

Unit : 6 : Software Testing Strategies

* Explain Strategic Approach of Software Testing.

=> Testing is the process of identify the error before the deliver the software to the end user.

In this Strategic Approach, There are many types of Testing.

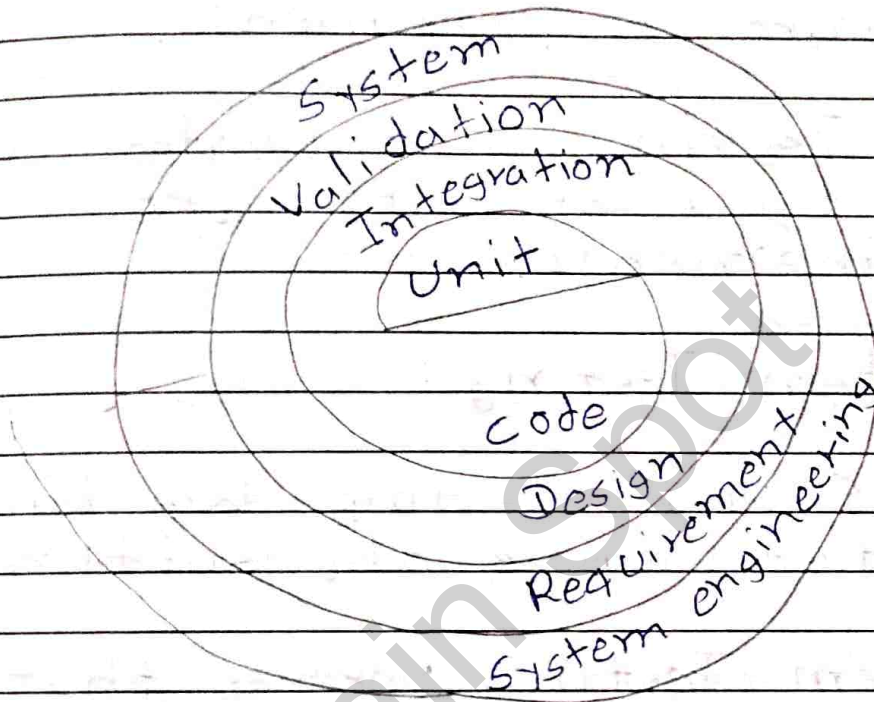
This are the different software Testing method.

- ci) Unit Testing
- cii) Integration Testing
- ciii) Validation Testing
- civ) System Testing

ci) Unit Testing :

In Unit Testing, software code is divided into small part which is called Unit.

In Unit Testing, we have to Test the code.



cii) Integration Testing :

This Testing is focus is on design and construction of software.

Integration Testing is the process of testing the interface between two software unit.

ciii) Validation Testing :

In this Testing method, we have to validate all the software requirements.

This Testing is validates all the types of software requirements.

civ) System Testing :

In System Testing, we have to test whole the software.

System Testing verifies that all the elements are work properly.

* Explain Different Types of Techniques of Testing.

=> There are Three Types of Techniques of Testing.

- ci) Black Box Testing
- cii) White Box Testing
- ciii) Grey Box Testing

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(i) Black Box Testing:

Black Box Testing is also called Functional testing.

This Testing is done without knowing of software products.

This Testing is only focuses on software external behavior.

In this Testing, we do not have to worry about the internal working of software.

In Black Box Testing, tester have to access only running code.

In this Testing, Test cases can be developed in parallel with code.

In Test case design, all the possible input and classes are covered.

There are Two method is used in Black Box Testing.

- ca) Equivalence Partitioning
- cb) Boundary Value Analysis

ca) Equivalence Partitioning :

Equivalence Partitioning is a method to reduce the number of test case.

According to number of input, equivalence class represents the set of valid and Invalid

cb) Boundary Value Analysis :

According to number of input, Boundary testing process gives extreme ends between partitions.

Boundary Testing is done after the Equivalence class Partitioning.

(iii) White Box Testing:

White Box Testing is also called Non-Functional Testing.

White Box Testing is always done by tester and developers not end users.

White Box Testing involves all the structural testing of a software.

White Box Testing does not provides any types of security against viral attacks.

This Testing focuses on software internal and external behavior of a software.

In this testing, Tester have to know about the all the internal code of a software.

There are Three Testing strategies is used in white box testing.

- ca) Statement Coverage
- cb) Branch Coverage
- cc) Path Coverage.

ca) Statement Coverage :

Statement Coverage ensures that all the statement of code are executed at least once in software.

Using this Formula, we have to find Statement Coverage of code.

$$\text{Statement Coverage} = \frac{\text{Number of executed Statement}}{\text{Total Number of statement in code}} * 100$$

cb) Branch Coverage :

Branch Coverage gives all the possible outcomes of the code.

Branch coverage is used to cover all branches of the control flow graph.

ii) Path Coverage:

In this method again we have to create control flow graph.

Control flow graph is used to find linearly independent paths of execution.

iii) Gray Box Testing:

Gray Box Testing is combination of white box and black box testing.

In this method, tester can access the source code but user in a restricted manner.

Test cases design is tested by using the information about the code.

Gray Box Testing does not provide security against viral attacks.

* Unit Testing :

In Unit Testing, Software code is ~~first~~ divided into small part which is called Unit.

Unit Testing is divided the software into small modules

Unit Testing validates small unit in software which can reduce the complexity of a software.

Unit Testing can reduce the complexity of a software which can help to test the software easily.

Unit test focuses on the internal Processing logic and their data structures.

Unit Testing is used to verify the correctness of the code in software.

- Advantages :

- 1 Unit Testing allows developers to find the issues in early time.
- 2 Unit Testing can decrease the complexity of a software.
- 3 Unit Testing can improve the quality of a code in software.

- Disadvantages :

- 1 Unit Testing can increase the time for a testing.
- 2 Unit Testing can not test the software non-functional requirement.
- 3 Sometime Unit Testing can not find the errors.

* Integration Testing :

Integration Testing is used to test the interface between two unit and modules.

Integration Testing can test the interface between software units.

For performing the Integration Testing, first we have to perform the Unit testing.

After the Unit testing, we can test the interface between two software units.

Integration testing can focus on exchange data between two software units.

This are the many types of Approach is used to perform Integration Testing.

- a) Big Bang Approach
- b) Top Down Approach
- c) Bottom Up Approach

(a) Big Bang Approach:

In this Approach, All the software modules are combined and tested at once.

(b) Top Down Approach:

Top Down Approach follows top to bottom approach for testing.

In this Approach, High level modules are tested first and after that low level modules are tested.

(c) Bottom Up Approach:

Bottom Up Approach follows bottom to top approach for testing.

In this Approach, Low level modules are tested first and after that High Level modules are tested.

- Advantages :

- 1 Top down Approach is Used to find easily interface errors.
- 2 Big Bang Approach is suitable for small systems.
- 3 Top down Approach can easily find design defects in early time.

- Disadvantages :

- 1 Sometimes it is difficult to observe the test output.
- 2 Sometime, it is require high cost of testing.
- 3 Sometime increase complexity when number of module are large.

* Regression Testing :

When we add new functionality in a software then we have to do Regression Testing.

Regression Testing is the Process of test the new functionality in a software.

This Testing is ensure that, After the add new functionality code is not defect.

Regression Testing can reduce the new error in software.

- Advantages :

- 1 Ensure that new error is add in the software.
- 2 Maintain the quality of the code

- Disadvantages :

- 1 If we change small thing in code than we have to again do this testing.

* Smoke Testing :

Smoke Testing is used when we develop software product.

Smoke Testing is also called as Confidence Testing.

Smoke Testing is used to verify the features of working software product.

Using Smoke test we can show that software product is ready or not.

Smoke Testing can identify the defects in a software product.

- Advantages :

1. ~~Some~~ Smoke Testing identifies the defects in software product.
2. It reduces the risk of software product failure.

- Disadvantages:

- 1 Smoke Testing, sometime does not test all the functionality of software product
- 2 Sometime smoke test does not find the error in software product.

* Alpha and Beta Testing:

Alpha and Beta Testing is used to do validation testing in software.

-> Alpha Testing:

Alpha Test is used to identify the error before the releasing the software product.

Alpha Testing is performed by the developers or testers which is part of software development organization.

This Testing is performed by developer or testers side.

Alpha test can ensures the quality of a software.

Alpha test can not check security of a software product.

Alpha test require long execution time for execution.

- Advantages :

- 1 Alpha test can improve the quality of software product.
- 2 Alpha test can helps to identify the errors in product.

- Disadvantages :

- 1 Alpha test require long time for execution.
- 2 Alpha test require specific lab testing environment.

→ Beta Testing :

Beta Test is performed after the releasing the software product.

Beta Testing is performed by the end users.

Beta Testing is done by the software product users which is not part of software development organization.

This testing is performed by the user side not developer or tester side.

Beta Test is use to collect the user input on the software product.

Beta Test can check the security of a software product.

Beta test does not require long execution time for the execution.

- Advantages:

- 1 Beta Test can reduce the software product failure risk after the release the software product.
- 2 Beta Test can help to collect the user feedback, that can help to improve the software product quality.

- Disadvantages:

- 1 Beta Testing require more time to collect the User Feedback.
- 2 IF User does not have proper information about the product then user can not perform the Beta testing in effective manner.

* System Testing:

System Testing is used to verify all the software system is properly work or not.

System Testing is used to test the whole the software.

System Testing can test the all the types of software system.

There are many types of System Testing.

a) Recovery Test:

Recovery Test is perform when software is fail.

When software is fail then this testing verify the recovery way of a software.

b) Security Test:

Security Test is used to check the security mechanisms in software.

Security test verify the security protection way in software.

(c) Stress Testing :

Stress Testing is used to test the stress of software.

This test check demands of resources - frequency or volume.

(d) Performance Testing :

Performance Testing is used to test the run-time performance of software.

(e) Deployment Testing :

Deployment Testing is used to test the working of software in any types of environment.

* Acceptance Testing:

Acceptance Testing is a last phase of software testing.

Acceptance Testing is a testing according to users requirements.

After this testing, we do not have to do any type of software testing.

There are many type of software Acceptance Testing.

a) User Acceptance Testing:

This Testing is used to check software is proper work for the user.

b) Business Acceptance Testing:

This Testing is used to check software product is proper ~~saticefy~~ satisfy the proper business purpose.

c) Contract Acceptance Testing:

Contract is includes all the terms of software condition, ~~per~~ period of software testing etc.

This Contract is accepta before the product is release in market.

c) Operational Acceptance Testing:

This Testing is used to test all the non-functional requirement of a software.

c) Alpha Testing:

Alpha Test is used to identify the error before the releasing the software product.

c) Beta Testing:

Beta Test is used to collect the user input on the software product.

* Difference between Verification and Validation.

=>	Verification	Validation
1	Static Testing	Dynamic Testing.
2	Check the code, design and program	Validate the actual product.
3	It comes before Validation.	It comes after Verification.
4	It is performed by Human	It is performed by computer.
5	Execution of code is not come in Verification.	Execution of code is come in this phase.
6	Cost of errors caught is less.	Cost of errors caught is high.