

# Assignment $\Rightarrow$ 2:

## Software Engineering & Project Management

Q1. Write the structural testing (WBT)-concept, characteristics, its pros and cons, and its comparison with BBT.

Ans1: White Box Testing is software testing technique in which internal structure, design and coding of software are tested to verify flow of I/O and to improve design and security. It is also known as clear box testing, open box testing and glass box testing.

It's one of the two parts of Box testing approach to software testing. Unlike its counterpart BBT, it is based on inner workings of an application and revolves around internal testing.

The term "White Box" was used because of the see through box concept. The white box name symbolises the ability to see through the software's outer shell into its inner part.

WBT involves the testing of software for following :-

- (1.) Internal security
- (2.) Broken or Poorly structured paths in coding process.
- (3.) The flow of specific inputs through the code.
- (4.) Expected output.
- (5.) The functionality of loops.
- (6.) Testing of each statements, object and function on individual basis.

→ Various WBT techniques :-

- (1.) Statement coverage => This tech is aimed at exercising all programming statements with minimal tests.
- (2.) Branch coverage => This technique is running a series of tests to ensure that all branches are tested at least once.
- (3.) Path coverage => This technique corresponds to testing all possible paths which means that each statement and branch is covered.

→ Advantages

- (1.) Code optimization by finding hidden errors.
- (2.) WBT cases can be easily automated.
- (3.) Testing is more thorough as all code paths are usually covered.



## → Disadvantages

- (1) Expensive as one has to spend both time and money to perform WBT.
- (2) It is time-consuming, bigger programming applications take the time to test fully.
- (3) It requires professional resources with a detailed understanding of programming.

## → Differences between WBT and BBT

WBT

BBT

- |   |   |
|---|---|
| (1.) In this approach, internal structure is known to the tester. | (1.) In this approach, internal structure is unknown.                   |
| (2.) Testing is best suited for testing like unit testing.        | (2.) Testing is ideal for a lower level of testing like system testing. |
| (3.) Programming knowledge is required.                           | (3.) Programming knowledge is not required.                             |
| (4.) It is easy to automate.                                      | (4.) It is tough to automate.   |

- (5.) Its main objective is to check the quality of the code.
- (5.) Its main objective is to check what function of system under test.

Q-2. What are the software quality attributes and elaborate Mc Call Model ?

Ans-2. The different software quality attributes are-

- (1.) Usability => It is described as how the user is utilizing a system effectively and the ease of which users can learn to operate or control a system.
- (2.) Reliability => It is the ability of a system to continue to keep operating over time.
- (3.) Availability => It is ratio of available system time to the total working time it is required or expected to function.
- (4.) Portability => It is the ability of a software application to run on numerous platforms such as date portability, hosting, etc.
- (5.) Testability => It shows how well the system or components facilitates to perform tests to determine

Whether the predefined test criteria have been met.

- (6) Scalability  $\Rightarrow$  It is the ability to handle stress caused by increased usage without decreasing performance.
- (7) Flexibility  $\Rightarrow$  It is the ability to adapt to future changes.
- (8) Reusability  $\Rightarrow$  It is the use of existing software more than once with small or no change.
- (9) Maintainability  $\Rightarrow$  It is ability of a software app maintain easily and support changes cost effectively.
- (10) Security  $\Rightarrow$  It is the ability to resist or block malicious and unauthorized attempts into the system.
- (11) Interoperability  $\Rightarrow$  The ability of two or more systems to communicate and exchange data easily.

$\Rightarrow$  Mc Call Model

$\Rightarrow$  This model is incorporated with many attributes, termed as software factors, which influence a software. The model

distinguishes between two levels of quality attributes.

- (1.) Quality factors  $\Rightarrow$  The higher level quality attributes which can be assessed directly are called quality factors. These are external attributes and are given more importance by users and managers.
- (2.) Quality criteria  $\Rightarrow$  The lower or second level quality attribute which can be assessed either objectively or subjectively are called quality criteria. These are internal attributes.

The IT factors are grouped into 3 categories:

- (1.) Product operations factors  $\Rightarrow$  correctness, reliability, efficiency, integrity, usability.
- (2.) Product revision  $\Rightarrow$  Maintainability, flexibility, testability.
- (3.) Product transition  $\Rightarrow$  Portability, reusability, interoperability.

Q3. Describe all phases of risk management.

Ans3. The different phases of risk management are :-

- (1.) Identify the risk => The team uncovers, recognizes and describes risks that might affect the project and its outcome.
- (2.) Analyze the risk => Once the risks are identified, we determine the likelihood and consequence of each risk.
- (3.) Evaluate the risk => The risk magnitude is determined which is the combination of likelihood and consequence of each risk. We make decisions on whether the risk is acceptable or whether it is serious enough to warrant treatment.
- (4.) Treat the risk => We assess our highest ranked risks during this step and set out a plan to treat or modify these risks to achieve acceptable risk levels. We create risk mitigation strategies, preventive plans and contingency plans in this step.

(5.) Monitor and review the risks  $\Rightarrow$  This is the step where we take our project risk register and use it to monitor, track and review risk.

Risk is about uncertainty, then we effectively de-risk our project which means we can move much more confidently to achieve our project goals.