SNS COLLEGE OF ENGINEERING

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Department of Artificial Intelligence and Data Science

23ITT203 Object Oriented Software Engineering

White Box Testing

What is White Box Testing?

- White Box Testing is a software testing technique where the internal structure, design, and coding of the software are tested.
- Also called Structural Testing or Glass Box Testing.
- The tester knows the internal code, logic, and structure.
- The main focus is on testing the flow of inputs, conditions, loops, and outputs within the code.

Why is it called White Box?

- White box means everything is visible like a transparent box.
- Tester has full knowledge of internal code structure.

Purpose of White Box Testing

- To check whether the code works correctly.
- To verify all possible paths of the code.
- To test conditions, loops, and logic.
- To ensure no hidden errors in the code.

Techniques of White Box Testing

- Statement Coverage → Every line of code is tested.
- Decision Coverage → Every decision (if-else) is tested.
- Condition Coverage → Every condition in the code is tested.
- Path Coverage → All possible paths in the program are tested.
- Loop Testing → Testing loops (for, while) with different inputs.

Techniques of White Box Testing

1. Statement Coverage→

It checks whether every line of code is executed at least once.

Example: Program to check Even or Odd number:

```
if num % 2 == 0:
   print("Even")
else:
print("Odd")
```

Test with num = 4 (Even) and num = 3 (Odd) — Both lines will be tested.

Techniques of White Box Testing

2. Decision Coverage → It checks both true and false conditions of if-else.

Example: Check if age is eligible to vote:

```
if age >= 18:
 print("Eligible")
  else:
print("Not Eligible")
```

→ Test with age = 20 (True) and age = 15 (False)

Techniques of White Box Testing

3. Condition Coverage

→ It checks each condition separately in a decision.

Example:

Check if A and B both are positive:

```
if A > 0 and B > 0:
   print("Both Positive")
```

Test with:

A=1, B=1 → Both True

A=1, B=0 → One True, One False

A=0, B=1 → One False, One True

Techniques of White Box Testing

4. Path Coverage

→ It checks all possible paths in the code.

Example:

Login Program:

Correct username & password → Login Success

Wrong username → Error

Wrong password → Error

Test all 3 paths.

Techniques of White Box Testing

5. Loop Testing

→ It checks the loop with different inputs like 0 times, 1 time, and many times.

Example:

→ Suppose a teacher tells a student —

"Write 'Good Morning' on the board N times."

Loop Testing will check:

If N = 0 → Student should not write anything.

If N = 1 → Student should write only 1 time.

If N = 5 → Student should write 5 times correctly.

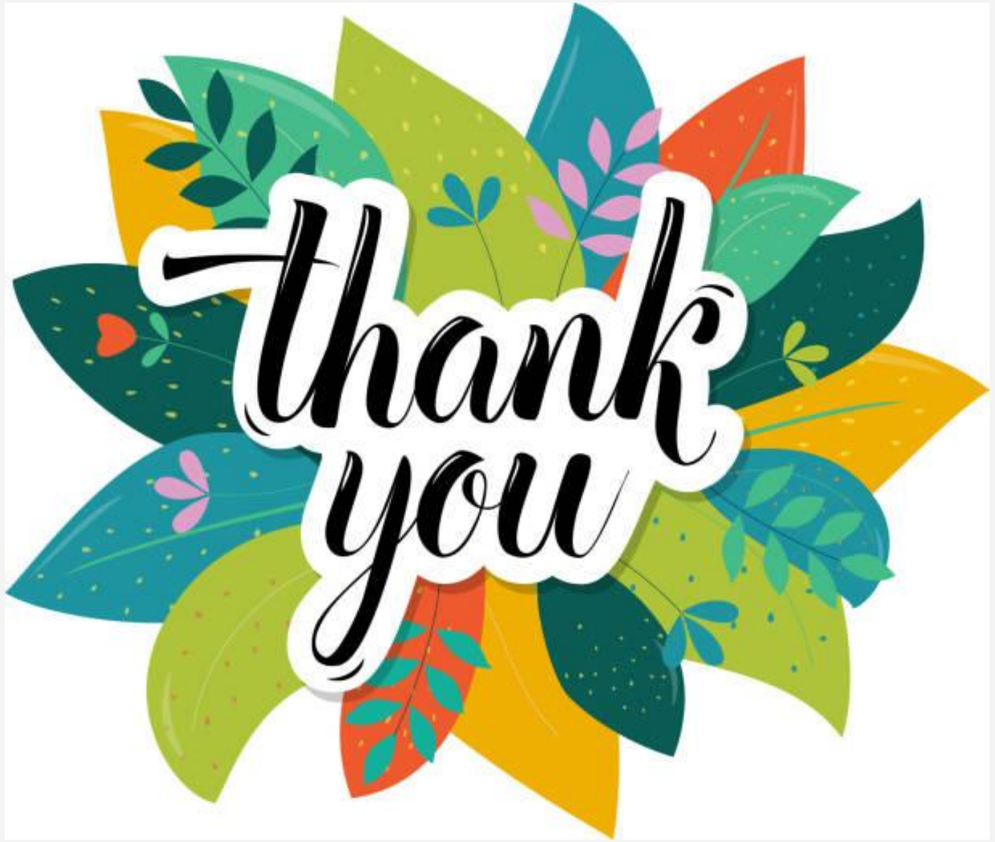
Advantages & Disadvantages of White Box Testing

Advantages of White Box Testing

- Helps find hidden errors in code.
- Optimizes the code.
- Ensures all paths and conditions are tested.

Disadvantages

- Requires programming knowledge.
- Time-consuming for large programs.


thank
you