

MVSR Engineering College

Software Quality & Testing

Introduction to Software Quality and Testing

Definition of Key Terms

- **Software:** A set of instructions or programs that tell a computer what to do.
- **Software Quality:** The degree to which a software product meets its requirements, is reliable, and performs its intended functions.
- **Software Quality Assurance (SQA):** A systematic process to ensure that software products meet their requirements and are reliable.
- **Software Quality Control:** A set of activities designed to ensure that software products meet their requirements and are reliable.

Software Quality Assurance System

The software quality assurance system consists of several components, including:

1. **Quality Planning:** Defining the quality objectives and standards for the software product.
2. **Quality Control:** Monitoring and controlling the software development process to ensure that it meets the quality standards.
3. **Quality Assurance:** Ensuring that the software development process is followed and that the software product meets the quality standards.
4. **Quality Improvement:** Identifying and implementing improvements to the software development process.

Software Configuration Management

Software Configuration Management (SCM) is the process of managing changes to the software product and its components. It involves:

1. **Identification:** Identifying the components of the software product.
2. **Control:** Controlling changes to the software product and its components.
3. **Status Accounting:** Maintaining a record of the status of the software product and its components.

4. **Audit:** Auditing the software product and its components to ensure that they meet the requirements.

Template and Checklist

- **Template:** A pre-defined format for a document or a process.
- **Checklist:** A list of items to be checked or verified. Both templates and checklists are used to ensure that the software development process is followed and that the software product meets the quality standards.

Verification, Validation, and Qualification

- **Verification:** The process of ensuring that the software product meets its specifications.
- **Validation:** The process of ensuring that the software product meets its requirements.
- **Qualification:** The process of ensuring that the software product is suitable for its intended use.

Software Quality Factors

The software quality factors include:

1. **Correctness:** The degree to which the software product meets its requirements.
2. **Reliability:** The degree to which the software product performs its intended functions.
3. **Efficiency:** The degree to which the software product uses system resources.
4. **Usability:** The degree to which the software product is easy to use.
5. **Maintainability:** The degree to which the software product can be modified or updated.

Software Development Models

Waterfall Model

The waterfall model is a linear approach to software development, where each phase is completed before moving on to the next phase.

Spiral Model

The spiral model is an iterative approach to software development, where each phase is repeated in a spiral fashion, with each iteration building on the previous one.

Project Progress Control

The components of project progress control include:

1. **Project Planning:** Defining the project scope, schedule, and budget.
2. **Project Monitoring:** Monitoring the project progress and identifying any deviations from the plan.
3. **Project Control:** Taking corrective action to get the project back on track.

CASE Tool

A **CASE (Computer-Aided Software Engineering) tool** is a software tool that supports the software development process. The contribution of CASE tools to quality includes:

1. **Improved Productivity:** CASE tools can automate many tasks, improving productivity.
2. **Improved Quality:** CASE tools can help ensure that the software product meets its requirements.
3. **Reduced Costs:** CASE tools can help reduce the costs of software development.

Software Configuration Items

The common types of software configuration items include:

1. **Source Code:** The source code for the software product.
2. **Documentation:** The documentation for the software product.
3. **Test Data:** The test data for the software product.
4. **Build Scripts:** The build scripts for the software product.

Error, Fault, and Failure

- **Error:** A mistake made by a person.
- **Fault:** A defect in the software product.
- **Failure:** The inability of the software product to perform its intended functions.

Causes of Errors

The causes of errors in software development include:

1. **Human Error:** Mistakes made by people.
2. **Technical Error:** Technical problems or limitations.
3. **Process Error:** Problems with the software development process.

Contribution of Template and Checklist

The contribution of templates and checklists to software quality includes:

1. **Improved Consistency:** Templates and checklists can help ensure that the software development process is followed consistently.
2. **Improved Quality:** Templates and checklists can help ensure that the software product meets its requirements.
3. **Reduced Errors:** Templates and checklists can help reduce the number of errors in the software development process.