

AI Assisted Coding – Assignment 4.2

Course Code: 23CS002PC304

Course Title: AI Assisted Coding

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

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Regulation: R23

Task Description – 1: Zero-shot Prompting

Prompt Used (Zero-shot)

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

Code

```
def is_prime(n):
    if n <= 1:
        return False
    for i in range(2, int(n ** 0.5) + 1):
        if n % i == 0:
            return False
    return True
```

Explanation

- Zero-shot prompting provides only instructions without examples.
- The function checks divisibility from 2 to \sqrt{n} .
- If any divisor exists, the number is not prime.

Sample Output

- `is_prime(7) → True`
- `is_prime(10) → False`

```
main.py
1 def is_prime(n):
2     if n <= 1:
3         return False
4     for i in range(2, int(n ** 0.5) + 1):
5         if n % i == 0:
6             return False
7     return True
8
9 print(is_prime(7))
10 print(is_prime(10))
11
```

Output:
True
False

Task Description – 2: One-shot Prompting

Prompt Used (One-shot)

“Input: [1, 2, 3, 4], Output: 10. Write a Python function that calculates the sum of elements in a list.”

Code

```
def sum_list(lst):
    total = 0
    for num in lst:
        total += num
    return total
```

Explanation

- One example guides the AI toward summation logic.
- Iterates through the list and accumulates the total.

Sample Output

- `sum_list([1, 2, 3, 4]) → 10`

Screenshot Placeholder:

```
main.py
1 def sum_list(lst):
2     total = 0
3     for num in lst:
4         total += num
5     return total
6
7 print(sum_list([1, 2, 3, 4]))
8
9
```

Output:
10
== Code Execution Successful ==

Task Description – 3: Few-shot Prompting

Prompt Used (Few-shot)

“Input: ‘a1b2c3’ → Output: ‘123’

Input: ‘abc456’ → Output: ‘456’

Input: ‘9x8y’ → Output: ‘98’

Write a Python function to extract digits from an alphanumeric string.”

Code

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

Explanation

- Multiple examples clarify the pattern.
- Digits are identified using `isdigit()`.

Sample Output

- `extract_digits("a1b2c3") → "123"`

main.py	Run	Output
1- def extract_digits(s): 2- result = "" 3- for ch in s: 4- if ch.isdigit(): 5- result += ch 6- return result 7- 8- print(extract_digits("a1b2c3")) 9- print(extract_digits("abc456")) 10- print(extract_digits("9x8y")) 11- 12-	[Run]	123 456 98 ==== Code Execution Successful ===
•		

Task Description – 4: Zero-shot vs Few-shot Comparison

Zero-shot Prompt

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

Zero-shot Code

```
def count_vowels_zero(s):
    vowels = "aeiouAEIOU"
    count = 0
    for ch in s:
        if ch in vowels:
```

```
        count += 1
return count
```

Few-shot Prompt

“Input: ‘hello’ → Output: 2

Input: ‘AI’ → Output: 2

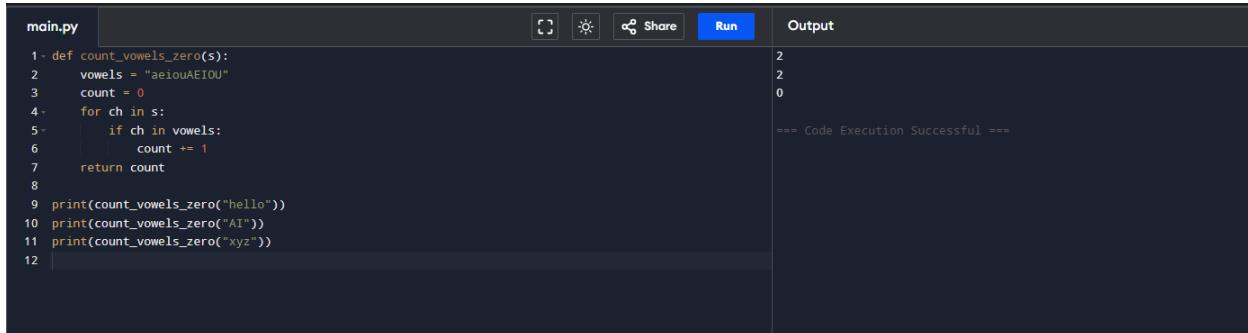
Input: ‘xyz’ → Output: 0

Write a Python function to count vowels in a string.”

Few-shot Code

```
def count_vowels_few(s):
    vowels = "aeiouAEIOU"
    return sum(1 for ch in s if ch in vowels)
```

 **Screenshot Placeholder (Zero-shot vowel count):** > Paste screenshot of zero-shot code execution and output here.

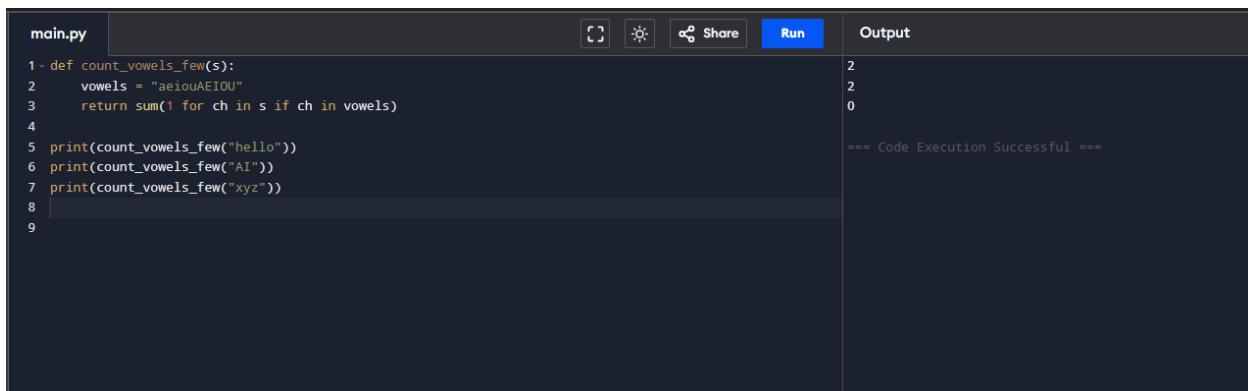


The screenshot shows a code editor window titled 'main.py'. The code defines a function 'count_vowels_zero' that iterates through each character in a string 's', checks if it is a vowel (using a string 'vowels' containing both lowercase and uppercase vowels), and increments a counter 'count' if true. The code then prints the value of 'count' for three test cases: 'hello', 'AI', and 'xyz'. The output panel shows the results: 2, 2, and 0 respectively, followed by a success message.

```
main.py
1 def count_vowels_zero(s):
2     vowels = "aeiouAEIOU"
3     count = 0
4     for ch in s:
5         if ch in vowels:
6             count += 1
7     return count
8
9 print(count_vowels_zero("hello"))
10 print(count_vowels_zero("AI"))
11 print(count_vowels_zero("xyz"))

Output
2
2
0
==== Code Execution Successful ===
```

 **Screenshot Placeholder (Few-shot vowel count):**



The screenshot shows a code editor window titled 'main.py'. The code defines a function 'count_vowels_few' which is identical to the one in the zero-shot example, using a loop and a generator expression to count vowels in a string. It is tested with the same three inputs ('hello', 'AI', 'xyz') and produces the same output (2, 2, 0) in the output panel, followed by a success message.

```
main.py
1 def count_vowels_few(s):
2     vowels = "aeiouAEIOU"
3     return sum(1 for ch in s if ch in vowels)
4
5 print(count_vowels_few("hello"))
6 print(count_vowels_few("AI"))
7 print(count_vowels_few("xyz"))

Output
2
2
0
==== Code Execution Successful ===
```

Comparison & Explanation

- Zero-shot gives a basic loop-based solution.
- Few-shot improves clarity and efficiency.
- Examples help AI understand edge cases.

Task Description – 5: Few-shot Prompting (Minimum of Three Numbers)

Prompt Used (Few-shot)

“Input: (3, 5, 1) → Output: 1

Input: (10, 2, 7) → Output: 2

Input: (4, 4, 9) → Output: 4

Write a Python function to find the minimum of three numbers without using min().”

Code

```
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
```

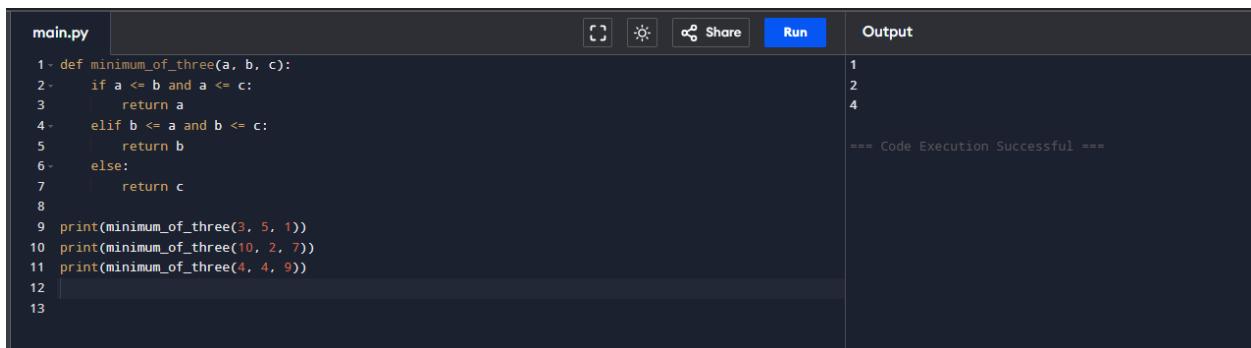
Explanation

- Conditional comparisons handle all cases.
- No built-in min() function is used.

Sample Output

- minimum_of_three(3, 5, 1) → 1

Screenshot Placeholder:



The screenshot shows a code editor interface with a dark theme. The left pane displays the code in a file named 'main.py'. The right pane shows the execution results. The code defines a function 'minimum_of_three' that takes three arguments (a, b, c) and returns the minimum value based on conditional logic. The execution output shows three test cases: minimum_of_three(3, 5, 1) outputs 1, minimum_of_three(10, 2, 7) outputs 2, and minimum_of_three(4, 4, 9) outputs 4. A message at the bottom right indicates "Code Execution Successful".

```
main.py
1- def minimum_of_three(a, b, c):
2-     if a <= b and a <= c:
3-         return a
4-     elif b <= a and b <= c:
5-         return b
6-     else:
7-         return c
8-
9 print(minimum_of_three(3, 5, 1))
10 print(minimum_of_three(10, 2, 7))
11 print(minimum_of_three(4, 4, 9))
12
13
```

Run	Output
	1
	2
	4
	==== Code Execution Successful ===

Conclusion

- Zero-shot prompting works for simple logic.
- One-shot improves accuracy with guidance.
- Few-shot produces the most reliable and optimized results.

- Prompt richness directly impacts output quality.