



ANJUMAN-I-ISLAM'S KALSEKAR TECHNICAL CAMPUS

School of Engineering & Technology

Affiliated to : University of Mumbai, Recognised by : DTE (Maharashtra) & Approved by : AICTE (New Delhi)

Course Code: CSL601	Course Name:
Class :	Batch :
Roll no :	Name :

Experiment : 10

Aim : Develop test cases for the project using white box testing.

Theory :

1) Explain White Box Testing?

WHITE BOX TESTING (also known as Clear Box Testing, Open Box Testing, Glass Box Testing, Transparent Box Testing, Code-Based Testing or Structural Testing) is a software testing method in which the internal structure/design/implementation of the item being tested is known to the tester. The tester chooses inputs to exercise paths through the code and determines the appropriate outputs. Programming know-how and the implementation knowledge is essential. White box testing is testing beyond the user interface and into the nitty-gritty of a system.

This method is named so because the software program, in the eyes of the tester, is like a white/transparent box; inside which one clearly sees.

2) Explain Unit Testing, Integration Testing and System Testing?

1) Unit Testing: It is often the first type of testing done on an application. Unit Testing is performed on each unit or block of code as it is developed. Unit Testing is essentially done by the programmer. As a software developer, you develop a few lines of code, a single function or an object and test it to make sure it works before continuing Unit Testing helps identify a majority of bugs, early in the software development lifecycle. Bugs identified in this stage are cheaper and easy to fix.

2) Integration Testing: is a level of software testing where individual units are combined and tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units. Test drivers and test stubs are used to assist in Integration Testing.

- **Integration testing:** Testing performed to expose defects in the interfaces and in the interactions between integrated components or systems. See also component integration testing, system integration testing.
- **component integration testing:** Testing performed to expose defects in the interfaces and interaction between integrated components.
- **system integration testing:** Testing the integration of systems and packages; testing interfaces to external organizations (e.g. Electronic Data Interchange, Internet).

3) System Testing is a level of software testing where a complete and integrated software is tested. The purpose of this test is to evaluate the system's compliance with the specified requirements.

When is it performed?

System Testing is the third level of software testing performed after Integration Testing and before Acceptance Testing.

Who performs it?

Normally, independent Testers perform System Testing.

3) Explain White Box Testing Techniques - Memory Leak Detection and Code Coverage ?

White box Testing Techniques:

Following techniques help in writing white box test cases and in execution as well.

1. Memory leak detection:

Here, the testers focus on finding problems like the stack overflow, buffer overflows, memory leaks, etc. The tools such as Valgrind, C++ memory leak detector get used to supporting this level.



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2. Code coverage:

Code coverage gets also measured to ensure the percentage of the code covered by the white box tests. This process can guide the testers to write cases for areas which remain untouched. Here, tools like C++ code coverage validator, GCOV facilitates this level.

This technique has three different levels.

i) Statement Coverage:

In programming terminology, a statement represents the line of code or the instruction for the compiler to recognize and respond accordingly.

It returns the total executable lines of the application exercised by the tests executed.

ii) Branch Coverage:

A branch indicates instructions that include the use of IF clause in the code.

An IF clause has two possible branches: Success and Failure.

It helps to determine the amount of code using the branching which further drives to write the appropriate no. of test cases.

iii) Path Coverage:

Path coverage is focussing on determining the tests covering all possible paths in an application.

It is an inclusive technique which makes sure that no paths remain left without validation. Such coverage is even more useful than the Branch coverage. This technique is beneficial for validating the complex products.

4) Explain the benefits and drawbacks of White Box Testing?

White box Testing Benefits:

1. The tester can begin white box testing at an earlier stage. They don't have to wait for the entire modules to become available.
2. This testing process is more inclusive, provides more coverage into application parts, and hence increases the possibility of testing most of the paths.

White box Testing Drawbacks:

1. White box test design is sophisticated, requires relevant programming skills, and the resources who have a thorough knowledge of the application design.
2. Managing the test code and the scripts are additional tasks and require extra efforts.
3. This type of testing has tight coupling with the source of the application under test. Hence, frequent changes in the code require re-execution, and even sometimes lead to new paths for the testing.

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Output :

Prepare the test cases as per the excel format.

Reference:

<https://www.techbeamers.com/white-box-testing/>

<https://www.guru99.com/white-box-testing.html>

Conclusion:
