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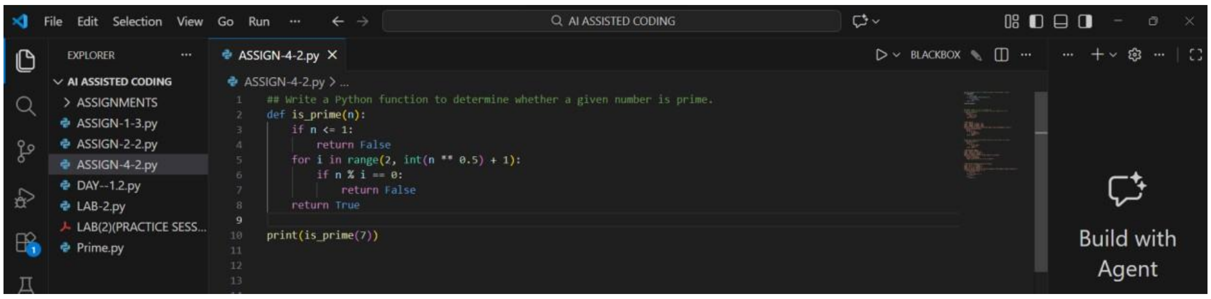
# Lab 4

**Advanced Prompt Engineering – Zero-shot, One-shot, and Few-shot Techniques**

## Task Description-1: Zero-shot Prompting

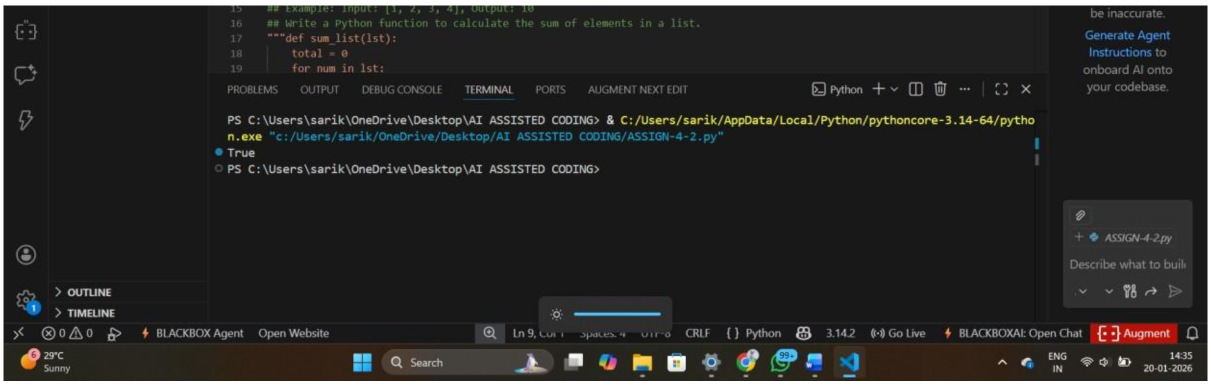
**Prompt:** Write a Python function to determine whether a given number is prime.



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

print(is_prime(7))
```

**OUTPUT:**



```python
## Example: Input: [1, 2, 3, 4], Output: 10
## Write a Python function to calculate the sum of elements in a list.
"""def sum_list(lst):
    total = 0
    for num in lst:
```

```
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING> & C:/Users/sarik/AppData/Local/Python/pythoncore-3.14-64/pytho
n.exe "c:/Users/sarik/OneDrive/Desktop/AI ASSISTED CODING/ASSIGN-4-2.py"
True
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING>
```

## Explanation:

1. Zero-shot prompting provides only instructions, no examples.
2. The AI correctly implemented:

   Prime definition logic

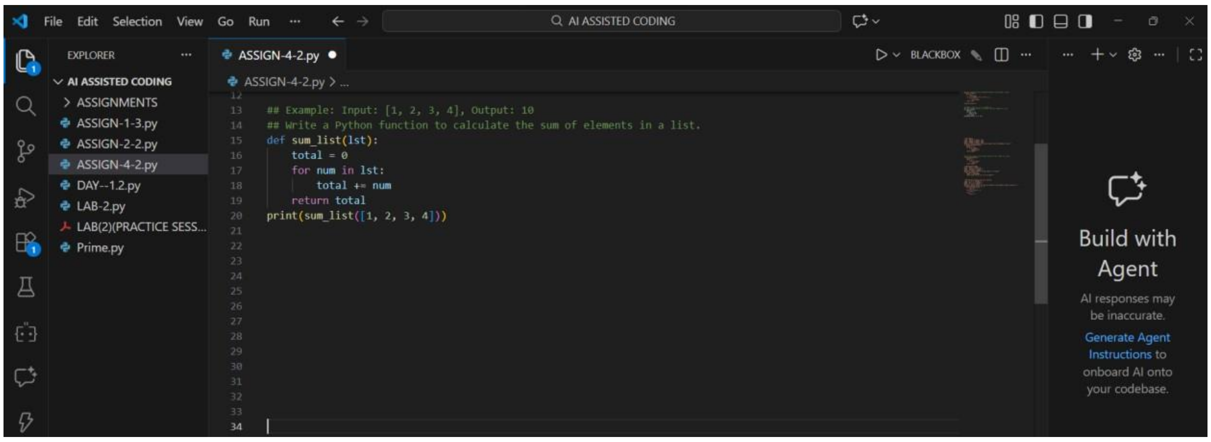
   Square-root optimization

3. Demonstrates that simple logical problems work well with zero-shot prompts.

## Task Description-2: One-shot Prompting

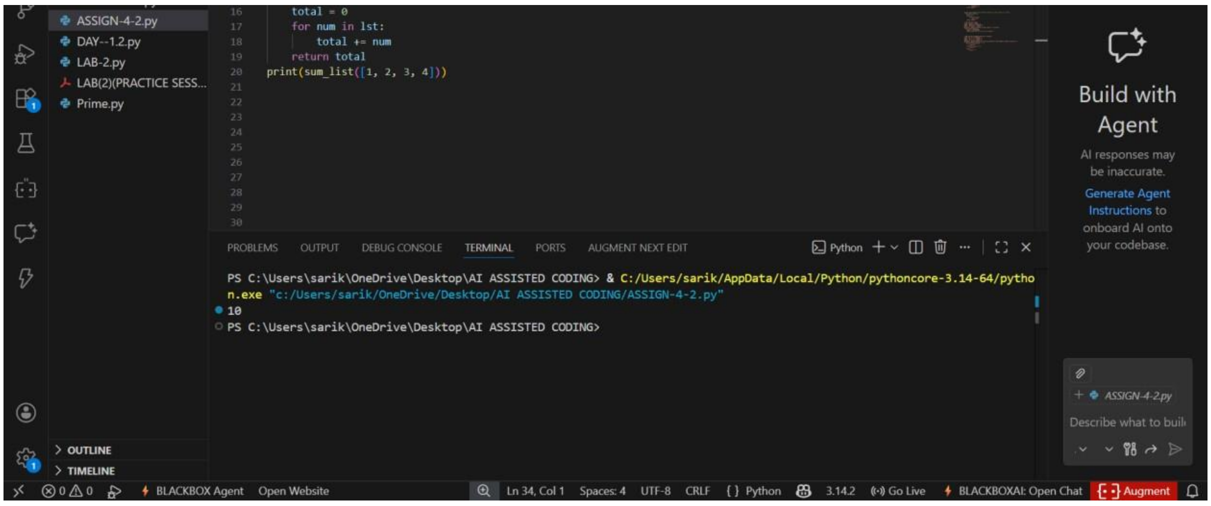
**Prompt:** Write a Python function to calculate the sum of elements in a list.

Example: Input: [1, 2, 3, 4], Output: 10



```python
## Example: Input: [1, 2, 3, 4], Output: 10
## Write a Python function to calculate the sum of elements in a list.
def sum_list(lst):
    total = 0
    for num in lst:
        total += num
    return total
print(sum_list([1, 2, 3, 4]))
```

**OUTPUT:**



```python
    total = 0
    for num in lst:
        total += num
    return total
print(sum_list([1, 2, 3, 4]))
```

```
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING> & C:/Users/sarik/AppData/Local/Python/pythoncore-3.14-64/pytho
n.exe "c:/Users/sarik/OneDrive/Desktop/AI ASSISTED CODING/ASSIGN-4-2.py"
10
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING>
```

## Explanation:

1. One example clarifies the expected behavior.
2. The AI correctly inferred:

   Iteration over list

   Accumulation of sum

3. The example helped remove ambiguity.

## Task Description-3: Few-shot Prompting

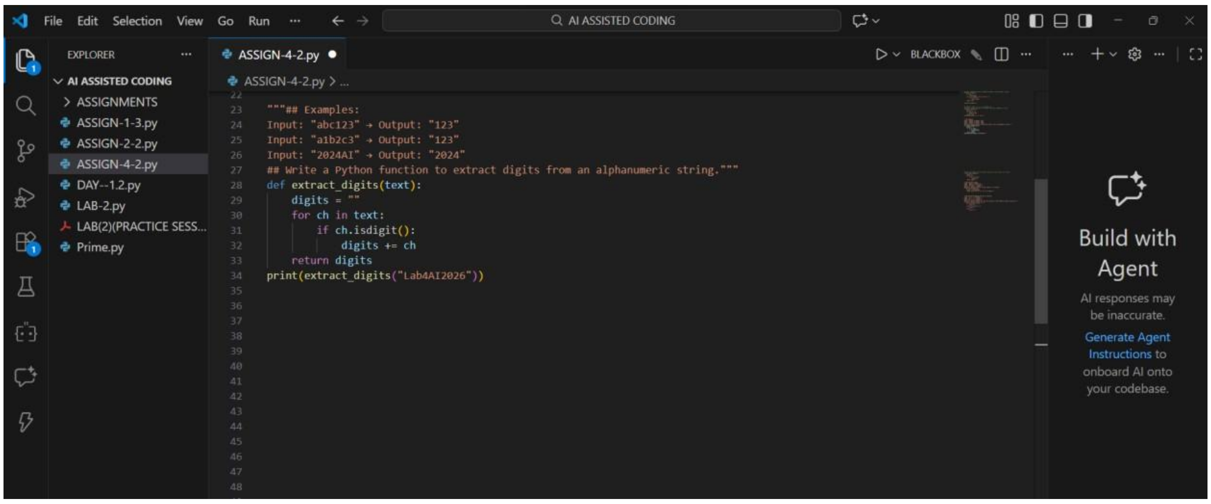
**Prompt:** Write a Python function to extract digits from an alphanumeric string.

Examples:

Input: "abc123" → Output: "123"

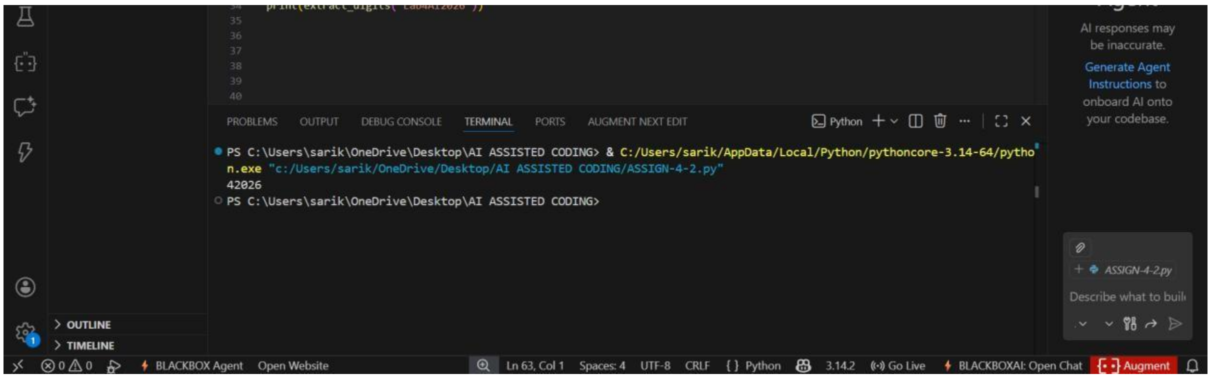
Input: "a1b2c3" → Output: "123"

Input: "2024AI" → Output: "2024"



```python
"""## Examples:
Input: "abc123" → Output: "123"
Input: "a1b2c3" → Output: "123"
Input: "2024AI" → Output: "2024"
## Write a Python function to extract digits from an alphanumeric string."""
def extract_digits(text):
    digits = ""
    for ch in text:
        if ch.isdigit():
            digits += ch
    return digits
print(extract_digits("Lab4AI2026"))
```

**OUTPUT:**



```
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING> & C:/Users/sarik/AppData/Local/Python/pythoncore-3.14-64/pytho
n.exe "c:/Users/sarik/OneDrive/Desktop/AI ASSISTED CODING/ASSIGN-4-2.py"
42026
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING>
```

## Explanation:

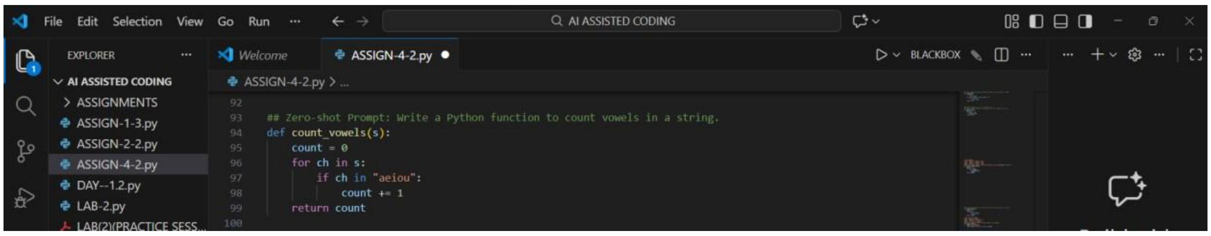
1. Few-shot prompting provides pattern recognition.
2. AI correctly:

   Identified digit extraction rule

   Ignored alphabetic characters
3. Output accuracy improved due to multiple examples.

## Task Description-4: Comparison Zero-shot vs Few-shot Prompting

**Zero-shot Prompt:** Write a Python function to count vowels in a string.

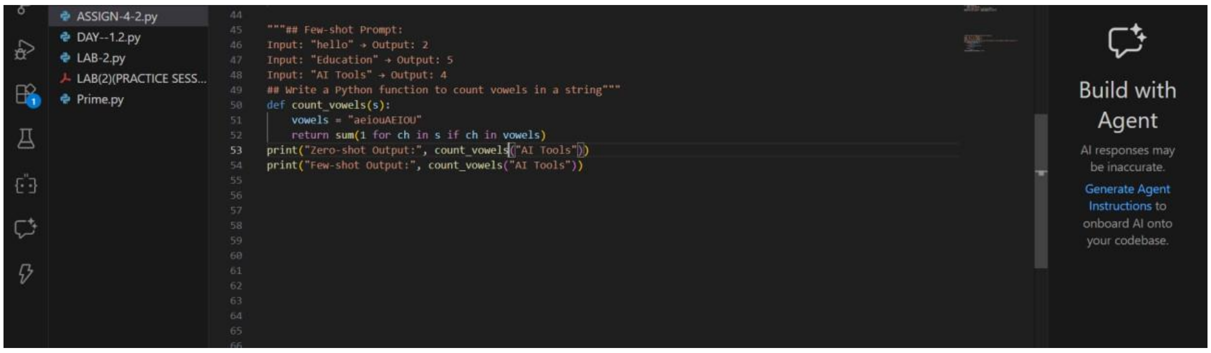


```python
## Zero-shot Prompt: Write a Python function to count vowels in a string.
def count_vowels(s):
    count = 0
    for ch in s:
        if ch in "aeiou":
            count += 1
    return count
```

**Few-shot Prompt:** Write a Python function to count vowels in a string

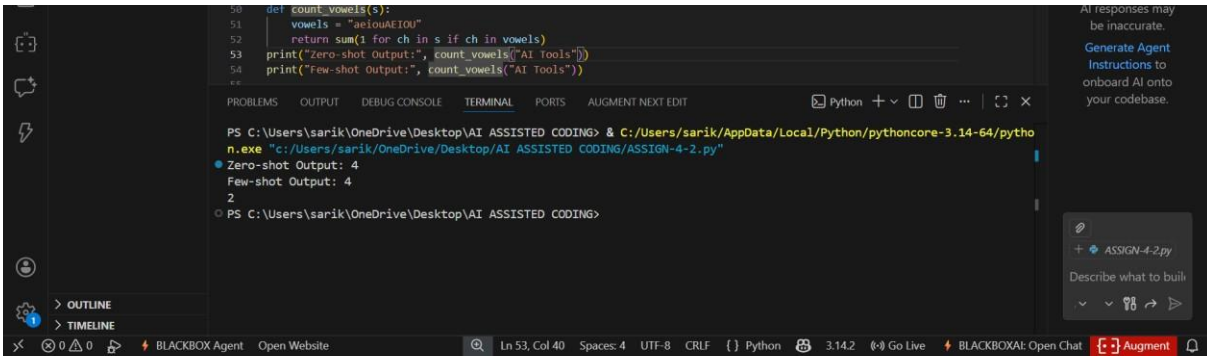
Examples:

Input: "hello" → Output: 2
Input: "Education" → Output: 5
Input: "AI Tools" → Output: 4



```python
"""## Few-shot Prompt:
Input: "hello" → Output: 2
Input: "Education" → Output: 5
Input: "AI Tools" → Output: 4
## Write a Python function to count vowels in a string"""
def count_vowels(s):
    vowels = "aeiouAEIOU"
    return sum(1 for ch in s if ch in vowels)
print("Zero-shot Output:", count_vowels("AI Tools"))
print("Few-shot Output:", count_vowels("AI Tools"))
```

**OUTPUT:**



```
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING> & C:/Users/sarik/AppData/Local/Python/pythoncore-3.14-64/pytho
n.exe "c:/Users/sarik/OneDrive/Desktop/AI ASSISTED CODING/ASSIGN-4-2.py"
Zero-shot Output: 4
Few-shot Output: 4
2
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING>
```

**Comparison Table:**

| Feature | Zero-shot | Few-shot |
|---|---|---|

| | | |
|---|---|---|
| Case handling | Only lowercase | Upper & lowercase |
| Accuracy | Moderate | High |
| Robustness | Basic | Improved |
| Readability | Simple | Optimized |

## Explanation:

1. Few-shot prompting improved the output by providing examples that showed:

   Upper and lowercase handling

   Realistic input patterns

This helped the AI generate a more accurate and generalized solution.

## Task Description-5: Few-shot Prompting (No min() function)

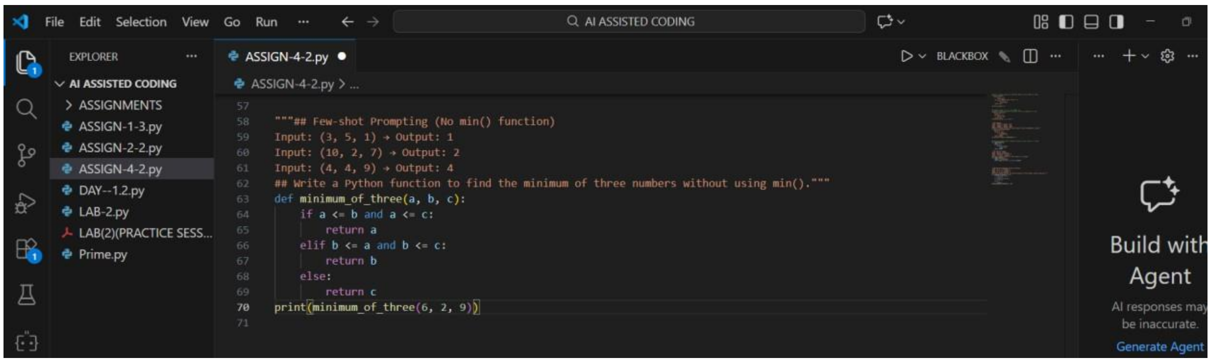
**Prompt:** Write a Python function to find the minimum of three numbers without using min().

Examples:

Input: (3, 5, 1) → Output: 1

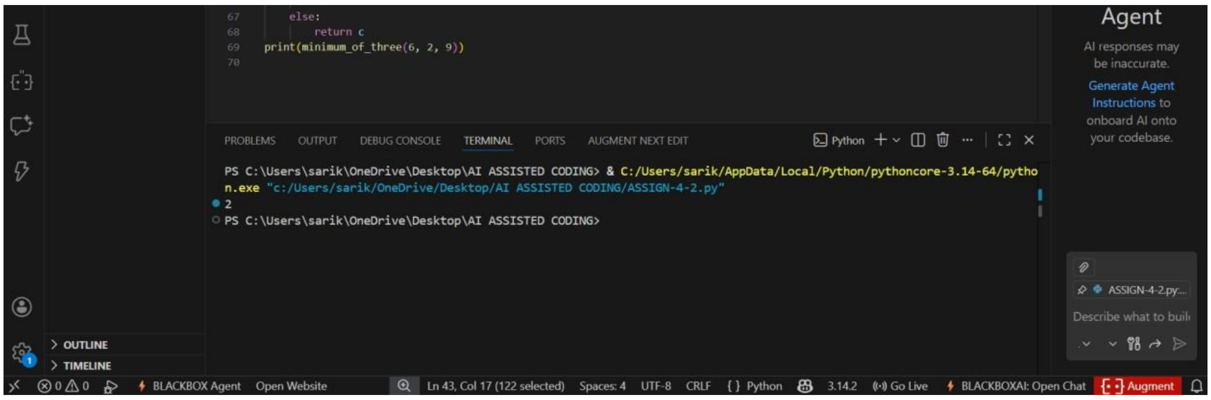
Input: (10, 2, 7) → Output: 2

Input: (4, 4, 9) → Output: 4



```python
"""## Few-shot Prompting (No min() function)
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()."""
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
print(minimum_of_three(6, 2, 9))
```

**OUTPUT:**



```python
        else:
            return c
print(minimum_of_three(6, 2, 9))
```

```
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING> & C:/Users/sarik/AppData/Local/Python/pythoncore-3.14-64/pytho
n.exe "c:/Users/sarik/OneDrive/Desktop/AI ASSISTED CODING/ASSIGN-4-2.py"
2
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING>
```

Agent

AI responses may be inaccurate.

Generate Agent Instructions to onboard AI onto your codebase.

## Explanation:

1. Few-shot examples guided logical comparisons.
2. Handles:

   Equal values

   All ordering cases

3. Does not use built-in min() as instructed.