Software Engineering

هندسة البرمجيات

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Introduction to Software Engineering

Topics covered

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- ✧ Software Characteristics
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Introduction to Software Engineering

The term *Software Engineering* was first introduced in 1968 North Atlantic Treaty Organization (NATO) conference held in Germany. During the late 1960s the computing field as starting to face a software “crisis”.

Software Crisis

- ✧ Projects running over-budget.
- ✧ Projects running over-time.
- ✧ Projects were unmanageable and code difficult to maintain.
- ✧ Software was very insufficient.
- ✧ Software was of low quality.
- ✧ Software often did not meet requirements.
- ✧ Software was never delivered.

Software Engineering Definitions

- "***Software Engineering*** is concerned with software systems developed by teams rather than individual programmers uses engineering principles in the development of theses systems and is made up of both non-technical aspects" (Sommerville).
- "***Software Engineering*** is a discipline that integrates methods, tools and procedures for the development of computer software" (Pressman).

Software Characteristics

✧ ***Software is intangible***

Hard to understand development effort.

✧ ***Software is easy to modify***

People make changes without fully understand it.

✧ ***Untrained people can hack something together***

Quality problems are hard to notice.

Software Characteristics

✧ ***Software is easy to reproduce.***

Cost in its development , in other engineering products, manufacturing is the costly stage.

✧ ***The industry is labor-intensive***

Hard to automate.

✧ ***Most software is "custom build" rather than assembled from existing components.***

Software Characteristics

✧ ***Software doesn't 'wear out'***

When a hardware component wears out, is replaced by a spare part. There are no software spare parts.

✧ ***Software is developed or engineered; it is not manufactured in the classical sense.***

Well Engineered Software

1. ***Maintainability***

The software can be easily understood and changed over time if problems occur.

2. ***Reliability***

The software performs as expected. Continuity of correct service.

3. ***Efficiency***

The software is produced in the expected time and within the limits of the available resources. The software-

Well Engineered Software

That is produced runs within the time expected for various computations to be completed.

4. ***Usability***

   The software can be used properly.

5. ***Modifiability***

   The software can be easily change.

6. ***Portability***

   The software system can be ported to other computers or systems without major rewriting of the software.

Well Engineered Software

7. ***Testability***

   The software can be easily tested.

8. ***Reusability***

   Some or all the software can be used again in other projects..

9. ***Interoperability***

   The software system can interact properly with other systems.

10. ***Correctness*** Software produces the correct output.

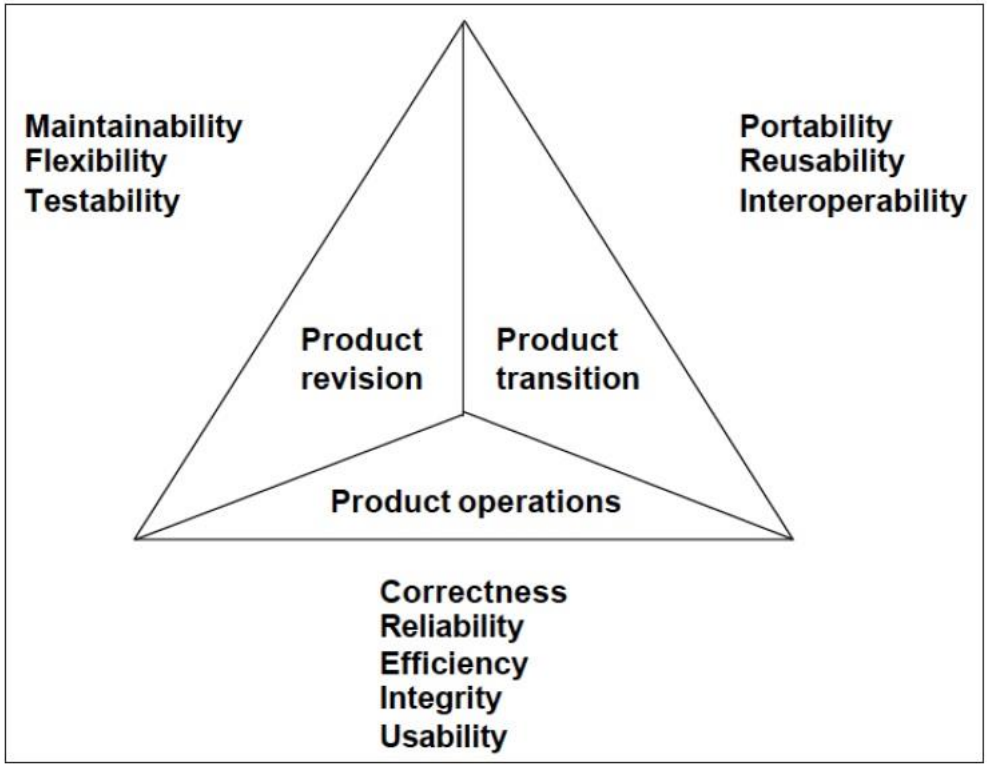

Figure 1: McCall's Software Quality Factors.

Software VS Program

Program	Software
Usually small in size	Usually large in size
Author himself is sole user	Large number of users
Single developer	Team of developers
Lacks proper user interface	Well- designed interface
Lacks proper documentation	Well- documented & user-manual prepared
Ad hoc developer	Systematic development

Software Applications

✧ Embedded Software

this type of software is placed in Read-Only-Memory (ROM) of the product and control the various functions of the product such as washing machine.

✧ Web Applications

The software related to web applications comes under this category such as HTML

Software Applications

✧ Artificial Intelligence Software

Artificial intelligence (AI) software makes use of non numerical algorithms to solve complex problems that are not amenable to computation or straightforward analysis. Applications within area include robotics, expert systems, pattern recognition (image and voice).

✧ Business Software

This software designed to process business applications. It may also be a data warehousing tool which helps us to make decisions base on available data.

Thanks