Test Automation

Module 4

Automation and Testing Tools

- Need of automating the testing activities
- Static and Dynamic testing tools
- Selection of a testing tool
- Costs incurred in adopting a testing tool
- Guidelines of testing automation

Reference: Software Testing Principles and Practices, Naresh Chauhan , Oxford University
Pooja Malhotra

Automation and Testing Tools

- Test automation is the use of special software (separate from the software being tested) to control the execution of tests and the comparison of actual outcomes with predicted outcomes.
- Test automation can automate some repetitive but necessary tasks in a formalized testing process already in place,
- or perform additional testing that would be difficult to do manually.

- The automation software can also enter test data into the System under Test , compare expected and actual results and generate detailed test reports.

- Goal of Automation is to reduce number of test cases to be run manually and not eliminate manual testing all together.

- Successive development cycles will require execution of same test suite repeatedly . Using a test automation tool it's possible to record this test suite and re-play it as required.

Reference: Software Testing Principles and Practices, Naresh Chauhan , Oxford University

Pooja Malhotra

Need of Automation

- Reduction of testing Effort
- Reduces the testers' involvement in executing tests
- Facilitates Regression Testing
- Avoids Human mistakes
- Reduces overall cost of the software
- Simulated testing
- Internal Testing
- Test Enablers
- Test case Design

Reference: Software Testing Principles and Practices, Naresh Chauhan , Oxford University
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Categorization of Testing Tools

Static Testing Tools

Dynamic Testing Tools

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Static Testing Tools

Static Program Analyzers which scan the source code and detect possible faults and anomalies.

- **Control Flow Analysis**
- **Data use Analysis**
- **Interface Analysis**
- **Path Analysis**

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Dynamic Testing Tools

Dynamic Testing Tools supports the dynamic testing activities

Program Monitors:

- List the number of times a component is called or line of code is executed. This information is used by testers about the statement or path coverage of their test cases.
- Report on whether a decision point has branched in all directions, thereby providing information about branch coverage.
- Report summary statistics providing a high level view of the percentage of statements, paths, and branches that have been covered by the collective set of test cases run. This information is important when test objectives are stated in terms of coverage.

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Testing Activity Tools

Tools for Review and Inspections

- Complexity Analysis Tools
- Code Comprehension

Tools for Test Planning

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

Tools for Test Design and Development

- Test data generator
- Test case generator

Test Execution and Evaluation Tools

- Capture/Playback Tools
- Coverage Analysis Tools
- Memory Testing Tools
- Test management Tools
- Network-testing Tools
- Performance testing Tools

Reference: Software Testing Principles and Practices, Naresh Chauhan , Oxford University
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Selection of Testing Tools

- Match the tool to its appropriate use
- Select the tool to its appropriate SDLC phase
- Select the tool to the skill of the tester
- Select a tool which is affordable
- Determine how many tools are required for testing the system
- Select the tool after having the schedule of testing

Reference: Software Testing Principles and Practices, Naresh Chauhan , Oxford University
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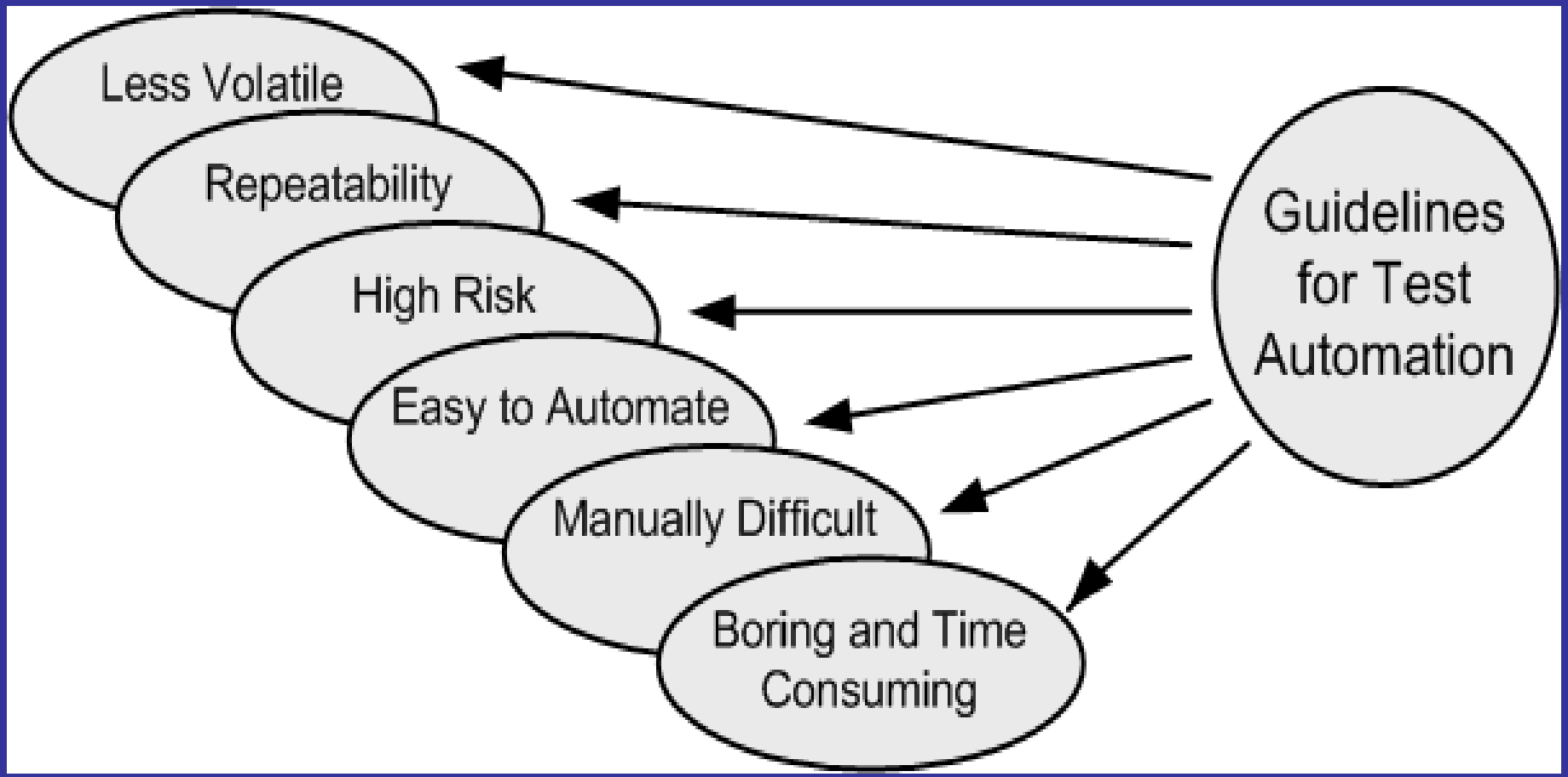
Test Selection Guidelines for Automation



Test selection guideline for test automation

Costs incurred in Testing Tools

- Automated Script Development
- Training is required
- Configuration Management
- Learning Curve for the Tools
- Testing Tools can be Intrusive
- Multiple Tools are required

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Guidelines for Automated Testing

- Consider building a tool instead of buying one if possible.
- Test the tool on an application prototype
- Not all the tests should be automated
- Focus on the needs of the Organization and know the resources (budget, schedule) before choosing the automation tool.
- Use proven test-script development techniques
- Automate the regression tests whenever feasible.

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Test Automation Framework

Framework is a constructive blend of various guidelines, coding standards, concepts, processes, practices, project hierarchies, modularity, reporting mechanism, test data injections etc. to pillar automation testing. Thus, user can follow these guidelines while automating application to take advantages of various productive results.

Advantage of Test Automation framework:

- Reusability of code
- Maximum coverage
- Recovery scenario
- Low cost maintenance
- Minimal manual intervention
- Easy Reporting

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Test Automation Framework

Types of Test Automation Framework

- Module Based Testing Framework
- Data Driven Testing Framework
- Keyword Driven Testing Framework
- Hybrid Testing Framework

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Example of keywords

Keywords	Description
Login	Login to demo site
Emails	Send Email
logouts	Log out from demo site
Notifications	Find unread notifications

Reference: Software Testing Principles and Practices, Naresh Chauhan , Oxford University
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Some Commercial Testing Tools

- Mercury Interactive's WinRunner
- Segue Software's SilkTest
- IBM rational SQA Robot
- Mercury Interactive's LoadRunner
- Apache's JMeter
- Mercury Interactive's TestDirector

Reference: Software Testing Principles and Practices, Naresh Chauhan , Oxford University
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Reference:

Software Testing Principles and Practices, Naresh Chauhan, Second edition, Oxford Higher Education