1. A point in the x-y plane is represented by its x-coordinate and y-coordinate. Design a class, pointType, that can store and process a point in the x-y plane. You should then perform operations on the point, such as setting the coordinates of the point, printing the coordinates of the point, returning the x-coordinate, and returning the y-coordinate. Also, write a program to test various operations on the point.

2. Every circle has a center and a radius. Given the radius, we can determine the circle's area and circumference. Given the center, we can determine its position in the x-y plane. The center of the circle is a point in the x-y plane. Design a class, circleType, that can store the radius and center of the circle. Because the center is a point in the x-y plane and you designed the class to capture the properties of a point in Question 1 you must derive the class circleType from the class pointType. You should be able to perform the usual operations on the circle, such as setting the radius, printing the radius, calculating and printing the area and circumference, and carrying out the usual operations on the center. Also, write a program to test various operations on a circle.

3. Every cylinder has a base and height, wherein the base is a circle. Design a class, cylinderType, that can capture the properties of a cylinder and perform the usual operations on the cylinder. Derive this class from the class circleType designed in Question 3. Some of the operations that can be performed on a cylinder are as follows: calculate and print the volume, calculate and print the surface area, set the height, set the radius of the base, and set the center of the base. Also, write a program to test various operations on a cylinder.

4. A retail store has a preferred customer plan where customers may earn discounts on all their purchases. The amount of a customer's discount is determined by the amount of the customer's cumulative purchases in the store.
   • When a preferred customer spends $500, he or she gets a 5% discount on all future purchases.
   • When a preferred customer spends $1,000, he or she gets a 6% discount on all future purchases.
   • When a preferred customer spends $1,500, he or she gets a 7% discount on all future purchases.
   • When a preferred customer spends $2,000 or more, he or she gets a 10% discount on all future purchases.
   Design a class named PreferredCustomer, which is derived from the CustomerData class you created in **problem 7**. The PreferredCustomer class should have the following member variables:
   • purchasesAmount (a double)
   • discountLevel (a double)
   The purchasesAmount variable holds the total of a customer's purchases to date. The discountLevel variable should be set to the correct discount percentage, according to the store's preferred customer plan. Write appropriate member functions for this class and demonstrate it in a simple program.

5. Design a class named Person with the following member variables:
●FirstName

- LastName
- Address
- City
- State
- Zip
- PhoneNo
- Struct DOB (day, month, year)

Having a private constructor.

Write the appropriate accessor (getter) and mutator (setter) functions for these member variables.

In the main() function, create an array of objects of user defined size by calling a static function

for making objects.

Input data of all the persons and then display it by using a constant functio

6. Design a class Car having attributes.

       PersonData Driver (an object of class done in Q#5)
       String carName
       Int carID
       String type (SUV, Wagon, Electrical etc)
       Static int count
       Const int wheels (assuming every car will have four wheels)
       Having default, overloaded, copy constructors with initializer lists and a destructor,
       Having functions addCar(), deleteCar(), updateCar(), printCar().
       In the main(), you'll only have a pointer of size 1 at start.
       Here, you'll have a constant object initialized explicitly like this const Car
       constantObj (Person, cName, cID, cType);

Now, print this object at the start of the program and then print the menu.You will have a menu driven program to perform following functionalities.

       1. Add Car
       2. DeleteCar
       3. Update Car Attributes
       4. Print Details
       5. Print List of cars
       One thing, while printing the Driver details display only his name

7. Design a class named PersonData with the following member variables:

- FirstName
- LastName
- Address
- City
- State
- Zip
- PhoneNo

Write the appropriate accessor (getter) and mutator (setter) functions for these member variables.

Next, design a class named CustomerData, which is derived from the PersonData class. The

CustomerData class should have the following member variables:
• CustomerNumber
• MailingList
The CustomerNumber variable will be used to hold a unique integer for each customer. The MailingList variable should be a bool. It will be set to true if the customer wishes to be on a mailing list, or false if the customer does not wish to be on a mailing list. Write appropriate Accessor and Mutator functions for these member variables. CustomerData class will have the
• InputCustomerData member function which will Input all the data for customer. (use function over riding).
• DisplayCustomerData member function which will display all the data for customer. (use function over riding).
Demonstrate an object of the CustomerData class in a simple program.

8. write a program to design a class representing the information regarding digital library (books, tape: book & tape should be separate classes having the base class as media). The class should have the functionality for adding new item, issuing, deposit etc. the program should use runtime polymorphism.