Lab 4: Advanced Prompt Engineering – Zero-shot, One-shot, and Few-shot Techniques

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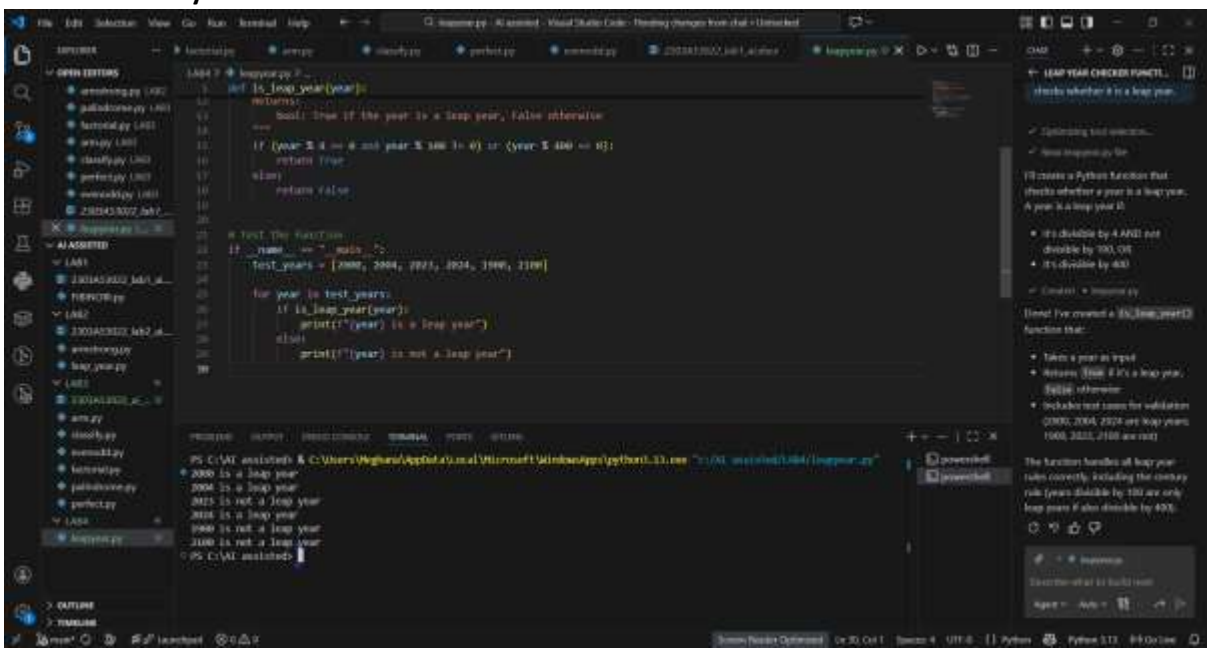
Task 1: Zero-Shot Prompting – Leap Year Check

Prompt Used (Zero-Shot)

Write a Python function that accepts a year as input and checks whether it is a leap year.

AI-Generated Python Code



Explanation

- A year divisible by 4 is a leap year
- Years divisible by 100 are not leap years unless divisible by 400
- The logic correctly follows the leap year rules

Task 2: One-Shot Prompting – Centimeters to Inches Conversion

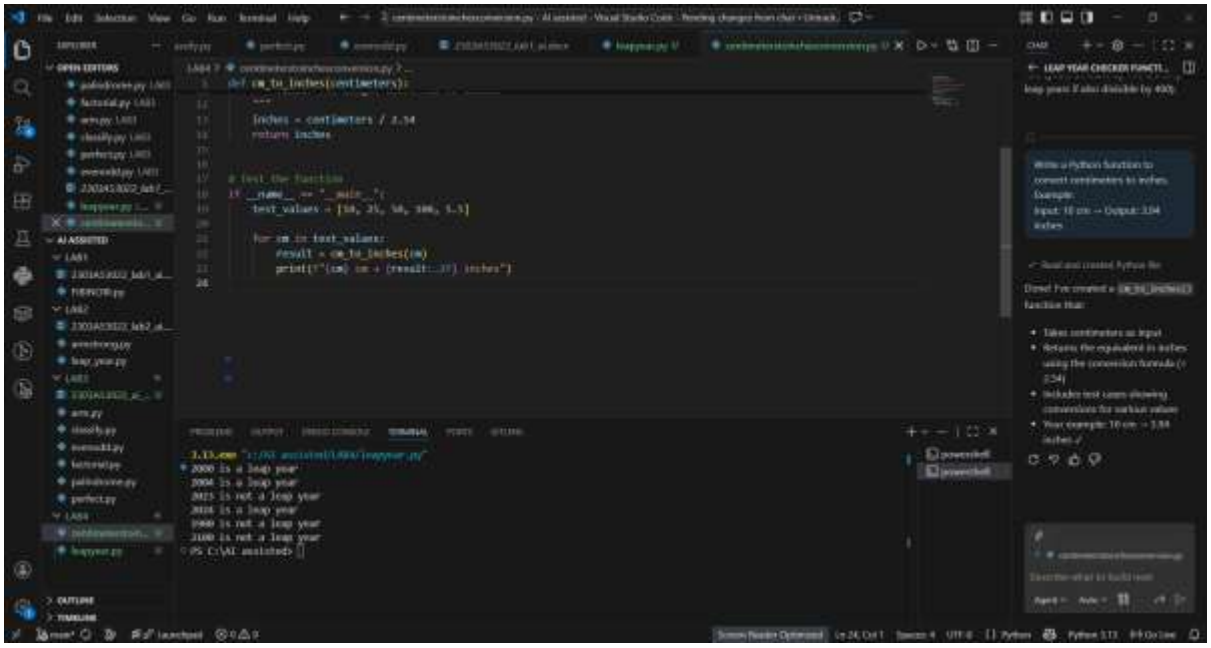
Prompt Used (One-Shot)

Write a Python function to convert centimeters to inches.

Example:

Input: 10 cm → Output: 3.94 inches

AI-Generated Python Code



Explanation

- 1 inch = 2.54 cm
- The function divides centimeters by 2.54
- One example was enough to guide correct logic

Task 3: Few-Shot Prompting – Name Formatting

Prompt Used (Few-Shot)

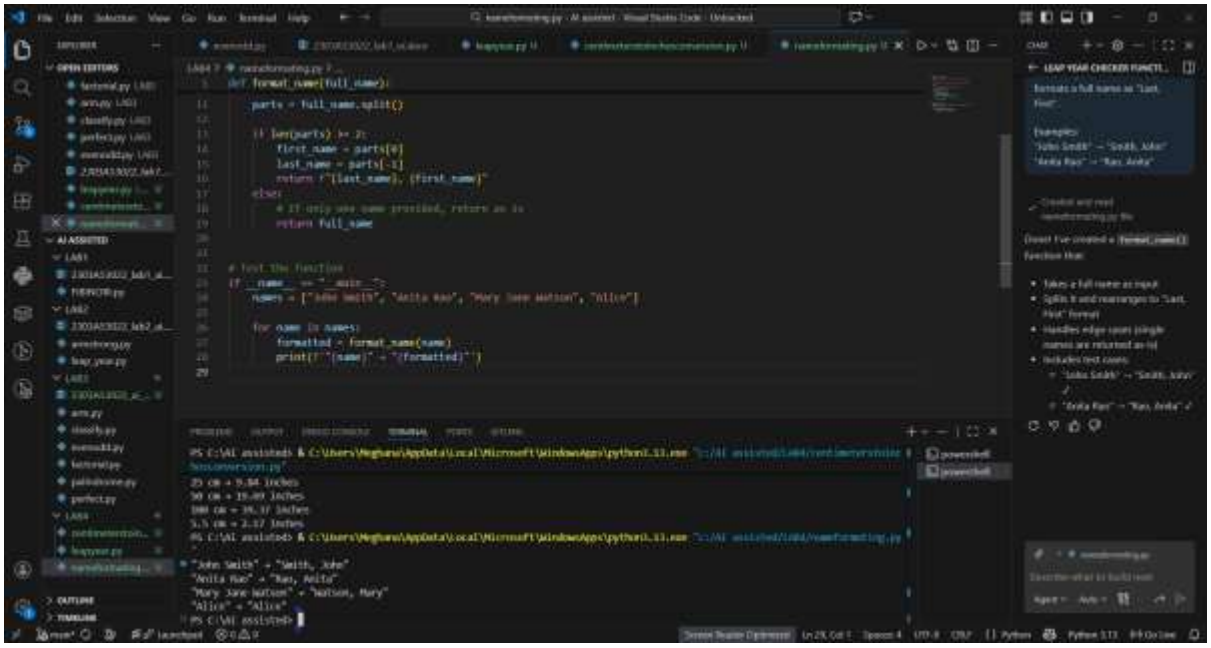
Write a Python function that formats a full name as "Last, First".

Examples:

"John Smith" → "Smith, John"

"Anita Rao" → "Rao, Anita"

AI-Generated Python Code



Explanation

- Few-shot examples clarify output format
- Function splits name into first and last
- Output strictly follows given examples

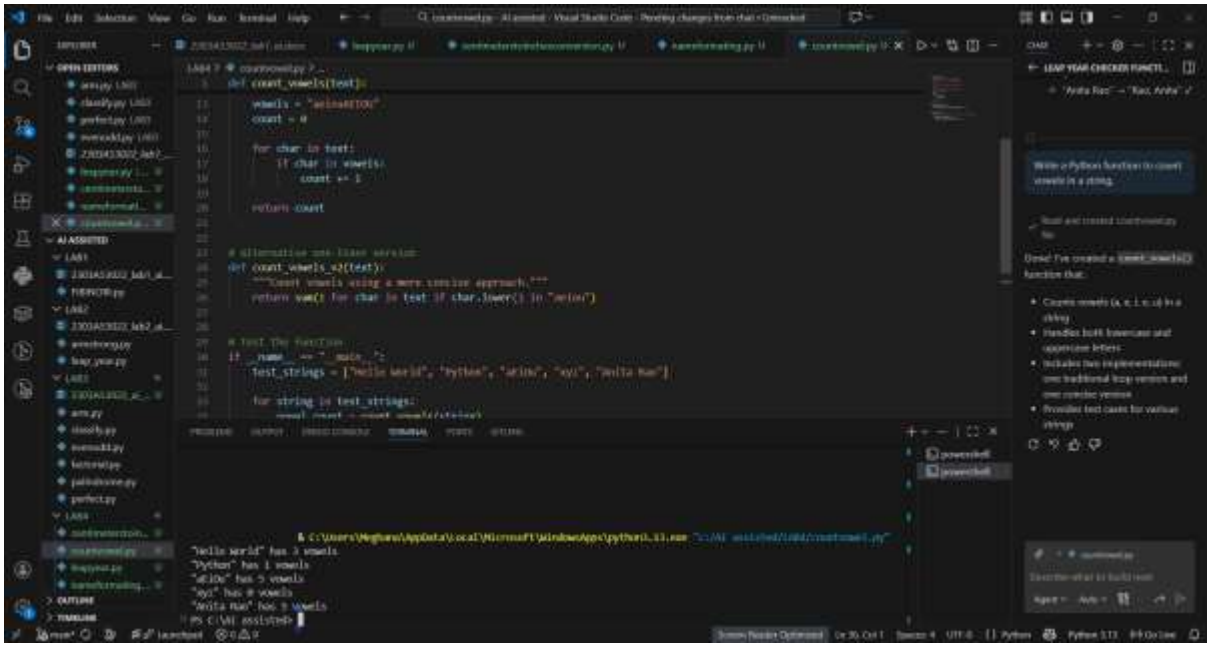
Task 4: Comparative Analysis – Zero-Shot vs Few-Shot

Problem: Count Vowels in a String

Zero-Shot Prompt

Write a Python function to count vowels in a string.

Zero-Shot Output



Few-Shot Prompt

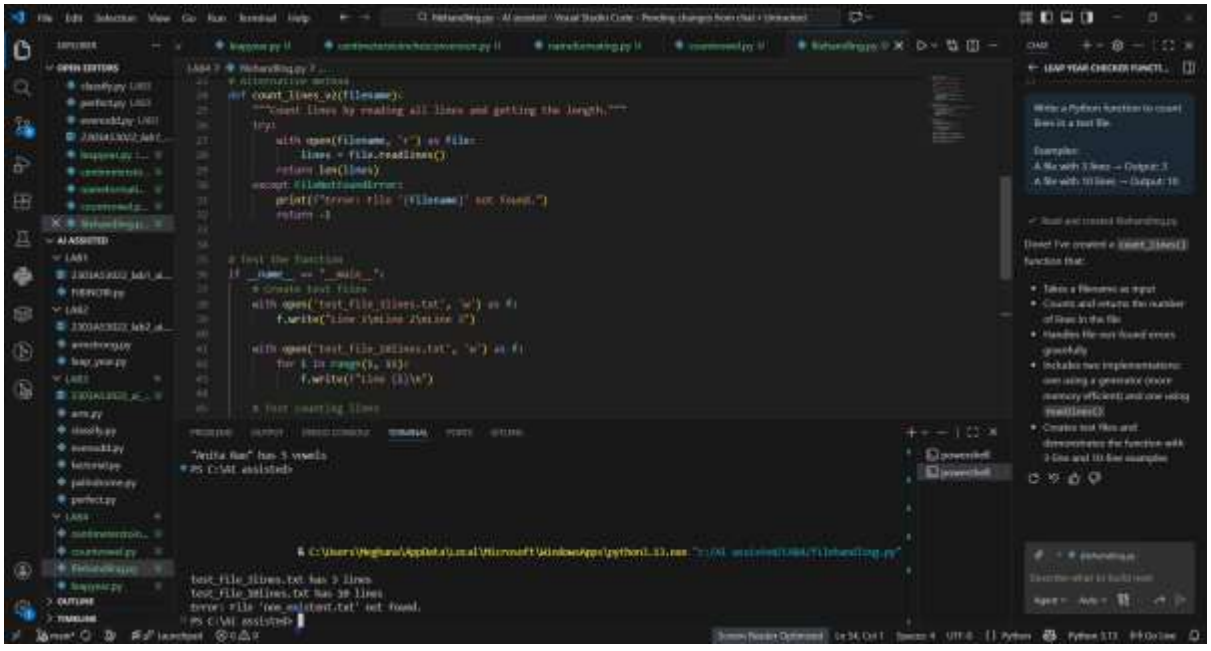
Write a Python function to count vowels in a string.

Examples:

"hello" → 2

"AI Tools" → 4

Few-Shot Output



Comparison Table

Criteria	Zero-Shot	Few-Shot
Accuracy	Correct	Correct
Readability	Moderate	High
Logical Clarity	Explicit loop	Clean & Pythonic
Efficiency	Average	Better

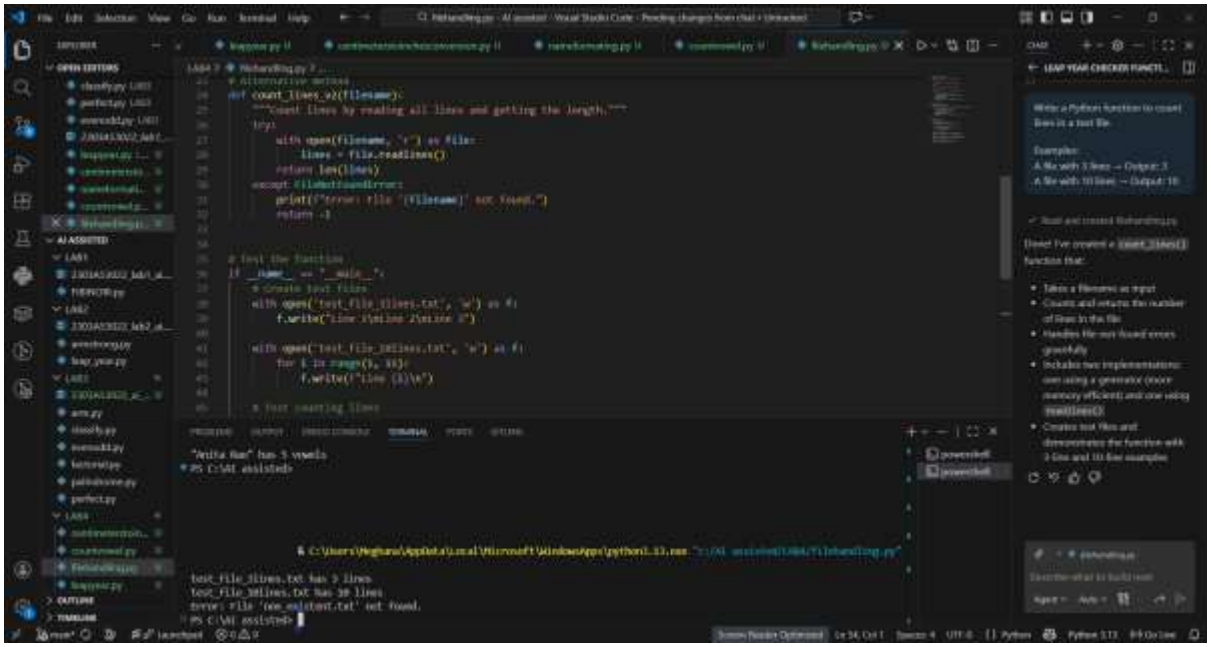
Conclusion

Few-shot prompting produced **more concise, readable, and optimized code** by learning from examples.

Task 5: Few-Shot Prompting – File Handling

Prompt Used (Few-Shot)

Write a Python function to count lines in a text file.



Examples:

A file with 3 lines → Output: 3

A file with 10 lines → Output: 10

AI-Generated Python Code

Explanation

- File opened in read mode
- readlines() returns list of lines

- Length of list equals number of lines

Overall Conclusion

- **Zero-shot** works well for simple, well-known problems
- **One-shot** helps clarify expected behavior
- **Few-shot** produces the best quality code for formatting and logic-heavy tasks
- Providing examples improves accuracy, readability, and confidence in AI outputs