

# 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.
- 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  $\geq 90\%$ : Grade A

Percentage  $\geq 80\%$ : Grade B

Percentage  $\geq 70\%$ : Grade C

Percentage  $\geq 60\%$ : Grade D

Percentage  $\geq 40\%$ : 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  $\geq 10000$ : HRA = 20%, DA = 80%

Basic Salary  $\geq 20000$ : HRA = 25%, DA = 90%

Basic Salary  $\geq 30000$ : 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  $1 + 2 + \dots + n$ .
- 23) Write a c program to find out the sum of series  $7 + 20 + 33 + \dots + \text{up to } 100 \text{ term}$
- 24) Write a c program to find out the sum of series  $5 - 11 + 17 - \dots + \text{up to } 75 \text{ term}$
- 25) Write a c program to find out the sum of series  $1 + (1+2) + (1+2+3) + \dots + (1+2+\dots+n)$ .
- 26) Write a c program to find out the sum of series  $1^2 + 2^2 + \dots + n^2$ .
- 27) C Program to Find Sum of the Series  $1/1! + 2/2! + 3/3! + \dots + 1/N!$
- 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)	**** *** ** *	c)	**** *** ** *
c)	**** *** ** * * ** *** **** *****	f)	* ** *** **** ***** *** ** *

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

a)	1 12 123 1234 12345	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.