Object Oriented Programming Lab

Lab 01 **Marks 05**

Instructions

- Work in this lab individually.
- You can use your books, notes, handouts etc. but you are not allowed to borrow anything from your peer student.
- Make sure to follow the best coding practices.
- Include comments to explain the logic where necessary.
- Test your program thoroughly with various inputs to ensure proper functionality and error handling.
- Show your work to the instructor before leaving the lab to get some or full credit.

Calculator Program

You are required to create a simple calculator program in C++ that allows users to perform basic arithmetic operations. The program should have a menu system with options to add, subtract, multiply, divide, and find the remainder of two numbers. Users can choose from the menu to perform these operations. Additionally, the program should include proper error handling to manage cases such as division by zero. The user can exit the program at any time by selecting the appropriate option. Your task is to implement the necessary functions to achieve this functionality, including the calculation of the remainder when two numbers are divided.

Requirements:

1. Create a function called **printMenu** that displays the following menu options:

```
----- Calculator Menu -----
1. Add
2. Subtract
3. Multiply
4. Divide
5. Get Remainder
6. Exit
-----------------------------------
```

This function should be called in the **main** function to show the menu.

2. User Input and Error Handling:

- Prompt the user to enter two numbers.
- Implement error handling to ensure that the user enters valid value. If the input is not a valid number, display an error message and prompt the user to enter the value again.

3. Perform Operation Function:

- Create a function called **performOperation** that takes a string parameter representing the operation to be performed ("add", "subtract", "multiply", "divide", "remainder").
- Based on the user's choice, perform the corresponding arithmetic operation on the two input numbers.
- Display the result of the operation.
- If the user chooses division or remainder, the program should handle the case where the second number is zero (division by zero). In such a scenario, display an appropriate error message and ask the user to enter a non-zero value again. This process will continue until the user enters a valid number. The program should execute the chosen operation and display the result.

4. Main Function Loop:

- Implement a loop that continues until the user chooses to exit (selects option 6).
- Inside the loop, display the menu using the **printMenu** function, get the user's choice, and call the **performOperation** function accordingly.

5. Exiting the Program:

- When the user chooses to exit, display a farewell message, and terminate the program.

Sample Run:

```
----- Calculator Menu -----
1. Add
2. Subtract
3. Multiply
4. Divide
5. Get Remainder
6. Exit
---------------------------------
Enter your choice (1-6): 1

Enter the first number: 8
Enter the second number: 3

8 + 3 = 11


----- Calculator Menu -----
1. Add
2. Subtract
3. Multiply
4. Divide
5. Get Remainder
6. Exit
---------------------------------
Enter your choice (1-6): 4

Enter the first number: 9
Enter the second number: 2

9 / 2 = 4.5


----- Calculator Menu -----
1. Add
2. Subtract
3. Multiply
4. Divide
5. Get Remainder
6. Exit
---------------------------------
Enter your choice (1-6): 4

Enter the first number: 16
Enter the second number: 0

Cannot divide by zero. Please enter a non-zero second number.

Enter the second number: 8

16 / 8 = 2


----- Calculator Menu -----
1. Add
2. Subtract
3. Multiply
4. Divide
5. Get Remainder
6. Exit
---------------------------------
Enter your choice (1-6): 7

Invalid choice. Please enter a number between 1 and 6.
```

```
----- Calculator Menu -----
1. Add
2. Subtract
3. Multiply
4. Divide
5. Get Remainder
6. Exit
---------------------------------
Enter your choice (1-6): 5

Enter the first number: 23
Enter the second number: 0

Cannot divide by zero. Please enter a non-zero second number.

Enter the second number: 0

Cannot divide by zero. Please enter a non-zero second number.

Enter the second number: 2

23 mod 2 = 3


----- Calculator Menu -----
1. Add
2. Subtract
3. Multiply
4. Divide
5. Get Remainder
6. Exit
---------------------------------
Enter your choice (1-6): 6

Exiting the program. Goodbye!
```