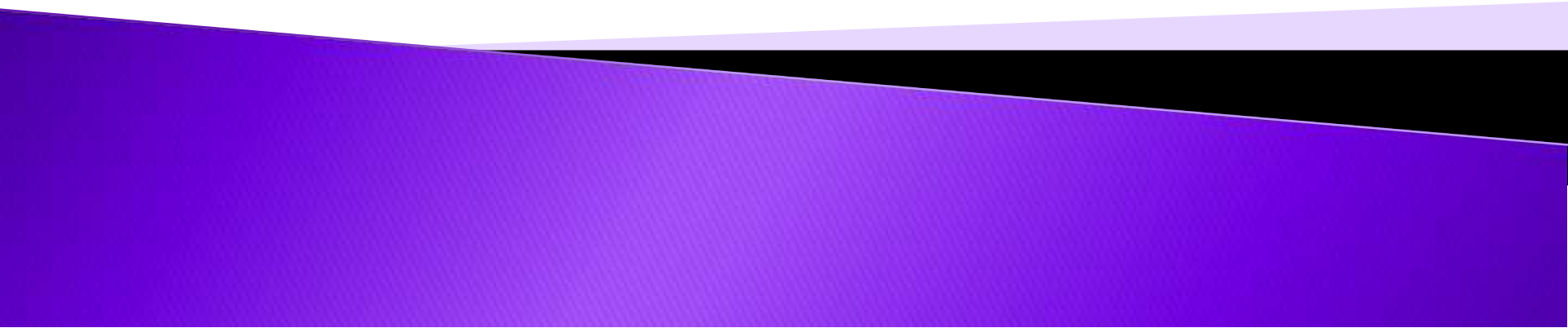
Module 4

Testing Automation



- **Automation Testing or Test Automation** is a software testing technique that performs using special automated testing software tools to execute a test case suite
- On the contrary, Manual Testing is performed by a human sitting in front of a computer carefully executing the test steps
- The automation testing software can also enter test data into the System Under Test, compare expected and actual results and generate detailed test reports
- Test Automation demands considerable investments of money and resources

❖ Why Test Automation?

- **Test Automation** is the best way to increase the effectiveness, test coverage, and execution speed in software testing
- Automated software testing is important due to the following reasons:

- Manual Testing of all workflows, all fields, all negative scenarios is time and money consuming
- It is difficult to test for multilingual sites manually
- Test Automation does not require Human intervention. You can run automated test unattended (overnight)
- Test Automation increases the speed of test execution
- Automation helps increase Test Coverage
- Manual Testing can become boring and hence error-prone.

❖ Which Test Cases to Automate?

Test cases to be automated can be selected using the following criterion to increase the automation ROI

- High Risk - Business Critical test cases
- Test cases that are repeatedly executed
- Test Cases that are very tedious or difficult to perform manually
- Test Cases which are time-consuming

The following category of test cases are not suitable for automation:

- Test Cases that are newly designed and not executed manually at least once
- Test Cases for which the requirements are frequently changing
- Test cases which are executed on an ad-hoc basis.

❖ Automated Testing Process:

Following steps are followed in an Automation Process

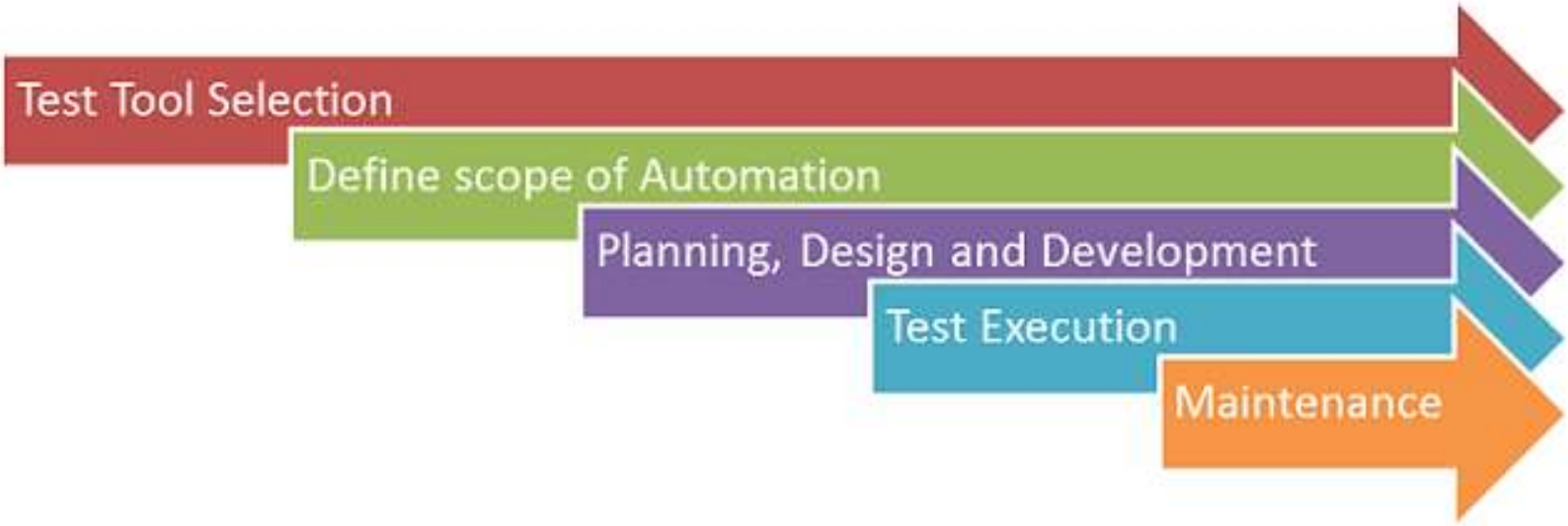
Step 1) Test Tool Selection

Step 2) Define scope of Automation

Step 3) Planning, Design and Development

Step 4) Test Execution

Step 5) Maintenance



1) Test tool selection

- Test Tool selection largely depends on the technology the Application Under Test is built on

2) Define the scope of Automation

Following points help determine scope:

- The features that are important for the business
- Scenarios which have **a large amount of data**
- **Common functionalities** across applications
- Technical feasibility
- The extent to which business components are reused
- **The complexity** of test cases
- Ability to use the same test cases for cross-browser testing

3) Planning, Design, and Development

During this phase, you create an Automation strategy & plan, which contains the following details-

- Automation tools selected
- Framework design and its features
- In-Scope and Out-of-scope items of automation
- Automation testbed preparation
- Schedule and Timeline of scripting and execution
- Deliverables of Automation Testing

4) Test Execution

- Automation Scripts are executed during this phase
- The scripts need input test data before there are set to run
- Once executed they provide detailed test reports

5) Test Automation Maintenance Approach

- **Test Automation Maintenance Approach** is an automation testing phase carried out to test whether the new functionalities added to the software are working fine or not
- Maintenance in automation testing is executed when new automation scripts are added and need to be reviewed and maintained in order to improve the effectiveness of automation scripts with each successive release cycle

❖ Automation Testing Tools

- **Classify the tools based on the specific methodology used**
- **Capture and Playback**
  - Test cases are executed manually only once, the inputs and outputs are recorded
  - Test can be automatically replayed on a subsequent occasion
  - Tests csn rerun cheaply and easily large number of times
  - When test changes captured test becomes invalid and will increase the cost
  - Invalid test cses to be removed and need toad new test cases
  - Eg .Selenium , Apache Jmeter etc

❖ Automation Testing Tools

- **Test Script**
  - Scripts provide input to the unit under test and record output
  - Testers can employ a variety of languages to express the test scripts
  - Advantage is once the test is debugged and verified it can be rerun for large number o ftimes. However , debugging the test script to ensure its accuracy requires significant effort.
  - Changes to the unit under test requires identification , modification and rerun impacted test script
  - Eg. Testsigma

❖ Automation Testing Tools

- **Random input test**
  - **Test values randomly generated cover input space of the unit under test**
  - **Outputs are ignored**
  - **The goal is to crash the unit not to check the correctness of the output**
  - **It finds only the defects that crash the unit under test but majority of th defects do not the crash the system but simply produce incorrect result.**
  - **Eg. MonkeyRunner Tool**
- **Model-based test**
  - **A model is a simplified representation of program**
  - **These models can be structural or behavioral models like state models and activity models (Markov model, Decision Table, ER model etc..)**
  - **A state model based testing generates tests that adequately covers the state space described by the model.**
  - **Eg. GraphWalker,**