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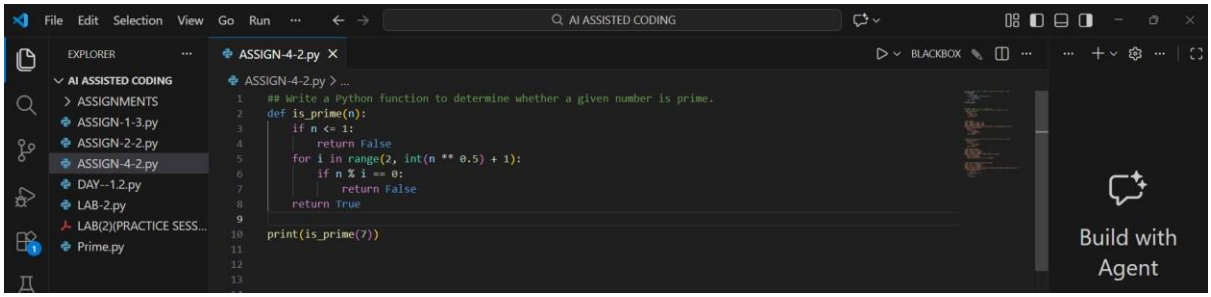
B-52

Lab 4

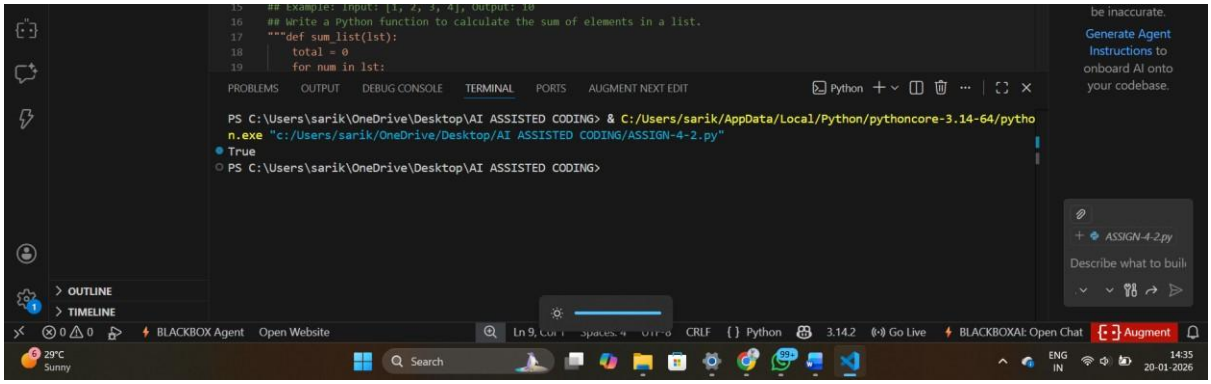
Advanced Prompt Engineering – Zero-shot, One-shot, and Few-shot Techniques

Task Description-1: Zero-shot Prompting

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



OUTPUT:



Explanation:

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

   Prime definition logic

   Square-root optimization

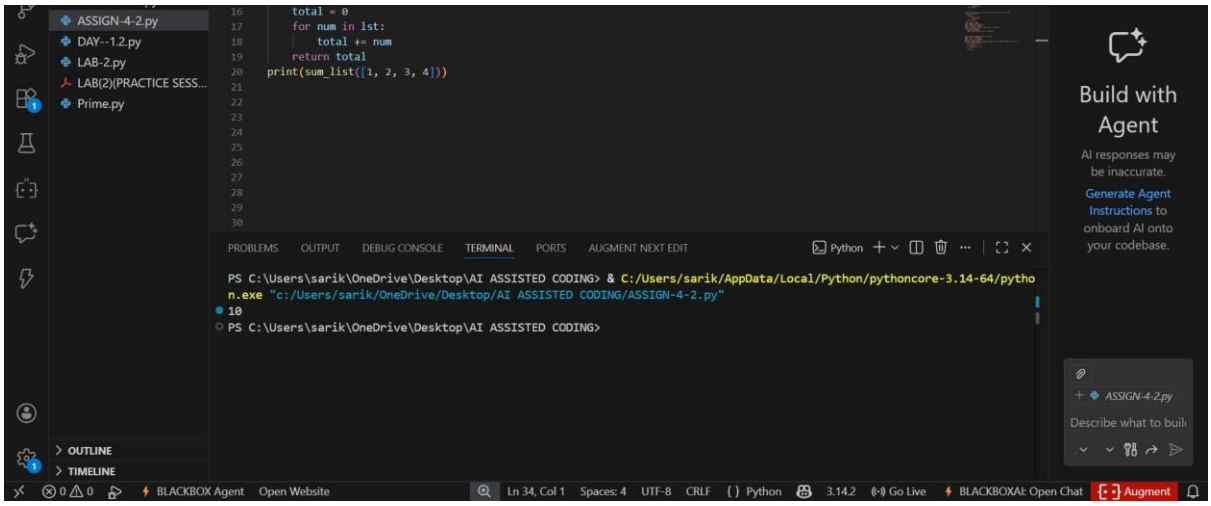
3. Demonstrates that simple logical problems work well with zero-shot prompts.

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

OUTPUT:



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

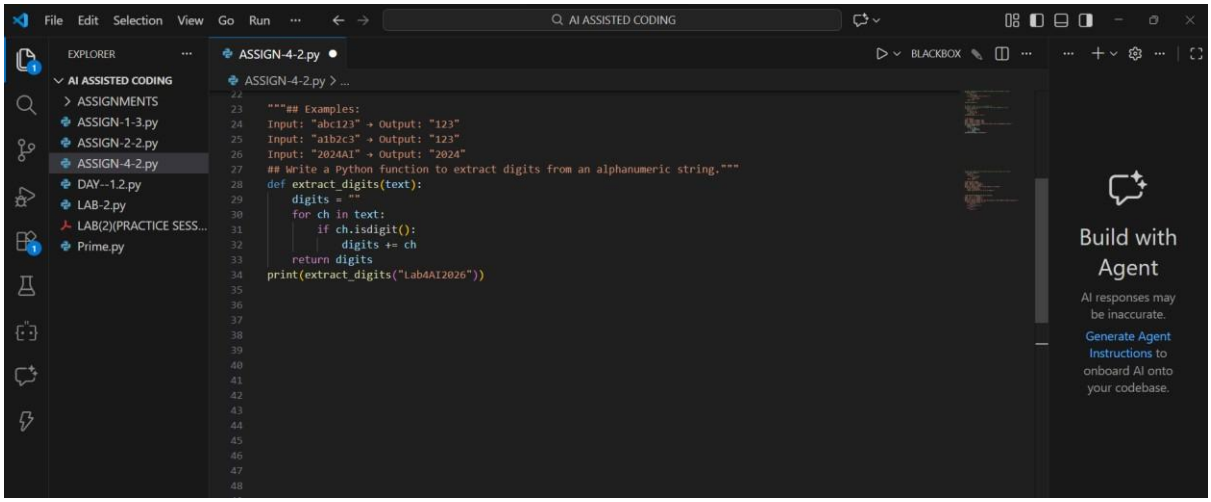
Prompt: Write a Python function to extract digits from an alphanumeric string.

Examples:

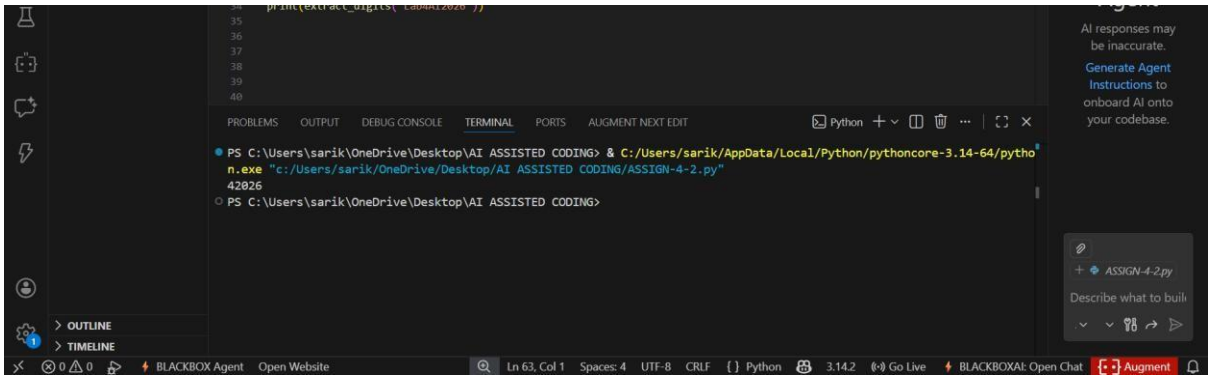
Input: "abc123" → Output: "123"

Input: "a1b2c3" → Output: "123"

Input: "2024AI" → Output: "2024"



OUTPUT:



Explanation:

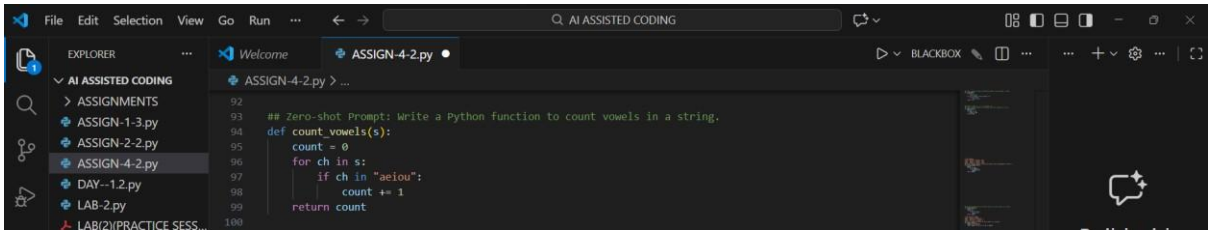
1. Few-shot prompting provides pattern recognition.
2. AI correctly:

   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.

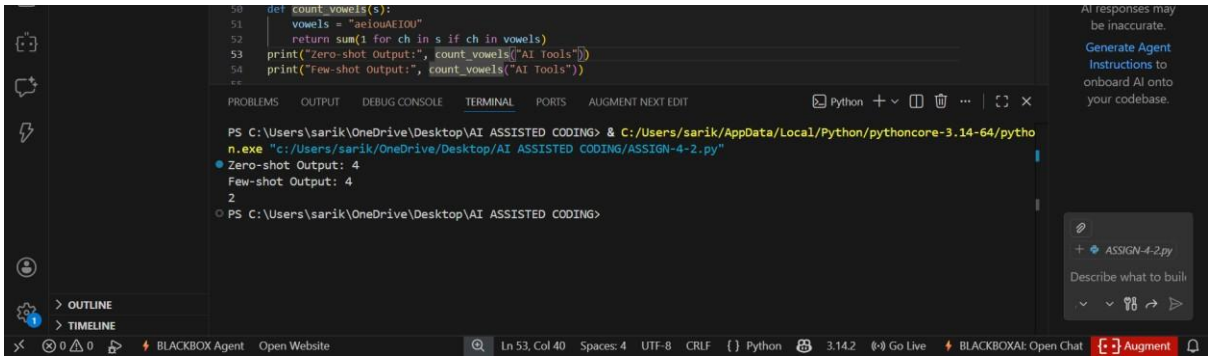


Few-shot Prompt: Write a Python function to count vowels in a string

Examples:

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

OUTPUT:



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)

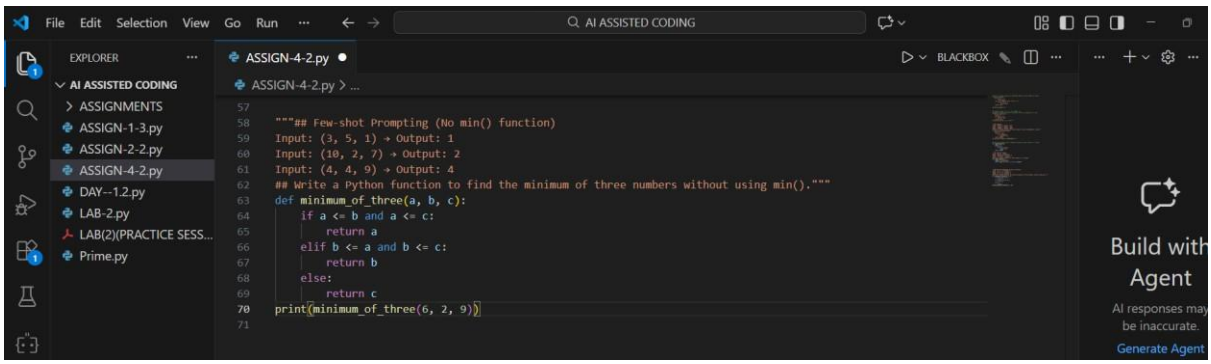
Prompt: Write a Python function to find the minimum of three numbers without using min().

Examples:

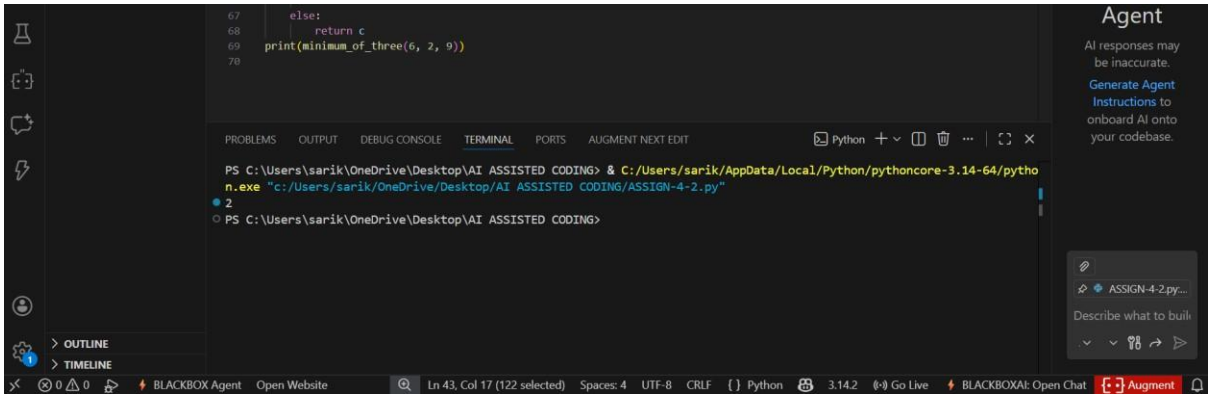
Input: (3, 5, 1) → Output: 1

Input: (10, 2, 7) → Output: 2

Input: (4, 4, 9) → Output: 4



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.