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Batch : 51

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

### Task 1: Zero-shot Prompting

#### Prompt:

Write a Python function to determine whether a given number is prime.

#### Code :

```
AI-4.2.py •
AI-4.2.py > is_prime
1 #Write a Python function to determine whether a given number is prime.
2 def is_prime(n):
3     """Check if a number is prime.
4     Args:
5         n (int): The number to check.
6     Returns:
7         bool: True if n is prime, False otherwise.
8     """
9     if n <= 1:
10         return False
11     for i in range(2, int(n**0.5) + 1):
12         if n % i == 0:
13             return False
14     return True
15 # Example usage:
16 print(is_prime(17)) # Output: True
17 print(is_prime(15)) # Output: False
```

#### Explanation

- Uses only instruction, no examples. □ Checks divisibility up to  $\sqrt{n}$ .
- Correctly handles non-prime cases.

**Output :**



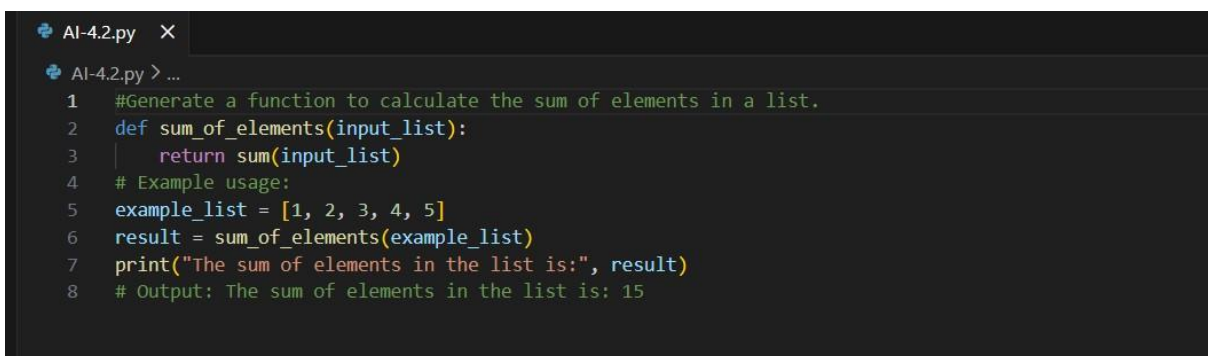
```
PS C:\Users\deept\Downloads\DevOps.3-2> c:; cd 'c:\Users\deept\Downloads\DevOps.3-2'; & 'C:\Users\deept\AppData\Local\Microsoft\Python\Python313\python.exe' 'c:\Users\deept\.vscode\extensions\ms-python.debugpy-2025.19.2026011901-win32-x64\bu...'
True
PS C:\Users\deept\Downloads\DevOps.3-2> c:; cd 'c:\Users\deept\Downloads\DevOps.3-2'; & 'C:\Users\deept\AppData\Local\Microsoft\Python\Python313\python.exe' 'c:\Users\deept\.vscode\extensions\ms-python.debugpy-2025.19.2026011901-win32-x64\bu...'
True
PS C:\Users\deept\Downloads\DevOps.3-2> c:; cd 'c:\Users\deept\Downloads\DevOps.3-2'; & 'C:\Users\deept\AppData\Local\Microsoft\Python\Python313\python.exe' 'c:\Users\deept\.vscode\extensions\ms-python.debugpy-2025.19.2026011901-win32-x64\bu...'
True
PS C:\Users\deept\Downloads\DevOps.3-2>
```

## Task 2: One-shot Prompting

**Prompt:**

Generate a function to calculate the sum of elements in a list.

**Code :**



```
AI-4.2.py
1 #Generate a function to calculate the sum of elements in a list.
2 def sum_of_elements(input_list):
3     return sum(input_list)
4 # Example usage:
5 example_list = [1, 2, 3, 4, 5]
6 result = sum_of_elements(example_list)
7 print("The sum of elements in the list is:", result)
8 # Output: The sum of elements in the list is: 15
```

**Explanation**

- Single example guides the logic.
- Iterates through list and adds elements.

**Output :**



```
PS C:\Users\deept\Downloads\DevOps.3-2> c:; cd 'c:\Users\deept\Downloads\DevOps.3-2'; & 'C:\Users\deept\AppData\Local\Microsoft\Python\Python313\python.exe' 'c:\Users\deept\.vscode\extensions\ms-python.debugpy-2025.19.2026011901-win32-x64\bu...'
The sum of elements in the list is: 15
```

## Task 3: Few-shot Prompting Prompt

:

Write a Python function that takes an alphanumeric string and returns only the digits.

## Code :

```
AI-4.2.py X
AI-4.2.py > ...
1 #write a Python function that takes an alphanumeric string and returns only the digits.
2 def extract_digits(alphanumeric_string):
3     digits = ''.join(filter(str.isdigit, alphanumeric_string))
4     return digits
5 # Example usage:
6 input_string = "a1b2c3d4e5"
7 result = extract_digits(input_string)
8 print(result) # Output: 12345
9
10
```

## Explanation

- Multiple examples clarify pattern.
- Extracts only numeric characters.

## Output :

```
ms\Python\Python313\python.exe 'c:\Users\deept\.vscode\extensions\ms-python.debugpy-2025.19.2026011901-win32-x64\bin
• s\debugpy\launcher' '51269' '--' 'C:\Users\deept\Downloads\DevOps.3-2\AI-4.2.py'
12345
```

## Task 4: Zero-shot vs Few-shot Comparison (Vowel Count)

### Prompt :

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

## Code :

```
AI-4.2.py X
AI-4.2.py > ...
1 #Write a Python function to count the number of vowels in a given string.
2 def count_vowels(input_string):
3     vowels = "aeiouAEIOU"
4     count = 0
5     for char in input_string:
6         if char in vowels:
7             count += 1
8     return count
9 # Example usage:
10 input_str = "Hello, World!"
11 print(f"Number of vowels in '{input_str}': {count_vowels(input_str)}")
12 # Output: Number of vowels in 'Hello, World!': 3
13
```

## Comparison Explanation

- **Zero-shot:** Basic and longer logic.
- **Few-shot:** More optimized and concise.
- Examples help AI improve clarity and efficiency.

**Output :**

```
ms-python\python313\python.exe -c: (Users\deept\vscode\extensions\ms-python.debugpy-2025.19.2026011901-win32-x64)
s\debugpy\launcher' '61501' '--' 'C:\Users\deept\Downloads\DevOps.3-2\AI-4.2.py'
Number of vowels in 'Hello, World!': 3
```

## Task 5: Few-shot Prompting (Minimum of Three Numbers) Prompt

:

write a Python function that takes three numbers and returns the minimum value without using min().

**Code :**

```
AI-4.2.py X
AI-4.2.py > ...
1  #write a Python function that takes three numbers and returns the minimum value without using min().
2  def find_minimum(a, b, c):
3      if a <= b and a <= c:
4          return a
5      elif b <= a and b <= c:
6          return b
7      else:
8          return c
9  # Example usage:
10 print(find_minimum(3, 1, 2)) # Output: 1
11 print(find_minimum(-5, -10, -3)) # Output: -10
12
```

## Explanation

- Uses conditional logic.
- Does not use built-in `min()`.
- Covers all comparison cases.

**Output :**

```
PS C:\Users\deept\Downloads\DevOps.3-2> python AI-4.2.py
1
-10
```