5. Control Structures for Iteration

(Algorithm, Pseudocode, flowchart, C Code)

CO1: Write simple C programs using basic constructs.

Note:

**Write algorithm, pseudo code and draw flow chart only for the first 2 problems.*

**Write C code for all the problems.*

while loop:

1. Print all odd numbers from n1 to n2.
2. Find the sum of all even numbers from n1 to n2.
3. Write a program to take integer inputs from the user until he/she presses '#' and print the sum and average of the entered numbers.
4. Write a program to find the product of each individual digits of an 'n' digit number entered by the user.
5. Write a program to check whether the given number is ***narcissistic number*** or not.
   (***Note:*** *Narcissistic Number is a* ***number that is the sum of its own digits each raised to the power of the number of*** *digits)*
6. Write a program to print ***Fibonacci series*** up to a given limit.
7. The greatest common divisor of two positive integers, A and B, is the largest number that can be evenly divided into both of them. Euclid's algorithm can be used to find the greatest common divisor (GCD) of two positive integers. Write a program that lets the user enter two integers and then print their GCD.

do while loop:

8. Write a program, in which the user can enter any number of positive and negative integer values till the user enter zero and at the end it should display the count of positive and negative numbers entered.
9. Write a program to check whether the given number is ***palindrome number*** or not. *(**Note:** a number is said to be palindrome if **the given number and its reversed value are equal**, for example, number=1221, reversed=1221 hence palindrome. Number=123, reversed=321 hence not Palindrome)*
10. Write a program to convert a ***decimal number to binary number***.
11. Write a program to convert a ***binary number to decimal number***.

for loop:

12. Print numbers divisible by 7 from n1 to n2.
13. Print the following sequences:
    a. 1,3,9,27,81,243…
    b. 1, 8, 27, 64…
14. Write C programs to print the sum of the following series upto 'n' terms,
    a. $1 + x + x^2 + x^3 + \cdots$
    b. $-x + x^2 - x^3 + x^4$ ...
    c. $\frac{1^2}{2} + \frac{2^2}{2} + \frac{3^2}{2} + \cdots$
15. Write a C program to display alphabets as given below az by cx dw ev fu gt hs ir jq kp lo mn nm ol pk qj ri sh tg uf ve wd xc yb za
16. Write a program to find whether the given number is ***perfect number*** or not. **Note:** A number is a perfect number if the sum of the factors of the number other than itself is equal to that number. Example: 28=1+2+4+7+14 is a perfect number.

Nesting of loops:

17. Write programs to evaluate $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots$ *(**Note:** convert degree to radians - To convert from degrees to radians, multiply the number of degrees by π/180.)*
18. The cost of a Scooter is Rs25000/-. Three optional accessories are supplied at different costs as follows.

    Mirror: Rs85 Crash Guard: Rs225 Side box: Rs300

    If A, B, and C represents the three accessories, the total cost of the scooter is 25000+A*85+B*225+C*300, where A,B and C are either 0 or 1 depending upon whether the option is required or not. Write a C program to print the total cost as per the illustration given below.

Base Price	Mirror	Crash Guard	Side box	Total
25000	0	0	0	25000
25000	0	0	1	25300
25000	0	1	0	25225
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
25000	1	1	1	25610

19. Write a program to print following patterns

    a)

    *
    * *
    * * *
    …

b)

1
2 3
4 5 6
7 8 9 10
…

20. Print prime numbers from n1 to n2. *(Note: Prime numbers are **numbers greater than 1 that only have two factors, 1 and the number itself**.)*