1. Create a class named Person with a data member to store the name of the person. Create another class named Student that inherits from the Person class and has a data member to store the student ID. Write a program to create a Student object and print out their name and ID.

2. Create a class named Shape with data members to store the width and height of a shape. Create another class named Rectangle that inherits from the Shape class and has a method to calculate the area of the rectangle. Write a program to create a Rectangle object and print out its area.

3. Create a class named Vehicle with data members to store the number of wheels and the top speed of a vehicle. Create another class named Car that inherits from the Vehicle class and has a data member to store the number of doors. Write a program to create a Car object and print out its number of wheels, top speed, and number of doors.

4. Create a class named Animal with a data member to store the name of the animal. Create another class named Cat that inherits from the Animal class and has a data member to store the number of lives of a cat. Write a program to create a Cat object and print out its name and number of lives.

5. Create a class named BankAccount with a data member to store the account balance. Create another class named SavingsAccount that inherits from the BankAccount class and has a data member to store the interest rate of the account. Write a program to create a SavingsAccount object and print out its account balance and interest rate.

6. Create a class named Person with data members to store the name and age of a person. Create another class named Student with data members to store the student ID and GPA. Create a third class named StudentAthlete that inherits from both the Student and Person classes and has a data member to store the sport played by the student athlete. Write a program to create a StudentAthlete object and print out their name, age, student ID, GPA, and sport.

7. Create a class named Shape with data members to store the width and height of a shape. Create another class named Color with a data member to store the color of a shape. Create a third class named ColoredShape that inherits from both the Shape and Color classes and has a method to print out the width, height, and color of the shape. Write a program to create a ColoredShape object and print out its width, height, and color.

8. Create a class named Vehicle with data members to store the number of wheels and the top speed of a vehicle. Create another class named Engine with a data member to store the horsepower of the engine. Create a third class named Car that inherits from both the Vehicle and Engine classes and has a data member to store the number of doors. Write a program to create a Car object and print out its number of wheels, top speed, horsepower, and number of doors.

9. Create a class named Animal with data members to store the name and age of the animal. Create another class named Pet with a data member to store the owner of the pet. Create a third class named PetAnimal that inherits from both the Animal and Pet classes and has a data member

10. Create two classes named "Mammals" and "MarineAnimals." Create another class called "BlueWhale," which inherits both the above classes. Now, create a function in each of these classes that prints "I am a mammal," "I am a marine animal," and "I belong to both the categories: Mammals as well as Marine Animals," respectively. Now, create an object for each of the above classes and try calling

   – a function of Mammals by the object of Mammal
   – a function of MarineAnimal by the object of MarineAnimal
   – a function of BlueWhale by the object of BlueWhale
   – a function of each of its parents by the object of BlueWhale

11. Make a Fruit class with a data member to calculate the number of fruits in a basket. Create two other classes named Apples and Mangoes to calculate the number of apples and mangoes in the basket. Print the number of fruits of each type and the total number of fruits in the basket.

12. We want to calculate the total marks of each student in a class in Physics, Chemistry, and Mathematics and the average marks of the class. The user enters the number of students in the class. Create a class named Marks with data members for roll number, name, and marks. Create three other classes inheriting the Marks class, namely Physics, Chemistry, and Mathematics, which are used to define marks in the individual subject of each student. The roll number of each student will be generated automatically.

13. We want to store the information about different vehicles. Create a class named Vehicle with two data members named mileage and price. Create its two subclasses
   *Car with data members to store ownership cost, warranty (by years), seating capacity, and fuel type (diesel or petrol).
   *Bike with data members to store the number of cylinders, number of gears, cooling type (air, liquid, or oil), wheel type (alloys or spokes) and fuel tank size (in inches)
   Make another two subclasses, Audi and Ford of Car, each having a data member to store the model type. Next, make two subclasses, Bajaj and TVS, each having a data member to store the make-type.
   Now, store and print the information of an Audi and a Ford car (i.e., model type, ownership cost, warranty, seating capacity, fuel type, mileage, and price.) Do the same for a Bajaj and a TVS bike.

14. Create a Shape class with a function that prints "This is a shape." Create another Polygon class, inheriting the Shape class with the same function that prints "Polygon

is a shape." Create two other classes called Rectangle and Triangle having the same function, which prints "Rectangle is a polygon" and "Triangle is a polygon," respectively. Again, another class named Square has the same function, which prints "Square is a rectangle." Now, try calling the function by the object of each of these classes.

15. All the banks operating in India are controlled by RBI. RBI has set well-defined guidelines (e.g., minimum interest rate, minimum balance allowed, maximum withdrawal limit, etc.), which all banks must follow. For example, suppose RBI has set the minimum interest rate applicable to a saving bank account to be 4% annually; however, banks are free to use a 4% interest rate or to set any rates above it.
Write a program to implement bank functionality in the above scenario.
Note: Create a few classes, namely Customer, Account, RBI (Base Class), and a few derived classes (SBI, ICICI, PNB, etc.). Assume and implement required member variables and functions in each class.

16. Create a class "Number" with protected member 'num', ' sqr', 'cube' constructor that takes the input of num. Create another class, "Square," which inherits "Number." and has a constructor which finds the square of 'num' and assigns it to 'sqr' and a public member function 'display' which prints the value; of 'sqr.' Create another class, "Cube," which inherits "Number." and has a constructor which finds the cube of 'num' and assigns it to 'cube' and a public member function 'print' which prints the value. Of 'cube.'