

SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		DEPARTMENT OF COMPUTER SCIENCE ENGINEERING	
Program Name: B. Tech		Assignment Type: Lab	Academic Year: 2025-2026
Course Coordinator Name		Dr. Rishabh Mittal	
Course Code	23CS002PC304	Course Title	AI Assisted Coding
Year/Sem	III/II	Regulation	R23
HALL TICKET	2303A54055	ASS	9.3
Name	V.SUSHMITHA	Applicable to Batches	47_B
Assignment Number: 9.3 (Present assignment number) / 24 (Total number of assignments)			
Q.No.	Question		Expected Time to complete
	<b>Lab 9: Documentation Generation – Automatic Documentation and Code Comments</b>  <b>Lab Objectives</b> <ul style="list-style-type: none"> <li>To understand the importance of documentation and code comments in software development</li> <li>To explore how AI-assisted coding tools generate documentation and inline comments</li> <li>To practice generating function-level and module-level docstrings automatically</li> <li>To evaluate the quality and accuracy of AI-generated documentation</li> <li>To develop a small automated documentation generator in Python</li> </ul>		
1	<b>Lab Outcomes (LOs)</b> After completing this lab, students will be able to: <ul style="list-style-type: none"> <li>Apply AI-assisted coding tools to generate docstrings and inline comments</li> <li>Analyze AI-generated documentation for correctness and readability</li> <li>Create structured documentation using standard formats (Google, NumPy)</li> <li>Design a mini documentation generation tool</li> </ul> <b>Task 1: Basic Docstring Generation</b> <b>Scenario</b> You are developing a utility function that processes numerical lists and must be properly documented for future maintenance. <b>Prompt : Create a Python function named sum_even_odd(numbers) that takes a list of integers and returns a tuple containing the sum of even numbers and sum of odd numbers.</b>  1. First, write the function with a manually written Google Style docstring including: <ul style="list-style-type: none"> <li>- Description</li> <li>- Args</li> <li>- Returns</li> <li>- Example</li> </ul> 2. Then generate an AI-style Google docstring for the same function separately (without changing logic).		Week 4 - Wednesday

3. Provide a structured comparison analyzing:

- Clarity
- Correctness
- Completeness
- Readability

Ensure the code runs without errors.

Code :

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

    Args:
        numbers: A list of integers to be processed.

    Returns:
        A tuple containing (sum_of_evens, sum_of_odds).

    Example:
        >>> sum_even_odd([1, 2, 3, 4, 5, 6])
        (12, 9)
    """
    sum_even = 0
    sum_odd = 0
    for num in numbers:
        if num % 2 == 0:
            sum_even += num
        else:
            sum_odd += num
    return (sum_even, sum_odd)
```

Requirements

- Write a Python function to return the **sum of even numbers** and **sum of odd numbers** in a given list
- Manually add a **Google Style docstring** to the function
- Use an AI-assisted tool (Copilot / Cursor AI) to generate a function-level docstring
- Compare the **AI-generated docstring** with the **manually written docstring**
- Analyze clarity, correctness, and completeness

Expected Output

- Python function with manual Google-style docstring
- AI-generated docstring for the same function
- Comparison explaining differences between manual and AI-generated documentation
- Improved understanding of AI-generated function-level documentation

**Explanation :** In this task, we create a function `sum_even_odd(numbers)` that finds the sum of even and odd numbers from a list and returns them as a tuple. The main focus is writing Google Style docstrings manually and then generating an AI-style docstring for the same function. Finally, both docstrings are compared based on clarity, correctness, completeness, and readability.

Task 2: Automatic Inline Comments

Scenario

You are developing a student management module that must be easy to understand for new developers.

**Prompt :** Create a Python class named `sru_student` with:

Attributes:

- name
- roll\_no
- hostel\_status

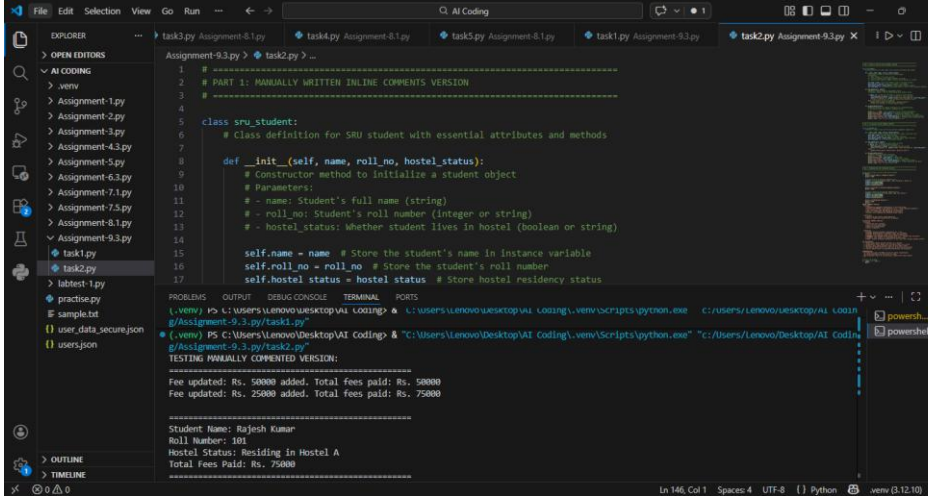
Methods:

- fee\_update(amount)
- display\_details()

1. First, write the class with detailed manual inline comments explaining each line or logical block.
2. Then generate an AI-assisted version of inline comments for the same code (without changing logic).
3. Provide a comparison discussing:
  - Missing comments
  - Redundant comments
  - Incorrect explanations
  - Strengths and limitations of AI-generated comments

Ensure the program runs without errors.

Code :



```
1 # PART 1: MANUALLY WRITTEN INLINE COMMENTS VERSION
2 # =====
3
4
5 class sru_student:
6     # Class definition for SRU student with essential attributes and methods
7
8     def __init__(self, name, roll_no, hostel_status):
9         # Constructor method to initialize a student object
10         # Parameters:
11         # - name: Student's full name (string)
12         # - roll_no: Student's roll number (integer or string)
13         # - hostel_status: Whether student lives in hostel (boolean or string)
14
15         self.name = name # Store the student's name in instance variable
16         self.roll_no = roll_no # Store the student's roll number
17         self.hostel_status = hostel_status # Store hostel residency status
18
19
20 # =====
21 # PART 2: AI-GENERATED COMMENTS VERSION
22 # =====
23
24
25 class sru_student:
26     """
27     Class definition for SRU student with essential attributes and methods.
28     """
29
30     def __init__(self, name, roll_no, hostel_status):
31         """
32         Constructor method to initialize a student object.
33         Parameters:
34         - name: Student's full name (string)
35         - roll_no: Student's roll number (integer or string)
36         - hostel_status: Whether student lives in hostel (boolean or string)
37         """
38         self.name = name
39         self.roll_no = roll_no
40         self.hostel_status = hostel_status
41
42
43 # =====
44 # PART 3: TESTING THE MANUALLY COMPILED VERSION
45 # =====
46
47
48 # Create a student object
49 student = sru_student("Rajesh Kumar", 101, "Residing in Hostel A")
50
51 # Update fees
52 student.fee_update(50000)
53 student.fee_update(25000)
54
55 # Display details
56 student.display_details()
57
58
59 # =====
60 # PART 4: TESTING THE AI-GENERATED VERSION
61 # =====
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63
64 # Create a student object
65 student = sru_student("Rajesh Kumar", 101, "Residing in Hostel A")
66
67 # Update fees
68 student.fee_update(50000)
69 student.fee_update(25000)
70
71 # Display details
72 student.display_details()
73
74
75 # =====
76 # PART 5: COMPARISON AND ANALYSIS
77 # =====
78
79
80 # The following table compares the manual and AI-generated comments.
81 # Manual comments are more detailed and provide context, while AI-generated
82 # comments are more concise and focus on the code structure.
83 # Manual comments are more accurate and provide more context, while AI-generated
84 # comments are more concise and focus on the code structure.
85 # Manual comments are more accurate and provide more context, while AI-generated
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98 # comments are more concise and focus on the code structure.
99 # Manual comments are more accurate and provide more context, while AI-generated
100 # comments are more concise and focus on the code structure.
```

Requirements

- Write a Python program for an sru\_student class with the following:
  - Attributes: name, roll\_no, hostel\_status
  - Methods: fee\_update() and display\_details()
- Manually write **inline comments** for each line or logical block
- Use an AI-assisted tool to automatically add inline comments
- Compare **manual comments** with **AI-generated comments**
- Identify missing, redundant, or incorrect AI comments

Expected Output

- Python class with manually written inline comments
- AI-generated inline comments added to the same code
- Comparative analysis of manual vs AI comments
- Critical discussion on strengths and limitations of AI-generated comments

**Explanation :** In this task, we create a class sru\_student with attributes like name, roll number, and hostel status, and methods to update fees and display details. First, the code is written with detailed manual inline comments. Then AI-generated comments are written for the same code. Finally, we compare both comment styles and analyze missing, redundant, and incorrect comments.

Task 3: Module-Level and Function-Level Documentation  
Scenario

You are building a small calculator module that will be shared across multiple projects and requires structured documentation.

**Prompt:** Create a Python calculator module containing four functions:

- add(a, b)
- subtract(a, b)
- multiply(a, b)
- divide(a, b)

1. First, manually write NumPy Style docstrings for each function including:
  - Parameters
  - Returns
  - Raises (for divide by zero)
  - Example
2. Then generate:
  - A module-level docstring
  - AI-generated NumPy Style function-level docstrings (without modifying function logic)
3. Provide a structured comparison evaluating:
  - Structure
  - Accuracy
  - Completeness
  - Readability
  - Professional quality

Ensure the code runs without errors.

Code :

```

1  """
2  Calculator module providing basic arithmetic operations.
3
4  This module contains four fundamental arithmetic functions: addition, subtraction,
5  multiplication, and division. Each function accepts two numeric arguments and returns
6  the result of the respective operation. The divide function includes error handling
7  for division by zero.
8
9  Functions
10 -----
11 add : Add two numbers
12 subtract : Subtract second number from first
13 multiply : Multiply two numbers
14 divide : Divide first number by second with zero-check
15 """
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	structure, accuracy, completeness, readability, and professional quality.	
	<b>Additional Requirement</b> <ul style="list-style-type: none"><li>• Push the complete project documentation as a <b>.md file</b> to a GitHub repository</li><li>• Ensure documentation covers module overview and function descriptions</li></ul> <b>Note: Report should be submitted a word document for all tasks in a single document with prompts, comments &amp; code explanation, and output and if required, screenshots</b>	