Exercise of Structured C Programming

A. Taking User Input

1) Write a C program to enter two numbers and find their sum.
2) Write a C program to enter length and breadth of a rectangle and find its perimeter & area. (*Presentation*)
3) Write a C program to enter radius of a circle and find its diameter, circumference and area.
4) Write a C program to enter base and height of a triangle and find its area.
5) Write a C program to enter length in centimeter and convert it into meter and kilometer.
6) Write a C program to enter temperature in Celsius and convert it into Fahrenheit.
7) Write a C program to enter temperature in Fahrenheit and convert it into Celsius
8) Write a C program to convert days into years, weeks and days.
9) Write a C program to find power of any number (x^y).
10) Write a C program to enter any number and calculate its square root.
11) Write a C program to enter two angles of a triangle and find the third angle.
12) Write a C program to calculate area of an equilateral triangle.
13) Write a C program to enter marks of five subjects and calculate total, average and percentage.
14) Write a C program to enter P, T, and R and calculate Simple and Compound Interest.
    [Hints:
    Compound Interest:
    Formula: P * ((1 + R / 100) T - 1) (where P = Principle, T = Time, R = Rate)
    Simple Interest:
    Formula: Principle * Time * Rate / 100]

B. Conditional/Ternary operator

1) Write a C program to find maximum and minimum among three numbers using conditional/ternary operator.
2) Write a C program to check whether a number is even or odd
3) Write a C program to check whether year is leap year or not using conditional/ternary operator.
4) Write a C program to check whether character is an alphabet or not using conditional/ternary operator.

C. If-Else

1) Write a C program to check whether a number is negative, positive or zero.
2) Write a C program to check whether a number is divisible by 5 and 11 or not.
3) Write a C program to count total number of notes (money) in given amount.
4) Write a C program to check whether a character is alphabet or not.
5) Write a C program to input any alphabet and check whether it is vowel or consonant.
6) Write a C program to input any character and check whether it is alphabet, digit or special character.
7) Write a C program to check whether a character is uppercase or lowercase alphabet.
8) Write a C program to input week number and print week day.
9) Write a C program to input month number and print number of days in that month.
10) Write a C program to input angles of a triangle and check whether triangle is valid or not.
11) Write a C program to input all sides of a triangle and check whether triangle is valid or not.
12) Write a C program to check whether the triangle is equilateral, isosceles or scalene triangle.
13) Write a C program to find all roots of a quadratic equation.
14) Write a C program to calculate profit or loss.
15) Write a C program to input marks of five subjects Physics, Chemistry, Biology, Mathematics and Computer. Calculate percentage and grade according to following:

    Percentage >= 90%: Grade A
    Percentage >= 80%: Grade B
    Percentage >= 70%: Grade C
    Percentage >= 60%: Grade D
    Percentage >= 40%: Grade E
    Percentage < 40%: Grade F

16) Write a C program to input basic salary of an employee and calculate its Gross salary according to following:

    Basic Salary >= 10000: HRA = 20%, DA = 80%
    Basic Salary >= 20000: HRA = 25%, DA = 90%
    Basic Salary >= 30000: HRA = 30%, DA = 95%

17) Write a C program to input electricity unit charges and calculate total electricity bill according to the given condition:

    For first 50 units BDT. 0.50/unit
    For next 100 units BDT. 0.75/unit
    For next 100 units BDT 1.20/unit
    For unit above 250 BDT. 1.50/unit

    An additional surcharge of 20% is added to the bill

D. Switch case:

1) Write a C program to check whether an alphabet is vowel or consonant using switch case.
2) Write a C program to print day of week name using switch case.
3) Write a C program print total number of days in a month using switch case.
4) Write a C program to find maximum between two numbers using switch case.
5) Write a C program to check whether a number is even or odd using switch case.
6) Write a C program to find roots of a quadratic equation using switch case.
7) Write a C program to create Simple Calculator using switch case.

E. Loop programming:

1) Write a C program to print all natural numbers in reverse (from n to 1). - using while loop
2) Write a C program to print all alphabets from a to z. - using while loop
3) Write a C program to print sum of all even numbers between 1 to n.
4) Write a C program to print sum of all odd numbers between 1 to n.
5) Write a C program to print prime numbers between 1 to n.
6) Write a C program to print table of any number.
7) Write a C program to enter any number and calculate sum of all natural numbers between 1 to n.
8) Write a C program to find first and last digit of any number.
9) Write a C program to count number of digits in any number.
10) Write a C program to calculate sum of digits of any number.
11) Write a C program to calculate product of digits of any number.
12) Write a C program to swap first and last digits of any number.
13) Write a C program to find sum of first and last digit of any number.
14) Write a C program to enter any number and print its reverse.
15) Write a C program to enter any number and check whether the number is palindrome or not.
16) Write a C program to find frequency of each digit in a given integer.
17) Write a C program to enter any number and print it in words.
18) Write a C program to print all ASCII character with their values.
19) Write a C program to find power of any number using for loop.
20) Write a C program to enter any number and print all factors of the number.
21) Write a C program to enter any number and calculate its factorial.
22) Write a c program to find out the sum of series $1 + 2 + \ldots + n$.
23) Write a c program to find out the sum of series $7 + 20 + 33 + \ldots +$ up to 100 term
24) Write a c program to find out the sum of series $5 - 11 + 17 - \ldots +$ up to 75 term
25) Write a c program to find out the sum of series $1 + (1+2) + (1+2+3) \ldots + (1 + 2 + 3 + \ldots + n)$.
26) Write a c program to find out the sum of series $1^2 + 2^2 + \ldots + n^2$.
27) C Program to Find Sum of the Series $1/1! + 2/2! + 3/3! + \ldots 1/N!$
28) Write a C program to find GCD of two numbers.
29) Write a C program to find LCM of two numbers.

30) Write a C program to check whether a number is Armstrong number or not.
31) Write a C program to check whether a number is Perfect number or not.
32) Write a C program to check whether a number is Strong number or not.
33) Write a C program to print all Armstrong numbers between 1 to n.
34) Write a C program to print all Perfect numbers between 1 to n.
35) Write a C program to print all Strong numbers between 1 to n.
36) Write a C program to enter any number and print its prime factors.
37) Write a C program to print Fibonacci series up to n terms.
38) Write a C program to find one's complement of a binary number.
39) Write a C program to find two's complement of a binary number.
40) Star pattern programs - Write a C program to print the given star patterns.

a)	***** ***** ***** ***** *****	d)	* ** *** **** *****
b)	***** **** *** ** *	e)	***** **** *** ** *
c)	***** **** *** ** * * ** *** **** *****	f)	* ** *** **** ***** **** *** ** *

41) Number pattern programs - Write a C program to print the given number patterns.

a)	1 1 2 1 2 3 1 2 3 4 1 2 3 4 5	c)	1 12 123 1234 12345
b)	54321 4321 321 21 1	d)	54321 4321 321 21 1

F. Array and Matrix programming

1) Write a C program to read and print elements of array. - using recursion.
2) Write a C program to print all negative elements in an array.
3) Write a C program to find sum of all array elements. - using recursion.
4) Write a C program to find maximum and minimum element in an array. - using recursion.
5) Write a C program to find second largest element in an array.
6) Write a C program to count total number of even and odd elements in an array.
7) Write a C program to count total number of negative elements in an array.
8) Write a C program to copy all elements from an array to another array.
9) Write a C program to insert an element in an array.
10) Write a C program to delete an element from an array at specified position.
11) Write a C program to print all unique elements in the array.
12) Write a C program to count total number of duplicate elements in an array.
13) Write a C program to delete all duplicate elements from an array.
14) Write a C program to count frequency of each element in an array.
15) Write a C program to merge two array to third array.
16) Write a C program to find reverse of an array.
17) Write a C program to put even and odd elements of array in two separate array.
18) Write a C program to search an element in an array.
19) Write a C program to sort array elements in ascending order.
20) Write a C program to sort array elements in descending order.
21) Write a C program to sort even and odd elements of array separately.
22) Write a C program to add two matrices.
23) Write a C program to subtract two matrices.
24) Write a C program to perform Scalar matrix multiplication.

25) Write a C program to multiply two matrices.
26) Write a C program to check whether two matrices are equal or not.
27) Write a C program to find sum of main diagonal elements of a matrix.
28) Write a C program to find sum of minor diagonal elements of a matrix.
29) Write a C program to find sum of each row and column of a matrix.
30) Write a C program to interchange diagonals of a matrix.
31) Write a C program to find upper triangular matrix.
32) Write a C program to find lower triangular matrix.
33) Write a C program to find sum of upper triangular matrix.
34) Write a C program to find transpose of a matrix.
35) Write a C program to find determinant of a matrix.
36) Write a C program to check Identity matrix.
37) Write a C program to check sparse matrix.
38) Write a C program to check Symmetric matrix.

G. String Manipulation

1) Write a C program to find length of a string.
2) Write a C program to copy one string to another string.
3) Write a C program to concatenate two strings.
4) Write a C program to compare two strings.
5) Write a C program to convert lowercase string to uppercase.
6) Write a C program to convert uppercase string to lowercase.
7) Write a C program to toggle case of each character of a string.
8) Write a C program to find total number of alphabets, digits or special character in a string.
9) Write a C program to count total number of vowels and consonants in a string.
10) Write a C program to count total number of words in a string.
11) Write a C program to find reverse of a string.
12) Write a C program to check whether a string is palindrome or not.
13) Write a C program to reverse order of words in a given string.
14) Write a C program to find first occurrence of a character in a given string.
15) Write a C program to find last occurrence of a character in a given string.
16) Write a C program to search all occurrences of a character in given string.
17) Write a C program to count occurrences of a character in given string.
18) Write a C program to find highest frequency character in a string.
19) Write a C program to find lowest frequency character in a string.
20) Write a C program to count frequency of each character in a string.
21) Write a C program to remove first occurrence of a character from string.
22) Write a C program to remove last occurrence of a character from string.
23) Write a C program to remove all occurrences of a character from string.
24) Write a C program to remove all repeated characters from a given string.
25) Write a C program to replace first occurrence of a character with another in a string.
26) Write a C program to replace last occurrence of a character with another in a string.
27) Write a C program to replace all occurrences of a character with another in a string.

28) Write a C program to find first occurrence of a word in a given string.
29) Write a C program to find last occurrence of a word in a given string.
30) Write a C program to search all occurrences of a word in given string.
31) Write a C program to count occurrences of a word in a given string.
32) Write a C program to remove first occurrence of a word from string.
33) Write a C program to remove last occurrence of a word in given string.
34) Write a C program to remove all occurrence of a word in given string.
35) Write a C program to trim leading white space characters in a string.
36) Write a C program to trim trailing white space characters in a string.
37) Write a C program to trim both leading and trailing white space characters in a string.
38) Write a C program to remove all extra blank spaces from a given string.

H. User Define Functions programming

1) Write a C program to find cube of any number using function.
2) Write a C program to find diameter, circumference and area of circle using functions.
3) Write a C program to find maximum and minimum between two numbers using functions.
4) Write a C program to check whether a number is even or odd using functions.
5) Write a C program to check whether a number is prime, Armstrong or perfect number using functions.
6) Write a C program to find all prime numbers between given interval using functions.
7) Write a C program to print all strong numbers between given interval using functions.
8) Write a C program to print all Armstrong numbers between given interval using functions.
9) Write a C program to print all perfect numbers between given interval using functions.
10) Write a C program to find power of any number using recursion.
11) Write a C program to print all natural numbers between 1 to n using recursion.
12) Write a C program to print all even or odd numbers in given range using recursion.
13) Write a C program to find sum of all natural numbers between 1 to n using recursion.
14) Write a C program to find sum of all even or odd numbers in given range using recursion.
15) Write a C program to find reverse of any number using recursion.
16) Write a C program to check whether a number is palindrome or not using recursion.
17) Write a C program to find sum of digits of a given number using recursion.
18) Write a C program to find factorial of any number using recursion.
19) Write a C program to generate nth Fibonacci term using recursion.
20) Write a C program to find GCD of two numbers using recursion.
21) Write a C program to find LCM of two numbers using recursion.
22) Write a C program to display all array elements using recursion.
23) Write a C program to find sum of elements of array using recursion.
24) Write a C program to find maximum and minimum elements in array using recursion.