

SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 107 Accredited by NAAC-UGC with 'A' Grade Approved by AICTE, Recognized by UGC & Affiliated to Anna University, Chennai

Department of Artificial Intelligence and Data Science

23ITT203 Object Oriented Software Engineering

SOWMIYA R/AP/AI&DS/23ITT203 OBJECT ORIENTED SOFTWARE ENGINEERING/SNSCE

4/9/2025





Debugging



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What is Debugging?

- Debugging is the process of identifying, analyzing, and correcting errors (bugs) in a computer program to make it work correctly.
- When we write a program, there is a chance of making mistakes.
- These mistakes are called bugs.
- Debugging helps us to find these bugs and fix them. Why is Debugging Important?
- No program is perfect in the first attempt.
- Bugs cause incorrect results or stop the program.
- Debugging ensures that the program runs correctly and gives accurate output.





Types of Errors (Bugs) Found During Debugging

Type of Error	Description
Syntax Error	Mistake in the rules of the language
Runtime Error	Error occurs when program is running
Logical Error	Mistake in logic or calculation

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Example

Missing semicolon in C

Division by zero

Using wrong formula



Debugging Process (Steps Involved)

Step 1: Identify the Problem

Understand the error.

Check error messages.

Step 2: Reproduce the Problem

Run the program with different inputs.

Observe the behavior.

Step 3: Locate the Error

Check the line where error occurs.

Trace variable values.

Step 4: Analyze the Cause

Why is this error occurring? Is it due to wrong logic or wrong input?

Step 5: Fix the Error

Correct the code.

Modify the logic or statements.

Step 6: Test the Program

Run the program again to check if error is fixed.

Step 7: Document the Bug

Write what was the bug and how it was solved for future reference.

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Example

Problem: Write a program to calculate the average of 3 numbers entered by the user. **Program with Bug**

a = int(input("Enter first number: "))

b = int(input("Enter second number: "))

c = int(input("Enter third number: "))

avg = (a + b + c) / 2 # Error: Divided by 2 instead of 3

print("Average is:", avg)

Input:

Enter first number: 10

Enter second number: 20

Enter third number: 30

Output:

Average is: 30.0

Correct Output should be

Average is: 20.0

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Debugging the Program

Step 1: Identify the Error Average should be total divided by 3, not 2. **Step 2: Correct the Code** avg = (a + b + c) / 3 # Correct division**Correct Program : python** a = int(input("Enter first number: ")) b = int(input("Enter second number: ")) c = int(input("Enter third number: ")) avg = (a + b + c) / 3print("Average is:", avg) **Correct Output:**

Average is: 20.0



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Debugging Process



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Tools Used for Debugging

Tool	Purpos
Print Statements	To disp
Debugger Tools	Breakp
IDE Debuggers	PyChar
Logging	Storing

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se

play variable values

oints, Stepwise execution

rm, Visual Studio, Eclipse

gerror details in log files



Advantages of Debugging

- Helps to find and fix errors. \bullet
- Increases program correctness. \bullet
- Improves understanding of the code.
- Makes software reliable and accurate. ullet









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