

Course 307: Advanced Software Testing for Quality Analysts (4 days)

Course Description...

Software Quality Assurance is the organization that takes responsibility for the final verification that the software delivered by a solution team has met all the requirements for use in the business, and achieves the expected level of quality. This course explores testing techniques for obtaining that assurance in all stages of software testing, focusing on the creation and maintenance of test cases, procedures and scenarios. The course also delineates the testing management responsibilities and roles.

Expected Student Outcomes...

After completion of this course a student will be able to...

- Describe the processes of various levels of testing and the management of the testing processes
- Create system test level scenarios for non-functional requirements and quality conditions as well as functional specifications
- Select the appropriate tools and techniques for various testing challenges
- Determine the most effective testing and inspection strategy for projects of varying complexity and size.
- Understand the concepts of managing the software test process from initiation to product delivery, including the test team

Who should attend...

- Experienced quality analysts and testers
- Test managers
- Anyone who has previously attended ROI course *306, Effective Software Testing Methods*.

Prerequisites...

Knowledge and experience equivalent to *Course 306, Effective Software Testing Methods*

See next page for a detailed course outline...



Course Outline...

Chapter 1: Software Testing Overview

Chapter Objectives

Testing Concepts

- Testing in the System Development Life Cycle (SDLC)
- Test Stages

Test Processes

- Defining a process *workshop 20 minutes*
- Test process models
- Test analysis
- Test Design
- Test execution

Test Planning

- Planning and control
- Testing for success
- Test Measurement *Discussion 5 minutes*
- Measuring the success of testing
- Entrance and exit Criteria *Workshop 20 Minutes*
- Entrance and exit criteria

Testing and Risk

- Risk reduction through testing
- Addressing risk in the life cycle

Summary

- To Sum Up...
- Keys to Success

Chapter 2: Test Management

Chapter Objectives

Test Management Issues

- Business case for software testing
- Test early, test often *testing during definition and development*
- The test environment
- Managing the test environment
- Test case management
- Exercise: The test environment *workshop 20 minutes*
- Test readiness
- Impact of configuration management
- Staffing issues
- Estimating testing costs and duration
- Measurement and metrics
- How do you know you are successful *workshop 20 minutes*
 - Strategic metrics
 - Tactical metrics

Test Program Direction

- Overview of testing policy



- QA Policy
- Test Policy
- Test strategy

Test Documentation

- Discussion: Why Documentation? *Discussion 5 minutes*
- Why document tests
- Test documents
- Test plans
- TCER
- Test procedure specification
- Test design specification
- Execution test documents
- Release notes

Summary

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Chapter 3: Unit Testing Techniques

Chapter Objectives

Unit Testing Concepts

- Goals of unit testing
- Pragmatics of unit testing
- Risk-based testing
- Planning unit testing
- How unit testing is done
- Creating isolation
- The test harness
- Activity: Constructing a test harness *exercise 10 minutes*
- Static analysis
- Dynamic analysis

White Box Testing

- White box testing methods
- What is done in white box testing
- What you can expect
- Complexity analysis
- The formula
- Evaluation
- Impact on testing
- Exercise: Path Coverage *exercise 10 minutes*
- Writing white box test cases – techniques
- Writing white box test cases – guidelines
- Exercise: Writing white box test cases *exercise 10 minutes*

Black Box Testing

- When to do black box testing
- Risk-based testing
- Requirements-based testing



- Benefits and drawbacks of black box chapter testing
- Types of unit level black box testing
- Advance warning with black box testing
- Constructing black box unit test cases
- Black box unit test case guidelines
- Activity: Black box unit tests *exercise 10 minutes*

Unit Testing in Object-Oriented Environment

- General approach
- Testing the classes and methods

When Are We Done?

- Discussion: When are we done? *Discussion 5 minutes*
- Completion criteria for testing
- Typical completion criteria
- Measuring completion

Managing Unit Testing

- Test procedure process
- Unit testing methods
- Test Driven Development
- Special considerations
- Exercise: Sharing test procedures *workshop 20 minutes*

Automating Unit Tests

- Types of automated chapter tests
- White box and path testing tools
- Black box testing tools
- Application of automation at the unit level

Summary

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Chapter 4: Integration Testing

Chapter objectives

Integration Testing Concepts

- Goals of integration
- Integration test design
- Planning the Integration Test process
- Example integration test process

The Order of Integration

- General principles
- Alternate orders of integration
- Integrating object-oriented systems
- Determining the order of integration *workshop 20 minutes*

Builds

- Smoke test
- Build order
- Types of builds
- A good build



- Managing the build process

The Testbed Database

- Integration test data
- Creating a testbed database
- Maintaining the testbed database
- Tips for an efficient applicable testbed

Managing Integration Testing

- Build sequences
- Continuous integration
- How Continuous Integration is done
- Benefits and drawbacks
- Multiple branches and variants
- Incident reporting at the integration level

Automating Integration Tests

- Automated build procedures
- Daily build and smoke test
- Integration tools
- Timing of the automation

Workshop: Creating integration test procedures *workshop 20 minutes*

Summary

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Chapter 5: System Testing

Chapter Objectives

System Testing Concepts

- Goals of system testing
- Repeatable system tests
- Risk-driven strategy for system test phase
- Requirements-driven system testing
- Planning System Testing

System Testing Scenarios

- System test scenario design
- Scripted
- Controlled
- Selection criteria
- Risk
- Example system test scenario
- Order of testing
- Exercise: Creating functional system test scenario *workshop 30 minutes*
- System test taxonomy
- Non-Functional Testing
 - External interface
 - Performance
 - Capacity
 - Accuracy



- Response time
- Availability
- Interoperability
- Reliability
- Portability and scalability
- Business Continuity
- Documentation testing
- Test scenario types
- Exercise: define system tests *workshop 20 minutes*
- Instrumentation
- Usability testing
- Usability testing scenario: *workshop 20 minutes*
- Web testing
- Web test team
- Web testing guidelines
- Web testing methods
- Exercise : web site testing *workshop 20 minutes*
- Security testing
- Principles of computer security
- Security test cases
- Trade-offs
- Exercise: security test planning *workshop 20 minutes*

Managing the System Test Stage

- Exploratory testing
- Automation and instrumentation
- Preparation
- Scheduling
- Team interaction
- Incident reporting in the system test stage
- Exercise: Creating non-functional system test scenario *workshop 30 minutes*

Automating System Tests

- System test automation
- Forms of automated system tests
- Performance measurement tools
- Point testing
- Automated scenario testing
- When to apply automated testing

Alpha and Beta Testing

- Alpha testing
- Beta testing
- Field certification

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Chapter 6: Acceptance Test

Chapter objectives

Acceptance Testing Concepts

- Goals of acceptance testing
- Exercise: Acceptance testing in your organization *discussion 10 minutes*
- Acceptance test environment and duration
- Planning the Acceptance Test

Preparation, Execution, Analysis

- Acceptance test scenarios
- Preparing acceptance test cases
- Involving users in acceptance test
- Analysis of tests
- Alternative acceptance test methods

Managing the Acceptance Test Stage

- Who does the testing? *Discussion 5 Minutes*
- Exit criteria
- Managing non-testers during acceptance testing
- Reviewing and reporting
- Incident reporting in the acceptance test stage
- Escalation methods
- Deployment readiness

Automating Acceptance Tests

- Fitness and other open source approaches
- Workshop: Creating the acceptance test scenario *workshop 20 Minutes*

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Chapter 7: Improving the Testing Process

Chapter Objectives

Applying Standards

- Types of applicable standards
- Profiling the standards

Test Improvement Approaches

- The Testing Maturity Model
- STEP
- Other test process approaches

Regression Test Approaches

- Purpose of regression testing
- Regression testing approaches
- Tips and techniques

Applying Automation

- Discussion: Why automate? *Discussion 5 minutes*
- Cost / benefits of test automation
- Overall approach
- Automation tips and cautions



Test Tool Taxonomy *Includes HP test tools*

- Functional testing tools
- Test management tools
- Performance tools
- Regression testing tools
- Static and dynamic analysis tools
- Test execution
- Non-functional requirements testing tools

Managing Test Automation

- Testing life cycles
- Introducing test automation into the organization
- Tool deployment
- Test Process Management Tools
- Automated test management

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Chapter 8: Managing the Test Team

Chapter objectives

Intra-team Relationships

- Test team *workshop 20 Minutes*
- Test team skill set
- Roles on the test team
- Intra-team dynamics

Inter-team Relationships

- Developer – tester issues *workshop 20 minutes*
- Developer – tester interactions
- Tester – management interactions

Managing the Team

- Team coalescence
- Goals and objectives
- Delegation
- Delegating the test activities
- Motivation
- Status reports
- Why do we test? *Workshop 20 minutes*

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Chapter 9: The Bottom Line

Ideas to Use

Where to go for more information