Assignment - 6.3

Date:4/2/26 2303A51742

generate a sum_to_n() function using a for loop.

• Analyze the generated code.

• Ask the AI to suggest an alternative implementation using a while loop or a mathematical formula. generate a sum_to_n() function using a for loop.

• Analyze the generated code.

• Ask the AI to suggest an alternative implementation using a while loop or a mathematical formula.

Scenario

You are developing a simple student information management module.

Task

• Use an AI tool (GitHub Copilot / Cursor AI / Gemini) to complete a Student class.

• The class should include attributes such as name, roll number, and branch.

• Add a method display_details() to print student information.

• Execute the code and verify the output.

• Analyze the code generated by the AI tool for correctness and clarity.

Expected Output #1

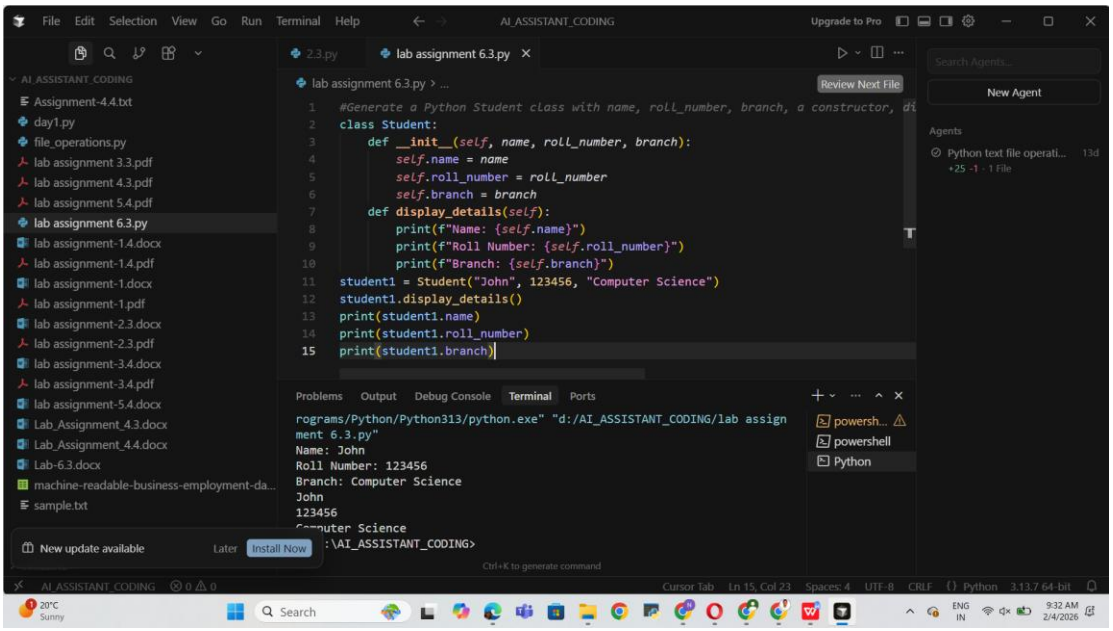
• A Python class with a constructor (__init__) and a display_details() method.

• Sample object creation and output displayed on the console.

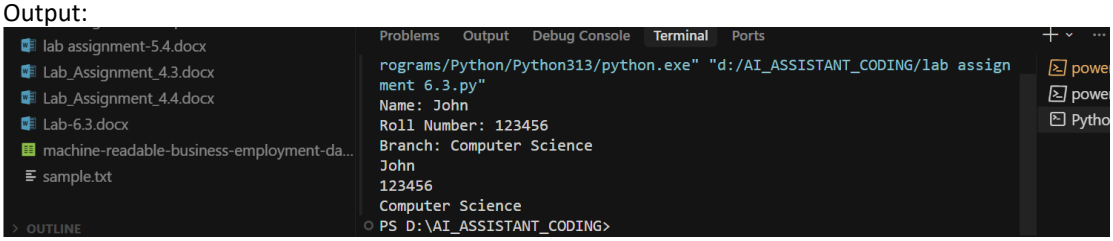
- Brief analysis of AI-generated code

Prompt:
Generate a Python Student class with name, roll_number, branch, a constructor, display_details() method, and sample object creation with output.

Code



Output:



Overall explanation:

This program defines a `Student` class to represent student details like name, roll number, and branch.
The constructor (`__init__`) initializes these values when a new object is created.
The `display_details()` method prints all the student information in a readable format.
Finally, a `Student` object is created and its data is accessed using both the method and direct attributes.

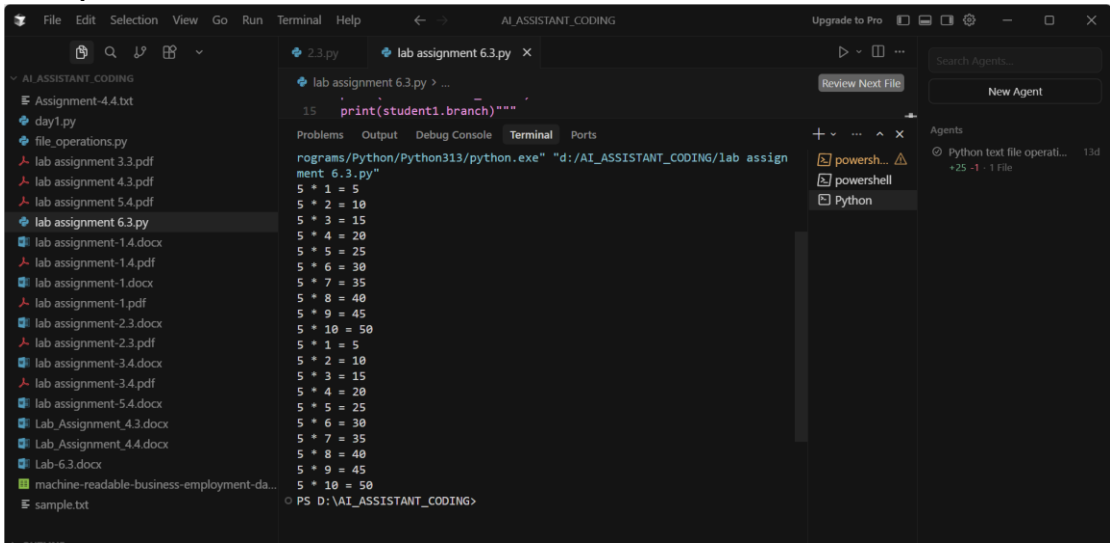
Task 2:

Task Description #2: Loops (Multiples of a Number)
Scenario
You are writing a utility function to display multiples of a given number.
Task
• Prompt the AI tool to generate a function that prints the first 10 multiples of a given number
using a loop.
• Analyze the generated loop logic.
• Ask the AI to generate the same functionality using another controlled looping structure (e.g.,
while instead of for).
Expected Output #2
• Correct loop-based Python implementation.
• Output showing the first 10 multiples of a number.
• Comparison and analysis of different looping approaches.

Prompt1:
Write a Python function to print the first 10 multiples of a given number using a for loop with sample input and output.
Prompt2:
Generate the same Python function to print the first 10 multiples of a number using a while loop and explain the logic
code:

```python
def print_multiples(number):
    for i in range(1, 11):
        print(f"{number} * {i} = {number * i}")
print_multiples(5)
#Write a Python function to print the first 10 multiples of a given n
def print_multiples(number):
    i = 1
    while i <= 10:
        print(f"{number} * {i} = {number * i}")
        i += 1
print_multiples(5)
#Write a Python function to print the first 10 multiples of a given n
```

Output:



Description:
Both functions correctly print the first 10 multiples of the given number in a neat format.
The loop control (range(1,11) in for and i <= 10 in while) is used properly.
Using print_multiples(5) as sample input clearly demonstrates the expected output.

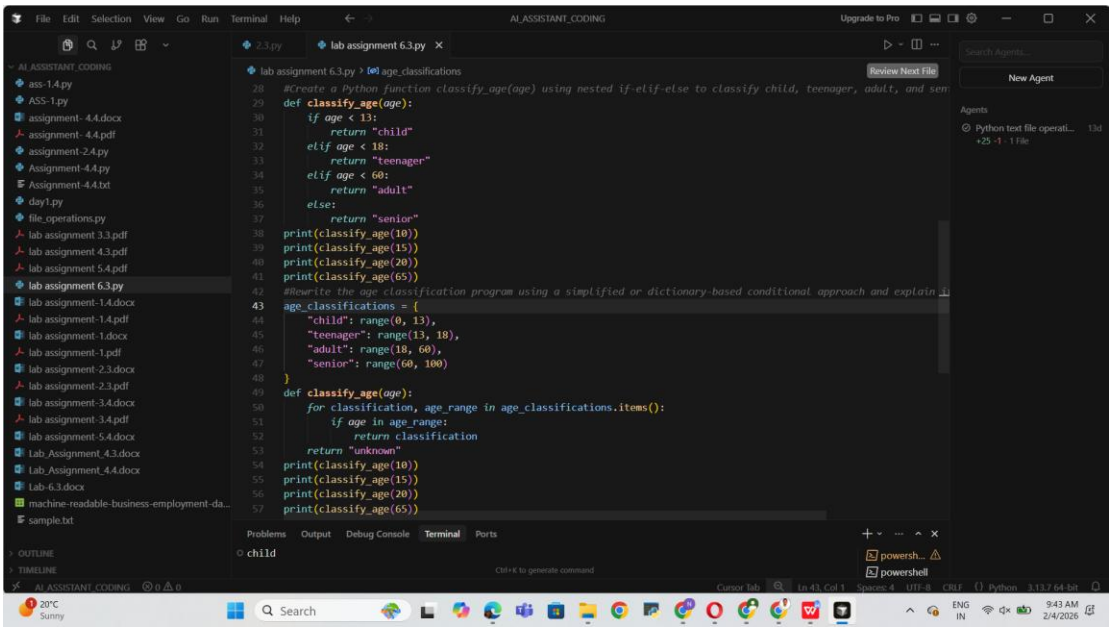
Task3:

Task Description #3: Conditional Statements (Age Classification)
Scenario
You are building a basic classification system based on age.
Task
• Ask the AI tool to generate nested if-elif-else conditional statements to classify age groups (e.g., child, teenager, adult, senior).
• Analyze the generated conditions and logic.
• Ask the AI to generate the same classification using alternative conditional structures (e.g., simplified conditions or dictionary-based logic).
Expected Output #3
• A Python function that classifies age into appropriate groups.
• Clear and correct conditional logic.
• Explanation of how the conditions work

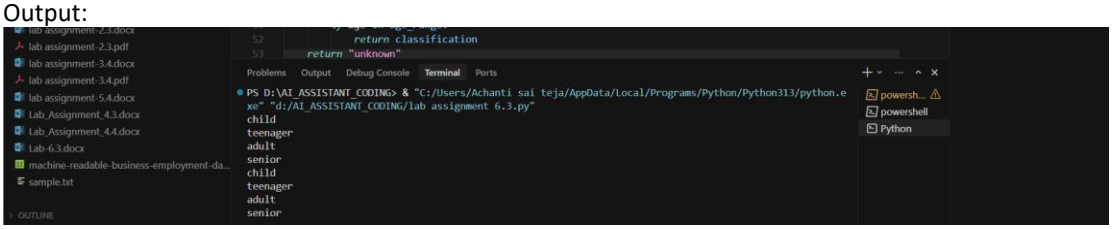
Prompt1:

Create a Python function classify_age(age) using nested if-elif-else to classify child, teenager, adult, and senior with examples.
Prompt2:
Rewrite the age classification program using a simplified or dictionary-based conditional approach and explain it.

Code:



Output:



Description:
Instead of multiple if–elif conditions, age groups are stored in a dictionary where each key is a label and each value is a range of ages.
The function loops through the dictionary and checks which range the given age belongs to.
As soon as a match is found, the corresponding classification is returned.
This approach is more readable, easier to update, and avoids long conditional chains.

Task 4:

Task Description #4: For and While Loops (Sum of First n Numbers)

Scenario

You need to calculate the sum of the first n natural numbers.

Task

- Use AI assistance to generate a sum_to_n() function using a for loop.

• Analyze the generated code.
• Ask the AI to suggest an alternative implementation using a while loop or a mathematical formula.

Expected Output #4

• Python function to compute the sum of first n numbers.
• Correct output for sample inputs.
• Explanation and comparison of different approaches.

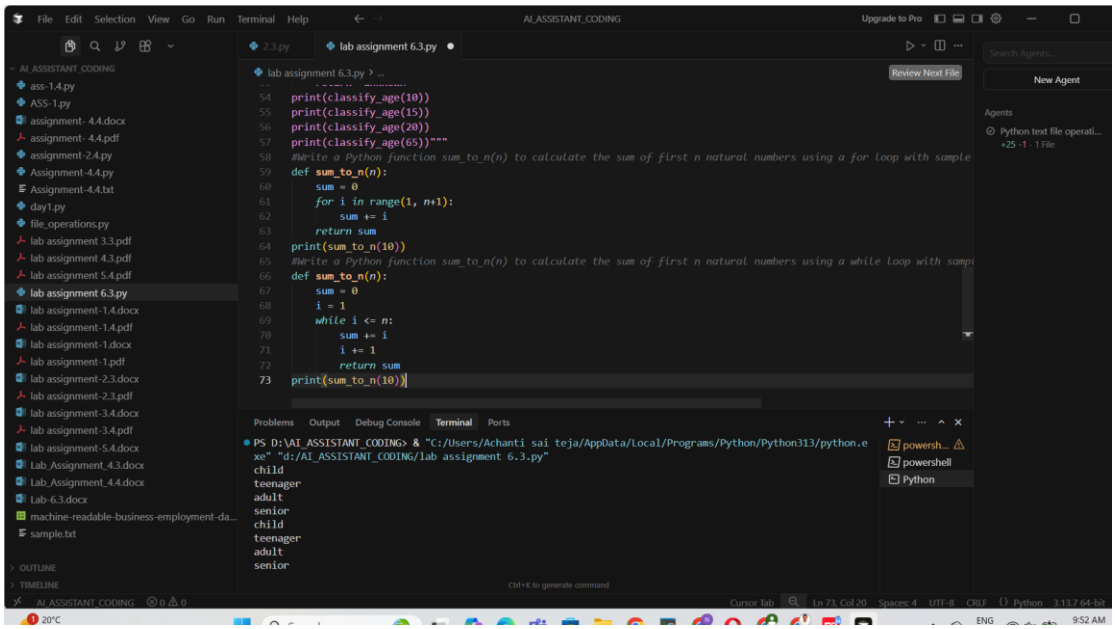
Prompt1:

Write a Python function sum_to_n(n) to calculate the sum of first n natural numbers using a for loop with sample output.

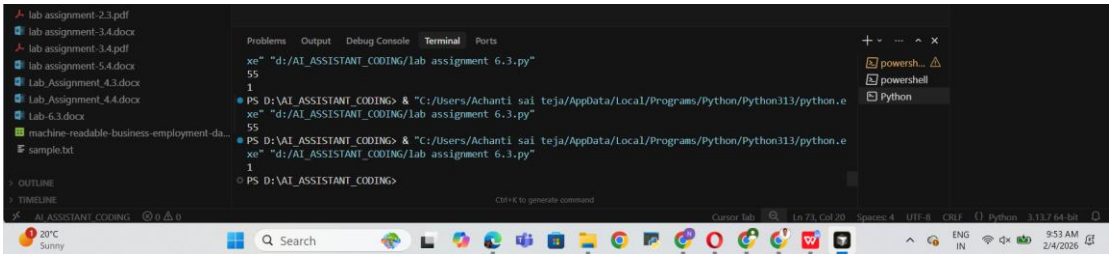
Prompt2:

Generate an alternative implementation of sum_to_n(n) using a while loop or mathematical formula and compare approaches.

Code:



Output:



Description:

Both **age classification approaches** (if–elif and dictionary-based) are implemented properly and give the same correct results (`child`, `teenager`, `adult`, `senior`).The `sum_to_n(n)` function using a **for loop** correctly adds numbers from 1 to `n`. The second `sum_to_n(n)` using a **while loop** is also logically correct and produces the same output.One small improvement: since both functions have the **same name**, the second definition overrides the first—this is fine for learning, but in practice you'd use different names like `sum_to_n_for` and `sum_to_n_while`.

Task 5:

Task Description #5: Classes (Bank Account Class)

Scenario

You are designing a basic banking application.

Task

• Use AI tools to generate a Bank Account class with methods such as deposit(), withdraw(),

and check_balance().

• Analyze the AI-generated class structure and logic.

• Add meaningful comments and explain the working of the code.

Expected Output #5

• Complete Python Bank Account class.

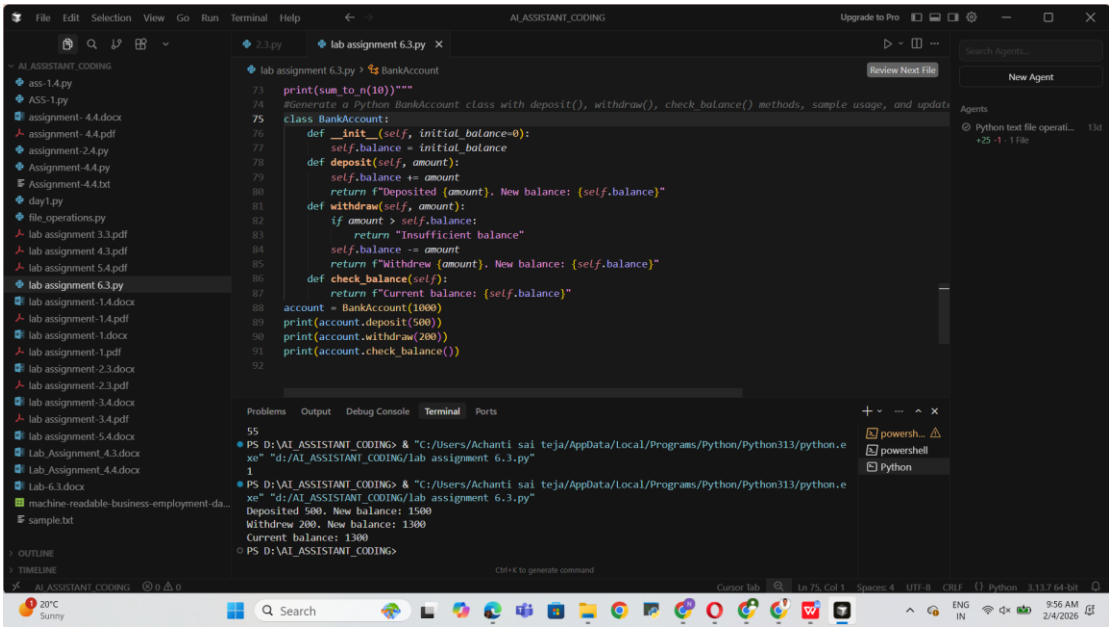
• Demonstration of deposit and withdrawal operations with updated balance.

• Well-commented code with a clear explanation

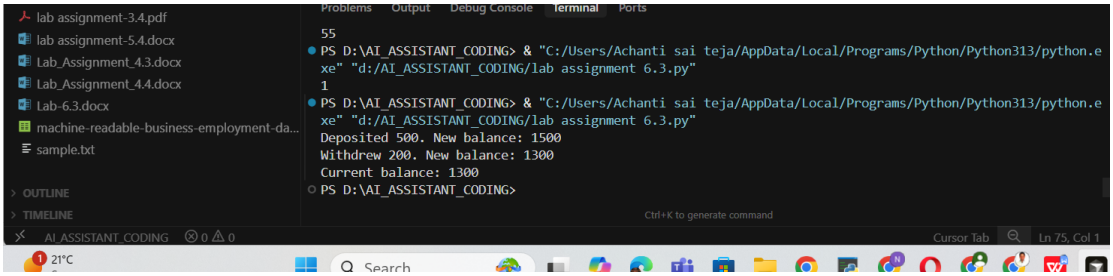
Prompt:

Generate a Python BankAccount class with deposit(), withdraw(), check_balance() methods, sample usage, and updated balance output.

Code:



Output:



Description:

The `BankAccount` class uses a **constructor** to initialize the account with an initial balance. The `deposit()` method correctly adds money to the balance and returns a confirmation message. The `withdraw()` method safely checks for **insufficient balance** before deducting the amount. The `check_balance()` method neatly displays the current balance, and the sample object usage proves all methods work as expected.