

Lesson 04 Demo 05

Debugging AI-Generated Code Using GitHub Copilot

Objective: To identify and fix errors in AI-generated code using GitHub Copilot

Tools required: VS Code with GitHub Copilot

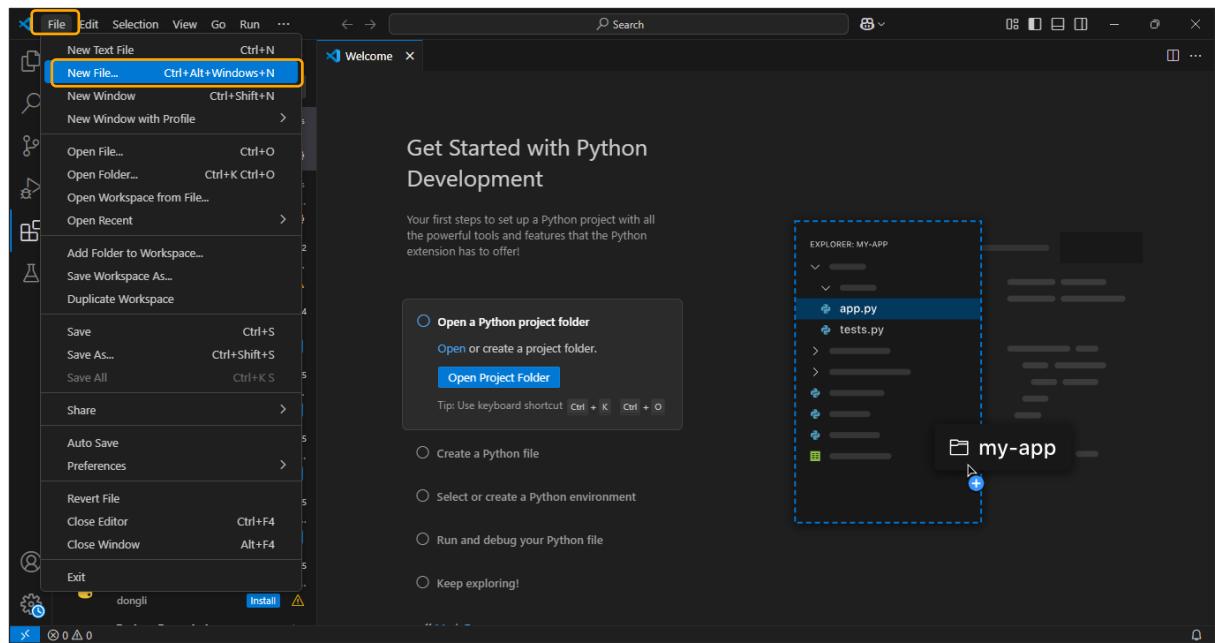
Prerequisites: None

Steps to be followed:

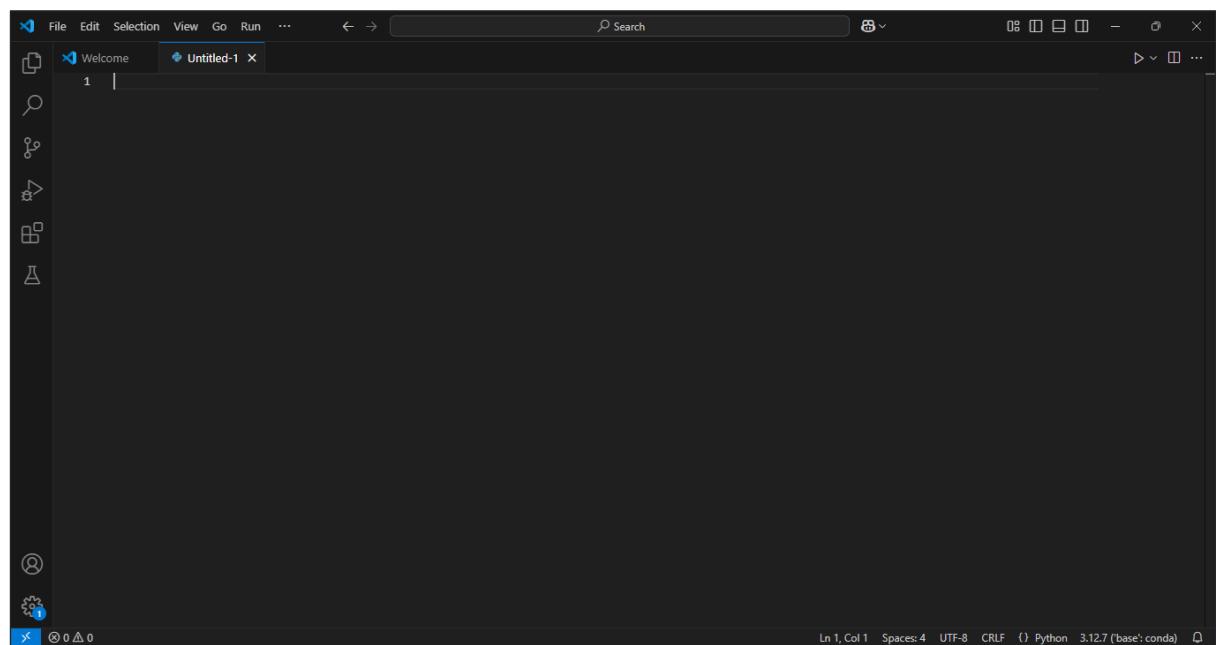
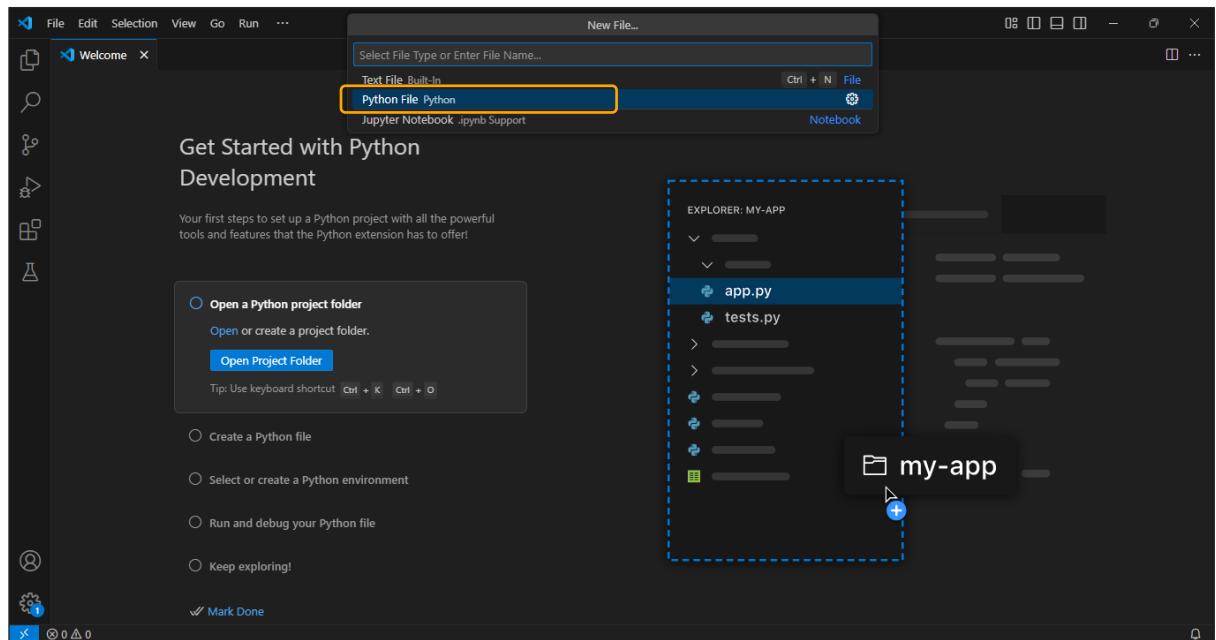
1. Launch VS Code and open a new file
2. Review the erroneous function
3. Identify errors and debug the function with GitHub Copilot
4. Apply the fixes and test the function

Step 1: Launch VS Code and open a new file

1.1 Launch VS Code and click on **File** and then **New File**



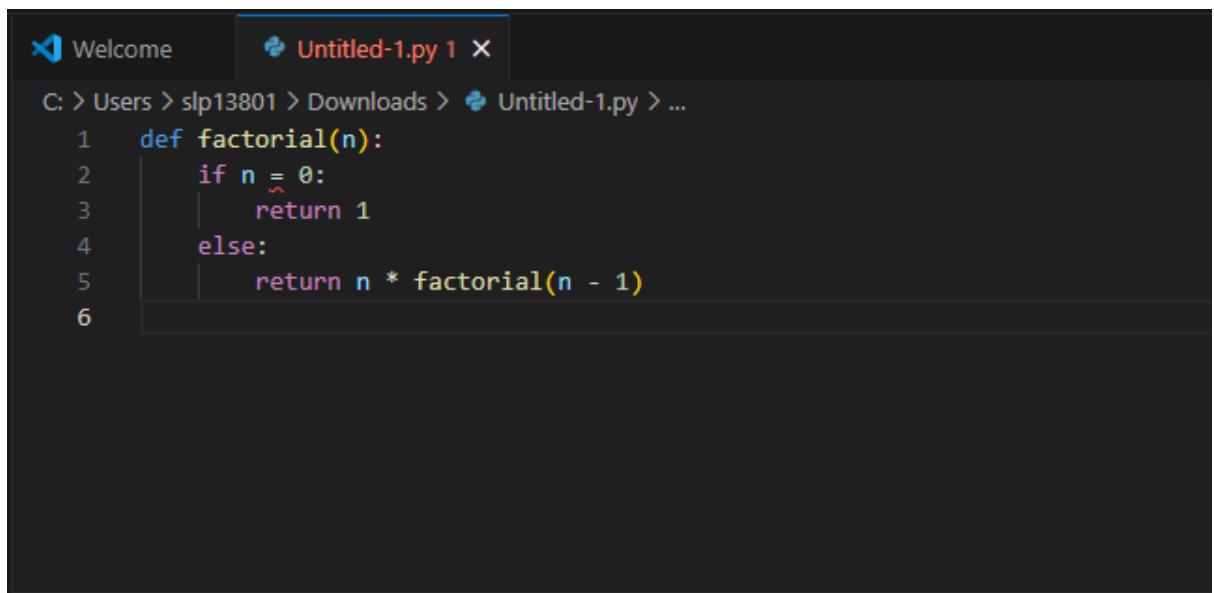
1.2 Select the **Python File** option from the name bar on top and a new Python file named Untitled-1 will open



Step 2: Review the erroneous function

2.1 Copy and paste the following erroneous function, which is supposed to calculate the factorial of a number but contains logical and syntax errors:

```
def factorial(n):
    if n = 0:
        return 1
    else:
        return n * factorial(n - 1)
```

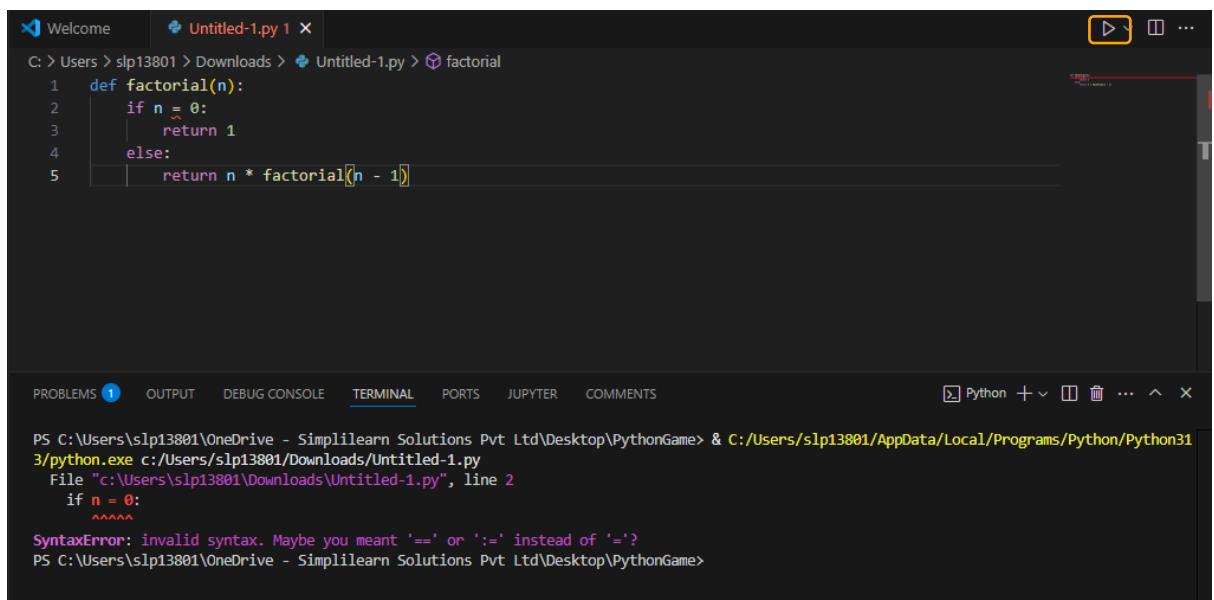


The screenshot shows a code editor window titled "Untitled-1.py 1". The file path is "C: > Users > slp13801 > Downloads > Untitled-1.py > ...". The code is as follows:

```
1  def factorial(n):
2      if n = 0:
3          return 1
4      else:
5          return n * factorial(n - 1)
6
```

The line "if n = 0:" has a syntax error, indicated by a red squiggly underline under the assignment operator "=".

2.2 Click the play button to run the function and observe the error messages



The screenshot shows a code editor window titled "Untitled-1.py 1". The file path is "C: > Users > slp13801 > Downloads > Untitled-1.py > factorial". The code is the same as in the previous screenshot.

The terminal output at the bottom shows:

```
PS C:\Users\slp13801\OneDrive - Simplilearn Solutions Pvt Ltd\Desktop\PythonGame> & C:/Users/slp13801/AppData/Local/Programs/Python/Python31
3/python.exe c:/Users/slp13801/Downloads/Untitled-1.py
  File "c:/Users/slp13801/Downloads/Untitled-1.py", line 2
    if n = 0:
        ^
SyntaxError: invalid syntax. Maybe you meant '==' or ':=' instead of '='?
PS C:\Users\slp13801\OneDrive - Simplilearn Solutions Pvt Ltd\Desktop\PythonGame>
```

A yellow play button icon is visible in the top right corner of the code editor interface.

Step 3: Identify errors and debug the function with GitHub Copilot

3.1 Place your cursor on the erroneous code and add a comment like:

```
# Fix syntax errors and handle negative inputs
```

A screenshot of a code editor window titled "Untitled-1.py 1". The code is a factorial function:

```
C: > Users > slp13801 > Downloads > Untitled-1.py > ...
1 def factorial(n):
2     if n ≈ 0:
3         return 1
4     else:
5         return n * factorial(n - 1)
6
7 # Fix syntax error and handle negative inputs
```

The line "if n ≈ 0:" has a red squiggle under the ≈ symbol. A cursor is positioned at the start of line 7. The status bar at the bottom of the editor shows "git: detached HEAD".

3.2 Press enter for GitHub Copilot to suggest an improved version of the function

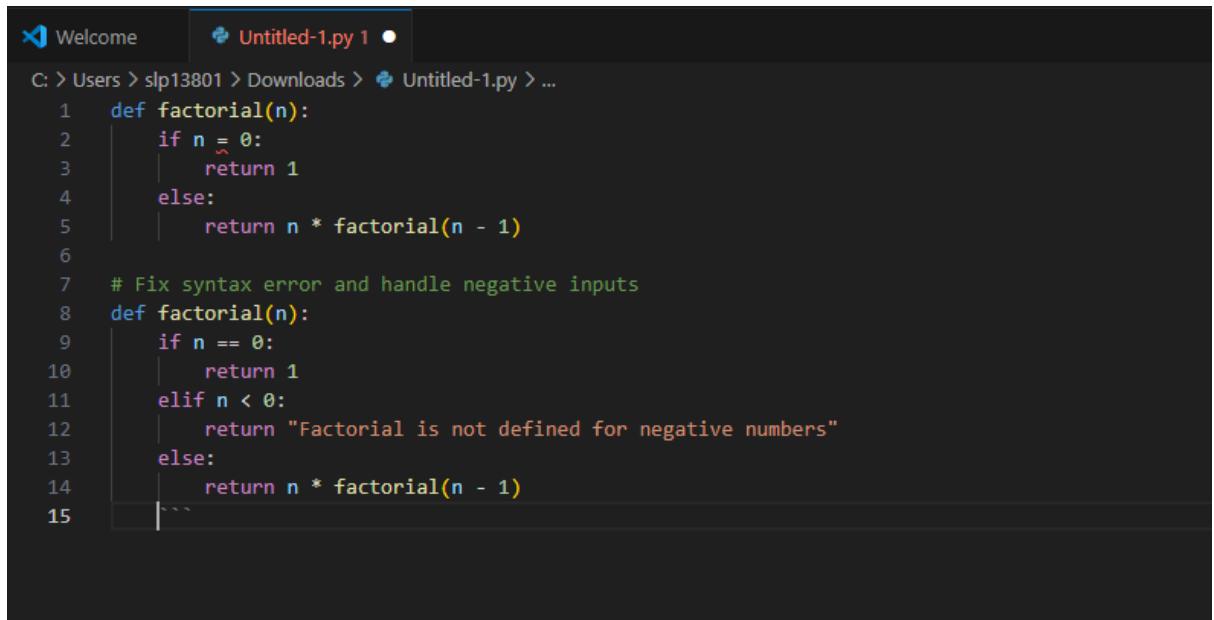
A screenshot of a code editor window titled "Untitled-1.py 1". The code is the same factorial function as before, but now includes an additional definition:

```
C: > Users > slp13801 > Downloads > Untitled-1.py > ...
1 def factorial(n):
2     if n ≈ 0:
3         return 1
4     else:
5         return n * factorial(n - 1)
6
7 # Fix syntax error and handle negative inputs
8 def factorial(n):
9     if n == 0:
10        return 1
11    elif n < 0:
12        return "Factorial is not defined for negative numbers"
13    else:
14        return n * factorial(n - 1)
```

The status bar at the bottom of the editor shows "git: detached HEAD".

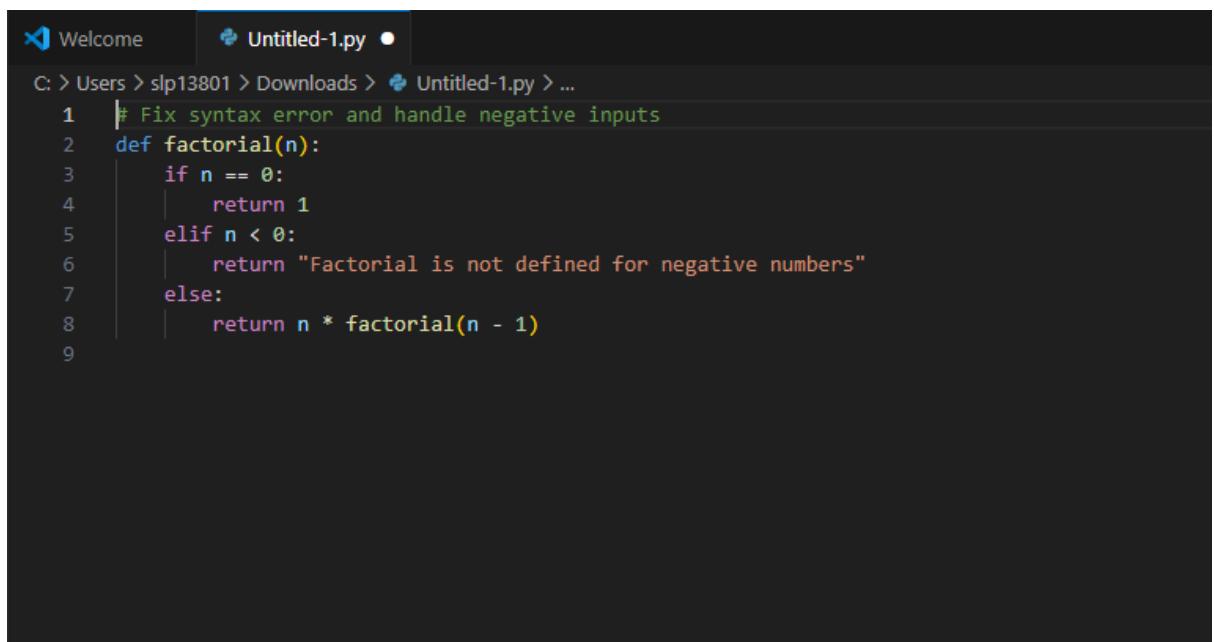
Step 4: Apply the fixes and test the function

4.1 Press tab to accept Copilot's suggestion, or you can manually rectify the function



```
C: > Users > slp13801 > Downloads > Untitled-1.py > ...
1 def factorial(n):
2     if n  $\leq$  0:
3         return 1
4     else:
5         return n * factorial(n - 1)
6
7 # Fix syntax error and handle negative inputs
8 def factorial(n):
9     if n == 0:
10        return 1
11    elif n < 0:
12        return "Factorial is not defined for negative numbers"
13    else:
14        return n * factorial(n - 1)
15
```

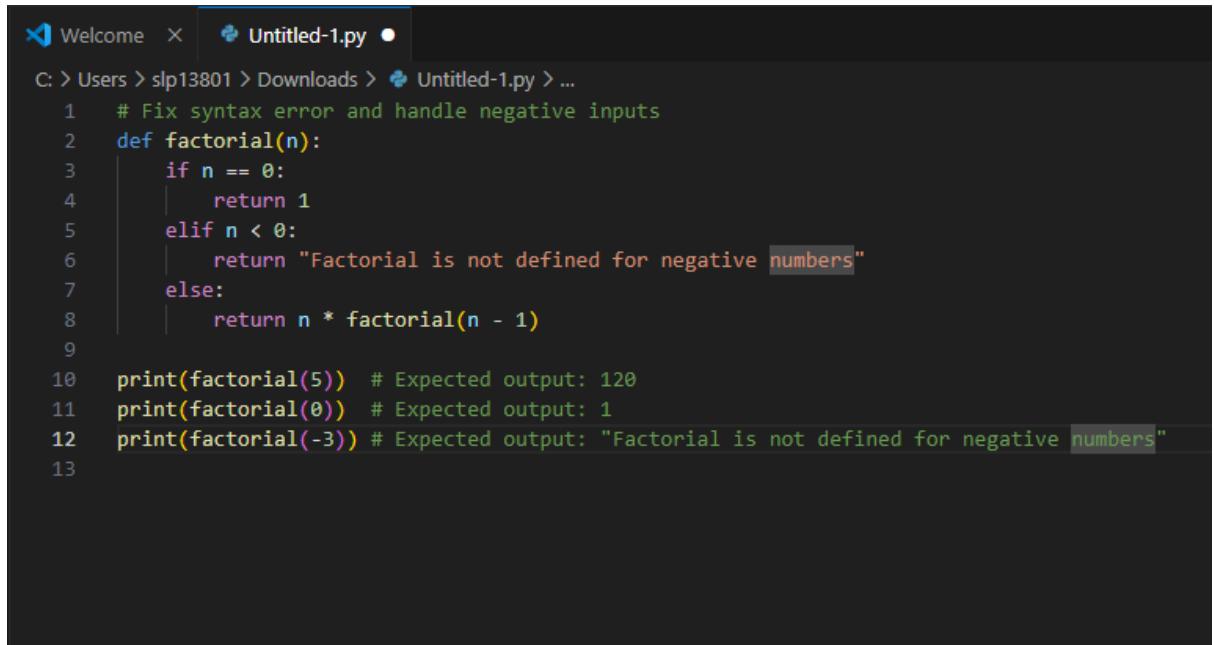
4.2 Remove the erroneous function that you created earlier



```
C: > Users > slp13801 > Downloads > Untitled-1.py > ...
1 # Fix syntax error and handle negative inputs
2 def factorial(n):
3     if n == 0:
4         return 1
5     elif n < 0:
6         return "Factorial is not defined for negative numbers"
7     else:
8         return n * factorial(n - 1)
9
```

4.3 Add the following test cases to check different inputs:

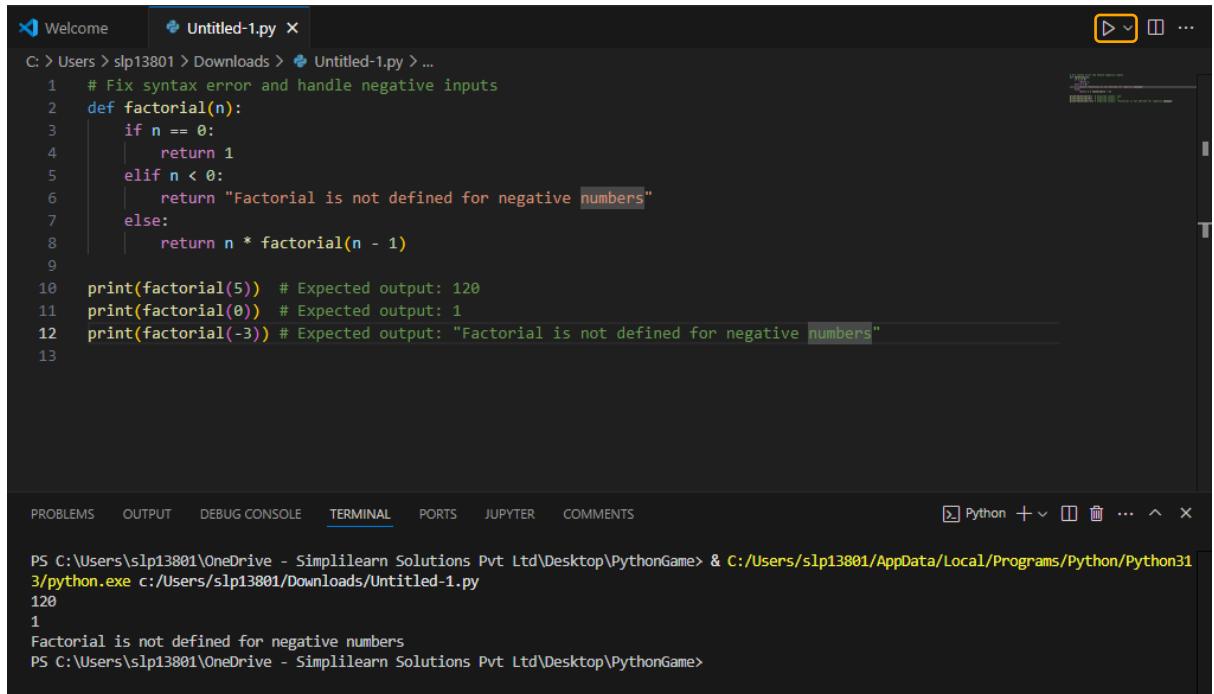
```
print(factorial(5)) # Expected output: 120
print(factorial(0)) # Expected output: 1
print(factorial(-3)) # Expected output: "Factorial is not defined for negative numbers"
```



The screenshot shows the VS Code interface with a dark theme. A tab bar at the top has 'Welcome' and 'Untitled-1.py'. The main area displays the following Python code:

```
C: > Users > slp13801 > Downloads > Untitled-1.py > ...
1  # Fix syntax error and handle negative inputs
2  def factorial(n):
3      if n == 0:
4          return 1
5      elif n < 0:
6          return "Factorial is not defined for negative numbers"
7      else:
8          return n * factorial(n - 1)
9
10 print(factorial(5)) # Expected output: 120
11 print(factorial(0)) # Expected output: 1
12 print(factorial(-3)) # Expected output: "Factorial is not defined for negative numbers"
13
```

4.4 Click the play button to run the Python file in VS Code and observe the output



The screenshot shows the VS Code interface with a dark theme. A tab bar at the top has 'Welcome' and 'Untitled-1.py'. Below the editor is a terminal window. The terminal shows the command 'python Untitled-1.py' being run, followed by the output:

```
C: > Users > slp13801 > Downloads > Untitled-1.py > ...
1  # Fix syntax error and handle negative inputs
2  def factorial(n):
3      if n == 0:
4          return 1
5      elif n < 0:
6          return "Factorial is not defined for negative numbers"
7      else:
8          return n * factorial(n - 1)
9
10 print(factorial(5)) # Expected output: 120
11 print(factorial(0)) # Expected output: 1
12 print(factorial(-3)) # Expected output: "Factorial is not defined for negative numbers"
13

PS C:\Users\slp13801\OneDrive - Simplilearn Solutions Pvt Ltd\Desktop\PythonGame> & C:/Users/slp13801/AppData/Local/Programs/Python/Python310/python.exe c:/Users/slp13801/Downloads/Untitled-1.py
120
1
Factorial is not defined for negative numbers
PS C:\Users\slp13801\OneDrive - Simplilearn Solutions Pvt Ltd\Desktop\PythonGame>
```

Note: The output in the terminal window should match the expected result.

By following these steps, you have successfully identified, debugged, and optimized an AI-generated function using GitHub Copilot. You have learned to analyze syntax and logical errors, leverage Copilot for automated fixes, and validate solutions with test cases. This structured debugging approach ensures that AI-assisted coding produces reliable and optimized results for real-world applications.