ASSIGNMENT- 9.3

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Batch: 20

Task 1: Basic Docstring Generation

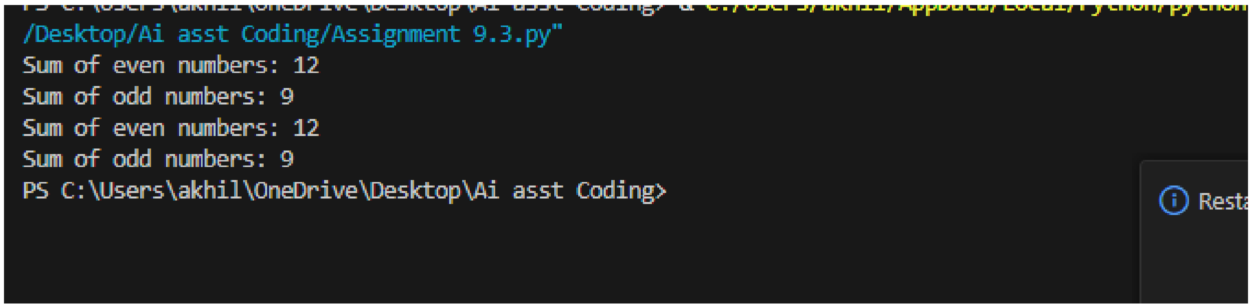
Scenario
You are developing a utility function that processes numerical lists and must be properly documented for future maintenance.
Requirements
• Write a Python function to return the sum of even numbers and sum of odd numbers in a given list
• Manually add a Google Style docstring to the function
• 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

CODE:

```
#Generate a Python function to return the sum of even numbers and sum of odd numbers in a given list of integers.
def sum_even_odd(numbers):
    sum_even = sum(num for num in numbers if num % 2 == 0)
    sum_odd = sum(num for num in numbers if num % 2 != 0)
    return sum_even, sum_odd
# Example usage:
numbers = [1, 2, 3, 4, 5, 6]
even_sum, odd_sum = sum_even_odd(numbers)
print(f"Sum of even numbers: {even_sum}")
print(f"Sum of odd numbers: {odd_sum}")

#Generate a docstring and inlilne comments using ai for the above function in  a professional manner for correctness and readability.
def sum_even_odd(numbers):
    """
    Calculate the sum of even and odd numbers in a given list.

    Parameters:
    numbers (list): A list of integers to be processed.

    Returns:
```

```
    tuple: A tuple containing the sum of even numbers and the sum of odd numbers.
    """
    # Calculate the sum of even numbers using a generator expression
    sum_even = sum(num for num in numbers if num % 2 == 0)

    # Calculate the sum of odd numbers using a generator expression
    sum_odd = sum(num for num in numbers if num % 2 != 0)

    # Return the results as a tuple
    return sum_even, sum_odd
# Example usage:
numbers = [1, 2, 3, 4, 5, 6]
even_sum, odd_sum = sum_even_odd(numbers)
print(f"Sum of even numbers: {even_sum}")
print(f"Sum of odd numbers: {odd_sum}")
```

OUTPUT:



```
/Desktop/Ai asst Coding/Assignment 9.3.py"
Sum of even numbers: 12
Sum of odd numbers: 9
Sum of even numbers: 12
Sum of odd numbers: 9
PS C:\Users\akhil\OneDrive\Desktop\Ai asst Coding>
```

OBSERVATION:

The function works correctly and efficiently calculates the sum of even and odd numbers, but without documentation, it may not be immediately clear to someone reading it later. The AI-generated docstring makes the purpose of the function much easier to understand at a glance. It clearly explains what the function takes as input and what it returns as output. The added inline comments also help readers follow the logic step by step. Overall, the AI documentation makes the code more readable and professional, while still requiring a quick review to ensure everything is accurate.

Task 2: Automatic Inline Comments

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

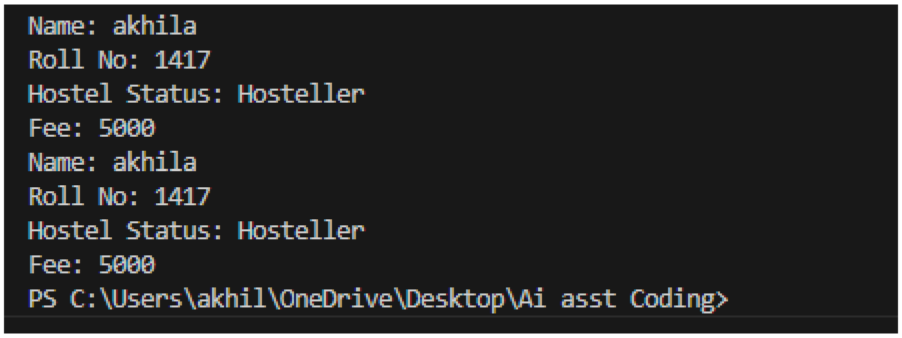
• Use an AI-assisted tool to automatically add inline comments
• Compare manual comments with AI-generated comments
• Identify missing, redundant, or incorrect AI comments
Expected Output
• Python class with manually written inline comments
• AI-generated inline comments added to the same code
• Comparative analysis of manual vs AI comments
• Critical discussion on strengths and limitations of AI-generated comments

CODE:

```
#generate a python program for an sru_student class with attributes : name , rollno,hostel_status and methods : fee_update(), and display_details()
class sru_student:
    def __init__(self, name, rollno, hostel_status):
        self.name = name
        self.rollno = rollno
        self.hostel_status = hostel_status
        self.fee = 0
    def fee_update(self, amount):
        self.fee += amount
    def display_details(self):
        print(f"Name: {self.name}")
        print(f"Roll No: {self.rollno}")
        print(f"Hostel Status: {self.hostel_status}")
        print(f"Fee: {self.fee}")
# Example usage
student1 = sru_student("akhila", "1417", "Hosteller")
student1.fee_update(5000)
student1.display_details()

#using ai generate inline comments for each line of the above code for better understanding and readability.
class sru_student:
    def __init__(self, name, rollno, hostel_status):
        # Initialize the student object with name, roll number, hostel status, and fee
        self.name = name
        self.rollno = rollno
        self.hostel_status = hostel_status
        self.fee = 0  # Initialize fee to 0
    def fee_update(self, amount):
        # Update the fee by adding the specified amount
        self.fee += amount
    def display_details(self):
        # Display the details of the student
        print(f"Name: {self.name}")
        print(f"Roll No: {self.rollno}")
        print(f"Hostel Status: {self.hostel_status}")
        print(f"Fee: {self.fee}")
# Example usage
```

```
student1 = sru_student("akhila", "1417", "Hosteller")  # Create an instance of sru_student
student1.fee_update(5000)  # Update the fee for the student
student1.display_details()  # Display the details of the student
```

OUTPUT:



```
Name: akhila
Roll No: 1417
Hostel Status: Hosteller
Fee: 5000
Name: akhila
Roll No: 1417
Hostel Status: Hosteller
Fee: 5000
PS C:\Users\akhil\OneDrive\Desktop\Ai asst Coding>
```

OBSERVATION :

The program correctly defines an sru_student class with clear attributes and methods, making it simple and easy to understand. The AI-generated inline comments improve readability by explaining the purpose of each method and important lines in the code. This makes the program more beginner-friendly and easier to maintain in the future. The comments clearly describe how the fee is updated and how student details are displayed. Overall, the AI assistance enhances clarity without changing the original logic of the program, though developers should still review comments to ensure they accurately reflect the code.

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.

Requirements

• Write a Python script containing 3–4 functions (e.g., add, subtract, multiply, divide)

• Manually write NumPy Style docstrings for each function

• Use AI assistance to generate:

– A module-level docstring

– Individual function-level docstrings

• Compare AI-generated docstrings with manually written ones

• Evaluate documentation structure, accuracy, and readability

Expected Output

• Python script with manual NumPy-style docstrings

• AI-generated module-level and function-level documentation

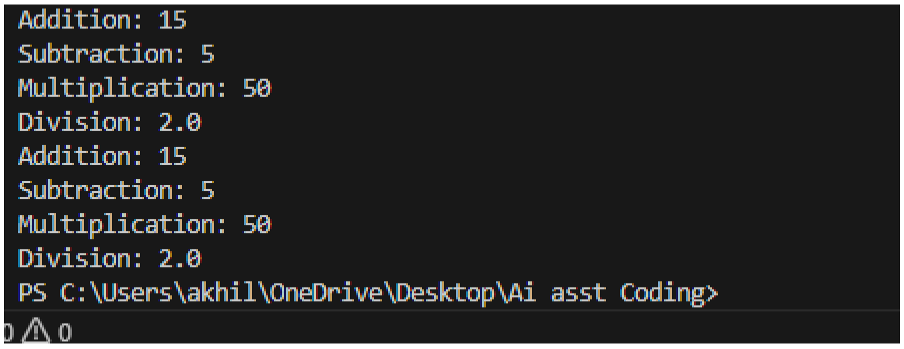
• Comparison between AI-generated and manual documentation

• Clear understanding of structured documentation for multi-function scripts

CODE:

```
#Generate a python code containing 3-4 functions : add,sustract,multiply , divide
def add(a, b):
    """Return the sum of a and b."""
    return a + b
def subtract(a, b):
    """Return the difference of a and b."""
    return a - b
def multiply(a, b):
    """Return the product of a and b."""
    return a * b
def divide(a, b):

    """Return the quotient of a and b. Raises ValueError if b is zero."""
    if b == 0:
        raise ValueError("Cannot divide by zero.")
    return a / b
# Example usage:
num1 = 10
num2 = 5
print(f"Addition: {add(num1, num2)}")        # Output: 15

print(f"Subtraction: {subtract(num1, num2)}")  # Output: 5
print(f"Multiplication: {multiply(num1, num2)}")  # Output: 50
print(f"Division: {divide(num1, num2)}")      # Output: 2.0

#using AI generate module-level docstring , individual function-level docstring for above code to increase accuracy and readability
"""This module provides basic arithmetic operations: addition, subtraction, multiplication, and division. Each function takes two numerical inputs and returns the result of the respective operation. The division function includes error handling to prevent division by zero.
"""
def add(a, b):
    """Return the sum of a and b.

    Parameters:
    a (float): The first number.
    b (float): The second number.

    Returns:
    float: The sum of a and b.
    """
    return a + b
def subtract(a, b):
    """Return the difference of a and b.

    Parameters:
    a (float): The first number.
    b (float): The second number.

    Returns:
    float: The difference of a and b.
    """
    return a - b
def multiply(a, b):
    """Return the product of a and b.

    Parameters:
    a (float): The first number.
    b (float): The second number.

    Returns:
    float: The product of a and b.
    """
    return a * b
def divide(a, b):
    """Return the quotient of a and b. Raises ValueError if b is zero.

    Parameters:
    a (float): The first number.
    b (float): The second number.

    Returns:
    float: The quotient of a and b.

    Raises:
    ValueError: If b is zero, as division by zero is undefined.
    """
    if b == 0:
        raise ValueError("Cannot divide by zero.")
    return a / b
# Example usage:
num1 = 10
num2 = 5
print(f"Addition: {add(num1, num2)}")        # Output: 15
print(f"Subtraction: {subtract(num1, num2)}")  # Output: 5
print(f"Multiplication: {multiply(num1, num2)}")  # Output: 50

print(f"Division: {divide(num1, num2)}")      # Output: 2.0
```

OUTPUT:



```
Addition: 15
Subtraction: 5
Multiplication: 50
Division: 2.0
Addition: 15
Subtraction: 5
Multiplication: 50
Division: 2.0
PS C:\Users\akhil\OneDrive\Desktop\Ai asst Coding>
```

OBSERVATION:

When comparing the version without detailed documentation to the AI-generated documented version, the main difference lies in clarity and professionalism. The original functions are simple and correct, but they provide very little explanation about inputs, outputs, or possible errors. The AI-generated module-level and function-level docstrings make the purpose of the program much clearer and easier to understand. They explain parameters, return values, and exceptions in a structured manner, which improves readability and maintainability. While the logic of the program remains unchanged, the documented version is more suitable for real-world projects and collaborative development.