ASSIGNMENT-4

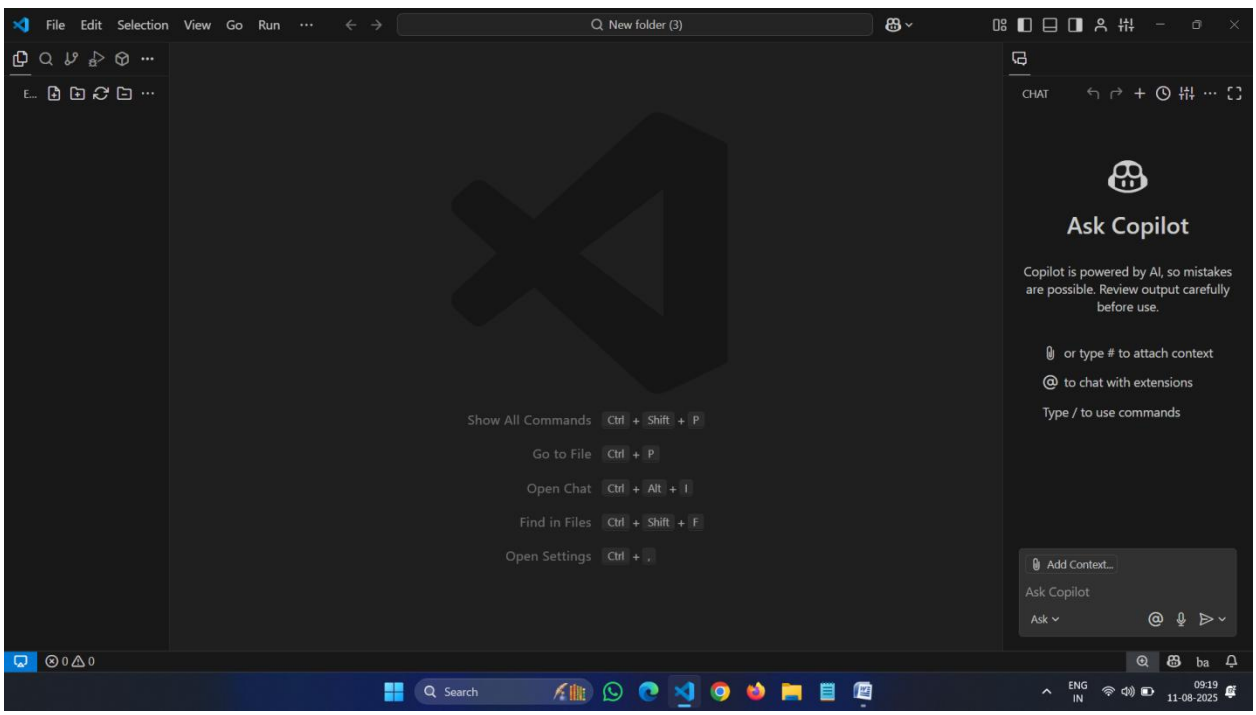
NAME : R.Shivani

ROLL NUMBER : 2403A52411

BATCH:15

Task 0 :

- Install and configure of GitHub Copilot Take Screenshot of each one.
- Expected output :

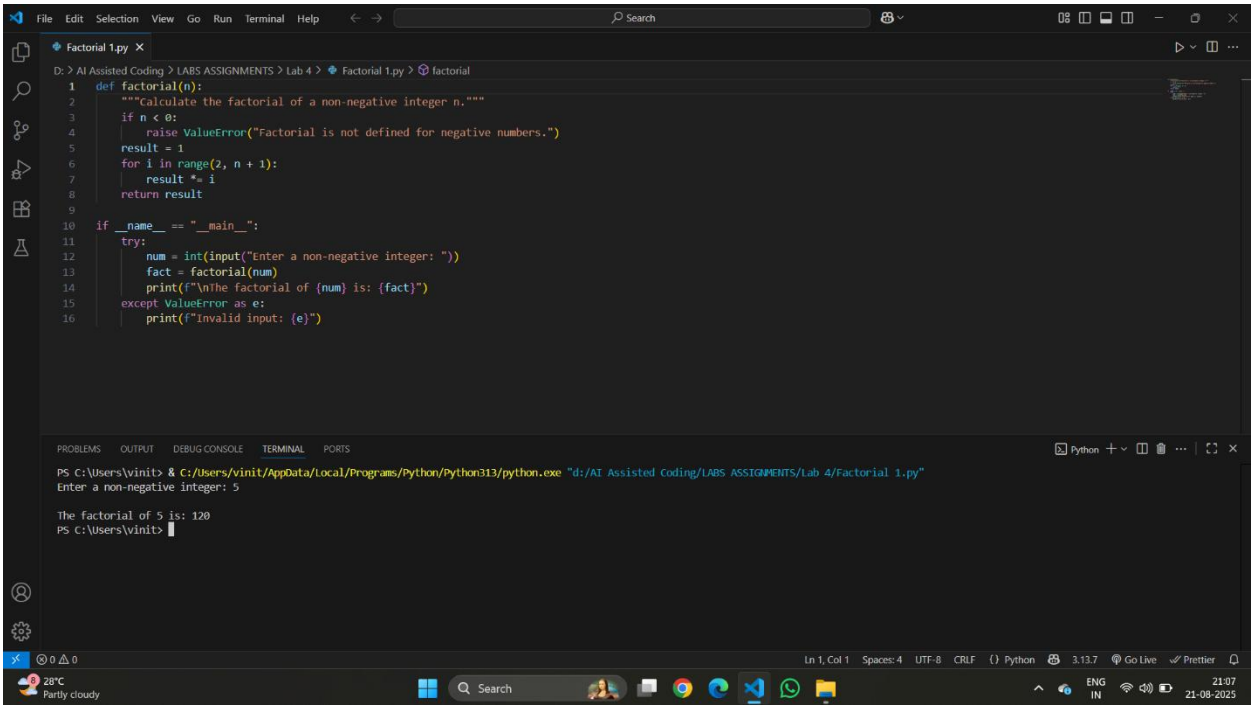


Task 1 : Factorial without function

- Description

Use GitHub copilot to generate a python program that calculates the factorial of number without defining any function using loops directly in the main code.

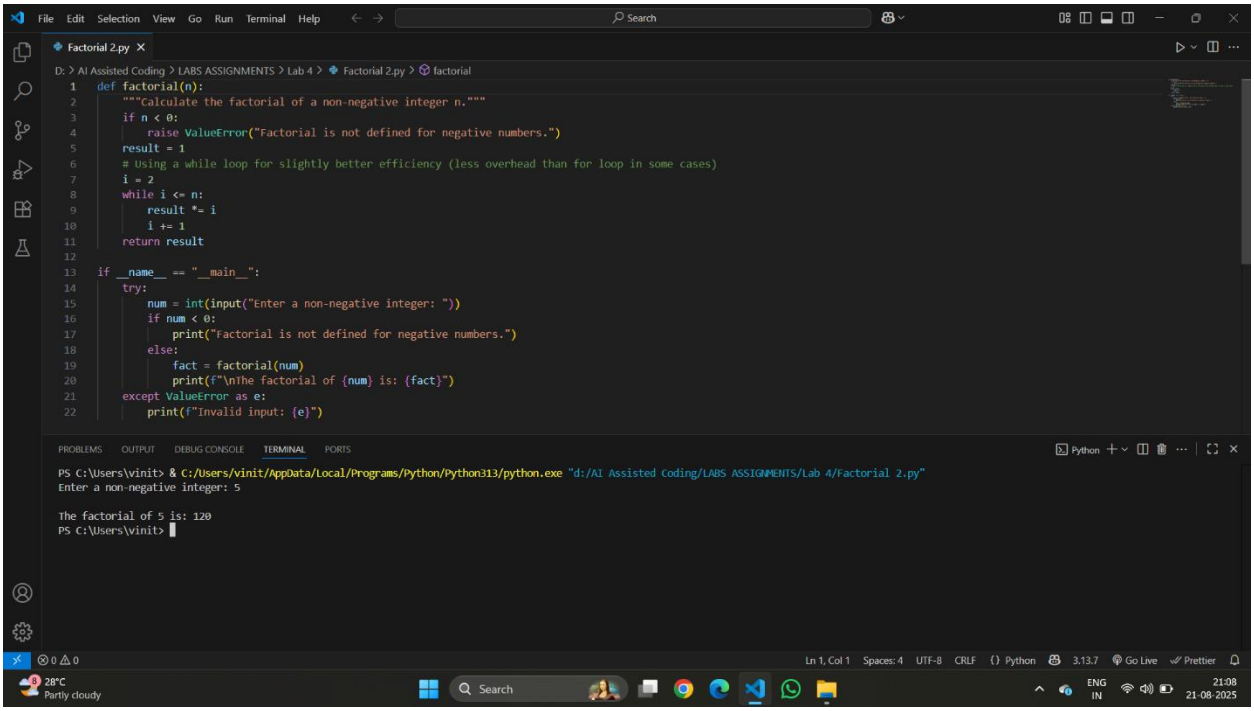
- Expected output :



Task 2 : Improving Efficiency

- Description
- Examine the Copilot generated code .

The code is improved by removing the function definition and calculating the factorial directly in the main block using a loop. This reduces function call overhead and simplifies the logic. The while loop starts from 2 and multiplies up to the input number, which is efficient for factorial calculation. Error handling for invalid input is also included.

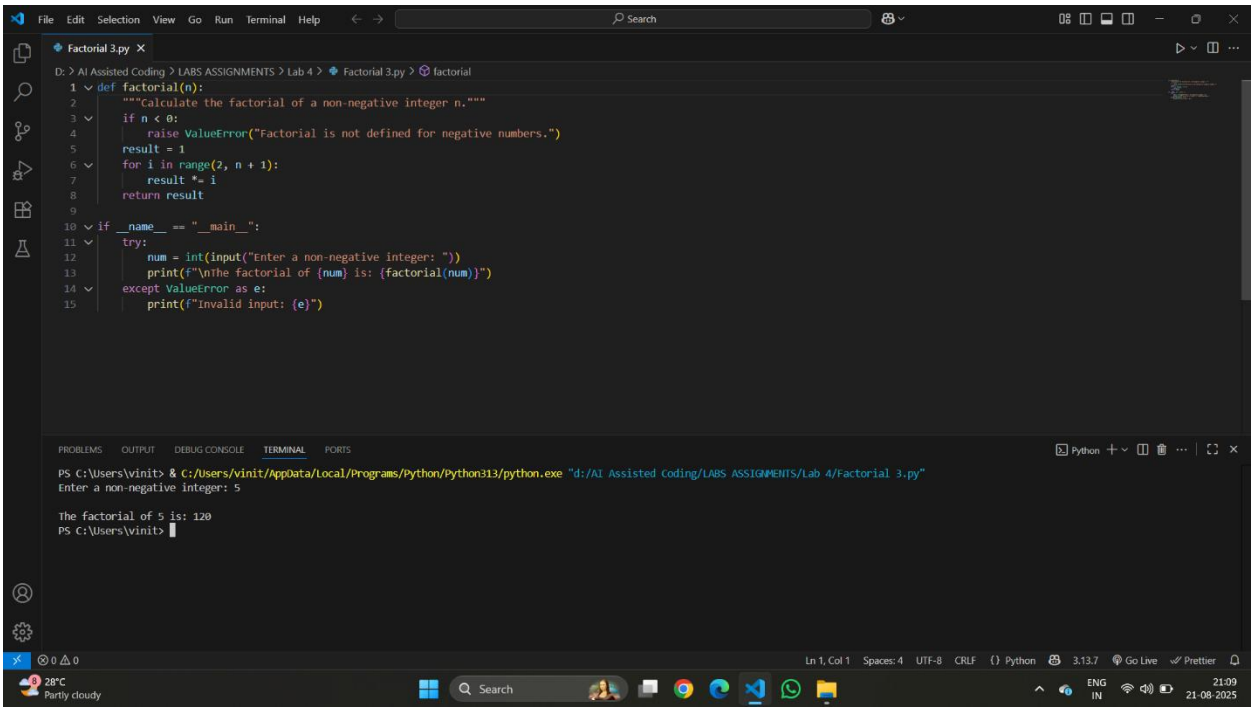


Task 3 :Factorial with functions

- Use GitHub copilot to generate a python program that calculates the factorial of number Using user defining any function
- Expected output :

- Defined a function factorial(n) to calculate the factorial of a non-negative integer.
- Checked if the input n is negative; if so, raised a ValueError.
- Initialized result to 1.
- Used a for loop to multiply result by each integer from 2 to n.
- Returned the computed factorial value.

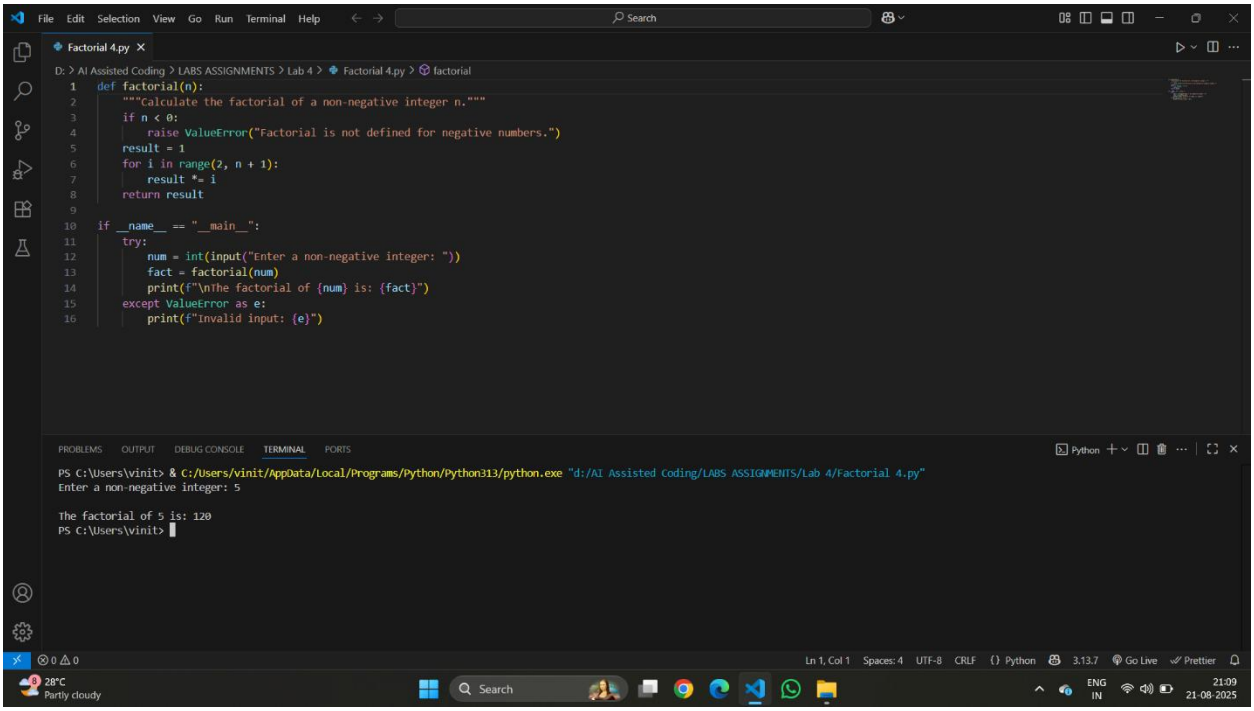
- In the main block, prompted the user to enter a non-negative integer.
- Called the factorial function with the user input and printed the result.
- Handled invalid input using a try-except block.



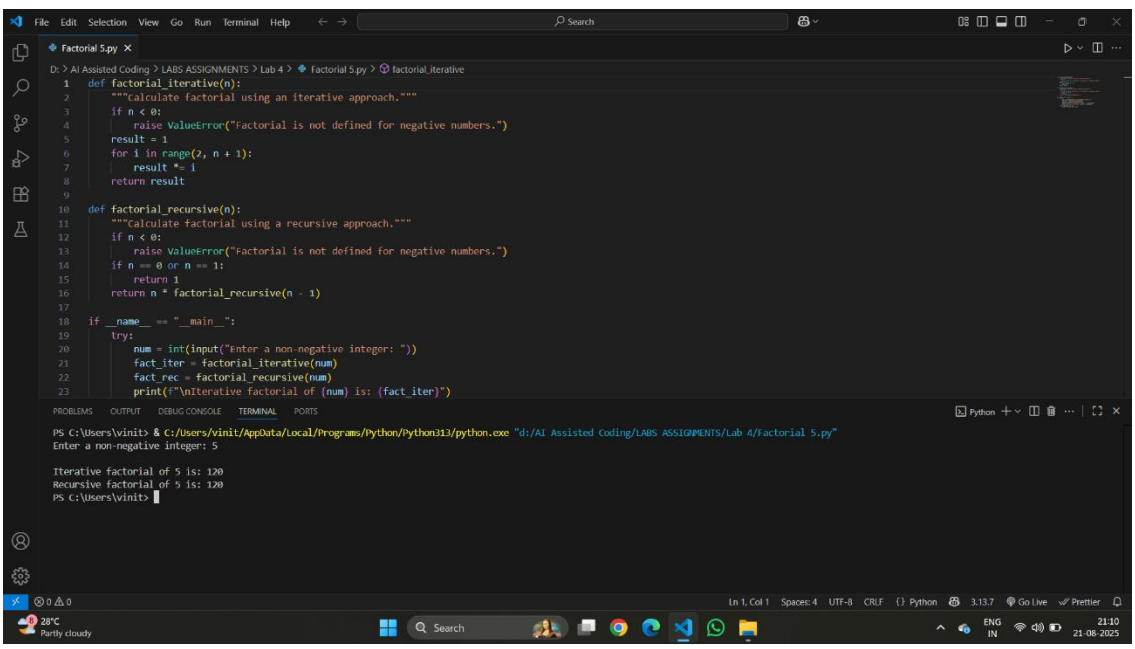
Task 4 : Comparative Analysis – With vs Without Functions

- Description

  Differentiate between the copilot generated factorial program with functions and without functions in the terms of logic ,reusability,and execution.
- Expected Output :
  - With functions



- Without functions



Logic

- **With Function:**
  The logic is encapsulated in a user-defined function (factorial(n)), which takes an argument and returns the factorial. The main code calls this function.

- **Without Function:**
  The logic is written directly in the main code block. The loop and calculation are performed inline, without any encapsulation.

2. Reusability

- **With Function:**
  Highly reusable. The factorial function can be called multiple times with different arguments, in other parts of the program or from other modules.

- **Without Function:**
  Not reusable. The code can only be executed as written, and cannot be called with different inputs without rewriting or copying the logic.

3. Execution

- **With Function:**
  Slight overhead due to function calls, but allows for cleaner code, easier testing, and better error handling.

- **Without Function:**
  Executes sequentially in the main block. Slightly faster for very simple scripts due to no function call overhead, but less organized and harder to maintain for larger programs.

Summary:
Using functions improves code organization, reusability, and maintainability, while direct logic in the main block is simpler but less flexible and harder to reuse.

Task 5 : Iterative vs Recursive Factorial

- Description :

  Prompt GitHub Copilot to generate both iterative and recursive versions of the factorial function

- Expected Output :