Assignment - 1

Name: A . Akshith Reddy

Roll Number: `2303A51177

Batch - 03

AI Assisted Coding

07-01-2026

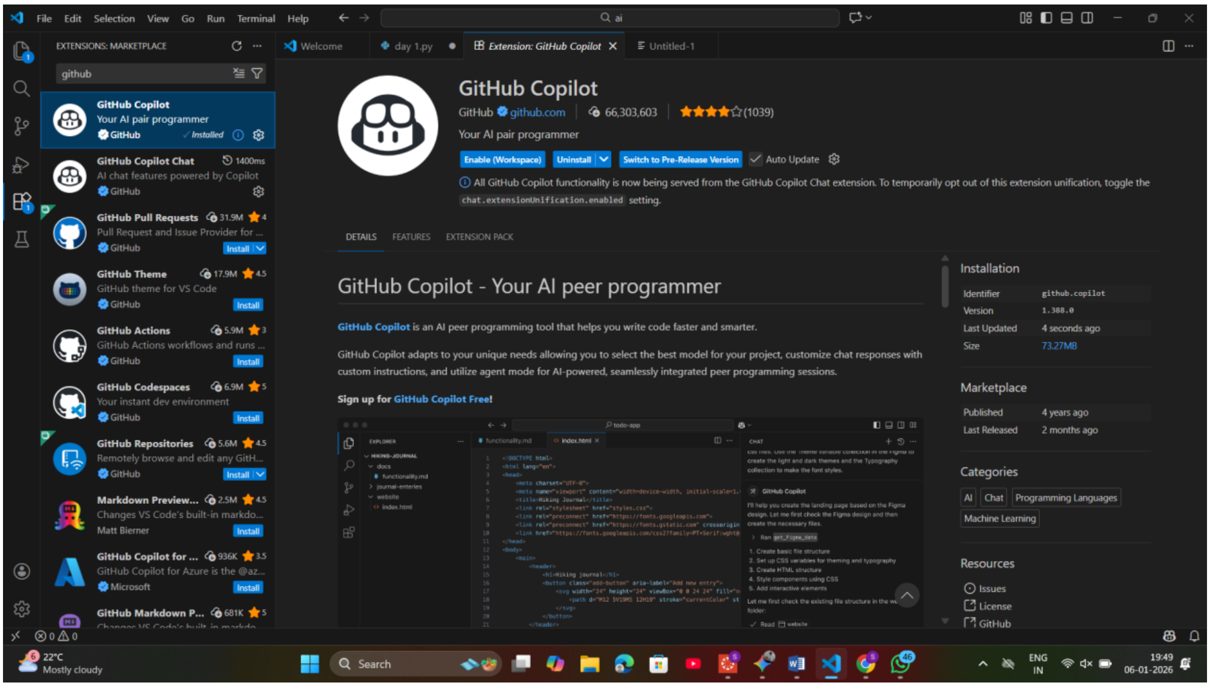
Task 0: Environment Setup:-

Task 0

- **Install and configure GitHub Copilot in VS Code. Take screenshots of each step.**

Expected Output

- **Install and configure GitHub Copilot in VS Code. Take screenshots of each step.**



GitHub Copilot

GitHub github.com | 66,303,603 | (1039)

Your AI pair programmer

All GitHub Copilot functionality is now being served from the GitHub Copilot Chat extension. To temporarily opt out of this extension unification, toggle the `chat.extensionUnification.enabled` setting.

GitHub Copilot - Your AI peer programmer

GitHub Copilot is an AI peer programming tool that helps you write code faster and smarter.

GitHub Copilot adapts to your unique needs allowing you to select the best model for your project, customize chat responses with custom instructions, and utilize agent mode for AI-powered, seamlessly integrated peer programming sessions.

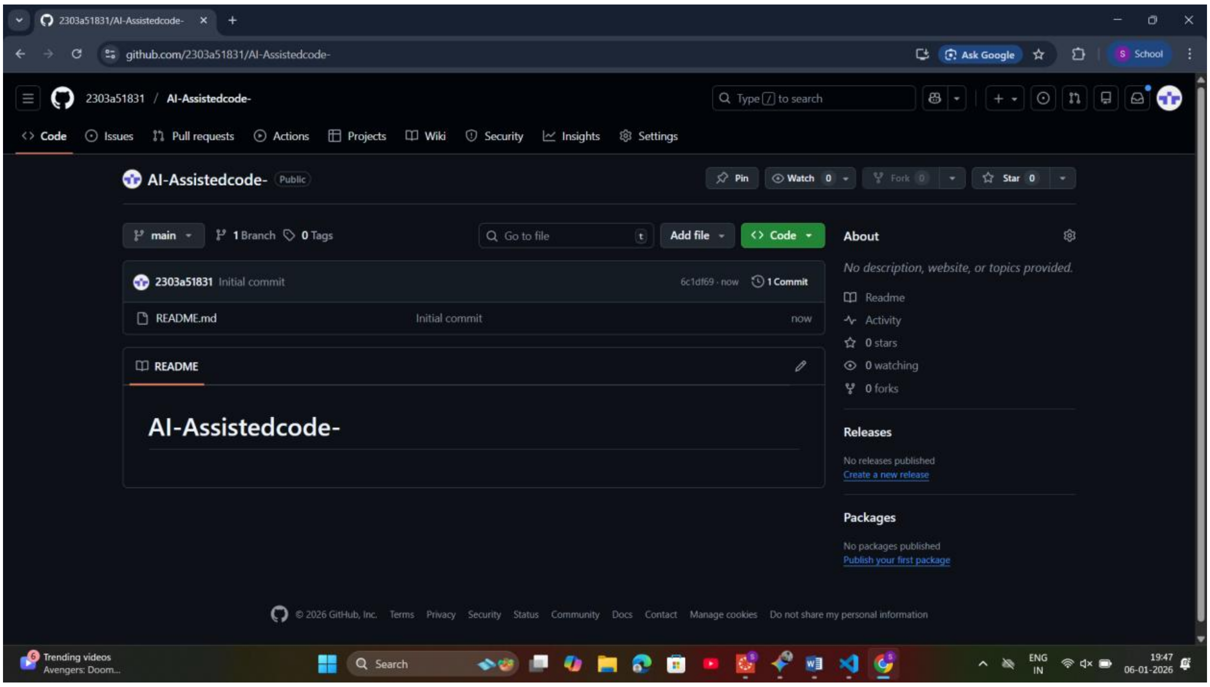
Sign up for GitHub Copilot Free!

Installation

Identifier	github.copilot
Version	1.388.0
Last Updated	4 seconds ago
Size	73.27MB

Marketplace

Published	4 years ago
Last Released	2 months ago



Task 1: Non-Modular Logic (Factorial):-

AI-Generated Logic Without Modularization (Factorial without Functions)

- Scenario

You are building a small command-line utility for a startup intern onboarding task. The program is simple and must be written quickly without modular design.

- Task Description

Use GitHub Copilot to generate a Python program that computes a mathematical product-based value (factorial-like logic) directly in the main execution flow, without using any user-defined functions.

- Constraint:

➢ Do not define any custom function

➢ Logic must be implemented using loops and variables only

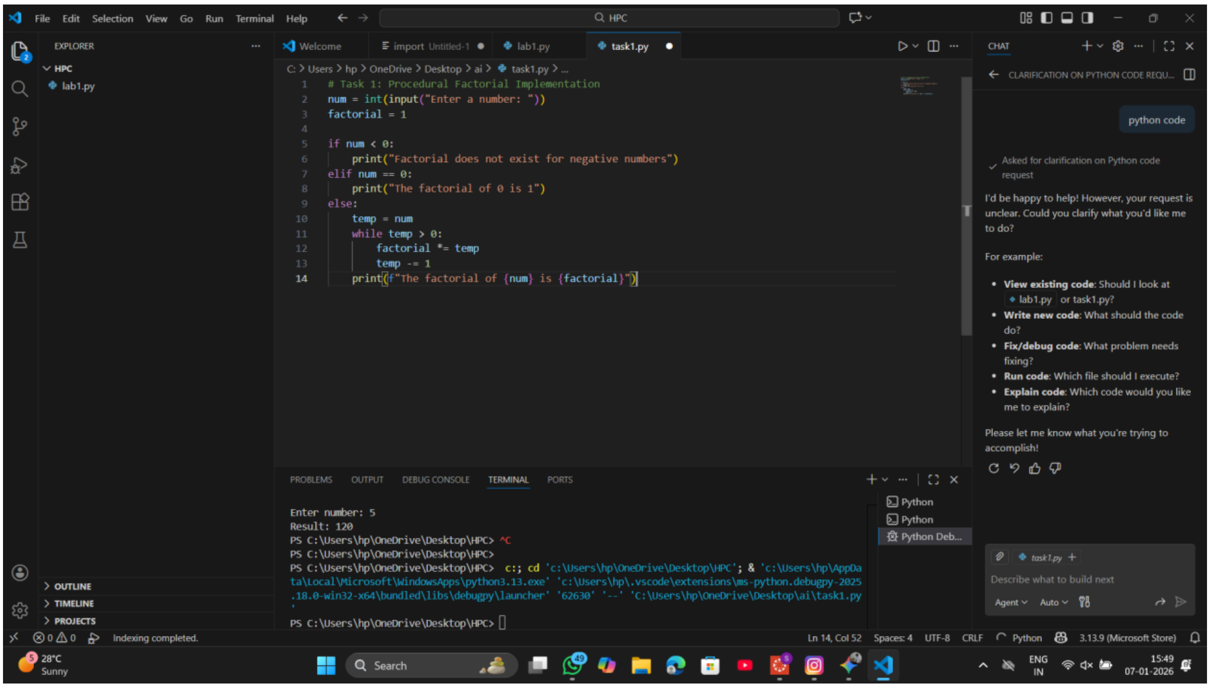
- Expected Deliverables

➢ A working Python program generated with Copilot assistance

➢ Screenshot(s) showing:

➢ The prompt you typed

- ➢ Copilot’s suggestions
- ➢ Sample input/output screenshots
- ➢ Brief reflection (5–6 lines):
- ➢ How helpful was Copilot for a beginner?
- ➢ Did it follow best practices automatically?



```python
# Task 1: Procedural Factorial Implementation
num = int(input("Enter a number: "))
factorial = 1

if num < 0:
    print("Factorial does not exist for negative numbers")
elif num == 0:
    print("The factorial of 0 is 1")
else:
    temp = num
    while temp > 0:
        factorial *= temp
        temp -= 1
    print(f"The factorial of {num} is {factorial}")
```

```
Enter number: 5
Result: 120
PS C:\Users\hp\OneDrive\Desktop\HPC> ^C
PS C:\Users\hp\OneDrive\Desktop\HPC>
PS C:\Users\hp\OneDrive\Desktop\HPC>  c:; cd 'c:\Users\hp\OneDrive\Desktop\HPC'; & 'c:\Users\hp\AppDa
ta\Local\Microsoft\WindowsApps\python3.13.exe' 'c:\Users\hp\.vscode\extensions\ms-python.debugpy-2025
.18.0-win32-x64\bundled\libs\debugpy\launcher' '62630' '--' 'C:\Users\hp\OneDrive\Desktop\ai\task1.py
'
PS C:\Users\hp\OneDrive\Desktop\HPC> 
```

python code

Asked for clarification on Python code request

I'd be happy to help! However, your request is unclear. Could you clarify what you'd like me to do?

For example:

- **View existing code**: Should I look at lab1.py or task1.py?
- **Write new code**: What should the code do?
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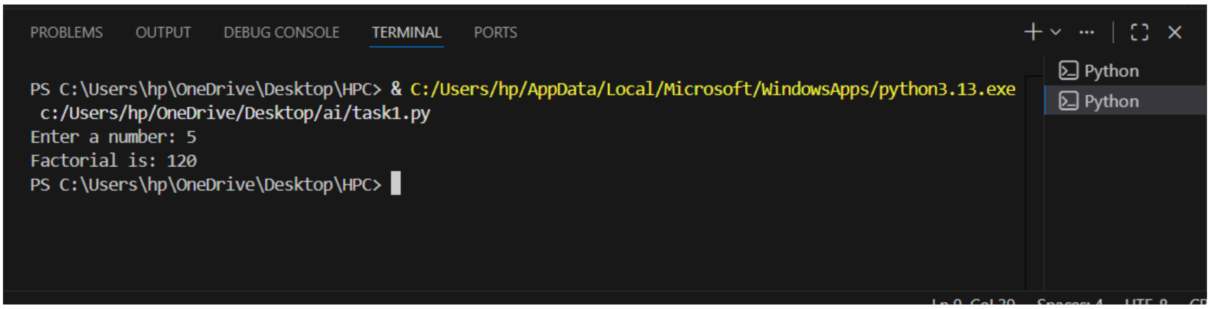


```
PS C:\Users\hp\OneDrive\Desktop\HPC> & C:/Users/hp/AppData/Local/Microsoft/WindowsApps/python3.13.exe
 c:/Users/hp/OneDrive/Desktop/ai/task1.py
Enter a number: 5
Factorial is: 120
PS C:\Users\hp\OneDrive\Desktop\HPC> 
```

Task 2: AI Code Optimization:-

AI Code Optimization & Cleanup (Improving Efficiency)

❖ Scenario

Your team lead asks you to review AI-generated code before committing it to a shared repository.

❖ Task Description

Analyze the code generated in Task 1 and use Copilot again to:

- ➢ Reduce unnecessary variables
- ➢ Improve loop clarity
- ➢ Enhance readability and efficiency

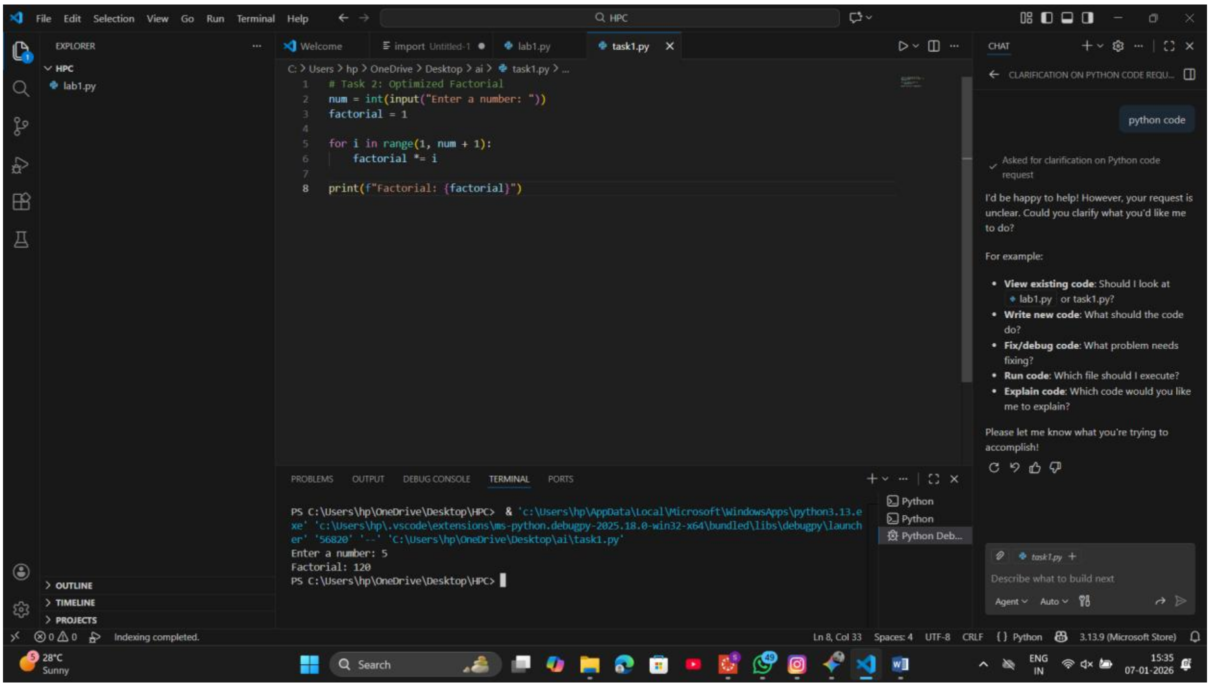
Hint:

Prompt Copilot with phrases like

“optimize this code”, “simplify logic”, or “make it more readable”

❖ Expected Deliverables

- ➢ Original AI-generated code
- ➢ Optimized version of the same code
- ➢ Side-by-side comparison
- ➢ Written explanation:
  - ▪ What was improved?
  - ▪ Why the new version is better (readability, performance, maintainability.



```python
# Task 2: Optimized Factorial
num = int(input("Enter a number: "))
factorial = 1

for i in range(1, num + 1):
    factorial *= i

print(f"Factorial: {factorial}")
```

```
PS C:\Users\hp\OneDrive\Desktop\HPC>  & 'c:\Users\hp\AppData\Local\Microsoft\WindowsApps\python3.13.e
xe' 'c:\Users\hp\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launch
er' '56820' '--' 'C:\Users\hp\OneDrive\Desktop\ai\task1.py'
Enter a number: 5
Factorial: 120
PS C:\Users\hp\OneDrive\Desktop\HPC> 
```

python code

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Task 3: Modular Design Using AI Assistance (Factorial with Functions)

❖ Scenario

The same logic now needs to be reused in multiple scripts.

❖ Task Description

Use GitHub Copilot to generate a modular version of the program by:

➢ Creating a user-defined function

➢ Calling the function from the main block

❖ Constraints

➢ Use meaningful function and variable names

➢ Include inline comments (preferably suggested by Copilot)

❖ Expected Deliverables

➢ AI-assisted function-based program

➢ Screenshots showing:

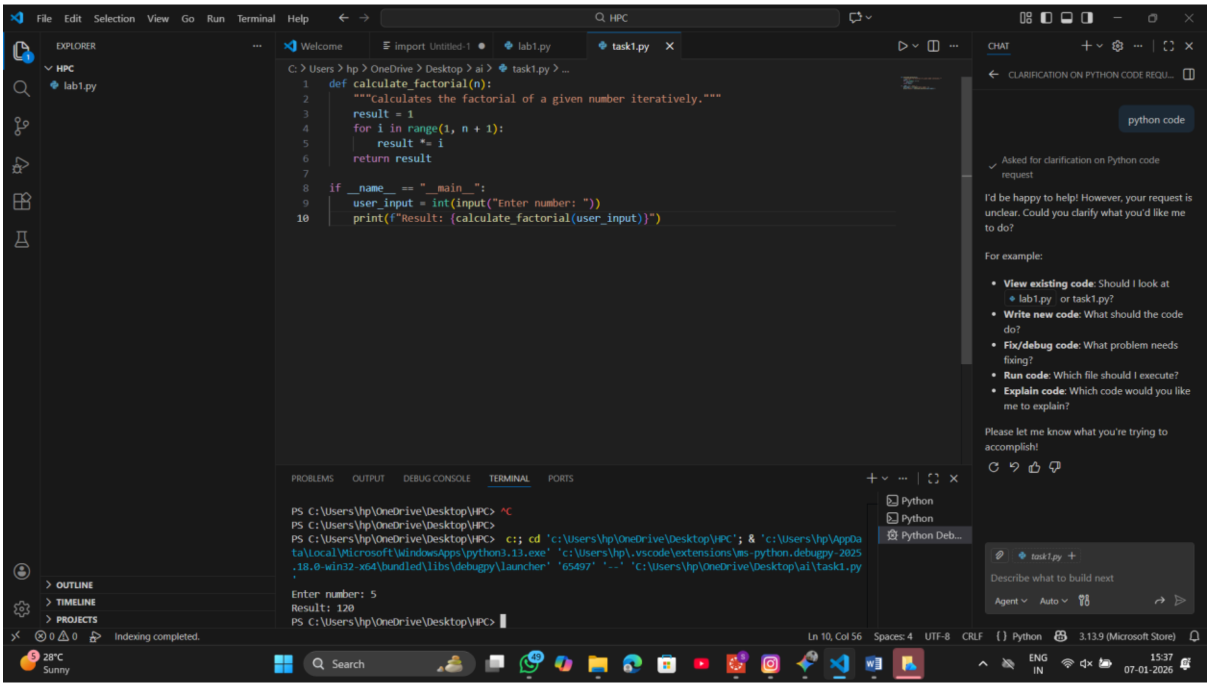
o Prompt evolution

o Copilot-generated function logic

➢ Sample inputs/outputs

➢ Short note:

o How modularity improves reusability.



File Edit Selection View Go Run Terminal Help
HPC
EXPLORER
HPC
lab1.py
Welcome
import Untitled-1
lab1.py
task1.py
C: > Users > hp > OneDrive > Desktop > ai > task1.py > ...
OUTLINE
TIMELINE
PROJECTS
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
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CHAT
CLARIFICATION ON PYTHON CODE REQU...
task1.py
Describe what to build next
Agent
Auto
Indexing completed.
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28°C Sunny
Search
ENG IN
15:37 07-01-2026

```python
def calculate_factorial(n):
    """Calculates the factorial of a given number iteratively."""
    result = 1
    for i in range(1, n + 1):
        result *= i
    return result

if __name__ == "__main__":
    user_input = int(input("Enter number: "))
    print(f"Result: {calculate_factorial(user_input)}")
```

```
PS C:\Users\hp\OneDrive\Desktop\HPC> ^C
PS C:\Users\hp\OneDrive\Desktop\HPC>
PS C:\Users\hp\OneDrive\Desktop\HPC>  c:; cd 'c:\Users\hp\OneDrive\Desktop\HPC'; & 'c:\Users\hp\AppDa
ta\Local\Microsoft\WindowsApps\python3.13.exe' 'c:\Users\hp\.vscode\extensions\ms-python.debugpy-2025
.18.0-win32-x64\bundled\libs\debugpy\launcher' '65497' '--' 'C:\Users\hp\OneDrive\Desktop\ai\task1.py
'
Enter number: 5
Result: 120
PS C:\Users\hp\OneDrive\Desktop\HPC> 
```

python code

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Task 4: Comparative Analysis:-

Comparative Analysis – Procedural vs Modular AI Code (With vs

Without Functions)

❖ Scenario

As part of a code review meeting, you are asked to justify design choices.

❖ Task Description

Compare the non-function and function-based Copilot-generated programs on the following criteria:

➢ Logic clarity

➢ Reusability

➢ Debugging ease

➢ Suitability for large projects

➢ AI dependency risk

❖ Expected Deliverables

Choose one:

➢ A comparison table

OR

➢ A short technical report (300–400 words).

Criteria	**Procedural (Task 1 & 2)**	**Modular (Task 3)**
Logic Clarity	Linear and straightforward for very small tasks but becomes "spaghetti code" as complexity grows.	High clarity; the mathematical logic is isolated from the input/output logic.
Reusability	None. To use the logic elsewhere, the code must be manually copied and pasted.	High. The function can be imported into other Python files or called multiple times in one script.
Debugging Ease	Difficult. Errors in logic are mixed with errors in user input handling.	Simple. You can test the function with specific values (Unit Testing) to ensure the math is correct.

Criteria	**Procedural (Task 1 & 2)**	**Modular (Task 3)**
Project Suitability	Suitable only for small, one-off scripts or prototypes.	Essential for enterprise-level, large-scale software development.
AI Dependency Risk	High. AI might generate redundant variables or inefficient loops in long scripts.	Low. AI is highly specialized and accurate when asked to write specific, single-purpose functions.

Task 5: Iterative vs Recursive Thinking:-

: AI-Generated Iterative vs Recursive Thinking

❖ Scenario

Your mentor wants to test how well AI understands different computational paradigms.

❖ Task Description

Prompt Copilot to generate:

An iterative version of the logic

A recursive version of the same logic

❖ Constraints

Both implementations must produce identical outputs

Students must not manually write the code first

❖ Expected Deliverables

Two AI-generated implementations

Execution flow explanation (in your own words)

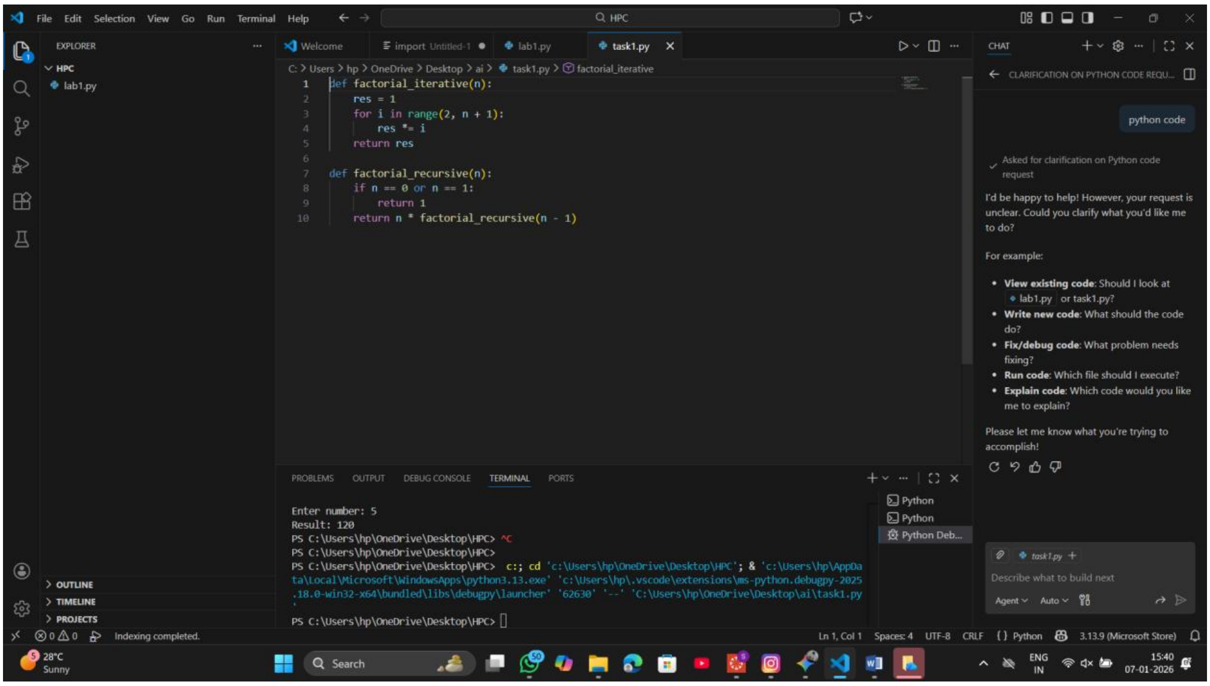
Comparison covering:

➢ Readability

➢ Stack usage

➢ Performance implications

➢ When recursion is not recommended.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C: > Users > hp > OneDrive > Desktop > ai > task1.py > factorial_iterative
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Python
Python
Python Deb...
CHAT
CLARIFICATION ON PYTHON CODE REQU...
task1.py
Describe what to build next
Agent
Auto
Indexing completed.
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF {} Python 3.13.9 (Microsoft Store)
28°C
Sunny
Search
ENG
IN
15:40
07-01-2026

```python
def factorial_iterative(n):
    res = 1
    for i in range(2, n + 1):
        res *= i
    return res

def factorial_recursive(n):
    if n == 0 or n == 1:
        return 1
    return n * factorial_recursive(n - 1)
```

```
Enter number: 5
Result: 120
PS C:\Users\hp\OneDrive\Desktop\HPC> ^C
PS C:\Users\hp\OneDrive\Desktop\HPC>
PS C:\Users\hp\OneDrive\Desktop\HPC>  c:; cd 'c:\Users\hp\OneDrive\Desktop\HPC'; & 'c:\Users\hp\AppDa
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'
PS C:\Users\hp\OneDrive\Desktop\HPC> 
```

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