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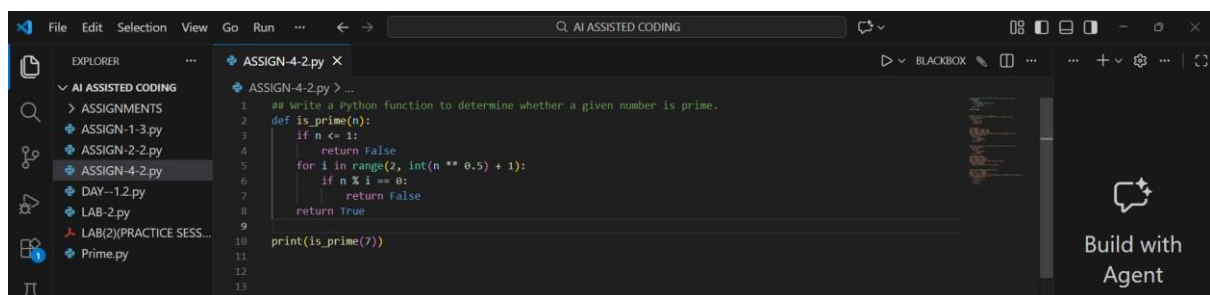
B-52

Lab 4

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

Task Description-1: Zero-shot Prompting

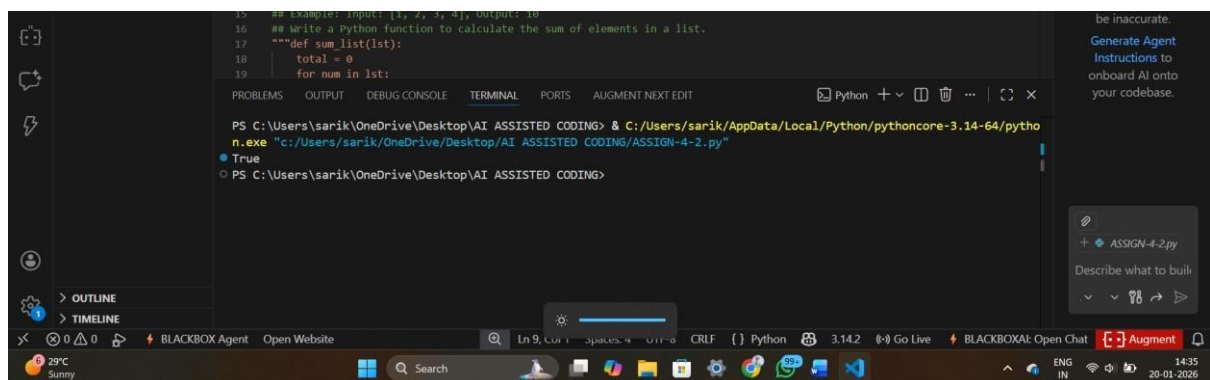
Prompt: Write a Python function to determine whether a given number is prime.



The screenshot shows a code editor with a file explorer on the left. The active file is 'ASSIGN-4-2.py'. The code in the editor is as follows:

```
1  ## Write a Python function to determine whether a given number is prime.
2  def is_prime(n):
3      if n <= 1:
4          return False
5      for i in range(2, int(n ** 0.5) + 1):
6          if n % i == 0:
7              return False
8      return True
9
10 print(is_prime(7))
```

OUTPUT:



The screenshot shows a terminal window with the following output:

```
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING> & C:/Users/sarik/AppData/Local/Python/pythoncore-3.14-64/python
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

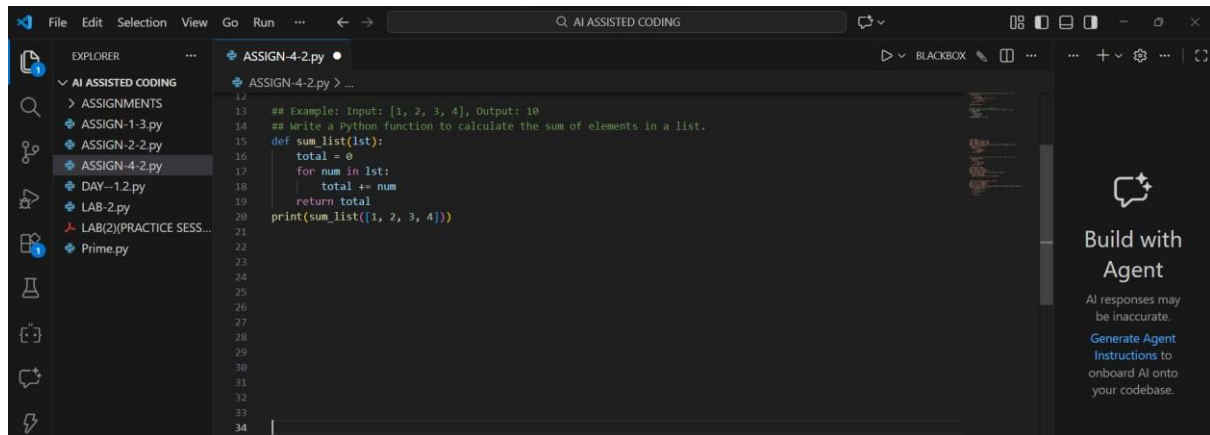
Square-root optimization

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

Task Description-2: One-shot Prompting

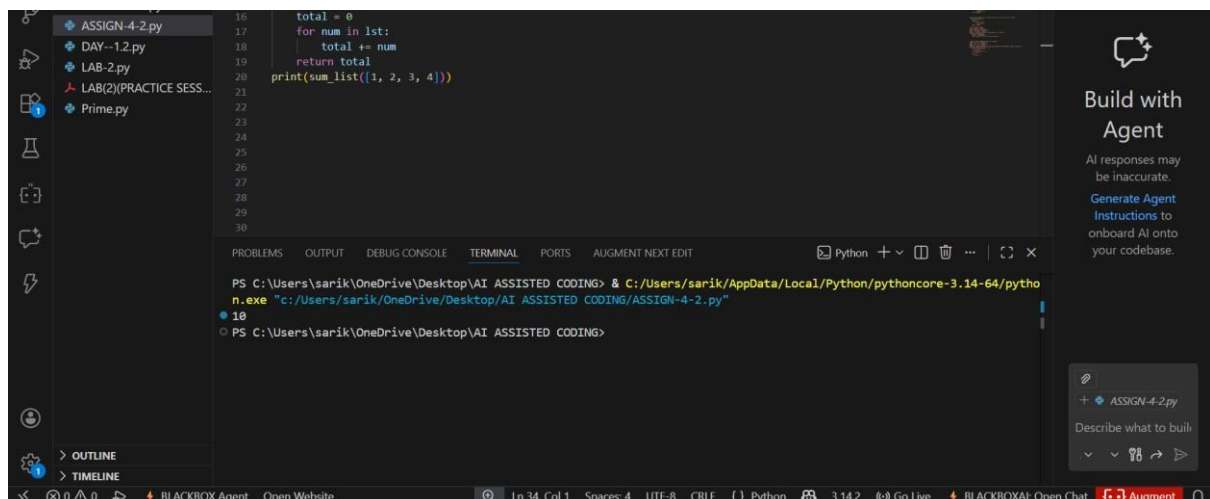
Prompt: Write a Python function to calculate the sum of elements in a list.

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



```
12
13
14 ## Example: Input: [1, 2, 3, 4], Output: 10
15 ## Write a Python function to calculate the sum of elements in a list.
16 def sum_list(lst):
17     total = 0
18     for num in lst:
19         total += num
20     return total
21 print(sum_list([1, 2, 3, 4]))
22
23
24
25
26
27
28
29
30
31
32
33
34
```

OUTPUT:



```
16     total = 0
17     for num in lst:
18         total += num
19     return total
20 print(sum_list([1, 2, 3, 4]))
21
22
23
24
25
26
27
28
29
30
```

```
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING> & C:/Users/sarik/AppData/Local/Python/pythoncore-3.14-64/python
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

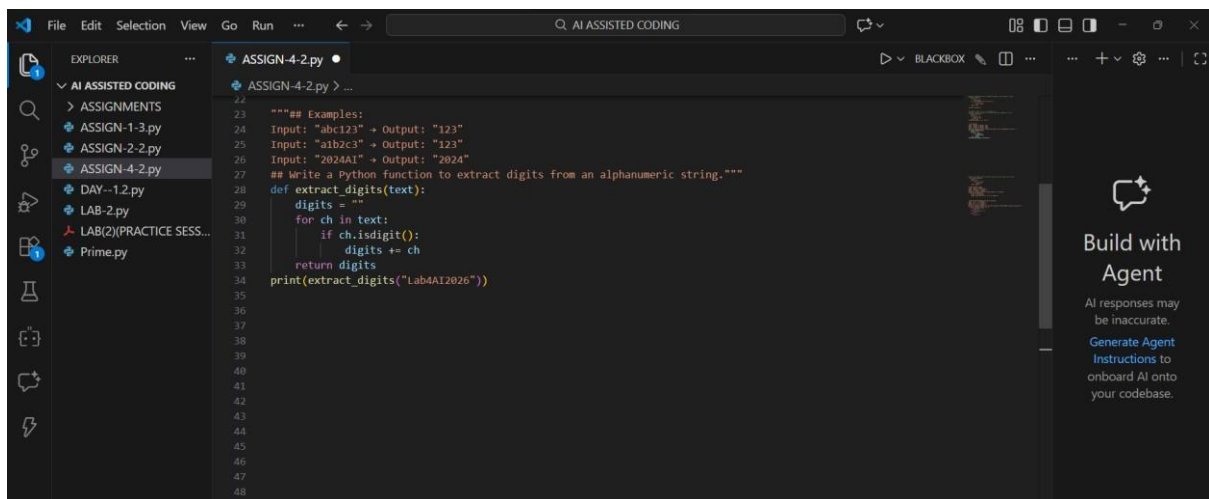
Prompt: Write a Python function to extract digits from an alphanumeric string.

Examples:

Input: "abc123" → Output: "123"

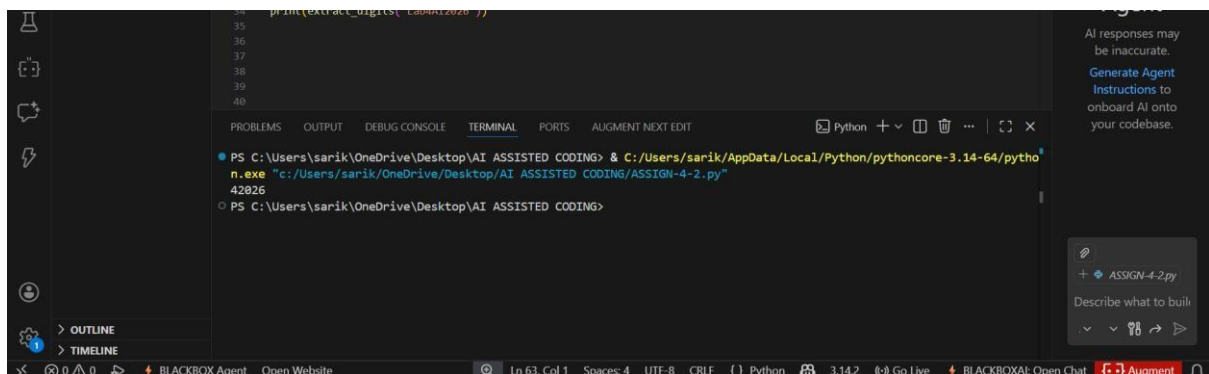
Input: "a1b2c3" → Output: "123"

Input: "2024AI" → Output: "2024"



```
22 """## Examples:
23 Input: "abc123" + Output: "123"
24 Input: "a1b2c3" + Output: "123"
25 Input: "2024AI" + Output: "2024"
26 ## Write a Python function to extract digits from an alphanumeric string."""
27
28 def extract_digits(text):
29     digits = ""
30     for ch in text:
31         if ch.isdigit():
32             digits += ch
33     return digits
34 print(extract_digits("Lab4AI2026"))
35
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41
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43
44
45
46
47
48
```

OUTPUT:



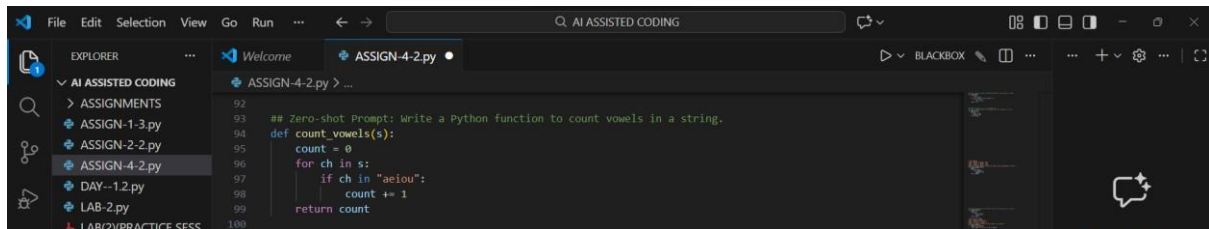
```
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING> & C:/Users/sarik/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/sarik/OneDrive/Desktop/AI ASSISTED CODING/ASSIGN-4-2.py"
42026
PS C:\Users\sarik\OneDrive\Desktop\AI ASSISTED CODING>
```

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.



A screenshot of the Visual Studio Code editor. The Explorer sidebar on the left shows a project named 'AI ASSISTED CODING' with several files. The main editor window is open to 'ASSIGN-4-2.py'. The code in the editor is as follows:

```
92
93 ## Zero-shot Prompt: Write a Python function to count vowels in a string.
94 def count_vowels(s):
95     count = 0
96     for ch in s:
97         if ch in "aeiou":
98             count += 1
99     return count
100
```

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

Examples:

Input: "hello" → Output: 2

Input: "Education" → Output: 5

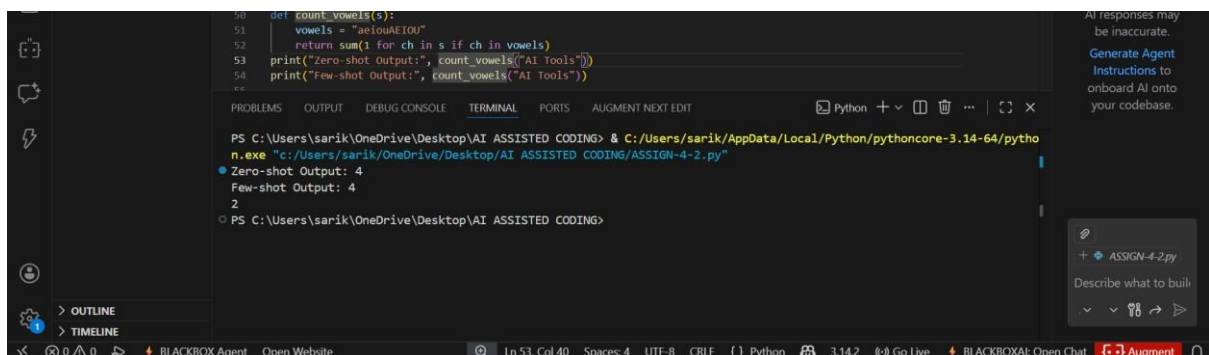
Input: "AI Tools" → Output: 4



A screenshot of the Visual Studio Code editor. The Explorer sidebar on the left shows a project named 'AI ASSISTED CODING' with several files. The main editor window is open to 'ASSIGN-4-2.py'. The code in the editor is as follows:

```
44
45 """## Few-shot Prompt:
46 Input: "hello" → Output: 2
47 Input: "Education" → Output: 5
48 Input: "AI Tools" → Output: 4
49 ## Write a Python function to count vowels in a string"""
50 def count_vowels(s):
51     vowels = "aeiouAEIOU"
52     return sum(1 for ch in s if ch in vowels)
53 print("Zero-shot Output:", count_vowels("AI Tools"))
54 print("Few-shot Output:", count_vowels("AI Tools"))
55
56
57
58
59
60
61
62
63
64
65
66
```

OUTPUT:



A screenshot of the Visual Studio Code editor. The Explorer sidebar on the left shows a project named 'AI ASSISTED CODING' with several files. The main editor window is open to 'ASSIGN-4-2.py'. The code in the editor is as follows:

```
98 def count_vowels(s):
99     vowels = "aeiouAEIOU"
100    return sum(1 for ch in s if ch in vowels)
101    print("Zero-shot Output:", count_vowels("AI Tools"))
102    print("Few-shot Output:", count_vowels("AI Tools"))
103
```

The output of the code is displayed in the terminal window at the bottom of the editor:

```
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

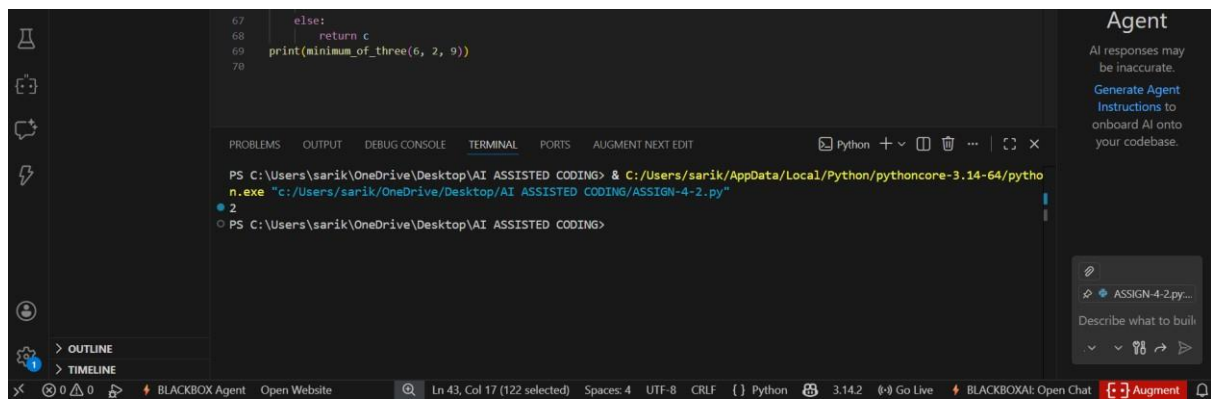
Input: (4, 4, 9) → Output: 4

```

57 """## Few-shot Prompting (No min() function)
58 Input: (3, 5, 1) → Output: 1
59 Input: (10, 2, 7) → Output: 2
60 Input: (4, 4, 9) → Output: 4
61 ## Write a Python function to find the minimum of three numbers without using min()."""
62 def minimum_of_three(a, b, c):
63     if a <= b and a <= c:
64         return a
65     elif b <= a and b <= c:
66         return b
67     else:
68         return c
69
70 print(minimum_of_three(6, 2, 9))
71

```

OUTPUT:



Explanation:

1. Few-shot examples guided logical comparisons.
2. Handles:
 - Equal values
 - All ordering cases
3. Does not use built-in `min()` as instructed.