UNIT 4
Software Verification and Validation

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Introduction

- Software verification and validation is a vital model that allows the team of software developers and testers ensure.

- Both software verification and validation help create a software product .

What is software Verification ?

- It is performed during the ongoing phase of software development.

- Verification is the process of checking or verifying the credentials , data or information.

- It is highly possible that a software product goes well through the verification process.

Features of Software Verification

- Performed during the early stages of the software development proess to determine for the specific requirements.

- Verification denotes precision of the end or final product.

- It conducts software review , walk through , inspection, and evaluate documents.

Methods of Verification

- Static Verification : Static verification involves inspection of the code .

- Dynamic verification : It concerns with the working behaviour of the software.

Types of Reviews on the Basis of Stage Phase

- Reviews

- Walkthrough

- Inspections

- Requirements tracing

- Static analysis

Review in Testing Lifecycle

- Testing – readiness review

- Prerequisites training

- Updations testing

- Un – installation testing

- Test - completion

Coverage in Verification

- Statement Coverage : Code includes many statements. Code are verified.

- Path Coverage : Sequence of control flow from entry to exit.

- Decision Coverage : When and application is executed ,it may have to make decisions based upon the situation it faces.

Concerns of Verificaiton

- Assurance that the best verification techniques will be used.
- Assurance that the verification techniques will be integrated.
- Assurance that the technique will be executed properly.

Validation

- Validation is an actual testing performed on the software product.
- Gathering and analysis of the specifications and requirements,
- Test the error message.
- Boundary values along with stress and functionalities test.

Validation workbench basic requirements

- Inputs

- Output

- Validation process

- Check process

- Standards , tools , guidelines

Levels of validation

- Unit testing : focuses verification efforts on the smallest unit of software design.

- Unit test consideration : module interface is tested to ensure that information properly flows.

Coverage in validation

- Requirement Coverage : All the requirements need not be necessarily covered.

- Functional Coverage : At time , requirements are expressed in the functionality required for the application to work correctly.

- Feature Coverage : It describes about covering a feature required by the user.

Acceptance testing and types of acceptance

- Acceptance testing is one of the last type of software testing .

- It is conducted by a pool of targeted users to ensure the readiness and quality.

- It is also referred to as red box testing.

- There are two types of acceptance testing : Alpha testing and Beta testing

V Test Model

- Testing is a lifecycle activity.
- It begins when the proposal of software development made.
- For every development activity, there is a testing activity attached with it.
- Every phase of software development activities must consider corresponding testing activity associated with it.

V Model for Software

- Validation model explains the validation activities associated with different phases of software development.
- Design phase is associated with interface testing which covers design.
- Program – level designs are associated with integration testing.
- All the code level to validate individuals units , unit testing is done.

Testing During Requirements stage

- This stage must cover all the requirements for the system . Verification of problem definition and requirements definition is the basis on which the system requirement specification is developed further.

- Characteristics of good requirements : adequate , clear and verifiable ,testable

Testing during test – planning phase

- This phase includes defining a test strategy for the given application.

- The test manager is responsible for defining test strategy .

- Testing artifacts must be reviewed for their consistency.

Testing during design phase

- Design is the backbone of any software application.

- Design may be made by system architects or designers.

- Design must reflect the requirements correctly.

- Verification and validation consist of :

Consistency with respect to requirements and

analyse design for errors.

Testing during coding

- Coding is the most vital stage in software development.

- It is important for the organization to establish verification and validation of a code.

- Aspects to be checked : coding standards implementation, Coding Optimization and Unit testing.

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VV model

- VV model describes verification and validation activities associated with software development during the entire lifecycle.

- Various activities associated with each phase of the software development lifecycle.

- Requirements

- Requirements verification

- Requirements validation

Design

- High level design are created by architects and low-level designs by the designers.
- Design verification – the project team along with desiger may walk through the design to find the completeness and give comments.
- Design validation – validation of design occurs at two or more stages during the software development lifecycle.

Coding

- Coding is done by developers where the low-level designs are implemented.
- Code verification- code review helps in identification of errors with respect to coding standards , indenting standards , commenting standards.
- Code validation – validation of coding happens through unit testing where individual units are tested separately.

Critical roles and responsibilities

- Development : development team may be comprised of various roles under them. They may be performing various activities as per their roles and responsibilities at different stages.

- Testing : testing includes test manager , test leads , and testers as per scope of testing , size of the project , and type of customer .

- Customer : customer may be final user group , or people who are actually sponsoring the project .

Reference:

- Software Testing: Principles, Techniques and Tools M. G. Limaye

- Software Quality Assurance – Techmax Publication

- Software Quality Assurance – Sheth Publication