

# AI ASSISTED CODING

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BATCH – 03

07 – 01 – 2026

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## ASSIGNMENT – 1.1

**Lab 1: Environment Setup – GitHub Copilot and VS Code Integration + Understanding AI-assisted Coding Workflow Lab Objectives:**

- To install and configure GitHub Copilot in Visual Studio Code.
- To explore AI-assisted code generation using GitHub Copilot.
- To analyze the accuracy and effectiveness of Copilot's code suggestions.
- To understand prompt-based programming using comments and code context.

**Lab Outcomes (LOs):**

After completing this lab, students will be able to:

- Set up GitHub Copilot in VS Code successfully.
- Use inline comments and context to generate code with Copilot.
- Evaluate AI-generated code for correctness and readability.
- Compare code suggestions based on different prompts and programming styles.

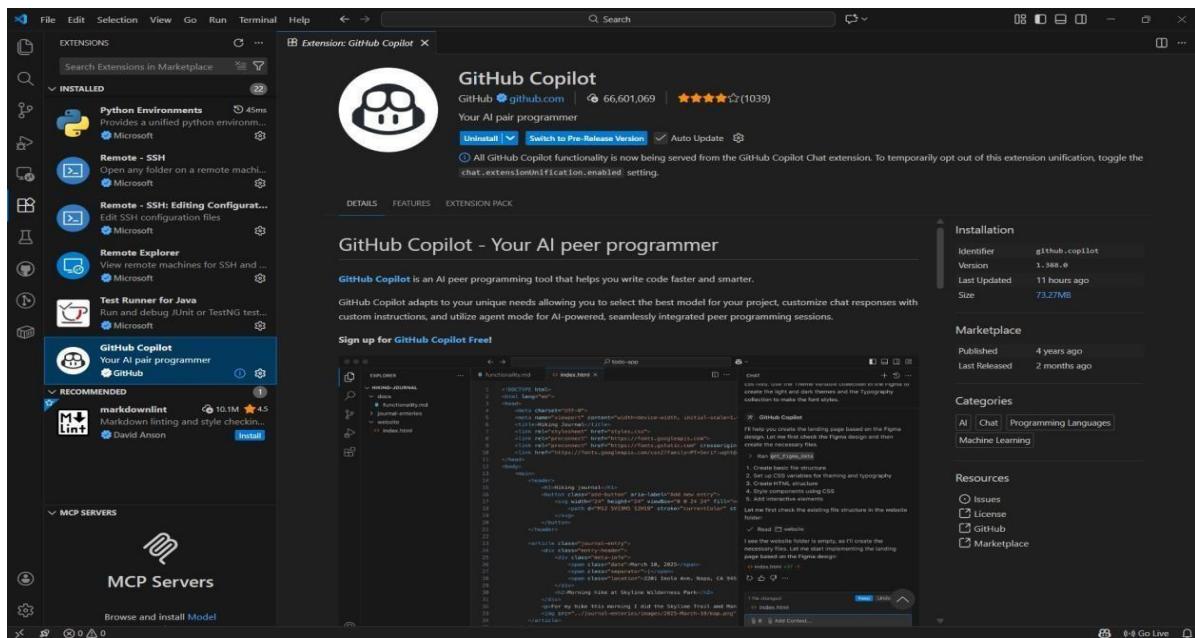
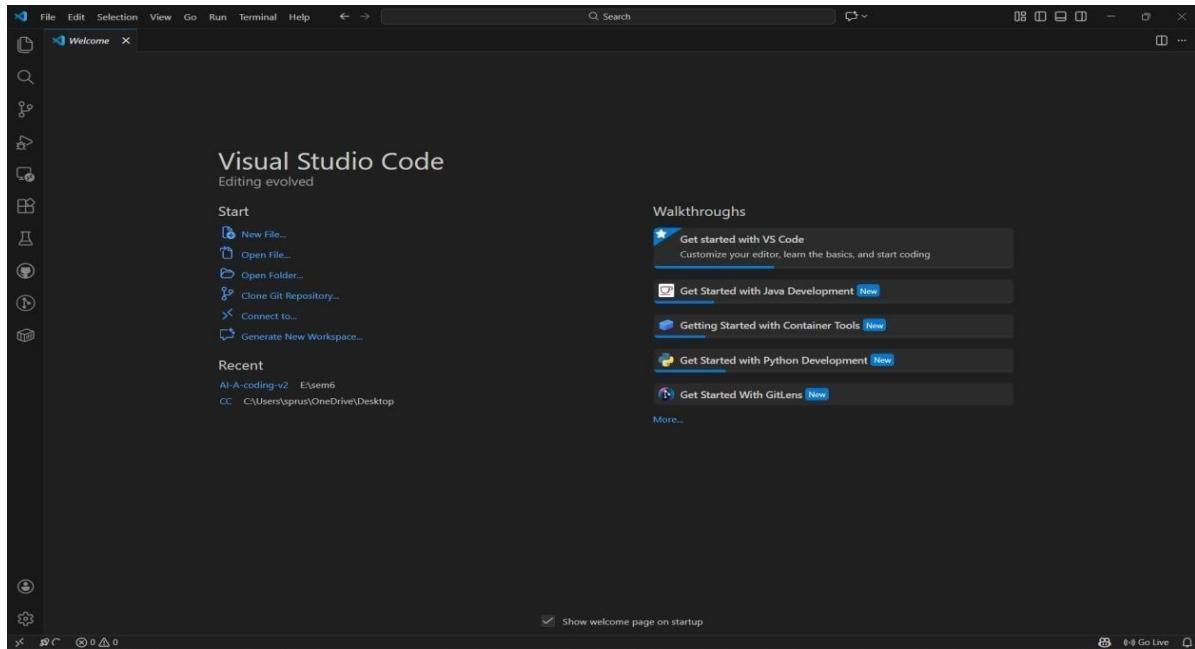
**Task o**

- 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.

**Task o: Environment Setup:-**



## Task 1: 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?

**Task 1: AI-Generated Logic Without Modularization  
(Factorial without Functions)**

The screenshot shows the VS Code interface with the following details:

- File Explorer:** Shows a folder named "AI-A-CODING-V2" containing ".github", "day1.py", and "README.md".
- Editor:** Displays the "day1.py" file content. The code is a simple command-line utility that calculates a product-based value (similar to factorial) from user input. It includes error handling for non-negative integers.
- Terminal:** Shows the output of the command "python day1.py <non-negative integer>".
- Status Bar:** Shows the file path "E:\sem6\AI-A-coding-v2\day1.py", line 5, column 5, and other status information like "Spaces: 4", "UTF-8", and "Python 3.14.0".

The screenshot shows the VS Code interface with the following details:

- File Explorer:** Shows a folder named "AI-A-CODING-V2" containing ".github", "day1.py", and "README.md".
- Editor:** Displays the "day1.py" file content. The code has been modified to include a main guard: `if \_\_name\_\_ == "\_\_main\_\_":`. It also includes a timestamp and a warning about modular design.
- Terminal:** Shows the output of the command "python day1.py <non-negative integer>".
- Status Bar:** Shows the file path "E:\sem6\AI-A-coding-v2\day1.py", line 20, column 1, and other status information like "Spaces: 4", "UTF-8", and "Python 3.14.0".

**Task 2: 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:

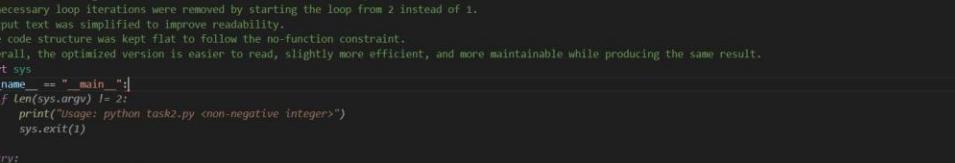
- Reduce unnecessary variables
- Improve loop clarity
- Enhance readability and efficiency Hint:

Prompt Copilot with phrases like “optimize this code”, “simplify logic”, or “make it more readable”

❖ **Expected Deliverables**

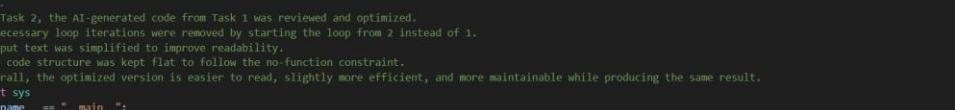
- Original AI-generated code
- Optimized version of the same code
- Side-by-side comparison
- Written explanation:
  - What was improved?
  - Why the new version is better (readability, performance, maintainability).

**Task 2: AI Code Optimization & Cleanup  
(Improving Efficiency)**



```
day1.py M task2.py L U

task2.py
1 # In Task 2, the AI-generated code from Task 1 was reviewed and optimized.
2 # Unnecessary loop iterations were removed by starting the loop from 2 instead of 1.
3 # Output text was simplified to improve readability.
4 # The code structure was kept flat to follow the no-function constraint.
5 # Overall, the optimized version is easier to read, slightly more efficient, and more maintainable while producing the same result.
6 import sys
7 if __name__ == "__main__":
8     if len(sys.argv) != 2:
9         print("Usage: python task2.py <non-negative integer>")
10        sys.exit(1)
11
12     try:
13         n = int(sys.argv[1])
14         if n < 0:
15             raise ValueError
16     except ValueError:
17         print("Please provide a valid non-negative integer.")
18         sys.exit(1)
19
20     product = 1
21     for i in range(2, n + 1):
22         product *= i
23
24     print(product)
```



The screenshot shows a code editor interface with a dark theme. The top bar includes standard menu items: File, Edit, Selection, View, Go, Run, Terminal, Help, and several system icons. The title bar displays "Q AI-A-coding v2". The left sidebar contains icons for file operations like Open, Save, Find, Replace, and Undo/Redo. The main workspace shows two tabs: "day1.py M" and "task2.py U X". The "task2.py" tab is active, displaying the following Python code:

```
# In Task 2, the AI-generated code from Task 1 was reviewed and optimized.
# Unnecessary loop iterations were removed by starting the loop from 2 instead of 1.
# Output text was simplified to improve readability.
# The code structure was kept flat to follow the no-function constraint.
# Overall, the optimized version is easier to read, slightly more efficient, and more maintainable while producing the same result.

import sys
if __name__ == "__main__":
    if len(sys.argv) != 2:
        print("Usage: python task2.py <non-negative integer>")
        sys.exit(1)

    try:
        n = int(sys.argv[1])
        if n < 0:
            raise ValueError
    except ValueError:
        print("Please provide a valid non-negative integer.")
        sys.exit(1)

    product = 1
    for i in range(2, n + 1):
        product *= i

    print(product)
```

## 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

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

- 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.

The screenshot shows the VS Code interface with the following details:

- File Explorer:** Shows a folder named "AI-A-CODING-V2" containing files: .github, README.md, task1.py, task2.py, and task3.py.
- Code Editor:** Displays the content of task3.py. The code defines a function `compute_factorial(n)` that calculates the factorial of a non-negative integer `n`. It includes input validation and handling of command-line arguments.
- Terminal:** Shows the command `python task3.py` being run, resulting in the output "Usage: python task3.py <non-negative integer>".
- Status Bar:** Shows the file is 25 lines long, has 120 characters, and was last modified at 3:14.0.

### Short Note: How Modularity Improves Reusability

Modularity helps in reusability by helping separate logic in terms of different functions which may be reused in multiple programs. The factorial computation is put in a function which makes the code easier to maintain and test. If the logic has to be changed, changes can be made at

**one place without having any impact on the whole program. Modular code is also more readable and easier to work on in a team environment.**

**Task 4: 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**

**Copilotgenerated 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).

**Task 4: Comparative Analysis – Procedural vs Modular AI Code (With vs Without Functions)**

**Task 5: AI-Generated Iterative vs Recursive Thinking**

**❖ Scenario**

**Your mentor wants to test how well AI**

**understands different computational paradigms.**

Criteria	Procedural Code (Without Functions)	Modular Code (With Functions)
Logic Clarity	Logic is written in one continuous flow, which is easy to follow for very small programs but becomes cluttered as code grows.	Logic is clearly separated into functions, making the purpose of each part easier to understand.
Reusability	Code cannot be reused easily because the logic is tightly coupled to the main execution block.	Function-based logic can be reused across multiple scripts by importing or calling the function.
Debugging Ease	Debugging is harder since all logic exists in one block, making it difficult to isolate issues.	Debugging is easier because errors can be traced to specific functions.
Suitability for Large Projects	Not suitable for large projects as it leads to poor organization and low maintainability.	Well suited for large projects due to better structure, scalability, and teamwork support.
AI Dependency Risk	High risk, as beginners may copy AI-generated code without understanding the full flow.	Lower risk, as modular structure encourages understanding of individual components.

#### ❖ 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.

## Task 5: AI-Generated Iterative vs Recursive Thinking

### Iterative Thinking –

The screenshot shows the VS Code interface with the following details:

- Explorer:** Shows a project folder "AI-A-CODING V2" containing files: README.md, task1.py, task2.py, task3.py, task5\_iterative.py, and AI Assisted Coding.docx.
- Code Editor:** Displays the content of `task5_iterative.py`. The code is as follows:

```
# Iterative approach using a loop
# This method calculates factorial by repeatedly multiplying values

import sys

if __name__ == "__main__":
    if len(sys.argv) != 2:
        print("Usage: python task5_iterative.py <non-negative integer>")
        sys.exit(1)

    try:
        n = int(sys.argv[1])
        if n < 0:
            raise ValueError
    except ValueError:
        print("Please provide a valid non-negative integer.")
        sys.exit(1)

    result = 1
    for i in range(2, n + 1):
        result *= i
    print(result)
```

- Terminal:** Shows the command `python task5_iterative.py 5` being run in a PowerShell terminal, resulting in the output `120`.

### Recursive thinking –

```

1 # recursive approach using function calls
2 # the function calls itself until it reaches the base case
3
4 import sys
5
6 def factorial(n):
7     if n == 0:
8         return 1
9     return n * factorial(n - 1)
10
11 if __name__ == "__main__":
12     if len(sys.argv) != 2:
13         print("Usage: python task5_recursive.py <non-negative integer>")
14         sys.exit(1)
15
16     try:
17         n = int(sys.argv[1])
18         if n < 0:
19             raise ValueError
20     except ValueError:
21         print("Please provide a valid non-negative integer.")
22         sys.exit(1)
23
24     print(factorial(n))
25

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS GITLINS

PS E:\sem6\AT-A-coding-v2> python task5\_recursive.py 5  
120  
PS E:\sem6\AT-A-coding-v2>

Ln 13, Col 45 Spaces:4 UTTF-8 CRLF Python 3.14.0 0 Go Live

Aspect	Iterative Approach	Recursive Approach
Readability	Easy to understand for beginners	More mathematical and elegant
Stack Usage	Uses constant memory	Uses additional stack
Performance	Faster and memory efficient	Slower for large inputs
Error Risk	Low	Risk of stack overflow
When Not Recommended	—	Not recommended for large input values

## ASSIGNMENT – 1.5

## TASK 1: String Reversal without Functions (Procedural)

A screenshot of the Visual Studio Code interface. The Explorer sidebar shows files: Welcome, Factorial.py, and String.py (selected). The Editor tab shows the code for Task 1:

```
#Task 1:String Reversal without Functions (Procedural)
user_input = input("Enter a string: ")
reversed_string = user_input[::-1]
print("Reversed string:", reversed_string)
```

The Terminal tab shows the output of running the script:

```
PS C:\Users\saith\OneDrive\Desktop\AIAC_1127> & C:/Users/saith/AppData/Local/Programs/Python/Python313/python.exe c:/Users/saith/OneDrive/Desktop/AIAC_1127/String.py
Enter a string: Sai Thrishool
Reversed string: loohsirht iaS
PS C:\Users\saith\OneDrive\Desktop\AIAC_1127>
```

## TASK 2: Optimize this code , simplify the logic or make it more readable.

A screenshot of the Visual Studio Code interface. The Explorer sidebar shows files: Welcome, Factorial.py, String.py (selected), and Release Notes: 1.108.0. The Editor tab shows the optimized code for Task 2:

```
# Task 2:optimize this code , simplifie the logic or make it more readable
user_input = input("Enter a string: ")
reversed_string = ''.join(reversed(user_input))
print("Reversed string:", reversed_string)
```

The Terminal tab shows the output of running the script:

```
PS C:\Users\saith\OneDrive\Desktop\AIAC_1127> & C:/Users/saith/AppData/Local/Programs/Python/Python313/python.exe c:/Users/saith/OneDrive/Desktop/AIAC_1127/String.py
Enter a string: Sai thrishool
Reversed string: loohsirht iaS
PS C:\Users\saith\OneDrive\Desktop\AIAC_1127>
```

## TASK 3: String Reversal using Functions.

The screenshot shows the Visual Studio Code interface. The left sidebar has an 'EXPLORER' view with files like 'Welcome', 'Factorial.py', 'String.py', and 'Release Notes: 1.108.0'. The main editor window contains a Python script named 'String.py' with the following code:

```
# Taskk 3:String Reversal using Functions
def reverse_string(s):
    return s[::-1]

if __name__ == "__main__":
    user_input = input("Enter a string: ")
    print("Reversed string:", reverse_string(user_input))
```

The bottom right terminal shows the output of running the script:

```
PS C:\Users\saith\OneDrive\Desktop\AIAC_1127> & C:/Users/saith/AppData/Local/Programs/Python/Python313/python.exe c:/Users/saith/OneDrive/Desktop/AIAC_1127/String.py
PS C:\Users\saith\OneDrive\Desktop\AIAC_1127> & C:/Users/saith/AppData/Local/Programs/Python/Python313/python.exe c:/Users/saith/OneDrive/Desktop/AIAC_1127/String.py
Enter a string: Sai Thrishool
Reversed string: loohsirH iaS
```

## TASK 4: Comparative Analysis – Procedural VS Modular Approach.

### Procedural Approach (Without Functions):

The string reversal logic is implemented directly in the main code. While this approach is simple and easy to understand for small programs, it lacks reusability and scalability. Debugging becomes difficult as the program grows because all logic is tightly coupled.

### Modular Approach (With Functions):

The function-based implementation separates logic from execution, improving code readability and structure. The function can be reused in multiple parts of an application, making it suitable for large-scale systems. Debugging and maintenance are easier due to isolated logic.

## TASK 5: Iterative vs Recursive Fibonacci Approach.

The screenshot shows the Visual Studio Code (VS Code) interface. The left sidebar (EXPLORER) lists files: Welcome, Factorial.py, String.py, Release Notes: 1.108.0, AIAC\_1127, Factorial.py, and String.py. The right pane displays the content of the String.py file:

```
2 def reverse_string_iterative(s):
3     reversed_str = ''
4     for char in s:
5         reversed_str = char + reversed_str
6     return reversed_str
7 user_input = input("Enter a string: ")
8 print("Reversed string (Iterative):", reverse_string_iterative(user_input))
9
10
11 def reverse_string_recursive(s):
12     if len(s) == 0:
13         return s
14     else:
15         return s[-1] + reverse_string_recursive(s[:-1])
16 user_input = input("Enter a string: ")
17 print("Reversed string (Recursive):", reverse_string_recursive(user_input))
```

The bottom right panel (TERMINAL) shows the execution of the script:

```
PS C:\Users\saith\OneDrive\Desktop\AIAC_1127> & C:/Users/saith/AppData/Local/Programs/Python/Python313/python.exe c:/Users/saith/OneDrive/Desktop/AIAC_1127/String.py
Enter a string: Sai
Reversed string (Iterative): ias
Enter a string: ias
Reversed string (Recursive): sai
```

**THANK YOU!!**