

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

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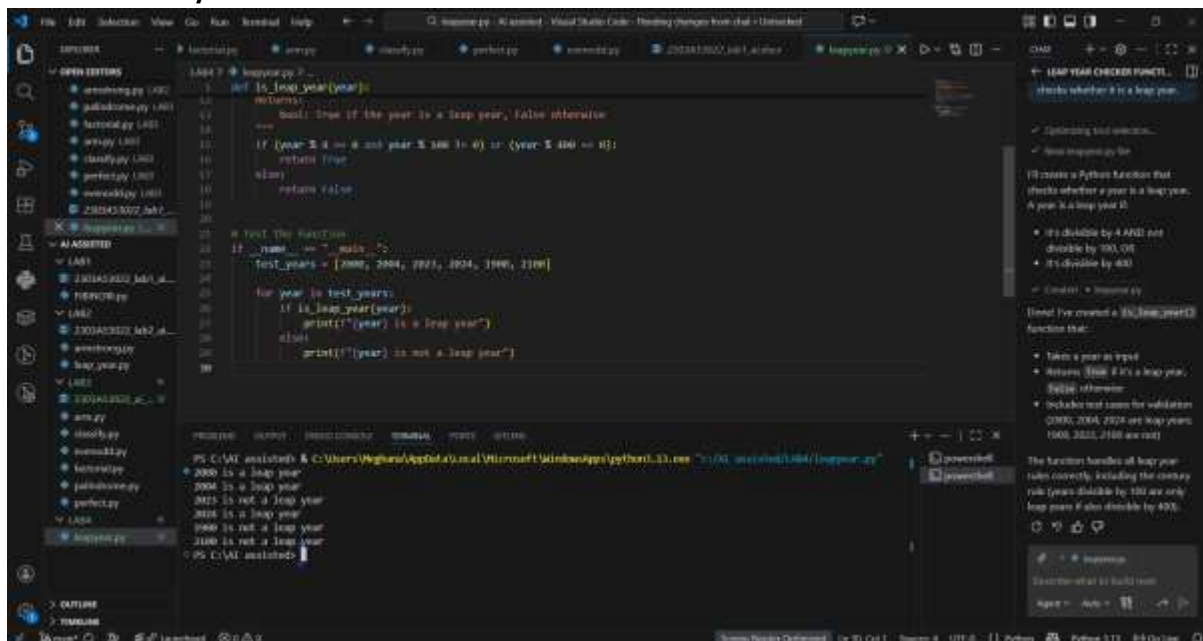
Batch no:47-A

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



```
def is_leap_year(year):  
    """  
    bool: True if the year is a leap year, False otherwise  
    """  
    if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):  
        return True  
    else:  
        return False  
  
# Test the function  
if __name__ == "__main__":  
    test_years = [2000, 2004, 2021, 2024, 2000, 2100]  
    for year in test_years:  
        if is_leap_year(year):  
            print(f"{year} is a leap year")  
        else:  
            print(f"{year} is not a leap year")
```

Output:

```
PS C:\AI assistant & C:\Users\Vignesh\AppData\Local\Microsoft\WindowsApps\python3.11.exe "C:\AI assistant\Lab4\leapyear.py"  
2000 is a leap year  
2004 is a leap year  
2021 is not a leap year  
2024 is a leap year  
2000 is not a leap year  
2100 is not a leap year  
PS C:\AI assistant >
```

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

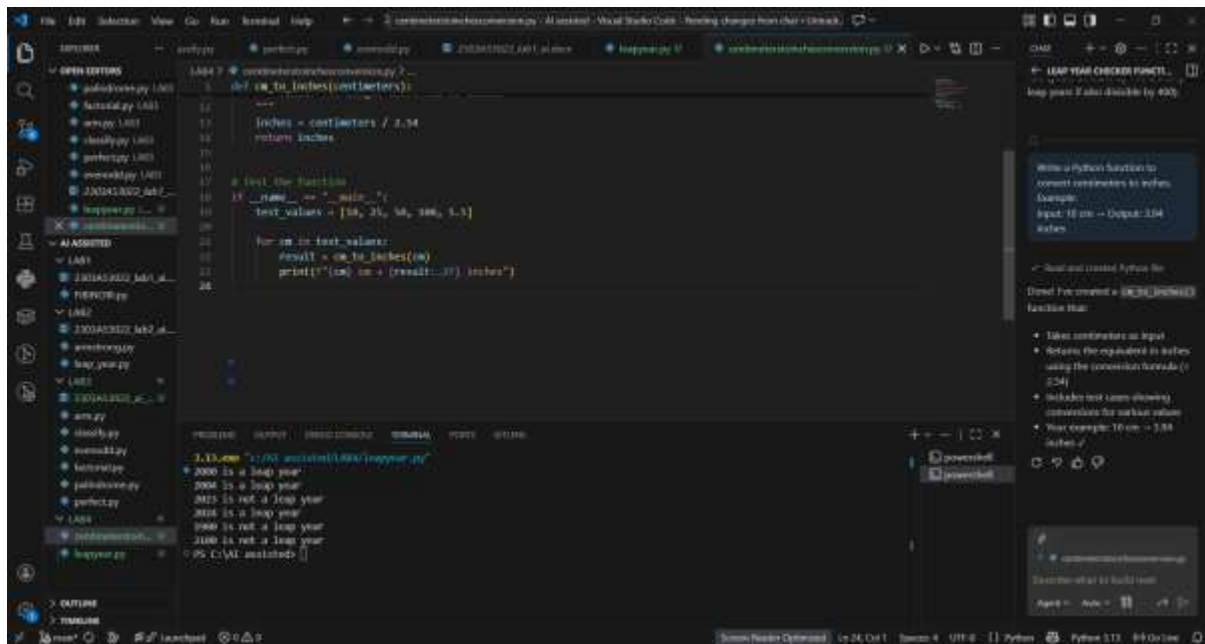
Prompt Used (One-Shot)

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)

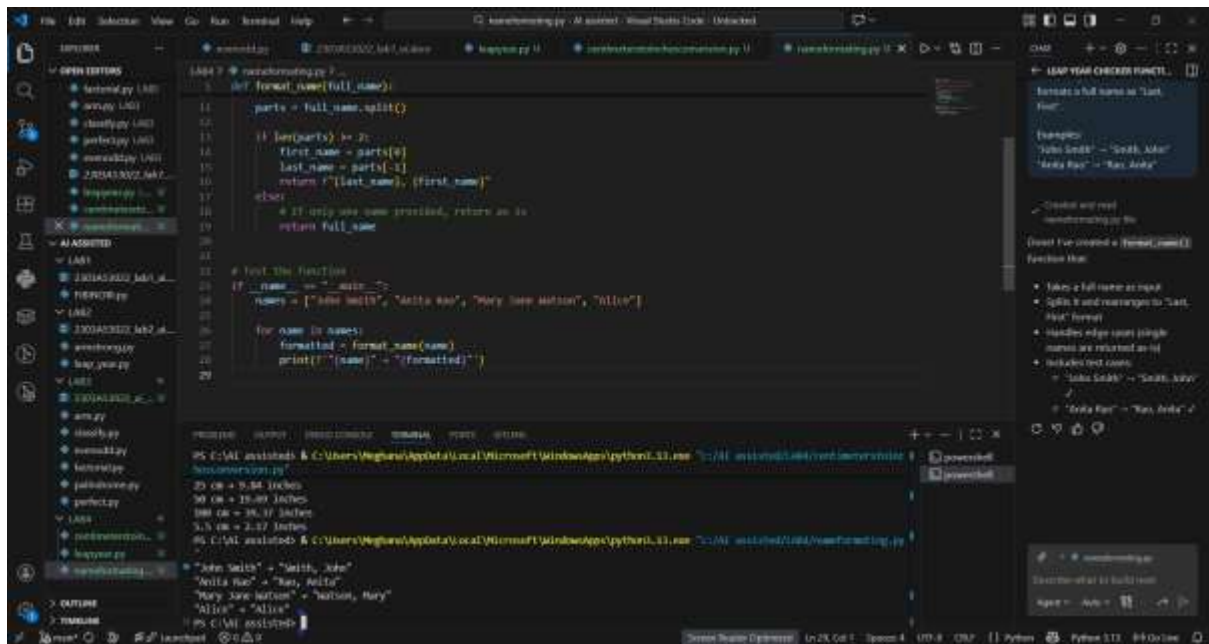
Write a Python function that formats a full name as "Last, First".

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

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.

```

def count_lines_v2(filename):
    """Count lines by reading all lines and getting the length."""
    try:
        with open(filename, "r") as file:
            lines = file.readlines()
            return len(lines)
        except FileNotFoundError:
            print(f"Error: File '{filename}' not found.")
            return -1

# Test the function
if __name__ == "__main__":
    # Create test file
    with open('test_file_lines.txt', 'w') as f:
        f.write("Line 1\nLine 2\nLine 3\n")

    with open('test_file_lines.txt', 'w') as f:
        for i in range(10):
            f.write(f"Line {i}\n")

    # Test counting lines
    print(count_lines_v2('test_file_lines.txt'))
  
```

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
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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