Software Quality

Master of Information Technology

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Software Quality

Definition “Software Quality” (IEEE)

Frame 2.3 **Software quality – IEEE definition**

Software quality is:

1. The degree to which a system, component, or process meets specified requirements.
2. The degree to which a system, component, or process meets customer or user needs or expectations.

Definition “Software Quality” (Pressman)

Frame 2.4 **Software quality – Pressman’s definition**

Software quality is defined as:
Conformance to explicitly stated functional and performance requirements, explicitly documented development standards, and implicit characteristics that are expected of all professionally developed software.

Definition “Software Quality” (Pressman)

Pressman’s definition suggests three requirements for quality assurance that are to be met by the developer:

- Specific functional requirements, which refer mainly to the outputs of the software system
- The software quality standards mentioned in the contract
- Good Software Engineering Practices (GSEP), even though not explicitly mentioned in the contract

Alternative Definitions

"Quality means conformance to requirements"
(Crosby, 1979)

"Quality consists of those product features which meet the needs of customers and thereby provide product satisfaction"

Software Quality Assurance

Definition SQA (IEEE)

Frame 2.5 **Software quality assurance – The IEEE definition**

Software quality assurance is:

1. A planned and systematic pattern of all actions necessary to provide adequate confidence that an item or product conforms to established technical requirements.
2. A set of activities designed to evaluate the process by which the products are developed or manufactured. Contrast with quality control.

Definition SQA contd. (IEEE)

SQA is based on planning and application of a variety of actions that are integrated into all the stages of the software development process.

This is will substantiate the client's confidence that the software product will meet all the technical requirements

In Simple Terms

Software Quality Assurance is a procedure to ensure the quality of software products or services provided to the customers by an organization

Product Quality & Service Quality

Product Quality Dimensions

The ISO 9126-1 software quality model identifies six (6) main **quality characteristics**, namely:

- Functionality
- Reliability
- Usability
- Efficiency
- Maintainability
- Portability

Product Quality Dimensions

Functionality

Suitability

This is the essential Functionality characteristic and refers to the appropriateness (to specification) of the functions of the software

Accurateness

This refers to the correctness of the functions

Interoperability

A given software component or system does not typically function in isolation This sub characteristic concerns the ability of a software component to interact with other components or systems

Product Quality Dimensions

Functionality

Compliance

Where appropriate certain industry (or government) laws and guidelines need to be complied

Security

This sub characteristic relates to unauthorized access to the software functions

Product Quality Dimensions

Reliability

Maturity

This sub characteristic concerns frequency of failure of the software

Fault tolerance

The ability of software to withstand (and recover) from component, or environmental, failure

Recoverability

Ability to bring back a failed system to full operation, including data and network connections

Product Quality Dimensions

Usability

Understandability

Determines the ease of which the systems functions can be understood, relates to user mental models in Human Computer Interaction methods

Learnability

Learning effort for different users, i.e. novice, expert, casual etc.

Operability

Ability of the software to be easily operated by a given user in a given environment

Product Quality Dimensions

Efficiency

Time behavior

Characterizes response times for a given thru put, i.e. transaction rate

Resource behavior

Characterizes resources used, i.e. memory, cpu , disk and network usage

Product Quality Dimensions

Maintainability

Analyzability

Characterizes the ability to identify the root cause of a failure within the software

Changeability

Characterizes the amount of effort to change a system

Product Quality Dimensions

Maintainability

Stability

Characterizes the sensitivity to change of a given system that is the negative impact that may be caused by system changes

Testability

Characterizes the effort needed to verify (test) a system change

Product Quality Dimensions

Portability

Adaptability

Characterizes the ability of the system to change to new specifications or operating environments

Installability

Characterizes the effort required to install the software

Replaceability

Characterizes the plug and play aspect of software components, that is how easy is it to exchange a given software component within a specified environment

Service Quality Dimensions

Tangibles

Appearance of physical facilities, equipment, personnel, and communication materials

Reliability

Ability to perform the promised service dependably and accurately

Responsiveness

Willingness to help customers and provide prompt service

Service Quality Dimensions

Assurance

Knowledge and courtesy of employees and their ability to convey trust and confidence

Empathy

The caring, individualized attention the firm provides its customers