Course Title: AI Assisted Coding

Course Code: 23CS002PC304

Faculty Name: Dr. R. Prashant Kumar

Name: Sri Harsha

HT no: 2303A52159- Batch(36)

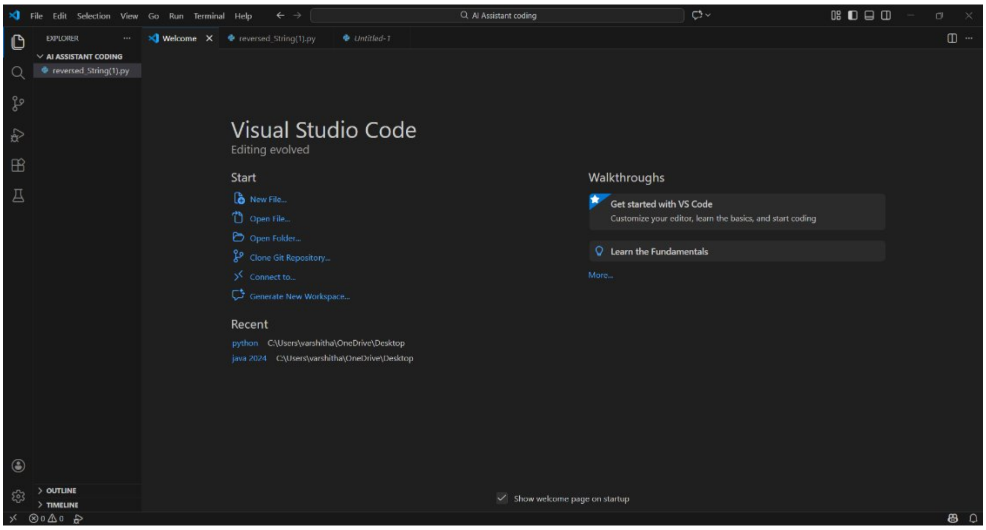
Question:

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

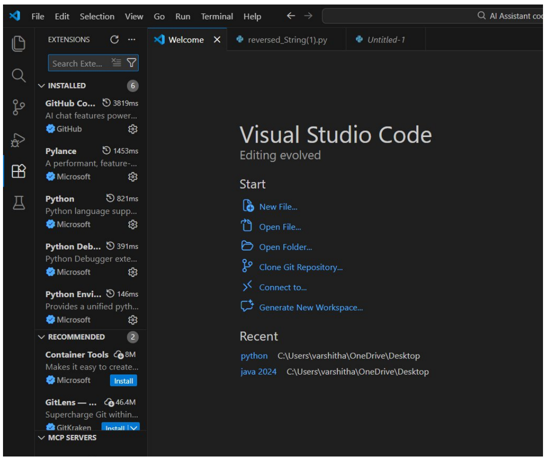
Task 0:

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

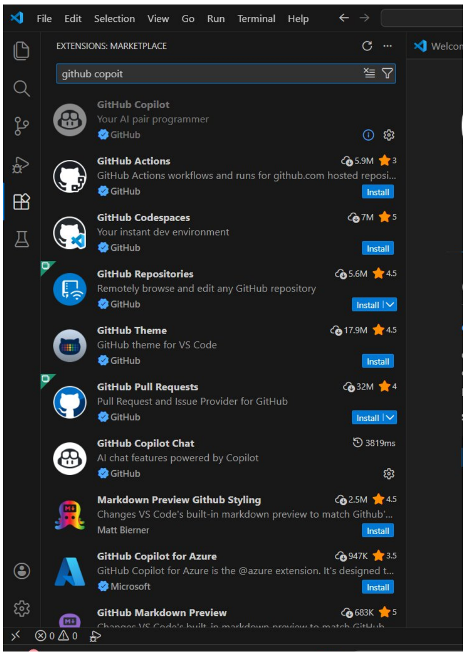
Step 1: Open Visual Studio Code



Step 2: Open Extensions Panel



Step 3: Search for GitHub Copilot


File Edit Selection View Go Run Terminal Help
EXTENSIONS: MARKETPLACE
github copoit
GitHub Copilot
Your AI pair programmer
GitHub
GitHub Actions 5.9M 3
GitHub Actions workflows and runs for github.com hosted reposi...
GitHub Install
GitHub Codespaces 7M 5
Your instant dev environment
GitHub Install
GitHub Repositories 5.6M 4.5
Remotely browse and edit any GitHub repository
GitHub Install
GitHub Theme 17.9M 4.5
GitHub theme for VS Code
GitHub Install
GitHub Pull Requests 32M 4
Pull Request and Issue Provider for GitHub
GitHub Install
GitHub Copilot Chat 3819ms
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Changes VS Code's built-in markdown preview to match Github'...
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GitHub Copilot for Azure 947K 3.5
GitHub Copilot for Azure is the @azure extension. It's designed t...
Microsoft Install
GitHub Markdown Preview 683K 5
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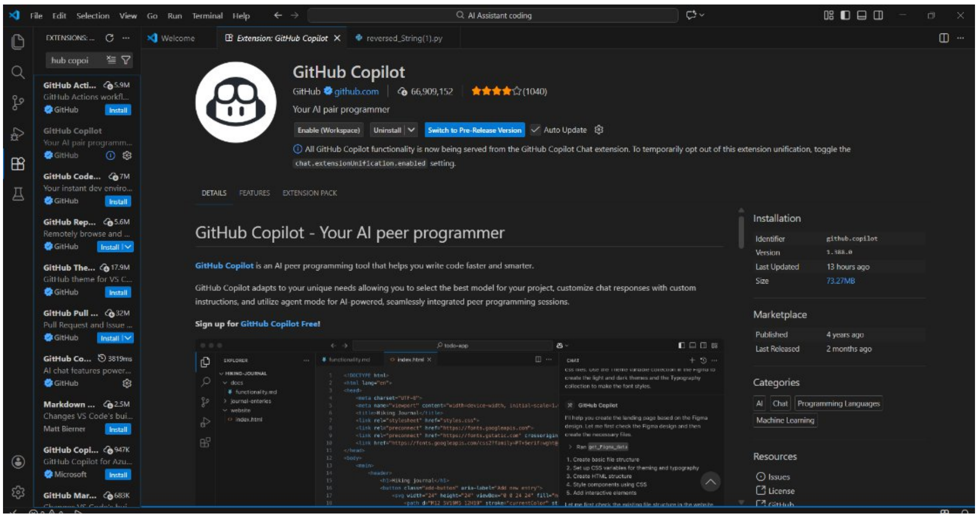
Step 4: Install GitHub Copilot



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.

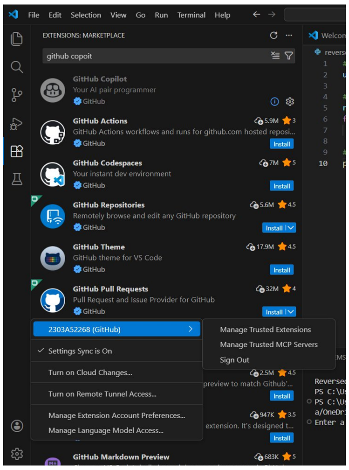
GitHub Copilot adapts to your unique needs allowing you to select the best model for your project, customize chat responses with custom instructions, and utilize agent mode for AI-powered, seamlessly integrated peer programming sessions.

Sign up for GitHub Copilot Free!

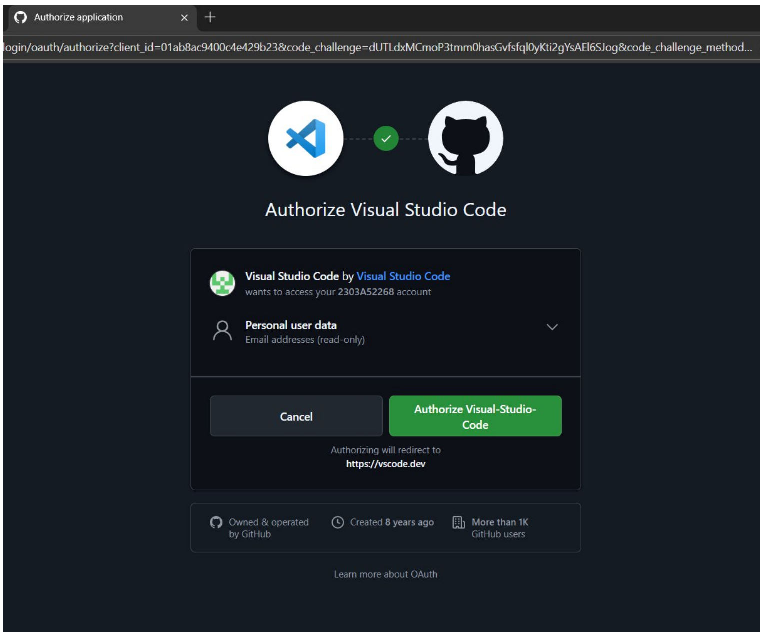
Identifier	github.copilot
Version	1.388.0
Last Updated	13 hours ago
Size	73.27MB

Published	4 years ago
Last Released	2 months ago

Step 5: Sign in to GitHub Account



Step 6: Authorize GitHub Copilot



login/oauth/authorize?client_id=01ab8ac9400c4e429b23&code_challenge=dUTLdxMCmoP3tmm0hasGvfsfql0yKti2gYsAEl6SJog&code_challenge_method...

Authorize Visual Studio Code

Visual Studio Code by Visual Studio Code
wants to access your 2303A52268 account

Personal user data
Email addresses (read-only)

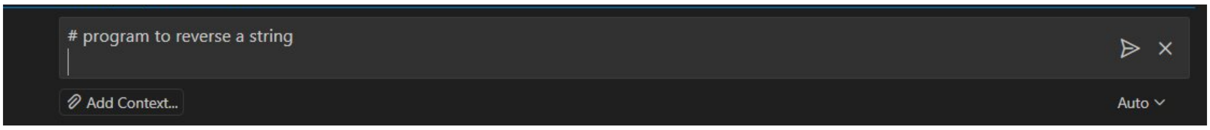
Authorizing will redirect to
https://vscode.dev

Owned & operated by GitHub

Created 8 years ago

More than 1K GitHub users

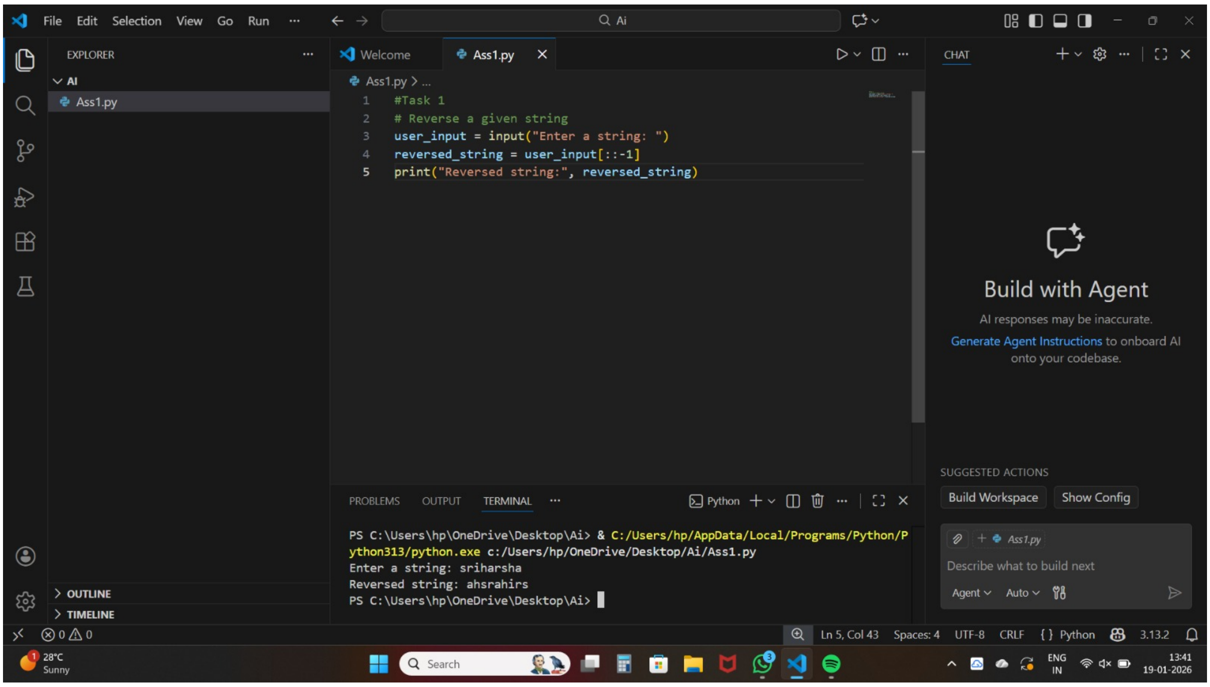
Step 7: Verify Copilot is Enabled



# program to reverse a string

Task 1: AI-Generated Logic Without Modularization (String Reversal Without Functions)

# program to reverse a string



```python
#Task 1
# Reverse a given string
user_input = input("Enter a string: ")
reversed_string = user_input[::-1]
print("Reversed string:", reversed_string)
```

```
PS C:\Users\hp\OneDrive\Desktop\Ai> & C:/Users/hp/AppData/Local/Programs/Python/Python313/python.exe c:/Users/hp/OneDrive/Desktop/Ai/Ass1.py
Enter a string: sriharsha
Reversed string: ahsrahirs
PS C:\Users\hp\OneDrive\Desktop\Ai>
```

Build with Agent

AI responses may be inaccurate.

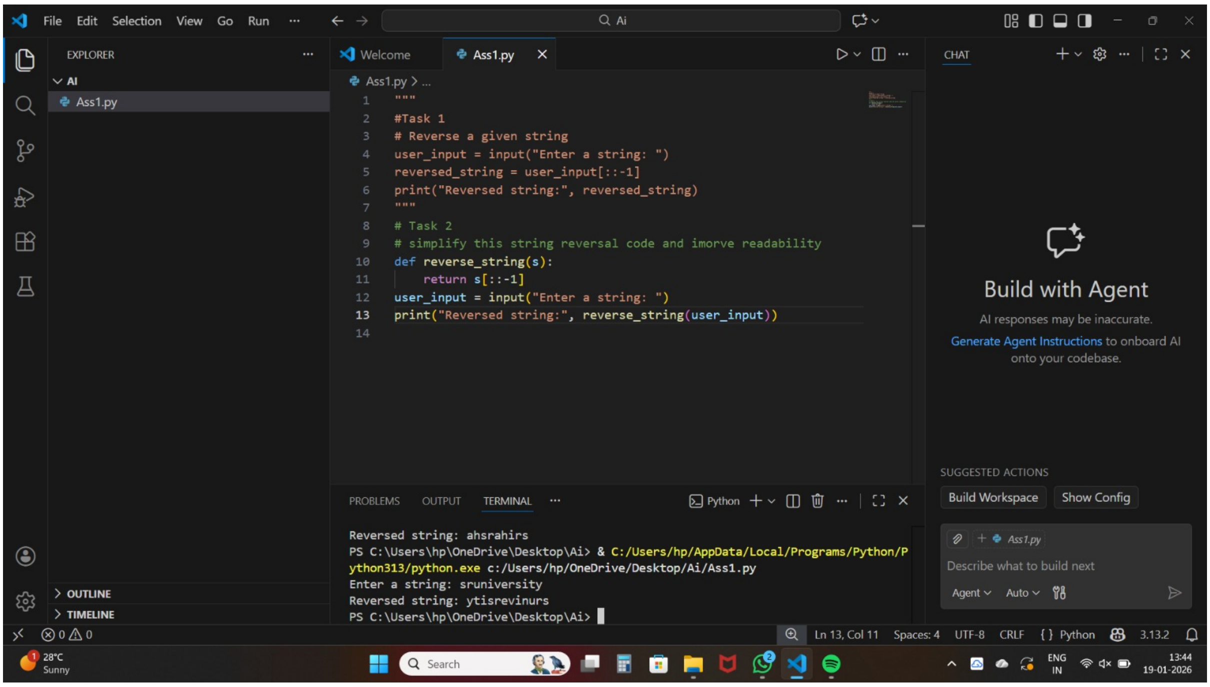
Generate Agent Instructions to onboard AI onto your codebase.

Explanation

- The input() function takes a string from the user.
- An empty string rev is created to store the reversed result.
- The for loop iterates through the string from the last character to the first.
- Each character is appended to rev.
- The final reversed string is printed.
- The logic is written directly in the main code without using functions

Task 2: Efficiency & Logic Optimization (Readability Improvement)

# Simplified String Reversal Code



```python
"""
#Task 1
# Reverse a given string
user_input = input("Enter a string: ")
reversed_string = user_input[::-1]
print("Reversed string:", reversed_string)
"""
# Task 2
# simplify this string reversal code and imorve readability
def reverse_string(s):
    return s[::-1]
user_input = input("Enter a string: ")
print("Reversed string:", reverse_string(user_input))
```

```
Reversed string: ahsrahirs
PS C:\Users\hp\OneDrive\Desktop\Ai> & C:/Users/hp/AppData/Local/Programs/Python/P
ython313/python.exe c:/Users/hp/OneDrive/Desktop/Ai/Ass1.py
Enter a string: sruniversity
Reversed string: ytisrevinurs
PS C:\Users\hp\OneDrive\Desktop\Ai>
```

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Explanation of Optimization

- The loop and extra variable were removed
- Python slicing reverses the string in a single step
- Code is shorter, cleaner, and easier to understand

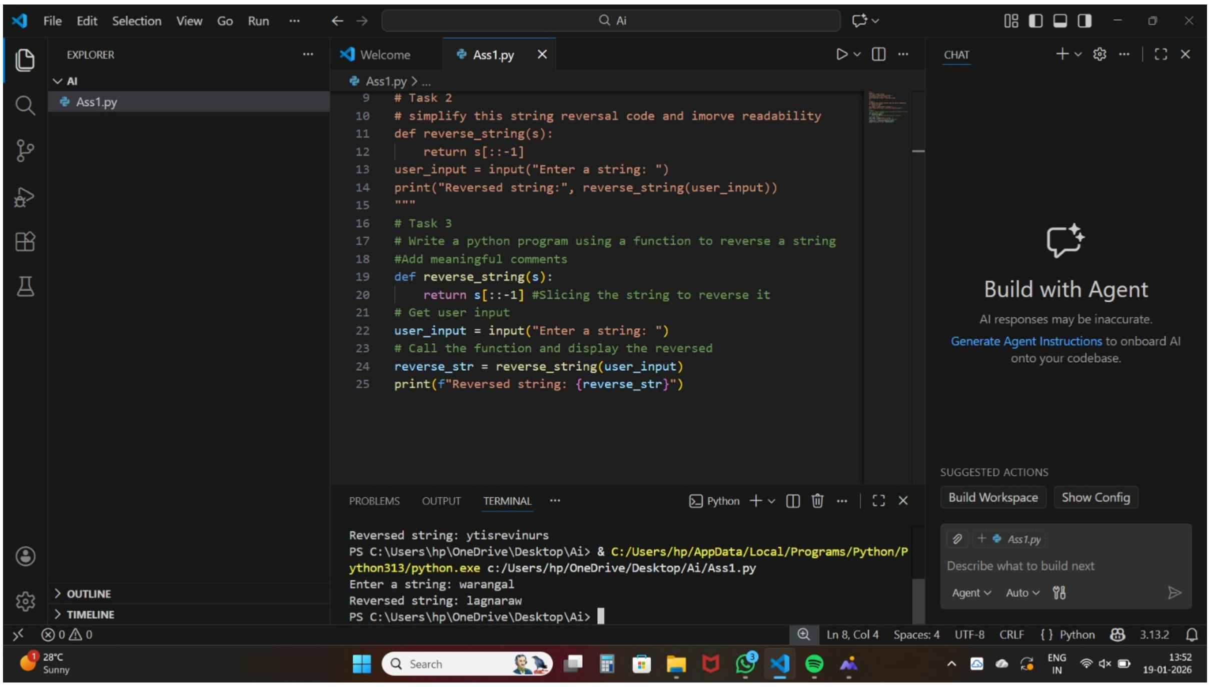
Time Complexity Explanation

- Original code: **O(n)** (manual loop)
- Optimized code: **O(n)** (built-in slicing)

- Although complexity remains the same, slicing is **faster in practice** due to internal optimization

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

# Write a Python function to reverse a string



```
# Task 2
# simplify this string reversal code and imorve readability
def reverse_string(s):
    return s[::-1]
user_input = input("Enter a string: ")
print("Reversed string:", reverse_string(user_input))
"""
# Task 3
# Write a python program using a function to reverse a string
#Add meaningful comments
def reverse_string(s):
    return s[::-1] #Slicing the string to reverse it
# Get user input
user_input = input("Enter a string: ")
# Call the function and display the reversed
reverse_str = reverse_string(user_input)
print(f"Reversed string: {reverse_str}")
```

```
Reversed string: ytisrevinurs
PS C:\Users\hp\OneDrive\Desktop\Ai> & C:/Users/hp/AppData/Local/Programs/Python/P
ython313/python.exe c:/Users/hp/OneDrive/Desktop/Ai/Ass1.py
Enter a string: warangal
Reversed string: lagnaraw
PS C:\Users\hp\OneDrive\Desktop\Ai>
```

Explanation

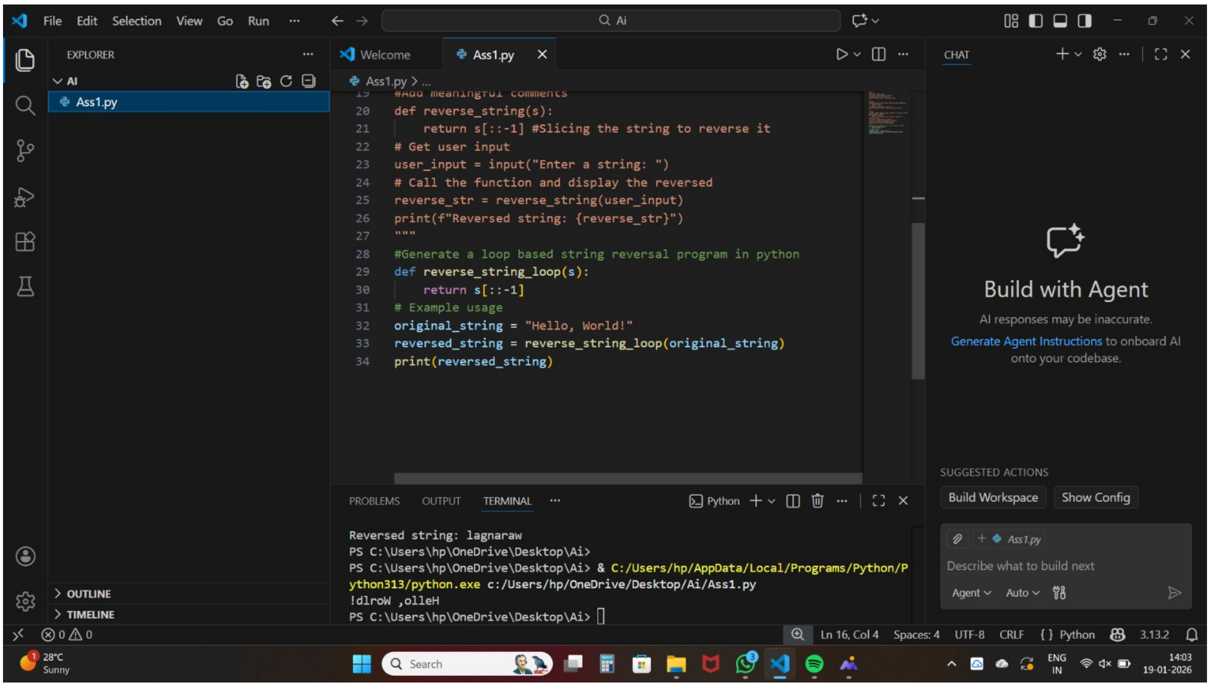
- A function reverse_string() is defined to reverse a string.
- The function takes one parameter text.
- The slicing method [::-1] is used to reverse the string.
- The reversed string is returned to the caller.
- User input is passed to the function.
- The result is printed.
- This modular approach improves reusability and readability.

Task 4: Comparative Analysis – Procedural vs Modular Approach (With vs Without Functions)

Aspect	Without Function (Procedural)	With Function (Modular)
Code Clarity	Moderate	High
Reusability	Not reusable	Highly reusable
Debugging	Difficult	Easier
Maintainability	Low	High
Large-scale Suitability	Poor	Good

Task 5: AI-Generated Iterative vs Recursive Fibonacci Approaches (Different Algorithmic Approaches to String Reversal)

#Generate a loop based string reversal program in Python



```python
#Add meaningful comments
def reverse_string(s):
    return s[::-1] #Slicing the string to reverse it
# Get user input
user_input = input("Enter a string: ")
# Call the function and display the reversed
reverse_str = reverse_string(user_input)
print(f"Reversed string: {reverse_str}")
"""
#Generate a loop based string reversal program in python
def reverse_string_loop(s):
    return s[::-1]
# Example usage
original_string = "Hello, World!"
reversed_string = reverse_string_loop(original_string)
print(reversed_string)
```

```
Reversed string: lagnaraw
PS C:\Users\hp\OneDrive\Desktop\Ai>
PS C:\Users\hp\OneDrive\Desktop\Ai> & C:/Users/hp/AppData/Local/Programs/Python/P
ython313/python.exe c:/Users/hp/OneDrive/Desktop/Ai/Ass1.py
!dlroW ,olleH
PS C:\Users\hp\OneDrive\Desktop\Ai> 
```

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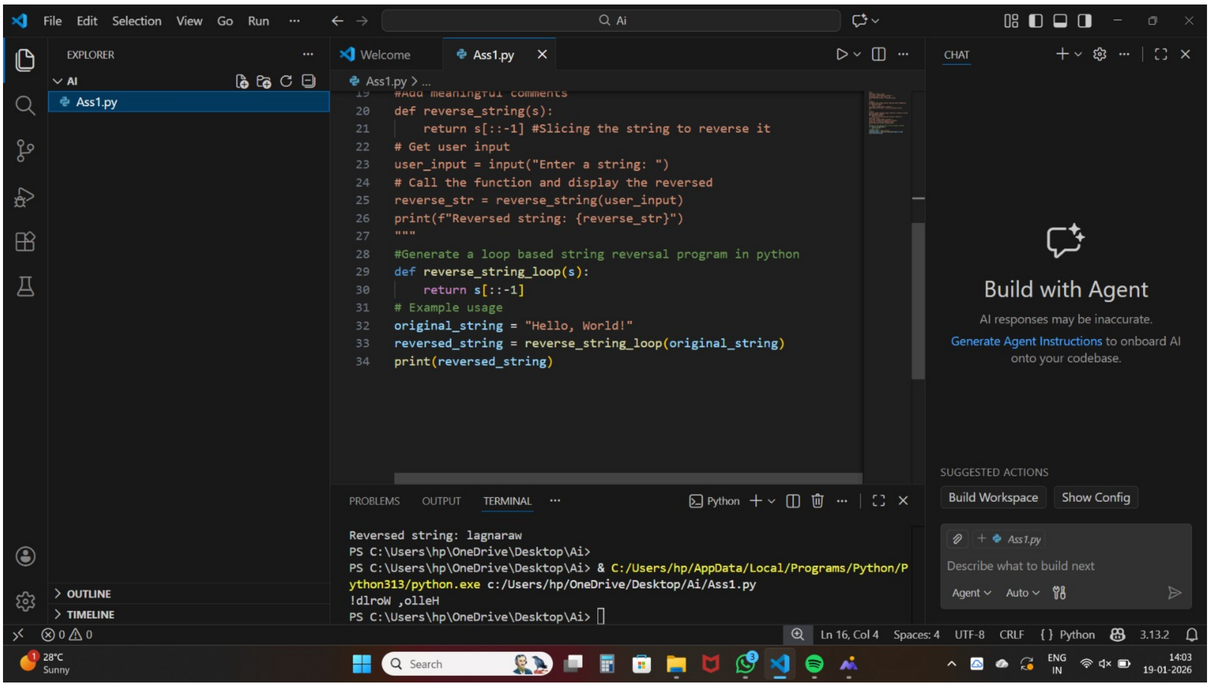
Explanation

- The user inputs a string.
- An empty string rev is created.
- The loop reads each character from left to right.
- Each character is added at the beginning of rev, reversing the order.
- The reversed string is printed.
- This method helps understand string manipulation logic.

#Generate a slicing based string reversal program in Python



```python
#Add meaningful comments
def reverse_string(s):
    return s[::-1] #Slicing the string to reverse it
# Get user input
user_input = input("Enter a string: ")
# Call the function and display the reversed
reverse_str = reverse_string(user_input)
print(f"Reversed string: {reverse_str}")
"""
#Generate a loop based string reversal program in python
def reverse_string_loop(s):
    return s[::-1]
# Example usage
original_string = "Hello, World!"
reversed_string = reverse_string_loop(original_string)
print(reversed_string)
```

```
Reversed string: lagnaraw
PS C:\Users\hp\OneDrive\Desktop\Ai>
PS C:\Users\hp\OneDrive\Desktop\Ai> & C:/Users/hp/AppData/Local/Programs/Python/P
ython313/python.exe c:/Users/hp/OneDrive/Desktop/Ai/Ass1.py
!dlroW ,olleH
PS C:\Users\hp\OneDrive\Desktop\Ai>
```

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Explanation

- The string is taken from the user.
- Python slicing reverses the string efficiently.
- The reversed string is printed directly.
- This approach is best for large inputs and real-world applications.

Comparison of Approaches

Aspect	**Loop-Based**	**Slicing-Based**
Execution Flow	Step-by-step reversal	Single operation
Time Complexity	O(n)	O(n)
Performance for Large Inputs	Slower	Faster
Readability	Moderate	Very High
Best Usage	Learning logic	Production code