

# Assignment - 1

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Batch - 03

AI Assisted Coding

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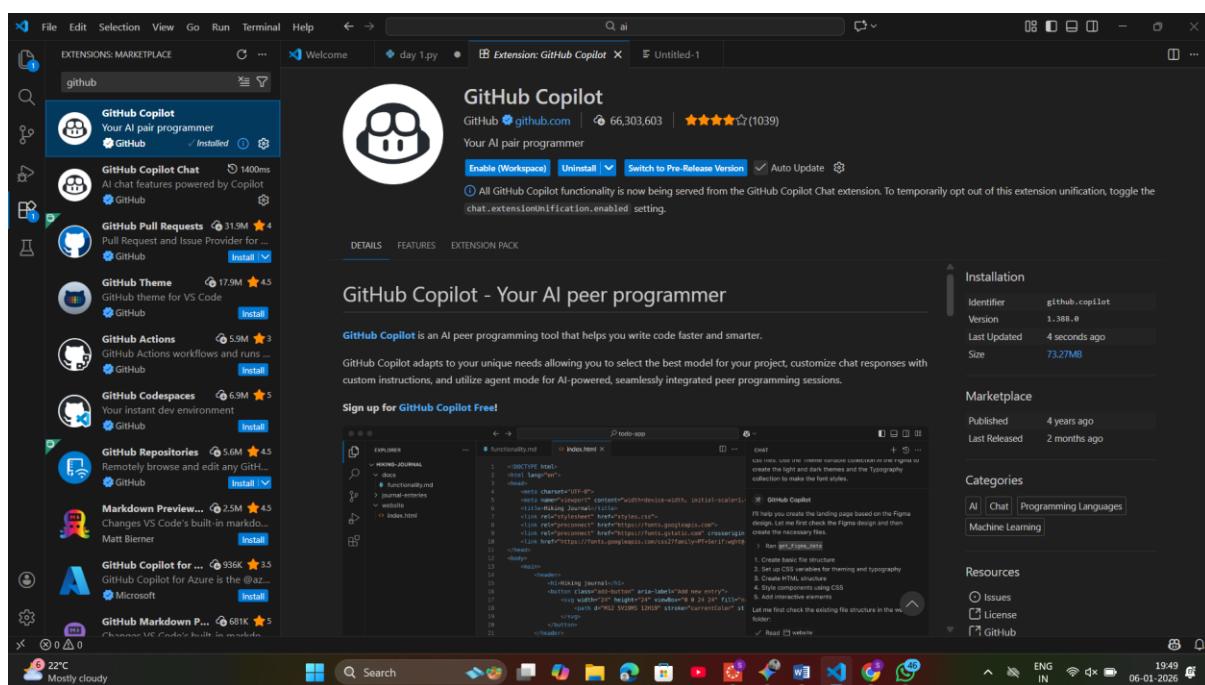
## Task 0: Environment Setup:-

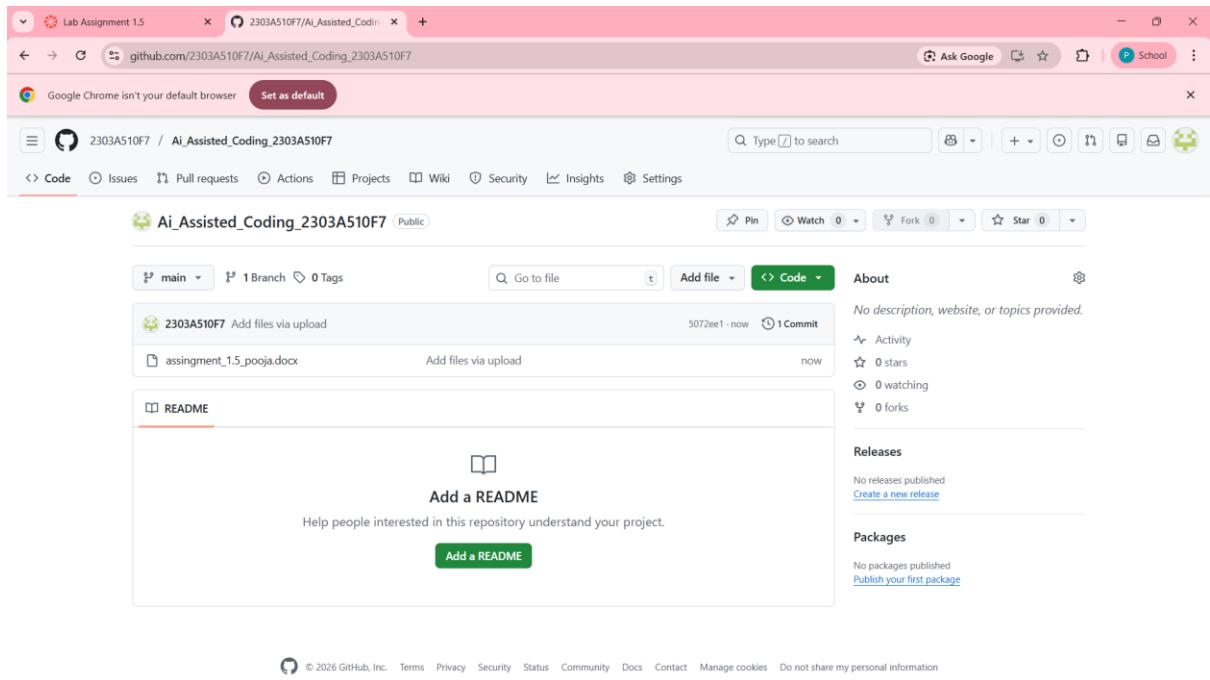
### Task 0

- 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.





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

: AI-Generated Logic Without Modularization (String Reversal Without Functions)

### ❖ Scenario

You are developing a basic text-processing utility for a messaging application.

### ❖ Task Description

Use GitHub Copilot to generate a Python program that:

- Reverses a given string
- Accepts user input
- Implements the logic directly in the main code
- Does not use any user-defined functions

### ❖ Expected Output

- Correct reversed string
- Screenshots showing Copilot-generated code suggestions

## ➤ Sample inputs and outputs

The screenshot shows the Microsoft Visual Studio Code interface. The top part displays a Python script named `task1.py` with the following code:

```
C:\> Users > hp > OneDrive > Desktop > ai > task1.py > ...
1 # Accepting user input
2 user_input = input("Enter a string to reverse: ")
3
4 # Initializing an empty string to store the result
5 reversed_string = ""
6
7 # Logic to reverse the string using a loop
8 for i in range(len(user_input) - 1, -1, -1):
9     reversed_string += user_input[i]
10
11 # Printing the result
12 print("Original String:", user_input)
13 print("Reversed String:", reversed_string)
```

The bottom part shows the terminal window with the output of running the script:

```
PS C:\Users\hp> & C:/Users/hp/AppData/Local/Microsoft/WindowsApps/python3.13.exe c:/Users/hp/OneDrive/Desktop/ai/task1.py
Enter a string to reverse: 2 3 4 5 6
Original String: 2 3 4 5 6
Reversed String: 6 5 4 3 2
PS C:\Users\hp>
```

The status bar at the bottom right indicates the file is 3.13.9 (Microsoft Store) and the date is 09-01-2026.

This screenshot shows a dark-themed terminal window with the same command and output as the one above, demonstrating the code's behavior on a different system or theme.

## Task 2: AI Code Optimization:-

### Efficiency & Logic Optimization (Readability Improvement)

#### ❖ Scenario

The code will be reviewed by other developers.

#### ❖ Task Description

Examine the Copilot-generated code from Task 1 and improve it by:

#### ➤ Removing unnecessary variables

#### ➤ Simplifying loop or indexing logic

#### ➤ Improving readability

#### ➤ Use Copilot prompts like:

■ “Simplify this string reversal code”

■ “Improve readability and efficiency”

**Hint:**

**Prompt Copilot with phrases like**

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

❖ **Expected Output**

➤ **Original and optimized code versions**

➤ **Explanation of how the improvements reduce time complexity**

The screenshot shows the VS Code interface. On the left is the code editor with a file named 'task1.py' containing the following Python code:

```
C:\> Users > hp > OneDrive > Desktop > ai > task1.py > ...
1 user_input = input("Enter a string: ")
2
3 # Using Python's slicing for maximum efficiency
4 reversed_string = user_input[::-1]
5
6 print(f"Reversed: {reversed_string}")
```

To the right of the editor is a terminal window showing the execution of the script and its output:

```
PS C:\Users\hp\OneDrive\Desktop\ai> & 'c:\Users\hp\AppData\Local\Microsoft\WindowsApps\python3.13.exe' 'c:\Users\hp\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\lib
s\debugpy\launcher' '50075' '--' 'c:\Users\hp\OneDrive\Desktop\ai\task1.py'
Enter a string: 40 50 60 70
Reversed: 70 60 50 40
PS C:\Users\hp\OneDrive\Desktop\ai>
```

### Task 3: Modular Design Using AI Assistance (String Reversal Using Functions)

❖ **Scenario**

The string reversal logic is needed in multiple parts of an application.

❖ **Task Description**

Use GitHub Copilot to generate a function-based Python program that:

- Uses a user-defined function to reverse a string
- Returns the reversed string
- Includes meaningful comments (AI-assisted)

❖ **Expected Output**

- Correct function-based implementation
- Screenshots documenting Copilot's function generation

## ➤ Sample test cases and outputs

The screenshot shows a code editor with a Python file named `task1.py` and a terminal window below it.

`task1.py` content:

```
C:\> Users > hp > OneDrive > Desktop > ai > task1.py > ...
1 def reverse_string_functional(text):
2     """
3         Reverses the input string and returns it.
4     """
5     reversed_text = ""
6     for char in text:
7         |     reversed_text = char + reversed_text
8     return reversed_text
9
10 # Testing the function
11 input_str = input("Enter text: ")
12 result = reverse_string_functional(input_str)
13 print(f"Result: {result}")
```

Terminal output:

```
5 4 3 2 1
5 4 3 2 1
PS C:\Users\hp\OneDrive\Desktop\ai> ^C
PS C:\Users\hp\OneDrive\Desktop\ai>
PS C:\Users\hp\OneDrive\Desktop\ai> c:; cd "c:\Users\hp\OneDrive\Desktop\ai"; & 'c:\Users\hp\AppData\Local\Microsoft\WindowsApps\python3.13.exe' 'c:\Users\hp\vscode\extensions\ms-python
on.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '54371' '--' 'c:\Users\hp\OneDrive\Desktop\ai\task1.py'
on.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '54371' '--' 'c:\Users\hp\OneDrive\Desktop\ai\task1.py'
Enter text: Teju
Result: ujer
PS C:\Users\hp\OneDrive\Desktop\ai>
```

## Task 4: Comparative Analysis – Procedural vs Modular Approach (With vs

### Without Functions)

#### ❖ Scenario

You are asked to justify design choices during a code review.

#### ❖ Task Description

Compare the Copilot-generated programs:

#### ➤ Without functions (Task 1)

#### ➤ With functions (Task 3)

Analyze them based on:

#### ➤ Code clarity

#### ➤ Reusability

#### ➤ Debugging ease

#### ➤ Suitability for large-scale applications

#### ❖ Expected Output

Comparison table or short analytical report

Feature	Procedural (Without Functions)	Modular (With Functions)
<b>Code Clarity</b>	Easy for tiny scripts; messy for large ones.	Very high; logic is isolated and named.
<b>Reusability</b>	Must copy-paste code to use it again.	Can be called anywhere in the app.
<b>Debugging</b>	Harder to isolate where an error occurs.	Easy to unit test the specific function.
<b>Scalability</b>	Not suitable for large applications.	Essential for professional development.

#### **Task 5: AI-Generated Iterative vs Recursive Fibonacci Approaches (Different**

#### **Algorithmic Approaches to String Reversal)**

❖ **Scenario**

**Your mentor wants to evaluate how AI handles alternative logic paths.**

❖ **Task Description**

**Prompt GitHub Copilot to generate:**

- **A loop-based string reversal approach**
- **A built-in / slicing-based string reversal approach**

❖ **Expected Output**

- **Two correct implementations**

➤ **Comparison discussing:**

- **Execution flow**
- **Time complexity**
- **Performance for large inputs**
- **When each approach is appropriate.**

```
C:\> Users > hp > OneDrive > Desktop > ai > task1.py > ...
1 def reverse_iterative(input_string):
2     reversed_str = ""
3     for char in input_string:
4         reversed_str = char + reversed_str
5     return reversed_str
6
7 def reverse_slicing(input_string):
8     return input_string[::-1]
9
10 test_input = input("Enter a string: ")
11
12 print(reverse_iterative(test_input))
13 print(reverse_slicing(test_input))

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
+ v ... | ⚡ X
Python
Python Deb...
Python Deb...
s\debugpy\launcher` '50436' ... 'c:\Users\hp\OneDrive\Desktop\ai\task1.py'
PS C:\Users\hp\OneDrive\Desktop\ai> ^
PS C:\Users\hp\OneDrive\Desktop\ai>
PS C:\Users\hp\OneDrive\Desktop\ai> c;; cd 'c:\Users\hp\OneDrive\Desktop\ai'; & 'c:\Users\hp\AppData\Local\Microsoft\WindowsApps\python3.11.exe' 'c:\Users\hp\.vscode\extensions\ms-python.on.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '57517' ... 'c:\Users\hp\OneDrive\Desktop\ai\task1.py'
on.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher` '57517' ... 'c:\Users\hp\OneDrive\Desktop\ai\task1.py'
Enter a string: 1 2 3 4 5
5 4 3 2 1
PS C:\Users\hp\OneDrive\Desktop\ai> [Delta] 0 ⚡ Indexing completed.
```