(If – else) && (Switch-Case):

Do all the following programs in both **if-else** and **switch-case** statements:

1. Write a program to take three integer numbers from the user and find which number is larger.(sir)
2. Write a program that takes number of month as an input and gives the months name as an output.(sir)
3. Write a program to check a number is even or odd.(sir)
4. Write a program that takes number of month as an input and prints quarter.(sir)
5. Write a program that takes marks and gives corresponding grade of an exam.(sir)

MARKS	GRADE
0-49	F
50-69	C
70-89	B
90-100	A

6. Write a program to check a character is uppercase or lowercase.(sir)
7. Write a program to check a number is positive or negative.(web)
8. Write a C program to find whether a given year is a leap year or not.(web)
9. Write a C program to read the age of a candidate and determine whether it is eligible for casting his/her own vote.(web)
10. Write a C program to accept a coordinate point in a XY coordinate system and determine in which quadrant the coordinate point lies.(web)
11. Write a C program to calculate the root of a Quadratic Equation.(web)
12. Write a C program to check whether a triangle is Equilateral, Isosceles or Scalene.(web)
13. Write a C program to check whether an alphabet is a vowel or consonant.(web)
14. Write a program in C to read any Month Number in integer and display the number of days for this month.(web)
15. Write a program to find the area of square, circle, triangle .Take choice from the user.

Write a program that takes an arithmetic operator ('+', '-', '*' or '/') and two operands as input and perform the corresponding calculation on the operands.

16. Write a program that takes the length of the four side and the four angels of a quadrilateral and prints the name of the quadrilateral. For this question only consider Square, Rectangle, Rhombus and Trapezium.

Loop: (While, For, Do While):

1. Write a C program to find the sum of first 10 natural numbers.(sir)
2. Write a program in C to display n terms of natural number and their sum.(web)
3. Write a program in C to read 10 numbers from keyboard and find their sum and average.(sir)
4. Write a program to check a number is prime or not.(sir)
5. Write a program to check a number is prime or not until the user wants to leave.(sir)
6. Write a program in C to find the prime numbers within a range of numbers and find the sum of those prime numbers.(web)
7. Write a program in C to find the prime numbers within a range of numbers.(web)
8. Write a program to find the factors of a number.(sir)
9. Write a program to find the factors of a number until user wants to leave.(sir)
10. Write a C program to find out the maximum digit in a decimal number which is an user input.(sir)
11. Write a C program to find out the sum of digit in a decimal number which is an user input.(sir)
12. Write a C program to find out the sum of even digit in a decimal number which is a user input.(quiz lab)
13. Write a C program to find out the sum of odd digit in a decimal number which is a user input.(quiz lab)
14. Write a C program to find sum of first and last digit of a number.(sir mid)
15. Write a C program to calculate the factorial of a given number.(web)
16. Write a c program to check whether a given number is a perfect number or not.(web)
17. Write a program in C to display the first n terms of Fibonacci series.(web)
18. Write a program in C to display the number in reverse order.(web)
19. Write a program to show all the even numbers between 0 and 100 inclusive.
20. Find the sum of the following series

    1+2+3+4+5+.....+N (Take N as input)

21. Write some codes to print a Pascal's triangle.
22. Write some codes to print a Floyd's triangle.
23. Consider this sequence:
24.
25. Sn = T1 + T2 + ... + Tn
    where, Tn = n^2 + (n − 1) ∗ (n + 1) + 1. Now write some codes to evaluate the series, where the value of n is a user input. Use ”pow()” function if necessary.

Array:

1. Write a program to find average of n students mark.(sir)
2. Write a program to find maximum number.(sir)
3. Write a program to find minimum number.(sir)
4. Write a program in C to copy the elements of one array into another array.(web)
5. Write a program in C to separate odd and even integers in separate arrays.(web)
6. Write a program in C to sort elements of array in ascending order.(web)
7. Write a program in C to sort elements of the array in descending order.(web)
8. Write a program to find prime elements and count how many are there.(web)
9. Write a program to read the ages of 15 persons and count the number of persons whose age is between 40 and 60 inclusive. Use while and continue statements.
10. Declare two integer arrays, A and B, of size 5. Take user input for both arrays and determine whether the two arrays are identical or not. Two arrays are identical if both contain same values at same indices. Print "Identical" or "Not identical" based on your finding.
11. Read 10 integers from the user and store them in an array. Take another integer from the user and check whether it is in the array (print "Found" in that case) or not (print "Not found").
12. Read an integer n from the user. Then, read n integers from the user and store them in an array. You can assume that n will not exceed 50. Then, reverse the order of the elements in the array and print them.
13. Write down a C program that takes input of a month (as an integer) and prints the corresponding last date of the month and outputs number of days since Jan 1.
    You must use the following array to keep number of days of each month:
    int days[ ] = {31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31};
14. Declare two integer arrays (A and B) of size 10. Take inputs (from user) for both the arrays and store their sum in a third array (C) of size 10. Also, find out the maximum number in array C.
15. Take an integer input from the user and count the repetition of the digit. Print each digit with its corresponding number of repetition.
16. Take an integer array as input from the user of size 10. Now, find out if the array is a palindrome or not.
17. You are given an integer array by the user of size 10. Find the maximum product of two elements in the given array.
18. Write a function to find out the 2^{nd} highest number in an integer array.(Sir final)
19. Write a function that converts a decimal number to a binary number.
20. Write down a function "int primes(int n)" that takes a positive integer number as input parameter and prints all the prime numbers less then n.(Sir final)
21. Write a program to find an integer number in an array. If the number didn't found add the number at the end of the array.

2D Array:

1. i) Declare a 2 dimensional array of row size 3 and column size 3.
   ii) Fill the 2 dimensional array with values from the user.
   iii) Search for a user given value in the 2D array. If the value is not present, then print "Not found", print "Found" otherwise.
2. In this task, you will find the summation of the elements in a specific column of a matrix. Read two integers, m and n, from the user. These are the dimensions of the matrix. Next, read the elements of the matrix from the user. Then, read which column you have the sum. Finally, print the sum.
3. In this task, you will find the summation of two matrices. Read two integers, m and n, from the user. These are the dimensions of the matrices. Next, read the elements of the matrices from the user. Then print the two matrices you read and finally, find the sum of two matrices and print it.
4. In this task, you will find the transpose of a matrix. Read two integers, m and n, from the user. These are the dimensions of the matrix. Next, read the elements of the matrix from the user. Then, print the transpose of the matrix.
5. Consider int num[20][4] holds the four quiz marks of a class of 20 students. Write a program to find out, (mid)
   (i) Average marks of all the quizzes for each student.
   (ii) Student count who got more than 15 in at least TWO quizzes.
   (iii) Print the highest and lowest average marks.
6. Consider int num[11][5] holds the runs of 5 t20 matches of 11 players. Write a program to find out ,
   (i) Total run of each player in the entire series.
   (ii) Average run of each player.
   (iii) Find the maximum and minimum batting average.
   (iv) Total runs in 2^{nd}, 3^{rd} and 5^{th} matches.
   (v) Count how many players had gone for a duck in at least 2 matches.
   (vi) Count how many players had made runs over 50 in at least 1 match.
   (vii) Find out the best score of each player.
7. In this task, you will find the summation of major and minor diagonal elements of a matrix. Read two integers, m and n, from the user. These are the dimensions of the matrix. Next, read the elements of the matrix from the user. then print the summation of major and minor diagonal elements.
8. Consider int num[10][5] holds the number of students of 10 classes{1,2,3,4 . . .10} each classes having five sections {a, b, c, d and e} . Find out total number of students in class 5 and 6. Also find out which class has the highest amount of students.

String:

1. Write a program that can convert a strings uppercase to lower case.(sir)
2. Write a program that can convert a strings lowercase to uppercase.(sir)
3. Write a program to find how many uppercase in a string.(sir)
4. Write a program to find how many lowercase in a string.(sir)
5. Write a program to find how many uppercase or lowercase (alphabets) in a string.(sir)
6. Write a program to replace all the uppercase by "*" in a string.(sir)
7. Write a program to input and output a string avoiding space problems. Don't use gets.(sir)
8. Write a program to find the length of a string.(sir)
9. Write a program that copies a string into a new variable.(sir)
10. Write a program that takes a string as an input and display it in reverse order.(sir)
11. Write a program for string concatenation. Take two input from the user.(sir)
12. Write a function to count all alphabets in a string.(sir)
13. Write a function for string concatenation. Take two input from the user.(sir)
14. Write a program to compare between two strings (which one is greater, smaller or equal). Using library function.(sir)
15. Write a function to compare between two string (works just as strcmp library function).(sir)
16. Write a function to compare between two strings case insensitively.(sir)
17. Write a function that works just as the library function strncmp.(sir)
18. Write down a function that reverses a given string and then copies the reverse string at the beginning. DO NOT use any string function. For example, if the given string is "ABCD", then the function should produce "DCBAABCD" .(sir mid)
19. Write a program in C to count the total number of words in a string.(web)
20. Write down a function that takes a string input (that terminates at $) and counts number of digits in the given string.
21. Write a program in C to count total number of vowel or consonant in a string.
22. Write a program in C to find maximum occurring character in a string.
23. Write a program in C to read a sentence and replace lowercase characters by uppercase and vice-versa.
24. Write a program in C to find the number of times a given word 'the' appears in the given string.
25. Write a program in C to Find the Frequency of a Character.
26. Write a C programming to convert vowels into upper case character in a given string.
27. Take 'n' character inputs from the user and store them in an array. Now. write a function to remove all the alphabet from the string which comes after 'l' and print the result.
28. Write a function to test whether a string is palindrome.(Sir final)

29. Write a function that searches for a character in a string. The function should print true if found false otherwise.
30. Implement a function which replaces all the occurrences of one character with another character in a string and shows the modified string.
31. Write down a function that takes a string as input and copy it after itself in reverse order. For example, if given string is “Dhaka”, then produce another string: “DhakaakahD”
32. Write a c program to find highest frequency of a character in a string.
33. Write a c program that takes a string and prints the character in alphabetically ascending order.

Functions:

1. Write a function to find area and volume of a sphere.
2. Write the function which takes 2 integers as input and return their average.
3. Write the function double getArea(int a, int b, int h) which returns the area of a Trapezoid. Area= 1⁄2 * (a + b) * h. User will enter the value of two parallel sides (a and b) and the height of the Trapezoid (h). Call the getArea function from the main function.
4. Write some codes to take a number from the user and print the sum of the ’even’ digits of the number. Example- let the number be 1423. Here, the even digits are 2 and 4. Therefore, the sum of the even digits is 2+4 = 6.
5. Write a function to find max digit for an user integer input number.
6. Write a function to find factorial of an integer number.
7. Take an integer input from the user and count the repetition of the digit. Print each digit with its corresponding number of repetition.
8. Take an integer array as input from the user of size 10. Now, find out if the array is a palindrome or not.
9. You are given an integer array by the user of size 10. Find the maximum product of two elements in the given array.
10. You are given an array of size 11. Sort the array in decreasing frequency.
11. Write a function to create a palindrome of a given number. Print the palindrome of last 5 digit of your NSU ID.

Recursion Function:

1. Write a recursive function to find the sum of series up to n integer number.
2. Write a recursive function to find the factorial of an integer number.
3. Write a recursive function to count digit from user input integer number.
4. Write a recursive function to find the sum of all the digit from user input integer number.

5. Write a recursive function for Fibonacci series.
6. Write a recursive function to reverse a integer number.
7. Write some code to print all even numbers in a given range using recursion.

   int EVEN (int start, int end)
8. Write some code to find the sum of all natural numbers between 1 to n using recursion.

   int SUM (int start, int end)
9. Write some code to check whether a number is palindrome or not using recursion.

   int Palindrome (int num)
10. Write some code to find GCD (HCF) of two numbers using recursion.

    int GCD (int a, int b)
11. Write some code to find LCM of two numbers using recursion.

    int LCM (int a, int b)
12. Write some code to find maximum elements in an array using recursion.

    int MAX(int arr[], int size)
13. Write a recursive function that converts a decimal number to a binary number.

    int DecToBin(int dec);
14. Write a recursive function that finds the sum of the following series.

    1 + 1/2 + 1/4 + 1/8 + ... + (1/2)^n
15. Study the following sequence 3, 1, 3, 7, 11, 21, 39, 71, 131, 241, 443, 815, ...

    In mathematical terms, the sequence Tn is defined as follows:

    Tn+3 = Tn + Tn+1 + Tn+2 for n >= 0.

    with initial values,

    T0 = 3, T1 = 1, T2 = 3,

    Now take an integer input n from the user and print the sequence up to n. Use recursion for this problem.
16. Study the following sequence

    1/1! +2/2! +3/3! + ... +n/n!

    Now, use recursion to print the summation of the given series up to nth term.
17. What will be the following recursion function output for Fn[20]

```
Int Fn(int n){
    If(n<=2)
        Retutn 2;
    Else
        Return n+Fn(n-1);
```

```
}
```

Modify this function to add every odd numbers up to n.(Sir final)

18. Write a program in C to check a number is a prime number or not using recursion.

19. Write a recursive function that converts a decimal number to a octal number.

```
int DecToOct(int dec);
```

Structure & File:

1. Create a structure called Shape which has two components, length and width. Create a structure variable Rectangle and take its length and width as input from the user. Implement the two functions int findArea(struct Shape R) and int findPerimeter(struct Shape R). From the main function, call these two functions to get the area and perimeter of the rectangle.

```
struct Shape
{
        double length;
        double width;
};
```

2. Write a program to add two complex numbers using structure. Create a structure called Complex with two components, real and imag. Write a function that takes two structure variables as input, then sum up the two complex number.

```
struct Complex
{

        float real;
        float imag;
};
struct Complex add(struct Complex n1, struct complex n2);
```

3. Define a structure named MovieStar which will have the following elements: Name (string),Rating(float), TotalFans(int). Declare a structure array of MovieStar for 5 movie stars. Now take N user reviews as input. Each review will consist of a Movie star name and his rating by a new fan. Now adjust each Movie Star's rating according to the reviews and show the results. Rating of a movie star is the average rating given by fans those who rated him.

4. Define a structure named Gamer which will have the following elements: Number_of_ favorite_games (int), List_of_favorite_games (2D string). Now declare a structure array

of Gamer for 5 gamers and take inputs for them. Now generate a rank list of the games. (Hint: The game which appeared most in the favorite games list will be the top game. In case of tie, print the game which comes alphabetically before).

5. Create a structure called BarcelonaPlayer with the following members.

```
struct BarcelonaPlayer
{
        char name[20];
        int age;
        char country[20];
        char Position[20];
        double Salary;
        double Rating;
};
```

First, create an array of BarcelonaPlayer structures. Now, write a function that takes an array of BarcelonaPlayer structures as input and find out the highest paid player among all the players.
void highestPaidPlayer(struct BarcelonaPlayer *pl, int size);
Create another function that finds all the players from Argentina.
void findPlayers(struct BarcelonaPlayer *pl, int size);

6.
```
Struct employee{
        Int id;
        Char name[30];
        Int age;
        Float salary;

};
```

Using the given structure , write a c program that asks for ten employee's name, id, age and salary from the user , then, it writes the data in file named out.txt.(Sir final).

7. For the same structure of no 6, read the contents of the file out.txt and print the name of the highest salaried employee and the youngest employee names in the output screen.(Sir final)
8. Write a program that reads a file in.txt, find out how many words in that file.
9. Write a program to read a file if there is any word "NSU" or not. If there is not append "NSU" at end of the file.
10. Write a program to count all the occurrences of "NSU" in a text file. Produce another output text file to write your output.
11. Write a program that counts line numbers from a file.

12. Write a program that reads a file of some integer numbers and counts total even, odd numbers separately in that file and prints all the even, odd numbers.

13. Consider you have an input file that have the following product information described by the structure as follows:

```
struct product {
char name[20];
int ID;
int quantity;
float price; }
```

Write down a C program to take input from the in.txt file and compute the total price of all the products and the least cost product name in the store.

In.txt file	**Output**
3 Printer 101 10 5000 Scanner 102 5 3000 Bag 103 10 800	Total price of all products = 73000 Least cost item name = Bag

14. Write a program to count total lines in a text file.Write a program that will read names, ids, dept names, and cgpa of some students from a file and will show the results. Consider that the name of the file is 'input.csv'. It is just a text file where each line holds information of one student.
Read all information from the file, and print them on screen (one student per line). Your program should use the following structure to hold information of a student

```
typedef struct
{
char name[50];
int id;
char dept[20];
double cgpa;
} student;
```

15. Write a function void pintByDept(char *deptName , student allStudents[], int size) that will print the information of only those students who belong to the department with name pointed to by deptName. The array allStudent is of length 'size' and holds information of all the students.

16. Write a function void saveByDept(char *fileName, char *deptName , student allStudents[], int size) that will save the information of all students who belong to the

department with name pointed to by deptName into a text file. The name of the file is given as an input parameter, fileName.

Pointer:

1. Implement the following function which takes the radius of a circle as one of its parameters and stores the circumference and area using the other two parameters.

   void calcCircleInfo(int radius, float *circumference, float *area)

2. Implement the following function which accepts a string as parameter and reverses it, without using any function from the string library.

   void strReverse(char *str)

3. (i) Write a function that takes the length and width of a rectangle and store the perimeter, area of the rectangle.
   (ii) Then write another function that swap the values of perimeter and area.
   (iii) Write a function that to find the factorial of the length of the rectangle.
   (iv) Write a function to find string length.
   (v) Write a function to find the maximum number in an array.
4. Write a function to swap two numbers using pointer.
5. Write a C program to reverse an array using pointers.
6. Write a function to find maximum number in an array.