TOPIC – 17

Why Automation ?

01. Why Automation?

MANUAL TESTING

01. Why Automation?

Test Automation & Tools

- What is test automation
- Why Automate
- Test Cases suitable for automation
- Test Cases unsuitable for automation
- Automation Strategies
- Pros & Cons - Manual Vs. Automated testing
- Let us get to know some Automation Tools
- Summary

Challenges of Testing

- Today we witness huge and very complex code churned out at faster pace
- Testing is struggling to keep pace with Technological obsolescence and Advancements
- Fast Changing requirements
- Waterfall Model of development leaves restrained scope for optimal testing
- Testing is often squeezed to the fag-end of the SDLC

How to overcome the challenges?

- Trade coverage for risk
  - Reduces scope
  - Shortens test cycles
- Outsource Testing work
- Introduce/ Enhance AUTOMATION

Why Automate?

- **Repeatability** : Tests can be executed multiple times and consistently each time.
- **Leverage** : Executing tests that were never performed manually at all.
- **Accumulation** : The number of test required for coverage increases with each enhancement done to applications.

Benefits of Automation

- **Improves human productivity**
  - Broader test coverage
- **Reduces redundancy**
  - Automate repetitive tasks
- **Enables process improvements**
  - Increase regression testing
  - Expose risk areas
  - Better management of testing (with Test-Director etc.)

Automation MYTHS

- Automate everything
- Shorten the test cycle by 50%
- Automation is 'Easy'
- An automated test is faster, because it needs no human intervention
- Automation will lead to "significant labor cost savings"

Suitable candidates for Automation

- ☑ Tests that need to be run for every build of the application (sanity check, regression test)
- ☑ Tests that use multiple data values for the same actions (data-driven tests)
- ☑ Tests that require detailed information from application internals (e.g., SQL, GUI attributes)
- ☑ Stress/load testing

Suitable Candidates ..Contd.

- ☑ Test cases that can not be done manually
- ☑ Scenario/ Use-Case / Transaction Flow test
- ☑ Configuration test
- ☑ Multi-user Scenarios

Examples :

- While testing the MS word we can check if we open a new document 1000 times, default name should be "Doc1000"
- In the case of adding more number of data say for example 1lakh of data to the database
- When broken links or Orphanage links are to be identified from the web application
- While testing the MS word we can make different styles by using automation and can check
- After preparing the next build we can automate to test that build contains all the files and folders
- Performance testing of the server, network application at various anticipated load levels (if 100 users are logging to yahoo mail, we can find out the response time and behavior of the site)
- GUI properties like Size, Position, Label, Visible, Enable, Value etc. to be tested. (Customer requirement is that the company logo should be displayed at the top center in all the screens)

Unsuitable to Automate

- ☒ Aesthetics (ease of use, usability, look and feel)
- ☒ One-time testing
- ☒ Start testing immediately
- ☒ Ad-hoc/random or Exploratory testing
- ☒ Tests without predictable results
- ☒ Testing dynamic areas under development

Why Automation Fails?

- Not clear or enough Requirements
- Staff skills may not match needs
- Staff turnover
- Insufficient time

Strategies for Automation

- Don't try to automate everything right away
- Focus on the most important test cases first
  - Regression tests
  - High priority features or product requirements
  - High risk use cases, capabilities
- Start with repetitive tasks susceptible to human error if done manually

MANUAL TESTING

Manual Testing Pros & Cons

- Quick & inexpensive
- Simulates real-world use better
- Better for extensive analysis of test cases as well as results
- Best when test steps and results are not well defined
- Can **explore** new test cases
- **Does not require technically trained staff**

- Might not be consistent in re-running test cases.
- Re-running large volumes of test cases is expensive and tedious.
- Work-force turnover may upset plans

Automated Testing Pros & Cons

- Can execute test cases unattended.
- Can cost-effectively **run** large volumes of test cases.
- Can cost-effectively **re-run** large volumes of test cases repetitively.

- Time-consuming & expensive
- Maintaining (modifications etc.) of test cases / scripts are difficult and expensive
- Requires a highly trained technical staff
- Re-running old tests may not necessarily spot new bugs

What Is a Test Script?

A series of commands or events stored in a script language file that execute a test case and report the results.

Fundamentals of Test Automation

- **Maintainability**
  - Applications are maintained continuously
  - Cross-reference test scripts o the application
  - Design to avoid regression
  - Adopt a test framework
- **Optimization**
  - Enough tests to do the job without having to manage to many

Fundamentals of Test Automation

- **Independence (test cases)**
  - Independent data
  - Independent context
  - Result independence
- **Modularity (test scripts)**
  - Identify common scripts

Fundamentals of Test Automation

Synchronization

- Execute the test scrip and the application at the same pace

- Different conditions may exist at the time of playback than existed when the test was created, precise timing coincidence may not be possible

Test Framework

- Test framework is like an application architecture
- It outlines the overall structure for the automated test environment, defines common functions, standard tests, provides templates for test structure, naming convention
- Leading to a maintainable and transferable test library

Test Framework

- **Common Functions** (e.g. Setup, Sign on, Monitor, Log Error, Recover, Signoff, Cleanup)
- **Standard Tests** (e.g. Walk thru to navigate thru each menu item)
- **Test Script templates** - (Header : Test description, inputs, outputs, special requirement, Dependencies, Common routines like setup etc.,End))
- **Test Dictionary** -(Vocabulary, Naming Conventions, Cross reference names to application)

Test Automation Approach

Approach	Profile
Capture /Playback	Application already in test phase or maintenance Stable application.
Variable Capture/ Variable Playback	Application in planning, analysis or design Unstable or stable application Technical test team

Different type of tools

- Reviews and Inspection
- Test planning
- Test design & Development
- Test execution & verification
- Test support

...Automation tools are not one-size-fits-all

Tools for Reviews & Inspection

- Requirement analysis
  - Compuware's **Reconcile**/TeleLogic's DOORS/Rational **Requisite Pro**
- Complexity analysis
  - Compuware's **Numega**
- Code comprehension
  - Compuware's **Numega**
- Syntax analysis
  - Lint for C and Jlint for Java

Tools for test planning

- Templates for test plan documentations
- Test schedule and staffing estimates
- Complexity analyzer

Tools for Test Design & Development

- Test data generator
  - Compuware's **File-Aid**
- Requirements-based test design tool
- Capture/Playback

Test Execution and Evaluation Tools

- Capture/playback
  - Mercury's **WinRunner**
  - Compuware's **QARun**
  - Segue's **Silk Test**
  - Rational's **Visual Test**
  - Rational's **ROBOT**
- Coverage analysis
- Memory testing

Test Execution and Evaluation Tools ..Contd.

- Test case management
  - Mercury's **Test Director**
  - Compuware's **QADirector**
- Simulators & performance
  - Mercury's **LoadRunner**
  - Compuware's **QALoad**
  - Segue's **Silk Performer**
  - Empirix's **eLoad**

Software testing support tools

- Defect tracking tool

  Compuware's TrackRecord
- Configuration management

  MS Visual Source Safe

- Have a clear mission - Plan, Plan, Plan !!! (Define your What, When and How)
- Focus on the most important areas first
- Automation is more than building scripts
- Test Automation is an investment
- Treat test automation as a "development project"

TIPS on Automation

- Avoid introducing automation on projects that are already behind schedule
- Build extra time into the schedule
- Recorded automated tests shouldn't be developed until you have a relatively stable UI for modules of the application
- Generally Test automation increases as the project evolves

More Tips on Automation

- Think of automation as a baseline test suite to be used in conjunction with manual testing, rather than as a replacement for it
- Assure that the product is mature enough so that maintenance costs from constantly changing tests don't overwhelm any benefits provided
- To make it a good investment, as well, the secret is to think about testing first and automation second
- Automation is a development project"
- "Test automation must be implemented as a full-time

Automation Tips (con't)

- Humans can spot bugs that automation ignores
- More so because humans are good at making mistakes
- With "Automation" , we now have **another** added software development effort
- No immediate payback from automation
- No automatic defect reporting without human analysis

====**Topic - 17**=== XXX === **Why Automation ======= ====** XXX =====

TOPIC – 18

Reference Books

01. Reference Books for Testing

MANUAL TESTING

01. Reference Books for Testing

Art of Software Testing - Glenford J. Myers
Testing Computer Software - Cem Kaner
Software Testing in the Real World - Edward Kit
Effective methods for Software testing - William E. Perry
Software Engineering -A Practitioner's Approach - Roger S. Pressman
Software Testing Techniques - Boris Beizer

====**Topic - 18**=== XXX === **Ref Books ======= ====** XXX =====