**Automation Testing:**

It is the Process of testing the functionality of an application, by the help of automation tools is known as “Automation Testing”.

(OR)

Converting manual testcases into automation scripts, executing them through a framework and getting test results is known as “Automation Testing”.

**Advantages of Automation testing:**

1. We switch to Automation testing when we have to do **Regression Testing**.
2. While regression testing, there are lot of repetitive tasks, and performing them manually is a boring job.
3. Also, in regression when the product size increases, time taken to test also will increase. Hence, we switch to automation to reduce the time taken for testing.
4. **To reduce** the manpower/ number of resources.
5. To obtain the **test results faster**.
6. To get **quick ROI (Returns on Investment)**.
7. We can expect **Accurate results.**
8. Due to tough competition, Software companies need to deliver high quality product within less time. Hence, we switch to Automation Testing.

**Drawbacks/Limitations of Automation Testing:**

1. 100% Automation testing is not possible.
2. Anything which is completely **dynamic cannot be automated**.
3. Anything which requires **manual intervention (Interaction)** cannot be automated. e.g.,

What all cannot be AUTOMATED...

* OTP, CAPTCHA.
* Making Payments through Swiping the Debit/Credit Card.
* Barcode scanner, QR Code Scanning.
* Animation.
* Testing the quality of audio/video files.
* Game Testing.

1. We need **Skilled resources** to do automation testing.
2. **Cost involved** in Automation testing **is more** compared to manual testing, because tools are licenced and automation skilled resources are paid higher.
3. We **can’t automate an unstable Product**, we have to wait for the product to become stable.

(Newly built features will not be automated).

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**Selenium - Automation Tool:**

Selenium is a **Free Open-Source** Automation testing tool. It can automate Web-Based Application. (Can’t automate Standalone applications and client-server applications).

**Selenium Versions/ Selenium Components/ Selenium Flavours:**

1. Selenium Core
2. Selenium IDE-Record and play back tool.
3. Selenium RC (Remote Control) / Also called Selenium-1.0
4. Selenium WebDriver (In 2007) / Also called Selenium-2.0

Current Stable Version------- Selenium 4.1.2 Version

1. Selenium Grid.

Selenium Supports **all the Programming Languages**. Like Java, C#, JavaScript, Perl, Ruby, Python, R, TCL, Elixir, Haskell.

Selenium Supports **all the Browsers** Chrome, Firefox, Opera, Safari, Microsoft Edge etc…

Selenium Supports **all the OS** (Operating Systems). Like windows, Mac, Linux **but except for Unix**.

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**Java-Selenium Architecture:**

**Selenium WebDriver API (Application Programming Interface)** supports all the programming languages and it communicates with language bindings like Java, Python etc…. by using **JSON Wire Protocol (JavaScript Object Notation)**.

These two (Selenium WebDriver API & Java) combined communicate with the **browsers** by using **respective** **driver executable files** like chromedriver.exe, geckodriver.exe etc….

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**WebDriver Architecture:**

**Search Context (Interface)** is the **Super most** interface, **WebDriver interface extends** it and **all the 13 abstract methods** of WebDriver are **given implementation in RemoteWebDriver Class** and all those **concrete methods** (Complete Method which has both body & implementation) are **overridden in respective browser classes** like ChromeDriver Class, FirefoxDriver Class etc.

As a selenium standard **we always upcast our browser classes to WebDriver interface** to achieve:

1. **Generalization**.
2. **Runtime Polymorphism** (at runtime I can decide in which browser my code will run)
3. **To get all those 13 methods** required for automation testing.

**WebDriver Abstract Methods (Browser Window Related Methods):**

1. **get(String url)** ---------------Used to enter the URL & it will Wait Until the Complete Page loads.
2. **getCurrentUrl()** --------------- Used to get the URL of the current WebPage.
3. **getPageSource()** ---------------Used to get the Source code of the current WebPage.
4. **getTitle()** ------------------------- Used to get the title of the current WebPage.
5. **getWindowHandle()** ----------- Used to get the window handle of the current browser window.
6. **getWindowHandles()** ---------------Used to get the window handle of all the browser windows.
7. **manage()** ---------------------- Used to manage browser window
8. **navigate()** ------------------ Used to navigate from one page to another, previous page, next page, and to refresh current webpage.
9. **findElement(By arg)** --------------- Find a particular element on the webpage.
10. **findElements(By arg)** --------------- Find multiple elements on the webpage.
11. **switchTo()** -------------------Used to switch our control from webpage to popups, frames, windows etc….
12. **close()** --------------- Close the current browser window.
13. **quit()** --------------- Close all the browser windows opened by selenium.

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