Introduction to Software Quality

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Agenda

- Introduction
- Views of Software Quality
- Examples
- Measurement of Software Quality
- Conclusion

Introduction

- What is Software Quality
- What are the different views in Software Quality
- Measurement related to Software Quality

Views of Software Quality

"Quality is never an accident; it is always the result of intelligent effort. John Ruskin"

- Transcendental View
- User View
- Manfacturing View
- Product View
- Value Based View

Transcendental View

- It is said to be philosphical
- No Measurement
- Only through experience

The transcendental view is much like Platos description of the ideal, or Aristotles concept of form.
In software sometimes We may never be able to implement its ideal functions and characteristics completely, because of imperfect understanding, imperfect technology, or an imperfect manufacturing process. But we still know what we want, and we have a sense of closeness between the actual and ideal products.

User View

- User is concerned with whether or not a product is fit for use.
- A product is considered to be of good quality if it satisfies the needs of a large number of customers.

Apart from doing basic functionalities, the following features are also measured:

1. Usability
2. Testability
3. Reliability
4. Efficiency

Product View

- Quality is related to the some property of the product
- If a product is manufactured with good internal properties, then it will have good external qualities
- If a code is having good level of modularity then it is easy for testable and maintainable.

We cannot assure some characteristics of the system by individualy assesing the various products of the sytem. They can assessed only by testing the whole system
for example, we know the reliability of a software system only after it has been completed and has run for a while. We cannot assess the reliability of its parts and then assume that the whole has a reliability. The same is true for security: A collection of secure parts is not necessarily itself secure.

Manfacturing View

- Quality is related to conformance to requirements
- Hom much the product is satisfying the requirements is taken as measurement.
- Process level improvement plays a vital role in this view
- CMM and ISO are developed based on Manfacturing view

Manfacturing expands the view by looking the quality both in production and in delivery. It assumes that the process standard will limit the chance of error in the product. But identifying the right process is very crictical for every project.

- User view and Manfacturing view looks from outside
- User cannot say anything about code structure (Inherritance hierarchy is deep or shallow, Code standards, etc)
- Product view looks inside and evaluvates each characteristics
- Many research are still going on to prove the relationship between the internal quality and quality as a whole.
- For example, consider that there is no convincing evidence that the infamous GOTO statement produces more unreliable products than its avoidance.
- The value-based view can link these disparate pictures of quality.

- Customers or marketers often adopt a users view.
- Researchers sometimes hold a product view, and the development team usually has a manufacturing view.

Value Based View

- It relates two terms excellence and worth
- How much a customer is willing to pay for a certain level of quality
- It is a tradeoff between cost and quality.

Measuring Quality

Need to measure quality

- Used to fix a baseline
- Is thera a need for process improvements?
- How much to spend on process improvement

Measurement of User's View

Key terms to Measure:

1. Functionality
2. Reliability
3. Usability

- How many Functionality of a product delivers ? Is a metric to measure.
- It is measured through the following mannner:
  Number of test cases passed by the functionalities / Total number of test cases designed to verify the functionalities

References I

[1] K.Naik, *"Software Testing and Quality Assurance Theory and Practice"*, Chapter 17

Thank you