List of lab programs (Sample)

1	a) Define a Sphere class with data members to store the radius, volume, and surface area.Write a C++ program to read the radius for three spheres and print their volume and surface area. b) Write a C++ program to sort the elements in ascending and descending order.
2	a)Write a C++ program to swap 2 values by writing functions for the following: Call-by-reference b) Define a Cube class and write a C++ program to read the side for three cubes and print their volume and outer area.
3	Write a C++ program to demonstrate **function overloading** by defining two functions-One function should accept two integer values and compute their sum, and the other should accept two double values and compute their sum. Call both functions from the main() function and display the results. b) Write a C++ program to swap 2 values by writing functions for the following: i. Call-by-name/value
4	a)Write a C++ program to demonstrate the concept of **function overloading**. Create two functions with the same name max but with different parameter lists as given below: max(int a, int b); max(double a, double b); The function max(int a, int b) should compare two integer values and display the **larger integer**. The function max(double a, double b) should compare two double values and display the **larger value**. b) Write a C++ program to swap 2 values by writing functions for the following: i. Call-by-pointers
4	Given that an EMPLOYEE class contains following members: Data members: Employee_Number, Employee_Name, Basic, DA, IT, Net_Salary. Member functions: to read the data, to calculate Net_Salary and to print data members. Write a C++ program to read the data of N employees and compute Net_Salary of each employee. The salary details are calculated using the following conditions: • Dearness Allowance (DA) = **52% of Basic salary** • Income Tax (IT) = **30% of Gross Salary** • Gross Salary = **Basic + DA** • Net Salary = **Basic + DA − IT**
5	Define a class BANK_ACCOUNT with data members for account number, account holder name, balance, interest, and final balance. Include member functions to read account details, calculate interest, and display the final balance.Write a C++ program to read the details of **N account holders** and compute the **final balance**, where: • Interest = **5% of balance**

	• Final Balance = **Balance + Interest** Display the details of all account holders.
6	Define a STUDENT class with USN, Name, and Marks in 3 tests of a subject. Declare an array of 10 STUDENT objects. Using appropriate functions, find the average of two better marks for each student. Print the USN, Name, and the average marks of all the students.
7	Write a C++ program to create a class called COMPLEX and implement the following overloading functions ADD that return a COMPLEX number. i. ADD (a, s2) – where a is an integer (real part) and s2 is a complex number. ii. ADD (s1, s2) – where s1 and s2 are complex numbers.
8	Write a C++ program to demonstrate **runtime polymorphism** using **virtual functions** and a **base class pointer**.Create a base class Shape with a virtual function that prints *"This is a shape"*.Derive Polygon from Shape and override the function to print *"Polygon is a shape"*.Further derive Rectangle and Triangle from Polygon, and Square from Rectangle, each overriding the function to print appropriate messages.Use a **base class pointer** to invoke the function for objects of all classes.
9	Write a C++ program to demonstrate **operator overloading** by overloading the **'+' operator** for a Complex class. The class should store the real and imaginary parts of a complex number. Overload the + operator so that the addition of two complex number objects can be performed using the statement: C1=C2+C3 Create objects c1, c2, and c3, perform the addition using the overloaded operator, and display the result.
10	Suppose we have three classes Vehicle, FourWheeler, and Car. Vehicle is the base class, FourWheeler is derived from Vehicle, and Car is derived from FourWheeler. The base class Vehicle contains a **virtual function** display() that prints **"I am a vehicle"**. The class FourWheeler overrides the display() function to print **"I have four wheels"**. The class Car again overrides the same function to print **"I am a car"**. Write a C++ program to demonstrate **multilevel inheritance** and **function overriding** by invoking the overridden function using an object of the Car class.
11	Write a C++ program to overload the **++ operator** (pre-increment) for a class. The program should increment the data members of an object and display the updated values.
12	Write a C++ program to demonstrate **multilevel inheritance** using a real-time example.Create a base class Person with data members such as **name** and **age**. Derive a class Employee from Person with data members such as **employee ID** and **salary**. Further derive a class Manager from Employee with data members such as **department** and **designation**. Read and display all the details using an object of the Manager class to demonstrate inheritance.