LAB 4(Loops)

1. Print the maximum value of an unsigned int using One's Compliment (~) Operator in C.
2. Write a C program that reads an integer n from the keyboard and prints out the factorial of n.

   Test data and expected output:
   Enter an integer:6
   Factorial of 6 is 720
   Enter an integer:-3
   number must be non-negative

3. Write a C program that calculates the sum of integers between 9 and 300 inclusive which are divisible by 7 but not divisible by 63.

   Expected output:
   Sum of integers between 9 & 300 that are divisible by 7 but not by 63 is 5684

4. Write a program to print all palindrome numbers between 10 to 100

   Expected output:

   11 22 33 44 55 66 77 88 99

5. Write a C program to generate the first n terms of Fibonacci sequence.

   Expected output:

   Enter total fibonacci number - 5
   0 1 1 2 3

6. Write a C program to enter numbers until the user wants. At the end, display the total number of positive, negative and zeros entered.

   Expected output:

   Enter a number : 6
   Another number(Y/N)? Y
   Enter a number: -3
   Another number(Y/N)? Y
   Enter a number: 0

Another number(Y/N)?Y
Enter a number: 9
Another number(Y/N)? N
Number of positive numbers: 2
Number of negative numbers: 1
Number of zeroes: 1

7. Write a C program that accepts a positive integer n less than 50 from the terminal and prints out the sum $1^4 + 2^4 + 4^4 + 7^4 + 11^4 + \cdots + m^4$, where m is less than or equal to n. If the input is outside the range, the program terminates with appropriate message.

Test data and expected output:
Enter a +ve integer less than 50: 0 Invalid input
Enter a +ve integer less than 50: 39 Sum of the series is 2898549
Enter a +ve integer less than 50: 0 Invalid input

8. Write a C program that asks the user to enter a positive integer n less than 10. If the user enters an invalid input, the code repeats the command of asking the user for a positive integer less than 10 until the input is correct. It then prints out the sum of the first n terms of the series $1^4 + 2^4 + 4^4 + 7^4 + 11^4 + \cdots$.

Test data and expected output:
Enter a +ve integer less than 10: 0
Invalid input, enter again: 4
Sum of the 4 terms of the series is 2674
Enter a +ve integer less than 10: 11
Invalid input, enter again: 5
Sum of the 5 terms of the series is 17315

9. Write a C program that accepts a positive integer n and a real number x from the keyboard and prints out the sum of the n terms of the series

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \cdots = \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n+1}}{(2n+1)!}$$

Test data and expected output:
Enter the value of n & x:0 1.0
Number of terms must be +ve
Enter the value of n & x:5 0.5
Sum of the series at x=0.50 with 5 terms is 0.47943

10. Write a C program that accepts a non-negative integer from the keyboard and checks whether the entered number is a palindrome number.

Test data and expected output:
Enter a non-negative integer:9
9 is a palindrome number
Enter a non-negative integer:246642
246642 is a palindrome number
Enter a non-negative integer:24312
 24312 is NOT a palindrome number