INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE – 247 667
Programming with C and C++ (CSC-101)

Assignment 02 Autumn Semester 2023-24

---

1. Write a C program to check whether the entered year is a leap year or not.

2. Write a C Program to find the duplicate characters in a string. For example, the string **Sakkett** has two duplicate characters, k and t.

3. Write an efficient C program to reverse bits of a number.

4. Write a C program that asks the user to supply an alphabet in the upper case from the keyboard and convert it in lower case. Note: Do not use any inbuilt method to convert the alphabet from upper case to lower case.

5. Write a C program to display the names of the Months of the year, depending upon the number entered by the user using:

   (a) if – else

   (b) switch – case

6. Read a positive integer value and compute the following sequence: If the number is even, halve it; if it's odd, multiply by 3 and add 1. Repeat this process until the value is 1, printing out each value. Finally, print out how many of these operations you performed. Write a C Program.

7. Write a C program to find the sum of the following series using for loop, while loop, and do-while loop.

   (a) Sum $= 1 + 5 + 10 + 15 + ... + n$

   (b) Sum $= 1 - \frac{1}{1!} + \frac{2}{2!} - \frac{3}{3!} + \frac{4}{4!} - .....$

   (c) Sum $= x - \frac{x^3}{3!} + \frac{x^5}{5!} - ..... - \frac{x^n}{n!}$

   (d) Sum $= 1^2 + 2^2 + 3^2 + 4^2 + ... + n^2$

   (e) Sum $= 1^3 - 3^3 + 5^3 - ..... + n^3$

8. Write a C program to simulate a calculator where the user enters two integer numbers and an operator (+, -, *, /, %). The program then carries out the specified operation and displays the result. Write using if statement as well as a switch statement.

9. Write a C program to display the table of a given number.

10. Write a C program to check for palindromes for Integers as well as string using (For example 1221, 57866875 and *avon sees nova* are some palindromes):

    (a) if-else

    (b) switch-case

11. Write a C program to find the maximum and minimum of n numbers using:

    (a) for loop

    (b) while loop

    (c) do-while loop

12. Write a C program to check if the given two numbers are relatively prime or not.

13. Write a C program to find the perfect numbers between 1 to 100000. m is a perfect number if $\sigma(m) = 2m$, that is, if m is the sum of all its positive divisors other than itself. $\sigma(m)$ sum of the positive divisors of m.
    For example: $\sigma(12) = 1 + 2 + 3 + 4 + 6 + 12$ where 1, 2, 3, 4, 6 and 12 are the positive divisors of 12.
    For example: 28 is a perfect number $\sigma(28) = 1 + 2 + 4 + 7 + 14 + 28$

14. Write a C program to generate Hemachandra series, 1, 2, 3, 5, 8, 13, 21,...