

LAB ASSIGNMENT

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ROLL NO : 2403A510A4

COURSE : AIML

BATCH:01

QUESTION :

Duration	2 Hours	Applicable to Batches	
Assignment Number: 6.3(Present assignment number)/24(Total number of assignments)			
Q.No.	Question	Expected Time to complete	
1	<p>Lab 6: AI-Based Code Completion – Classes, Loops, and Conditionals</p> <p>Lab Objectives:</p> <ul style="list-style-type: none">To explore AI-powered auto-completion features for core Python constructs.To analyze how AI suggests logic for class definitions, loops, and conditionals.To evaluate the completeness and correctness of code generated by AI assistants. <p>Lab Outcomes (LOs):</p>	Week 3 - Wednesday	

	<p>After completing this lab, students will be able to:</p> <ul style="list-style-type: none"> • Use AI tools to generate and complete class definitions and methods. • Understand and assess AI-suggested loops for iterative tasks. • Generate conditional statements through prompt-driven suggestions. • Critically evaluate AI-assisted code for correctness and clarity. <p>Task Description#1 (Classes)</p> <ul style="list-style-type: none"> • Use AI to complete a Student class with attributes and a method. • Check output • Analyze the code generated by AI tool <p>Expected Output#1</p> <ul style="list-style-type: none"> • Class with constructor and display_details() method <p>Task Description#2 (Loops)</p> <ul style="list-style-type: none"> • Prompt AI to complete a function that prints the first 10 multiples of a number using a loop. • Analyze the generated code • Ask AI to generate code using other controlled looping <p>Expected Output#2</p> <ul style="list-style-type: none"> • Correct loop-based implementation <p>Task Description#3 (Conditional Statements)</p> <ul style="list-style-type: none"> • Ask AI to write nested if-elif-else conditionals to classify age groups. • Analyze the generated code • Ask AI to generate code using other conditional statements <p>Expected Output#3</p> <ul style="list-style-type: none"> • Age classification function with appropriate conditions and with explanation <p>Task Description#4 (For and While loops)</p> <ul style="list-style-type: none"> • Generate a sum_to_n() function to calculate sum of first n numbers • Analyze the generated code • Get suggestions from AI with other controlled looping 	
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- Analyze the generated code
- Ask AI to generate code using other conditional statements

Expected Output#3

- Age classification function with appropriate conditions and with explanation

Task Description#4 (For and While loops)

- Generate a sum_to_n() function to calculate sum of first n numbers
- Analyze the generated code
- Get suggestions from AI with other controlled looping

Expected Output#4

- Python code with explanation

Task Description#5 (Class)

- Use AI to build a BankAccount class with deposit, withdraw, and balance methods.
- Analyze the generated code
- Add comments and explain code

Expected Output#5

- Python code with explanation

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

Evaluation Criteria:

Criteria	Max Marks
Class	1.0

TASK 1

PROMPT :

Use AI to write a Python Student class with some attributes (like name, age, and grade) and one method to display student details. Show the output and explain the code in an easy way.”“Write a Python class named Student with a constructor that initializes attributes like name, age, and grade. Include a display_details() method that prints the student’s information. Show the output and explain the code simply

The screenshot shows the Google Colab interface. On the left is a 'Table of contents' sidebar. The main editor area displays a Python class named 'Student'. The class has a docstring 'A class to represent a student.', an '.__init__' method that takes 'name', 'age', and 'grade' as arguments and assigns them to 'self.name', 'self.age', and 'self.grade', and a 'display_details' method that prints the student's name, age, and grade. Below the class definition, there is a comment '# Create an instance of the Student class'. On the right, the Gemini chat interface is visible, showing a prompt and a response.

```
class Student:
    """
    A class to represent a student.
    """
    def __init__(self, name, age, grade):
        """
        Constructor to initialize the Student object with name, age, and grade.

        Args:
            name (str): The name of the student.
            age (int): The age of the student.
            grade (str): The grade of the student.
        """
        self.name = name
        self.age = age
        self.grade = grade

    def display_details(self):
        """
        Displays the details of the student.
        """
        print(f"Student Name: {self.name}")
        print(f"Student Age: {self.age}")
        print(f"Student Grade: {self.grade}")

# Create an instance of the Student class
```

This screenshot shows the same Google Colab interface as the previous one, but with the code executed. The 'display_details' method is now called on an instance of the 'Student' class named 'student2'. The output of the program is displayed at the bottom of the code cell, showing the student's name, age, and grade. The Gemini chat interface on the right remains the same.

```
self.age = age
self.grade = grade

def display_details(self):
    """
    Displays the details of the student.
    """
    print(f"Student Name: {self.name}")
    print(f"Student Age: {self.age}")
    print(f"Student Grade: {self.grade}")

# Create an instance of the Student class
student2 = Student("Bob", 17, "11th")

# Call the display_details method to show the student's information
student2.display_details()
```

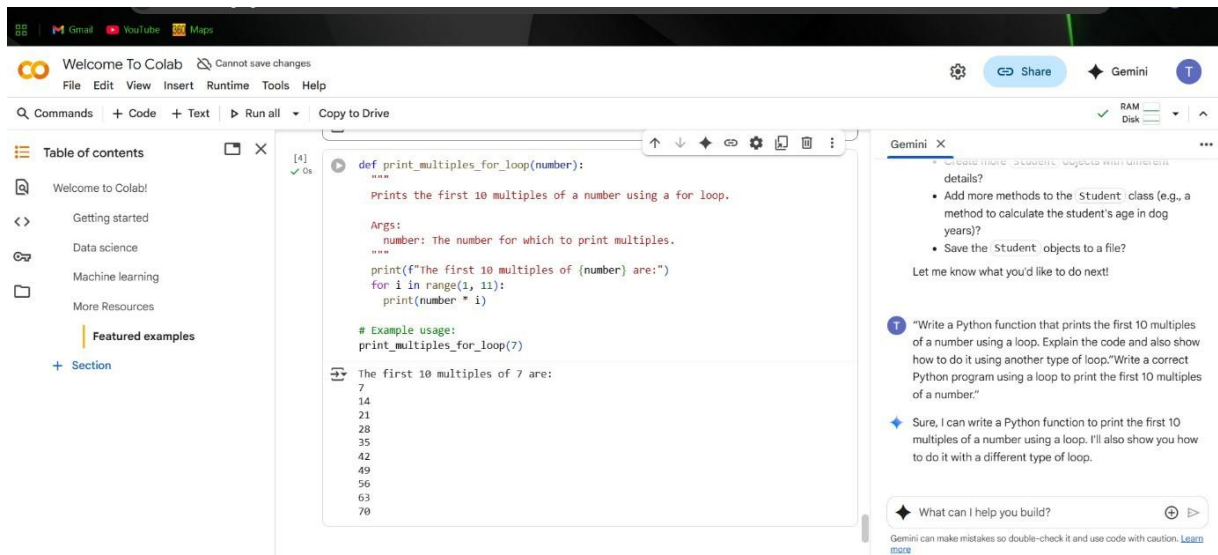
Student Name: Bob
Student Age: 17
Student Grade: 11th

TASK 2

Prompt

Write a Python function that prints the first 10 multiples of a number using a loop. Explain the code and also show how to do it using another type of loop."Write a correct Python program using a loop to print the first 10 multiples of a number

Output



Task 3

Prompt :

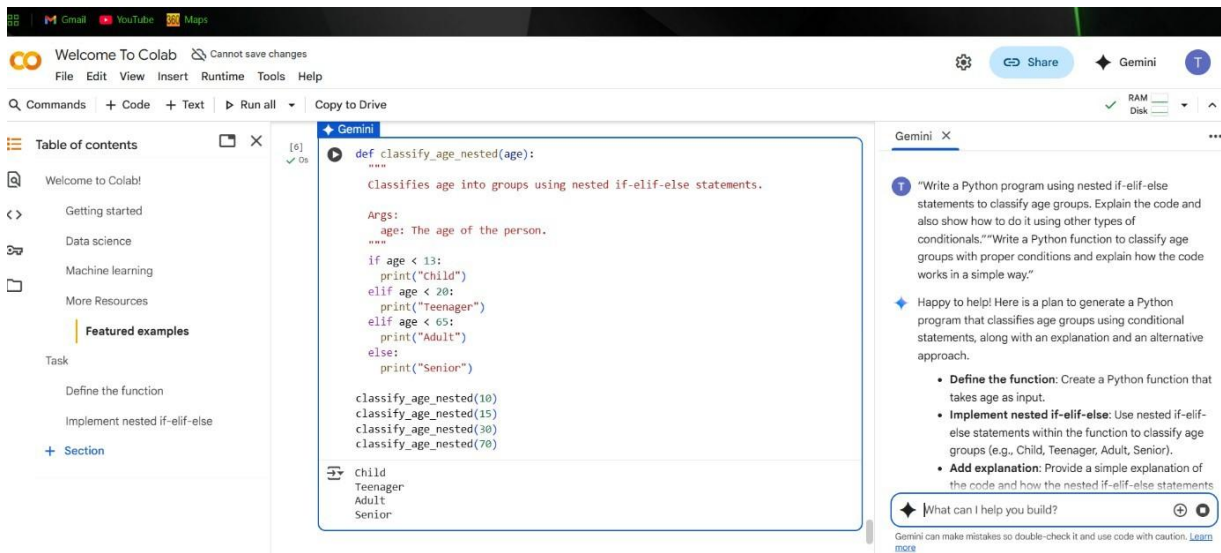
Write a Python program using nested if-elif-else statements to classify age groups. Explain the code and also show how to do it using other types of conditionals.”“Write a Python function to classify age groups with proper conditions and explain how the code works in a simple way.

OUTPUT:

Explanation :

- **Define the function:** Create a Python function that takes age as input.
- **Implement nested if-elif-else:** Use nested if-elif-else statements within the function to classify age groups (e.g., Child, Teenager, Adult, Senior).
- **Add explanation:** Provide a simple explanation of the code and how the nested if-elif-else statements work.

- **Implement alternative conditional:** Show an alternative way to classify age groups using a different conditional structure (e.g., a dictionary or a series of simple if-elif-else statements without nesting).



TASK 4

PROMPT :

Write a Python function `sum_to_n()` to calculate the sum of the first `n` numbers. Explain the code and show how to do it using other loops. Python code with explanation

Explanation :

- **Define the function using a for loop:** Create a Python function `sum_to_n_for()` that takes an integer `n` as input and calculates the sum of the first `n` numbers using a for loop.

- **Explain the for loop code:** Add a markdown cell explaining the `sum_to_n_for()` function and how the for loop is used to calculate the sum.
- **Define the function using a while loop:** Create a Python function `sum_to_n_while()` that takes an integer `n` as input and calculates the sum of the first `n` numbers using a while loop.
- **Explain the while loop code:** Add a markdown cell explaining the `sum_to_n_while()` function and how the while loop is used.

OUTPUT:

The screenshot shows a Google Colab notebook interface. The top bar includes the Colab logo, 'Welcome To Colab', and a 'Cannot save changes' warning. The menu bar has 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. The toolbar shows 'Commands', '+ Code', '+ Text', 'Run all', and 'Copy to Drive'. The left sidebar contains a 'Table of contents' with links to 'Welcome to Colab!', 'Getting started', 'Data science', 'Machine learning', 'More Resources', and 'Featured examples'. The main area displays a Python function `sum_to_n_while(n)` with a docstring, arguments, and returns. The function uses a while loop to calculate the sum of the first `n` numbers. Below the function, there are example calls and their outputs: 'The sum of the first 5 numbers is: 15', 'The sum of the first 10 numbers is: 55', and 'The sum of the first 0 numbers is: 0'. The right sidebar shows a Gemini chat window with a prompt: 'Write a Python function sum_to_n() to calculate the sum of the first n numbers. Explain the code and show how to do it using other loops. Python code with explanation'. The chat response provides a plan to create a Python function to calculate the sum of the first `n` numbers using different loops, along with explanations. The bottom status bar shows 'Variables', 'Terminal', '11:45 PM', and 'Python 3'.

```
def sum_to_n_while(n):
    """
    Classifies age into groups using nested if-elif-else statements.

    Args:
        n: The age of the person.

    Returns:
        str: The age group.
    """
    total_sum = 0
    i = 1
    while i <= n:
        total_sum += i
        i += 1
    return total_sum

# Example usage:
print(f"The sum of the first 5 numbers is: {sum_to_n_while(5)}")
print(f"The sum of the first 10 numbers is: {sum_to_n_while(10)}")
print(f"The sum of the first 0 numbers is: {sum_to_n_while(0)}")
```

The sum of the first 5 numbers is: 15
The sum of the first 10 numbers is: 55
The sum of the first 0 numbers is: 0

Write a Python function `sum_to_n()` to calculate the sum of the first `n` numbers. Explain the code and show how to do it using other loops. Python code with explanation

Certainly! I can help you with that. Here is a plan to create a Python function to calculate the sum of the first `n` numbers using different loops, along with explanations.

- **Define the function using a for loop:** Create a Python function `sum_to_n_for()` that takes an integer `n` as input and calculates the sum of the first `n` numbers using a `for` loop.
- **Explain the for loop code:** Add a markdown cell explaining the `sum_to_n_for()` function and how the `for` loop is used to calculate the sum.
- **Define the function using a while loop:** Create a Python function `sum_to_n_while()` that takes an integer `n` as input and calculates the sum of the first `n` numbers using a `while` loop.
- **Explain the while loop code:** Add a markdown cell explaining the `sum_to_n_while()` function and how the `while` loop is used.

What can I help you build?

Gemini can make mistakes so double-check it and use code with caution. [Learn more](#)

TASK 5 :

PROMPT :

Create a Python class called BankAccount that has methods for depositing money, withdrawing money, and checking the balance. Include error checks for negative amounts and insufficient funds. Add comments and explain each method clearly."

OUTPUT :

Explanation :

- **Define the bankaccount class:** Create a Python class named BankAccount with a constructor to initialize the account balance.
- **Implement deposit method:** Add a deposit method to the BankAccount class that takes an amount as input and adds it to the balance. Include comments.
- **Implement withdraw method:** Add a withdraw method to the BankAccount class that takes an amount as input and subtracts it from the balance, ensuring there are sufficient funds. Include comments.
- **Implement balance method:** Add a balance method to the BankAccount class that returns the current account balance. Include comments.
- **Add example usage:** Create instances of the BankAccount class and demonstrate the usage of the deposit, withdraw, and balance methods.
- **Explain the code:** Provide a detailed explanation of the BankAccount class, its methods, and how they work together.

- **Explain the output:** Explain the output generated from the example usage, showing how the balance changes after each operation.

The screenshot shows a Google Colab notebook with the following code in the main cell:

```
class BankAccount:
    """Represents a simple bank account."""
    def __init__(self, account_holder, initial_balance=0.0):
        """
        Initializes a new bank account.

        Args:
            account_holder (str): The name of the account holder.
            initial_balance (float): The starting balance of the account. Defaults to 0.0.
        """
        # Ensure initial balance is not negative
        if initial_balance < 0:
            print("Warning: Initial balance cannot be negative. Setting balance to 0.")
            self.balance = 0.0
        else:
            self.balance = initial_balance
        self.account_holder = account_holder
        print(f"Account created for {self.account_holder} with an initial balance of ${self.balance:.2f}")

    def deposit(self, amount):
        """
        Deposits money into the account.

        Args:
            amount (float): The amount to deposit.
        """
        # Check if the deposit amount is valid
        if amount <= 0:
```

The right sidebar shows the Gemini chat interface with the following text:

Create a Python class called BankAccount that has methods for depositing money, withdrawing money, and checking the balance. Include error checks for negative amounts and insufficient funds. Add comments and explain each method clearly.

Absolutely! I can create a BankAccount class with methods for depositing, withdrawing, and checking the balance, including the error checks you mentioned. I'll also add comments and explanations for each method. The BankAccount class has been successfully created with the requested methods and error handling, and the example usage demonstrates its functionality.

What can I help you build?

The screenshot shows the same Google Colab notebook, but with additional code added to the main cell:

```
        # Check if the deposit amount is valid
        if amount <= 0:
            print("Error: Deposit amount must be positive.")
        else:
            self.balance += amount
            print(f"Deposited ${amount:.2f}. New balance: ${self.balance:.2f}")

    def withdraw(self, amount):
        """
        Withdraws money from the account.

        Args:
            amount (float): The amount to withdraw.
```

The right sidebar shows the Gemini chat interface with the following text:

Create a Python class called BankAccount that has methods for depositing money, withdrawing money, and checking the balance. Include error checks for negative amounts and insufficient funds. Add comments and explain each method clearly.

Absolutely! I can create a BankAccount class with methods for depositing, withdrawing, and checking the balance, including the error checks you mentioned. I'll also add comments and explanations for each method. The BankAccount class has been successfully created with the requested methods and error handling, and the example usage demonstrates its functionality.

What can I help you build?

