**Selenium Documentaion:** https://www.selenium.dev/selenium/docs/api/java/index.html?overview-summary.html

https://mvnrepository.com/artifact/org.seleniumhq.selenium/selenium-java

**Part 1**

➢ What is selenium ?
➢ What are the components available in Selenium ?
➢ What is WebDriver ?
➢ Advantages & Disadvantages
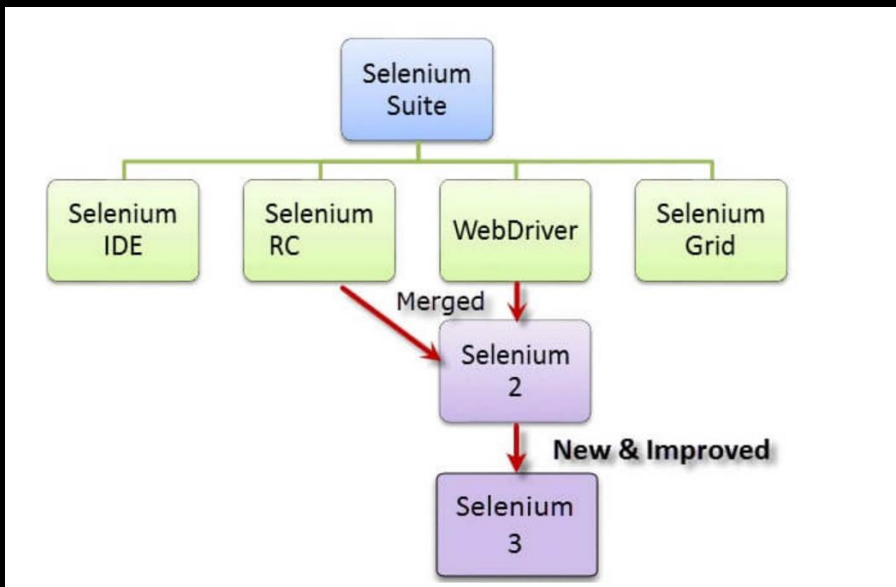


**What is Selenium**

- Selenium is a free (open-source) automated testing framework used to validate web applications across different browsers and platforms
- Selenium Software is not just a single tool but a suite of software

**Selenium Components**

- Selenium IDE
- Selenium Remote Control (RC) (deprecated from 2.0)
- Selenium WebDriver
- Selenium Grid

**What is WebDriver**

- It is a java interface
- It is also an API
- One of the components of the selenium suite to automate web browsers

**Adavantages**

- Supports multiple languages, web browsers, operating systems
- It is open source and freely available

## Disadvantages

- Automates only web browsers
- It cannot automate the window based applications (Eg:File Upload)
- It doesn't supoort graphs (because graphs generate data dynamically)
- It doesn't generate the reports

## Alternatives

- AutoIt for File Upload, Sikuli for screen scrolling
- For data driven testing using EXCEL we can use apache POI libraray
- For generating reports we could us external third parties reports like allure report
  https://docs.qameta.io/allure/

## Part 2

➢ Selenium Web Driver Architecture
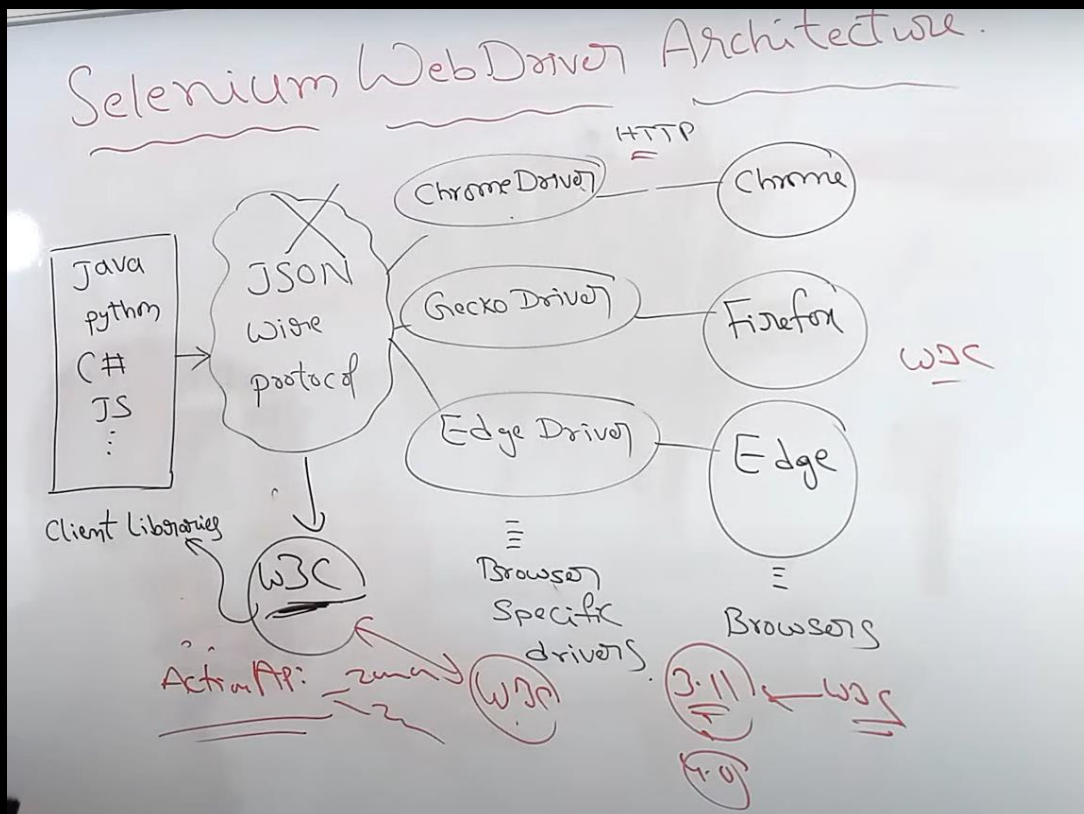


- Up to 3.8.x json wire protocol were used by client libraries to communicate with web drivers
  which requires encoding and decoding for communication between them.
- From 3.11.0, w3c protocol is using for accessing web drivers because all the web drivers and web browsers
  support w3c protocol. This protocol also gives fast communication, stability, consistency between client
  libraries and web driver. And also support Action Api classes to zoom in, zoom out the browsers, many more.

## Part 3

- ➢ How to launch Browser in WebDriver ?
- ➢ How to open URL ?
- ➢ How to capture Title of the page ?
- ➢ How to capture URL of the page ?
- ➢ How to capture page source of the page ?

### Types of browsers

- Chrome: chromedriver

  https://chromedriver.chromium.org/downloads

- Firefox: geckodriver

  https://github.com/mozilla/geckodriver/releases

- Edge: msedgedriver

  https://developer.microsoft.com/en-us/microsoft-edge/tools/webdriver/

### WebDriverManager

- Using this class, no need to add web drivers paths explicitly to our program
- Instead we can add WebDriverManager Dependency in pom.xml file
  https://mvnrepository.com/artifact/io.github.bonigarcia/webdrivermanager

```java
System.setProperty("webdriver.edge.driver", "D:\\Selenium\\WebDrivers\\msedgedriver.exe");
WebDriver ed=new EdgeDriver(); //EdgeDriver ed=new EdgeDriver();
ed.get("https://frontend.nopcommerce.com/");
ed.close();
```

```java
WebDriverManager.edgedriver().setup();
WebDriver driver=new EdgeDriver();
driver.get("https://frontend.nopcommerce.com/");
System.out.println("Title of the page:"+driver.getTitle());
System.out.println("Current URL of the page:"+driver.getCurrentUrl());
System.out.println(driver.getPageSource());
driver.close();
```

## Part 4

- ➢ How to check WebElement is Displayed, Enabled and Selected ?

**Practice Url:** https://demo.nopcommerce.com/register

**Order**

1.StatusOfWebElements

**Methods**

- isDisplayed ()
- isEnabled()
- isSelected()

These methods are called conditional methods or conditional commands

> ➤ How to navigate Back & Forward ?
> ➤ How to refresh Page ?
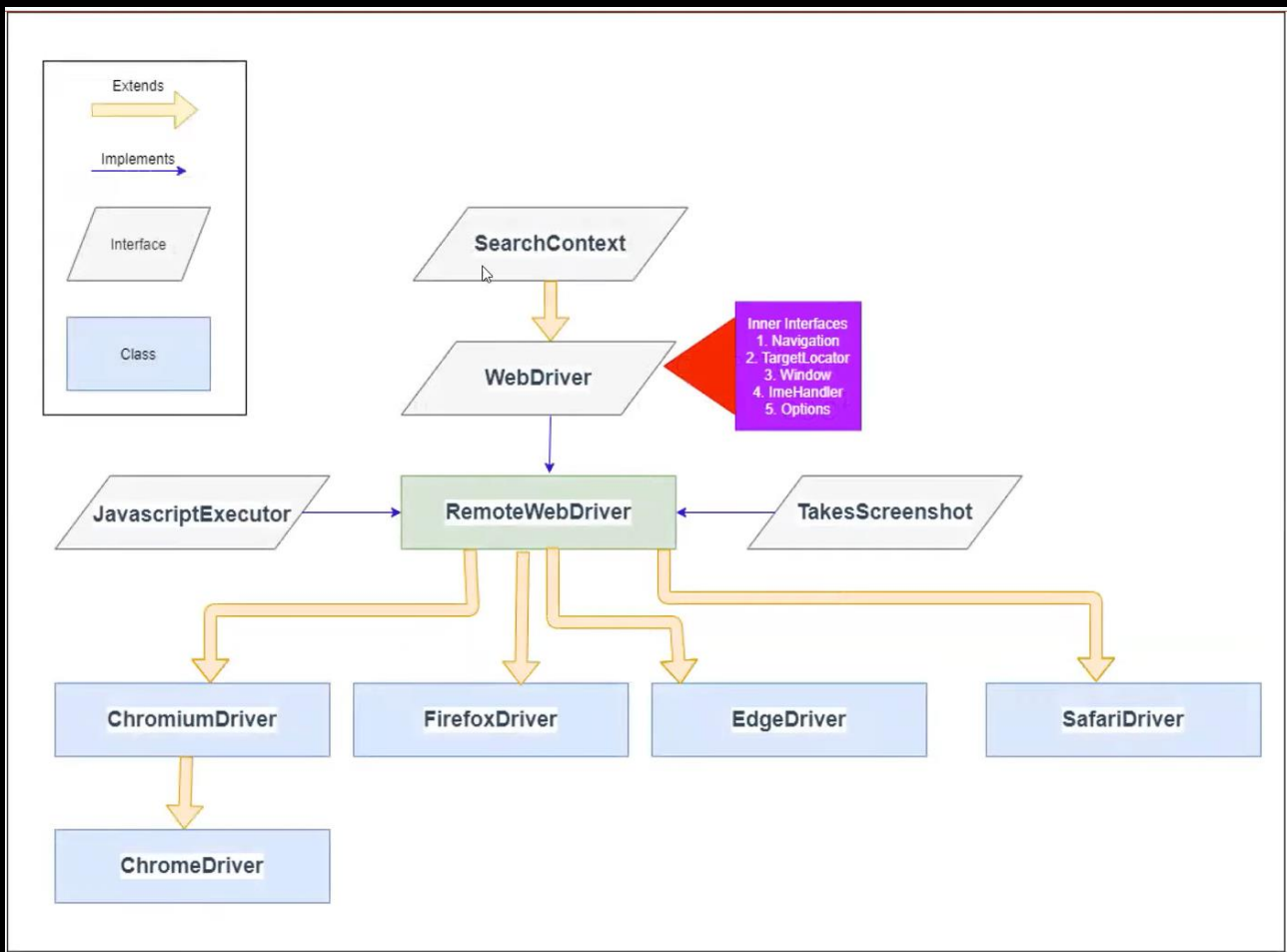> ➤ What is the difference between get() & navigate.to() ?

**Methods**

- driver.navigate().back()
- driver.navigate().forward()
- driver.navigate().refresh()
- driver.navigate().to()

```java
WebDriver driver=new ChromeDriver();
driver.get("https://www.snapdeal.com/");
//driver.get("https://www.amazon.com/");
driver.navigate().to("https://www.amazon.com/");
driver.navigate().back(); //snapdeal
driver.navigate().forward(); //amazon
driver.navigate().refresh(); // To refresh or reload the page
driver.close();
```

Difference between get() and navigate.to() **according to internet**

- get() is used to navigate particular URL(website) and wait till page loads.
- naviagate().to() is used to navigate particular URL(website) and does not
  wait till page loads.It maintains browser history or cookies to navigate back and forward.

## What is the difference between Get () and navigate () to () method?

- Both the methods are used for opening URL in the browser. **There is no difference between them.**
- They are synonyms for one another.
- The only difference is that can be found in the parameters
- *get() accepts only one string parameter*
- *navigate().to() accepts Sting parameter and URL instance as parameter.*

## Part 6

➢ What is the difference between findElement() and findElements() in Selenium WebDriver ?

**Practice URL:** nopCommerce demo store

|  | findElement() | findElements() |
|---|---|---|
| Single WebElement Present | Returns Single Element | Returns Single Element |
| Multiple WebElements Present | Returns First Element | Returns all Elements |
| Element not present | Throws NoSuchElementException | Does not throw any Exception. Returns Zero Elements |
| Return Type | WebElement | List<WebElement> |
| Access | Directly | Iterate the list of Elements |

- **findElement()** method returns the first matching element on the current page.

- If the element is not found then it throws NoSuchElementFoundException.

- **findElements()** method returns all he matching elements on the current page and it doesn't throw any exception if the element is not found, Instead it will return zero elements

**Part 7**

➢ How to enter & clear text from Input box ?
➢ How to capture Text from Input box ?
➢ What is the difference between getText() and getAttribute('value') ?

**Practice URL :** https://admin-demo.nopcommerce.com/

```
<input name="email" id="user" value="admin@yourstore.com">abc@mail.com</input>

getAttribute("name") ---> email
getAttribute("id") ---> user
getAttribute("value") -->  admin@yourstore.com


abc@mail.com    ---> inner text
getText()--> abc@gmail.com
```

## What is the difference between getText() and getAttribute(value) in selenium?

- The **getText**() method returns the innerText of an element.

- The **getAttribute**() method fetches the text contained by an attribute **in an** html document.

**Part 8**

➢ How to handle Dropdown in Selenium WebDriver ?

**Practice URLs:**

- https://www.opencart.com/index.php?route=account/register
- https://www.orangehrm.com/orangehrm-30-day-trial/

**Order**

HandleDropDown

```java
WebDriverManager.chromedriver().setup();
WebDriver driver=new ChromeDriver();
driver.get("https://www.opencart.com/index.php?route=account/register");
WebElement dropdownElement=driver.findElement(By.id("input-country"));
Select dropdown=new Select(dropdownElement);
dropdown.selectByVisibleText("Denmark");
Thread.sleep(3_000);
dropdown.selectByValue("10"); //Argentina
Thread.sleep(3_000);
dropdown.selectByIndex(13); //Australia
Thread.sleep(3_000);
```

```java
public static void selectOptionFromDropDown(WebElement element, String value) {
    Select dropdown=new Select(element);
    List<WebElement> allOptions=dropdown.getOptions();
    for(WebElement option:allOptions) {
        if(option.getText().equals(value)) {
            option.click();
            break;
        }
    }
}

static WebDriver driver;
public static void main(String[] args) throws InterruptedException{
    WebDriverManager.chromedriver().setup();
    driver=new ChromeDriver();
    driver.get("https://www.orangehrm.com/orangehrm-30-day-trial/");

    WebElement dropdown1=driver.findElement(By.name("NoOfEmployees"));
    selectOptionFromDropDown(dropdown1,"16 - 20");

    WebElement dropdown2=driver.findElement(By.name("Industry"));
    selectOptionFromDropDown(dropdown2,"Healthcare");
```

## Part 9

➢ How to handle Bootstrap Dropdown in Selenium WebDriver ?

Bootstrap dropdown url

https://getbootstrap.com/docs/4.0/components/dropdowns/

**Practice URL:** https://www.hdfcbank.com/

```java
//Code to handle bootstrap dropdowns
static void  selectOptionFromDropDown(List<WebElement> elements, String value) {
    for(WebElement element:elements) {
        if(element.getText().equals(value)) {
            element.click();
            break;
        }
    }

}

static WebDriver driver;
public static void main(String[] args) throws InterruptedException {
    WebDriverManager.chromedriver().setup();
    WebDriver driver=new ChromeDriver();
    driver.get("https://www.hdfcbank.com/");
    driver.manage().window().maximize();

    //Clicking product type dropdown
    driver.findElement(By.xpath("//div[@class='drp1']//div[@class='dropdown']")).click();
    //Identifying the dropdown elements
    List<WebElement> productTypes=driver.findElements(By.xpath("//ul[@class='dropdown1 dropdown-menu']/li"));
    selectOptionFromDropDown(productTypes, "Accounts");
    Thread.sleep(5_000);

    //Clicking products dropdown
```
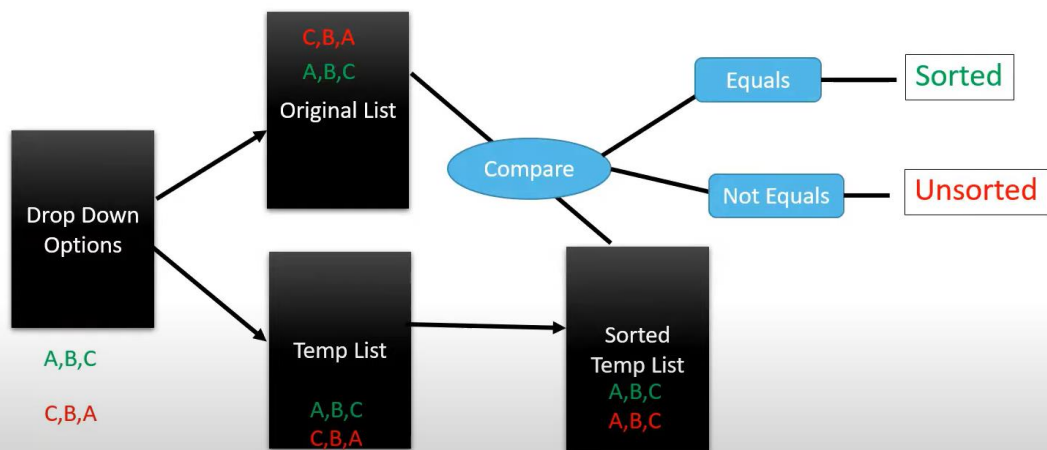
## Part 10

➢ How to handle Jquery Dropdown in Selenium WebDriver ?

**Practice URL:** ComboTree jQuery Plugin Demos (jqueryscript.net)

## Part 11

➢ How to check drop down options are sorted in selenium WebDriver ?

**Practice URL:** twoPLUGS - A plug for your Service and another for your Need

**Part 12**

➢ How to handle Auto Suggest Drop Down in Selenium Web Driver ?

**Practice URLs:**

https://www.bing.com/

**https://www.google.com/**

**Part 13**

➢ How to handle Autocomplete Google Places drop down in selenium web driver ?

**Prcatice URL:** https://www.twoplugs.com/newsearchserviceneed

```java
public static void main(String[] args) throws InterruptedException {
    WebDriverManager.chromedriver().setup();
    WebDriver driver=new ChromeDriver();
    driver.get("https://www.twoplugs.com/newsearchserviceneed");
    driver.manage().window().maximize();

    WebElement search=driver.findElement(By.id("autocomplete"));
    search.clear();
    search.sendKeys("ind");
    String  text;
    do {
        search.sendKeys(Keys.ARROW_DOWN);
        text=search.getAttribute("value");

        if(text.equals("Indonesia")) {
            search.sendKeys(Keys.ENTER);
            break;
        }
        Thread.sleep(1_000);
    }while(!text.isEmpty());

    Thread.sleep(5_000);
    driver.quit();
}
```

**Part 14**

- ➢ How to select specific Check box ?
- ➢ How to select all the check boxes ?
- ➢ How to select multiple check boxes by choice ?
- ➢ How to select last 2 check boxes ?
- ➢ How to select first 2 check boxex ?

**Prcatice URL:** https://itera-qa.azurewebsites.net/home/automation

```java
//1) select specific text box
//driver.findElement(By.xpath("//input[@id='monday']")).click();

//2) Select all check boxes
/*List<WebElement> elements=driver.findElements(By.xpath("//div[@class='form-check']//input[@type='checkbox']"));
for(WebElement element:elements)
    element.click();*/

//3) Select multiple checkboxes by choice
//monday & sunday
/*List<WebElement> elements=driver.findElements(By.xpath("//div[@class='form-check']//input[@type='checkbox']"));
for(WebElement element:elements) {
    String text=element.getAttribute("id");
    if(text.equals("monday") || text.equals("sunday"))
        element.click();
}*/

//4) Select last n checkboxes
/*List<WebElement> elements=driver.findElements(By.xpath("//div[@class='form-check']//input[@type='checkbox']"));
System.out.println(elements.size());
int start=elements.size()-3;
for(int i=start;i<elements.size();i++) {
    elements.get(i).click();
}
*/
```

## Part 15

- How to handle browser windows in Selenium WebDriver ?
- What is the difference between getWindowHandle() & getWindowhandles() methods ?
- How to switch between Multiple Browser Windows ?
- How to close all browser windows ?
- How to close specific browser window by choice ?

**Practice URLs:**

https://opensource-demo.orangehrmlive.com/

https://www.orangehrm.com/

**Order**

HandleBrowserWindow

## Part 16

- How to Locate links in Selenium WebDriver ?
- What is the difference between linkText() and partialLinkText() ?
- How to capture all the links from Web Page ?
- What is Broken Link ? How to check broken links ?

**Prcatice URL:**

https://www.amazon.in/

http://www.deadlinkcity.com/

**Order**

1.HandleBrowserWindow

2.BrokenLinks

## Part 17

- How to handle Java Script Alerts ?
- How to handle Authentication Popup ?
- How to handle permission based Pop-ups ?

**Practice URLs:**

https://the-internet.herokuapp.com/javascript_alerts

For Authenticated Popup:

https://the-internet.herokuapp.com/basic_auth

For Permision pop-up:

https://www.cleartrip.com/

**Order**

1.Alerts

2.AuthenticatedPopup

```java
WebDriverManager.chromedriver().setup();
WebDriver driver=new ChromeDriver();
driver.get("https://the-internet.herokuapp.com/javascript_alerts");

//Alert window with OK button
//driver.findElement(By.xpath("//button[text()='Click for JS Alert']")).click();
//Thread.sleep(2_000);
//driver.switchTo().alert().accept();

//Alert window with OK and Cancel buttons
//driver.findElement(By.xpath("//button[text()='Click for JS Confirm']")).click();
//Thread.sleep(2_000);
//driver.switchTo().alert().accept(); //close alert by using OK button
//driver.switchTo().alert().dismiss(); //close alert by using Cancel button

//Alert window with pop-ups
driver.findElement(By.xpath("//button[text()='Click for JS Prompt']")).click();
Alert alert=driver.switchTo().alert();
System.out.println("Alert Text:"+alert.getText());
Thread.sleep(2_000);
alert.sendKeys("Welcome Vamsi Krishna Pallapolu");
Thread.sleep(2_000);
alert.accept();
Thread.sleep(2_000);
driver.quit();
```

```java
public static void main(String[] args) throws InterruptedException {
    WebDriverManager.chromedriver().setup();
    WebDriver driver=new ChromeDriver();
    //driver.get("https://the-internet.herokuapp.com/basic_auth"); show authentication pop-up

    driver.get("https://admin:admin@the-internet.herokuapp.com/basic_auth");

    Thread.sleep(2_000);
    driver.quit();
}
```

```java
public static void main(String[] args) throws InterruptedException {
    WebDriverManager.chromedriver().setup();
    ChromeOptions options=new ChromeOptions();
    options.addArguments("--disable-notifications");
    WebDriver driver=new ChromeDriver(options);
    driver.get("https://www.cleartrip.com/");

    Thread.sleep(5_000);
    driver.quit();
}
```

**Part 18**

➢ What is the difference between frame and iframe ?
➢ How to handle iframes in WebDriver ?

- ➢ How to switch between multiple iFrames ?
- ➢ How to work with inner iframes ?

- https://www.selenium.dev/selenium/docs/api/java/index.html?overview-summary.html
- Frames (automationtesting.in)
- Tryit Editor v3.6 (w3schools.com)

iframe means content coming from other sources

Ways to switch to iframes

- driver.switchTo().frame(index)
- driver.switchTo().frame(WebElement)
- driver.switchTo().frame(name/id)

Other

- driver.switchTo().defaultContent()
- driver.switchTo().parentFrame()

## Part 19

- ➢ What is Synchronization problem in Automation ?
- ➢ What are the different types of waits available in Selenium WebDriver ?

**Practice URL:** https://www.google.com/

Application scripts execute faster than page responses

Order

1.ImplicitWaitExample

2.ExplicitWaitExample

3.ExplicitWaitExample2

4.FluentWaitExample

5.FluentWaitExample2

## Waits in Selenium

- Implicit Wait
- Explicit Wait
- Fluent Wait

Implicit Wait applicable for all the elements in the web page

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

We can add only once in the script

If we give time as 10 seconds and element is taking more than 10 seconds then there are chances that exceptions will come

Explicit Wait is applicable for specific element

Fluent Wait is also similar to WebDriverWait with more flexibility in polling time and ignoring Exceptions

It's not recommended to useThread.sleep()

## Part 20

➢ How to handle Web Table in Selenium WebDriver ?
  o How many rows in table ?
  o How many columns in table ?
  o Retrieve the specific row/column data
  o Print release date, versionno of java language of selenium

**Practice URL:** https://www.selenium.dev/downloads/

## Part 21

➢ How to handle Dynamic Web Table with Pagination in Selenium ?

**Practice URL:** Administration (opencart.com)

## Part 22

➢ How to handle DatePicker in Selenium ?

**Prcatice URLs:**

Book Bus Travels, AC Volvo Bus, rPool & Bus Hire - redBus India

Dummy ticket for applying visa - Verifiable flight reservation for embassy

## Part 23

➢ How to perform Mouse Operations in Selenium WebDriver ?
➢ How to perform Right Click Action ?
➢ How to perform Double click Action ?
➢ How to perform Drag and Drop Action ?
➢ How to perform Mouse Hover Action ?

**Practice URL:**

jQuery contextMenu (2.x) (swisnl.github.io)

Tryit Editor v3.6 (w3schools.com)

Demo 2: Drag and drop (dhtmlgoodies.com)

[Drag and Drop Demo Sites | Testing Site - GlobalSQA](#)

[Your Store (opencart.com)](#)

**Order**

1. MouseRightClickAction

2. MouseDoubleClickAction

3. MouseDragAndDrop

4. MouseDragAndDropImages

5. MouseHoverAction

**Methods**

 Actions action=new Actions(driver);

- action.**contextClick**(element).perform();
- action.**doubleClick**(button).perform();
- action.**dragAndDrop**(source, target).perform();
- action.**moveToElement**(mainMenu).**moveToElement**(subMenu).click().perform();

**Part 24**

- ➢ How to handle Slider ?
- ➢ How to find location and size of the web element ?
- ➢ What is the difference between Actions & Action ?
- ➢ What is the difference between build & perform ?

**Prcatice URLs:**

[jQuery UI Price Range Slider Demo (jqueryscript.net)](#)

[http://automationpractice.com/index.php](http://automationpractice.com/index.php)

**Order**

1. Slider
2. ActionvsActions

**Points**

- - Actions is a class
- - Action is an interface
- - build() returns the action
- - perform() completes the action

**Methods**

- getLocation()
- getSize()
- Actions action=new Actions(driver);

```
        action.dragAndDropBy(slider, 100, 0).perform();
```

**Part 25**

➢ How to perform keyboard actions in selenium ?

Practice URLs:

https://the-internet.herokuapp.com/key_presses

https://text-compare.com/

**Order**

1.KeyboardAction

2.KeyboardActionMultipleKeys

**Part 26**

➢ How to capture ScreenShot of full page ?
➢ How to capture ScreenShot of section of page ?
➢ How to capture ScreenShot of Element on a page ?

**Practice URLs:**

https://demo.nopcommerce.com/

**Order**

1.CaptureScreenShots

**Part 27**

➢ How to capture tooltip of the Web Element ?
➢ How to open a link in new tab ?
➢ How to open URL's in multiple tabs and windows ?
➢ How to capture size and location of the WebElement ?

**Practice URLs:**

https://jqueryui.com/tooltip/

https://demo.nopcommerce.com/

https://www.opencart.com/

https://opensource-demo.orangehrmlive.com/

**Order**

1.Tootip

2.OpenLinkInNewTab

3.OpenURLSin2tabs

4.SizeAndLocation

**Part 28**

➢ How to use JavaScriptExecutor in Selenium WebDriver ?

Practice Urls:

https://demo.nopcommerce.com/

**Order**

1.JavaScriptExecutorDemo.java [JavaScriptUtil.java]

**Part 29**

➢ How to capture cookies from browser ?
➢ How to print cookies from browser ?
➢ How to add cookie to the browser ?
➢ How to delete specific cookie from the browser ?
➢ **How to delete all cookies from the browser ?**

**Practice Urls:**

https://demo.nopcommerce.com/

**Order**

1.HandleCookies

Cookies are temporary files created by the browser when we visit a website

**Methods**

• driver.manage().getCookies() -> Returns the list of cookies
• driver.manage().addCookie(arg0) -> Create and add the cookie
• driver.manage().deleteCookie(arg0) -> Delete specific cookie
• driver.manage().deleteCookieNamed(arg0) -> Delete specific cookie according name
• driver.manage().deleteAllCookies() -> Delete all cookies

**Part 30**

➢ How to download the files using Selenium WebDriver ?

**Practice Urls:**

https://file-examples.com/index.php/sample-documents-download/sample-doc-download/

https://file-examples.com/index.php/sample-documents-download/sample-pdf-download/

Order

1.Downloadwordfile

2.DownloadPdfFile

MIME types

**Part 31**

➢ How to upload the file in Selenium WebDriver ?

Practice URLs:

https://www.monsterindia.com/

Order

1.UploadFile

- sendKeys() method
- Robot class
- AutoIT, sikuli 3rd party tools
- If we have type="file" attribute then only we can use sendKeys() method to upload file

```
<input data-v-e71578e4 id="file-upload" name="file" type="file" xpath="1">
```

**Part 32**

➢ How to perform Database testing in Selenium Web Driver ?

https://mvnrepository.com/artifact/mysql/mysql-connector-java

Order

Databasetesting