CSC 220 – Lab 12

Objective:
Exercise polymorphism in Java.

Java program:

1. Write a class `Point`. Points are described as having an (x,y) location. Instance variables should be private. Your class should contain a constructor that takes two integer values to set the point, accessor and mutator methods for the private instance variables and a toString method that prints the coordinates of the point.
2. Write a class `Circle`. Since circles are described by a centerpoint and a radius, the `Circle` class should extend the `Point` class. You need to add a private double for the radius. You should include a constructor, an accessor and a mutator method for the radius. Negative radii are not permitted (check and print an error message in the mutator). You should override the toString method to print the coordinates of the point, the radius, and the area of the circle.
3. Write a class `Cylinder`. Since cylinders are circles with heights, the `Cylinder` class should extend the `Circle` class. Add the appropriate instance variable and include a constructor, an accessor and a mutator method. Override the toString method to print the coordinates of the point, the radius, the height and the volume of the cylinder.
4. Write a driver class called `Application` that reads three x,y locations, radii and heights from the user. Create 3 point, 3 circle and 3 cylinder objects using the input values. Use polymorphism (and a for loop) to store all objects in one ArrayList. Finally use polymorphism to print the description of each object.

What to turn in:

JAR your `*.java` files into a file called `Lab12.jar`. When you're done, upload the JAR file to Canvas, by the deadline.