System Testing and Implementation

Testing Process

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Types of System Testing

• *Pre-implementation testing.*
  To determine that the system functions as specified and that defects in the system are removed prior to placing the system into production (implementation).

• *Post-implementation testing.*
  Part of system maintenance.
Cost of Pre-Implementation Testing

- Building the defect into the system.
- Identifying existence of the defect.
- Correcting the defect.
- Testing to determine that the defect is removed.
Cost of Post-Implementation Testing

- Specifying and coding the defect into the system.
- Detecting the problem within the application system.
- Reporting the problem to information services and/or the user.
- Correcting the problems caused by the defect.
- Operating the system until the defect is corrected.
- Correcting the defect.
- Testing to determine that the defect no longer exists.
- Integrating the corrected program(s) into production.
Cause of Defects

- Improperly interpreted requirements.
- Users specify wrong requirements.
- Requirements are incorrectly recorded.
- Design specifications incorrect.
- Program specifications incorrect.
- Program coding error.
- Program structural or instruction error.
- Data entry error.
- Testing error.
- Error correction mistake.
- Corrected condition causes another defect.
V-Testing Concept

[Diagram showing the V-Testing Concept]

- START IMPLEMENTATION
- START TEST
- VERIFICATION
- TESTING (CHECK) PROCEDURES
- IMPLEMENTATION (DO) PROCEDURES
- VALIDATION
- CORRECTION COMPLETE

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Eleven-Step Testing

- Assess development plan and status.
- Develop the test plan.
- Test software requirements.
- Test software design.
- Program phase testing.
- Execute and record results.
- Acceptance test.
- Report test results.
- Test software installation.
- Test software changes.
- Evaluate test effectiveness.
Eleven-Step V-Testing

1. Define software requirements
2. Build software
3. Install software
4. Operate and maintain software
5. Evaluate test effectiveness
6. Test software changes
7. Test software installations
8. Acceptance test
9. Execute and record results
10. Program phase testing
11. Develop the test plan
   - Assess development plan and status

Graphical representation of the eleven-step process:

- Define software requirements
  - Build software
    - Install software
      - Operate and maintain software
        - Evaluate test effectiveness
          - Test software changes
            - Test software installations
              - Acceptance test
                - Execute and record results
                  - Program phase testing
                    - Develop the test plan
                      - Assess development plan and status
Step 1: Assess development plan and status

- Testing the validity of the software estimate.
- Testing the status of the software system.
Step 2: Develop the test plan

- Form the test team.
- Understand the project risks.
- Build the test plan.
- Inspect the test plan.
Step 3: Test software requirements

- Prepare a risk matrix.
- Perform a test factor analysis for the requirements phase (methodology, correctness, ease-of-use, maintainable, portable, coupling, performance, ease-of-operations, reliability, authorization, file integrity, audit trail, continuity-of-processing, service level, security).
- Conduct a requirements walk-through.
Step 4: Test software design

• Score success factors.
• Analyze test factors.
• Conduct design review.
• Inspect design deliverables.
Step 5: Program phase testing

- Desk debug the program.
- Perform program phase test factor analysis.
- Conduct a program peer review.
Step 6: Execute and record results

• Build test data.
• Execute tests.
• Record test result.
Step 7: Acceptance test

- Define the acceptance criteria.
- Develop an acceptance plan.
- Execute the acceptance plan (conduct acceptance tests and reviews)
- Reach an acceptance decision.
Step 8: Report test results

- Report software status.
- Report interim test results and individual component test results.
- Report final test results.
Step 9: Test software installation

- Test installation of new software.
- Test changed version (of software).
- Monitor production.
- Document problems.
Step 10: Test software changes

- Develop/update the test plan.
- Develop/update the test data.
- Test the control change process.
- Conduct testing.
- Develop/update the training material.
Step 11: Evaluate test effectiveness

- Establish assessment objectives.
- Identify what to measure.
- Assign measurement responsibility.
- Select evaluation approach.
- Identify needed facts.
- Collect evaluation data.
- Assess the effectiveness of testing.
References