Part A

1. Write a C++ program to find the sum of the following series where the user will enter the number of elements in the series.

   sum

2. Write a C++ program to print the following pattern.

$x+1$

$x^2+1 \quad x^2+2$

$x^3+1 \quad x^3+2 \quad x^3+3$

$x^4+1 \quad x^4+2 \quad x^4+3 \quad x^4+4$

$x^5+1 \quad x^5+2 \quad x^5+3 \quad x^5+4 \quad x^5+5$

3. Write a C++ program to print the following pattern.

0

101

21012

3210123

432101234

54321012345

4. Write a C++ program to take three 6 digit numbers as input from the user. Both the numbers have to be modified in the decreasing order of digits and find the largest of 3 modified numbers.
   (For example, if the user enters a 3 digit number 318, its modified number is 831).

5. Write a C++ program to print the following pattern of Fibonacci series numbers of n numbers.

Number (n)	Factorial (n!)
1	1
1	1
2	2
3	6
5	120
8	40320

6. Write a C++ program to find the number of occurrence of vowels and non-alphabetic characters in a sentence entered by the user. Also the find the first occurrence of vowel.

7. Write a C++ program to remove the consecutive repeated characters from a string entered by the user. Also count the number of characters in the string before and after processing.

Part B – Object Oriented Programming

Use necessary constructor for initialization and destructors

1. Develop a program in C++ to create a database for people who asked for rescue during Kerala Flood 2019. Database should contain the following information.

   Name
   Mobile Number
   Location
   Number of people to be rescued

   The program should be able to perform the following operations in the database.
   - Build a master table
   - Search the entry with mobile number.
   - Sort the list in the decreasing order of number of people to be rescued.

2. Develop a program in C++ to create a database for people who are in relief camps during Kerala Flood 2019. Database should contain the following information.

   Relief Camp Name/Code
   Contact number
   Location
   Number of food packets required

   The program should be able to perform the following operations in the database.
   - Build a master table
   - Search the entry with Relief camp name/code.
   - Find the location with maximum and minimum number of food packets required.

   The program should be able to perform the following operations in the database.
   - Build a master table
   - List table
   - Sort entries in decreasing order of number of items purchased.

3. Write a C++ program to find the area and perimeter of different shapes using the concept of inheritance. The base class is polygon. Derived classes are square, rectangle and triangle.

4.Make a employee program .The data is

Employee name
Employee age
Employee salary
Increment

Write a OOPs program that will ask for the employee details and print it out .

5.Do the same program as the previous one except that ‘inheritance’ is included .
Employees have a hierarchy as:

Manager →Technician→labourer
Managers have functions like 'financial' which will not be used by the lower classes
Technicians have functions like 'papers published' which will not be used by the class 'labourer'.
Use:

i) Public inheritance ii) private inheritance

Use your creativity and imagination to include more functions and data for this program.
Note: **make sure each 'group' thinks 'differently' such that identical programs should not be seen by us.**

6. Make a similar program with concepts like in question 5.
Student is the base class
Undegrad student and Postgrad students are the derived classes (in the same hierarchy).
Define data and use functions to print out information for both categories of students.

7.Create a computer warehouse class in which three types of computer peripherals are stored ,for selling. Write a main function which prints how many of each peripheral is sold, what is the total amount received by sales ,and a message stating whether the month's target is achieved or not .Note that every month , many of these items are sold .Develop the code for such a system

8. Define a class REPORT with the following specification:

Private members :
adno 4 digit admission number
name 20 characters
marks an array of 5 floating point values
GETAVG() a function to compute the average obtained in five subject
Public members:

READINFO() function to accept values for adno, name, marks. Invoke the function GETAVG()
DISPLAYINFO() function to display all data members of report on the screen.

You should give function definitions