Inheritance

Q1. Imagine a publishing company that markets both book and audiocassette versions of its works. Create a class publication that stores the title (a string) and price (type float) of a publication. From this class derive two classes: book, which adds a page count (type int), and tape, which adds a playing time in minutes (type float). Each of these three classes should have a getdata() function to get its data from the user at the keyboard, and a putdata() function to display its data. Write a main() program to test the book and tape classes by creating instances of them, asking the user to fill in data with getdata(), and then displaying the data with putdata().

Q2. Create a class called Musicians to contain three methods string(), wind(), and perc(). Each of these methods should initialize a string array to contain the following instruments

- veena, guitar, sitar, sarod and mandolin under string()

- flute, clarinet saxophone, nadhaswaram, and piccolo under wind()

- tabla, mridangam, bangos, drums and tambour under perc()

It should also display the contents of the arrays that are initialized. Create a derived class called TypeIns to contain a method called get() and show().

The get() method must display a menu as follows

Type of instruments to be displayed

a. String instruments

b. Wind instruments

c. Percussion instruments

The show() method should display the relevant detail according to our choice. The base class variables must be accessible only to their derived classes.

Q3. In an organization, employee information is maintained to calculate salaries and bonuses. Every employee has a name, ID, and basic salary. The payroll system adds functionality to compute the total payable salary after adding a bonus. Implement *Single Inheritance* to show how a derived class can extend the functionality of a base class.

Create a **base class Employee** that stores empName, empID, and basicSalary. Derive a **class Payroll** that adds a member function to calculate a **10% bonus** and compute **totalSalary = basicSalary + bonus**. Display complete employee details along with the computed salary.

Q4. A school wants to automate its academic record system where student details, subject marks, and overall results are computed step-by-step. Demonstrate *Multi-level Inheritance* by passing data across multiple derived classes.

- Create a **base class Student** with data members like name and rollNo.

- Derive a **class Marks** from Student that stores marks of three subjects.
- Derive another **class Result** from Marks that calculates the **total**, **average**, and **grade**.
- Display the final report card with all details.

Q5. In a hospital, doctor information is stored using two separate modules: the Staff database (personal and salary details) and the Department database (specialization and allowances). Both need to be combined to display a complete doctor profile. Apply *Multiple Inheritance* to combine features from two independent base classes.

- Create a **class Staff** that stores staffID, name, and basicPay.
- Create another **class Department** that stores deptName and allowance.
- Derive a **class Doctor** from both Staff and Department that computes the **totalPay = basicPay + allowance**.
- Display doctor details, department, and total pay.