Lab 08
Repetitions-I (while loop, for loop)

NOTE: Use for loops in first two questions and while loop in last 3 questions.

Problem 01

Write a program that calculates the occupancy rate for a hotel.

The program should start by asking the user how many floors the hotel has. A loop should then iterate once for each floor. In each iteration, the loop should ask the user for the *number of rooms* on the floor and how many of them are *occupied*.

After all the iterations, the program should display how many rooms the hotel has, how many of them are occupied, how many are unoccupied, and the percentage of rooms that are occupied. The percentage may be calculated by dividing the number of rooms occupied by the number of rooms.

Input Validation: Do not accept a value less than 1 for the number of floors. Do not accept a number less than 10 for the number of rooms on a floor.

Note: It is traditional that most hotels do not have a fourth floor. The loop in this program should skip the entire fourth iteration.

```
Enter number of floors: 3
Enter the number of rooms on the floor 1 11
How many rooms are occupied? 8
Enter the number of rooms on the floor 2 12
How many rooms are occupied? 7
Enter the number of rooms on the floor 3 13
How many rooms are occupied? 9
The hotel has total of 3 floors
The hotel has total of 36 rooms
There are 24 rooms occupied
There are 12 empty rooms
Percentage of occupied rooms is 66.6667%
```

Problem 02

Write a C++ program to find the factorial of an integer entered by the user. If the number is less than zero then display “Invalid Input” else display the resulting factorial.

```
Enter a positive Integer: 5
5! = 120
```

Problem 03

Write a C++ program which takes an integer number as input and checks whether the number entered by the user is a prime number. An integer is said to be a prime number if and only if n is greater than 1 and is divisible only by 1 and n. This process should continue until the user enters a negative number.

```
Enter any number: 5
This is Prime number

Enter any number: 12
This is not a prime number

Enter any number: -3
```

Problem 04

Write a C++ program that implements a number guessing game. The computer randomly generates a number between 1 and 100, and the user tries to guess it. The program should provide feedback on whether the user's guess is high, low, or correct. The game should continue until the user guesses the correct number. Additionally, the program should track and display the number of attempts it took for the user to guess the correct number.

Note: Use a `while` loop to keep asking the user for a guess until they correctly guess the randomly generated number.

```
Welcome to the Number Guessing Game!
I have selected a number between 1 and 100.

Enter your guess: 50
Your guess is too low.

Enter your guess: 75
Your guess is too high.

Enter your guess: 60
Your guess is too low.

Enter your guess: 65
Congratulations! You guessed the number in 4 attempts!
```

Problem 05

Write a program that plays rock, paper, scissors between the computer and the user. The program asks the user their choice r, c, p representing rock, paper, scissors respectively. After that, the computer needs to

randomly choose between r, c, p. The winner will be chosen after 3 games on the basis of who wins the maximum number of times. In case of a tie, play it one more time and decide the winner. The rock paper scissor game is played on the following rules:

1. Rock beats scissors as it smashes Scissors.
2. Scissors beats paper as it cuts Papers
3. Paper beats rocks as it wraps the Rock.
4. Show a tie if both choices match.

Below is the game menu which shows a list of options to choose.

```
Rock, Paper and Scissors Game!
Choose one of the following options
-----------------------------------
(r) for rock
(p) for paper
(s) for scissors
r
Computer choice is rock
Tie. Play again win the Game.
Rock, Paper and Scissors Game!
Choose one of the following options
-----------------------------------
(r) for rock
(p) for paper
(s) for scissors
p
Computer choice is rock
You Win! Paper wraps Rock.
Rock, Paper and Scissors Game!
Choose one of the following options
-----------------------------------
(r) for rock
(p) for paper
(s) for scissors
s
Computer choice is paper
```