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Software Testing and Quality Assurance

Theory and Practice

Chapter 14

Acceptance Testing

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Outline of the Chapter

- Types of Acceptance Testing
- Acceptance Criteria
- Selection of Acceptance Criteria
- Acceptance Test Plan
- Acceptance Test Execution
- Acceptance Test Report
- Acceptance Testing in eXtreme Programming

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Types of Acceptance Testing

- Acceptance testing is a formal testing conducted to determine whether a system satisfies its acceptance criteria
- There are two categories of acceptance testing:
  - User Acceptance Testing (UAT)
    - It is conducted by the customer to ensure that system satisfies the contractual acceptance criteria before being signed-off as meeting user needs.
  - Business Acceptance Testing (BAT)
    - It is undertaken within the development organization of the supplier to ensure that the system will eventually pass the user acceptance testing.

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Types of Acceptance Testing

Three major objectives of acceptance testing:

- Confirm that the system meets the agreed upon criteria
- Identify and resolve discrepancies, if there is any
- Determine the readiness of the system for cut-over to live operations

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Acceptance Criteria

- The acceptance criteria are defined on the basis of the following attributes:

  - Functional Correctness and Completeness
  - Accuracy
  - Data Integrity
  - Data Conversion
  - Backup and Recovery
  - Competitive Edge
  - Usability
  - Performance
  - Start-up Time
  - Stress
  - Reliability and Availability
  - Maintainability and Serviceability
  - Robustness
  - Timeliness
  - Confidentiality and Availability
  - Compliance
  - Installability and Upgradability
  - Scalability
  - Documentation

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Selection of Acceptance Criteria

- The acceptance criteria discussed are too many and very general
- The customer needs to select a subset of the quality attributes
- The quality attributes are prioritize them to specific situation
- IBM used the quality attribute list CUPRIMDS for their products
  - Capability, Usability, Performance, Reliability, Installation, Maintenance, Documentation, and Service
- Ultimately, the acceptance criteria must be related to the business goals of the customer's organization

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Acceptance Test Plan

1. Introduction
2. Acceptance test category For each category of acceptance criteria (a) Operation environment (b) Test case specification (i) Test case Id# (ii) Test title (iii)Test objective (iv) Test procedure
3. Schedule
4. Human resources

Table 14.1: An outline of an acceptance test plan.

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Acceptance Test Execution

- The acceptance test cases are divided into two subgroups
  - The first subgroup consists of basic test cases, and
  - The second consists of test cases that are more complex to execute
- The acceptance tests are executed in two phases
  - In the first phase, the test cases from the basic test group are executed
  - If the test results are satisfactory then the second phase, in which the complex test cases are executed, is taken up.
  - In addition to the basic test cases, a subset of the system-level test cases are executed by the acceptance test engineers to independently confirm the test results
- Acceptance test execution activity includes the following detailed actions:
  - The developers train the customer on the usage of the system
  - The developers and the customer co-ordinate the fixing of any problem discovered during acceptance testing
  - The developers and the customer resolve the issues arising out of any acceptance criteria discrepancy

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Acceptance Test Execution

- The acceptance test engineer may create an Acceptance Criteria Change (ACC) document to communicate the deficiency in the acceptance criteria to the supplier
- A representative format of an ACC document is shown in Table 14.2.
- An ACC report is generally given to the supplier's marketing department through the on-site system test engineers

1. ACC Number:	A unique number
2. Acceptance Criteria Affected:	The existing acceptance criteria
3. Problem/Issue Description:	Brief description of the issue
4. Description of Change Required:	Description of the changes needed to be done to the original acceptance criterion
5. Secondary Technical Impacts:	Description of the impact it will have on the system
6. Customer Impacts:	What impact it will have on the end user
7. Change Recommended by:	Name of the acceptance test engineer(s)
8. Change Approved by:	Name of the approver(s) from both the parties

Table 14.2: Acceptance criteria change document information.

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Acceptance Test Report

- The acceptance test activities are designed to reach at a conclusion:
  - accept the system as delivered
  - accept the system after the requested modifications have been made
  - do not accept the system
- Usually some useful intermediate decisions are made before making the final decision.
  - A decision is made about the continuation of acceptance testing if the results of the first phase of acceptance testing is not promising
  - If the test results are unsatisfactory, changes be made to the system before acceptance testing can proceed to the next phase
- During the execution of acceptance tests, the acceptance team prepares a test report on a daily basis
- A template of the test report is given in Table 14.3
- At the end of the first and the second phases of acceptance testing an acceptance test report is generated which is outlined in Table 14.4

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Acceptance Test Report

1. Date:	Acceptance report date
2. Test case execution status:	Number of test cases executed today Number of test cases passing Number of test cases failing
3. Defect identifier:	Submitted defect number Brief description of the issue
4. ACC number(s):	Acceptance criteria change document number(s), if any
5. Cumulative test execution status:	Total number of test cases executed Total number of test cases passing Total number of test cases failing Total number of test cases not executed yet

Table 14.3: Structure of the acceptance test status report.

Acceptance Test Report

1. Report identifier
2. Summary
3. Variances
4. Summary of results
5. Evaluation
6. Recommendations
7. Summary of activities
8. Approval

Table 14.4: Structure of the acceptance test summary report.

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Acceptance Testing in eXtreme Programming

- In XP framework the user stories are used as acceptance criteria
- The user stories are written by the customer as things that the system needs to do for them
- Several acceptance tests are created to verify the user story has been correctly implemented
- The customer is responsible for verifying the correctness of the acceptance tests and reviewing the test results
- A story is incomplete until it passes its associated acceptance tests
- Ideally, acceptance tests should be automated, either using the unit testing framework, before coding
- The acceptance tests take on the role of regression tests