## What is automation testing

* Automation testing refers to use of Softwares/Frameworks and Scripts to execute tests in software without much human interaction required
* Lifecycle of automation testing
  + Identifying test components
  + Framwork design
  + Test Scripting
  + test executing
  + Test result analysis
* **Identifying test components**
  + Here the component that needs to be automated for testing are identified
* **Framework Design**
  + Here the framework to be used according to test automation requirements is choosen here
  + There are various test automation frameworks ..
    - Selenium (For web automation testing)
    - Appium (For mobile automation testing)
    - QTP (AI-Powered automation testing tool)
    - OpenQA (For Operating Systems automation testing)
    - Cucumber (BDD Automation tool)
    - Robot Framework (ATDD Automation tool)
* **Test Scripting**
  + Here the scripts for test automation are prepared , we can use various programming language for the scripting which can be used with Selenium Webdriver
    - JAVA (80% of Organizations currently uses this)
    - Python (Startups and for migrations, this one is used)
    - JavaScript
    - C# etc..
* **Test Executing**
  + Here the prepared test scripts are executed and results are stored for further analysis
* **Test Result Analysis**
  + The results of executed scripts are stored and those are analysed here which includes
    - Test cases executed
    - Test cases passed
    - Test cases failed

## **Benefits of automation testing**

* Followings are the benefits of automationt testing
  + **70% Faster than manual testing**
    - Since the scirpts are used for automatin testing , the time taken to test for a test case is reduced by 70%
  + **Wider range of test coverage**
  + **Reliable in results**
  + **Saves Time & Cost**
    - Once automation script is developed it can be re-used which saves time when need to execute same test casess again and again
  + **Improves accuracy**
    - Test execution are performed as per scripts so same steps are followed everytime which imporves accuracy of executing a test case
  + **Human interventaion is not required**
    - Once scripts are written there is no human interaction required in between execution
  + **Increases efficiency**
  + **Better execution speed**
    - Scripts are written in a way that it takes very less time as compared to human’s manual testing
  + **Re-Usable test scripts**
    - Since these scripts only have to be created once so reuse is another benefit of automation testing unless there is change in DOM structure of website

## **Types of automation testing**

* Following test types can also be done through automation testing
  + Unit testing
    - With the use of unit test automation tool , unit testing can be performed with automation
  + Smoke testing
    - Majority of smoke test cases are always executed in automation testing phase
  + Functional testing
    - Some of the detailed functional testing can be achived with test automation
  + Integration testing
  + Regression testing
    - After re-test we can use specific test scripts for regression testing

## **Selenium : automation testing tool**

* Selenium is a widely used , open source web automation testing tool
* It is compatible with multiple OS (Linux , Mac , Windows) and multiple browsers (Chrome , Edge , Firefox , Safari)
* It was made in JAVA , but also supports for following programming languages
  + JAVA (80% of Organizations currently uses this)
  + Python (Startups and for migrations, this one is used)
  + JavaScript
  + C# etc..
* It requires same version of webdriver as the browser we will be using for test automation
* It is compatible with multiple framework like TestNG and Maven

## **JAVA**

* JAVA is a compiler based language which is widely used for developing Web application
* It is also widely used by the organization for automation testing
* **What makes up JAVA**
  + Followings are 3 primary components of JAVA
    - **JDK (Java Development Kit)**
    - **JRE (Java Runtime environment)**
    - **JVM (Java Virtual Machine)**
  + **JDK (Java Development Kit)**
    - JDK is the super set of all java components which includes
      * Compiler
      * Debugger
      * JRE (JRE Includes JVM)
    - JDK is responsible for creating java application and use the libraries and runtime environments provided by JRE
  + **JRE (Java Runtime Environment)**
    - JRE is the super set of JVM
    - JRE includes the librearies and runtime environment which is needed for JDK to create & code java applications
  + **JVM (Java Virtual Machine)**
    - JVM is the subset of JRE
    - When a java script is written it is compiled and converted to byte-code which is in “.class” format
    - JVM uses this and convert it to a language (Binary form) which machine understands and returns the output
* **Features of JAVA**
  + **Object oriented**
    - JAVA is a object oriented language which implements following attribtues
      * Encapsulation
      * Inheritance
      * Polymorphism
      * Compositions
      * Interfaces
  + **Secure**
    - JAVA provides many features such as strong exceptional handling method which makes it more secure as compared to other languages
  + **Platform independent**
    - JAVA uses JVM which makes it independent of platform we will be using
  + **High performance**
    - JAVA is a compiler based language which converts java file to a byte-code file which is in .class format which is later used by jvm which makes it more performence efficient
* **Why use JAVA for Selenium**
  + Selenium was originally made up with JAVA
  + 80% of the organizations are currently using JAVA for their test automation with selenium due to it’s high performence and other features
  + It is platform independent and statically typed which provides suggestions and error while creating java scripts which helps make the script better
* **IDEs for JAVA**
  + Eclipse
  + Intellij IDEA (By JetBrains)
  + NetBeans etc..