the developer tool bar.

Example:-

```
<html>
<body>
        FN:<input type = "text">
        LN:<input type = "text">
</body>
</html>
```

In the above web page, to identify the last name field we cannot use id, name, className, linkText, partialLinkText locators because they are not present. We can use tagName or cssSelector but both are duplicate with first name field. In this situation, we can use xpath.

xpath:-

It is a path of an element in the html tree.
Html tree:-

```
document
  |→html
      |→body
          |→input FN
          |→input LN
```

Examples: -

```
/html/body/input matches with FN and LN both
/html/body/input[1] matches with FN only
/html/body/input[2] matches with LN only
```

Using xpath in selenium: -

```
WebDriver driver = new FirefoxDriver();
driver.get("files:///Users/guruprasadsr/Desktop/D-Drive/Selenium/java_Tutorials/HTML/DemoFNLN.html");
driver.findElement(By.tagname("input")).sendKeys("Guruprasad");
driver.findElement(By.xpath("/html/body/input[2]")).sendKeys("S");
```

DemoTable.html
file:///Users/guruprasadsr/Desktop/D-Drive/Selenium/Java_Tutorials/HTMLs/DemoTable.html

Absolute xpath:

Example: -

```
<html>
<body>
    <table border = "1">
    <tbody>
        <tr>
```

```
                    <td>SQL</td>
                    <td>300</td>
                </tr>

                <tr>
                    <td>Java</td>
                    <td>400</td>
                </tr>

        </tbody>
</body>
</html>
```

html tree

```
html
 |→body
   |→table
        |→tbody
            |→tr
                |  |→td SQL
                |  |→td 300
            |→tr
                |→td Java
                |→td 200
```

1) If we specify the path of the element, from the beginning of the tree(html) till the element then it is called as absolute xpath.
2) While writing this xpath, we use single / which represents immediate child element.
3) We can use index in xpath which always starts from 1.
4) Index will be 2 if the tag of the element is same which is present under the same parent.

Absolute xpath	Matching Element
/html/body/table/tbody/tr/td	SQL, 300, Java, 400
/html/body/table/tbody/tr[1]	SQL,300
/html/body/table/tbody/tr[1]/td[1]	SQL
/html/body/table/tbody/tr[1]/td[2]	300
/html/body/table/tbody/tr[2]	Java, 400
/html/body/table/tbody/tr[2]/td[1]	Java
/html/body/table/tbody/tr[2]/td[2]	400
/html/body/table/tbody/tr/td[1]	SQL,java
/html/body/table/tbody/tr/td[2]	300,400
/html/body/table/tbody/tr[1]/td[1]| /html/body/table/tbody/tr[2]/td[2]	SQL,400
/html/body/table/tbody/tr[1]/td[1] | /html/body/table/tbody/tr[1]/td[2] | /html/body/table/tbody/tr[2]/td[2] OR /html/body/table/tbody/tr[1]/td | /html/body/table/tbody/tr[2]/td[2]	SQL,300,400

Writing absolute xpath on the elements which are present in the webpage will be very lengthy. To reduce the length, we use relative xpath.

Relative xpath: -
In relative xpath, we use '//' which represents any child element (descendants)

Example:-

Relative xpath	Matching Element
//td	SQL, 300, Java, 400
//tr[1]/td	SQL,300
//tr[1]/td[1]	SQL
//tr[1]/td[2]	300
//tr[2]/td	Java, 400
//tr[2]/td[1]	Java
//tr[2]/td[2]	400
//td[1] OR //tr/td[1]	SQL,java
//td[2] OR //tr/td[2]	300,400
//tr[1]/td[1] | //tr[2]/td[2]	SQL,400

//tr[1]/td[1] |
//tr[1]/td[2] |
//tr[2]/td[2]
OR
//tr[1]/td | //tr[2]/td[2]
	SQL,300,400

Interview Questions: -
Q. What is the difference between / and // ?

- / represent immediate child and // represents any child or descendant.

Q. Derive the xpath which matches with all the links present on the webpage?

- //a

Q. Difference between //a and //table//a ?

- //a matches with all the links which are present in the entire page. //table//a matches with all the links which are present inside all the tables.

Q. Write xpath which matches all the images and links present on the webpage?

- //img | //a

```
WebDriver driver = new FirefoxDriver();
Driver.get("file:///Users/guruprasadsr/Desktop/D-Drive/Selenium/Java_Tutorials/HTMLs/DemoFNLN.html");
driver.findElement(By.xpath("//input")).sendkeys("a");
driver.findElement(By.xpath("//input[1]")).sendkeys("b");
driver.findElement(By.xpath("//input[2]")).sendkeys("c");
```

When we get the driver object, the below are the methods that we can perform operation on a driver. In IDE like eclipse, when we enter driver. and click on space bar, it will show all the below methods.All these come under WebElement

1. get()
2. getCurrentUrl();
3. getTitle()
4. findElements()
5. findElement()

6. getPageSource()
7. close()
8. quit()
9. getWindowHandles()
10. getWindowHandle()
11. navigate()
12. manage()
13. switchTo()

Other methods:

14. getAttribute()
15. getLocation()
16. click()
17. clear()

1. Method Name :- get()

Syntax: get(url)
Example: driver.get();
Purpose: It will load a new web page in the current browser window. This is done using an http get operation, and the method will block until the load is complete.
Parameters: URL - The URL to load and it should be a fully qualified URL

2. Method Name: getCurrentUrl()

Syntax: getCurrentUrl()
Example: driver.getCurrentUrl();

Returns: The URL of the page currently loaded in the browser

3. Method Name: getTitle()

Syntax: getTitle()
Example: driver.getTitle();
Purpose: Gets the title of the current web page.
Returns: The title of the current page, with leading and trailing white space stripped, or null if one is not already set

4. Method Name: findElements()

Syntax: findElements(By by)
Example: driver.findElements(By.xpath("//");

Purpose: Find all elements within the current page using the given mechanism.
Parameters: By - The locating mechanism to use
Returns: A list of all WebElements, or an empty list if nothing matches

5. **Method Name: findElement()**

Syntax: WebElement findElement(By by)
Example: driver.findElements(By.xpath("//");
Purpose: Find the first WebElement using the given method.
Parameters: By - The locating mechanism
Returns: The first matching element on the current page Throws: NoSuchElementException - it will return exception if no matching elements are found

6. **Method Name: getPageSource()**

Syntax: getPageSource()
Example: driver.getPageSource();
Purpose: Get the source of the currently loaded page. If the page has been modified after loading (for example, by Javascript) there is no guarantee that the returned text is that of the modified page.
Returns: The source of the current page

7. **Method Name: close()**

Syntax: void close()
Example: driver.close();
Purpose: Close the current window, if there are multiple windows, it will close the current window which is active and quits the browser if it's the last window opened currently.

8. **Method Name: quit()**

Syntax: void quit()
Example: driver.quit();
Purpose: Quits this driver instance, closing every associated window which is opened.

9. **Method Name: getWindowHandles()**

Syntax: Set getWindowHandles()
Example: driver.getWindowHandles();
Purpose: Return a set of window handles which can be used to iterate over all the open windows of this Webdriver instance by passing them to switchTo().WebDriver.Options.window()
Returns: A set of window handles which can be used to iterate over all the open windows.

10. **Method Name: getWindowHandle()**

Syntax: String getWindowHandle()
Example: driver.getWindowHandle();
Parameter: Return an opaque handle to this window that uniquely identifies it within this driver instance. This can be used to switch to this window at a later date switchTo

WebDriver.TargetLocator switchTo() The next future commands will be performed to a different frame or window.

11. **Method Name: navigate()**

Syntax: WebDriver.Navigation navigate()
Example: driver.navigate.to("");
Purpose: An abstraction allowing the driver to access the browser's history and to navigate to a given URL.
Returns: A WebDriver.Navigation that allows the selection of what to do next

Click here to know more on Navigation methods

12. Method Name: manage()

Syntax: WebDriver.Options manage()

Purpose: Gets the Option interface

Returns: An option interface

13. switchTo()

Syntax: Webdriver.TargetLocator()switchto()

Purpose: Send future commands to a different frame or window.

Returns:A TargetLocator which can be used to select a frame or window

3. Xpath by attribute:

Using relative xpath we can reduce the length of expression but it may match with multiple elements even after using index.In order to identify the element uniquely we can use attribute in the xpath expression using following syntax:

//tag[@AttributeName='AttributeValue']

Example: //input[@placeholder='Username']

IQ 1]Can we use multiple attribute in the xpath expression Ans:

Yes

Example:1) //input[@placeholder='Username' AND@name='username']

//input[@placeholder='Username' OR name='username']

2)//input[@value='Log In']

3)//input[@id='next']

4)//input[@value='Next']

4.Xpath by text():

If attribute is not present (or) attribute is matching with multiple elements in such cases we can use xpath by text,which has following syntax:

//tag[text()='textvalue']

Example: **1)**//div[text()='Login']

2)//div[text()='USERS']

NOTE: In the same xpath expression we can specify both attribute and text()

HANDLING NON-BREAKABLE SPACE:

1)developer can give the space in the value using spacebar or using Keyword ** **[non breakable space]

2)when we inspect the element in the browser we cannot make out whether   is used or not

3)If value has   then xpath will not identify such elements

Example:

```
<html>
<body>
    <button type=”submit>&nbspOK </button>
</body>
</html>
```

IN FIREBUG:

*<button type=”submit”> OK </button> not identify the element

*//button[text()=’ OK ‘] not identify the element To handle non breakable space we should use contains() which has following syntax:

//tag[contains(text(),’textvalue’)]

//tag[contains(@AttributeName,’AttributeValue’)]

Example:

1) attribute example
button[contains(text(),’OK’)]

Example: //input[contains(@value,’Create Type of Work’)]login to actitime>settings>types of work>create types of work> create types of work>

2)text example

//a[contains(text(),’delete’)]

NOTE:

We use contains() if value has **non-breakable** space or if **value is keep changing**.

Example://span[contains(text(),'Inbox')]

XPATH TRAVERSING

We can derive a xpath expression which can navigate from one element to another element which is called as traversing.It supports 2 types of traversing;

1) Forward Traversing

2) Backward Traversing

EXAMPLE:

```
<html>
    <body>
        <table border="1">
        <tbody>
            <tr>
<td>1</td>
                <td>Unix</td>
                <td>300</td>
            </tr>
            <tr>
                <td>2</td>
                <td>Java</td>
                <td>400</td>
            </tr>
        </tbody>
</table>
</body>
</html>
```

1) FORWARD TRAVERSING:

Navigating from parent element to any of its child element is called as forward traversing.

Example:

Navigating from;

table to Unix;

//table/tbody/tr[1]/td[2]

Table to java;

//table/tbody/tr[2]/td[2]

2) BACKWARD TRAVERSING:

Navigating from child element to any of its parent element is called as backward traversing

Example:

Navigating from;

Unix to table;

//td[text()='Unix']/../../..

Java to table;

//td[text()='Java']/../../..

5) INDEPENDENT DEPENDENT XPATH:

If the element is completely changing (or) it duplicate with some other elements we can use independent dependent concept of xpath to identify it.

EXAMPLE:

Derive xpath to identify cost of UNIX

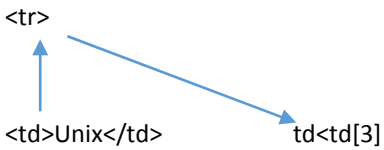
Step#1: Inspect the independent element and Note down its source code.

Step#2: Place the mouse pointer on the source code of independent element and move the mouse pointer in upward direction step by step till it highlights both independent and dependent element. This will be the common parent ,add it to the html tree

Step#3:

Use arrow key to navigate till dependent element, add its path to the html tree.

Step#4: Using the tree derive the xpath expression which navigates from independent element to common parent and then to dependent element



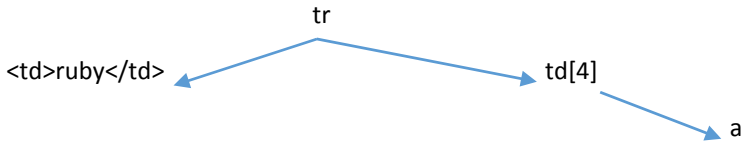
//td[text()='Unix']/../td[3]

NOTE:

While doing forward traversing we should navigate till end i.e, expand all the + sign.

IQ2)Derive the xpath to match with download link of ruby present in download page of selenium

Ans:



//td[text()='Ruby']/../td[4]/a

Note :

The above xpath identifies the link which is present in 4th column only.To identify the download link even if column is keep changing we can use below xpath;

//td[text()='Ruby']/..//a[text()='Download']

Example in actiTime: //a[text()='Vidya']/../..//a[text()='set by default']

Assignment:

1) **Derive a xpath to identify the price of Mi 4i(Blue 16GB) present in flipkart**
   //span[text()=' Rs. 11,998']
2) **Derive a xpath to identify add to compare checkbox of Redmi2 Prime(Grey 16 GB) in flipkart**
   //input[@id='MOBE9T7GTHERTDAC']

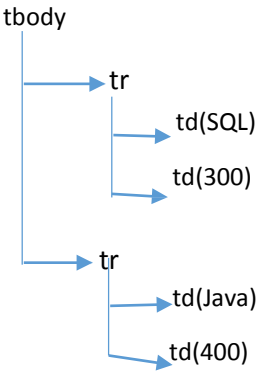
3) Derive a xpath to identify phone number of Mumbai present in isrtc.com

4) Identify help icon(?) present in actitime application;

(//div[@class='popup menu arrow'])[3]

Note:

Sometimes we may not be able to identify the element even after using all types of xpath which is previously discussed.In such case we use GROUP INDEX(GI)



*//td[1]->SQL

*(//td)[1]->SQL

*(//td)[3]->Java

*(//td[1])[2]->java

IQ3)What is the difference between //a, //a[1], (//a)[1] 1.all

the links

2.all the first links

3.only first link

IQ4)Derive the xpath which matches with last checkbox.

Answer: (//input[@type='checkbox'])[last()]

IQ5)Write a xpath to select first and last checkbox

(//input[@type='checkbox'])[1]|(//input[@type='checkbox'])[last()]

|||ly

*(//input[@type='checkbox']

*(//input[@type='checkbox'])[1]

*(//input[@type='checkbox'])[6]

IMPORTANT LOCATORS:

1) Id

2) name

3) linkText

4) xpath

Note:

In very few situations xpath written using a browser(Firefox)may not work in some other browser,in such cases we can use CssSelector.

CONVERTING XPATH TO CSSSELECTOR:

XPATH	CSSSELECTOR
1) //button[@type='submit']	button[type='submit']
2) //input[@id='UN']	input#UN
3) //input[@class='c1']	input.c1
4) //a	a
5) //tr/td	tr>td
6) //table//a	table a
7) //td/..	Backward traversing is not supported in selenium
8) //td[text()='Java']	text() is not supported in selenium

IQ6) Can we use independent dependent concept in selenium Ans;

No,because backward traversing is not supported in selenium

Note: 1) get() will enter the Url and wait till the page is completely loaded.Waiting time of get() is **infinite.**

2)findElement() will search for specified element in the current page,if it is present it will returns the address of the element.If it is not there it will trow NoSuchElementFoundException IMMEDIATELY.

SYNCHRONIZATION:

Process of matching Selenium speed with application is called as synchronization .In order to synchronize the script we can use sleep() of Thread class as shown below;

```
Try
{
Thread.sleep(30000);
}
catch(InterruptedException e)
{
}
```

IMPLICITLY WAIT:

If we use sleep(),It will drastically increase maintenance consumes lot of time and space.Instead of this we can use implicitly wait statement of selenium.

Example: driver.manage().timeouts.implicitlyWait(30,TimeUnit.SECONDS);

In the above example 30SECONDS is used by all the findElement method and each findElement() waits upto 30 SECONDS.

After every half second it will search for element in page till the time out or till the element is located which ever comes earlier,This is called **POLLING PERIOD**.This is specified in a class called FluentWait.

The implicitelyWait() takes 2 arguments i.e,duration(long type) and Timeunit() such as DAYS,HOURS,**SECONDS**,**MINUTES**,MILLISECONDS,MICROSECONDS and NANOSECONDS

If element is not located even after the time out then FindElement() will throw NoSuchElementException

EXPLICIT WAIT:

*If the method is other than findElement then to synchronize it we can use explicit wait.

*webDriverWait itself is called as Explicitwait because we specify waiting condition Explicitly These

conditions are available in ExpectedConditions class,these are also called as Predicates.

*If specified condition is not specified even after the specified duration then explicitWait will throw TimeoutException(Selenium unchecked exception)

Code:

```
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.ExpectedConditions;
import org.openqa.selenium.support.ui.WebDriverWait;
```

```
public class Demo010216 {

	public static void main(String[] args)
	{
		//script to login to actitime
		//open the browser
		WebDriver driver=new FirefoxDriver();
		//enter the url
		driver.get("http://localhost/login.do");
		//enter the username
		driver.findElement(By.id("username")).sendKeys("admin");
		//enter the password
		driver.findElement(By.name("pwd")).sendKeys("manager");
		//click on login button
		driver.findElement(By.xpath("//div[text()='Login ']")).click();
		//wait till logout link is visible within 30Sec
		WebDriverWait wait=new WebDriverWait(driver,30);
		wait.until(ExpectedConditions.visibilityOfAllElementsLocatedBy(By.id("logoutLink")));
		//get the title of home page and print it
		String title=driver.getTitle();
		System.out.println(title);


	}

}
```

IQ7) What are the differences between ImplicitWait and ExplicitWait

ImplicitWait	ExplicitWait
1) We do not specify any condition	We should specify the condition
2) We can only handle findElement() and findElements()	We can handle any method
3) After the timeout we get NoSuchElementException	After the timeout we get TimeOutException
4) Time unit can be DAYS,HOURS,SECONDS etc	It can be only SECONDS

IQ8) Write a script to login and logout from the application without specifying any type of waiting duration(period)

Answer:
```
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.ExpectedConditions;
import org.openqa.selenium.support.ui.WebDriverWait;

public class Demo010216 {
```

```
	public static void main(String[] args)
	{
		//script to login to actitime
		//open the browser
		WebDriver driver=new FirefoxDriver();
		//enter the url
		driver.get("http://localhost/login.do");
		//enter the username
		driver.findElement(By.id("username")).sendKeys("admin");
		//enter the password
		driver.findElement(By.name("pwd")).sendKeys("manager");
		//click on login button
		driver.findElement(By.xpath("//div[text()='Login ']")).click();
		while(true)
		{
			try
			{
				driver.findElement(By.id("logoutLink")).click();
				break;
			}
			catch(Exception e)
			{
			}
			}
		}

	}
```

IQ9) How do you click on a button without using click()

Answer: By pressing enter key

```
import org.openqa.selenium.By;
import org.openqa.selenium.Keys;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo01216 {

	public static void main(String[] args)
	{
		WebDriver driver = new FirefoxDriver();
		driver.get("https://demo.vtiger.com/");
		driver.findElement(By.xpath("//button[text()='Sign in']")).sendKeys(Keys.ENTER);
		driver.findElement(By.xpath("//button[text()='Sign in']")).submit();
	}}
```

*We can also use submit() if button type=submit

```
	<button type="submit">sign in</button>
```

*We can also use java script to click on a button

IQ10) How do you change the value present in the text box Ans:

Using clear() and sendkeys()

WebElement un=driver.findelement(By.id(“username”));

Un.clear();

Un.sendkeys(“bhanu”);

IQ11) How do you remove the value present in the text box without using clear() Ans:

un.sendkeys(Keys.CONTROL+”a”+Keys.DELETE);

IQ12)Write a script to copy paste the value present in one text box into another text box Ans:

un.sendkeys(Keys.CONTROL+”ac”+Keys. CONTROL+”v”);

IQ13)Write a script to print value present in the textbox.

Ans: WebElement un=driver.findElement(By.id(“username”));

String v=un.getAttribute(“value”);

System.out.println(v)

Limitation1:

In Selenium we cannot store the password in encrypted format.

IQ14)How do you retrieve tooltiptext of an element Ans:

using getAttribute(“title”)

```
import org.openqa.selenium.By;
import org.openqa.selenium.Keys;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo01216 {

	public static void main(String[] args)
	{
		WebDriver driver = new FirefoxDriver();
		driver.get("https://demo.vtiger.com/");
		WebElement chkBox=driver.findElement(By.name("remeber"));
		String tt = chkBox.getAttribute("title");
		System.out.println("tt");
	}}
```

IQ15)Write a script to find the phone number of mubai in isrtc.com

```
import org.openqa.selenium.By;
import org.openqa.selenium.Keys;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo01216 {
```

```
	public static void main(String[] args)
	{
		WebDriver driver = new FirefoxDriver();
		driver.get("https://demo.vtiger.com/");
		WebElement chkBox=driver.findElement(By.name("remeber"));
		String tt = chkBox.getAttribute("title");
		System.out.println("tt");


	}

}
```

IQ16)What is the difference between getAttribute() & getText()

Ans: getAttribute() get the value of the specified attribute where as getText() is used to get the text of the specified element

IQ17)Write a script to print x and y co-ordinates of an element.

```
import org.openqa.selenium.By;
import org.openqa.selenium.Point;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo622016 {

	public static void main(String[] args)
	{
		WebDriver driver = new FirefoxDriver();
		driver.get("http://localhost/login.do");
		Point p=driver.findElement(By.id("username")).getLocation();
		int x=p.getX();
		int y=p.getY();
		System.out.println(x);
		System.out.println(y);
		driver.close();

	}

}
```

IQ18)Write a code to print height and width of the code

```
import org.openqa.selenium.By;
import org.openqa.selenium.Dimension;
import org.openqa.selenium.Point;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
```

```
public class Demo622016 {

	public static void main(String[] args)
	{
		WebDriver driver = new FirefoxDriver();
		driver.get("http://www.gmail.com");
		Dimension d=driver.findElement(By.id("next")).getSize();
		int h=d.getHeight();
		int w=d.getWidth();
		System.out.println(h);
		System.out.println(w);
		driver.close();

	}

}
```

IQ19)Write a code to print font size and color of the username text box in actiTime application

```
import org.openqa.selenium.By;
import org.openqa.selenium.Dimension;
import org.openqa.selenium.Point;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo622016 {

		public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.get("http://localhost/login.do");
		WebElement un = driver.findElement(By.id("username"));
		String fs = un.getCssValue("font-size");
		System.out.println(fs);
		String fc = un.getCssValue("color");
		System.out.println(fc);
		String ff = un.getCssValue("font-family");

		System.out.println(ff);

		driver.close();

	}

}
```

OUTPUT:

14px

Rgba(0,0,0,1)

MS Shell Dlg\32

IQ20)Write a script to verify that login button is enabled

```
import org.openqa.selenium.By;
import org.openqa.selenium.Dimension;
import org.openqa.selenium.Point;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo622016 {

	public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.get("http://localhost/login.do");
		WebElement button = driver.findElement(By.id("loginButton"));
		if(button.isEnabled())
		{
			System.out.println("Login Button is Enabled");
		}
		else
		{
			System.out.println("Login Button is not Enabled");
		}

		driver.close();

	}

}
```

IQ21)Write a script to verify that Next button in the gmail login page is visble(hint:using isDisplayed())

IQ22)Write a script to verify whether keep me logged in checkbox present in facebook login page is selected or not?(hint:isSelected())

Note:

1.isSelected() can be also used on radio button

2.Importent mathods of WebElement Interface

1. clear()
2. **click()***
3. **getAttribute()***
4. getCssValue()
5. getLocation()
6. getSize()
7. getTagName()
8. **getText()***
9. isDisplayed()
10. isEnabled()
11. isSelected()

12. **sendKeys()***
13. submit()

last page:

InvalidStateElementException(Unchecked Selenium Exception)

EXECUTING JAVA SCRIPT

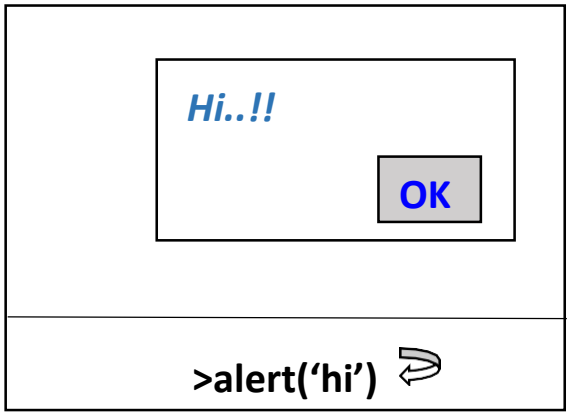
Sometimes Selenium methods such as **click(),sendKeys() etc**.,may not work as an alternative option or work around we can use java script.

EXECUTING JAVA SCRIPT MANUALLY:

Step#1: Open FireFox browser and open the required web page.press **F12** which opens firebug window.

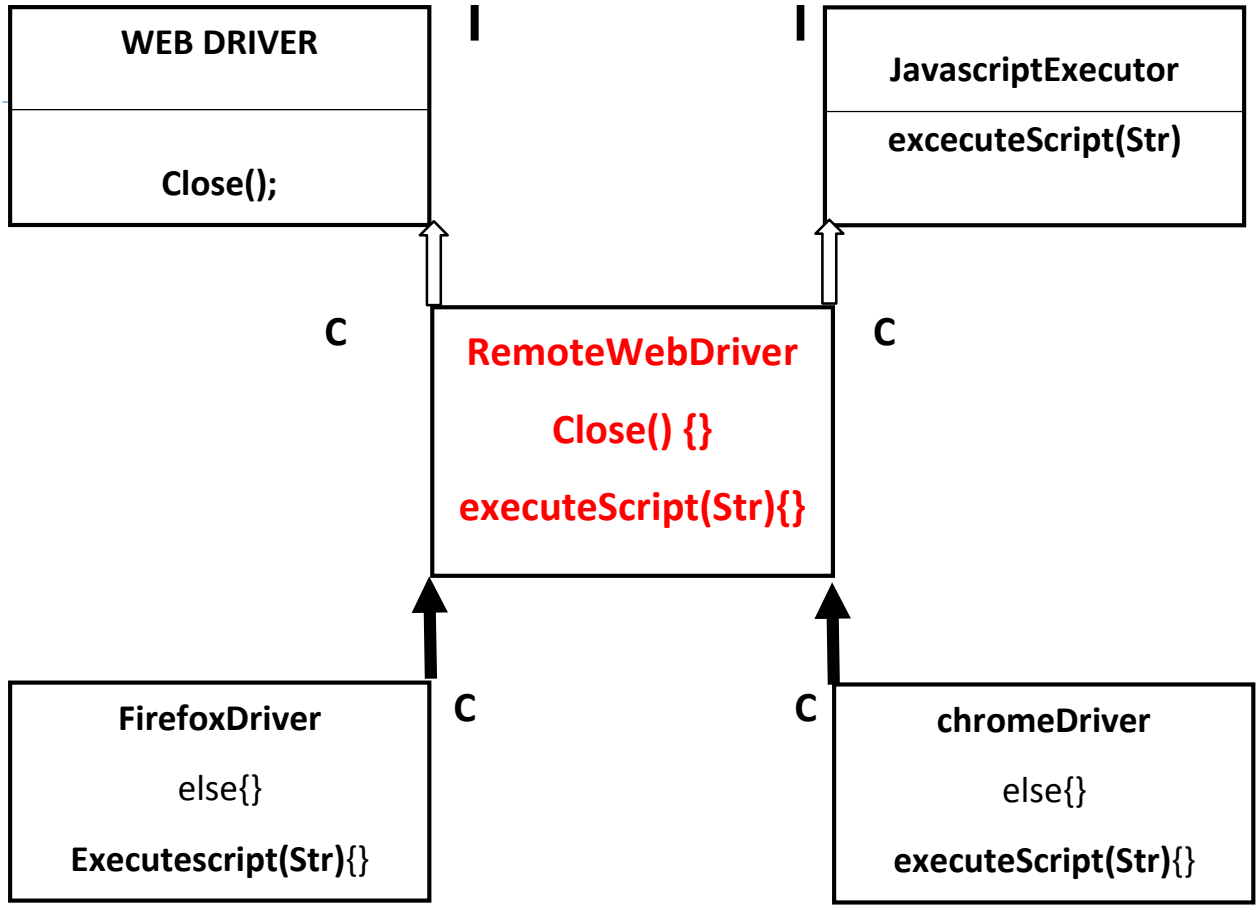
Step#2: Click on console tab

Step#3: Type the javascript statement in the text box which is available at rite the java script statement in the text box which is available at the bottom of the firebug window and press enter



EXECUTING JAVA SCRIPT PROGRAMMATICALLY:

To run the java scripts programmatically in selenium we should use **excecuteScript()** of **JavascriptExcecutor**.Generally the object of the browser will be upcasted to WebDriver interface hence excecuteScript()will be hidden.In order to access this method either we should downcast it to RemoteWebDriver class or we should type cast it to JavascriptExcecuter interface



IQ23)Write a code to click() on the button using java script

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.remote.RemoteWebDriver;

public class Demo062 {

        public static void main(String[] args) {
        Interface  WebDriver driver = new FirefoxDriver();
                driver.get("http://localhost/login.do");
                RemoteWebDriver r=(RemoteWebDriver) driver;
                r.executeScript("document.getElementById('loginButton').click()");

        }}
```

Browser
Constructor
Up-Casting
Down casting

IQ24) Write a script to enter the text into text box without using sendKeys()

```
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.remote.RemoteWebDriver;

public class Demo062 {
```

```
        public static void main(String[] args) {
         WebDriver driver = new FirefoxDriver();
         driver.get("https://demo.vtiger.com/");
         String c = "document.getElementById('username').value='abc'";
         JavascriptExecutor j = (JavascriptExecutor) driver;
         j.executeScript(c);
    }

}
```

IQ25) How do you enter the text if the text box is disabled using JavaScript**

```
<html>

<body>

UN:<input id=”username” type=”text” disabled>

</body>

</html>
```

```
        WebDriver driver = new FirefoxDriver();
        driver.get("file:///c:/demo.html");
        String c = "document.getElementById('username').value='bhanu'";
        JavascriptExecutor j = (JavascriptExecutor) driver;
        j.executeScript(c);
```

IQ26) Write a script to scroll to the bottom of the page**

```
        WebDriver driver = new FirefoxDriver();
        driver.get("http://news.google.com/");
        String c = "window.scrollTo(0,document.body.scrollHeight)";
        JavascriptExecutor j = (JavascriptExecutor) driver;
        j.executeScript(c);
```

|||ly String c = "window.scrollTo(0,document.body.scrollHeight/2)"; for half

```
        String c = "window.scrollTo(document.body.scrollWidth,0)";for complete right
```

IQ27)Write a script to scroll to the element

(**hint:** find the x and y co-ordinates of the element using getLocation(),pass them as argument for javaScript)

Driver.findElement(By.id(“”)).getLocation()

Window.scrollTo(x,y)

IQ28)Write a script to take the photo of a application

```
import java.io.File;
import java.io.IOException;

import org.apache.commons.io.FileUtils;
import org.openqa.selenium.OutputType;
```

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import     org.openqa.selenium.support.events.EventFiringWebDriver;


public class Demo062
{

        public static void main(String[] args) throws IOException
        {
                WebDriver driver = new FirefoxDriver();
                driver.get("http://localhost/license.jsp");
                EventFiringWebDriver e=new EventFiringWebDriver(driver);
                File srcFile = e.getScreenshotAs(OutputType.FILE);
                File destFile = new File("c:/abc.png");
                FileUtils.copyFile(srcFile, destFile);
                driver.close();
        }

}
```

NOTE:

Limitation:

*using selenium we can take screen shot in PNG(portable network graphics) format only.we can not take the screenshot of popups,we cannot take screenshot of specific area in the page,we can not take the screenshot of multiple browser or desktop

* If the page is very lengthy it will automatically takes the screenshot of complete page.

ENCAPSULATION

"Process of hiding the data and binding with methods is called as encapsulation."

Example:

```
public class A

{

private int i;

public A()

{

i=10;

}

public int getValue()

{
```

```
return i;
}
}
Class B
{
Psvm()
{
A a1=new A();
S.o.p(a1.getValue());
}
}
```

For any given variable in java we should perform following steps;

1.Decleration

2.Initialization

3.Utilization

NOTE:

Usually initialize variables within constructor for encapsulation.

Example:

```
public class LoginPage
{
private WebElement unTextBox;
public LoginPage(WebDriver driver)
{
unTextBox=driver.findElement(By.id(“username”));
}
public void setUserName()
{
unTextBox.sendKeys(“admin”);
}
}
```

Example:

```
package qspiders;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;

public class LoginPage {

	private WebElement unTextBox;
	private WebElement pwTextBox;
	private WebElement loginButton;

	public LoginPage(WebDriver driver) {
		unTextBox = driver.findElement(By.id("username"));
		pwTextBox = driver.findElement(By.id("pwd"));
		loginButton = driver.findElement(By.id("loginButton"));
	}

	public void login(String un, String pw) {
		unTextBox.sendKeys(un);
		pwTextBox.sendKeys(un);
		loginButton.sendKeys(un);
	}

}
```

```
package qspiders;

import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo
{

	public static void main(String[] args)
	{
		WebDriver driver=new FirefoxDriver();
		driver.get("http://localhost");
		LoginPage l=new LoginPage(driver);
		l.login("admin","manager");

	}

}
```

Lastpage:

StaleElementReferenceException(unchecked Selenium Exception) We get this when the page is reloaded

```
package qspiders;

import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo2 {

	public static void main(String[] args) throws InterruptedException {
		WebDriver driver = new FirefoxDriver();
		driver.get("http://localhost");
		LoginPage l = new LoginPage(driver);
		l.login("abc", "xyz");
		Thread.sleep(3000);
		l.login("admin", "manager");
	}

}
```

StaleElementReferenceException:

When we run the following code it will perform following steps;

Step#1: Open the browser

Step#2: Open the login page

Step#3: Create the object of Login page class by initializing its elements such as username (a1), password (b1), login (c1).

Where a1, b1, c1 are the address of the current address of the respective elements.

Step#4: Go to address a1 and type abc

Step#5: Go to address b1 and type xyz

Step#6: Go to address c1 and click

Step#7: Since invalid username and password are not entered after clicking on login button, it will display error message by reloading the complete page

Step#8: After reloading elements will be having different address i.e,username(x1),password(y1) and loginButton(z1)

Step#9: It waits for 3 seconds, it will try to enter “admin”in a1 and it is old address of username which does not exist anymore hence we get StaleElementReferenceException

PAGE OBJECT MODEL

*It is one of the java design pattern.

*It is used to develop and test webpages.

*In selenium we use page object model to avoid staleElementReferenceException and to improve the performance of the code.

*In page object model we declare the element using FindBy Annotation(@FindBy) should be imported from following package;

Import org.openqa.selenium.support.FindBy;

It has the following syntax;

@FindBy(locator=”locatorValue”)

private webElement elementName;

We use initElement() [it is a static method] of pageFactory class to initialize all the elements of current class which are declared using @FindBy,it takes 2 arguments

1. WebDriver

2. Current object of the class

IQ29)What happens if we do not use initElements()

We get null pointer NullPointerException

IQ30)How do you develop Pageobject model class without writing constructors

In the POM class we include only declration and utilization and before calling any method of page object class in main method we use initElement statement.

Example:

```
@FindBy(id=”username”)
Private WebElement unTextBox;
//no constructor
Public void setUserName(String un)
{
unTextBox.sendKeys(un);
}
```

```
public static void main(String[] args) throws InterruptedException {
WebDriver driver = new FirefoxDriver();
driver.get("http://localhost");

Log inPage l=new LoginPage();

pageFactory.initElements(driver,l);

l.setUserName("admin");
```

We develop 2 types of classes

1. POM class: It is used to store the elements and its objects

2. Test class: It is used to execution purpose

Note:POM class is also called as Page object Repository because we use it to store elements(object of the page)

TestNG: (Test Next Generation)

It is an unit testing framework.

It is a tool used by developers to run unit test cases.It can also be used by automation engineers to run multiple automation scripts and to generate the execution results.

TestNG is available as plugin for eclipse.To install it perform the following steps;

#Step1: Go to help in eclipse

#Step2: Select eclipse marketplace

#Step3: Search for TestNG

#Step4: Click install button of TestNG for eclipse

#Step5: Follow the default instructions till finish

After restarting the eclipse right click on java project□Properties□click on java build path□

Library tab□click Add library□Select TestNG□Click next□Click Finish□click OK

TestNG class:

1.It is a java class which contains **Test method.**

2.Any method written using Test annotation(@Test).

3.When we run the TestNG class it automatically generates execution result in HTML format.The name of the file is 'emailable-report.html' which is present inside a folder called'test-output'

4.If the folder is not visible refresh the java project.

Example:

```
package pom;

import org.testng.Reporter;
import org.testng.annotations.Test;

public class Demo {

	@Test
	public void testA() {
		Reporter.log("hi", true);
	}
}
```

Note:

***To print the message in HTML report we use log reporter class to print same in console also we specify second argument as True

*While developing TestNG class do not use **default package, main method and s.o.p**

TestNG Suite

It is an xml file which contains list of TestNG classes which are to be executed,In order to create it right click on java project goto TestNG select convert to TestNG click Finish.It creates a file with the name testing.xml inside java project folder

Example:

<suite name="Suite"parallel="none">

<test name="Test">

<classes>

<class name="qsp.DemoA"/>

<class name=”qsp.DemoB”/>

</classes>

</test>

</suite>

Important tags of TestNG Suite:

1) <suite>
2) <test>
3) <classes>
4) <class>

In order to execute it right click on the xml file goto runAs select TestNG Suite

Note: We can directly execute multiple classes by right clicking on the package or java project but it execute them in the random order

IQ31)Can we have more than one Test method in TestNG class

Yes

IQ32)If multiple Test methods are present,In which order they will be executed?

In the alphabetical order

IQ33) How do you execute Test methods in required order

Using ‘priority’

Note:

*It always executes in ascending order.priority value need not be in continuous order it can be any integer values (+,-) and variables and decimals are not allowed.

*The default priority value is “0”

*If the priority is duplicate then those methods will be executed in alphabetical order

IQ34) How do you write run a test method multiple times

using invocationCount

IQ35) What is the default invocationCount

1

Note: *If invocationCount is less than or equal to 0(<=0), it will not execute the test method.

*For invocationCount we cannot use variables and decimal numbers.

IMPORTANT ANNOTATIONS OF TestNG

1. **@Test** indicates Test method
2. **@BeforeMethod** indicates that the method should be executed before the execution of every @Test method
3. **@AfterMethod** This method is executed after every @Test method
4. **@BeforeClass** this method is executed at the beginning of the TestNG class
5. **@BeforeClass** this method is executed at the ending of the TestNG class

Example Program:

```
package Demo;

import org.testng.Reporter;
import org.testng.annotations.AfterClass;
import org.testng.annotations.AfterMethod;
import org.testng.annotations.BeforeClass;
import org.testng.annotations.BeforeMethod;
import org.testng.annotations.Test;

public class Demo1 {

	public class DemoA
	{
		@BeforeClass
		public void openApp()
		{
			Reporter.log("open App",true);
		}
		@AfterClass
		public void closeApp()
		{
			Reporter.log("close App",true);
		}
		@BeforeMethod
		public void login()
		{
			Reporter.log("login",true);
		}
		@AfterMethod
		public void logout()
		{
			Reporter.log("logout",true);
		}
		@Test(priority=1)
		public void deleteuser()
		{
			Reporter.log("deleteuser",true);
		}
		@Test(priority=0,invocationCount=3)
```

```
	public void edituser()
	{
		Reporter.log("edituser",true);
	}
	@Test(priority=-1)
	public void registeruser()
	{
		Reporter.log("registeruser",true);
	}


}
}
```

OUTPUT:

```
open App
login
registeruser
logout

login
edituser
logout

login
edituser
logout

login
edituser
logout

login
deleteuser
logout

close App
```

IQ36)How do you create dependency in TestNG

Using “dependsOnMethods”

NOTE:

*If both priority and dendency are specified it will consider the dependency

*If both methods are independent then we will get TestNGException(unchecked TestNG exception)

Example program:

```
package Demo;

import org.testng.Assert;
```

```
import org.testng.Reporter;
import org.testng.annotations.Test;

public class Demo2 {

		@Test
		public void createUser()
		{
			Reporter.log("createUser",true);
			Assert.fail();
		}
		@Test(dependsOnMethods={"createUser"})
		public void deleteUser()
		{
			Reporter.log("deleteUser",true);

		}
	}
```

OUTPUT:

Failed: createUser

Skipped: deleteUser

IQ37)How do you fail TestNG test

using Assert.fail()

IQ38)How do we compare actual value with expected value without using ifelse statement

Using assertEquals() of Assert class

Example: Assert.assertEquals(actual,expected);

IQ39)what are the methods available under Assert class

- **1)** asserEquals()
- **2)** asserNotEquals()
- **3)** assertTrue()
- **4)** assertFalse()
- **5)** assertNull() (used to check whether object is initialized or not)
- **6)** assertNotNull()
- **7)** assertSame()
- **8)** assertNotSame()
- **9)** fail()

Note:

*All the above methods are static methods of Assert class.

***If comparison fails then remaining statements of the current Test method will not be executed

*To continue the execution even after the comparision fails we should use softAssert which has non-static methods.

Example:

```
package Demo;

import org.testng.Reporter;
import org.testng.asserts.SoftAssert;

public class Demo3 {

	{
		@Test
		public void create()
		{
			SoftAssert soft=new SoftAssert();
			Reporter.log("Step1", true);
			soft.assertEquals("abc", "xyz");
			Reporter.log("Step2", true);
			soft.assertAll();
			Reporter.log("Step3", true);

		}

	}

}
```

IQ40)What are the difference between Assert and SoftAssert

Assert	SoftAssert
If comparision fails,it will not execute the remaining statements of current method.	If comparision fails,it will execute the remaining statements of current method.
All the methods are static	All the methods are non-static
We do not call assertAll()	We should call assertAll()

*To verify major and critical features we use assert statements and to verify minor statements we use SoftAssert Statements

IQ41) How do you rerun only failed TestNG classes?

Using “testing-failed.xml” which is autogenerated by TestNG and it will be present inside test-output folder

Important link:

http://testing.org/doc/documentation-main.html

AUTOMATION FRAMEWORK

*It is the standard guideline,best practices and rules which should be followed while automating the application.

*We should use automation framework to have consistency.

*In automation framework we have three stages:

1)Framework design

2)Framework Implimentation

3)Framework Excecution

1. FRAMEWORK DESIGN

This is the initial stage where Automation lead or manager will specify the folder structures,naming conventions, types of files used etc., based on their past experience and project need.

Example:

Types of files used in the framework with their location

File type	Location
.java	Javaproject/src
.class	Javaproject/bin
.html	Javaproject/test-output
.xml	Javaproject
.jar	Javaproject/jarfiles
.exe	Javaproject/exefiles
.xlsx	Javaproject/TestData
.bat	
.war	

STEPS TO CREATE FOLDERS AND CONFIGURE THE FRAMEWORK:

#Step1: Goto required drive example:D drive and create a folder with the name BSSW5.

#Step2:I n eclipse goto file switch work space other.Browse and select newly created folder(D://BSSW5)click OK

#Step3: After restarting the eclipse create a java project with the name Automation

#Step4: Under the java project create a folder with the name jarfiles

#Step5: copy selenium jar file and paste it inside the above folder.

#Step6: Right click selenium.server.standalone file→go to build path→select add to build path.It will associate jar file with the java project

#Step7: Create a folder with the name exefiles under java project→copy chromedriver.exe and iedriversever.exe files and paste the exefiles folder

#Step8: Create a folder with the name testdata inside javaproject folder,it will be used to store excel files

#Step9: Right click on java project→goto properties→click on java build path→click on Add library→under library tab select TestNG→next→finish→ok

#Step10: Under src create 2 packages with a name pom and test scripts used to store pom class and testscripts of TestNG class

2. FRAMEWORK IMPLIMENTATION

In this stage each automation engineer will convert the assigned test cases into automation scripts by developing 2 types of classes

1)POM class

2) TestNG class

First we should develop POM class

Automation team will select the test case for automation based on following 2 criterias;

1)It should be part of regression testing,this information will be provided by manual testing team

2)Test case shoud not have any manual intervensions;

a) CAPTCHA(Completely Automated Public Turing test tell Computers and Humans Apart)

b) Bar Code Scanning

c) Bio metric scanning, access cards,OTP,Credit cards etc.,

Because of the above reason 100% automation is not possible

SAMPLE TEST CASES

TESTCASE 1: **Valid Login**;

Precondition: Login page should be present

Post Condition: Application should be closed

#step1: Enter valid user name

#step2: Enter valid password

#step3: Click on login button

#step4: Click on logout button

TESTCASE 2: Invalid Login:

#Step1: Enter invalid username

#Step2: Enter invalid password

#Step3:click on login button

#Step4: Verify that error message is displayed

TESTCASE 3: Verify build number:

#step1: Login to the application using valid user name and password

#step2: click on help icon

#step3: click on about actiTime

#step4: verify build number

#step5: click on close

#step6: click on logout

STEPS TO DEVELOP A POM CLASS:

#step1: Number of POM class Should be same as number of web pages present on the application i.e.,for each web page there should be a POM class

#step2: Name of the POM class should be same as Title of the respective Web page ending with the word "Page"

#step3:I n each POM class we should declare the elements using @FindBy and initialized using PageFactory class

#step4: The action which should be performed by the elements should be developed of methods

#step5: First execute test cases manually which gives more clarity on the steps,which are to be automated

#step6: While executing Test cases note down title of the page,elements present on the page and actions which s ould be performed on the elements

Example:

PAGE 1:

TitleLogin

Elementsusername text box,password textbox,Login button,error message.

Actions **#step1:** Enter a value in the UN

#step2: Enter a value in password text field

#step3: click on Login button.

#step4: verify error message is displayed or not.

PAGE 2:

Titleenter Time-Track

ElementsLogout link,Help,about actiTime,Build number,close.

Actions

#step1: Click on logout link

#step2: click on help

#step3: click on about actiTime

#step4: click on close

#step5: verify Build number

POM class for login Page:

```
package pom;

import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.support.FindBy;
import org.openqa.selenium.support.PageFactory;
import org.testng.Assert;

public class LoginPage {
	@FindBy(id="username")
	private WebElement unTextBox;

	@FindBy(name="pwd")
	private WebElement pwTextBox;

	@FindBy(id="loginButton")
	private WebElement loginButton;

	@FindBy(xpath="//span[contains(text()='invalid')]")
	private WebElement errMsg;
	public LoginPage(WebDriver driver)
	{
		PageFactory.initElements(driver, this);
	}
	public void setUserName(String un)
	{
		unTextBox.sendKeys(un);
	}
	public void setPassword(String pw)
```

```
	{
		unTextBox.sendKeys(pw);
	}
	public void clickLoginButton()
	{
		 loginButton.click();
	}
	public void verifyErrMsg()
	{
		Assert.assertTrue(errMsg.isDisplayed());
	}

}
```

POM class for Enter Time Track Page:

```
package pom;

import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.support.FindBy;
import org.openqa.selenium.support.PageFactory;
import org.testng.asserts.SoftAssert;

public class EnterTimeTrackPage {
	@FindBy(id = "logoutlink")
	private WebElement logoutLink;
	@FindBy(xpath = "(//div[@class='popup_menu_arrow')")
	private WebElement help;

	@FindBy(linkText = "About actiTIME")
	private WebElement aboutActiTime;

	@FindBy(xpath = "//img[@title='close']")
	private WebElement close;

	@FindBy(xpath = "//span[contains(text(),'build')]")
	private WebElement buildNumber;

	public EnterTimeTrackPage(WebDriver driver) {
		PageFactory.initElements(driver, this);
	}

	public void clicklogoutlink() {
		logoutLink.click();
	}

	public void clickhelp() {
		help.click();
	}

	public void clickAboutActiTime() {
		aboutActiTime.click();
	}
```

```
	public void clickClose() {
		close.click();
	}

	public void verifyBuildnumber(SoftAssert s, String eBuildNumber) {
		String aBuildNumber = buildNumber.getText();
		s.assertEquals(aBuildNumber, eBuildNumber);
	}

}
```

DEVELOPING TestNG CLASS (automation script)

1)For every manual TestCase we shpold develop TestNG class inside scripts package.

2)For all the Test cases there will be common steps such as preconditions and postconditions.instead of writing the code repetitively we use inheritance as shown below which increases code reusability;

BaseTest Class:

```
package scripts;

import java.util.concurrent.TimeUnit;

import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.testng.annotations.AfterClass;
import org.testng.annotations.BeforeClass;

public class BaseTest {
	public WebDriver driver;

	@BeforeClass
	public void preCondition() {
		driver = new FirefoxDriver();
		driver.get("http://localhost");
		driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);

	}

	@AfterClass
	public void postCondition() {
		driver.close();
	}
}
```

STEPS TO WRITE AUTOMATION SCRIPTS:

#step1: create a class under scripts package and the name of the class should be same as Respective Test case ID.

#step2: Extend it from BaseTest class

#step3: Create a Test Method and the name of the method should start with “test” and end with the class name

#step4: inside the test method write test case steps as in-line comments so that we will not skip any of the steps and it also helps the reviewer

#step5: After each in-line comment call the required method of POM class.

TEST SCRIPT 1:

```
package scripts;

import org.testng.annotations.Test;

import pom.EnterTimeTrackPage;
import pom.LoginPage;

public class ValidLogin extends BaseTest {
	@Test
	public void testValidLogin() {
		// enter valid un
		LoginPage l = new LoginPage(driver);
		l.setUserName("admin");
		// enter the password
		l.setPassword("manager");
		// click on login button
		l.clickLoginButton();
		EnterTimeTrackPage e = new EnterTimeTrackPage(driver);
		e.clicklogoutlink();

	}

}
```

HIDING METHODS OF OBJECT CLASS

In eclipse goto window □preferences□java□appearance□Type filters□Add□java.lang.Object□OK□OK

TEST SCRIPT 2:

```
package scripts;

import org.testng.annotations.Test;

import pom.LoginPage;

public class InvalidLogin extends BaseTest
{

	@Test
		public void testInvalidLogin()
		{
			// enter invalid un
			LoginPage lp = new LoginPage(driver);
			lp.setUserName("abc");
			// enter invalid password
			lp.setPassword("xyz");
			// click on login button
			lp.clickLoginButton();
			lp.verifyErrMsg();

		}

	}
```

TEST SCRIPT 3:

```
package scripts;

import org.testng.annotations.Test;
import org.testng.asserts.SoftAssert;

import pom.EnterTimeTrackPage;
import pom.LoginPage;

public class VerifyBuildNumber extends BaseTest {
	@Test
	public void testverifyBuildNumber() {
		SoftAssert s = new SoftAssert();
		// enter valid un
		LoginPage lp = new LoginPage(driver);
		lp.setUserName("admin");
		// enter valid password
		lp.setPassword("manager");
		// click on login button
		lp.clickLoginButton();
		// click on help
		EnterTimeTrackPage e = new EnterTimeTrackPage(driver);
		e.clickAboutActiTime();

		// verify Build Number
		e.verifyBuildnumber(s, "build 27261");
```

```
                //click on close
                e.clickClose();
                //click on logout
                e.clicklogoutlink();
                s.assertAll();

        }

}
```

NOTE: In order to open the login page and close the application only one time we can ude @BeforeSuite and @AfterSuite annotations.

3. FRAMEWORK EXECUTION

To run all the scripts present in the frame work we use TestNG suite file.

Example:

Right click on the scripts package go to TestNG Select convert to TestNG Finish

Right click on testing.xml file select testing suite Refresh the java project which will display test-output folder open emailable-report.hyml file in the browser to see the execution purpose

```
<suite name="Suite" parallel="none">
 <test name="Test">
  <classes>
   <class name="scripts.ValidLogin"/>
    <class name="scripts.InvalidLogin"/>
    <class name="scripts.VerifyBuildNumber"/>
  </classes>
 </test>
</suite>
```

URL:https://poi.apache.org/download.html

Section:29 September 2015-POI 3.13 available

SubSection: Binary Distribution

File:poi-bin-3.13-20150929.zip

DATA DRIVEN FRAMEWORK:

Testing the application with multiple inputs is called as data driven testing.If this feature is available in the framework then such type of file such as xl,xml,txt,csv.very frequently used is excel file we use the api provide by apache called POI.

POI (Poor obfuscation Implementation)

After downloading POI zip file extract it,It creates a folder with the name POI-3.13 within that we will have many files and sub folders only following 4 jar files are required;

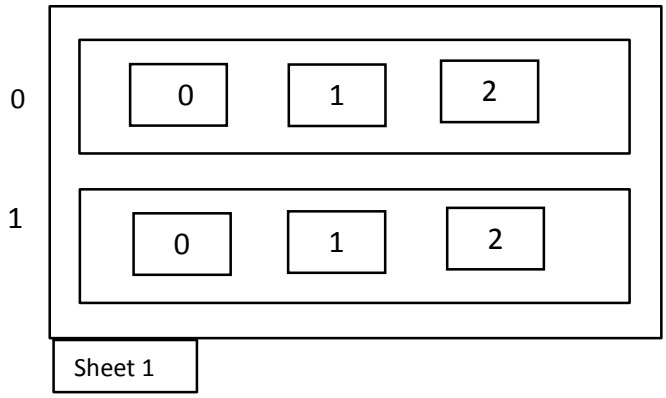
1) Poi-3.13
2) Poi-ooxml-3.13
3) Poi-ooxml-schemes-3.13
4) Xml beans

Copy all the above 4 jar files paste them inside jar files folder of the framework.

Select all these 4 jar files using control right click, go to build path and select add to build path.

STEPS TO READ DATA FROM A CELL:

D: Book1.xlsx



#Step1: Open xl fille(workbook)
#Step2: Goto sheet 1
#Step3: Goto row 0
#Step4: Goto cell 0
#Step5: Print cell

NOTE:

1) Tostring method is present in Object class and it is inherited in all the java classes.
2) toString method will return address of the current object but in string class it is overrided instead of returning the address it returns the value of the String.
3) If we specify any reference variable as arguments for println method,it automatically calls toString().
4) In cell class also toString() is overrided,it returns value present in the cell,instead of its address.
5) While reading data from xl sheet if specified sheet is not present or specified row or cell is blank we get NullPointerException.

*** **CODE TO FETCH DATA FROM EXCEL:**

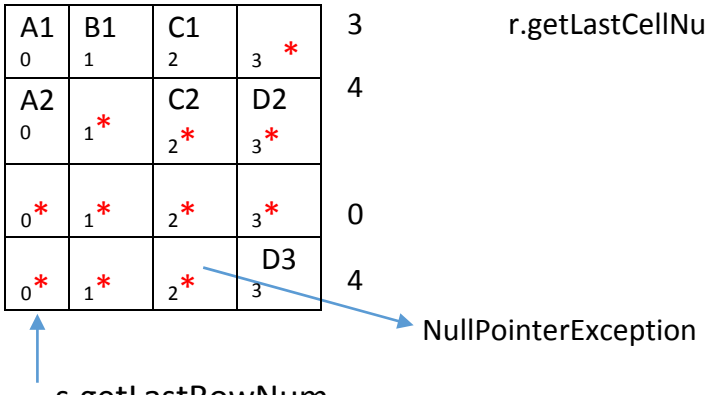
Write a script to print content of the excel sheet.

```
package generics;

import java.io.FileInputStream;
import java.io.IOException;
import org.apache.poi.EncryptedDocumentException;
import org.apache.poi.openxml4j.exceptions.InvalidFormatException;
import org.apache.poi.ss.usermodel.Cell;
import  org.apache.poi.ss.usermodel.Workbook;
import org.apache.poi.ss.usermodel.WorkbookFactory;
public class ExcelTest {
	public static void main(String[] args) throws EncryptedDocumentException, InvalidFormatException,
IOException
	{
		/*FileInputStream fis = new FileInputStream("C:/book1.xlsx");
		Workbook wb = WorkbookFactory.create(fis);
		for(int i=0;i<2;i++)
		{
			for(int j=0;j<2;j++)
			{
				Cell c = wb.getSheet("Sheet1").getRow(i).getCell(j);
				System.out.println(c+" ");
			}
			System.out.println();
		}*/

		String s = Excel.getCellvalue("C:/book1.xlsx", "Sheet1", 0, 0);
		System.out.println(s);
	}
	}
```

Note:

To count the number of rows present in the excel sheet we should use getLastRowNum() of sheet class it returns index of the last row(not the count)

To count the number of cells present in the row we should use getLastCellNum() of row class,it returns the count instead of index



Assignment: Write a script to print content of the excel sheet

Generic Methods

If we can use the method in any project then such type of methods are called as generic methods,sometimes it is also called as utility library.

Example: Handling excel sheet methods ,handling database exception.

We store these methods in separate package.

Example:

1) Create a package with the name generics under src folder then create a class with the name Excel.
2) Develop static methods as shown below.

```
package generic;

import java.io.FileInputStream;
import org.apache.poi.ss.usermodel.Workbook;
import org.apache.poi.ss.usermodel.WorkbookFactory;

public class Excel {
	public static String getCellvalue(String xlPath, String sheet, int row, int cell) {
		String v = "";
		try {
			FileInputStream fis = new FileInputStream(xlPath);
			Workbook wb = WorkbookFactory.create(fis);
			v = wb.getSheet(sheet).getRow(row).getCell(cell).toString();
		} catch (Exception e) {

		}
		return v;
	}

	public static int getRowCount(String xlPath, String sheet) {
		int rc = 0;
		try {
			FileInputStream fis = new FileInputStream(xlPath);
			Workbook wb = WorkbookFactory.create(fis);
			rc = wb.getSheet(sheet).getLastRowNum();
		} catch (Exception e) {

		}
		return rc;
	}

}
```

EXECUTING THE SCRIPTS BY TAKING DATA FROM EXCEL SHEET :

1) Goto test data folder of the frame work
2) Create an excel file with the name DataInputs.
3) Rename a sheet as verify build number.
4) Enter the data as shown,save it and close it

Username	Password	BuildNumber
admin	manager	(build 27261)

5) Update the test method present in the testNG class as shown below.

Note:

While specifying path of the excel file do not use absolute path,always use relative path.

D:/BSSW5/Automation/testdata/Datainputs.xlsx

./testdata/DataInputs.xlsx

Note:

While entering test datas ensure that number of column is always fixed where as number of rows can be changed.

File name: data inputs.xlsx

Sheet name: invalid Login

Username	Password
abc	xyz
admin	xyz
admin	bhanu
blank	blank
abc	manager
123	fg#$%

Assignment:

Write a script to execute valid login script by taking multiple valid UN and PW from xl sheet

IQ42)How do you pass a value from suite file into any method of TestNG class

Ans: Using Parameter

Example:

#Step1: Create a class as shown below;

```
package scripts;

import org.testng.Reporter;
import org.testng.annotations.BeforeClass;
import org.testng.xml.XmlTest;

public class ParameterTest {

	@BeforeClass

	public void preCondition(XmlTest xmlTest) {
		String v = xmlTest.getParameter("area");
		Reporter.log(v, true);
	}

	@Test

	public void testDemo(XmlTest x) {
		String v = x.getParameter("city");
		Reporter.log(v, true);
	}

}
```

#Step2: Update TestNG.xml file as shown below

```
<suite name="Suite" parallel="none">
 <test name="Test">

  <parameter name="city" value="Bengaluru"/>
  <parameter name="area" value="Basavanagudi"/>
  <classes>
  <class name="qsp.Demo"/>
  </classes>
  </test>
  </suite>
```

#Step3: Excecute the suite file.

Output:

Basavanagudi

Bengaluru

Note:

*If we use xml test object in the testing class then it is mandatory to execute testNG classes from testNG.xml files.If we directly run the testNG classes then values of all the parameters will be null.

*If we try to use those parameters to perform any action we get null pointer exception.

***When we execute testNG.xml file it automatically creates copy of this file(instance)and it will be automatically passed as arguments for the methods present in the TesstNG class.The data type should be always XmlTest

*To retrieve the content of the xml,we use geters() of this class.

IQ43)** How do you execute automation scripts on multiple browsers at the same time.

 By Using Parallel option available in testNG suite

Example: Step1: Update precondition method of BaseTest classas shown below;

```
package scripts;

import java.util.concurrent.TimeUnit;

import org.openqa.selenium.WebDriver;

import org.openqa.selenium.chrome.ChromeDriver;

import org.openqa.selenium.firefox.FirefoxDriver;

import org.testng.annotations.AfterClass;

import org.testng.annotations.BeforeClass;

import org.testng.xml.XmlTest;

public class BaseTest {

	public WebDriver driver;

	@BeforeClass

	public void preCondition(XmlTest xmlTest) {

		String browser = xmlTest.getParameter("browser");

		if (browser.equals("GC")) {

			System.setProperty("webdriver.chrome.driver", "./exefiles/chromedriver.exe");

			driver = new ChromeDriver();

		} else {

			driver = new FirefoxDriver();

		}


		driver.get("http://localhost");

		driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);
```

```
	}

	@AfterClass
	public void postCondition() {
		driver.close();
	}
}
```

#Step3: Update testNg.xml file as shown below;

```
<suite name="Suite" parallel="tests">
 <test name="TestGC">
  <classes>
   <class name="scripts.VerifyBuildNumber"/>
   <class name="scripts.InvalidLogin"/>
   <class name="scripts.ValidLogin"/>
  </classes>
 </test>
 <test name="TestFF">
  <classes>
   <class name="scripts.VerifyBuildNumber"/>
   <class name="scripts.InvalidLogin"/>
   <class name="scripts.ValidLogin"/>
  </classes>
 </test>
</suite>
```

NOTE:

If we execute above TestNG.xml file,Since we specified parallel=”tests”it will create multiple threads.Each for one test block.In the above xml file we have two test blocks Hence it will create 2 threads.1st thread will execute all the scripts on the chrome browser and the 2nd thread will execute all the scripts on the FF browser parallel.This will reduce the total time taken to execute the scripts.

IQ44) How do you execute the framework from command prompt
Answer: Using following command;
Java –cp bin;jarfiles/* org.testng.TestNG testng.xml

Stepts to create batch file

#Step1:open the note pad and type the above command

#Step2:go to file and select save

#Step3: Navigate to the location where TestNG.xml file is present.

C:\BSSW5\Automation

#Step4: Specify the name as RunMe.bat

#Step5: To execute it double click on bat file

*****Note:** To run the entire framework from command prompt we need jdk and TestNG.

Eclipse IDE is not required Hence TestNG plugin is not required but we need following 4 jar files

1)testng

2)jcommander.jar

3)bsh

4)snakeyaml

How to get them?

Ans: 1)The above jar files can be downloaded from the internet or we can copy from TestNG plugin i.e.,

Right click on Eclipse icon and select "open file location"Go to plugins folder Go to org.Testng foldergo to lib folderand copy all the required 4 jar files and paste them inside jar files folder of the framework(totally 9 jar files should be there selenium1,poi4,testng4)

SELENIUM GRID

We test the application in different environments which are similar to production environment of the customer, this will be done during system compatibility testing. To run the framework on different computer we can copy paste the entire framework on to remote computer and execute it by double clicking on the batch file. In order to do this remote computer should have following softwares,

1) Build

2) Browsers: IE, FF, GC

3) JRE

4) Automation Framework Copy

If we need to test the application in multiple environment,

Example: In 20 different computers then we need to copy paste the frame work 20 different times and we need to execute the batch file 20 different times.

In order to execute the frame work on multiple remote computers, without copy pasting the frame work we use selenium grid

In order to execute the without copy pasting the frameworks we use Selenium grid. In selenium grid we will have 2 types of systems;

1) HUB:

This is the computer where framework is present and it controlles the execution.In Selenium grid there will be only one hub.This system should have following softwares;

1) Build
2) Browsers:IE,FF,GC
3) JDK
4) Automation FrameWork Copy
5) Selenium jar files
6) Eclipse IDE

2) NODE:

It is a remote computer in which actual execution of the scripts takes place.We can have one or more nodes which will be communicated with the hub.We need following softwares in node;

1) Build
2) Browsers:FF,GC
3) JDK
4) Selenium jar files
5) chromedriver.exe

***To implement this concept we should perform following steps;

1) start the Hub
2) start the node
3) Execute the framework using RemoteWebDriver

1) START THE HUB:

a) Goto the computer where framework is present

b) Open the command prompt and type the following command;

Java –jar d:\s.jar-role hub

c) We should get a message "Selenium Grid hub is up and running"

Note: Default port number of hub is 4444

Change using:-port xxxx

2) START THE NODE:

a) Go to remote computer and type the following command;

Java-jar e:\s.jar-role node-hub http://192.168.1.18:4444-Dwebdriver.chrome.driver=e:\cd.exe

(7 spaces)

b) It should display following message:

"The node is registered to the hub and ready to use"

Note: Port number of the node is 5555

3) EXECUTE THE FRAMEWORK USING REMOTE WEBDRIVER:

a) Goto precondition metod of BaseTest class and update the code as below;

Old code:

```
driver = new ChromeDriver();
```

New code:

```
driver=new RemoteWebDriver(DesiredCapabilities.chrome());
```

b) Execute the framework by double clicking on batch file.

c) It will run all the scripts on node but result will be stored inside "test-ouput"folder of the framework.

Note:** If hub or node is down we get UnreachableBrowserException(Unchecked Selenium Exception)add to last page.

JENKINS

"Jenkins is a continuous integration tool used by developers to automatically create and install the build."

Developers use Jenkins to perform following steps:

1)take the latest source code.

2)compile the code.

3)Run Unit scripts(WBT).

4)compress the compiled code(called Buid).

5)Install the build.

6)send e-mail notification.

Note: We can integrate framework with Jenkins so that it automatically execute the framework(batch file)after installing the build.this will avoid the manual intervension of running the framework manually by double clicking on the batch file.

Download: Jenkins-ci.org

Jenkins.war

To implement the above concept we should perform following steps;

1)Install and configure Jenkins.(Developer)

2)Integrate framework with Jenkins.

3)Create the build.

1)Install and configure Jenkins:

This step will be done by development team

a)Download Jenkins.war file from Jenkins-CI.org website.

b)execute following command;

java-jar d:\jenkins.war

It should display following message"Jenkins is fully up and running"

c)open the browser and enter Url of the Jenkins(localhost:8080)

It should display Home page of the Jenkins

d)Click on create new jobs

e)Specify the name

f)select first radio button"Free Style project.Click on OK and click save.

2)Integrating FrameWork with Jenkins:

This steps will be done by Automation engineer.

a)Open the home page of Jenkins—

b)

c)_click on advanced and select use custom workspace check box

d)Specify the location of the folder where the batch file is present

e)click on "add build "step

f)select execute "windows batch command"

g)Specify the name of batch file(RunMe.bat)

h)Click save

3)Create Build:

a)This step will be done by the developers

a)open the Jenkins home page

b)click on name

c)click on"build now"

NOTE:When developer clicks on build now Jenkins will execute the framework after installing the build.

d)For every execution Jenkins will create a link under build history,So that we can view the execution result.i.e.,Click on the link present under build history click on console output

Automation flow diagram

Interview questions on framework:

1)what is automation framework,what are the types/

Automation framework is standard rule best practice and guidelile which should be followed while automating the application testing.Based on the design we can categorise the framework into following types.

1)method driven automation framework

2)module driven automation framework

3)Data driven automation framework

4)Keyword driven automation framework

5)Hybrid automation framework

Note: All the above types are generic names.

1) The framework can be customized to the project need and it can be given with different names.such as Cucumber Framework
2) Robot Framework
3) Proptractor Framework etc.,

2)which framework you have used in your project and why?

We have used Hybrid framework which is the combination of)Data driven automation framework and method driven automation framework,We use methods to avoid the repeatation,we use multiple datas to test features thoroughly

3)Explain the flow diagrams of the framework

4)Explain the architecture of the framework

5)***How many scripts you write per day.

2-5, it depends on the complexity

6) How many scripts you execute per day

We execute all the scripts using framework automatically with the use of Jenkins. In a day it executes 150-200 scripts.

7)How many regression TCs you have in your project?

500

8)How many TCs are automated till today?

90%

9)How many scripts you have written till today?

3*200

10)what are your roles and responsibilities?

HANDLING MULTIPLE ELEMENTS:

IndexoutofboundsexceptionAdd to last page(java uncked exception)

We use findelements()to handle multiple elements,which returns List<WebElement>

**We should import the list from java.util package.we use following important methods of List;

1)size()It returns the size of the List(int)

2)get(0)It returns the element presnt in specified index(WebElement)

Example:Counting number of links present on flipkart.com and also printing text of all the links;

```
import java.util.List;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Demo1 {

	public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.get("http://www.flipkart.com");
		List<WebElement> allLinks = driver.findElements(By.xpath("//a"));
		int count = allLinks.size();
		System.out.println(count);
		for (int i = 0; i < count; i++) {
			WebElement link = allLinks.get(i);
			String text = link.getText();
			 System.out.println(text);
		}
		driver.close();

	}

}
```

IQ)Write a script to print all the links exceptthe blank one

If condition is used

Note:

For findelements we can use any of the 8 locators but generally we use xpath.

IQ)Write a script to select all the checkboxes from first to last and deselect all the checkboxes from last to first using both type of for loops.

```
 import java.util.List;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;

public class CheckBox {

	public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.get("file:///c:/demo.html");
		String xp = "//input[@type='checkbox']";
		List<WebElement> allCheckBox = driver.findElements(By.xpath(xp));
		int count = allCheckBox.size();
		for (WebElement checkbox : allCheckBox) {
			checkbox.click();
		}
		for (int i = count - 1; i >= 0; i--) {
			WebElement checkbox = allCheckBox.get(i);
			checkbox.click();
		}

	}

}
```

IQ)How do you handle multiple elements in POM model?

In POM model we use @FindBy itself to handle multiple elements but we change the data type to List<WebElement>

```
package scripts;

import java.util.List;

import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.support.FindBy;
import org.openqa.selenium.support.PageFactory;

public class DemoPage {
	@FindBy(xpath = "//input[@type='checkbox']")
```

```
	private WebElement checkBox;
	@FindBy(xpath = "//input[@type='checkbox']")
	private List<WebElement> allCheckBox;

	public DemoPage(WebDriver driver) {
		PageFactory.initElements(driver, this);
	}

	public void ClickCheckbox() {
		checkBox.click();
	}

	public void clickAllCheckbox() {
		for (WebElement checkBox : allCheckBox) {
			checkBox.click();
		}
	}

}


    WebDriver driver=new FirefoxDriver();
	driver.get("file:///c:/demo.html");
	DemoPage d=new Demopage(driver);
	d.clickAllCheckBox();
		d.clickCheckBox();
```

IQ)What are the differences between findElement() and findElements()?

findElement()	findElements()
It returns WebElement	It returns List<WebElement>
If the specified locator is matching with multiple elements,It returns first matching element.	If the locator matches with multiple elements it returns all matching elements
If the specified locator ids matching with non of the elements,it will throw NoSuchElementException.	If the specified locator ids matching with none of the elements,it will return empty list

IQ)How do you handle Autosuggestion

Using findElements()

IQ)Write a script to search selenium in google and print all the auto suggestions and select one of the auto suggestions

```
package scripts;

import java.util.List;
import java.util.concurrent.TimeUnit;
```

```
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;

public class AutoSuggestions {

	public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);
		driver.get("http://www.google.com");
		driver.findElement(By.id("lst-ib")).sendKeys("selenium");
		String xp = "//div[contains(text(),'selenium')]";
		List<WebElement> allAST = driver.findElements(By.xpath(xp));
		int count = allAST.size();
		System.out.println(count);
		int p = 0;
		for (int i = 0; i < count; i++) {
			String text = allAST.get(i).getText();
			System.out.println(text);
			if (text.equals("selenium webdriver")) {
				p = i;
			}

		}
		allAST.get(p).click();
		// write a code to handle if"web driver" is not present
	}

}
```

IQ)Write a script to type letter'a' in the from fied present in make my trip.com and print all the suggested options

HANDLING LIST BOX:

We use "Select" class of selenium to handle the list box.It should be imported from following package;

Import org.openqa.selenium.support.ui.Select;

Example:

```
package scripts;

import java.util.concurrent.TimeUnit;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.Select;

public class ListBox {
```

```
	public static void main(String[] args) throws InterruptedException {
		WebDriver driver = new FirefoxDriver();
		driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);
		driver.get("http://www.facebook.com");
		WebElement listBox = driver.findElement(By.id("month"));
		Select select = new Select(listBox);
		select.selectByIndex(2);// select February
		Thread.sleep(1000);
		select.deselectByVisibleText("Mar");// select March
		Thread.sleep(1000);
		select.selectByValue("4");

	}

}
```

Important:

*If Specified index text or value is invalid we get NoSuchElementException

*We can use “Select” class itself to handle multi select list box.

*If the specified option is duplicate in single select list box,It will select first matching option.

*If te specified option is duplicate in multiselect list box,It will select all the matching options.

IQ)Write a script to count the number of options presnt in the list box and print all of them in reverse order.

```
 package scripts;

import java.util.List;
import java.util.concurrent.TimeUnit;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.Select;

public class ListBoxReverse {

	public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);
		driver.get("file:///C:/Users/vidya_s2/Desktop/ListBox.html");

		WebElement listBox = driver.findElement(By.id("s1"));
		Select select = new Select(listBox);
		List<WebElement> allOptions = select.getOptions();
		int count = allOptions.size();
		System.out.println(count);
```

```
		for (int i = count - 1; i >= 0; i--) {
			String text = allOptions.get(i).getText();
			System.out.println(text);
		}
		driver.close();
	}

}
```

IQ***)Write a script to search for specified optionin the list box.

```
int found=0;
for(int i=0;i<count;i++)
{
	aText=allOptions.get(i).getText();
	if(aText.equals(eText))
	{
		found++;

	}
}
System.out.println(found);
```

0Not found

1Found once

2,3,4,5…Duplicate

Web Page:

```
<html>
<body>
<select id="s1" multiple>
<option value="i">idli</option>
<option value="v">Vada</option>
<option value="p">poori</option>
<option value="d">Dosa</option>
<option value="d">Vada</option>
</select>
</body>
</html>
package scripts;

import java.util.List;
import java.util.Scanner;
import java.util.concurrent.TimeUnit;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.Select;

public class ListBox2 {
```

```
	public static void main(String[] args) {
		System.out.println("option to Search?");
		Scanner s = new Scanner(System.in);
		String eText = s.next();
		System.out.println("Searching...");
		int found = 0;

		WebDriver driver = new FirefoxDriver();
		driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);
		driver.get("file:///C:/Users/vidya_s2/Desktop/ListBox.html");
		WebElement listBox = driver.findElement(By.id("s1"));
		Select select = new Select(listBox);
		List<WebElement> allOptions = select.getOptions();
		int count = allOptions.size();
		for (int i = count - 1; i >= 0; i--) {
			String aText = allOptions.get(i).getText();
			if (aText.equals(eText)) {
				found++;

			}
			if (found == 0)

			{
				System.out.println(eText + "Not found");

			} else if (found == 1) {
				System.out.println(eText + "found");

			} else {
				System.out.println(eText + "Duplicate");
			}
		}
	}

}
```

IQ)Write a script to print content of list box in sorted order

```
package scripts;

import java.util.ArrayList;
import java.util.Collections;
import java.util.List;
import java.util.concurrent.TimeUnit;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.Select;
```

```
public class ListBoxSorting {

	public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);
		driver.get("file:///C:/Users/vidya_s2/Desktop/ListBox.html");
		WebElement listBox = driver.findElement(By.id("s1"));
		Select select = new Select(listBox);
		List<WebElement> allOptions = select.getOptions();
		ArrayList<String> allText = new ArrayList<String>();
		for (int i = 0; i < allOptions.size(); i++) {
			String aText = allOptions.get(i).getText();
			allText.add(aText);

		}
		Collections.sort(allText);
		for (String text : allText) {
			System.out.println("text");
		}

	}
}
```

IQ)Write a script to print content of the lis box in sorted order when th list box had numerical values.

Example:Day list box present in FaceBook page

Hint Convert strint into number using integer.parsing and store them in array lest of integer then use sort method of collections:

```
package scripts;

import java.util.ArrayList;
import java.util.Collections;
import java.util.List;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.Select;

public class NumericalSort {

	public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.get("https://www.facebook.com");
		Select select = new Select(driver.findElement(By.id("day")));
		List<WebElement> allOptions = select.getOptions();
		ArrayList<Integer> allNumber = new ArrayList<Integer>();

		// in Facebook,1st option id "DAY" so we arestarting loop from index
```

```
		// 1(not 0)
		for (int i = 1; i < allOptions.size(); i++) {
			String aText = allOptions.get(i).getText();
			allNumber.add(Integer.parseInt(aText));

		}
		Collections.sort(allNumber);
		for (Integer i : allNumber) {
			System.out.println("i");

		}
	}

}
```

Note: UnsupportedOperationException Java unchecked exception.(you may only de-select option of multi select)

*The selectBy() is present in select class can be used on single select as well as multi select list box.

*deselect() can be used only on multiselect list box.In order to check whether the list box is multi select or not we should use "isMultiple()" of select class.

Example:

```
package scripts;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.Select;

public class isSelect {

	public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.get("https://www.facebook.com");
		Select select = new Select(driver.findElement(By.id("day")));
		select.selectByIndex(1);
		select.selectByValue("d");
		select.deselectByVisibleText("Poori");
		if (select.isMultiple()) {
			select.deselectAll();
			select.deselectByIndex(1);
			select.deselectByValue("d");
			select.deselectByVisibleText("Poori");
		} else {
			System.out.println("It is not multi select listBox");
		}
	}

}
```

IQ)Write a script to select and deselect the option in reverse order.

```
package scripts;
```

```
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.Select;

public class ReverseOrder {

	public static void main(String[] args) {
		WebDriver driver = new FirefoxDriver();
		driver.get("file:///c...");
		Select select = new Select(driver.findElement(By.id("s1")));
		int count = select.getOptions().size();
		for (int i = count - 1; i >= 0; i--) {
			select.selectByIndex(i);

		}
		for (int i = count - 1; i >= 0; i--) {
			select.deselectByIndex(i);

		}
	}

}
```

UnexpectedTagNameException□Selenium unchecked
NOTE**:If the list box is developed without using<select> html tag,we can not use select class.If we use it we get UnexpectedTagNameException.To handle such type of text box we can use sendkeys() or click() as shown below;

```
package scripts;

import  org.openqa.selenium.By; import
org.openqa.selenium.Keys; import
org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.ui.Select;

public class RareCaseInSelect {

	public static void main(String[] args) { WebDriver driver = new
		FirefoxDriver(); driver.get("http://localhost/login.do");
		driver.findElement(By.id("username")).sendKeys("admin");
		driver.findElement(By.name("pwd")).sendKeys("manager");
		driver.findElement(By.id("loginButton")).click();
		WebElement listBox = driver.findElement(By.id("ext-comp-1001")); listBox.clear();
		listBox.sendKeys("Moss"); listBox.sendKeys(Keys.ENTER);

	}

}
```

Assignment:Write a script to perform following steps

1)login to actiTime application.
2)click on task menu.
3)click on projects and customers check box
4)Select second radio button present in the list box
5)select a checkbox
6)click on close.
IQ)** Write a script for the following steps:
1)goto following website http://www.plus2net.com/php_tutorial/ajax_dd3.php
2)select india in first list box
3)select rajastan in second list box
4)print content in last list box

IQ) How do handle drop down menu?
*Dropdown menu is an element on which if we move the mouse pointer it will display list of options to handle it we use moveToElement() of "Actions" class

```
package scripts;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.interactions.Actions;

public class DropDownMenu {

	public static void main(String[] args) { WebDriver driver =
		new FirefoxDriver();
		driver.get("http://www.actimind.com/");
		String xp = "//span[text()='About Company']"; WebElement menu =
		driver.findElement(By.xpath(xp)); Actions actions = new Actions(driver);
		actions.moveToElement(menu).perform();
		driver.findElement(By.linkText("BasicFacts")).click();

	}

}
```

Note:ElementNotVisibleException selenium unchecheked exception
IQ)write a script to perform following steps;
1)goto istqb.in
2)navigate to"foundation registration corporate registeration online registeration
IQ)write a script to move the mouse pointer
on about us menu pesent in istqb.in and print all the sub menus
IQ)How do handle context menu
1)right clicking on any element is called context click
2)when we right click on any element we get a list of options called as context menu.
*to right click on any element we use contextClick() of actions class and to select the required option present in the context menu we type the shortcut such as "t" for ne tab,"w" for new window etc., using sendkeys() of actions class.

```
package scripts;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
```

```
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.interactions.Actions;

public class ContextMenu {

	public static void main(String[] args) { WebDriver driver = new
		FirefoxDriver(); driver.get("http://localhost/login.do");
		WebElement link = driver.findElement(By.linkText("Actimind Inc.")); Actions actions = new
		Actions(driver); actions.contextClick(link).perform(); actions.sendKeys("w").perform();

	}

}
```

IQ)How do perform drag and drop option in selenium?

```
package scripts;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.interactions.Actions;

public class DragAndDrop {

	public static void main(String[] args)
	{
		WebDriver driver=new FirefoxDriver();
		driver.get("http://www.dhtmlgoodies.com/submitted-scripts/i-google-
like");

		Actions actions=new Actions(driver); String
		xp1="//h1[text()='Block 1]";
		String xp2="//h1[text()='Block 3]";

		WebElement source=driver.findElement(By.xpath(xp1)); WebElement
		target=driver.findElement(By.xpath(xp2));
		actions.dragAndDrop(source, target).perform();

	}

}
```

HANDLING FRAMES:

1)Web Page present inside another WebPage is called as Embedded WebPage.
2)Developer uses “iframe” or”frameset” html tag to create the embedded webpage.
3)If the element is inside the frame,browser will display this frame option in the conext menu when we right click on that element.
4)Before performing any action on the element which are inside the frame,we should transfer the control Into the frame using following statement “driver.switchTo.frame(arg);”

Where argument can be index of the frame(int),id of the frame(string),element off the frame(WebElement).

5)In order to switch back to the page from the frame,we should use following statement;
“driver.switchTo().defaultContent();”
6)To transfer the control from child frame to parent frame we should use following statement;
“driver.switchTo().parentFrame();”
7)If the specified frame is not found we get”NoSuchFrameException”(Selenium Unchecked Exception)

Example:
DemoB.html:-

```
<html>
<body>
t2<input type="text" id="t1">
</body>
</html>
```

DemoA.html:-

```
<html>
<body>
t2<input type="text" id="t2">
</body>
</html>
```

```
package scripts;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;

public class Frames {

	public static void main(String[] args) { WebDriver
		driver=new FirefoxDriver();
		driver.get("file:///D:/DemoA.html");
		driver.findElement(By.id("t1")).sendKeys("abc"); driver.switchTo().frame("f1");
		WebElement f=driver.findElement(By.className("c1"));
		driver.switchTo().frame(f);
		driver.findElement(By.id("t2")).sendKeys("xyz");
		driver.switchTo().parentFrame();
		driver.findElement(By.id("t1")).sendKeys("123");

	}

}
```

IQ)Write a script to validate invalid login scenario for the following webpage
https://www.zoho.com/crm/lp/login.html
Important:
A if new page is loaded or current page id refreshed control will be automatically transferred to main page;

IQoracle)What are the different ways to switch back to main page;
1)driver.switchTo().defaultContent().
2))driver.switchTo().parentFrame().

3)driver.Navigate().refresh()
POPUP HANDLING:
In selenium writing the code to handle the popup depends on type of the popup.
With Respect to selenium we can catogarize the popups into following types;
1)Alert an confirmation popup
2)hidden division popup
3)file upload popup
4)file download popup
5)Child browser popup
6)Window popup
Note:
NoAlertPresentException(Selenium Unchecked Exception)
UnhandledAlertException(Selenium Unchecked Exception)
ALERT AND CONFIRMATION POPUPS:
Characterstics:
1)We can move the popup.
2)We cannot inspect the popup
3)If the popup has warning symbol with OK button(Trianle with !)it is alert popup
4)If the popup has confirmation symbol(?) with OK and CANCEL button--.confirmation popup.
NOTE:They are also called ass JavaScript popups.
To handle the alert and confirmation popups first we transfer the control using switch to alert statement a d then we use any of the following method of alert interface;
1)gettext() to get the message
2)accept To click OK button
3)dismiss()to click on CANCEL or CLOSE button
If popup is closed control will be automatically transferred back to main page.Whhile performing the action if the popup is not present we get NoAlertPresentException.
If we try to perform action on the page without closing the action we get UnhandledAlertException

```
package scripts;

import org.openqa.selenium.Alert; import
org.openqa.selenium.By; import
org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class PopupAlertAndConfirmation {

        public static void main(String[] args) { WebDriver driver =
                new FirefoxDriver();
                driver.get("https://www.isrtc.co.in/eticketing/loginHome.jsf");
                driver.findElement(By.id("loginbutton")).click();

                Alert alert = driver.switchTo().alert(); String msg =
                alert.getText(); System.out.println(msg);
                alert.accept();
                alert.dismiss();

        }

}
```

2.HIDDEN DIVISION POPUPS:
Characterstics:
1)We cannot move the popup.

2)We can inspect the popup.
3)Popup will be colorfull
4)Generally these types of popups are developed using html tag and it will be hidden hence it is called as "Hidden Division popup"
5)we use findElement() to handle Hidden Division popup

Calender popup is a type of Hidden Division popup.

```
package scripts;

import java.util.concurrent.TimeUnit;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class HiddenDivisionPopup {

	public static void main(String[] args) { WebDriver driver =
		new FirefoxDriver();
		driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);
		driver.get("http://www.yatra.com");
		driver.findElement(By.id("BE_flight_depart_date")).click();
		driver.findElement(By.id("a_2016_3_18")).click();

	}

}
```

IQ)Write a script to performe following steps; 1)goto makemytrip.com2)click on departure date 3)select today's date.

3. FILE UPLOAD POPUP;
Characterstics:
1)Clicking on browse button will diasplay a popup with the title file upload. 2)We can move the popup but we cannot inspect it.
Note:This popup is used to "select a file to be uploaded" SOLUTION:
To handle file upload popup we specify absolute path of the file as arguments for send keys method as shown below.

```
package scripts;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class FileUploadPopup {

	public static void main(String[] args) { WebDriver driver =
		new FirefoxDriver();
		driver.get("http://www.2shared.com/");
		driver.findElement(By.id("upField")).sendKeys("D:\\Book1.xlsx");
```

```
        }

}
```

4) Relative path is not supported
5)forward slash is not supported
To upload multiple files we shoud specify absolute path of each file using comma as a separator in sendkeys method.

If file upload popup is created without browse button like attatchment icon in Gmail.In such cases we cannot use sendKeys method.We should use third party tool such as AutoIt.
Limitations:
5) We cannot handle file upload popup of ot has attatchment icon instead of browse button.

4. FILE DOWNLOAD POPUP:

Characteristics;

1) We can move the popup
2) we cannot inspect the popup. 3)It will
have 2 radio buttons: a)open with
b)save file
SOLUTION:To handle file download popup we use setPference() of FirefoxProfileclass

```
package scripts;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.firefox.FirefoxProfile;

public class FileDownloadPopup {

        public static void main(String[] args) { FirefoxProfile profile = new
                FirefoxProfile();
                // if file is.zip then do not display popup download it directly String key =
                "browser.helperApp.neverAsk.saveToDisk";
                String value = "application/zip";
                profile.setPreference(key, value);
                // open browser with above setting WebDriver
                driver = new FirefoxDriver();
                driver.get("http://docs.seleniumhq.org/download/"); String xp =
                "//td[text()='Java'../td[4]/a"; driver.findElement(By.xpath(xp)).click();

        }

}
```

Example:
1) Setting is called as preference.

2) To change thesetting we use “setPreference()” of FirefoxProfile class.Thismethod takes arguments(key and value.To know the details about key and value follow below link;
“http://kb.mozillazine.org/About:config_entries”
In Seelenium there is no option to handle file download popups in other browsers.Hence we use 3rd party tool such asAutoit
Limitation 6:
In Seelenium there is no option to handle file download popups in other browsers.Hence we use 3rd party tool such asAutoit

5. CHILD BROWSER POPUPS;
Characteristics:
1)We can move the popup 2)We can inspect the popup
3)We have minimiz,maximize options 4)It will have address bar

IQ)How do you handle child browser popup
driver.switchTo().window(wh); IQ)What is window handle?
It is a “Unique alpa-numeric string of the Browser”

IQ)what is the difference between getWindowHandle() andgetWindowHandles()?
getWindowHandle()It returns window handle of current browser(return type is String).
getWindowHandles()it returns windowHandle of all browser.

IQ)What is the difference between close() and quit()?
close()This closes the current browser quit()it will close all browsers.

IQ)write a script to count number of browsers opened by selenium IQ)write a script to print window handle of all the browsers.
IQ)Write a script to print title of all the browsers?
IQ)Write a script to clase all the browsers without using quit

```
package scripts;

import java.util.Set;

import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class ChildBrowserPopup {

	public static void main(String[] args) { WebDriver driver =
		new FirefoxDriver();
		Set<String> allWH = driver.getWindowHandles(); System.out.println(allWH.size());
		for (String v : allWH) { System.out.println(v);
			driver.switchTo().window(v); String title =
			driver.getTitle(); System.out.println(title);
```

```
                    driver.close();
                }

            }

}
```

IQ)Write a code to close specified browser. IQ)Write a script to close only parent browser Use driver.close()
IQ)Write a script to close only child browser;

Exceptions:
21)AWTException.-->Checked selenium Exception
22)NoSuchWindowException Selenium unchecked exception

```
package scripts;

import java.awt.Dimension;
import java.awt.Rectangle; import
java.awt.Robot; import
java.awt.Toolkit;
import java.awt.image.BufferedImage;
import java.io.File;

import javax.imageio.ImageIO;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class ScrrenShot {
public static void getScreenShotofDesktop()

        {
                try
                {
                        Robot r=new Robot();
                        //get the current size of the desktop
                        Dimension d = Toolkit.getDefaultToolkit().getScreenSize(); Rectangle
                        screenRect = new Rectangle(d);
                        //take screen shot of complete desktop
                        BufferedImage img = r.createScreenCapture(screenRect);
                        //save to disk
                        ImageIO.write(img, "jpg", new File("d:/desktop.jpg"));
                }
                catch(Exception e)
                {

                }
        }
                public static void main(String[] args) throws InterruptedException
                {
```

```
                    WebDriver driver = new FirefoxDriver();
                    driver.get("http://docs.selenium.org/download/");
                    driver.findElement(By.linkText("2.52.0")).click(); Thread.sleep(3000);
                    getScreenShotofDesktop(); driver.close();
            }



        }
```

6.WINDOW POPUP:
Characteristics:
1)If the popup displayed in the application is not alert and confirmation,hidden division,file upload,file download or child browser then it is “Window popup” SOLUTION: In selenium there is no option to handle this popup
Limitation 7) In selenium there is no option to handle this window popup In order to handle window popup we use third party tools such as “Autoit”

AutoIt:
*It is a free window based automation tool.
*It can be downloaded from following URL;
“http://www.autoitscript.com/site/autoit/downloads/ File name:
autoit-v3-setup.exe
1) double click on the set of file
2) follow the default instructions available in set of wizard(next,next..) 3)Click finish

Steps to inpect elements in auto it: 1)Goto start All Programs Autoit 2)Select Autoit window info
3) drag and drop finder tool on the required element.

STEPS TO WRITE SCRIPT IN AUTOIT:
1)Goto all programs AutoIt select script editor 2)Write the code as shown below; WinWaitActivw(“Calculator”)
WinClose(“Calculatorr”)
3) goto file save
4) navigate to the equired loacation
5) specify the name ex.script1.-->clicksave script.au3
6) goto tool and click complie it will create an.exe file on the samelocation 7)to run the autoit tool goto tools clickgo
8)We can also execute it directly by double clicking on the .exe file

To run/execute the script from java,we can use “exec()” of Runtime class
Runtime.getRuntime().exec(“C:\\Windows\\system32\\calc.exe”);
Runtime.getRuntime().exec(“D;\\Script1.exe”);

IQ)Write a script to perform following steps; 1)open firefox browser
2) enter the url of selenium download page

3) click on the link”2.52.0”
4)Activate the window popup
5)Press left arrow key so that control can be transferred from cancel button 6)press enter key so that it clicks on save file button.

7) AutoIt Script:

WinWaitActive(“Opening selenium-server-standalone-2.52.0.jar”) Sleep(1000)
Send(“{LEFT}”)
Sleep(1000) Send(“{ENTER}”)

8) Save the above code ass script1 in D-drive which creates .exefile. 9)Write the above code in java and execute it;

```
package scripts;

import java.io.IOException;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class AutoIt {

	public static void main(String[] args) throws IOException { WebDriver driver =
		new FirefoxDriver();
		driver.get("http://docs.selenium.org/download/");
		driver.findElement(By.linkText("2.52.0")).click();
		Runtime.getRuntime().exec("d:\\script1.exe");

	}

}
```

MAVEN

:
Maven is a dependency tool with respect to selenium it is used to downloadlatest selenium jar file and run the automation framework.To implement this concept we should perform following steps;

1)Convert java project into maven project. 2)Specify the dependency.
3) Execute the framework using pom.xml(Project object model).
4) Right click on the java project goto configure Select convert to maven project Click finish.
It will generate a file with the name”pom.xml”(Project object model).Inside java project.Maven projects are indicated with the letter M above folder icon of the java project.

Specify the dependency:
*Specify the jar file which are to be downloaded is called as dependency.
*For each jar file we should specify following informations: 1)groupID

2)artifactID3)version.NOTE: Only for TestNG Scope of the dependency is test,For all the other it is compile(default option)
URL:"http://docs.seleniumhq.org/download/maven.jsp"

<dependency>
<groupId>org.seleniumhq.selenium</groupId>
<artifactId>selenium-java</artifactId>
<version>2.52.0<</version>
</dependency>

<dependency>
<groupId>org.testng</groupId>
<artifactId>testng</artifactId>
<scope>test</scope>
<version>6.8<</version>
</dependency>
NOTE:We can directly copy paste above xml content into pom.xml file or goto dependency tab click on add specify groupId,artifactId,version and scope click ok.

Executing framework using pom.xml:
*After specifying the dependency,if we directly run pom.xml it can only download the jar file but it will not be knowing how to run the framework.
*We have developed the framework using TestNG and we used testng.xml to executeit.
*In order to run testng.xml from pom.xml we should use "sure fire"plugin which can be copied from following URL:
http://maven.apache.org/surefire/maven-surefire-plugin/examples/testng.html
*Copy the content from plugin to /plugin available in the above website.
*goto pom.xml paste it just above </pugins> tag and save xml file.

*Only for the first time right click on the pom.xml goto runAs and select Maven install second time on wards use maven test.
IMPORTANT NOTE:
If we run the framework directly using testng.xml; 1)It will not
downloadd any jar files.
2) It will executes the scripts using the jar files which are listed under reference libraries.
3) After the execution result will be generated in test-ouputfolder. If we run the frame work using pom.xml then,
1)It will download the latest jar files from the internet into .m2 repository. 2)It executes the script using the jar files which are listed under maven dependencies folder.
3) After the execution the result will be generated under target folder.i.e, java project//target/surefire-reports/emailable-repert.html.
4) location of the .m2 repository will be "C:\Users\Administrator\.m2"
5) Using framework we cannot download other type of files such aschromdriver.exe

Specify the versions in maven:

version	Meaning
[2.52.0]	Download only 2.52.0 version
[2.52.0,2.58.0]	Download only 2.52.0 or 2.58.0 in between versions are not allowed
[2.52.0,2.58.0)	Download the jar file with the version 2.52.0 to 2.58.0
***** [2.52.0,)	Download 2.52.0 or any other above version

*We can also disable automatic update of the browser to avoid the failures.

JDBC
In order to connect to database and fetch the data ,so that we can verify it or use it.To use JDBC(Java Database Connection):
It will help us to connect us to data base.
*Before writing JDBC code we should know following informations;
1)DataBase file□ex.MySql
2)DataBase location□ex:localhost or IP address
3)DataBase port number□ex:3306
4)User name for the DataBase.:Ex:root
5)DataBase password:ex:Blank here
6)Name of the DataBase: ex: qspiders
7)Name of the table:ex:student
8)table colums:ex:Id,name,city
9) Sql query:ex: ex:select*from student

In order to connect to database we should perform following steps;
1)Load the driver
2)Open the connection using connection string
3)execute sql statement
4)close the connection
5)we can download the driver for MySql database from the following url:
https://dev.mysql.com/downloads/file/?id=13598
file: musql-connector-java-5.0.8-bin.jar

after downloading associate the above jar file to java project
refer: http://www.connectionstring.com/

java code to open and close the database;

```
package scripts;

import java.sql.Connection; import
java.sql.DriverManager; import
java.sql.SQLException;

public class JDBC1 {

	public static void main(String[] args) throws SQLException,
ClassNotFoundException {
		Class.forName("com.mysql.jdbc.Driver");
		String cs = "jdbc:mysql://localhost:3306/qspiders"; String un =
		"root";
		String pw = "";
		Connection c = DriverManager.getConnection(cs, un, pw); c.close();
		System.out.println("done");

	}

}
```

IQ)Printing column header and table content of a database.

```
package scripts;

import java.sql.Connection; import
java.sql.DriverManager; import
java.sql.ResultSet; import
java.sql.SQLException;

public class JDBC1 {

        public static void main(String[] args) throws SQLException,
ClassNotFoundException {
                Class.forName("com.mysql.jdbc.Driver");
                String cs = "jdbc:mysql://localhost:3306/qspiders"; String un =
                "root";
                String pw = "";
                Connection c = DriverManager.getConnection(cs, un, pw); String sql =
                "select*from student";
                ResultSet r = c.createStatement().executeQuery(sql); int cc =
                r.getMetaData().getColumnCount(); System.out.println(cc);

                for (int i = 1; i <= cc; i++) {
                        String cn = r.getMetaData().getColumnName(i);
                        System.out.print(cn + " '");
                }
                System.out.println();
                while (r.next()) {
                        for (int i = 1; i <= cc; i++) { String v =
                                r.getString(i); System.out.println(v + "
                                ");
                        }
                        System.out.println();
                }

                c.close();
                System.out.println("----------");

        }

}
```

OUTPUT:

```
Id      name        city
1       Akash       Agra
2       Bhanu         Bangalore
```

Note:javagalbhanu@gmail.com