What is White Box Testing?

White box testing is a testing technique, that examines the program structure and derives test data from the program logic/code. The other names of glass box testing are clear box testing, open box testing, logic driven testing or path driven testing or structural testing.

White Box Testing Techniques:

- **Statement Coverage** - This technique is aimed at exercising all programming statements with minimal tests.
- **Branch Coverage** - This technique is running a series of tests to ensure that all branches are tested at least once.
- **Path Coverage** - This technique corresponds to testing all possible paths which means that each statement and branch is covered.

Calculating Structural Testing Effectiveness:

$$\text{Statement Testing} = \left( \frac{\text{Number of Statements Exercised}}{\text{Total Number of Statements}} \right) \times 100\%$$

$$\text{Branch Testing} = \left( \frac{\text{Number of decisions outcomes tested}}{\text{Total Number of decision Outcomes}} \right) \times 100\%$$

$$\text{Path Coverage} = \left( \frac{\text{Number paths exercised}}{\text{Total Number of paths in the program}} \right) \times 100\%$$

Advantages of White Box Testing:

- Forces test developer to reason carefully about implementation.
- Reveals errors in "hidden" code.
- Spots the Dead Code or other issues with respect to best programming practices.

Disadvantages of White Box Testing:

- Expensive as one has to spend both time and money to perform white box testing.
- Every possibility that few lines of code are missed accidentally.
- In-depth knowledge about the programming language is necessary to perform white box testing.