Assignment-9.3

Ht.No: 2303A51308

Batch: 05

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

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

    Args:
        nums (list): List of integers.

    Returns:
        tuple: (sum_of_even, sum_of_odd)
    """
    even_sum = 0
    odd_sum = 0

    for num in numbers:
        if num % 2 == 0:
            even_sum += num
        else:
            odd_sum += num

    return even_sum, odd_sum
```

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

    This function iterates through the given list of integers and
    computes two separate sums:
    - One for even numbers
    - One for odd numbers

    Args:
        numbers (list of int): A list containing integer values.

    Returns:
        tuple: A tuple containing two integers:
            - Sum of even numbers
            - Sum of odd numbers

    Example:
        >>> sum_even_odd([1, 2, 3, 4, 5, 6])
        (12, 9)
    """
    even_sum = 0
    odd_sum = 0

    for num in numbers:
        if num % 2 == 0:
            even_sum += num
        else:
            odd_sum += num

    return even_sum, odd_sum
```

Comparison:

Manual doctstring:

- A manual docstring is written by the programmer in their own words.
- Manual docstrings may be short or long depending on the person.
- Writing a manual docstring takes more time.
- Manual docstrings show the programmer's understanding of the code.
- Manual docstrings are commonly used in exams and learning.

AI-generated docstring:

- An AI-generated docstring is written automatically by an AI tool.
- AI-generated docstrings are usually well-structured and detailed.
- AI-generated docstrings save time and effort.
- AI-generated docstrings depend on the quality of the prompt given.
- AI-generated docstrings are useful in real projects for consistency.

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

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```python
# Creating a class named sru_student
class sru_student:

    # Constructor to initialize student details
    def __init__(self, name, roll_no, hostel_status):
        self.name = name                # Store student name
        self.roll_no = roll_no          # Store roll number
        self.hostel_status = hostel_status  # Store hostel status (Yes/N
        self.fee = 0                    # Initialize fee as 0

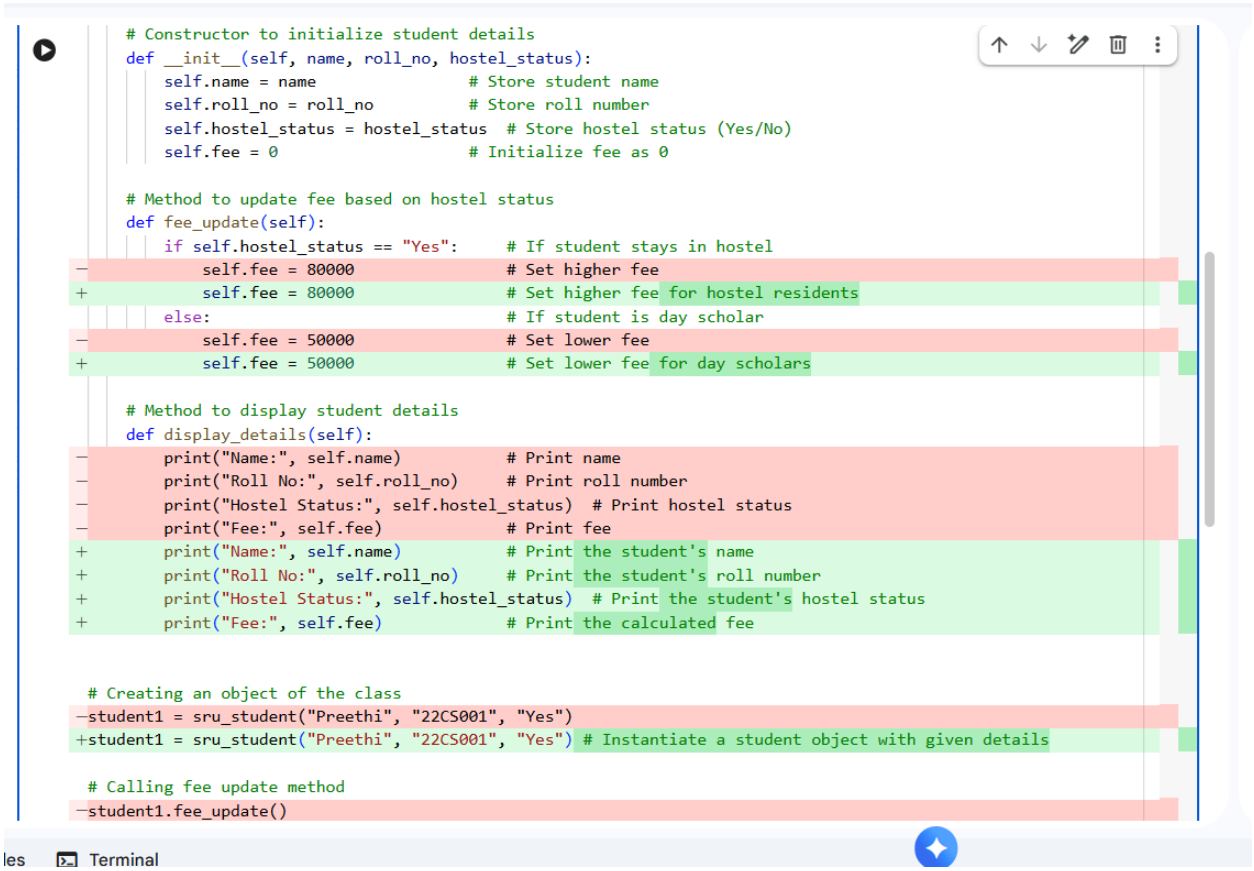
    # Method to update fee based on hostel status
    def fee_update(self):
        if self.hostel_status == "Yes":     # If student stays in hostel
            self.fee = 80000                # Set higher fee
        else:                               # If student is day scholar
            self.fee = 50000                # Set lower fee

    # Method to display student details
    def display_details(self):
        print("Name:", self.name)           # Print name
        print("Roll No:", self.roll_no)     # Print roll number
        print("Hostel Status:", self.hostel_status)  # Print hostel statu
        print("Fee:", self.fee)             # Print fee


# Creating an object of the class
student1 = sru_student("Preethi", "22CS001", "Yes")

# Calling fee update method
student1.fee_update()

# Displaying student information
student1.display_details()
```



```
    # Constructor to initialize student details
    def __init__(self, name, roll_no, hostel_status):
        self.name = name                # Store student name
        self.roll_no = roll_no          # Store roll number
        self.hostel_status = hostel_status  # Store hostel status (Yes/No)
        self.fee = 0                    # Initialize fee as 0

    # Method to update fee based on hostel status
    def fee_update(self):
        if self.hostel_status == "Yes":     # If student stays in hostel
-           self.fee = 80000                # Set higher fee
+           self.fee = 80000                # Set higher fee for hostel residents
        else:                               # If student is day scholar
-           self.fee = 50000                # Set lower fee
+           self.fee = 50000                # Set lower fee for day scholars

    # Method to display student details
    def display_details(self):
-       print("Name:", self.name)           # Print name
-       print("Roll No:", self.roll_no)     # Print roll number
-       print("Hostel Status:", self.hostel_status)  # Print hostel status
-       print("Fee:", self.fee)             # Print fee
+       print("Name:", self.name)           # Print the student's name
+       print("Roll No:", self.roll_no)     # Print the student's roll number
+       print("Hostel Status:", self.hostel_status)  # Print the student's hostel status
+       print("Fee:", self.fee)             # Print the calculated fee


 # Creating an object of the class
-student1 = sru_student("Preethi", "22CS001", "Yes")
+student1 = sru_student("Preethi", "22CS001", "Yes") # Instantiate a student object with given details

 # Calling fee update method
-student1.fee_update()
```

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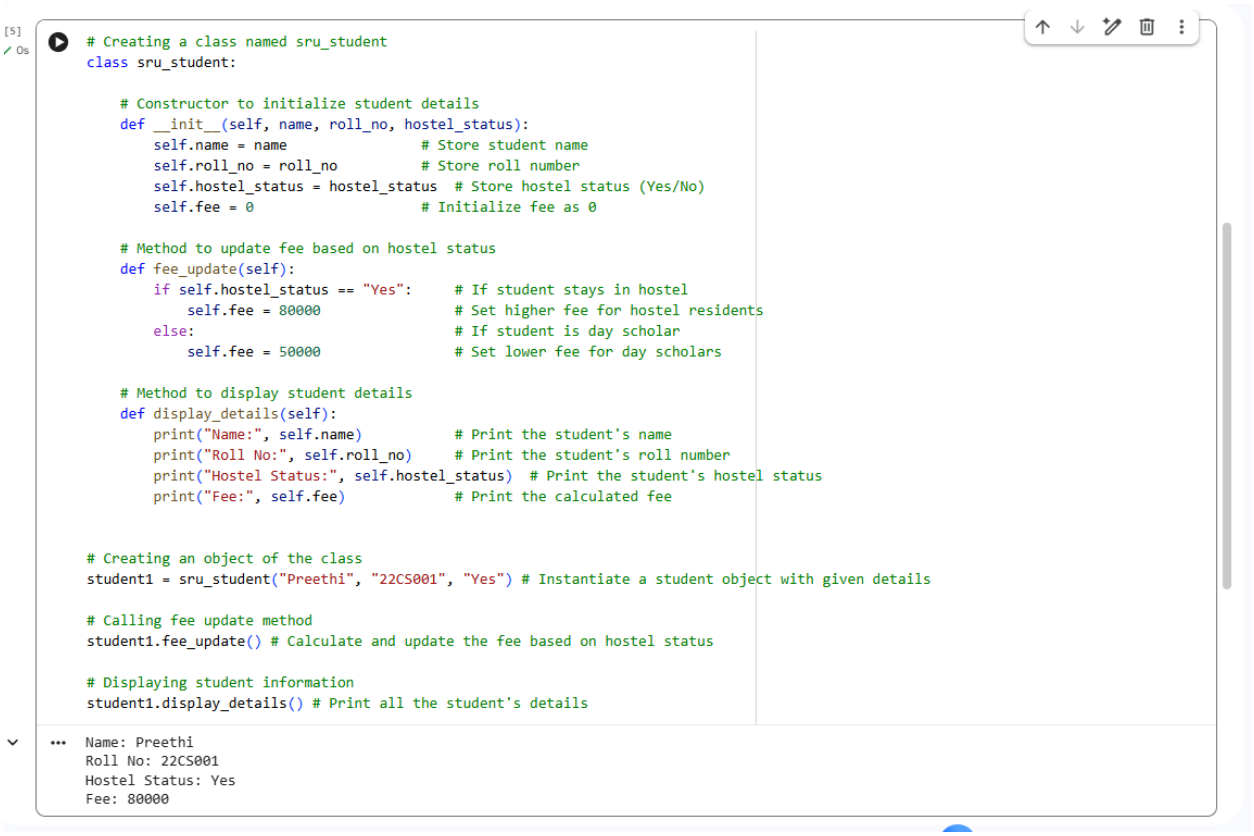

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# Creating a class named sru_student
class sru_student:

    # Constructor to initialize student details
    def __init__(self, name, roll_no, hostel_status):
        self.name = name                # Store student name
        self.roll_no = roll_no          # Store roll number
        self.hostel_status = hostel_status  # Store hostel status (Yes/No)
        self.fee = 0                    # Initialize fee as 0

    # Method to update fee based on hostel status
    def fee_update(self):
        if self.hostel_status == "Yes":     # If student stays in hostel
            self.fee = 80000                # Set higher fee for hostel residents
        else:                               # If student is day scholar
            self.fee = 50000                # Set lower fee for day scholars

    # Method to display student details
    def display_details(self):
        print("Name:", self.name)           # Print the student's name
        print("Roll No:", self.roll_no)     # Print the student's roll number
        print("Hostel Status:", self.hostel_status)  # Print the student's hostel status
        print("Fee:", self.fee)             # Print the calculated fee


# Creating an object of the class
student1 = sru_student("Preethi", "22CS001", "Yes") # Instantiate a student object with given details

# Calling fee update method
student1.fee_update() # Calculate and update the fee based on hostel status

# Displaying student information
student1.display_details() # Print all the student's details

...
Name: Preethi
Roll No: 22CS001
Hostel Status: Yes
Fee: 80000
```

Comparision:

Manual comments:

- In the manual version, each line and block in the sru_student program is commented by the programmer to explain what it does.
- Manual comments clearly show the student's understanding of class, constructor, and methods like fee_update() and display_details().
- Writing manual comments for the program takes more time, especially for constructors and methods.
- Manual comments may be simple and exam-oriented.
- Manual comments are preferred in academic submissions to prove learning.

AI-generated comments:

- AI comments explain the same logic but in a more standardized and polished way.
- AI-generated comments reduce effort and save time.
- In the AI-generated version, comments are added automatically based on code understanding.
- AI comments may be slightly more descriptive, sometimes more than required for exams.
- AI-generated comments are useful in real projects where clarity and consistency matter.

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:

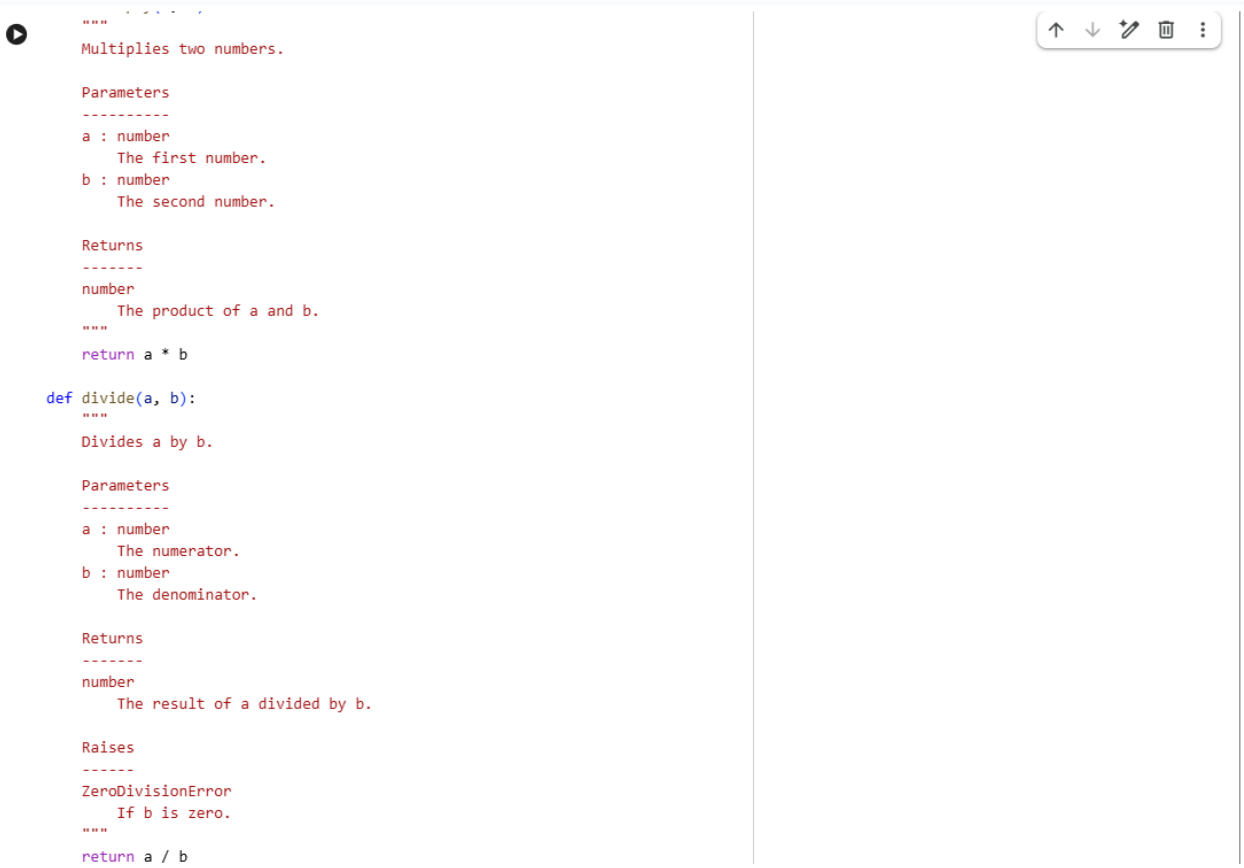
– A module-level docstring

– Individual function-level docstrings

- Compare AI-generated docstrings with manually written ones
- Evaluate documentation structure, accuracy, and readability

```python
def add(a, b):
    """Add two numbers."""
    return a + b


def subtract(a, b):
    """Subtract b from a."""
    return a - b


def multiply(a, b):
    """Multiply two numbers."""
    return a * b


def divide(a, b):
    """Divide a by b."""
    return a / b
```

```python
def add(a, b):
    """
    Adds two numbers.

    Parameters
    ----------
    a : number
        The first number.
    b : number
        The second number.

    Returns
    -------
    number
        The sum of a and b.
    """
    return a + b

def subtract(a, b):
    """
    Subtracts b from a.

    Parameters
    ----------
    a : number
        The number to subtract from.
    b : number
        The number to subtract.

    Returns
    -------
    number
        The result of a minus b.
    """
    return a - b

def multiply(a, b):
    """
```



```
    """
    Multiplies two numbers.

    Parameters
    ----------
    a : number
        The first number.
    b : number
        The second number.

    Returns
    -------
    number
        The product of a and b.
    """
    return a * b

def divide(a, b):
    """
    Divides a by b.

    Parameters
    ----------
    a : number
        The numerator.
    b : number
        The denominator.

    Returns
    -------
    number
        The result of a divided by b.

    Raises
    ------
    ZeroDivisionError
        If b is zero.
    """
    return a / b
```

Comparsion:

Manual docstrings:

- Manual docstrings are written by the programmer.
- Manual docstrings show the programmer's understanding of the code.
- Writing manual docstrings takes more time.
- Manual docstrings may differ in quality and style.
- Manual docstrings are preferred in learning and exams.

AI-generated docstrings:

- AI-generated docstrings are created automatically by AI tools.
- AI docstrings are usually clear and well-structured.
- AI-generated docstrings save time and effort.
- AI-generated docstrings are consistent and standard.
- AI-generated docstrings are useful in real-world projects.