Selenium

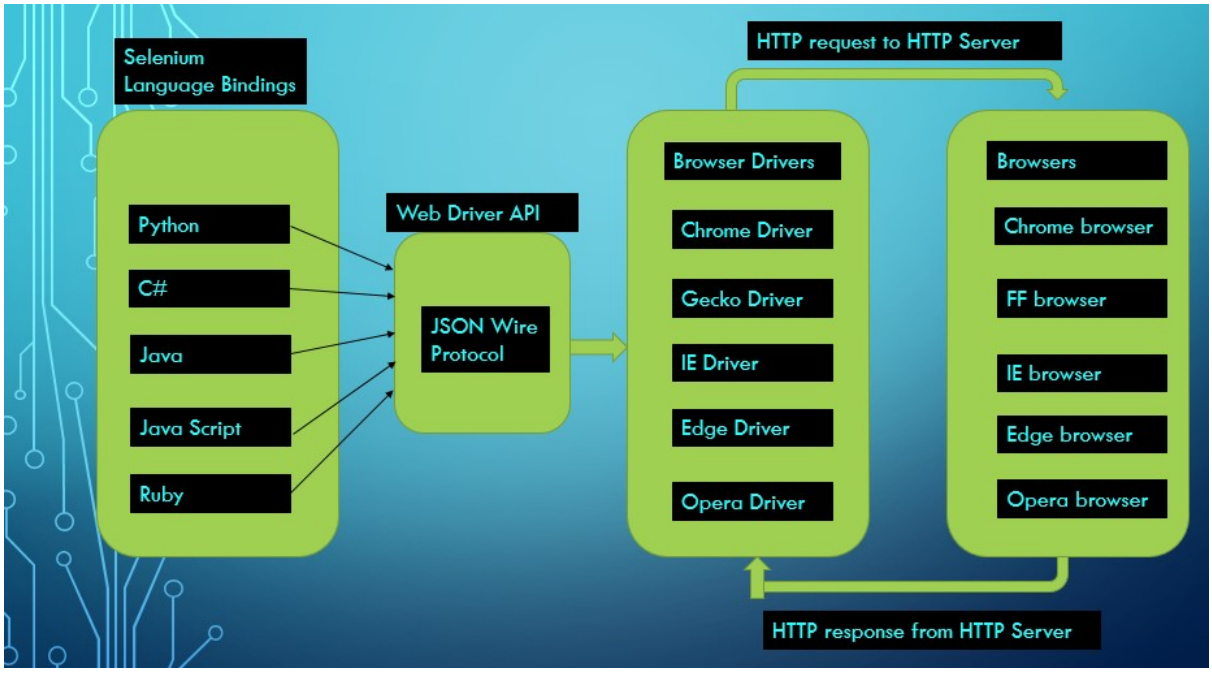
- Selenium is a free and open source tool used for automating the web application.

Selenium workflow

There are three components in selenium architecture

1 Selenium Client Library (Web Driver API)
2 Browser drivers
3 Browsers

Below is the diagram which illustrate how selenium interacts with the browsers.



1 Selenium Client Library

- Selenium supports multiple libraries such as Python, C#, Java, Ruby and many other programming languages.
- Selenium developers have developed language bindings to allow selenium to support multiple languages.

WebDriver API

- Webdriver API generates an **HTTP request** to each selenium command.
- WebDriver internally uses a JSON for transferring the HTTP Request to HTTP Server.
- **JSON** stands for **JavaScript Object Notation.**
- It is used to transfer the data between a server and a client on the web.
- JSON wire protocol is a REST API that transfers the information between HTTP servers.
- Each browser driver (Such as, Firefox, Chrome ETC) has its own HTTP server.

2 Browser Drivers

- The browser driver uses a HTTP server for getting the **HTTP request.**

- **HTTP server** determines the steps needed to implement the selenium command.
- Browser drivers communicate with respective browser without revealing the internal logic of browser functionality.
- When the browser driver receives any command then that command will be executed on the respective browser and the response will go back in the form of **HTTP Response.**

3 Browser

- Selenium supports multiple browsers such as Firefox, Chrome, and IE ETC.

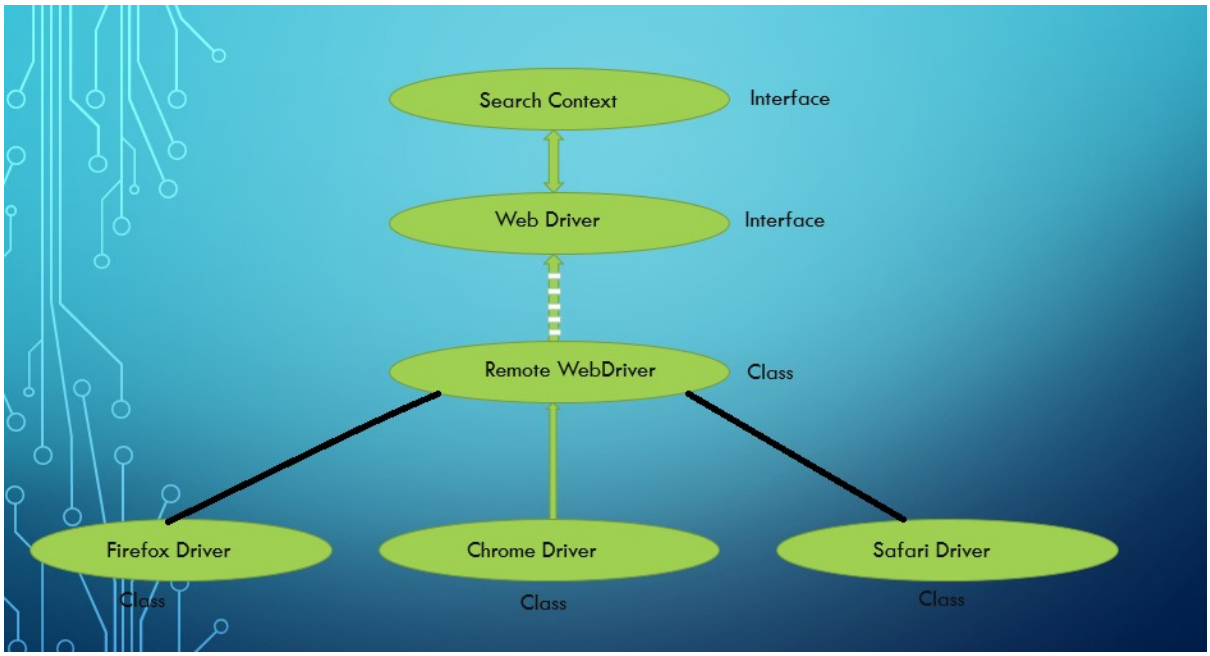
Note:

- Basically, HTTP request will come in two format
  1 POST
  2 GET

1 POST: If the HTTP request is POST than there will be action on the browser. Example: Selenium commands which performs only action on the browser are generated as a POST HTTP request.

2 GET: If the HTTP request id GET then the corresponding request will be generated at the browser end and it will send back in the form of HTTP response.
Example: Selenium commands which returns a value, those commands are generated as a GET HTTP request.

WebDriver API Architecture



SearchContext is super most interfaces which are extended by **WebDriver** interface. Abstract methods of these two interfaces is implemented in **Remote WebDriver** class, this class has a private constructor and the class is extended by the respective browser classes such as Firefox Driver, Chrome Driver, IE Driver, Safari Driver etc.

Generally, while writing automation script we always up-cast the instance of the browser to web driver interface so that the automation script will be generic and it should work for any other browser.

Example: WebDriver driver = new ChromeDriver ();

Write a program to launch the browser.

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class LauchBrowser {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
    }
}
```

Browser Commands

- Selenium commands which are used to perform an action on the browsers are called as browser commands.
- Below are the commands are called as browser commands
  -> Get
  -> FullScreen
  -> Maximize
  -> Close
  -> Quit
  -> To
  -> Back
  -> Forward
  -> Refresh
  -> GetCurrentURL
  -> GetPageSource
  -> GetTitle
  -> SetPosition
  -> SetSize
  -> GetPosition
  -> GetSize

1. Get (String URL)

- Get method is used to enter the URL in the browser address bar.

Note: We should specify complete URL of the application starting
From the protocol.

Write a program to enter the URL?

```java
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class Get {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();

        driver.get("https://demo.actitime.com");
    }
}
```

2. Naviaget.to (String URL)

- To method is also used to enter the URL in the browser address bar.

Write a program to enter the URL to address bar using to method.

```java
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class NavigateTo {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();

        driver.navigate().to("https://demo.actitime.com");
    }
}
```

3 Close ()

- Close method is used to close the browser which is opened by selenium.

Write a script to close the browser using close method.

```java
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class Close {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();

        driver.get("https://demo.actitime.com");
        driver.close();
    }
}
```

4 Quit ()

- Quit method is also used to close the browser.

```java
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class Close {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();

        driver.get("https://demo.actitime.com");
        driver.quit();
    }
}
```

5 GetTitle ()

- GetTitle method is used to get the title of the current web page.

Write a script to verify the webpage?

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class GetTitle {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https://demo.actitime.com");

        String TitleOfThePage = driver.getTitle();

        if(TitleOfThePage.contains("actiTIME Login"))
        {
            System.out.println("Pass: actiTIME login page is displaying");
        }
        else
        {
            System.out.println("Pass: actiTIME login page is not displaying");
        }

        driver.quit();
    }
}
```

6 Maximize ()

- Maximize method is used for maximizing the browser.

Write a script to maximize the browser?

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class Maximize {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https://demo.actitime.com");
        driver.manage().window().maximize();

        driver.quit();
    }
}
```

7 GetCurrentURL ()

- GetCurrentURL method is used to get the URL present in the current browser.

Write a script to get the URL present in the address bar and validate it?

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class GetCurrentURL {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https://demo.actitime.com");
        driver.manage().window().maximize();

        String CurrentURL = driver.getCurrentUrl();

        if(CurrentURL.contains("https://demo.actitime.com")){
            System.out.println("PASS: Entered URL is correct");
        }else {
            System.out.println("FAIL: Entered URL is incorrect");
        }
        driver.quit();
    }
}
```

8 Back ()

- Back function is used to click on the back button on the browser.

Write a script to click on the back button and verify it.

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class NaviagetBack {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https:\\www.google.com");
        driver.manage().window().maximize();
        driver.navigate().to("http:\\www.bing.com");
        driver.navigate().to("http:\\www.gmail.com");
        driver.navigate().back();
        String url = driver.getCurrentUrl();
        if (url.contains("bing")) {
            System.out.println(url);
            System.out.printf("Back page %s loaded successfully", url);
        } else {
            System.out.println("bing page is not loaded");
        }

        driver.quit();
    }
}
```

9 Forward ()

- Forward function is used to click on the forward button on the browser.

Write a script to click on the forward button and verify it.

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class NavigateForward {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.navigate().to("http:\\demo.actitime.com");
        driver.navigate().to("https:\\www.google.com");
        driver.navigate().back();
        driver.navigate().forward();
        String url = driver.getCurrentUrl();
        if (url.contains("google")) {
            System.out.println(url);
            System.out.printf("Forward page %s loaded successfully", url);
        } else {
            System.out.println("Google page is not loaded");
        }

        driver.quit();
    }
}
```

10 Refresh ()

- Refresh method is used to click on the refresh button on the browser.

Write a script to click on the refresh button?

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class NaviagateRefresh {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https://demo.actitime.com");
        driver.manage().window().maximize();

        driver.navigate().refresh();

        driver.quit();
    }
}
```

11 FullScreen ()

- FullScreen method is used to open the application in a full screen.

Write a script to open the application in full screen

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class FullScreen {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https:\\www.google.com");
        driver.manage().window().maximize();

        driver.manage().window().fullscreen();

        driver.quit();
    }
}
```

12 GetPageSource ()

- GetPageSource method is used to get the source code of the current page.

Write a script to get the source code of the current page?

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class GetPageSource {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https:\\www.google.com");
        driver.manage().window().maximize();

        String PageSourceCode = driver.getPageSource();

        System.out.println(PageSourceCode);

        driver.quit();
    }
}
```

13 SetSize ()

- SetSize method is used to resize the browser

Write a script to resize the browser?

```
import org.openqa.selenium.Dimension;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class SetSize {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https:\\www.google.com");
        driver.manage().window().maximize();
        int width = 200;
        int height = 400;

        Dimension dimension = new Dimension(width, height);
        driver.manage().window().setSize(dimension);

        driver.quit();
    }
}
```

14 SetPosition ()

- SetPosition method is used to move the browser based on the x and y coordinates.

Write a script to move the browser.

```
import org.openqa.selenium.Point;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class SetPosition {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https:\\www.google.com");
        driver.manage().window().maximize();
        int x = 300;
        int y = 400;

        Point point = new Point(x, y);
        driver.manage().window().setPosition(point);

        driver.quit();
    }
}
```

15 GetSize ()

- GetSize method is used to get the size of the browser.

Write a script to get the size of the browser.

```
import org.openqa.selenium.Dimension;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class GetSize {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https:\\www.google.com");

        Dimension sizeOfTheBrowser = driver.manage().window().getSize();

        System.out.println("Size of the browser is: "+sizeOfTheBrowser);
        System.out.println("Width of the browser: "+sizeOfTheBrowser.getWidth());
        System.out.println("Height of the browser: "+sizeOfTheBrowser.getHeight());

        driver.quit();
    }
}
```

16 GetPosition ()

- GetPosition is used to get the x and y coordinates of the browser.

Write a program to get the x and y coordinates of the browser.

```java
import org.openqa.selenium.Point;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class GetPostiont {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:\\Training\\QSSW3\\Driver\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https:\\www.google.com");

        Point sizeOfTheBrowser = driver.manage().window().getPosition();

        System.out.println("Position of the browser is: "+sizeOfTheBrowser);
        System.out.println("X-Coordinate of the browser: "+sizeOfTheBrowser.getX());
        System.out.println("Y-Coordinate of the browser: "+sizeOfTheBrowser.getY());

        driver.quit();
    }
}
```