SR UNIVERSITY

AI ASSIST CODING

LAB-2: Exploring Additional AI Coding Tools – Gemini (Colab) and Cursor AI

Name :P. SUSMIJA

Pin No:2503A51L11

Lab Objectives:

- To explore and evaluate the functionality of Google Gemini for AI-assisted coding within Google Colab.
- To understand and use Cursor AI for code generation, explanation, and refactoring.
- To compare outputs and usability between Gemini, GitHub Copilot, and Cursor AI.
- To perform code optimization and documentation using AI tools.

Lab Outcomes (LOs):

After completing this lab, students will be able to:

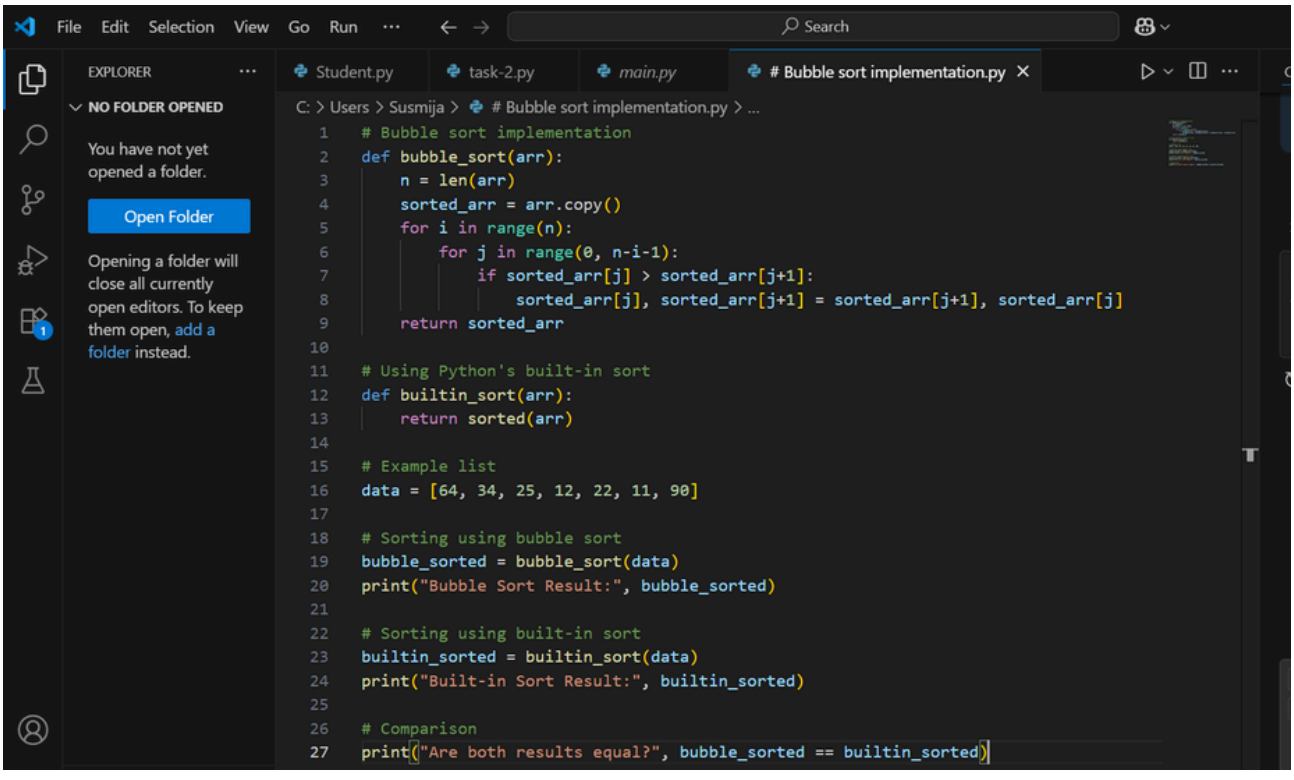
- Generate Python code using Google Gemini in Google Colab.
- Analyze the effectiveness of code explanations and suggestions by Gemini.
- Set up and use Cursor AI for AI-powered coding assistance.
- Evaluate and refactor code using Cursor AI features.
- Compare AI tool behavior and code quality across different platforms.

TASK #1:

Prompt:

- Open Google Colab and use Google Gemini to generate Python code that performs sorting of a list using both the bubble sort algorithm and Python's built-in sort() function. Compare the two implementations.

Code Generated:



Output After executing Code:

Your Observations:

1.Correct Implementation of Bubble Sort:

- The function bubble_sort(arr) correctly implements the bubble sort algorithm using nested loops and value swapping.

2.Data Integrity Preserved:

- The function uses arr.copy() to avoid modifying the original list, which is a good practice.

3.Clear Comparison with Built-in Sort:

- The code includes a custom sort function and compares its result with Python's built-in sorted() function — great for validating correctness.

4.Readable and Well-Structured:

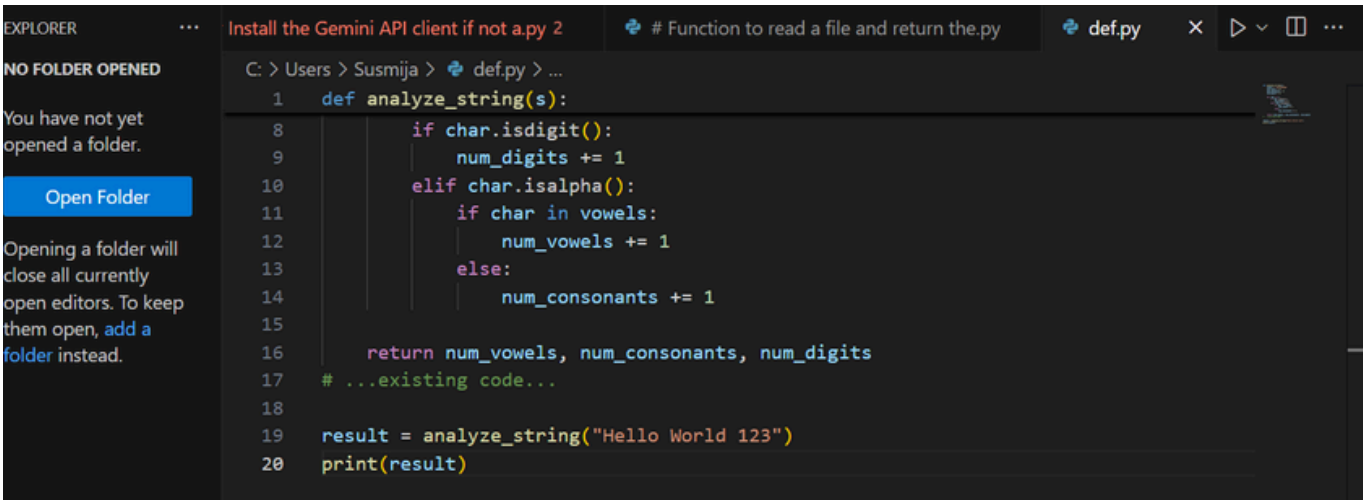
- The code is neatly organized into:
  - Custom sort
  - Built-in sort
  - Example list
  - Comparison

TASK #2:

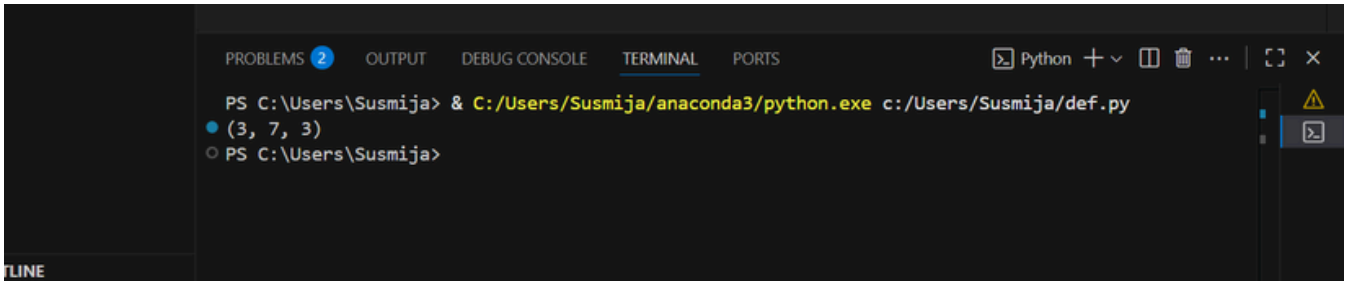
Prompt:

- In Colab, use Google Gemini to generate a Python function that takes a string and returns: The number of vowels, The number of consonants, The number of digits in the string

Code Generated:



Output After executing Code:



Your Observations:

Function Definition

1.def count_lines(filename):

- A function count_lines is defined that takes a filename (e.g., "example.txt") as input.

2. Try Block – Reading the File

- try:
  with open(filename, 'r') as file:
  return sum(1 for _ in file)
- **open(filename, 'r')**: Tries to open the file in **read mode**.
-
- **sum(1 for _ in file)**: Counts each line using a generator expression.
  - It iterates through each line and adds 1 per line.
- If the file is found, it returns the line count.

3. **Exception Handling – File Not Found**

1. except FileNotFoundError:
2. If the file **doesn't exist**, this block is executed.

4. **Created a Sample File**

- with open(filename, 'w') as file:
  file.write("Hello\n")
  file.write("World\n")

file.write("This is a test file\n")

- The file is opened in **write mode** ('w') which **creates a new file.**

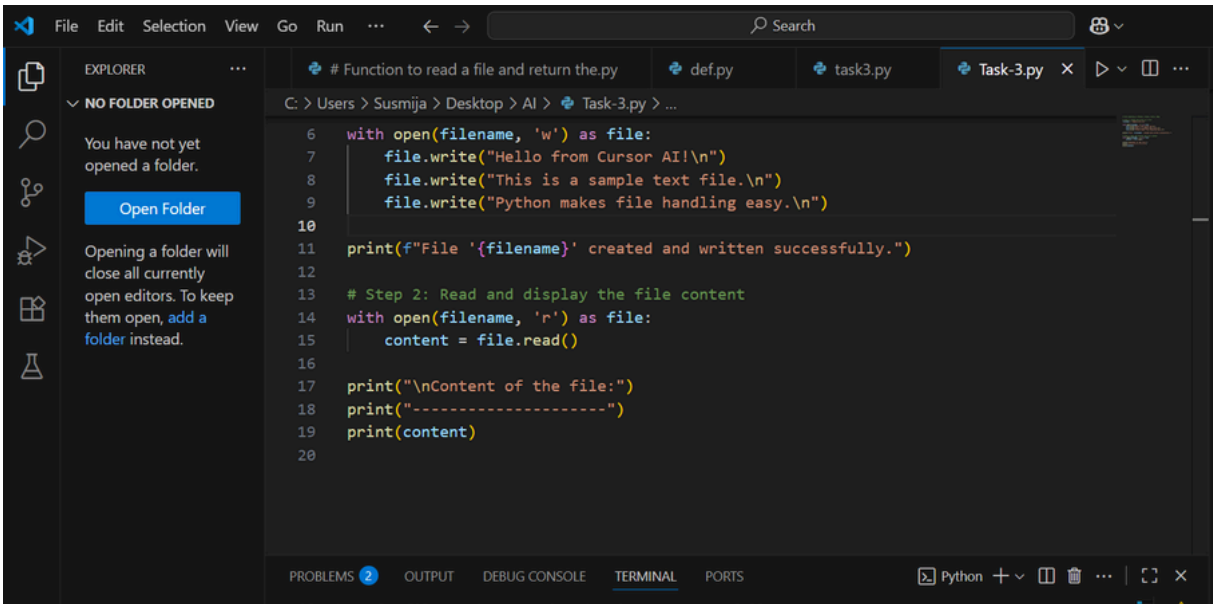
TASK #3:

Prompt:

- Install and set up Cursor AI. Use it to generate a Python program that performs file handling:

1. Create a text file
2. Write sample text
3. Read and display the content.

Code Generated:



Output After executing Code:

Your Observations:

1.filename = "sample_file.txt": Sets the name of the file.

2.with open(filename, 'w') as file::

- Opens (or creates) the file in **write mode** ('w').
- If the file already exists, it will be **overwritten**.

3.file.write(...): Writes 3 lines of text into the file, each ending with a newline (\n).

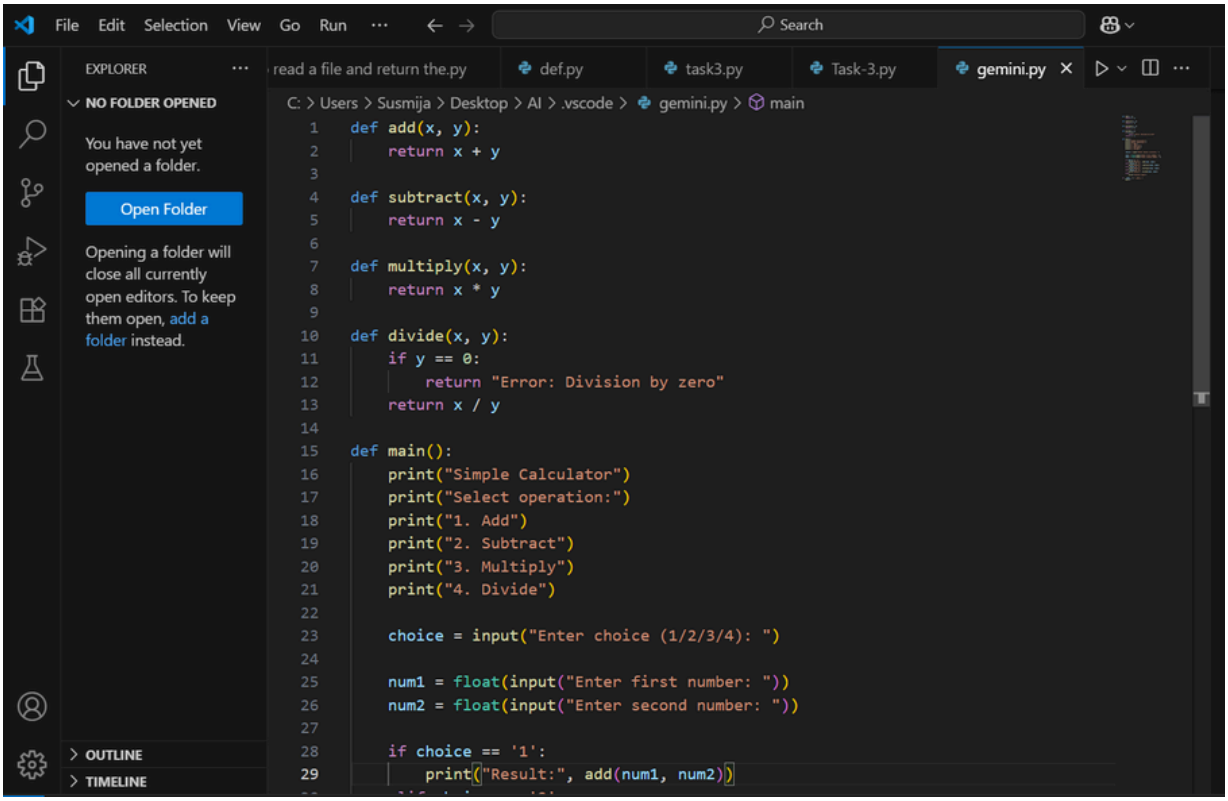
4.print(...): Confirms that the file was created and written successfully.

TASK #4:

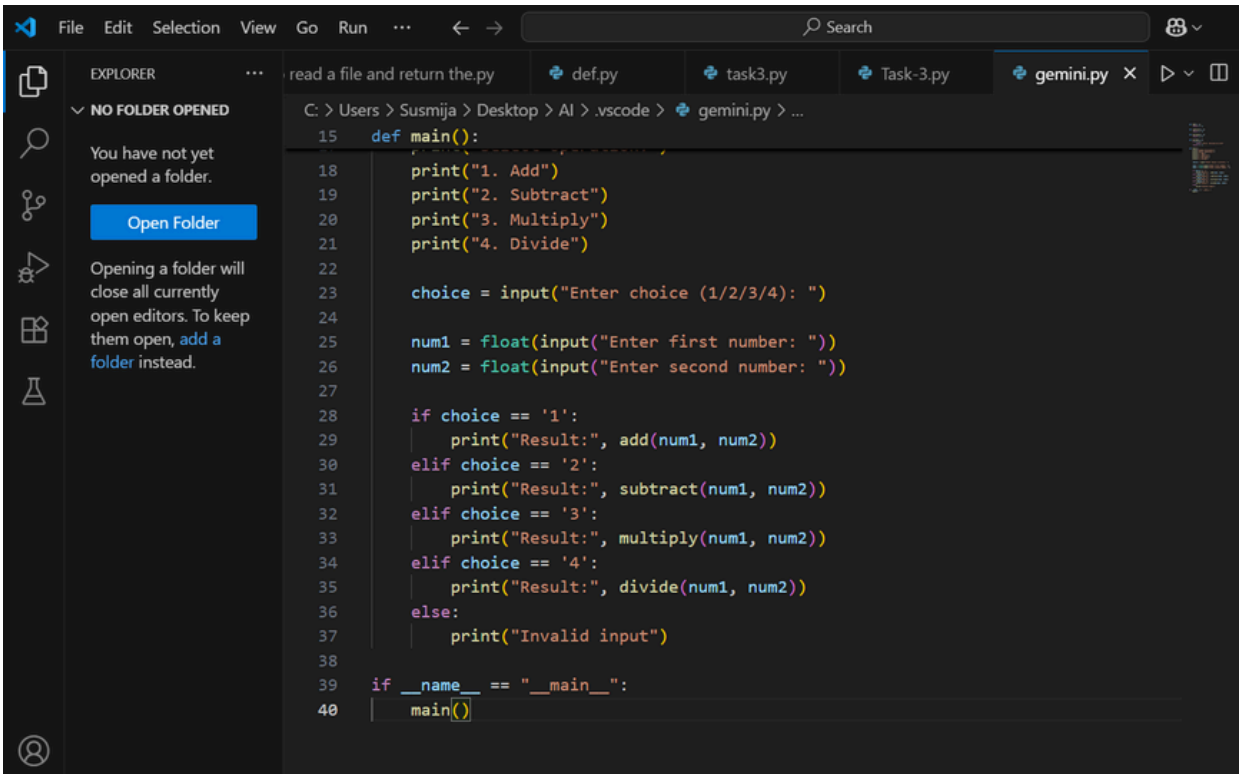
Prompt:

- Ask Google Gemini to generate a Python program that implements a simple calculator using functions (add, subtract, multiply, divide). Then, ask Gemini to explain how the code works.

Code Generated:

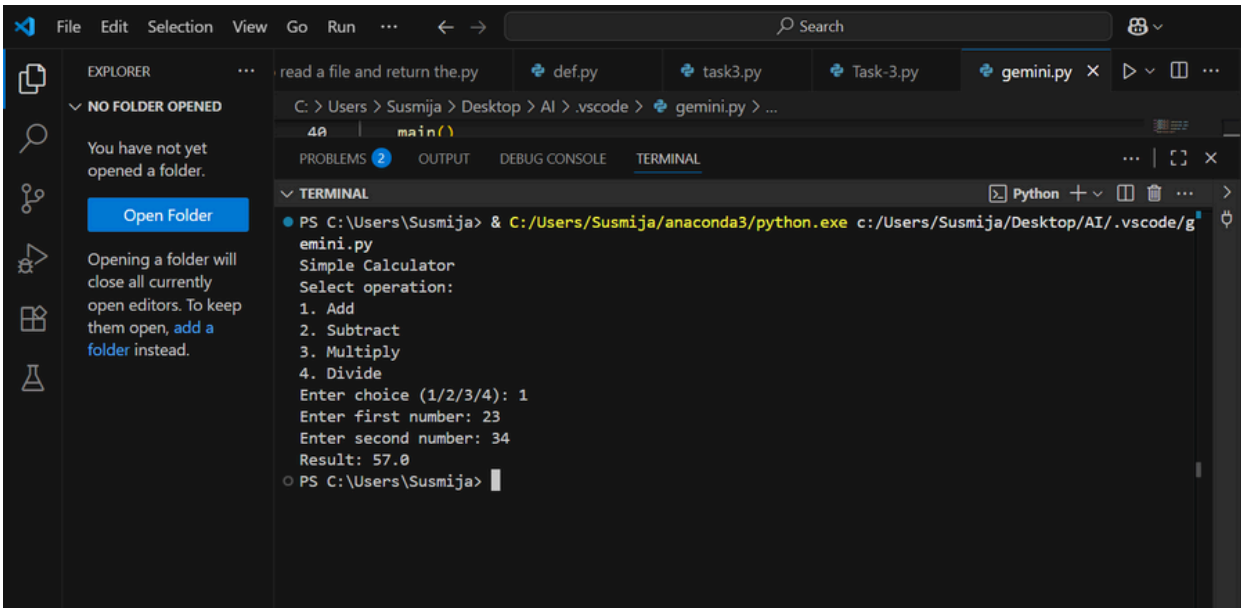


```python
def add(x, y):
    return x + y

def subtract(x, y):
    return x - y

def multiply(x, y):
    return x * y

def divide(x, y):
    if y == 0:
        return "Error: Division by zero"
    return x / y

def main():
    print("Simple Calculator")
    print("Select operation:")
    print("1. Add")
    print("2. Subtract")
    print("3. Multiply")
    print("4. Divide")

    choice = input("Enter choice (1/2/3/4): ")

    num1 = float(input("Enter first number: "))
    num2 = float(input("Enter second number: "))

    if choice == '1':
        print("Result:", add(num1, num2))
```



```python
def main():
    print("1. Add")
    print("2. Subtract")
    print("3. Multiply")
    print("4. Divide")

    choice = input("Enter choice (1/2/3/4): ")

    num1 = float(input("Enter first number: "))
    num2 = float(input("Enter second number: "))

    if choice == '1':
        print("Result:", add(num1, num2))
    elif choice == '2':
        print("Result:", subtract(num1, num2))
    elif choice == '3':
        print("Result:", multiply(num1, num2))
    elif choice == '4':
        print("Result:", divide(num1, num2))
    else:
        print("Invalid input")

if __name__ == "__main__":
    main()
```

Output After executing Code:



Your Observations:

1. Function Definitions

- These functions perform basic arithmetic:

->def add(x, y):

return x + y

-->def subtract(x, y):

return x - y

-->def multiply(x, y):

return x * y

-->def divide(x, y):

if y == 0:

-->return "Error: Division by zero"

return x / y

- Each function takes two numbers x and y, and returns the result.
- The divide() function includes **error handling** for division by zero.

2. The main() Function

- This is where user interaction happens:

def main():

print("Simple Calculator")

print("Select operation:")

print("1. Add")

print("2. Subtract")

print("3. Multiply")

print("4. Divide")

- The program prints a menu of operations for the user.

choice = input("Enter choice (1/2/3/4): ")

- The user selects an operation (e.g., 1 for addition).

num1 = float(input("Enter first number: "))

num2 = float(input("Enter second number: "))

- The user inputs two numbers, which are converted to floats for accurate calculations.

3. Conditional Execution Based on Choice

```
if choice == '1':
    print("Result:", add(num1, num2))
elif choice == '2':
    print("Result:", subtract(num1, num2))
elif choice == '3':
    print("Result:", multiply(num1, num2))
elif choice == '4':
    print("Result:", divide(num1, num2))
else:
    print("Invalid input")
```

- Depending on the user's choice, the corresponding function is called.
- If the choice doesn't match 1–4, it prints "Invalid input.

4. Script Entry Point

```
if __name__ == "__main__":
    main()
```

- This ensures that the main() function runs **only when the script is executed directly**, not when imported.

Terminal Output :

Simple Calculator

Select operation:

1. Add

2. Subtract

3. Multiply

4. Divide

Enter choice (1/2/3/4): 1

Enter first number: 23

Enter second number: 34

Result: 57.0

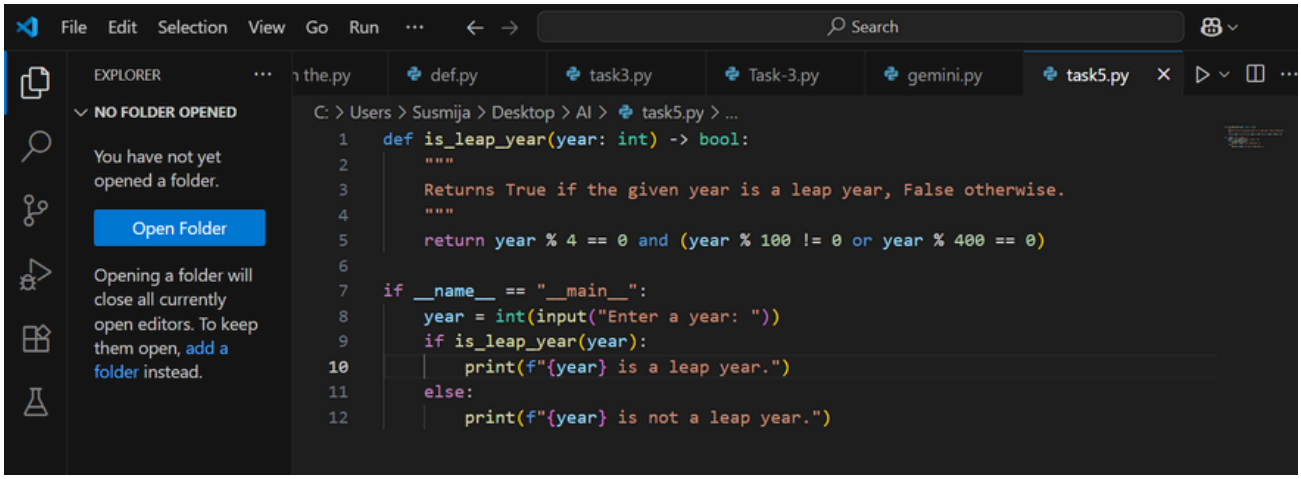
- The user selected **1 (Addition)**.
- Entered **23** and **34**.
- Got the correct result: 57.0**.**

TASK #5:

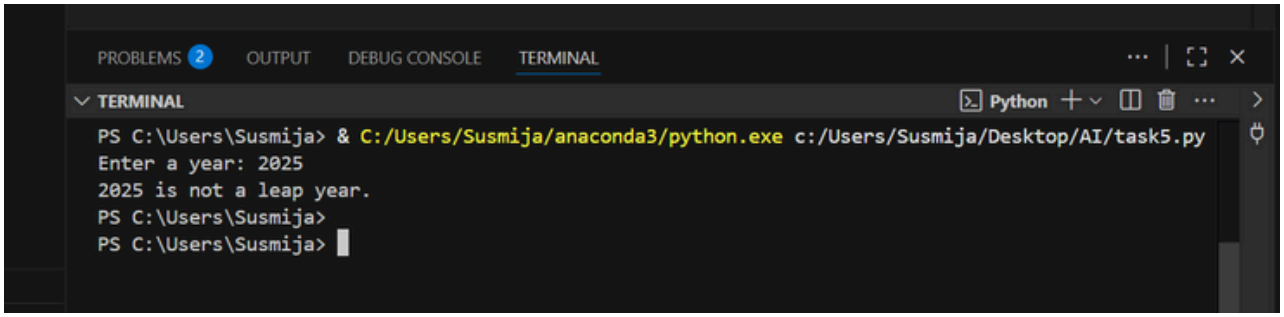
Prompt:

- Use Cursor AI to create a Python program that checks if a given year is a leap year or not. Try different prompt styles and see how Cursor modifies its code suggestions.

Code Generated:



Output After executing Code:



Your Observations:

1. Function Definition

- def is_leap_year(year: int) -> bool:

"""

Returns True if the given year is a leap year, False otherwise.

"""

return year % 4 == 0 and (year % 100 != 0 or year % 400 == 0)

- Purpose: Checks leap year condition.
- Type hinting:
  - year: int → function expects an integer.
  - -> bool → function returns a boolean (True or False).
- Logic: Implements the leap year condition in one line.

2. Main Execution Block

if __name__ == "__main__":

year = int(input("Enter a year: "))

if is_leap_year(year):

print(f"{year} is a leap year.")

```
else:
    print(f"{year} is not a leap year.")
```

- if __name__ == "__main__": Ensures this code only runs when the script is executed directly.
- input(...): Takes user input and converts it to an integer.
- Conditional check: Calls is_leap_year(year) to check and print the appropriate message.

Output from Terminal:

Enter a year: 2025

2025 is not a leap year.

- Since 2025 is not divisible by 4, the output is correct.