Assignment 3.1

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Batch - 14

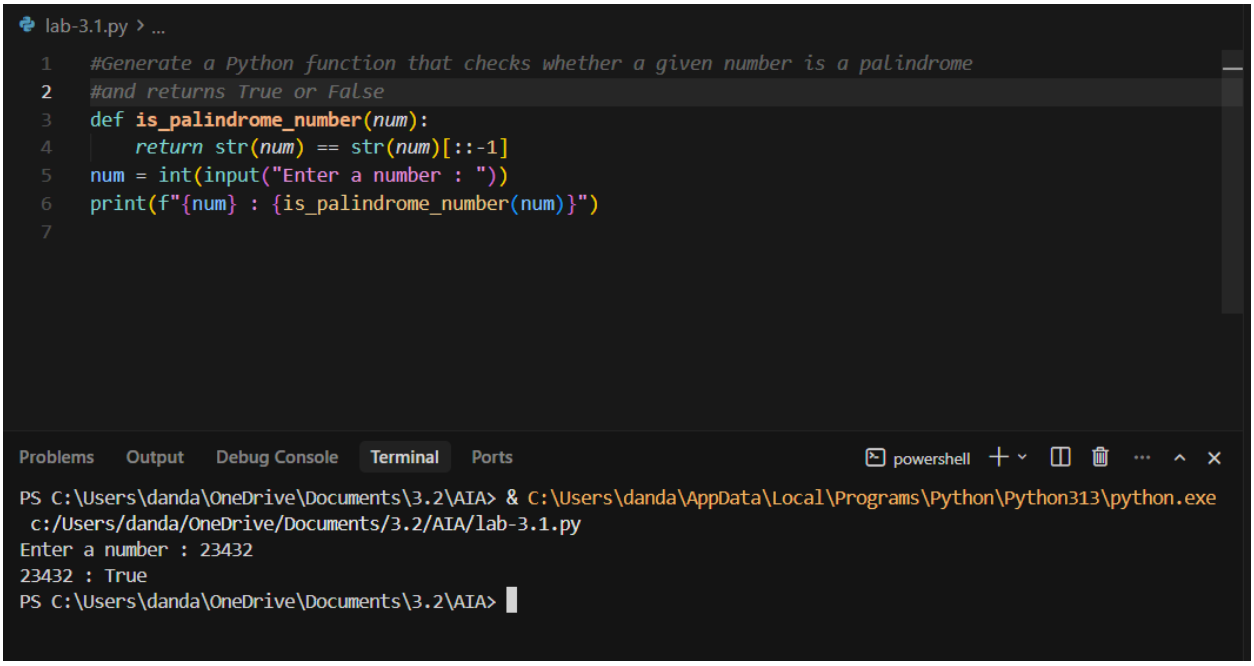
Lab Experiment: Prompt Engineering – Improving Prompts and Context Management

Question 1: Zero-Shot Prompting (Palindrome Number Program)

Prompt:

Write a Python function that checks whether a given number is a palindrome and returns True or False.

Code & Output:



Explanation:

- Define a function called is_palindrome_number that takes a single argument num.
- Convert the number to a string using str(num)
- Reverse the string using [::-1]
- Compare the original string with the reversed string using ==
- Return the result of the comparison
- Print the result of the function call

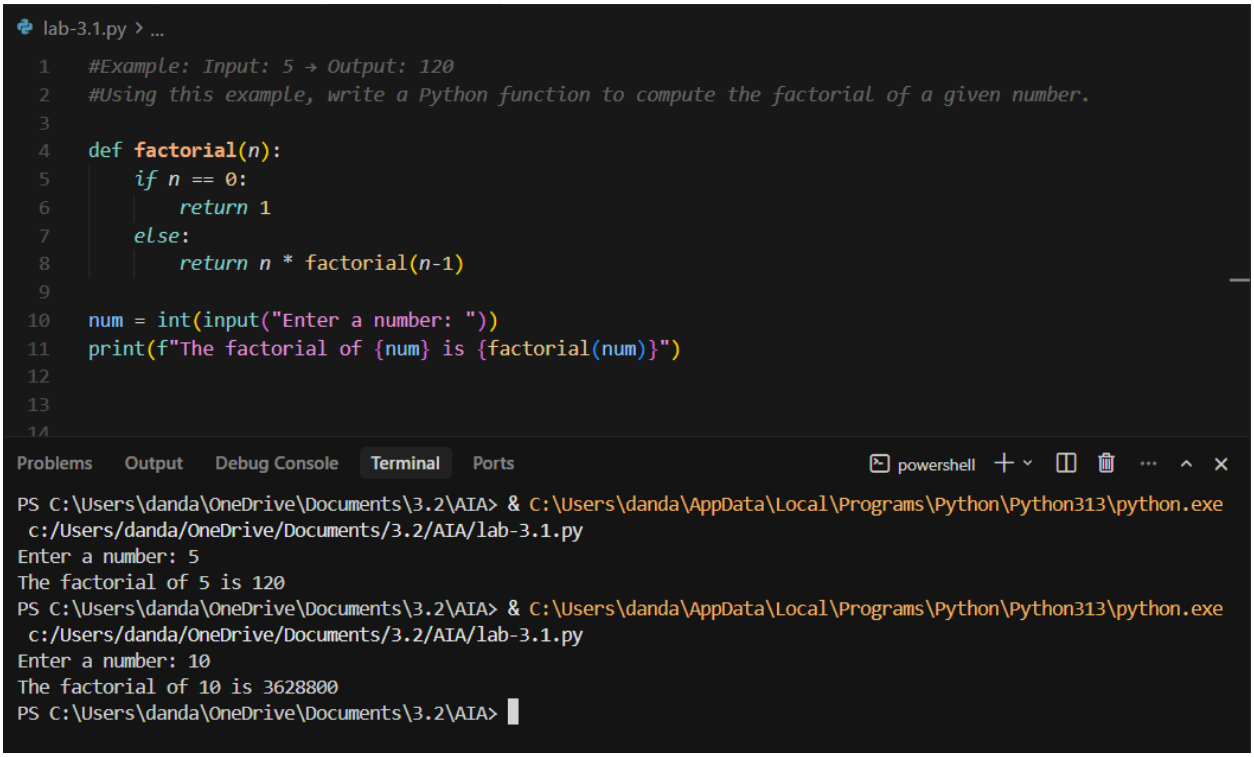
Question 2: One-Shot Prompting (Factorial Calculation)

Prompt:

Example: Input: 5 → Output: 120

Using this example, write a Python function to compute the factorial of a given number.

Code & Output :



Explanation:

- Define a function called factorial that takes a single argument n.
- If n is 0, return 1

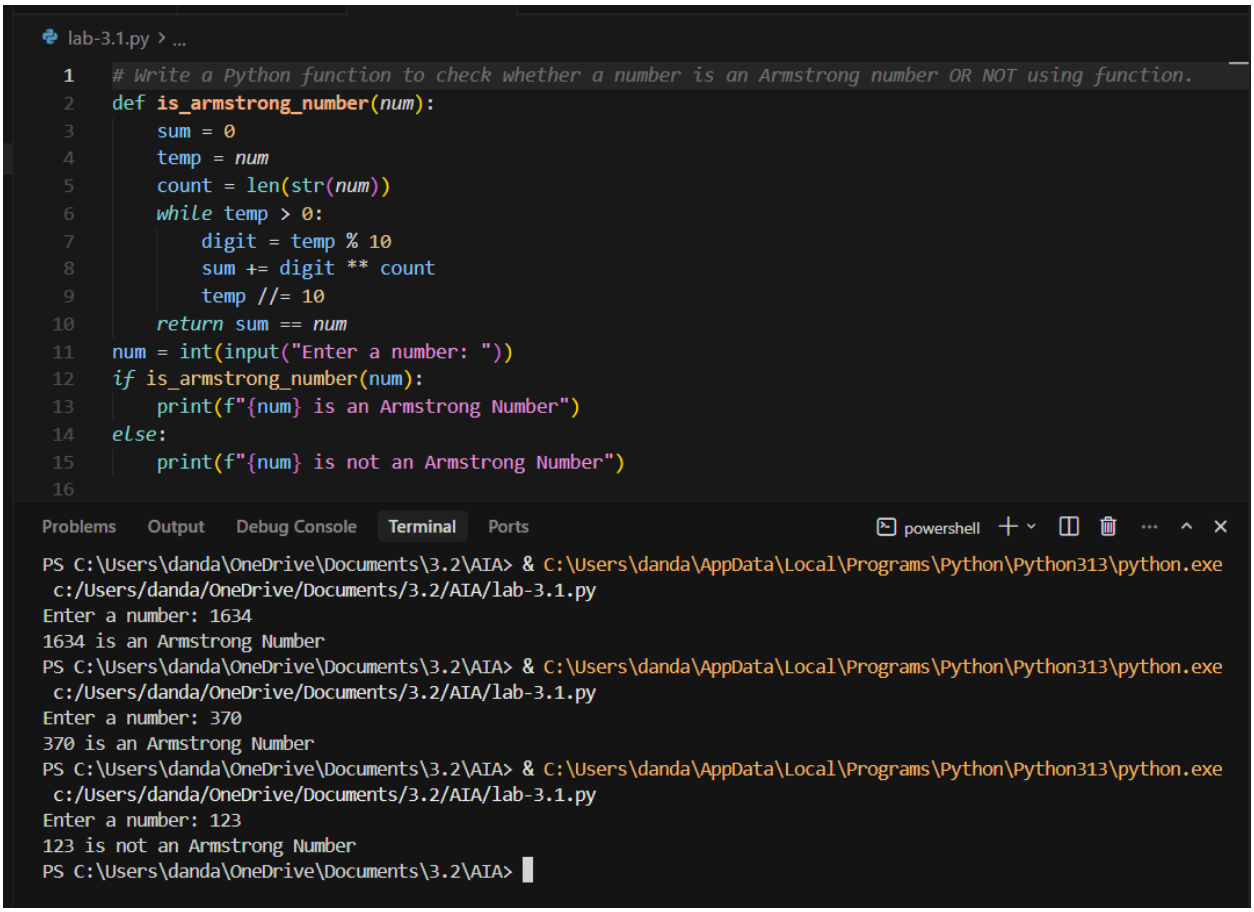
- Else, return n * factorial(n-1)
- Print the result of the function call

Question 3: Few-Shot Prompting (Armstrong Number Check)

Prompt:

Write a Python function to check whether a number is an Armstrong number.

Code & Output:



```
lab-3.1.py > ...
1   # Write a Python function to check whether a number is an Armstrong number OR NOT using function.
2   def is_armstrong_number(num):
3       sum = 0
4       temp = num
5       count = len(str(num))
6       while temp > 0:
7           digit = temp % 10
8           sum += digit ** count
9           temp //= 10
10      return sum == num
11  num = int(input("Enter a number: "))
12  if is_armstrong_number(num):
13      print(f"{num} is an Armstrong Number")
14  else:
15      print(f"{num} is not an Armstrong Number")
16
```

```
Problems  Output  Debug Console  Terminal  Ports        powershell
PS C:\Users\danda\OneDrive\Documents\3.2\AIA> & C:\Users\danda\AppData\Local\Programs\Python\Python313\python.exe
 c:/Users/danda/OneDrive/Documents/3.2/AIA/lab-3.1.py
Enter a number: 1634
1634 is an Armstrong Number
PS C:\Users\danda\OneDrive\Documents\3.2\AIA> & C:\Users\danda\AppData\Local\Programs\Python\Python313\python.exe
 c:/Users/danda/OneDrive/Documents/3.2/AIA/lab-3.1.py
Enter a number: 370
370 is an Armstrong Number
PS C:\Users\danda\OneDrive\Documents\3.2\AIA> & C:\Users\danda\AppData\Local\Programs\Python\Python313\python.exe
 c:/Users/danda/OneDrive/Documents/3.2/AIA/lab-3.1.py
Enter a number: 123
123 is not an Armstrong Number
PS C:\Users\danda\OneDrive\Documents\3.2\AIA>
```

Explanation:

- Define a function called is_armstrong_number that takes a single argument num.
- Initialize a variable called sum to 0.
- Initialize a variable called temp to num.
- Initialize a variable called count to the length of the number.

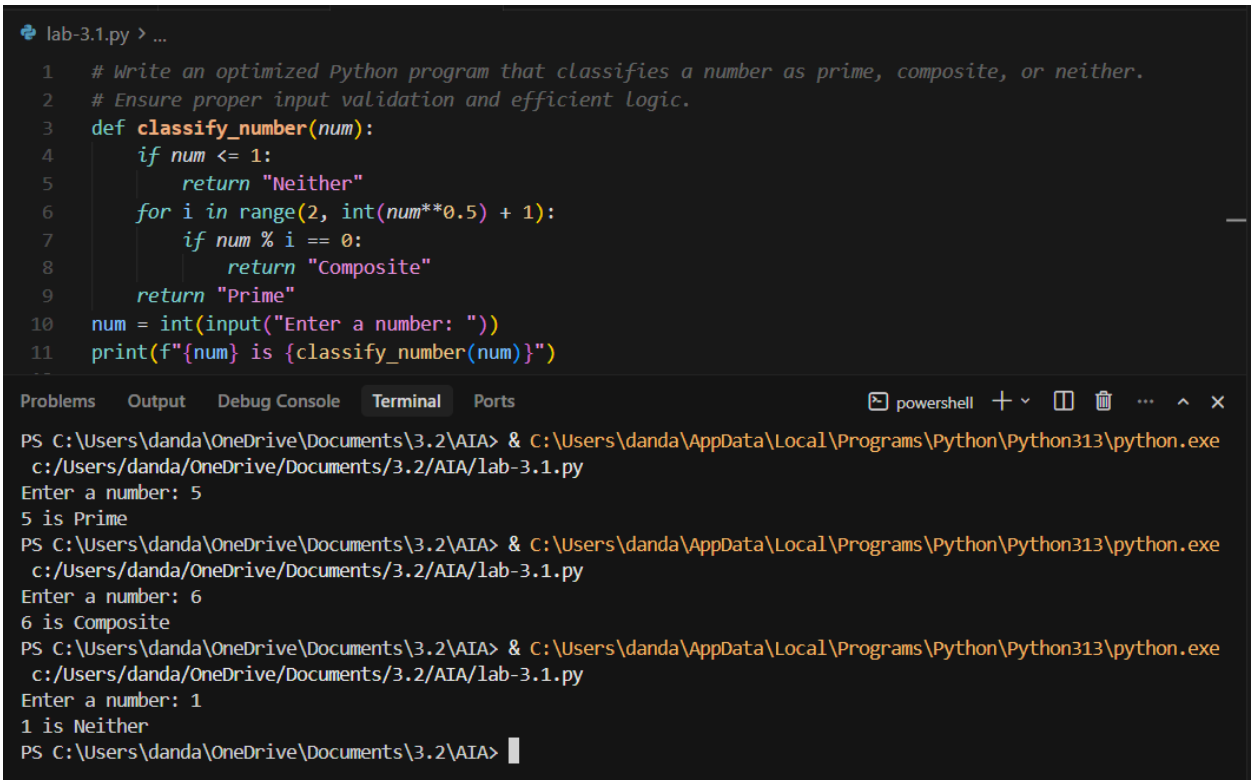
- While temp is greater than 0, do the following:
- Get the last digit of temp using temp % 10.
- Add the cube of the last digit to sum.
- Divide temp by 10 to remove the last digit.
- Return True if sum is equal to num, otherwise return False.
- Print the result of the function call.

Question 4: Context-Managed Prompting (Optimized Number Classification)

Prompt:

Write an optimized Python program that classifies a number as prime, composite, or neither. Ensure proper input validation and efficient logic.

Code & Output:



Explanation:

- Define a function called classify_number that takes a single argument num.

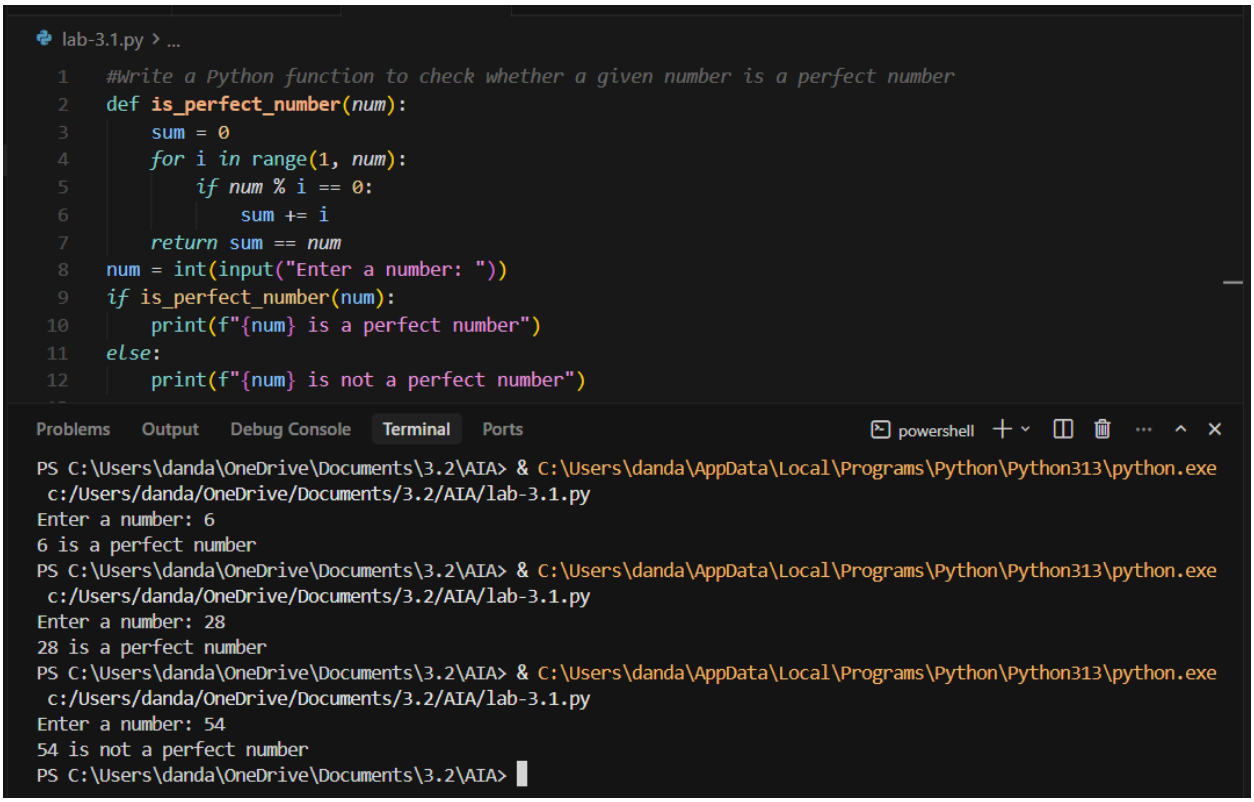
- If num is less than or equal to 1, return "Neither".
- For i in range (2, int(num**0.5) + 1), do the following:
- If num is divisible by i, return "Composite".
- Return "Prime".
- Print the result of the function call.

Question 5: Zero-Shot Prompting (Perfect Number Check)

Prompt:

Write a Python function to check whether a given number is a perfect number.

Code & Output:



Explanation:

- Define a function called is_perfect_number that takes a single argument num.
- Initialize a variable called sum to 0.
- For i in range (1, num), do the following:

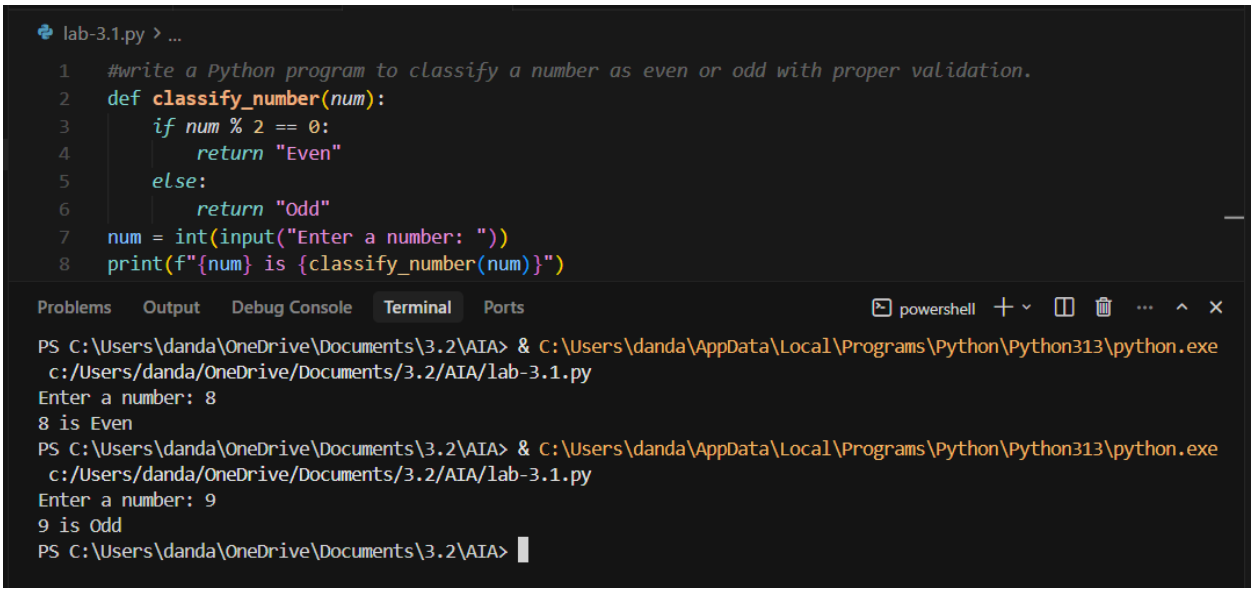
- If num is divisible by i, add i to sum.
- Return True if sum is equal to num, otherwise return False.
- Print the result of the function call.

Question 6: Few-Shot Prompting (Even or Odd Classification with Validation)

Prompt:

Write a Python program to classify a number as even or odd with proper validation.

Code & Output:



Explanation:

- Define a function called classify_number that takes a single argument num.
- If num is divisible by 2, return "Even".
- Else, return "Odd".
- Print the result of the function call.
- Print the number and the result of the function call.