SR UNIVERSITY

AI ASSIST CODING

LAB-3: Advanced Prompt Engineering – Zero-shot, One-shot, and Few-shot Techniques

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Lab Objectives:

· To explore and apply different levels of prompt examples in AI-assisted code generation.

· To understand how zero-shot, one-shot, and few-shot prompting affect AI output quality.

· To evaluate the impact of context richness and example quantity on AI performance.

· To build awareness of prompt strategy effectiveness for different problem types.

Lab Outcomes (LOs):

After completing this lab, students will be able to:

· Use zero-shot prompting to instruct AI with minimal context.

· Use one-shot prompting with a single example to guide AI code generation.

· Apply few-shot prompting using multiple examples to improve AI responses.

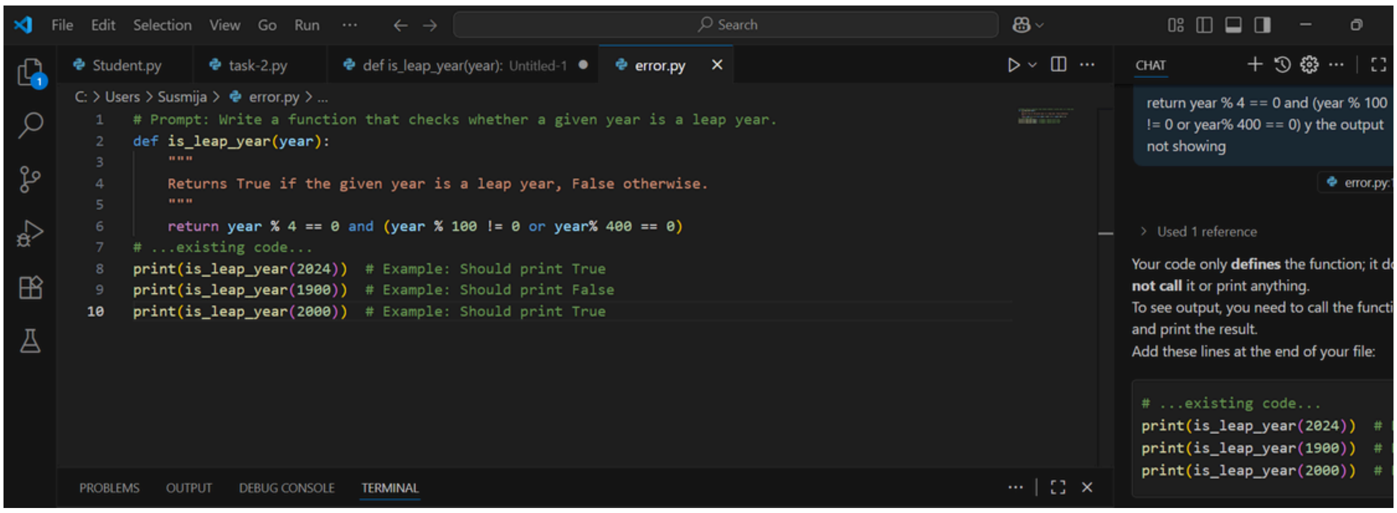
· Compare AI outputs across the three prompting strategies.

TASK #1:

Prompt:

- Zero-shot: Prompt AI to write a function that checks whether a given year is a leap year.

Code Generated:



```
# Prompt: Write a function that checks whether a given year is a leap year.
def is_leap_year(year):
    """
    Returns True if the given year is a leap year, False otherwise.
    """
    return year % 4 == 0 and (year % 100 != 0 or year% 400 == 0)
# ...existing code...
print(is_leap_year(2024))  # Example: Should print True
print(is_leap_year(1900))  # Example: Should print False
print(is_leap_year(2000))  # Example: Should print True
```

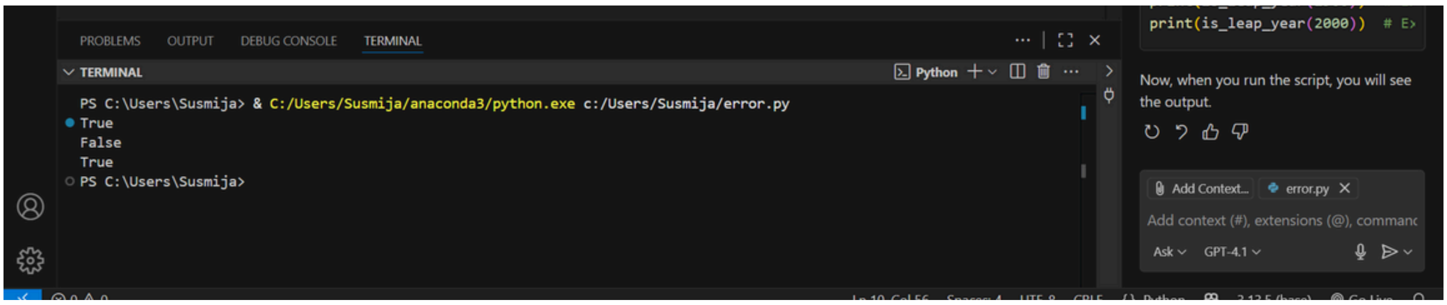
return year % 4 == 0 and (year % 100 != 0 or year% 400 == 0) y the output not showing

Used 1 reference

Your code only **defines** the function; it d
not call it or print anything.
To see output, you need to call the functi
and print the result.
Add these lines at the end of your file:

```
# ...existing code...
print(is_leap_year(2024))  #
print(is_leap_year(1900))  #
print(is_leap_year(2000))  #
```

Output After executing Code:



```
PS C:\Users\Susmija> & C:/Users/Susmija/anaconda3/python.exe c:/Users/Susmija/error.py
True
False
True
PS C:\Users\Susmija>
```

Now, when you run the script, you will see the output.

Your Observations:

Code Functionality:

- **Purpose**: The code checks if a given year is a leap year.
- **Function**:
- def is_leap_year(year: int) -> bool:
- return year % 4 == 0 and (year % 100 != 0 or year % 400 == 0)
- This correctly implements the leap year rule:
  - A year divisible by 4 **and** not divisible by 100 **unless** divisible by 400 is a leap year.

1.The script uses:

year = int(input("Enter a year: ")) to take user input and then prints:

- "{year} is a leap year." if the condition is true.
- Otherwise, "not a leap year."

2.Example Execution:

- Input: 2025
- Output: 2025 is not a leap year.

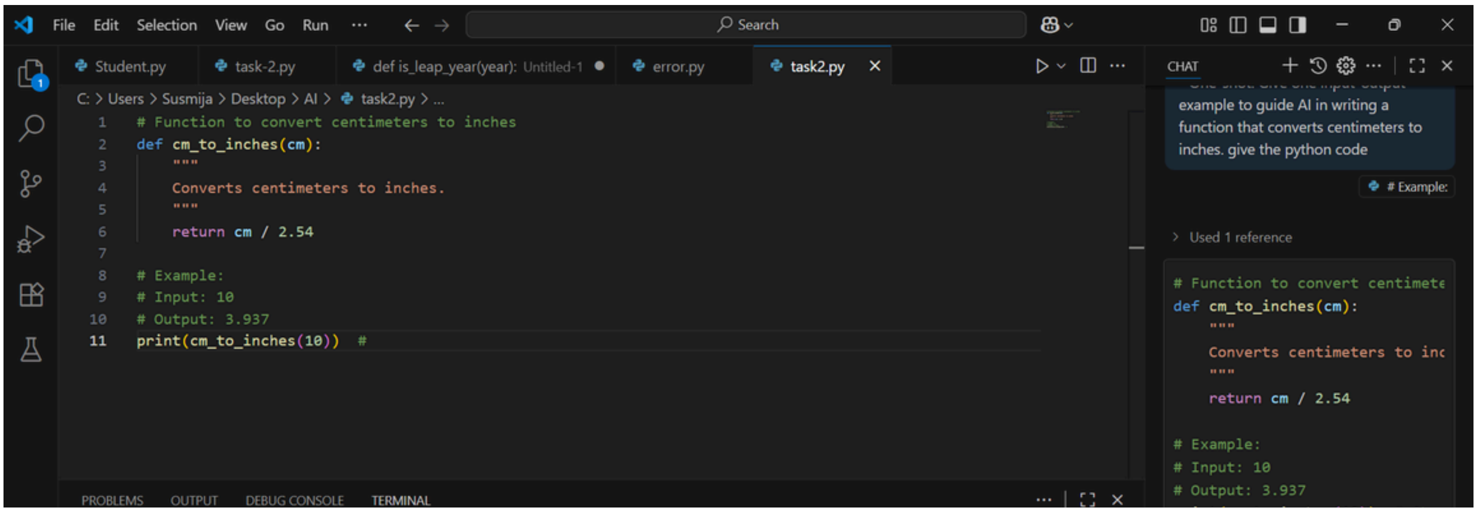
1. Uses type hinting (year: int -> bool) — ✅ good practice.
2. Uses f-strings for output — ✅ clean and readable.
3. The function name is_leap_year is descriptive and appropriate.

TASK #3:

Prompt:

- One-shot: Give one input-output example to guide AI in writing a function that converts centimeters to inches

Code Generated:

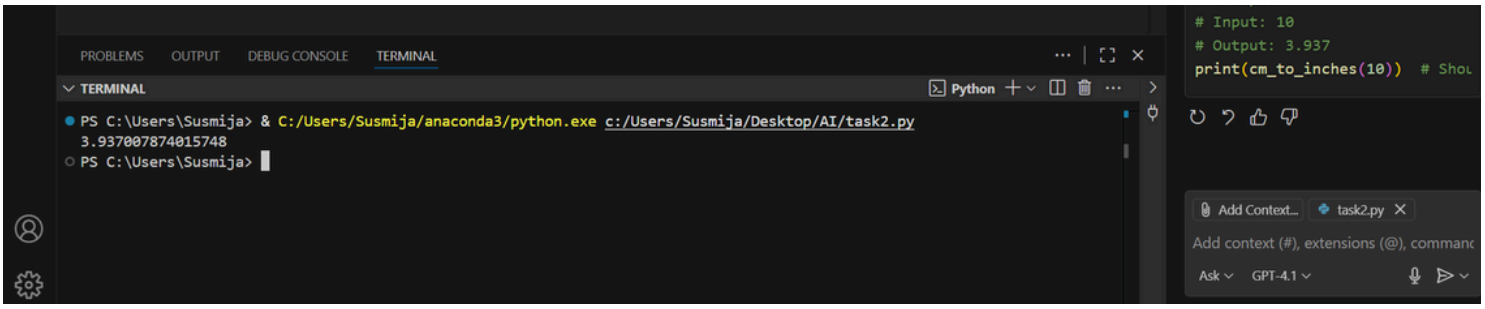

File Edit Selection View Go Run ···
Search
Student.py
task-2.py
def is_leap_year(year): Untitled-1
error.py
task2.py
C: > Users > Susmija > Desktop > AI > task2.py > ...
CHAT
# Example:
Used 1 reference
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL

```python
# Function to convert centimeters to inches
def cm_to_inches(cm):
    """
    Converts centimeters to inches.
    """
    return cm / 2.54

# Example:
# Input: 10
# Output: 3.937
print(cm_to_inches(10))  #
```

example to guide AI in writing a function that converts centimeters to inches. give the python code

```python
# Function to convert centimete
def cm_to_inches(cm):
    """
    Converts centimeters to inc
    """
    return cm / 2.54

# Example:
# Input: 10
# Output: 3.937
```

Output After executing Code:



```
# Input: 10
# Output: 3.937
print(cm_to_inches(10))  # Shou
```

```
PS C:\Users\Susmija> & C:/Users/Susmija/anaconda3/python.exe c:/Users/Susmija/Desktop/AI/task2.py
3.937007874015748
PS C:\Users\Susmija>
```

Your Observations:

Function Definition:

1.def cm_to_inches(cm):

- This defines a function that takes one parameter: cm (centimeters).
- A helpful docstring is provided, making the code easier to understand.

Conversion Logic:

- return cm / 2.54
- Correct formula is used.

  (1 inch = 2.54 cm)

Function Call:

- print(cm_to_inches(10))
- Calls the function with 10 cm and prints the output.

Output:

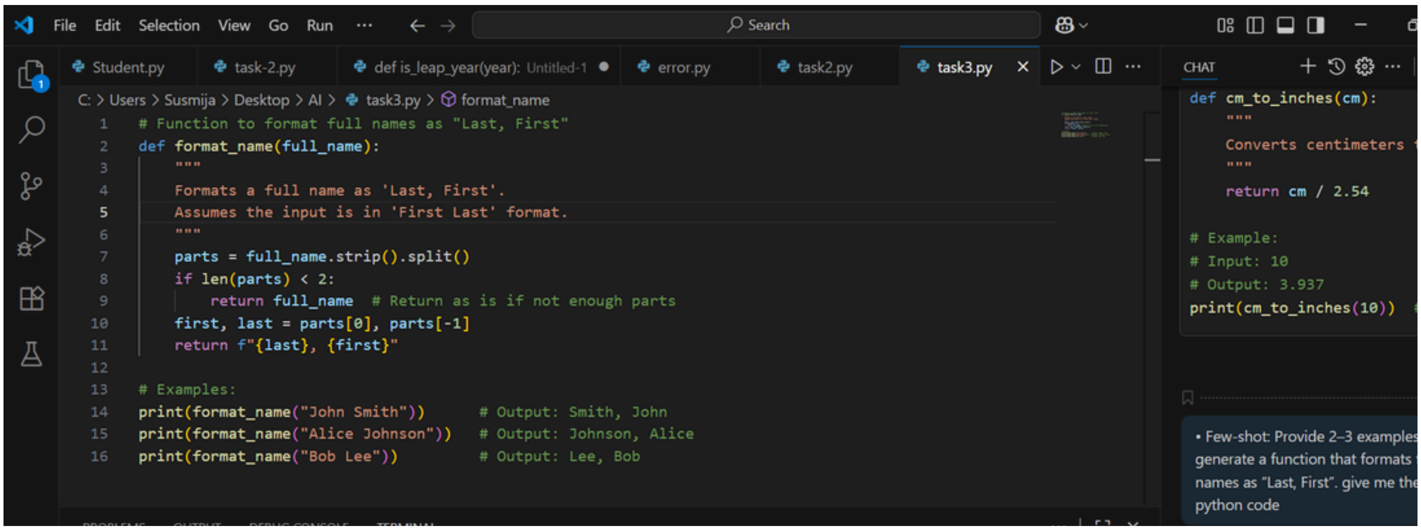
- 3.937007874015748

TASK #3:

Prompt:

- Few-shot: Provide 2–3 examples to generate a function that formats full names as “Last, First”.

Code Generated:

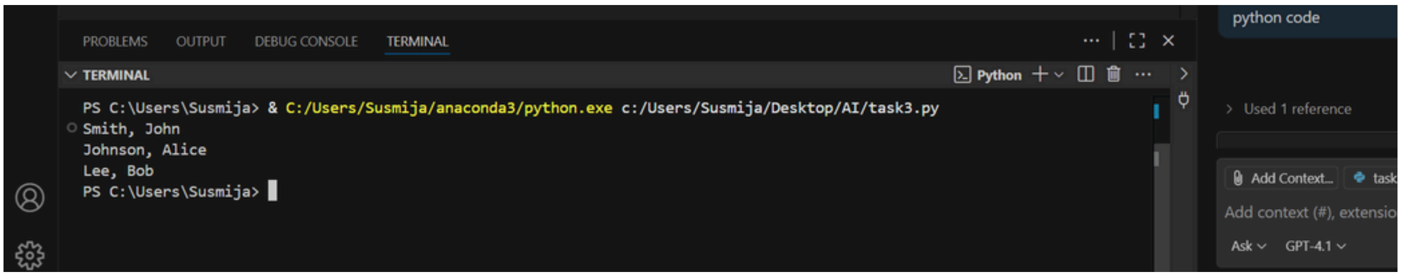


```python
# Function to format full names as "Last, First"
def format_name(full_name):
    """
    Formats a full name as 'Last, First'.
    Assumes the input is in 'First Last' format.
    """
    parts = full_name.strip().split()
    if len(parts) < 2:
        return full_name  # Return as is if not enough parts
    first, last = parts[0], parts[-1]
    return f"{last}, {first}"

# Examples:
print(format_name("John Smith"))       # Output: Smith, John
print(format_name("Alice Johnson"))    # Output: Johnson, Alice
print(format_name("Bob Lee"))          # Output: Lee, Bob
```

```python
def cm_to_inches(cm):
    """
    Converts centimeters
    """
    return cm / 2.54

# Example:
# Input: 10
# Output: 3.937
print(cm_to_inches(10))
```

• Few-shot: Provide 2-3 examples generate a function that formats names as "Last, First". give me the python code

Output After executing Code:



```
PS C:\Users\Susmija> & C:/Users/Susmija/anaconda3/python.exe c:/Users/Susmija/Desktop/AI/task3.py
Smith, John
Johnson, Alice
Lee, Bob
PS C:\Users\Susmija>
```

Your Observations:

- The code defines a function format_name(full_name) that **formats a full name** from the form:
- "First Last" → "Last, First"

1.Function Definition:

def format_name(full_name):

- Takes a string input full_name.

2.Docstring and Assumptions:

Formats a full name as 'Last, First'.

Assumes the input is in 'First Last' format.

- Clearly states purpose and assumptions, which helps with code readability and maintenance.

3.Splitting the Name:

parts = full_name.strip().split()

- Removes extra spaces using strip().
- Splits the name into parts (words) using split().

4.Validation of Input:

if len(parts) < 2:

return full_name

- If there are not at least two words, it returns the input unchanged.

5.Name Reformatting:

1.first, last = parts[0], parts[-1]

2.return f"{last}, {first}"

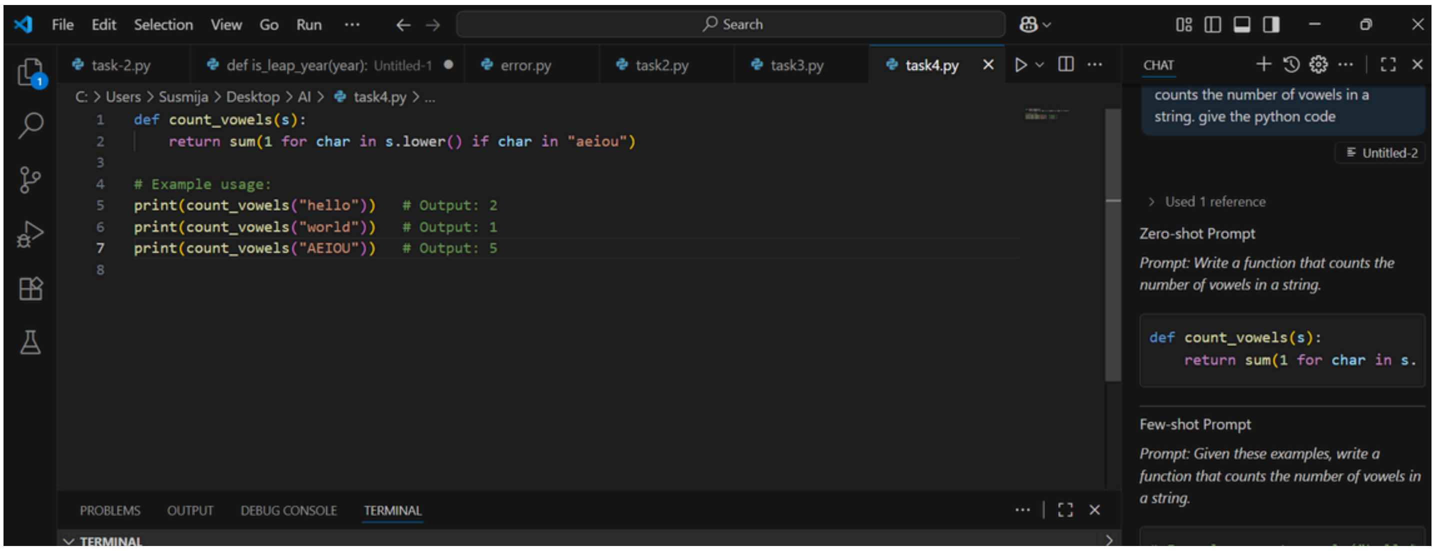
- Assigns the **first** and **last** names and formats as "Last, First" using an f-string.
- Works even if there are middle names (e.g., "Alice Mary Johnson" → "Johnson, Alice")

TASK #4:

Prompt:

- Compare zero-shot and few-shot prompts for writing a function that counts the number of vowels in a string.

Code Generated:



```python
def count_vowels(s):
    return sum(1 for char in s.lower() if char in "aeiou")

# Example usage:
print(count_vowels("hello"))   # Output: 2
print(count_vowels("world"))   # Output: 1
print(count_vowels("AEIOU"))   # Output: 5
```

counts the number of vowels in a string. give the python code

Untitled-2

Used 1 reference

Zero-shot Prompt

Prompt: Write a function that counts the number of vowels in a string.

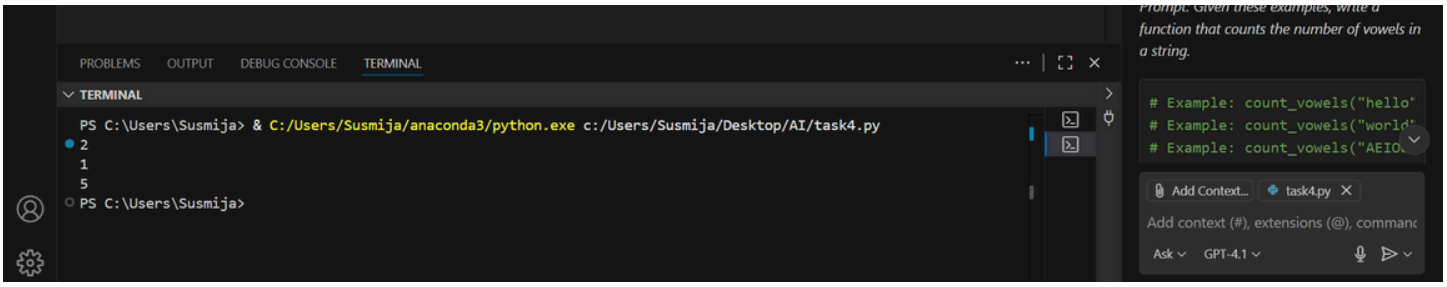
```python
def count_vowels(s):
    return sum(1 for char in s.
```

Few-shot Prompt

Prompt: Given these examples, write a function that counts the number of vowels in a string.

File Edit Selection View Go Run
Search
task-2.py
def is_leap_year(year): Untitled-1
error.py
task2.py
task3.py
task4.py
C: > Users > Susmija > Desktop > AI > task4.py > ...
CHAT
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
TERMINAL

Output After executing Code:



```
PS C:\Users\Susmija> & C:/Users/Susmija/anaconda3/python.exe c:/Users/Susmija/Desktop/AI/task4.py
2
1
5
PS C:\Users\Susmija>
```

function that counts the number of vowels in a string.

```
# Example: count_vowels("hello"
# Example: count_vowels("world"
# Example: count_vowels("AEIO
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
TERMINAL
Add Context... task4.py
Add context (#), extensions (@), commanc
Ask GPT-4.1

Your Observations:

-->The function count_vowels(s) counts how many **vowels** (a, e, i, o, u) are present in the input string s, **case-insensitively**.

1.Function Definition:

def count_vowels(s):

- Accepts a string inputs.

2.Core Logic:

return sum(1 for char in s.lower() if char in "aeiou")

- Converts the string to lowercase using s.lower() (ensures both upper and lower case are handled.
- Uses a **generator expression** inside sum() to:
  - Iterate over each character.
  - Count 1 for each character that is a vowel (a, e, i, o, u).
- Efficient, concise, and Pythonic implementation.

3.Test Cases and Output:

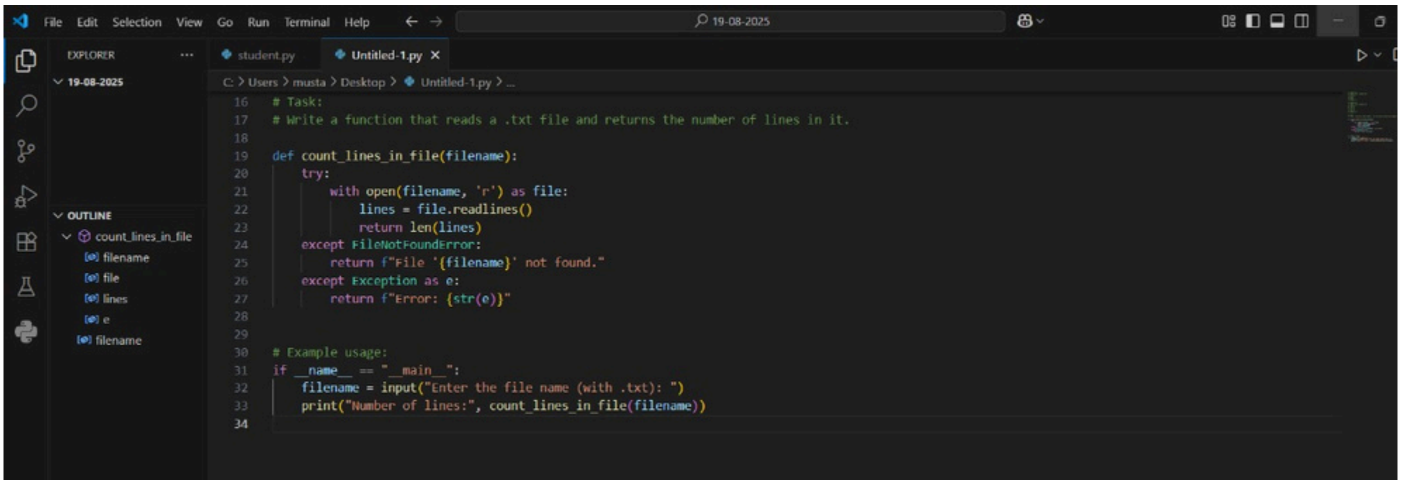
1. **Best Cases and Output:**
2. print(count_vowels("hello"))   # Output: 2
3. print(count_vowels("world"))   # Output: 1
4. print(count_vowels("AEIOU"))   # Output: 5
   - The code prints the number of vowels in different test strings.
   - Terminal output confirms the expected results:
   - 2
   - 1
   - 5
5. **Handle Non-String Inputs (Edge Case Handling):**
   Add a type check:
6. if not isinstance(s, str):
7.   raise TypeError("Input must be a string")
8. **Return 0 for Empty Strings:**
   Already handled correctly (returns 0), but worth documenting.
9. **Consider Y as Vowel (If Required):**
   Some definitions include "y" as a vowel in certain contexts. If so:
10. if char in "aeiouy"
11. **Extended Test Cases (Optional):**
12. print(count_vowels("Python 3.10"))
13. print(count_vowels(""))
14. print(count_vowels("sky"))

<u>TASK #5:</u>

Prompt:.

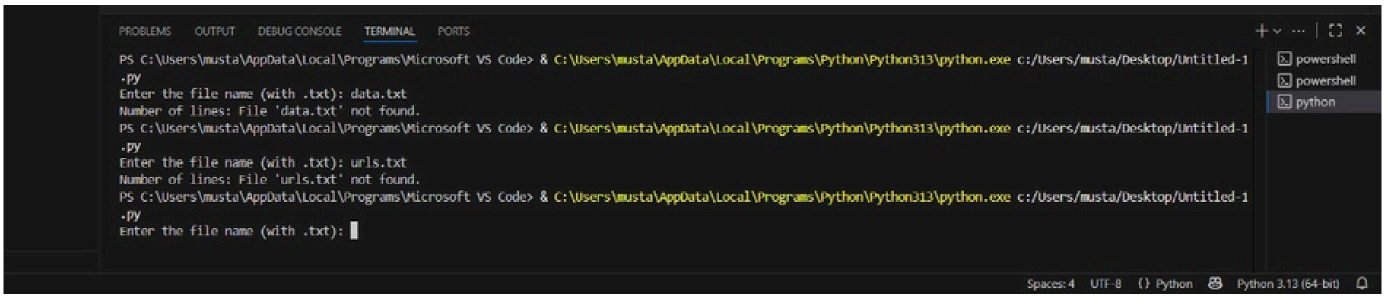
- Use few-shot prompting to generate a function that reads a .txt file and returns the number of lines.

Code Generated:



```python
# Task:
# Write a function that reads a .txt file and returns the number of lines in it.

def count_lines_in_file(filename):
    try:
        with open(filename, 'r') as file:
            lines = file.readlines()
            return len(lines)
    except FileNotFoundError:
        return f"File '{filename}' not found."
    except Exception as e:
        return f"Error: {str(e)}"


# Example usage:
if __name__ == "__main__":
    filename = input("Enter the file name (with .txt): ")
    print("Number of lines:", count_lines_in_file(filename))
```

Output After executing Code:



```
PS C:\Users\musta\AppData\Local\Programs\Microsoft VS Code> & C:\Users\musta\AppData\Local\Programs\Python\Python313\python.exe c:/Users/musta/Desktop/Untitled-1
.py
Enter the file name (with .txt): data.txt
Number of lines: File 'data.txt' not found.
PS C:\Users\musta\AppData\Local\Programs\Microsoft VS Code> & C:\Users\musta\AppData\Local\Programs\Python\Python313\python.exe c:/Users/musta/Desktop/Untitled-1
.py
Enter the file name (with .txt): urls.txt
Number of lines: File 'urls.txt' not found.
PS C:\Users\musta\AppData\Local\Programs\Microsoft VS Code> & C:\Users\musta\AppData\Local\Programs\Python\Python313\python.exe c:/Users/musta/Desktop/Untitled-1
.py
Enter the file name (with .txt): 
```

Your Observations

- The function count_lines_in_file(filename) reads a .txt file and returns the number of lines.

It includes error handling for:

- File not found
- Other unexpected exceptions
- 1. **Function Definition and Logic:**

def count_lines_in_file(filename):

- Accepts the file name as a string input.
- with open(filename, 'r') as file:

lines = file.readlines()

return len(lines)

- Opens the file in read mode.
- Reads all lines into a list.
- Returns the number of lines using len().

2. Error Handling:

- except FileNotFoundError:

return f"File '{filename}' not found."

- Specifically catches missing file errors and returns a friendly message.

except Exception as e:

- return f"Error: {str(e)}"
- Catches any other exceptions and prints the error message.

3. **User Input and Example Usage:**

if __name__ == "__main__":

- filename = input("Enter the file name (with .txt): ")
- print("Number of lines:", count_lines_in_file(filename))

Takes filename input from the user.

Prints the result of count_lines_in_file().

4. **Terminal Output:**

- Enter the file name (with .txt): data.txt
- Number of lines: File 'data.txt' not found.
- The file data.txt and urls.txt were not found in the directory, so the exception handling worked as expected.

l path; ensure it works correctly.

1. **Make It Case-Insensitive for Extension (Minor):**
   Allow .TXT, .Txt, etc., by checking lowercase extension:
2. if not filename.lower().endswith(".txt"):

return "Please provide a valid .txt file"

- The code is **correct, robust, and user-friendly**.
- It effectively reads line counts from a file and handles missing files gracefully.
- Once a valid .txt file is present in the same directory, it will work perfectly.
- Would you like help creating a sample .txt file for testing?