Homework 5

Inheritance & Polymorphism

This assignment will test your skill about using C++ Inheritance and Polymorphism.

Request:

For this assignment, you need to write a program, which can calculate the area of circle/cylinder (superficial) and the volume of cylinder. You are required to use inheritance to build the necessary classes and to write virtual function “area()” for corresponding classes to calculate the area of circle and the superficial area of cylinder.

Details:

1) You need to define a base class **point**. This base class should have attribute **x**, **y** (i.e. coordinate of point(x,y)). The base class should derive class **circle**, which have an additional attribute **r** (radius). Then, you should define another subclass **cylinder** derived from class **circle**, which will add another attribute **h** (height). You need to design the access property (private/public/protected) of member attributes/function.
   (Hint: class **circle** is the son of class **point**; class **cylinder** is the son of class **circle**)
2) All the class should have necessary member functions such as 1)constructor, 2)mutators, 3)the function to calculate the area of circle or the superficial area of cylinder, and 4)the function to calculate the volume of cylinder. (You are free to have additional functions that can improve the performance)
   (Hint: you may need to use virtual or pure virtual function to implement the polymorphism of function **area()**)

NOTE:

You are free to use any format to write source code to achieve the goal of this assignment, but you must notice that:

1. In your assignment, you must use concept of inheritance to define the classes. You can use any type of inheritance (just make sure you use it correctly). You are required to write some comments to explain why you choose the inheritance type you use.
2. In your assignment, you must use virtual/pure virtual function to show that you have the ability to implement polymorphism. Also, please write some comments about which type of virtual function you choose and why you choose it.