DEVELOPING THE TEST PLAN

OBJECTIVE

To describe all testing to be accomplished, together with resources and schedule necessary for completion.

CONCERNS

The Testers problems faced in completing the test plan

- Not enough training
- Us-versus-them mentality
- Lack of testing tools
- Lack of Management understanding/support of testing

- Lack of customer and user involvement
- Not enough time for testing
- Over-reliance on independent testers
- Rapid change
- Testers are in a lose-lose situation
- Having to say no

WORKBENCH

Input : Project Plan,

Project plan assessment and status.

Do : **Task 1 -** Profile the software project

Task 2 - Understand the project risks

Task 3 - Select a testing technique

Task 4 - Plan unit testing

Task 5 - Build the test plan

Task 6 - Inspect the test plan

Check : Test plan complete

Output : Test plan.

INPUT

- **Project Plan :** Address the totality of activities required to implement and control the project.

- **Project plan assessment and status report :** Evaluates the completeness and reasonableness of the project plan.

Task 1:Profile the software project

- **Conduct a walkthrough of the customer/user areas.**
- **Developing a profile of the software project.**
  - » Project objectives
  - » Development process
  - » Customer/users
  - » Project deliverables
  - » Cost/schedule

- Project construction
- Developmental staff competency
- Legal /Industry issues
- Implementation technique
- Database built/used
- Interfaces to other system
- Project statistics

Task 2: Understand the software project's risks

- ✓ Reliability
- ✓ Authorization
- ✓ File Integrity
- ✓ Audit Trail
- ✓ Continuity of Processing
- ✓ Service Level
- ✓ Access Control

- ✓ Methodology
- ✓ Correctness
- ✓ Ease-of-use
- ✓ Maintainable
- ✓ Portable
- ✓ Coupling
- ✓ Performance
- ✓ Ease of operation

Task 3: Select a Testing Technique

- **Structural System Testing Techniques**
  - Stress Testing
  - Execution Testing
  - Recovery Testing
  - Operations Testing
  - Compliance Testing
  - Security Testing

Functional System Testing Techniques

- Requirement Testing
- Regression Testing
- Error-handling Testing
- Manual Testing
- Intersystem Testing
- Control Testing
- Parallel Testing

Task 4: Plan Unit Testing and Analysis

The strategies are categorized as

- **Functional**
- **Structural**
- **Error-oriented**

Testing :

Dynamic approach to verification in which code is executed with test data to assess the presence of required features.

Analysis :

Static approach to verification in which required features are detected by analyzing, but not executing the code.

- **Functional Testing and Analysis**
  - **Functional Analysis**
  - **Functional Testing**

Testing Independent on the specification Technique

- **Testing based on the interface**
  a) Input Domain Testing
  b) Equivalence Partitioning
  c) Syntax Checking

- **Testing based on the function to be computed**
  a) Special-value testing
  b) Output Domain Coverage

Testing Dependent on the Specification Technique

- Algebraic
- Axiomatic
- State Machines
- Decision Tables

- **Structural Testing and Analysis**
  - **Structural Analysis**
  - **Structural Testing**

Structural Analysis

- Complexity Measures
- Data Flow Analysis
- Symbolic Execution

Structural Testing

- Statement Testing
- Branch Testing
- Conditional Testing
- Expression Testing
- Path Testing

- **Error-Oriented Testing and Analysis**
  - **Statistical Method**
    - To determine the operational reliability of the program.
    - Primary Concern is how faults in the program affect its failure rate in its actual operating environment.
  - **Error-Based Testing**

❖ Fault Estimation

- Fault seeding used to assess the number and characteristics of the faults remaining in the program.

- Harlan Mills originally proposed first faults are seeded into the program. Then the program is tested and the number of faults discovered is used to estimate the number of faults yet undiscovered.
- Techniques for predicting the quantity of remaining faults can also be based on a reliability model.

❖ Domain Testing

- The input domain of the program can be partitioned according to which inputs cause each pat to be executed. These partitions are called **path domains.**

- Faults that cause an input to be associated with wrong path domain are called **domain faults.**
- Other faults are called **computation faults.**
- **Goal –** To discover domain faults by ensuring that the test data limits the range of undetected faults

❖ Perturbation Testing

- Attempts to decide what constitutes a sufficient set of paths to test. Faults are modeled as a vector space and characterization theorems describe when sufficient paths have been tested to discover both computation and domain errors.

- **Fault-Based testing**
  - Extent
  - Breadth

❖ Local extent, finite breadth

- Local effect will not produce program failure

❖ Global extent, finite breadth

- A fault will cause program failure.

❖ Local extent, infinite breadth

- Whether the techniques handles a finite or infinite class or faults.

❖ Global extent, infinite breadth

Managerial Aspects of Unit Testing and Analysis

- **Selecting techniques appropriate to the project**
- **Then these techniques must be systematically applied**

Selecting Techniques

- Goals
- Nature of the Product
- Nature of the Testing Environment

Control

- Configuration Control
- Conducting Tests

Task 5: Build the Test Plan

- **Set the test objectives**
- **Develop a test matrix**
- **Define test administration**
- **Write the test plan**

- **Setting Test Objectives**
  - Itemize the objectives so that they can be referred to by number
  - Write the objectives in a measurable statement to focus tester's attention

- Assign a priority to the objectives, as follows
  - High
  - Average
  - Low
- Define the completion criteria for each objective

- **Developing a Test Matrix**
  - Individual software modules
  - Structural Attributes
  - Match Tests

- Conceptual Test Script for Online System Test
- Verification Tests

- **Defining Test Administration**
  - Test Plan General Information
  - Define Test Milestones
  - Define Checkpoint Administration

- **Writing the Test Plan**

Task 6: Inspect the Test Plan

- **Inspection Concerns**
- **Products/Deliverables to Inspect**
- **Formal Inspection Roles**
  - Moderator
  - Reader
  - Recorder
  - Author
  - Inspectors

- **Formal Inspection Defect Classification**
  - By Origin
  - By Type
  - By Class
  - By Severity
- **Inspection Procedures**
  - Planning and Organizing
  - Overview Session (Optional)
  - Individual Preparation
  - Inspection Meeting
  - Rework and Follow-up

THANK YOU