

COURSE NAME

SOFTWARE QUALITY
AND TESTING

CSC 4133

(UNDERGRADUATE)

CHAPTER 5

SOFTWARE QUALITY ENGINEERING

SOFTWARE QUALITY ENGINEERING (SQE)

- ❑ To meet or exceed these quality expectations through the selected and execution of appropriate QA activities while **minimizing the cost** and other **project risks** under the project constraints
- ❑ The SQE process forms an integral part of the overall software engineering process, where other concerns, such as **cost** and **schedule** are also considered and managed.

SQE activities-Generic Testing Process (Systematic testing based on formal models)

- ❑ Pre-QA activities: Quality Planning/Test Planning
 - Most of the key decisions about testing are made during this stage
 - ❖ **Set specific quality goals** (high-level activities to test planning)
 - Identify quality perspective and expectation: meaningful to target customers and users
 - Select direct quality measures: quantified measure of the selected quality attributes (efficiency, reliability, usefulness target in quantified values)
 - Assess quality expectations vs. Cost: cost of achieving different quality goals

SOFTWARE QUALITY ENGINEERING (SQE)

- ❖ **Form an overall QA strategy** (low-level activities to test preparation, test case)
 - Select appropriate QA activities to perform
 - Choose appropriate quality measurements and models to provide feedback, quality assessment and improvement

Test Procedure Preparation

- **Preparing test cases (micro-level)**
 - Test case is a collection of entities and related information that allows a test to be executed or a test run to be performed
 - Test case allocation
 - Sequencing of the individual test cases **from simple to complex**

TEST CASE

| | | | | |
|--|----------------------------------|--|----------------|--------------------|
| Project Name: | | Test Designed by: Name | | |
| Test Case ID: FR_I0 | | Test Designed date: date | | |
| Test Priority (Low, Medium, High): Medium | | Test Executed by: Name | | |
| Module Name: login session | | Test Execution date: date | | |
| Test Title: verify login with valid username and password | | | | |
| Description:Test the website login page | | | | |
| Precondition: user has valid username and password | | | | |
| Dependencies: if any | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |
| 1. Go to the site 2. Enter username 3. Enter password 4. Click submit | Username: urs99 Password: 321 | User should login into the application | As expected | Pass |
| Post Condition: User is validated with database and successfully login to account.The account session details are logged in the database | | | | |

TEST PLAN

- A **test plan** is a **document** that describes the objectives, scope, approach, resources, schedule and focus of software testing activities.
- A test plan gives detailed testing information regarding an upcoming testing effort. In other words, a test plan is a systematic approach to testing a system and typically contains a detailed understanding of what the eventual workflow will be.
- Organizations may follow some **standard test plan outlines** or they can have their **own customized test plan outlines**.

TEST CASE

- A **test case** is a **document** that describes an input, action, or event, and its expected results, in order to determine if a feature of an application is working correctly.
- In other words, a test case is a document specifying inputs, predicted results and a set of execution conditions for a test item.
- Different organizations may use different test case formats.
- **Note:** Test Plan is a high-level document whereas Test Case is a low-level document.

SOFTWARE QUALITY ENGINEERING (SQE)

■ Preparing test suit (macro-level)

- The collection of individual test cases that will be run in a test sequence until some stopping criteria are satisfied is called a test suite.
- Involves the construction and allocation of individual test cases in some systematic way based on the specific testing techniques used.
- Another way to obtain a test suite is through reuse of test cases for earlier versions of the same product. This kind of testing is commonly referred to as regression testing.
- In general, all the test cases should form an integrated suite, regardless of their origin, how they are derived, and what models are used to derive them.

SOFTWARE QUALITY ENGINEERING (SQE)

□ In-QA activities: Test Execution

- Executing planned QA activities and handling discovered defects
- Collect failure information: What /where/when/severity/etc.
- Documentation of testing activities to check future execution results
- Organizations use template for test execution measurements

□ Post-QA activities: Quality Measurement, Assessment & Improvement

- Follow-up activities - providing feedback and identifying improvement potentials
- “Post-QA” does not mean after the finish of QA activities. In fact, many of the measurement & analysis activities are carried out parallel to QA activities after they are started. In addition, pre-QA activities may overlap with the QA activities as well.

TESTING TEAMS: ORGANIZATION & MANAGEMENT

- ❑ Customers and users, who may also serve as testers informally for usability or beta testing
- ❑ Independent professional testing organizations as trusted intermediary between software vendors and customers
- ❑ Testers and testing teams can be organized into various different structures:
 - **Vertical model:** would recognize around a product, where dedicated people perform one or more testing tasks for the product
 - **Horizontal model:** performs one kind of testing for many different products within the organization
 - **Mixed model:** often used in large software organizations that combine both horizontal and vertical model together in the testing process.

REFERENCES

- ❑ Software Testing And Quality Assurance – Theory and Practice - Kshirasagar Naik & Priyadarshi Tripathy
- ❑ Software Quality Engineering: Testing, Quality Assurance and Quantifiable Improvement - Jeff Tian