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.

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

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```
# Examples:
# Input: "a1b2c3" → Output: "123"
# Input: "abc456" → Output: "456"
# Input: "9x8y7" → Output: "987"
#
# Write a Python function that extracts and returns only the digits
# from an alphanumeric string in the same order.
def extract_digits(input_string):
    return ''.join([char for char in input_string if char.isdigit()])

# Test cases
print(extract_digits("a1b2c3"))  # Output: "123"
print(extract_digits("abc456"))   # Output: "456"
print(extract_digits("9x8y7"))    # Output: "987"
print(extract_digits("no_digits")) # Output: ""
print(extract_digits("123abc456")) # Output: "123456"
```

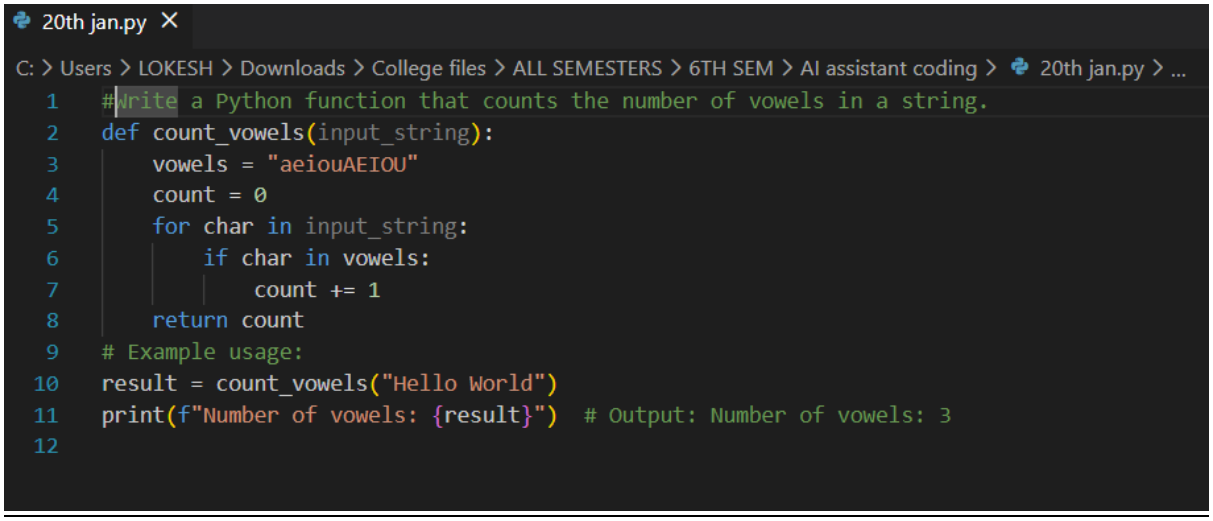
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

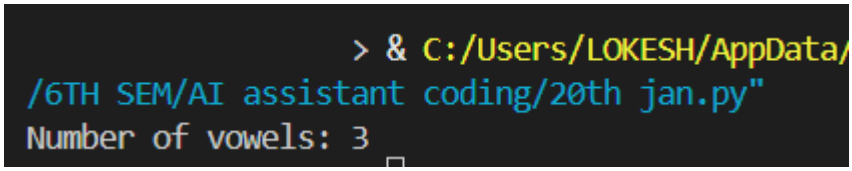
```
PS C:\Users\LOKESH> & C:/Users/LOKESH/AppData/Local/Programs/Python/Python313/python.exe "c:/Users
/6TH SEM/AI assistant coding/20th jan.py"
123
456
987

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

Task Description-4

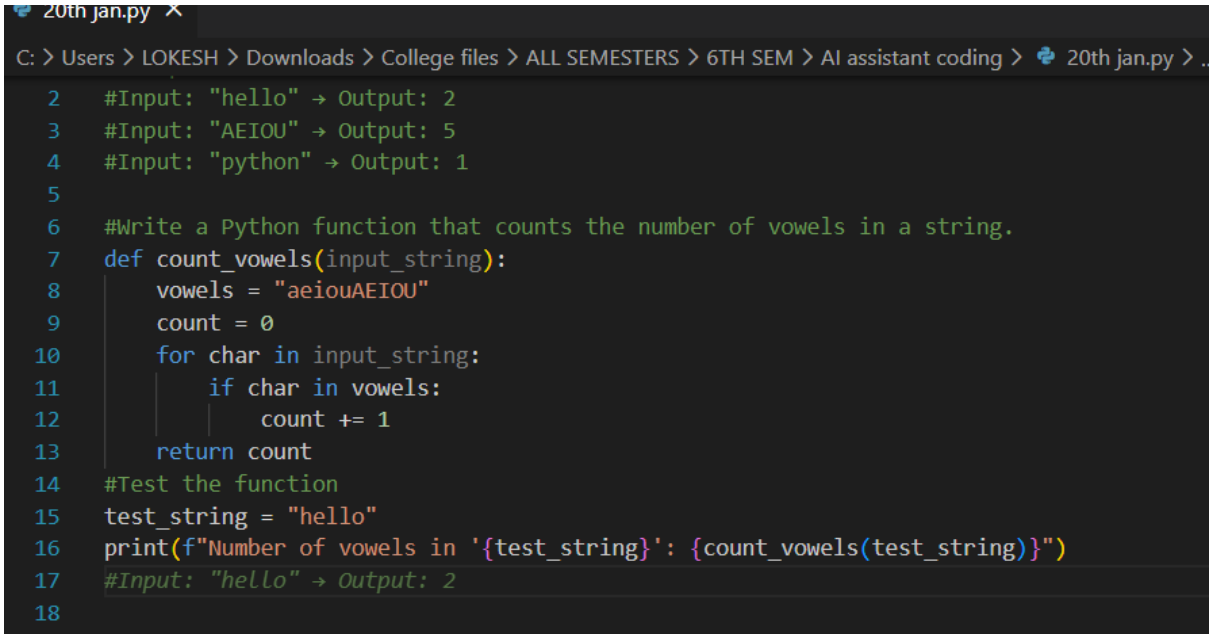
- Compare zero-shot vs few-shot prompting for generating a function that counts the number of vowels in a string.

Zero-shot:





Few-Shot:



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

Explaination:

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.

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```python
'''Examples:
Input: (3, 5, 1) → Output: 1
Input: (10, 7, 9) → Output: 7
Input: (4, 4, 6) → Output: 4

Write a Python function that determines the minimum of three numbers without using the built-in min() function.'''
def minimum_of_three(a, b, c):
    if a <= b and a <= c:
        return a
    elif b <= a and b <= c:
        return b
    else:
        return c
# Example usage:
print(minimum_of_three(3, 5, 1))  # Output: 1

```

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