Java Script Executor

JavaScript is a language that was created by Brendon Eich, to have a way to interact dynamically with the HTML DOM. In today's world, JavaScript is one of the most popular and widely used language to create dynamic websites.

We can execute JavaScript code through Selenium WebDriver using the methods available from the webdriver.

Selenium provides "Execute Script" method to run Java script in the context of the currently selected frame or window.

Why we use it?

- To enhance the capabilities of the existing scripts by performing Java Script injection into our application under test.
- In simple words, java script can be executed with in the browser with the help of java script executor.
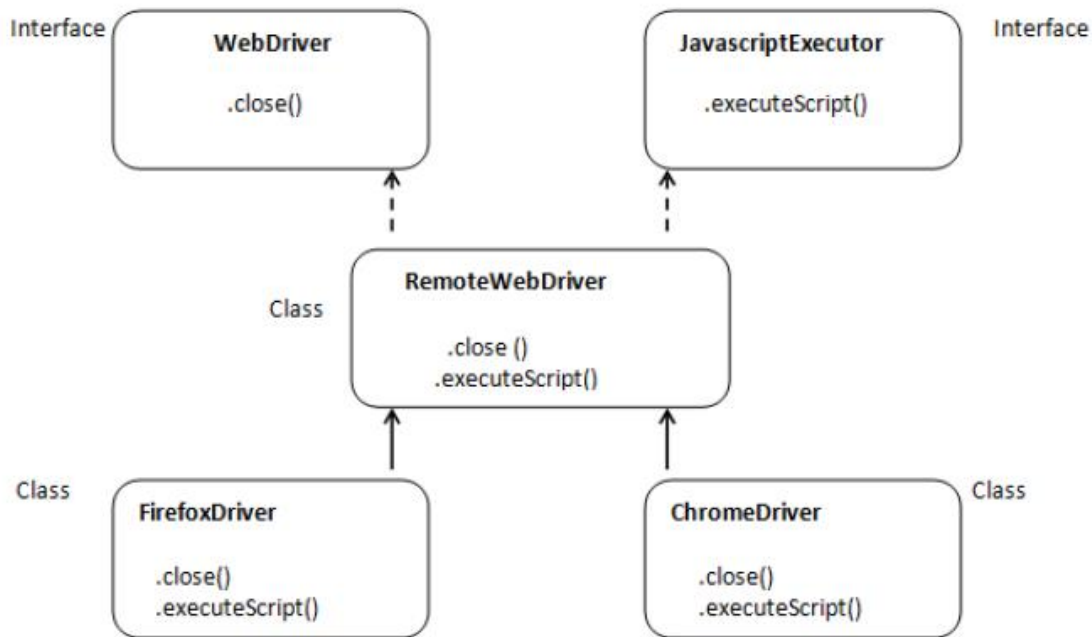
In this session, we will look at how we can directly execute java script snippets in selenium. We will explore the sort of things that you can do and how they can help you work around some of the limitations that you will came across while writing your scripts. We will also have a look at some examples of things that you should avoid doing.

Introducing the java script executor

Selenium has a mature API that caters to the majority of automation tasks that you may want to throw at it. That being said, you will occasionally come across problems that the API doesn't really seem to support. This is very much on the development teams mind when selenium was written. So, they provided a way for you to easily inject and execute arbitrary blocks of java script.

Selenium provides a function "executeScript" to inject the java script commands to inject into browser.

ExecuteScript method is available in an interface called JavaScriptExecutor.

The **executeScript()** method is declared in **JavaScriptExecutor** interface which is implemented in **RemoteWebDriver**, but after creating the object of the browser we will '**upcast**' it to **WebDriver** interface which will hide all the methods of **RemoteWebDriver**. In order to access those methods we should '**downcast**' it.

```
JavascriptExecutor JS = (JavascriptExecutor) driver;
```

Program to print the statement in console window of browser.

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class Console {
    public static void main(String[] args) throws InterruptedException {
        System.setProperty("webdriver.chrome.driver", "D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https://demo.actitime.com/login.do");
        driver.manage().timeouts().implicitlyWait(30, TimeUnit.SECONDS);

        JavascriptExecutor JS = (JavascriptExecutor) driver;
        JS.executeScript("console.log('Welcome to Qspiders')").toString();
        driver.close();
    }
}
```

- We can also get the execute script function to return things for us. For example, if we tweak the script of java script in the above example.
- We can get selenium to tell us whether it managed to write to the java script console or not by using the return statement in the execute script function.

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class Console {
    public static void main(String[] args) throws InterruptedException {
        System.setProperty("webdriver.chrome.driver", "D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https://demo.actitime.com/login.do");
        driver.manage().timeouts().implicitlyWait(30, TimeUnit.SECONDS);

        JavascriptExecutor JS = (JavascriptExecutor) driver;
        Object status = JS.executeScript("return console.log('Welcome to Qspiders')");
        System.out.println("Return value of execute script is: " + status);
        driver.close();
    }
}
```

- Above program will run successfully and returns 'None'. Coz method console.log is used to enter the text into the console window of browser.

Note: Java script commands will always return an object. Based on the commands we are using the return value will be different.

- If there is no return value, a 'NONE' will be returned.
- If the returned result is an HTML element, a web element will be returned.
- If the returned result is decimal, a float will be returned.
- If the returned result is non decimal number, a long will be returned.
- If the returned result is Boolean, Boolean will be returned.
- If the returned result is array of element, a list object with each object that it contains, along with all of the values will be returned.
- For all other cases, a STRING will be returned.

The execute script method is so powerful that you can pass arguments into the execute script function.

The arguments that you pass in can be any of the following.

- ➢ Web element
- ➢ Number
- ➢ Boolean
- ➢ String
- ➢ List

The above then put into a variable called arguments, which can be accessed by the java script. Let's extend one example a little bit to pass in some arguments.

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Animal = "Lion"

Seen = 5

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class Arguments {
    public static void main(String[] args) throws InterruptedException {
        System.setProperty("webdriver.chrome.driver", "D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https://demo.actitime.com/login.do");
        driver.manage().timeouts().implicitlyWait(30, TimeUnit.SECONDS);
        int seen = 5;
        String animal = "Lion";

        JavascriptExecutor JS = (JavascriptExecutor) driver;
        JS.executeScript("console.log('I have seen a '+arguments[0]+''+arguments[1]+' times')", animal, seen);

        driver.close();
    }
}
```

So, what should we do with it in automation?

- Let's have a look at some examples of the things that we can do with the java script executor that aren't really possible using the base selenium API.

First of all, we will start of by getting the element text?

- Wait a minute, element text. But that's easy, you can get using existing selenium API with the function called "text".
- When we have the text function, so why would we want to use java script executor to get the text of an element?
- Answer: Getting the text is easy using the selenium API. But only under certain conditions. The element that you are collecting the text from element needs to be displayed. If selenium thinks that the element from which you are collecting the text is not displayed, it will return an empty string. If you want to collect some text from hidden element. You are out of luck.
- You will need to implement a way to do it with a java script executor.
  Note: Why would want to do this? Well, maybe you have a responsive website that shows different element based on different resolutions. You may want to check whether these two different elements are displaying the same text to the user or not. To do this we will need to get the text of the visible and invisible elements so that you can compare them.

Following are the Java script functions

- ➢ **TextContent ->** Used to get the text of an element from the web element.
- ➢ **InnerHTML ->** Used to get the inner HTML of the web element.
- ➢ **OuterHTML ->** Used to get the HTML of the current element and inner HTML.
- ➢ **Click ->** Used to click on the web element.

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- ➢ **Value ->** Used to enter the text and clear the text from the text box web element.
- ➢ **Alert ->** Used to create the alert pop-up.
- ➢ **Window.ScrollTo ->** Used to scroll the web page.
- ➢ **Window.ScrollBy ->** Used to scroll the web page.
- ➢ **Window.location ->** Used to enter the URL into address bar.
- ➢ **Window.open ->** Used to open tab and enter the URL into the new tab.
- ➢ **Document.domain ->** to get the domain name of the application.
- ➢ **Document.title ->** to get the title of the current web page.
- ➢ **Document.URL ->** to get the URL of the current web page.
- ➢ **History.go ->** to refresh the web page.

Write a program to get the text of an element using JS?

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class GetText {
    public static void main(String[] args) throws InterruptedException
    {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https://demo.actitime.com");
        driver.manage().timeouts().implicitlyWait(50, TimeUnit.SECONDS);

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        String Credentials = JS.executeScript("return document.getElementById('demoCredentials').textContent").toString();
        System.out.println(Credentials);
        driver.close();
    }
}
```

Write a program to click on the element?

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class Click {
    public static void main(String[] args) throws InterruptedException
    {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        //driver.manage().window().maximize();
        driver.get("https://demo.actitime.com");
        driver.manage().timeouts().implicitlyWait(50, TimeUnit.SECONDS);

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        JS.executeScript("document.getElementById('loginButton').click()");

        driver.close();
    }
}
```

Write a script to login to the application by using the arguments?

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.By;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.chrome.ChromeDriver;

public class GetWebElement {
    public static void main(String[] args) throws InterruptedException
    {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        //driver.manage().window().maximize();
        driver.get("https://demo.actitime.com");
        driver.manage().timeouts().implicitlyWait(50, TimeUnit.SECONDS);

        WebElement username = driver.findElement(By.id("username"));
        WebElement password = driver.findElement(By.name("pwd"));

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        JS.executeScript("arguments[0].value='admin'", username);
        JS.executeScript("arguments[0].value='manager'", password);
        JS.executeScript("document.getElementById('loginButton').click()");

        driver.close();
    }
}
```

Write a script to enter the text using the Java script?

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;

public class GetWebElement {
    public static void main(String[] args) throws InterruptedException
    {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        //driver.manage().window().maximize();
        driver.get("https://demo.actitime.com");
        driver.manage().timeouts().implicitlyWait(50, TimeUnit.SECONDS);

        WebElement username = driver.findElement(By.id("username"));
        WebElement password = driver.findElement(By.name("pwd"));

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        JS.executeScript("arguments[0].value='admin'", username);
        JS.executeScript("arguments[0].value='manager'", password);

        driver.close();
    }
}
```

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Write a script to clear the text from the text box?

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.By;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.chrome.ChromeDriver;

public class Clear {
    public static void main(String[] args) throws InterruptedException
    {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        //driver.manage().window().maximize();
        driver.get("https://demo.actitime.com");
        driver.manage().timeouts().implicitlyWait(50, TimeUnit.SECONDS);

        WebElement username = driver.findElement(By.id("username"));

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        //Entering the "admin"
        JS.executeScript("arguments[0].value='admin'", username);
        //Clearing the "admin"
        JS.executeScript("arguments[0].value=''", username);

        driver.close();
    }
}
```

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Write a script to get the innerHTML of the web element?

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class HTML_inner {
    public static void main(String[] args) throws InterruptedException
    {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https://demo.actitime.com");
        driver.manage().timeouts().implicitlyWait(50, TimeUnit.SECONDS);

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        String innerHTML = JS.executeScript("return document.getElementById('demoCredentials').innerHTML").toString();
        System.out.println(innerHTML);
        driver.close();
    }
}
```

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Write a script to get the outerHTML of the web element?

```
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class HTML_outerHTML {
    public static void main(String[] args) throws InterruptedException
    {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https://demo.actitime.com");
        driver.manage().timeouts().implicitlyWait(50, TimeUnit.SECONDS);

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        String outerHTML = JS.executeScript("return document.getElementById('demoCredentials').outerHTML").toString();
        System.out.println(outerHTML);
        driver.close();
    }
}
```

Write a script to develop the alert pop up?

```
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

public class AlertPopUp {
    public static void main(String[] args) throws InterruptedException {
        System.setProperty("webdriver.gecko.driver", "D:/Softwares/Drivers/geckodriver.exe");
        WebDriver driver = new FirefoxDriver();
        driver.manage().window().maximize();
        driver.get("https://www.flipkart.com/search?q=phones&otracker=start&as-show=off&as=off");
        driver.manage().timeouts().implicitlyWait(30, TimeUnit.SECONDS);

        JavascriptExecutor JS = (JavascriptExecutor) driver;
        JS.executeScript("alert('Qspiders')");

        driver.close();
    }
}
```

Write a script to scroll down to the bottom of the page?

```
package javaScriptExecutor;

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

public class ScrollHeight {
    public static void main(String[] args) throws InterruptedException {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https://demo.actitime.com");

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        JS.executeScript("window.scrollTo(0,document.body.scrollHeight)");

        driver.close();
    }
}
```

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Write a script to scroll to the top of the page?

```java
package javaScriptExecutor;

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

public class ScrollTop {
    public static void main(String[] args) throws InterruptedException {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.manage().window().maximize();
        driver.get("https://www.flipkart.com/search?q=phones&otracker=start&as-show=off&as=off");

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        JS.executeScript("window.scrollTo(0,document.body.scrollHeight)");
        Thread.sleep(5000);
        JS.executeScript("window.scrollTo(0,document.body.scrollTop)");
        Thread.sleep(5000);
        driver.close();
    }
}
```

Write a script to scroll to the right side of the page?

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class ScrollingVertically {
    public static void main(String[] args) throws InterruptedException
    {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https://www.google.com/search?q=selenium&oq=selenium&aqs=chrome..69i57.2907j0j9&sourceid=chrome&ie=UTF-8");
        driver.manage().timeouts().implicitlyWait(50, TimeUnit.SECONDS);

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        JS.executeScript("window.scrollBy(2000, 0)");

        driver.close();
    }
}
```

Write a script to scroll to the left side of the page?

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;

public class ScrollingVertically {
    public static void main(String[] args) throws InterruptedException
    {
        System.setProperty("webdriver.chrome.driver","D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https://www.google.com/search?q=selenium&oq=selenium&aqs=chrome..69i57.2907j0j9&sourceid=chrome&ie=UTF-8");
        driver.manage().timeouts().implicitlyWait(50, TimeUnit.SECONDS);

        JavascriptExecutor JS = (JavascriptExecutor)driver;
        JS.executeScript("window.scrollBy(2000, 0)");
        Thread.sleep(5000);
        JS.executeScript("window.scrollBy(-2000, 0)");
        Thread.sleep(5000);

        driver.close();
    }
}
```

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Write a script to scroll into the specific element using scrollTo method

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.By;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.chrome.ChromeDriver;

public class ScrollToEle {
    public static void main(String[] args) throws InterruptedException {
        System.setProperty("webdriver.chrome.driver", "D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        driver.get("https://demo.vtiger.com");
        driver.manage().timeouts().implicitlyWait(30, TimeUnit.SECONDS);

        WebElement checkBox = driver.findElement(By.xpath("//a[text()='Privacy Policy']"));
        int x = checkBox.getLocation().getX();
        int y = checkBox.getLocation().getY();
        JavascriptExecutor JS = (JavascriptExecutor) driver;
        JS.executeScript("window.scrollTo(arguments[0],arguments[1])", x, y);
        Thread.sleep(5000);
        driver.close();
    }
}
```

Write a script to login to specific element using the ScrollIntoView method

```java
package javaScriptExecutor;

import java.util.concurrent.TimeUnit;
import org.openqa.selenium.By;
import org.openqa.selenium.JavascriptExecutor;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.chrome.ChromeDriver;

public class ScrollIntoView {
    public static void main(String[] args) {
        System.setProperty("webdriver.chrome.driver", "D:/Softwares/Drivers/chromedriver.exe");
        WebDriver driver = new ChromeDriver();
        // driver.manage().window().maximize();
        driver.get("https://demo.vtiger.com");
        driver.manage().timeouts().implicitlyWait(30, TimeUnit.SECONDS);

        WebElement checkBox = driver.findElement(By.xpath("//a[text()='Privacy Policy']"));

        JavascriptExecutor JS = (JavascriptExecutor) driver;
        JS.executeScript("arguments[0].scrollIntoView();", checkBox);

        driver.close();
    }
}
```

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