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

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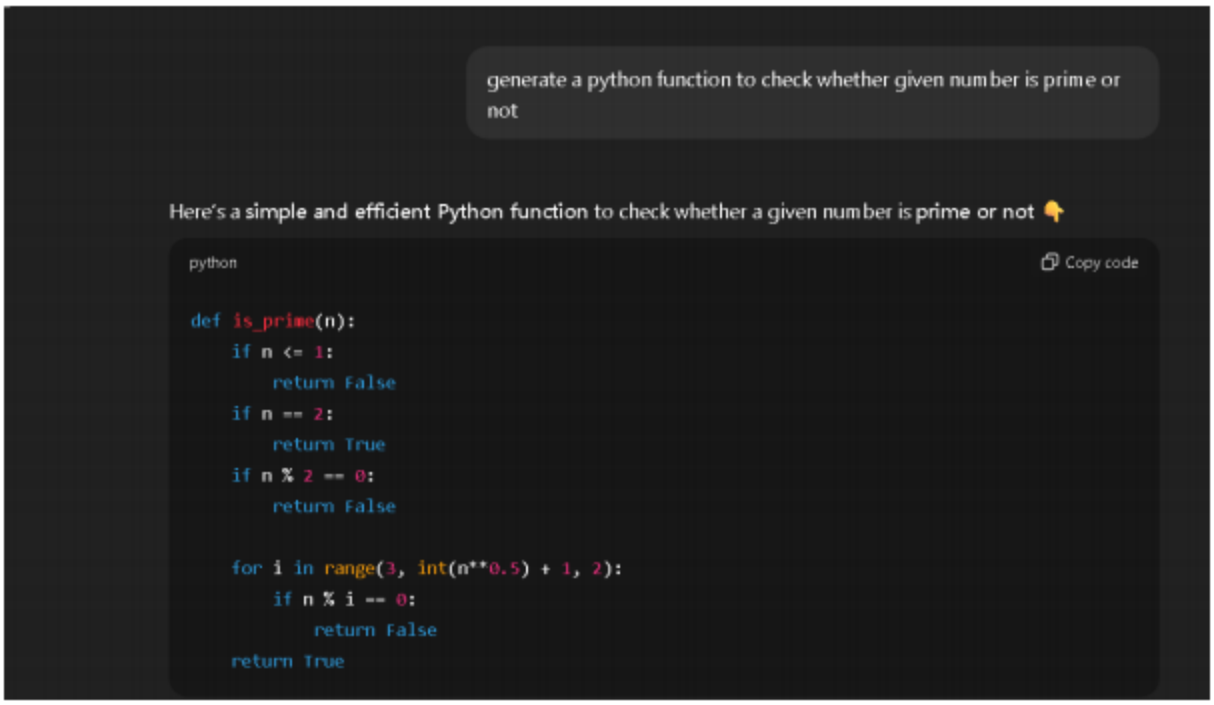
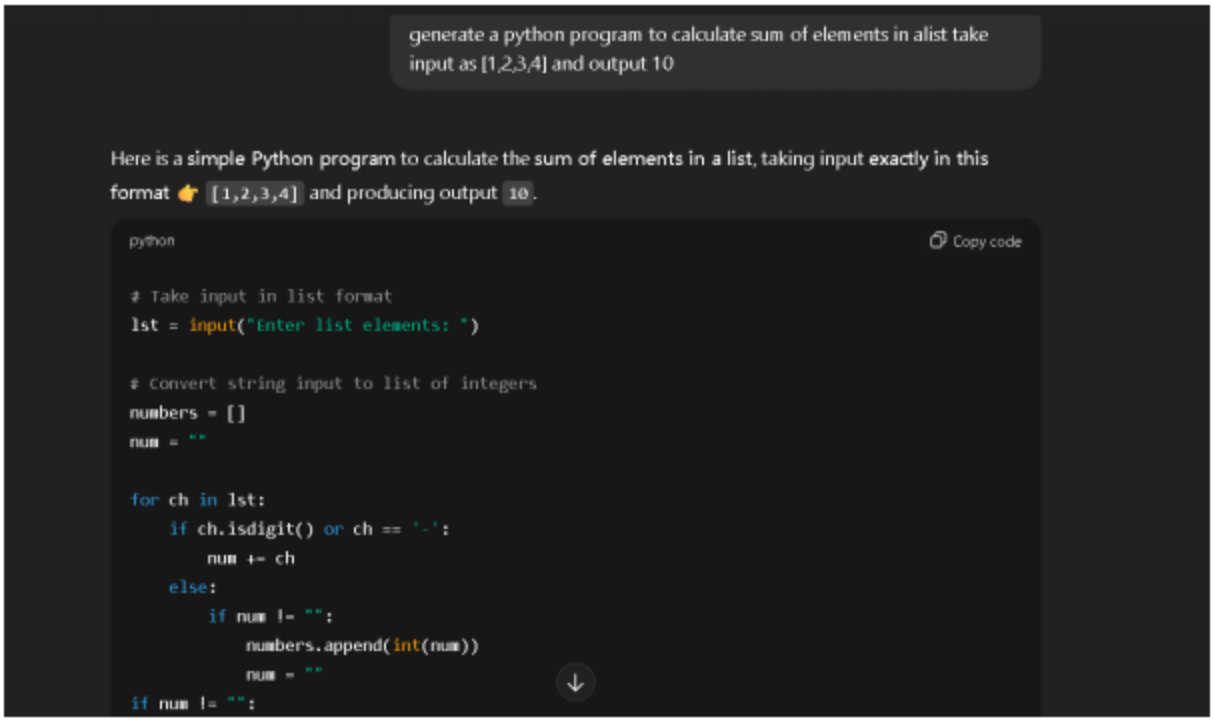
Task 1:

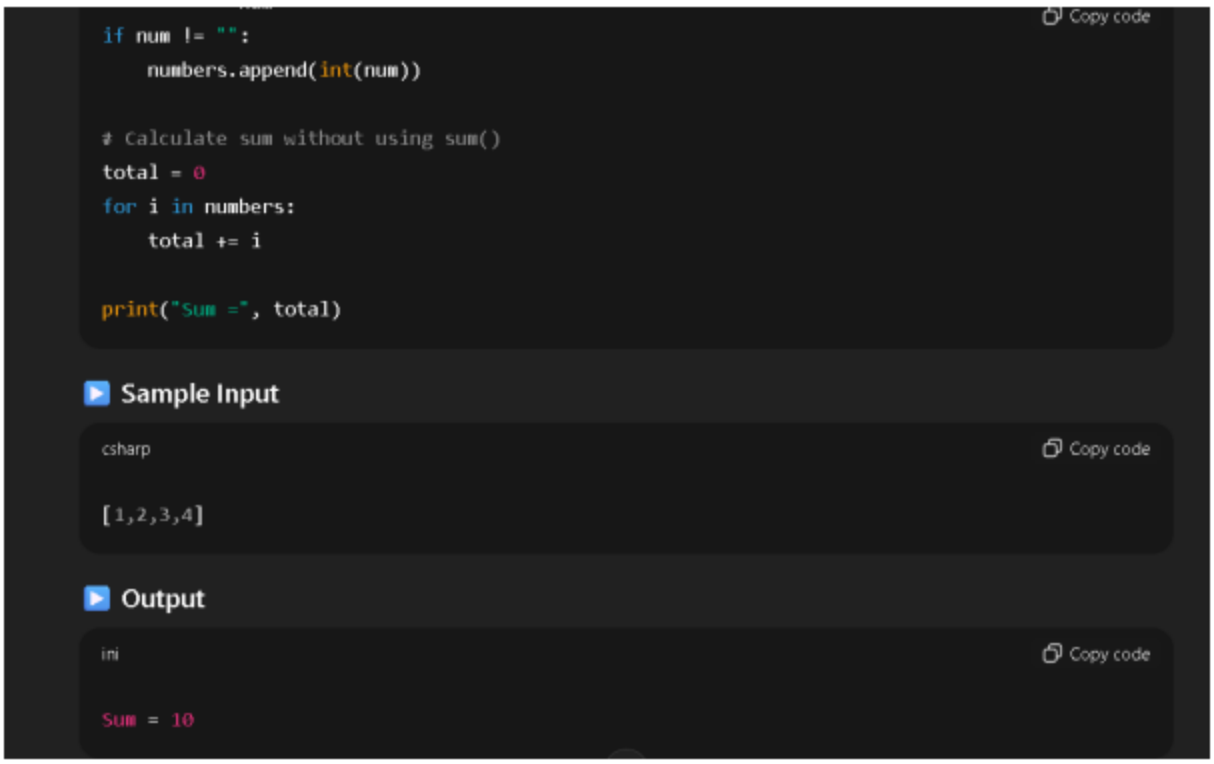
Zero-shot: Prompt AI with only the instruction. Write a Python function to determine whether a given number is prime



Task 2:

One-shot: Provide one example: Input: [1, 2, 3, 4], Output: 10 to help AI generate a function that calculates the sum of elements in a list





Task 3:

Few-shot: Give 2–3 examples to create a function that extracts digits from an alphanumeric string.

generate a python function to return digits from the alphanumeric strings examples like (input1:yash1020@ and output:1020,input2:yash@ output: ,input3:Priyu5122 output:5122)

Here is a clean Python function that extracts and returns digits from an alphanumeric string, exactly matching your examples 👇

python Copy code

```python
def extract_digits(s):
    result = ""
    for ch in s:
        if ch.isdigit():
            result += ch
    return result
```

▶️ Example Usage

python Copy code

```python
print(extract_digits("yash1020@"))   # Output: 1020
print(extract_digits("yash@"))       # Output:
print(extract_digits("Priyu5122"))   # Output: 5122
```

Task 4:

Compare zero-shot vs few-shot prompting for generating a function that counts the number of vowels in a string.

Write a Python function to count the number of vowels in a string.

Here is a simple and correct Python function to count the number of vowels in a string 👇

python Copy code

```python
def count_vowels(s):
    vowels = "aeiouAEIOU"
    count = 0
    for ch in s:
        if ch in vowels:
            count += 1
    return count
```

▶️ Example Usage

python Copy code

```python
print(count_vowels("hello"))     # Output: 2
print(count_vowels("AEIOU"))     # Output: 5
print(count_vowels("python"))    # Output: 1
```

Example 1:
Input: "hello" → Output: 2

Example 2:
Input: "AEIOU" → Output: 5

Example 3:
Input: "xyz" → Output: 0

Now write a Python function to count the number of vowels in a string.

Here is a Python function that matches all the given examples:

python Copy code

```python
def count_vowels(s):
    count = 0
    for ch in s.lower():
        if ch in ['a', 'e', 'i', 'o', 'u']:
            count += 1
    return count
```

3 Output Comparison Table

Aspect	Zero-Shot	Few-Shot
Examples provided	❌ No	✅ Yes
Case handling	Implicit	Explicit (from examples)
Output reliability	Good	Better
Control over logic	Low	High
Suitability for exams/interviews	Good	Very Good

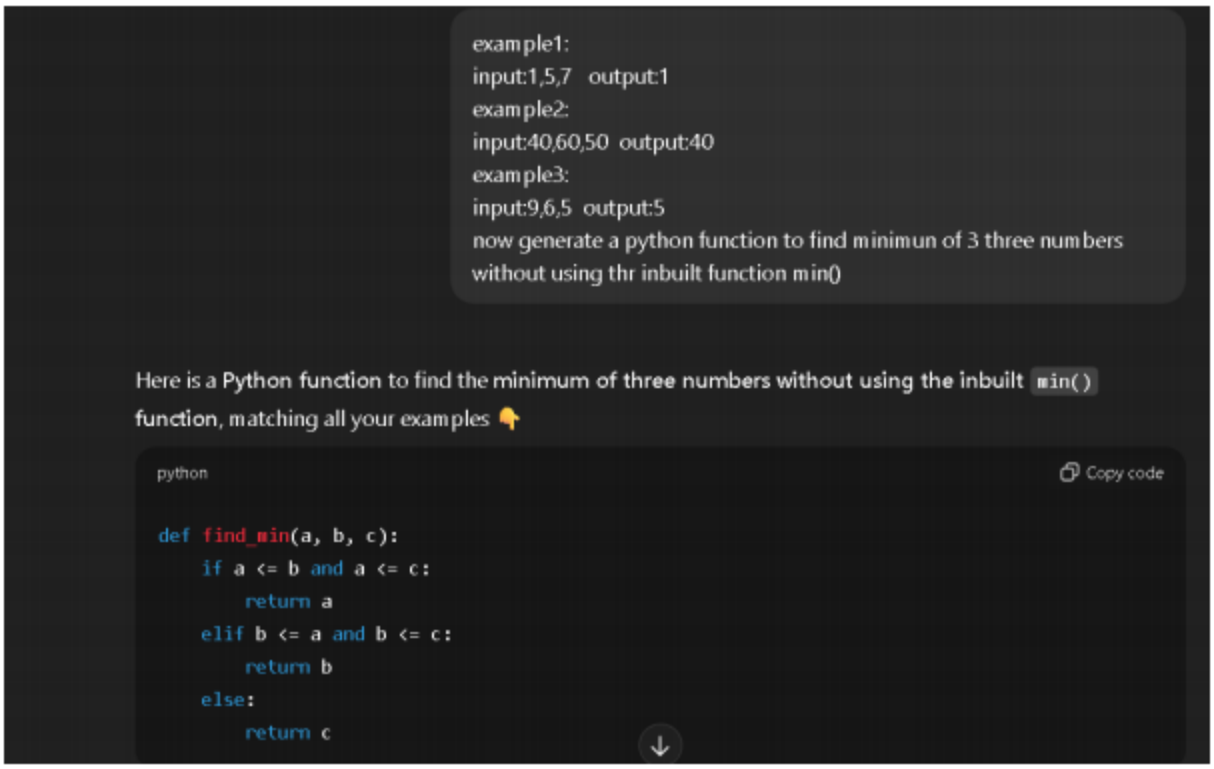
Explanation:

In zero-shot prompting, the model generates the function using its general understanding of programming and vowels. Since no examples are given, the model decides on its own how to handle cases like uppercase letters.

In few-shot prompting, the examples clearly show what the expected input and output look like. From these examples, the model learns important rules such as:

- Uppercase vowels should be counted
- Strings without vowels should return 0

Because of this guidance, the model produces a more accurate and user-aligned function. Examples act like hints, reducing ambiguity and improving correctness.

Task 5:

Use few-shot prompting with 3 sample inputs to generate a function that determines the minimum of three numbers without using the built-in min() function.