Object Oriented Programming  
Lab Manual



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Problem Set 1:

Define an abstract base class shape that includes protected data members for area and volume of a shape, public methods for computing area and volume of a shape (make the functions virtual), and a display function to display the information about an object. Make this class abstract.

Derive a concrete class point from the shape class. This point class contains two protected data members that hold the position of point. Provide no-argument and 2-argument constructors. Override the appropriate functions of base class.

Derive a class Circle publicly from the point class. This class has a protected data member of radius. Provide a no-argument constructor to initialize the fields to some fixed values. Provide a 3-argument constructor to initialize the data members of Circle class to the values sent from outside. Override the methods of base class as required.

Derive another class Cylinder from the Circle class. Provide a protected data member for height of cylinder. Provide a no-argument constructor for initializing the data members to default values. Provide a 4-argument constructor to initialize x- and y-coordinates, radius, and height of cylinder. Override the methods of base class.

Write a driver program to check the polymorphic behaviour of this class.

Problem Set 2:

Create a class named Pizza that stores information about a single pizza. It should contain the following:

* Private instance variables to store the size of the pizza (either small, medium, or large), the number of cheese toppings, the number of pepperoni toppings, and the number of ham toppings.
* Constructor(s) that set all of the instance variables.
* Public methods to get and set the instance variables.
* A public method named calcCost( ) that returns a double that is the cost of the pizza.
* Pizza cost is determined by:
  + Small: $10 + $2 per topping
  + Medium: $15 + $2 per topping
  + Large: $20 + $2 per topping
* public method named getDescription() that returns a String containing the pizza size, quantity of each topping.

Write test code to create several pizzas and output their descriptions. For example, a large pizza with one cheese, one pepperoni and two ham toppings should cost a total of $22. Now Create a PizzaOrder class that allows up to three pizzas to be saved in an order. Each pizza saved should be a Pizza object. Create a method calcTotal() that returns the cost of order.

In the runner order two pizzas and return the total cost.

Problem Set 3:

Function Templates for Sorting Arrays: The function takes an array of elements of any data type and sorts them in ascending and descending order