



edunet  
Foundation



LAB MANUAL

# Python

## Practicing Debugging Using IDE

### Objective:

To learn how to debug Python code in VS Code using breakpoints, step execution, and variable inspection.

### Equipment Required:

1. Install VS Code - <https://code.visualstudio.com/download>
2. Download Python Installer File - <https://www.python.org/downloads/>

### Prerequisites:

- Basic familiarity with Python syntax and program execution.
- Experience running Python scripts in VS Code or other IDEs.

**Duration:** 2 hr

### Problem Statement:

Students will debug a Python program using VS Code. They will configure the debugger, use breakpoints, step through the code, inspect variables, and fix bugs.

### Procedure:

**Step 1: Create a Python File**

**Step 2: Set a Breakpoint**

**Step 3: Start Debugging**

**Step 4: Control Execution**

**Step 5: Inspect Variables**

**Step 6: Fix the Bugs**

**Step 7: Run Again**

## Step 1: Create a Python File

1. Open VS Code.
2. Create a new file → save as **debug\_lab.py**.
3. Write this buggy program into it:

```
1  # Program to compute average of numbers
2
3  def calculate_average(nums):
4      total = 0
5      for n in nums:
6          total += n
7      average = total / len(nums)  # ⚠ Might cause ZeroDivisionError
8      return avg  # ⚠ Wrong variable name (should be average)
9
10 def main():
11     values = input("Enter numbers separated by commas: ").split(',')
12     numbers = [int(n.strip()) for n in values]  # ⚠ Will crash if input not numbers
13     avg = calculate_average(numbers)
14     print("Average is:", avg)
15
16 if __name__ == "__main__":
17     main()
18
```

## Step 2: Set a Breakpoint

1. In VS Code, look at the line numbers on the left.
2. Click next to the line `average = total / len(nums)`.
  - A red dot will appear → this is a breakpoint.

## Step 4: Start Debugging

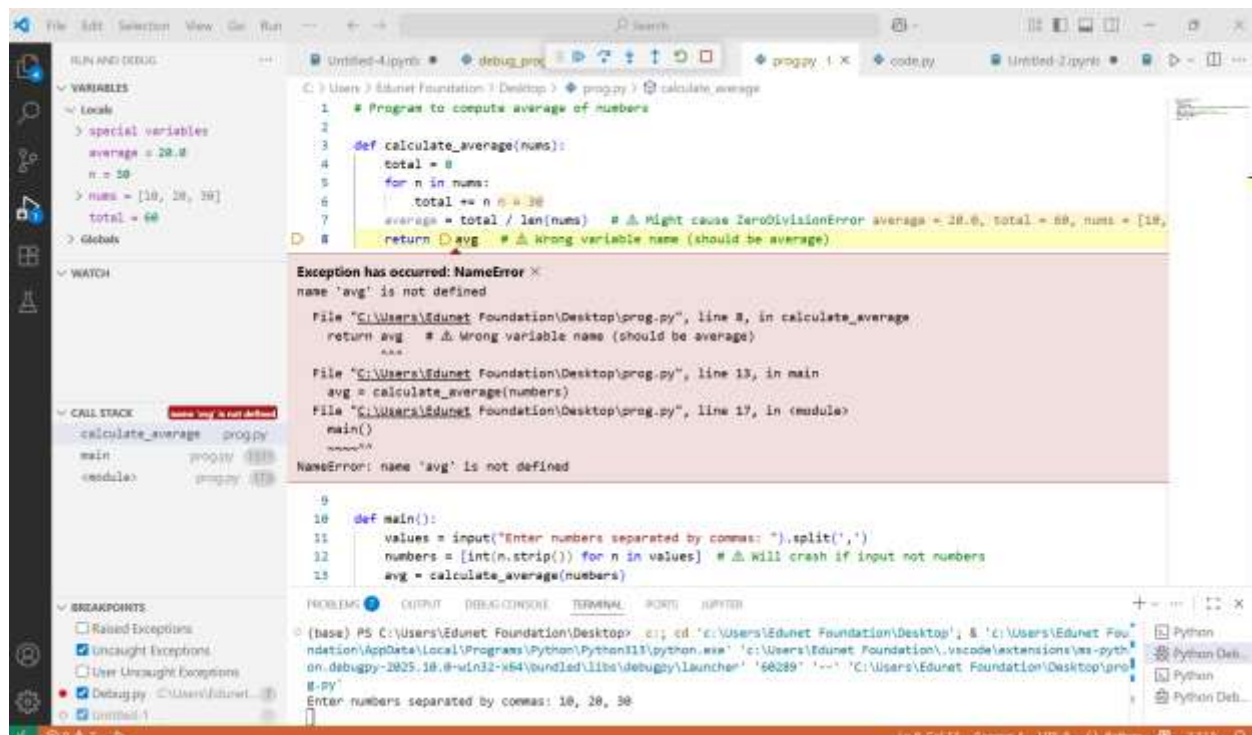
1. Press F5 (or go to top menu → Run > Start Debugging).
2. VS Code will ask for a configuration → select Python: Current File or Python Debugger.
3. Program starts and stops at your breakpoint.
4. Enter the Values separated by commas and press Enter to execute.
5. After you press Enter, the program will stop at the line with the red dot.
6. Check the **VARIABLES** panel on the left — you should see `nums`, `total`, etc.

## Step 5: Control Execution

Use the debug toolbar (appears at the top):

- **Continue (F5):** Run until the next breakpoint.
- **Step Over (F10):** Run current line, go to next.
- **Step Into (F11):** Go inside a function call.
- **Step Out (Shift+F11):** Exit current function.
- **Stop (Shift+F5):** End debugging.

When you reach return avg, the debugger will throw an error because avg is not defined.



This is the bug you are supposed to find.

## Step 6: Fix the Bugs

1. Change return avg → return average.

## Step 7: Run Again

1. Save the file (Ctrl+S).
2. Run again with **F5**.
3. Enter input as:  
10, 20, 30
4. Output:  
Average is: 20.0

The screenshot shows the VS Code interface with a Python file named `calculate_average.py` open. The code defines a function `calculate_average` and a `main` function. The `main` function takes user input, splits it into a list of numbers, and calls `calculate_average`. The output panel shows the execution of the script, which successfully calculates the average of the numbers 10, 20, and 30 as 20.0.

```

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3 def calculate_average(nums):
4     total = 0
5     for n in nums:
6         total += n
7     average = total / len(nums) # Might cause ZeroDivisionError
8     return average # Wrong variable name (should be average)
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11 def main():
12     values = input("Enter numbers separated by commas: ").split(',')
13     numbers = [int(n.strip()) for n in values] # Will crash if input not numbers
14     avg = calculate_average(numbers)
15     print("Average is:", avg)
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17 if __name__ == "__main__":
18     main()

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS JUPYTER

```

NameError: name 'avg' is not defined
(base) PS C:\Users\EduNet Foundation\Desktop> cd 'c:\Users\EduNet Foundation\Desktop'; & "c:\Users\EduNet Foundation\AppData\Local\Programs\Python\Python313\python.exe" 'c:\Users\EduNet Foundation\.vscode\extensions\ms-python-on-ide-debugpy-2025.10.0-win32-x64\bundle\libs\debugpy\launcher' '68389' '-.' 'c:\Users\EduNet Foundation\Desktop\program.py'
Enter numbers separated by commas: 10, 20, 30
Average is: 20.0
(base) PS C:\Users\EduNet Foundation\Desktop>

```

You have successfully practiced debugging with breakpoints in VS Code