Laboratory Assignment 5: Advanced Python Programming

Task 1: Temperature Converter Using Conditional Operators

1. Input Collection:
    - Prompt the user to enter a temperature value.
    - Ask the user to specify the conversion direction (C for Celsius to Fahrenheit, F for Fahrenheit toCelsius).
2. Conversion Logic:
    - If the user selects C, convert the temperature to Fahrenheit using the formula: F = C * 9/5 + 32.
    - If the user selects F, convert the temperature to Celsius using the formula: C = (F - 32) * 5/9.
    - Handle invalid conversion options by displaying an appropriate error message.
3. Output:
    - Display the converted temperature with a clear message.

Task 2: Guess the Number Game

1. Game Setup:
    - Generate a random integer between 1 and 100.
2. Gameplay Loop:
    - Prompt the user to guess the number.
    - Provide feedback:
    - If the guess is higher than the target number, display 'Too high!'
    - If the guess is lower than the target number, display 'Too low!'   - If the guess is correct, congratulate the user and exit the loop.
3. Exit Option:
    - Allow the user to exit the game at any time by entering a special command (e.g., q).

Task 3: Fibonacci Sequence Generator

1. Input:
    - Ask the user to enter the number of terms for the Fibonacci sequence.
    - Validate that the input is a positive integer.
2. Generation:
    - Use a for loop to generate the Fibonacci sequence up to the specified number of terms.
3. Output:
    - Print each term of the Fibonacci sequence on a new line.

Task 4: Unique Word Counter

1. Input:
    - Prompt the user to enter a sentence.
2. Processing:
    - Split the sentence into words.
    - Use a set to identify and count unique words.
3. Output:
    - Display the number of unique words found in the sentence.

Task 5: Prime Number Checker

1. Input:
    - Ask the user to enter a number.
2. Processing:

- Determine whether the entered number is a prime number using a for loop and conditionalstatements.

3. Output:
   - Inform the user whether the number is prime or not.

Task 6: Simple Text-Based Menu

1. Menu Display:
   - Present a menu with at least four options (e.g., Add, Subtract, Multiply, Exit).
2. User Selection:
   - Prompt the user to select an option.
3. Action Handling:
   - Perform the corresponding action based on the user's choice.
   - Loop back to the menu after completing an action until the user selects the exit option.
4. Error Handling:
   - Handle invalid menu selections with appropriate messages.

Task 7: BMI Calculator Using Conditional Operators

Input Collection:

Prompt the user to enter their weight (in kilograms) and height (in meters).

Calculation:

Calculate the Body Mass Index (BMI) using the formula: BMI = weight / (height ** 2).

Classification:

Use conditional statements to classify the BMI into categories:

Underweight (< 18.5)
Normal weight (18.5 – 24.9)
Overweight (25 – 29.9)
Obesity (30 and above)

Output:

Display the BMI value along with its classification.

Task 8: To-Do List Manager Using a Loop

1. Data Structure:
   Initialize an empty list to store to-do items.
2. Loop Operations:
   - o Enter an endless loop where the user can choose to:
      - Add a new to-do item.
      - View all to-do items.
      - Remove a to-do item by its number.
      - Exit the program by entering a special command (e.g., q).
3. Error Handling:
   - o Handle invalid inputs gracefully, prompting the user to try again when necessary.
4. Output:
   - o Provide clear feedback after each operation (e.g., item added, item removed).

Task 9: Multiplication Table Generator

1. Input:
   - o Ask the user to enter a number for which the multiplication table will be generated.
   - o Validate that the input is a positive integer.

2. Generation:
   - o Use a for loop to generate the multiplication table from 1 to 10 for the entered number.
3. Output:
   - o Display the multiplication table in a formatted manner.

Task 10: List Comprehensions and Filtering

1. Data Setup:
   - o Create a list of integers from 1 to 50.
2. Processing:
   - o Use a list comprehension to create a new list containing only the numbers that are divisible by both 3 and 5.

3 Output:

o Print the filtered list.