



QA Testing Boot Camp

Chapter 6 – Quality Assurance
Management

Learning Outcomes

- Understand the meaning and value of Software Quality Assurance
- Understand the techniques used to ensure quality
- Apply SQA techniques to the testing cycles

Quality Assurance Defined

American Heritage Dictionary:

An inherent or distinguishing characteristic or a property

Characteristics Define Quality: Complexity, Cohesion, Function Points,
Lines of Code

Department of Defense (DOD) – 1988

The ability of a software product to satisfy its specified requirements.

British Standard Institute (BSI) – 1986

Quality is in the eye of the beholder, a matter of the client's judgment.

Quality Standards and Procedures

Quality is said to be high if the software meets the standards and procedures defined for the product.

Documentation, design and code standards are the typical standards followed.

Documentation

Specifies form and content for planning, control, and product documentation rules and methods for translating requirements to design.

Code Standards – Define the language of the code including structure, styles, conventions, rules for data and interfaces.

Procedures – Explicit steps followed in a process to manage quality.

Quality Concepts

Quality depends on:

- Conformance to requirements and standards
- Quality of design
 - How well clients requirements are captured
- Adherence to design specifications
- Manufactured to design specifications

Quality Control

Objective: to find problems as early as possible and to fix those that are found

Consists of a series of review activities

- Inspections
- Reviews
- Tests

Must be a feedback mechanism

Evaluates product against standards and specifications

Can be automated or manual

Quality Factors

A number of factors that determine the quality of a software product

Measured either directly or indirectly

Based on three most important aspects of a software product:

1. Product operation
2. Product revision
3. Product transition

Quality Factors – Product Operation Factors

Product Operation Factors - Determine the quality of software when a program is executed.

Factors include:

- Correctness
- Reliability
- Efficiency
- Integrity
- Usability

Quality Factors – Product Revision Factors

Focus on the ease of maintenance of the software product

Can be associated with correcting faults or making improvements

Factors include:

- Maintainability
- Flexibility
- Testability

Quality Factors – Product Transition Factors

Determines the quality of programs that are designed for open systems.

Focus is on the portability and reusability of a software product.

Factors include:

- Portability
- Reusability
- Interoperability
- Configurability
- Expandability

Software Quality Assurance (SQA) Activities

The process of evaluating the quality of a product and enforcing adherence to software product standards and procedures.

Ensures conformance to standards and procedures throughout the SDLC.

Includes a large number of tasks involved in SQA activities.

SQA Activities – Formulating a Quality Management Plan

Quality management plan (QMP) identifies the quality aspects of the software.

Planning checkpoints for work products and the development process

Tracks changes made to the development process.

QMP is tracked, monitored and updated throughout the SDLC.

SQA Activities – Apply SE Techniques

Software engineering (SE) techniques help the software designer to achieve high quality specification.

Prepares project estimation with the help of techniques such as:

- Work Breakdown Structure (WBS)
- Software Lines of Code (SLOC) estimation
- Function Point (FP) estimation

SQA Activities – Conduct Formal Tech Reviews

Conducted to assess the quality and design of the prototype

A meeting with the technical staff to discuss the quality requirements and design quality

Helps to detect errors at an early phase of development to avoid later rework

SQA Activities – Apply Multi-tiered Testing Strategy

Software testing is a critical task

Goal is error detection

Levels of testing include

- Unit – Developers
- Integration – Developers w/ help of testers
- System – Testers w/ help of developers
- QA (Functional Testing) – Testers
- Post Production (Beta) – Business Community

Penetration Testing is included in the updated standard in response to the significant amount of security breaches experienced across industries.

SQA Activities – Enforce Process Adherence

Emphasizes the need for process adherence during product development

Development process should adhere to procedures for product development

Two Task Focus:

- Product Evaluation – Ensures the standards are followed
- Process Monitoring – Ensures the steps needed are carried out

SQA Activities – Controlling Change

Combines human procedures and automated tools for change control

Ensures software quality by:

- Formalizing requests for change

- Evaluating the nature of change

- Controlling the impact of change

SQA Activities – Measuring Impact of Change

Change is inevitable

Change needs to be measured and monitored.

Measured using software quality metrics to support costs and resource utilization.

Must measure quality then compare to established standards.

Metrics help to:

- Evaluate the effectiveness of techniques and tools
- Productivity of development activities
- Quality of products
- Enable managers and developers to monitor activities and proposed changes.

SQA Activities – Perform SQA Audits

Audits scrutinize the software development process by comparing it to established processes.

Ensures that proper control is maintained.

Ensures status activity is actually reflected in the status reports.

SQA Activities – Keeping Records and Reporting

Ensures the collection and **circulation** of information relevant to SQA.

Results of software reviews, audits, change control, testing, and other SQA activities are reported and compiled for future reference.

Software Review

Effective way of filtering errors in a software product.

An error found after the product release costs 50 times as much to correct as one detected during the design phase.

Need to filter errors as early as possible.

Software Review (2)

Performed at various levels during the SDLC

- Analysis
- Design
- Coding
- Testing

Techniques Include:

- Inspection
- Walkthrough
- Formal Technical Review

Summary

Quality was defined as the ability to satisfy its specified requirements. QA Management attempts to maintain quality via procedures, standards, audits and reviews



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