*Testing Concepts*

Lesson 4: Test Management & Test Case
Execution

### *Lesson Objectives*

To understand the following topics

- Test Planning
- Test Plan Contents (IEEE 829)
- Entry Criteria for Functional Testing
- Test Case Execution - Pre-execution activities
- Types of Test Environment
- Before starting Execution
- Test Case Execution
- Exit Criteria for Functional Testing
- Test Estimation Techniques
- Factors affecting Test Effort
- Roles & Responsibilities - Working as Test Leader
- Roles & Responsibilities - Working as a Tester

*Test Planning*

The Purpose and Substance of Test Plan

- The Test plan guides our thinking and forces us to confront the challenges that await us
- The Test plan itself serve as vehicles for communicating with project team members
- The Test plan helps us manage changes
- The Test plan becomes a record of previous discussions and agreements between the testers and the rest of the project team
- There can be different Test plans for different Test levels

Test Plan: A document Describing the Scope, approach, resources and schedule of the intended test activities. It identifies, amongst other, test items, the features to be tested, the testing task, the degree of tester independence, the test environment, the test design technique, the entry exit criteria to be used and the rationale for their choice and any risk requiring contingency planning. it is record of the test planning process.

Test Level: A group of test activities that are organized and managed together. A test level is linked to the responsibilities in a project.

### *Test Plan Contents (IEEE 829)*

1. Test Plan Identifier
2. References
3. Introduction
4. Test Items
5. Software Risk Issues
6. Features to be Tested
7. Features not to be Tested
8. Test Approach (Strategy)
9. Item Pass/Fail Criteria
10. Suspension Criteria and Resumption Requirements
11. Test Deliverables
12. Testing Tasks
13. Environmental Needs
14. Staffing and Training Needs
15. Responsibilities
16. Schedule
17. Planning Risks and Contingencies
18. Approvals
19. Glossary

Test Planning Activities :

Determining the scope, risks and identifying the objectives of testing
Defining the overall approach of testing, definition of the test levels, entry and exit criteria
Integrating and coordinating the testing activities into the SDLC activities
Making decisions about what to test, what roles will perform the test activities, how the test activities should be done, and how the test results will be evaluated
Scheduling test analysis and design activities
Scheduling test implementation, execution and evaluation
Assigning resources for the different activities
Defining the amount, level of detail and templates for the test documentation
Selecting metrics for monitoring and controlling test preparation and execution, defect resolution and risk issues

### *Entry Criteria for Functional Testing*

| Functional/System Testing Entry Criteria |
|---|
| ▪ Integration Testing is complete and sign-off is received by Project team |
| ▪ Integration test results are provided to the QA team within the Integration Execution & Signoff artefact. |
| ▪ Development team provides a demonstration of application changes prior to promotion to QA Environment |
| ▪ Code is delivered and successfully promoted to the Functional/System Test Environment as described in Master Test Plan |
| ▪ Functional/System Test planning is detailed, reviewed and approved within the Master Test Plan |

### *Entry Criteria for Functional Testing (Cont.)*

| Functional/System Testing Entry Criteria |
|---|
| ▪ Smoke /Shake down test has been completed to ensure test environment is stable for testing. |
| ▪ Functional/System Test planning is detailed, reviewed and approved within the Master Test Plan |
| ▪ Test cases created are traceable back to SRS, and any approved change requests, using HPQC |
| ▪ Functional/System Test Cases are created, reviewed and approved within the RBC Enterprise approved tool (HP QC) |
| ▪ Test data is ready for Functional/System Testing |

### *Test Case Execution*

Pre-execution activities

Setting up the Environment

- Similar to production environment
- Hardware (e.g. Hard Disk, RAM, Processor)
- Software (e.g. IE, MS office)
- Access to Applications

Setting up data for Execution

- Any format (e.g. xml test data, system test data, SQL test data)
- Create fresh set of your own test data
- Use existing sample test data
- Verify, if the test data is not corrupted
- Ideal test data - all the application errors get identified with minimum size of data set

### *Test Data Readiness*

Test data to ensure complete test coverage

Design test data considering following categories:

- No data
  - Relevant error messages are generated
- Valid data set
  - Functioning as per requirements
- Invalid data set
  - Behavior for negative values
- Boundary Condition data set
  - Identify application boundary cases
- Data set for Performance, Load and Stress Testing
  - This data set should be large in volume

### *Types of Test Environment*

- Unit Test Environment
- Assembly/Integration Test Environment
- System/Functional/QA Test Environment
- User Acceptance Test Environment
- Production Environment

### *Before starting Execution*

Validate the Test Bed
- Environment
  - Hardware (e.g. Hard Disk, RAM, Processor)
  - Software (e.g. IE, MS office)
- Access
  - Access to the Application
  - Availability of Interfaces (e.g. Printer)
  - Availability of created Test Data
- Application
  - High level testing on the application to verify if the basic functionality is working
  - There are no show-stoppers
  - Referred to as Smoke/Sanity/QA Build Acceptance testing

### *Test Case Execution*

Run Tests
- Run test on the identified Test Bed
- Precondition
- Use the relevant test data

Note the Result
- Objective of test case
- Action performed
- Expected outcome
- Actual outcome
- Pass/Fail (according to pass/fail criteria)

Compare the Input and Output
- Validate the data (e.g. complex scenarios, data from multiple interfaces)

Record the Execution
- Test data information (e.g. type of client, account type)
- Screenshots of the actions performed and results
- Video recording (HP QC Add-in)

### *Test Case Execution (Cont.)*

Report deviation

- Log Defect for Failed Test Cases
- Defect logging
    - Project
    - Summary
    - Description
    - Status
    - Detected By
    - Assigned To
    - Environment (OS, Release, Build, Server)
    - Severity
    - Priority
    - Steps to recreate and Screenshots

## *Exit Criteria for Functional Testing*

| Functional/System Testing Exit Criteria |
|---|
| ➢ All high and medium risk tests identified in the detailed test plan are executed, including interface testing |
| ➢ All planned testing is complete and documented |
| ➢ Functional/System test execution results are captured |
| ➢ All known defects have been entered into the defect tracking tool |
| ➢ There are no known severity one or severity two defects |
| ➢ Action plans have been created for outstanding severity three and four defects |

## *Exit Criteria for Functional Testing (Cont.)*

| Functional/System Testing Exit Criteria |
| --- |
| ➤ Appropriate signoffs are obtained |
| ➤ Location of test cases, automated test scripts, defects and Functional/System Execution & Signoff artefact are detailed within the SCM plan. |
| ➤ Any known deviations from the BRD and SRS are documented and approved |

## *Factors affecting Test Effort*

Characteristics of the product:

- The quality of the specification
- The size of the product
- The complexity of the problem domain

Characteristics of the development process:

- The stability of the organization
- Tools used
- Test process
- Skills of the team members
- Time pressure

The outcome of testing:

- The number of defects
- The amount of rework required

### *Roles & Responsibilities - Working as Test Leader*

Strategy & Management

- Write and review the test strategy
- Plan testing effort – context, risks & approach
- Proactive representation in project activities – ensure testing has correct focus
- Ensure proper configuration management of Testware
- Determine what should be automated and select most appropriate Test Tools
- Management and definition of the test environmental requirements
- Define the test schedule based on the delivery of code in to test

Monitor

- Define, record and continually review the testing project metrics
- Monitor test progress against the test schedule

Test Leader: The Person responsible for the management of testing activities and resources. The individual who directs control, administers, plan and regulate the evaluation of a test object.

### *Roles & Responsibilities - Working as a Tester*

- Review and contribute to test plans
- Analyze, review and assess user requirements, specifications and models for testability
- Create, review Test specifications
- Set up the test environment
- Define, prepare and acquire test data
- Implement tests on all test levels, execute and log the tests
- Evaluate the results and document the deviations (defects/issues) from expected results
- Use various test tools as required
- Automate tests

Tester: A skilled Professional who is involved in the testing of component or system

## *Summary*

In this lesson, you have learnt:

- Test management is covered from a skills perspective, focusing on test execution and defect reporting and handling.
- Managing the Test Activities
- Role of test leader and testers
- Test planning activities
- Template of Test document artifacts such as test plan and test case designs
- Entry and exit criteria of tests
- Test execution activities

### *Review - Questions*

Question 1: The degree of independence to which testing is performed is known as _____.

Question 2: there can be different test plans for different test levels

• Option: True / False

Question 3 Exit criteria are used to report against and to plan when to begin testing

• Option: True / False

Question 4: Which of the following are Test Environments

• Unit Test Environment

• QA Test Environment

• Simple Test Environment

• Product Environment

## *Review – Match the Following*

| | | |
|---|---|---|
| 1. Entry Criteria | | A. Consultative approach |
| 2. Exit Criteria | | B. Acceptance criteria |
| 3. Test Approach | | C. Methodical approach |
| 4. Failure based testing | | D. Completion criteria |