Role of Software Inspection & Testing with various attributes of software Quality

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ABSTRACT :The goal of Software inspection and testing is to reduce the expected cost of software failure over the life of the software product.Inspection in software Engineering refers to peer review of any work product by trained individuals who look for defects using a well defined process. Software testing is any activity aimed at evaluating an attribute or capability of a program or system and determining that it meets required results.

Keywords :*Software inspection, software testing, Quality attributes, Phases of SDLC*

INTRODUCTION :

While Software has become one of the most valuable products of the past decades, its growing complexity and size is responsible for making one of the most challenging one to build and maintain. The challenge stems from the fact that software development belongs to the most labor and the same time, knowledge –intensive processes of today's world.The heavy dependence on knowledgeable human beings may be one reason why software development is often compared to an art or craft rather to an engineering discipline[1]. However it has almost become impossible nowadays to a given schedule ,to a limited budget and to the quality requirements of a customer at delivery. Hence researchers as well as practitioners are integrate engineering principles.

Software inspection is a proven method for improving software product quality and it provides a very cost effective way to improve their development process. Software inspection allows software development teams to find effect earlier and cheaper ,thus reducing rework cost. In addition there are often benefits more difficult to quantify. software inspection aid in project management and they provide more definite and more dependable milestones.

Performing an inspection immediately after completion of a work product or a part and analyzing the resultant data of the detected defects will provide an early quality indicator to the management and technical team.

The contribution of this study is first a view of the software inspection and software testing. Second the study checks whether can we replace software inspection with software testing?There are two main purpose of testing:

1.To evaluate quality or acceptability of that which is being tested.

2.To discover problems or errors.

DEFINITION

Software inspection :The word 'inspect' is an ordinary English verb whose meaning is "to look at or examine ".Inspection in software engineering refers to peer review of any work product by trained individuals who look for defects using a well defined process.Inspection are a static technique in that the code or documents is not executed .Each inspected document during the project life cycle is examined and compared to a previous stste to see if the transformed state has been correctly transformed and is itself correct.

A formal inspection consists of several activities which are as follows:

1.Planning & scheduling :The moderator selects the inspection team ,obtain material to be inspected from the producer and distribute them and any other relevant documents to the inspection team in advance.The complete planning and scheduling for inspection occurs in two stages:

(a)when the project leader defines the initial project paln (inspection planning)

(b)When specific work product approach inspection readiness (inspection scheduling)

2.Overview :The overview meeting is schedule based on a need as determined by the moderator with the project leader and producer .This includes education and transfer of information necessary for the participation to perform an effective and efficient inspection.

3.Preparation:Each participant is responsible for examining the work product to the actual inspection meeting,nothing any defects found or issues to be raised.

4.Inspection meeting:Its primary purpose is to find as many defects as possible during the meeting.During the

discussion all inspection can report defects or raise other issues which are documented on a form by the recorder.

5.Rework& follow up : The producer is responsible for resolving all issues raise during the inspection.To verify that the necessary rework has been performed properly,the moderator is responsible for following up with the author.

6.Prevention Meeting:The prevention team leader for the prevention meeting will record the results of the meeting & deliver proposals for actions to the organization management

Software testing: Software tasting is the process of analyzing a software item to detect the differences between existing and required conditions(that is bug)and to evaluate the features of the software items.Software testing is one of the "verification and validation" software practices[5].

Objective of Testing : There are four main objectives of testing are:

(1.)Demonstration:it show that the system can be used with acceptable risk,demonstrate functions under special condition and show that products are ready for integration or use.

(2.)Detection:It discover defects ,errors and deficiencied.Determine system capabilities and limitations quality of components ,work products and the system.

(3)prevention: It provide information to prevent or reduce the number of errors clarify system specification and performance>

(4)Improving quality :By doing effective testing ,we an minimize errors and hence improve the quality of software.

VARIOUS TYPES OF TESTING : There are two basic classes of software testing,Black box testing and white box testing.

1. Black box Testing (also called functional testing) is testing that ignores the internal mechanism of a system or components and focuses solely on the outputs generated in response to selected inputs and execution conditions.

2. White box testing (also called structural testing and glass box testing) is the testing that takes into account theinternal mechanism of a system or components.

SOFTWARE QUALITY :The quality is defined as "the essential character of omitting an inherent or distinguishing character".There are two generally accepted meaning of quality .The first is that quality means "meeting requirements"with this definition to have a quality product,the requirement must be measurable and the product's requirements will either be met or not met.The second is the quality definition by thee customer "whether the product or servie does what the custotmer needs"Another way of wording it is "fit for use".

How to Measure Quality?: Inorder to measure quality we need to analyse requirements to design test cases the design the test cases,documents them ,implement them and execute these test case.Then the results are analysed.Before all this we need to plan for testing,including risk analysis and test management practices.

Various Quality Attributes are:

(a) **Understandability** :the purpose of the software product is clear.This goes further than just a statement of purpose all of the design and user documentation must be clearly written so that it is easily understandable.

(b) **Completeness**: All parts of the software product are present and each of its parts are fully developed.

(c) **Conciseness**: No Excessive information is present .This is important where memor capacity is limited and it is important to reduce lines of code to a minimium.

(d) **Portability:**The software product can be easily operated or made to operated on multiple computer configurations.

(e) **Consistency**:The software contains uniform notation ,symbology and terminology within itself.

(f) **Maintainability**:The product should facilitates updating to satisfy new requirements and software product that is maintainable is simple ,well documented.

(g) **Testability**:The software product facilitates the establishment of acceptance criteria and supports evaluation of its performance.

(h) **Usability**:The product is convenient and practicable to use .the component of the software which has most impact on this is the user interface(UI),which for best usability is usually graphical.

Application of testing Typs to Measurement of Quality Attributes: We can categorize various types of testing according to the qua;ity feature[6] it applies to in the given Table:

Table 1
Testing Technique According to quality features

Quality Attributes	Types of Testing
Functionality	FUNCTIONSL TESTING
Security	Security testing
Complexity	Unit testing
Performance	Performance testing
Compatibility	Compatibility testing
Reliability	Stress Testing
Vulnerability	Penetration testing
Usability	Comparison Testing
Efficiency	Performance testing
Maintainability	Regression Testing

CONCLUSION: Quality is the main focus of any software engineering project,without measuring ,we cannot be sure of the level of quality in software.Testing and inspection are not mutually exclusive ,instead they complement each other as quality assurance techniques,both improving different aspects of product quality. Inspection finds different kinds of errors than testing finds the errors. Finding defects is not the only goal of testing ,for example,testing is still needed to assess reliability. Finally we can say that we can't replace software inspection with software testing, but both of these are two faces of a coin.

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