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_10			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