

## ASSIGNMENT-4.2

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

#### Task Description-1

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

```
def is_prime(num):  
    if not isinstance(num, int):  
        print("Input must be an integer.")  
        return False  
  
    if num <= 1:  
        print("Input must be greater than 1.")  
        return False  
  
    for i in range(2, int(num**0.5) + 1):  
        if num % i == 0:  
            print(f"{num} is not a prime number.")  
            return False  
  
    print(f"{num} is a prime number.")  
    return True  
is_prime(29)  
is_prime(9)  
is_prime(15)  
is_prime(2)
```

Output:

```
29 is a prime number.  
9 is not a prime number.  
15 is not a prime number.  
2 is a prime number.
```

## Task Description-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.

```
1  '''Input: [1, 2, 3, 4], Output: 10 generate a function that calculates the sum of elements in a list.'''
2  def sum_of_elements(input_list):
3      return sum(input_list)
4  print(sum_of_elements([1, 2, 4, 4])) # Output: 10
```

Output:

```
STERS\6TH SEM\AI assistant coding ;
ms-python.debugpy-2025.18.0-win32-x
M\AI assistant coding\20th jan.py'
11
```

## Task Description-3

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

```
20th jan.py -->
C: > Users > LOKESH > Downloads > College files > ALL SEMESTERS > 6TH SEM > AI assistant coding > 20th jan.py > ..
1  # Examples:
2  # Input: "a1b2c3" → Output: "123"
3  # Input: "abc456" → Output: "456"
4  # Input: "9x8y7" → Output: "987"
5  #
6  # Write a Python function that extracts and returns only the digits
7  # from an alphanumeric string in the same order.
8  def extract_digits(input_string):
9      return ''.join([char for char in input_string if char.isdigit()])
10
11 # Test cases
12 print(extract_digits("a1b2c3")) # Output: "123"
13 print(extract_digits("abc456")) # Output: "456"
14 print(extract_digits("9x8y7")) # Output: "987"
15 print(extract_digits("no_digits")) # Output: ""
16 print(extract_digits("123abc456")) # Output: "123456"
17
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\LOKESH> & C:/Users/LOKESH/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/LOKESH/6TH SEM/AI assistant coding/20th jan.py"
123
456
987

123456
PS C:\Users\LOKESH>
```

## Task Description-4

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

### Zero-shot:

```
20th jan.py X
C: > Users > LOKESH > Downloads > College files > ALL SEMESTERS > 6TH SEM > AI assistant coding > 20th jan.py > ...
1 #Write a Python function that counts the number of vowels in a 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 result = count_vowels("Hello World")
11 print(f"Number of vowels: {result}") # Output: Number of vowels: 3
12
```

```
> & C:/Users/LOKESH/AppData/
/6TH SEM/AI assistant coding/20th jan.py"
Number of vowels: 3
```

### Few-Shot:

```
20th jan.py X
C: > Users > LOKESH > Downloads > College files > ALL SEMESTERS > 6TH SEM > AI assistant coding > 20th jan.py > ...
2 #Input: "hello" → Output: 2
3 #Input: "AEIOU" → Output: 5
4 #Input: "python" → Output: 1
5
6 #Write a Python function that counts the number of vowels in a string.
7 def count_vowels(input_string):
8     vowels = "aeiouAEIOU"
9     count = 0
10    for char in input_string:
11        if char in vowels:
12            count += 1
13    return count
14 #Test the function
15 test_string = "hello"
16 print(f"Number of vowels in '{test_string}': {count_vowels(test_string)}")
17 #Input: "hello" → Output: 2
18
```

```
S C:\Users\LOKESH> & C:/Users/LOK  
6TH SEM/AI assistant coding/20th  
umber of vowels in 'hello': 2
```

### Explanation:

The zero-shot prompt generated a correct but lengthy solution using basic logic. The few-shot prompt, supported by examples, helped the model understand the pattern clearly and produce a shorter and more optimized solution. Thus, examples improve both clarity and efficiency of the output.

### Task Description-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.

```
C: > Users > LOKESH > Downloads > College files > ALL SEMESTERS > 6TH SEM > AI assistant coding > 20th jan.py > minimum_of_three  
1     '''Examples:  
2     Input: (3, 5, 1) → Output: 1  
3     Input: (10, 7, 9) → Output: 7  
4     Input: (4, 4, 6) → Output: 4  
5  
6     Write a Python function that determines the minimum of three numbers without using the built-in min() function.'''  
7     def minimum_of_three(a, b, c):  
8         if a <= b and a <= c:  
9             return a  
10        elif b <= a and b <= c:  
11            return b  
12        else:  
13            return c  
14    # Example usage:  
15    print(minimum_of_three(3, 5, 1)) # Output: 1  
16
```

```
PS C:\Users\LOKESH> & C:/  
6TH SEM/AI assistant cod  
1
```

