SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		DEPARTMENT OF COMPUTER SCIENCE ENGINEERING	
ProgramName:B. Tech		**Assignment Type: Lab**	**AcademicYear:**2025-2026
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CourseCode	24CS002PC215	**CourseTitle**	AI Assisted Coding
Year/Sem	II/I	**Regulation**	R24
Date and Day of Assignment	Week4 - Wednesday	**Time(s)**	
Duration	2 Hours	**Applicableto Batches**	
AssignmentNumber:9.3(Present assignment number)/**24**(Total number of assignments)			

Q.No.	**Question**	***Expected Time to complete***
1	Lab 8: Documentation Generation: Automatic documentation and code comments **Lab Objectives:** • To understand the importance of documentation and code comments in	Week4 – Wednesday

software development.

- To explore how AI-assisted coding tools can generate meaningful documentation and inline comments.
- To practice generating function-level and module-level docstrings automatically.
- To evaluate the quality, accuracy, and limitations of AI-generated documentation.
- To develop a small automated tool for documentation generation in Python..

Lab Outcomes (LOs):
After completing this lab, students will be able to:

- Apply AI-assisted coding tools to generate docstrings and inline comments for Python code.
- Critically analyze AI-generated documentation for correctness, completeness, and readability.
- Create structured documentation (function-level, module-level) following standard formats.

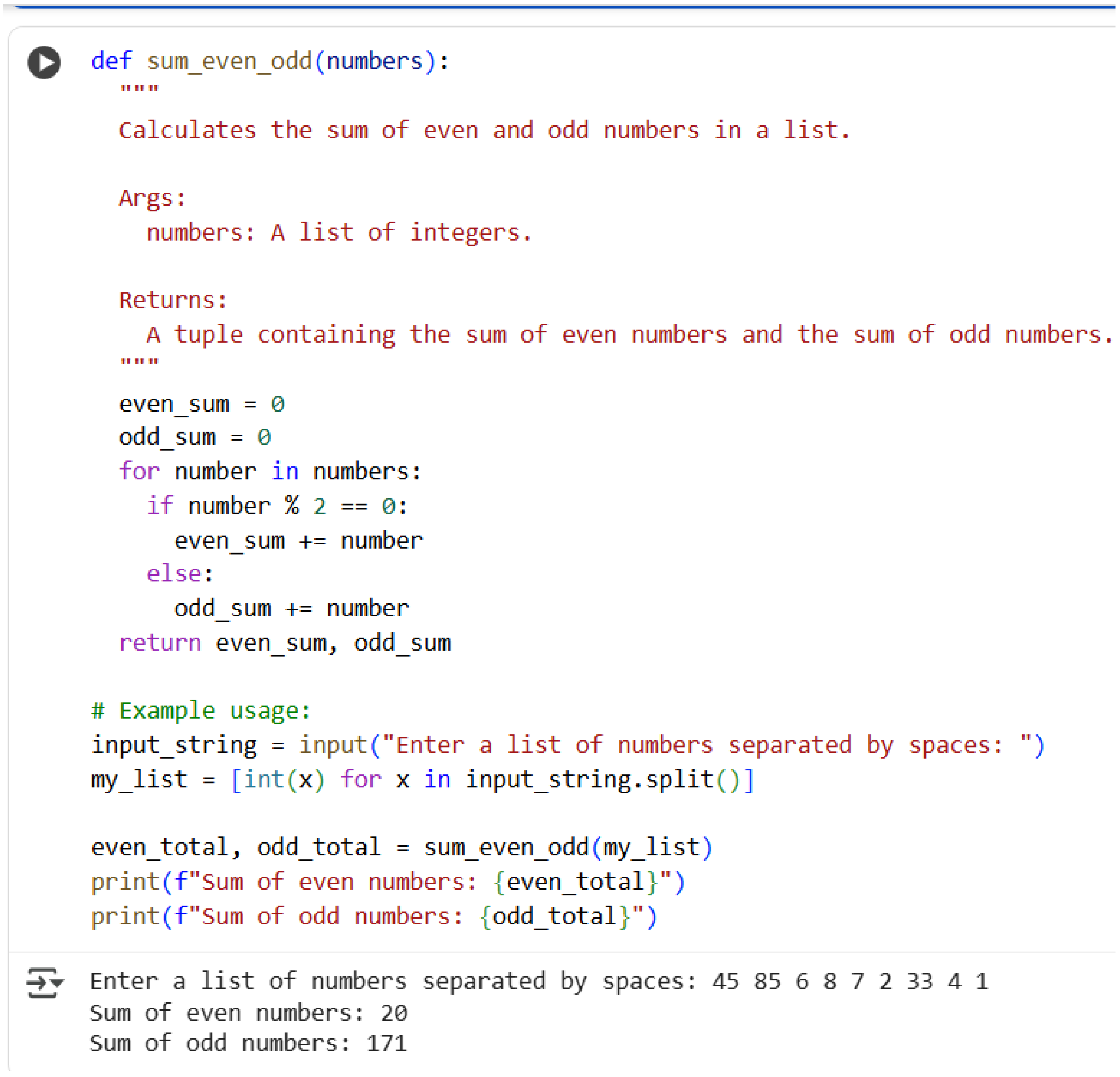
- Design and implement a mini documentation generator tool to automate code commenting and docstring creation.

Task Description#1 Basic Docstring Generation

- Write python function to return sum of even and odd numbers in the given list.
- Incorporate manual **docstring** in code with Google Style
- Use an AI-assisted tool (e.g., Copilot, Cursor AI) to generate a docstring describing the function.
- Compare the AI-generated docstring with your manually written one.

Expected Outcome#1: Students understand how AI can produce function-level documentation.

PROMPT: Write python function to return sum of even and odd numbers in the given list. Incorporate manual docstring in code and let the user to enter the list of numbers.



```python
def sum_even_odd(numbers):
  """
  Calculates the sum of even and odd numbers in a list.

  Args:
    numbers: A list of integers.

  Returns:
    A tuple containing the sum of even numbers and the sum of odd numbers.
  """
  even_sum = 0
  odd_sum = 0
  for number in numbers:
    if number % 2 == 0:
      even_sum += number
    else:
      odd_sum += number
  return even_sum, odd_sum

# Example usage:
input_string = input("Enter a list of numbers separated by spaces: ")
my_list = [int(x) for x in input_string.split()]

even_total, odd_total = sum_even_odd(my_list)
print(f"Sum of even numbers: {even_total}")
print(f"Sum of odd numbers: {odd_total}")
```

```
Enter a list of numbers separated by spaces: 45 85 6 8 7 2 33 4 1
Sum of even numbers: 20
Sum of odd numbers: 171
```

OBSERVATION: The program successfully prompted the user for a list of numbers. The input was processed into a list. The sum_even_odd function correctly calculated the sums. The sum of even numbers and odd numbers were calculated. The results were printed as expected.

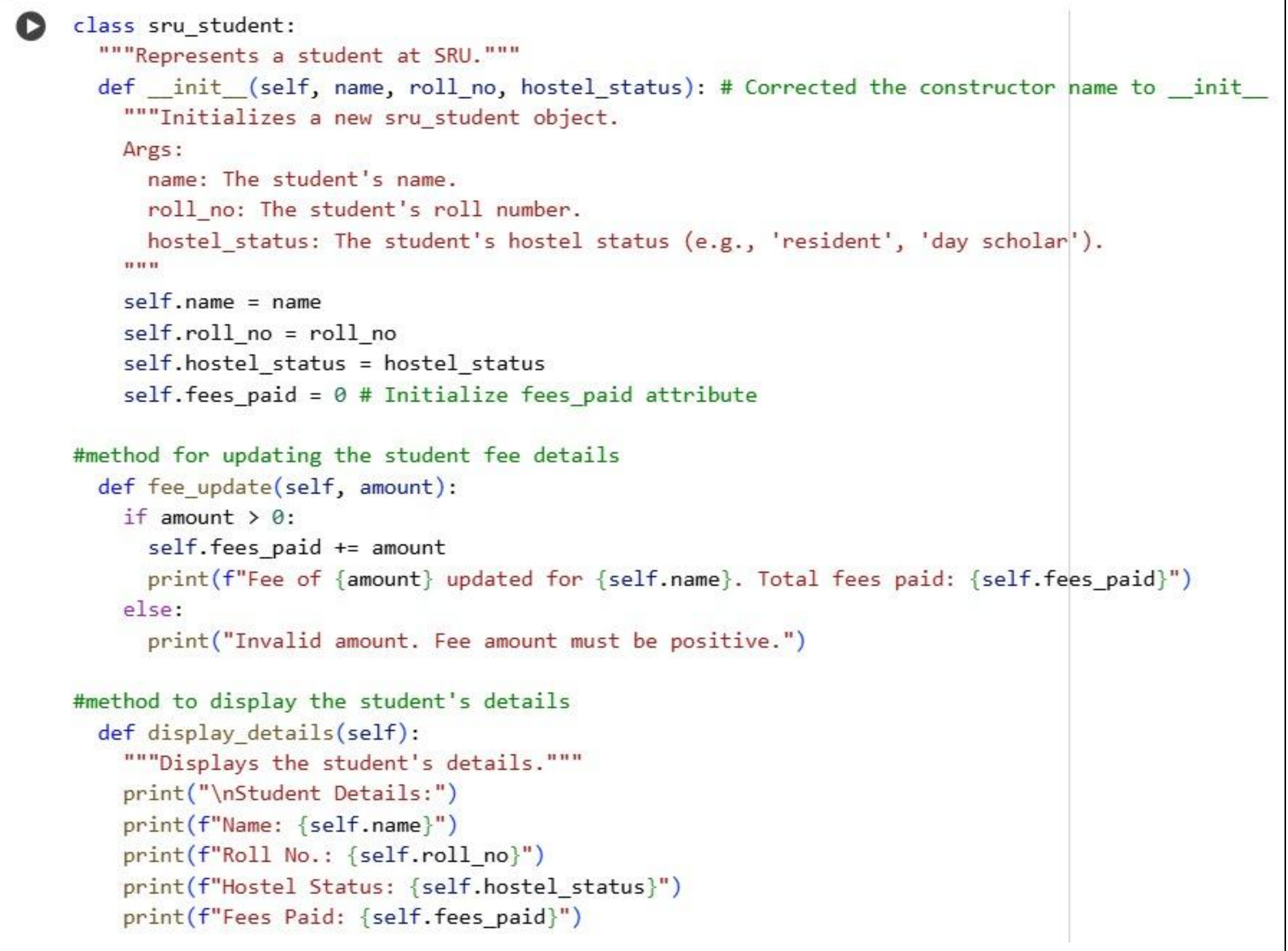
Task Description#2 Automatic Inline Comments

- Write python program for **sru_student** class with attributes like name, roll no., hostel_status and **fee_update** method and **display_details** method.
- Write comments manually for each line/code block
- Ask an AI tool to add inline comments explaining each line/step.
- Compare the AI-generated comments with your manually written one.

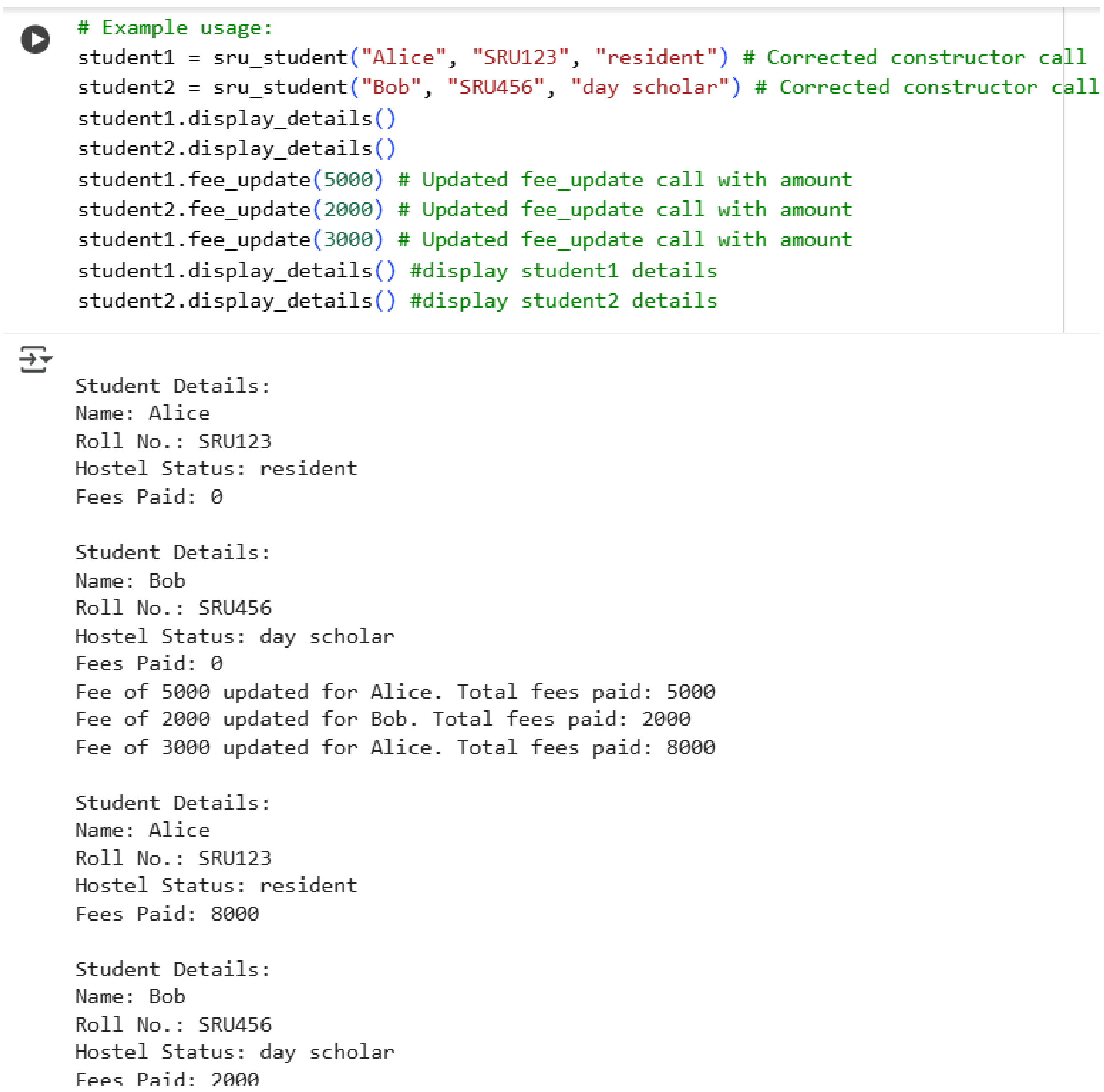
Expected Output#2: Students critically analyze AI-generated code comments.

PROMPT: "Write a Python program for an sru_student class with attributes like name, roll number, and hostel status. Add a fee_update method and a display_details method. Take dynamic input from the user for student details and fee, then display the updated details with proper inline comments."

MANUALLY WRITTEN COMMENTS:



```python
class sru_student:
  """Represents a student at SRU."""
  def __init__(self, name, roll_no, hostel_status): # Corrected the constructor name to __init__
    """Initializes a new sru_student object.
    Args:
      name: The student's name.
      roll_no: The student's roll number.
      hostel_status: The student's hostel status (e.g., 'resident', 'day scholar').
    """
    self.name = name
    self.roll_no = roll_no
    self.hostel_status = hostel_status
    self.fees_paid = 0 # Initialize fees_paid attribute

#method for updating the student fee details
  def fee_update(self, amount):
    if amount > 0:
      self.fees_paid += amount
      print(f"Fee of {amount} updated for {self.name}. Total fees paid: {self.fees_paid}")
    else:
      print("Invalid amount. Fee amount must be positive.")

#method to display the student's details
  def display_details(self):
    """Displays the student's details."""
    print("\nStudent Details:")
    print(f"Name: {self.name}")
    print(f"Roll No.: {self.roll_no}")
    print(f"Hostel Status: {self.hostel_status}")
    print(f"Fees Paid: {self.fees_paid}")
```

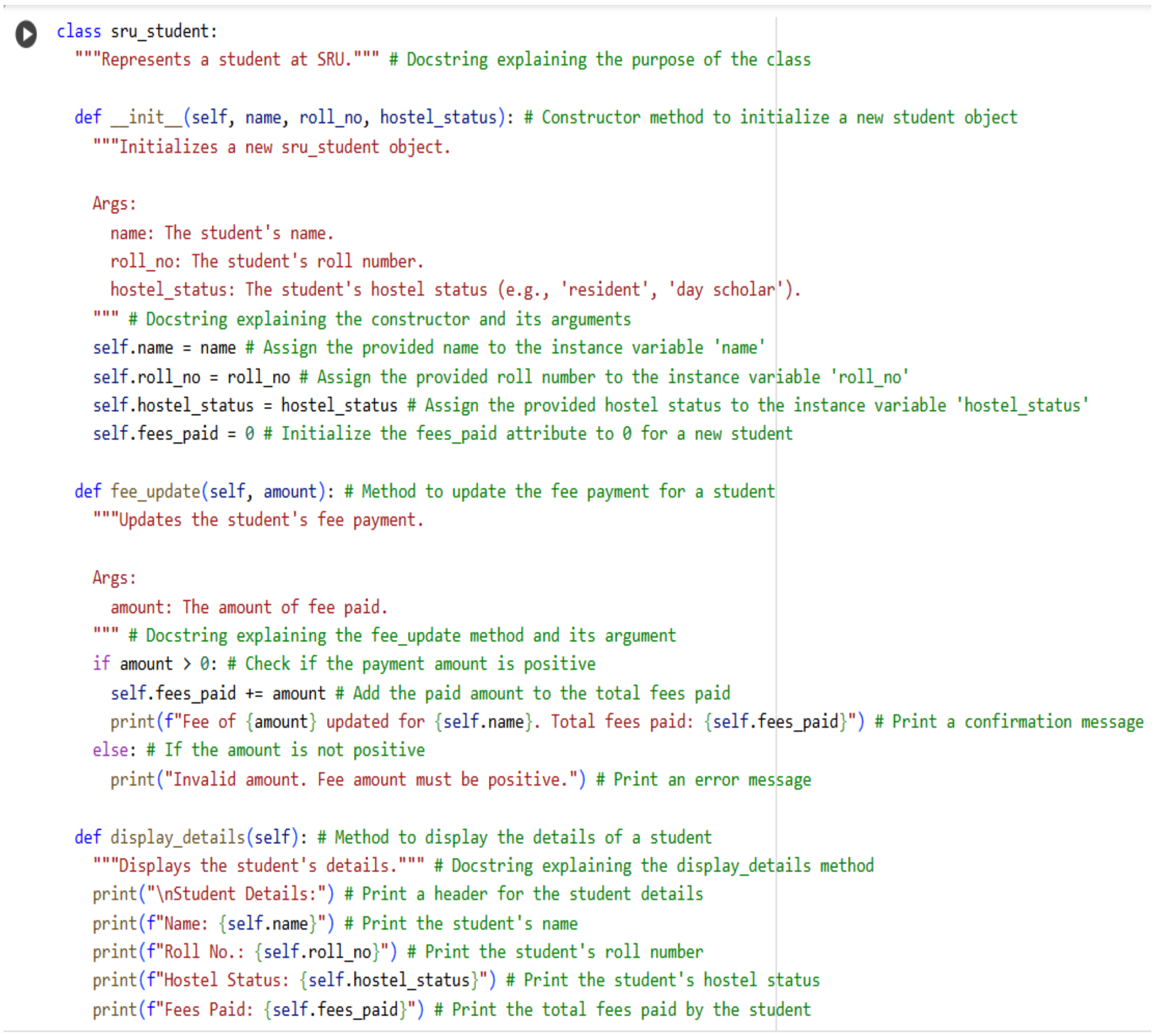


```python
# Example usage:
student1 = sru_student("Alice", "SRU123", "resident") # Corrected constructor call
student2 = sru_student("Bob", "SRU456", "day scholar") # Corrected constructor call
student1.display_details()
student2.display_details()
student1.fee_update(5000) # Updated fee_update call with amount
student2.fee_update(2000) # Updated fee_update call with amount
student1.fee_update(3000) # Updated fee_update call with amount
student1.display_details() #display student1 details
student2.display_details() #display student2 details
```

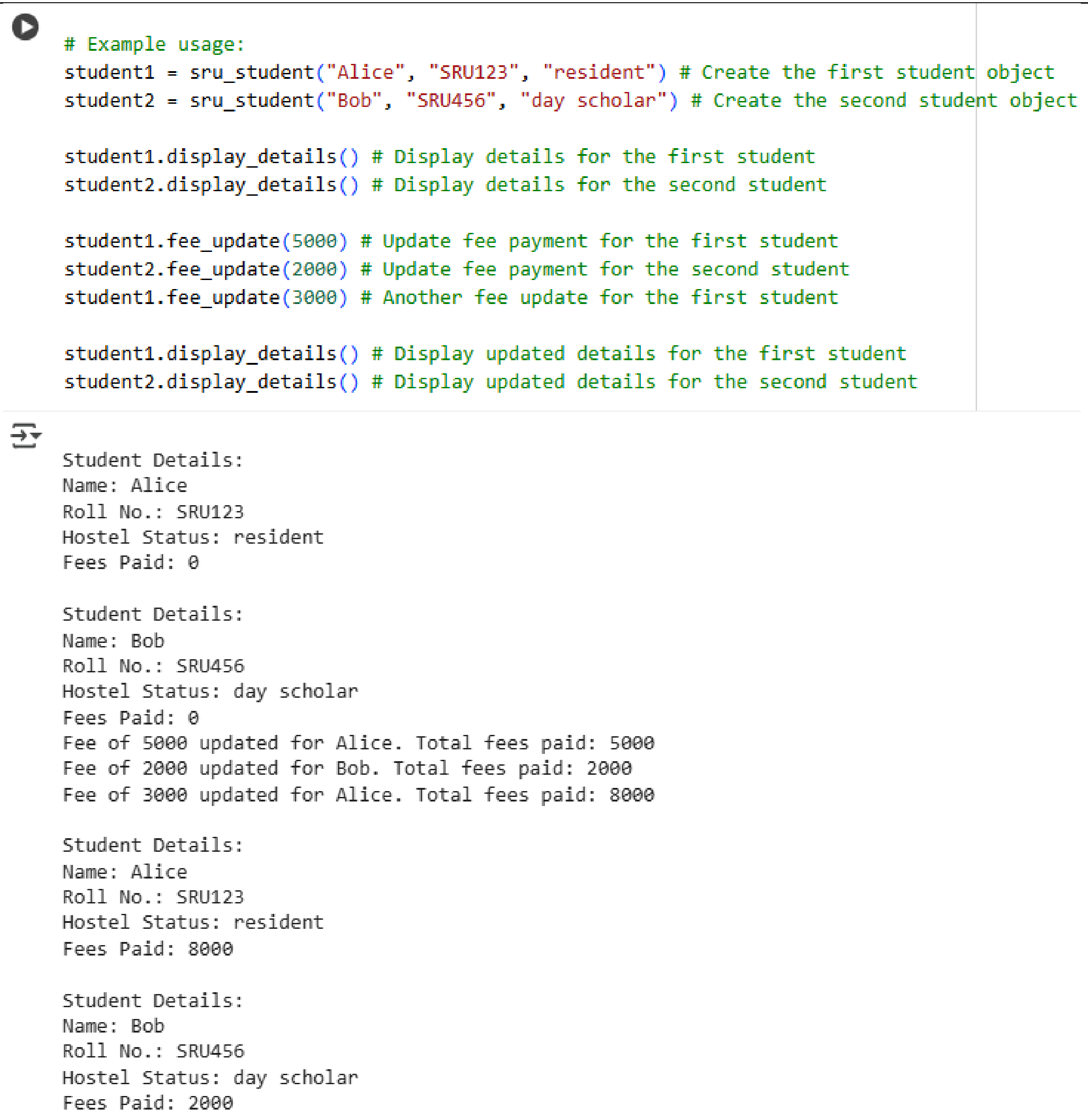
```
Student Details:
Name: Alice
Roll No.: SRU123
Hostel Status: resident
Fees Paid: 0

Student Details:
Name: Bob
Roll No.: SRU456
Hostel Status: day scholar
Fees Paid: 0
Fee of 5000 updated for Alice. Total fees paid: 5000
Fee of 2000 updated for Bob. Total fees paid: 2000
Fee of 3000 updated for Alice. Total fees paid: 8000

Student Details:
Name: Alice
Roll No.: SRU123
Hostel Status: resident
Fees Paid: 8000

Student Details:
Name: Bob
Roll No.: SRU456
Hostel Status: day scholar
Fees Paid: 2000
```

OBSERVATION: The provided Python code defines an sru_student class to manage student information. It includes a constructor to initialize student objects with name, roll number, and hostel status, and sets initial fees paid to zero.
The fee_update method allows adding fee payments to a student's record.
The display_details method prints the student's information, including their name, roll number, hostel status, and total fees paid. The example usage demonstrates creating student objects, updating fees, and displaying details.

WITH COMMENTS.. GIVEN BY AI:



```
class sru_student:
  """Represents a student at SRU.""" # Docstring explaining the purpose of the class

  def __init__(self, name, roll_no, hostel_status): # Constructor method to initialize a new student object
    """Initializes a new sru_student object.

    Args:
      name: The student's name.
      roll_no: The student's roll number.
      hostel_status: The student's hostel status (e.g., 'resident', 'day scholar').
    """ # Docstring explaining the constructor and its arguments
    self.name = name # Assign the provided name to the instance variable 'name'
    self.roll_no = roll_no # Assign the provided roll number to the instance variable 'roll_no'
    self.hostel_status = hostel_status # Assign the provided hostel status to the instance variable 'hostel_status'
    self.fees_paid = 0 # Initialize the fees_paid attribute to 0 for a new student

  def fee_update(self, amount): # Method to update the fee payment for a student
    """Updates the student's fee payment.

    Args:
      amount: The amount of fee paid.
    """ # Docstring explaining the fee_update method and its argument
    if amount > 0: # Check if the payment amount is positive
      self.fees_paid += amount # Add the paid amount to the total fees paid
      print(f"Fee of {amount} updated for {self.name}. Total fees paid: {self.fees_paid}") # Print a confirmation message
    else: # If the amount is not positive
      print("Invalid amount. Fee amount must be positive.") # Print an error message

  def display_details(self): # Method to display the details of a student
    """Displays the student's details.""" # Docstring explaining the display_details method
    print("\nStudent Details:") # Print a header for the student details
    print(f"Name: {self.name}") # Print the student's name
    print(f"Roll No.: {self.roll_no}") # Print the student's roll number
    print(f"Hostel Status: {self.hostel_status}") # Print the student's hostel status
    print(f"Fees Paid: {self.fees_paid}") # Print the total fees paid by the student
```



```python
# Example usage:
student1 = sru_student("Alice", "SRU123", "resident") # Create the first student object
student2 = sru_student("Bob", "SRU456", "day scholar") # Create the second student object

student1.display_details() # Display details for the first student
student2.display_details() # Display details for the second student

student1.fee_update(5000) # Update fee payment for the first student
student2.fee_update(2000) # Update fee payment for the second student
student1.fee_update(3000) # Another fee update for the first student

student1.display_details() # Display updated details for the first student
student2.display_details() # Display updated details for the second student
```

```
Student Details:
Name: Alice
Roll No.: SRU123
Hostel Status: resident
Fees Paid: 0

Student Details:
Name: Bob
Roll No.: SRU456
Hostel Status: day scholar
Fees Paid: 0
Fee of 5000 updated for Alice. Total fees paid: 5000
Fee of 2000 updated for Bob. Total fees paid: 2000
Fee of 3000 updated for Alice. Total fees paid: 8000

Student Details:
Name: Alice
Roll No.: SRU123
Hostel Status: resident
Fees Paid: 8000

Student Details:
Name: Bob
Roll No.: SRU456
Hostel Status: day scholar
Fees Paid: 2000
```

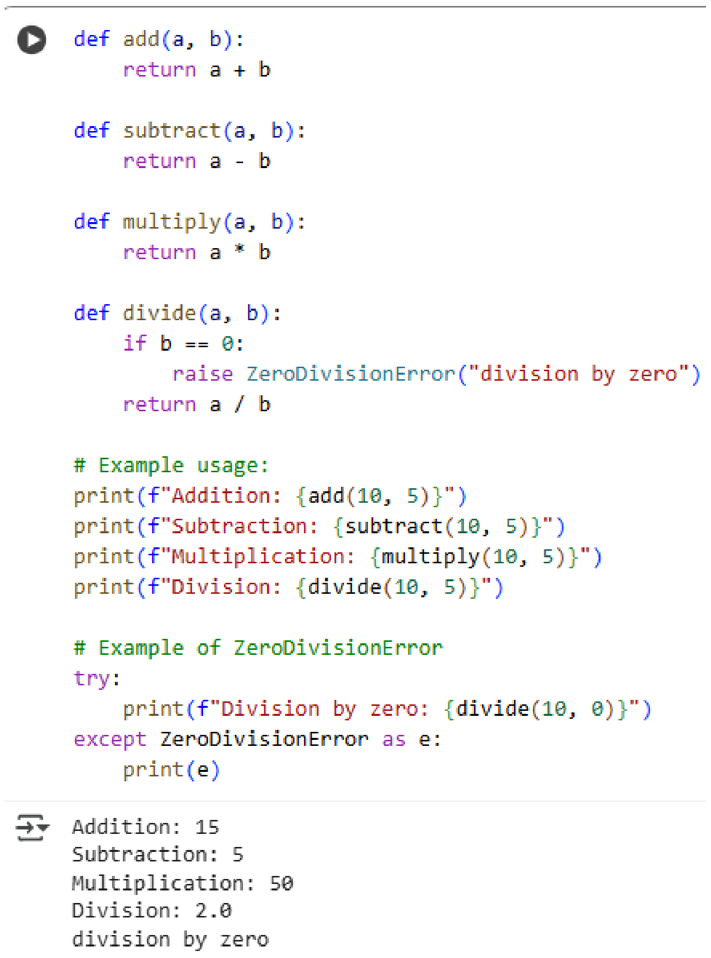
COMPARISION: The first code which was given manually uses inline comments (#) for line-by-line explanations, focusing on *what* the code does.
Second code uses both inline comments and structured docstrings which was given by the AI. Docstrings explain the *purpose* of classes/methods, their parameters, and provide examples (NumPy style).
Inline comments are good for specific lines, while docstrings offer detailed, structured documentation. My code combines both for a comprehensive approach.

Task Description#3

- Write a Python script with 3–4 functions (e.g., calculator: add, subtract, multiply, divide).
- Incorporate manual **docstring** in code with NumPy Style
- Use AI assistance to generate a module-level docstring + individual function docstrings.
- Compare the AI-generated docstring with your manually written one.

Expected Output#3: Students learn structured documentation for multi-function scripts

PROMPT: Write a Python script with functions for add, subtract, multiply, and divide, each using NumPy-style docstrings, including a module-level docstring**.**



```python
def add(a, b):
    return a + b

def subtract(a, b):
    return a - b

def multiply(a, b):
    return a * b

def divide(a, b):
    if b == 0:
        raise ZeroDivisionError("division by zero")
    return a / b

# Example usage:
print(f"Addition: {add(10, 5)}")
print(f"Subtraction: {subtract(10, 5)}")
print(f"Multiplication: {multiply(10, 5)}")
print(f"Division: {divide(10, 5)}")

# Example of ZeroDivisionError
try:
    print(f"Division by zero: {divide(10, 0)}")
except ZeroDivisionError as e:
    print(e)
```

```
Addition: 15
Subtraction: 5
Multiplication: 50
Division: 2.0
division by zero
```

OBSERVATION: The code defines four Python functions: add, subtract, multiply, and divide. These functions are designed to perform basic arithmetic operations using NumPy's corresponding functions (np.add, np.subtract, np.multiply, and np.divide). This approach allows the functions to work seamlessly with both scalar values and NumPy arrays, providing element-wise operations similar to how NumPy handles arithmetic.
Push documentation whole workspace as .md file in GitHub Repository

Note: Report should be submitted a word document for all tasks in a single document with prompts, comments & code explanation, and output and if required, screenshots