CSE4708: Software Project Management

Unit V:

Software Quality

Topic:

Introduction, the place of software quality in project planning, the importance of software quality,

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Software Quality:

Software Quality:

Some thoughts :

- Ability of the product/service to fulfill its function.
- Hard to define.
- Impossible to measure.
- Easy to recognize in its absence.
- Transparent when present.

Software Quality:

- Quality is defined as the products or services capability to meet customer expectations.
- Quality that is defined as a matter of products and services whose measurable characteristics satisfy a fixed specification.
- Quality is defined as conformance to requirements.
- Quality consists of those product features which meet the need of customers and there by provide product satisfaction.
- Quality is multidimensional.
- Some aspects of quality can be measured.

Software Quality:

- Kitchen ham (1989 b) refers to software quality "fitness for needs" and claims quality involves matching expectations.
- Two features of a piece of quality software:
  - Conformance to its specification
  - Fitness for its intended purpose.
- The Department of Defense (DOD, 1985) in the USA defines software quality as "the degree to which the attributes of the software enable it to perform its intended end use".

Software Quality

Software was particularly problematical for the following reasons:

- Software has no physical existence.
- The lack of knowledge of client needs at the start.
- The change of client needs over time.
- The rapid rate of change on both hardware and software.
- The high expectations of customers, particularly with respect to adaptability.
- Within the software quality area, the need to provide a solution that matches user needs is often considered as “design quality”, whilst ensuring a match to the specification is considered as “manufacturing quality”.

Software Quality

External characteristics

- **Correctness**- Degree to which system is free from faults in specification, design and implementation.
- **Usability**- The Ease with which users can learn and use the system.
- **Efficiency**- Minimal use of system resource including memory and execution time.
- **Reliability**- The ability of a system to perform whenever required without/with few failures.
- **Integrity**- Prevention of unauthorized or improper use.

Software Quality

External characteristics

- **Adaptability**-Usability in other application than the original one.
- **Accuracy-** Degree of "**quantitative"** correctness.
- **Robustness-** Functioning of system in presence of invalid inputs, stress environment.

Software Quality

Internal characteristics

- **Maintainability:** Ease of modifying software for changing/adding capabilities, improving performance.
- **Flexibility:** Extend of modifying system for other uses/environments.
- **Portability:** Ease of modifying system for operating in different environment.
- **Reusability:** Extend of using parts in other systems.

Software Quality

Techniques for improving SQ

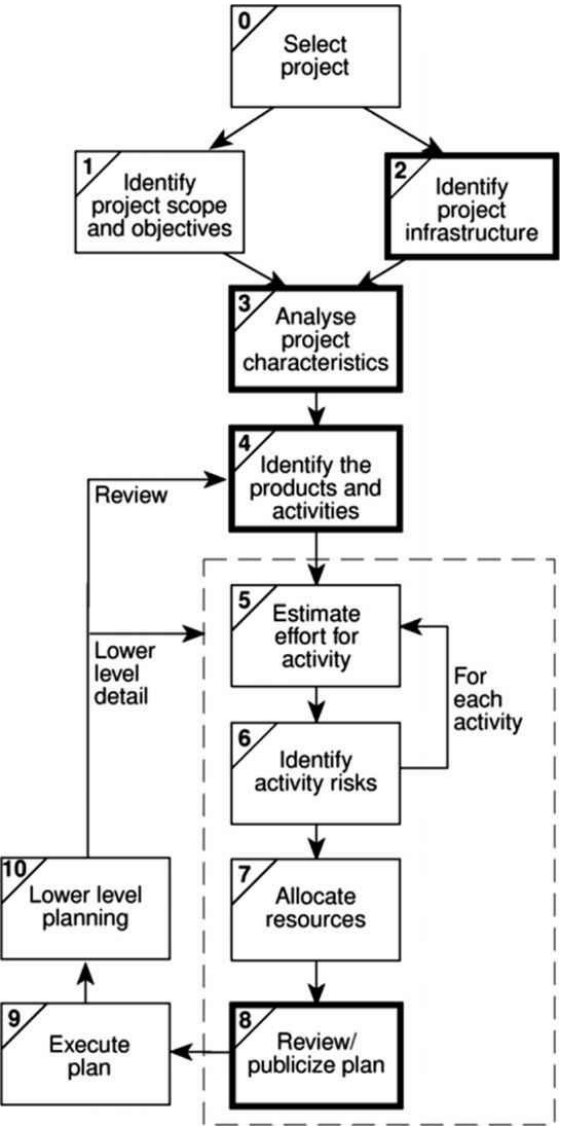
- Explicit software quality objectives.
- Explicit quality assurance activities.
- Testing strategy.
- Software Engineering guidelines.
- Informal technical reviews.
- Formal technical reviews.
- External audits.
- Development process.

Software Quality

Techniques for improving SQ

- Change control procedures.
- Measurement of results.
- Prototyping.
- Mathematical proof.
- Modular programming techniques.

Software Quality in Project Management



Software Quality

1. Identify Project Scope and objective: Some objective could relate to the qualities of the application to be delivered.

2. Identify project infrastructure: Identify the installation standard and procedures. Some of these almost certainly be about quality

3. Analyze project characteristics: To identify the other qualities based requirement.

4. Identify the products and activities of the project: It is at this point the entry, exist and process requirement are identified for each activity

5. Review and publicize Plan: At his stage the overall quality aspects of the project plan are reviewed

Software Quality

Attempt to identify specific product qualities that are appropriate to software, for instance, grouped software qualities into three sets. Product operation qualities, Products revision qualities and product transition qualities.

Product operation qualities

Correctness: The extent to which a program satisfy its specification and fulfil user objective

Reliability: The extent to which a program can be expected to perform its intended function with required precision

Efficiency: The amounts of computer resource required by software

Integrity: The extent to which access to software or data by unauthorized persons can be controlled

Usability: The effort required to learn, operate, prepare input and interprets output

Software Quality

Product revision qualities

Maintainability: the effort required to locate and fix an error in an operational program

Testability: The effort required to test a program to ensure it performs its intended function

Flexibility: The effort required to modify an operational program,

Product Transition qualities

Portability: The efforts required to transfer a program from one hardware configuration and or software system environment to another

Reusability: The extent to which a program can be used in other applications.

Interoperability: The efforts required to couple one system to another

Software Quality

Quality factor	*Software quality criteria*
Correctness	traceability, consistency, completeness
Reliability	error tolerance, consistency, accuracy, simplicity
Efficiency	execution efficiency, storage efficiency
Integrity	access control, access audit
Usability	operability, training, communicativeness, input/output volume, input/output rate
Maintainability	consistency, simplicity, conciseness, modularity, self-descriptiveness
Testability	simplicity, modularity, instrumentation, self-descriptiveness
Flexibility	modularity, generality, expandability, self-descriptiveness
Portability	modularity, self-descriptiveness, machine independence, software system independence
Reusability	generality, modularity, software system independence, machine independence, self-descriptiveness
Interoperability	modularity, communications commonality, data commonality

Software Quality

- **ISO 9126 Software Quality Characteristics**

Refer to : http://www.sqa.net/iso9126.html