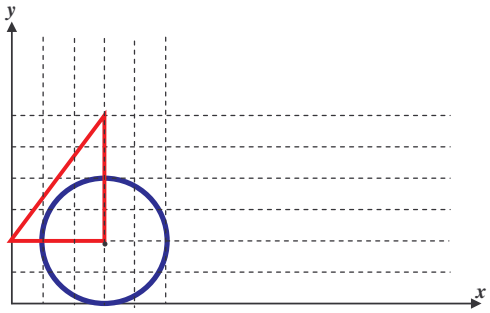
CSC330 Object Oriented Design Lab2 Out February 24 Due March 5

Problem: Generate a C++ object-oriented project that models the following descriptions:

- A **circle** "is a" **shape.**
- A **circle** "has a" a **point** ***(x,y)*** and a **radius.**
- A **right triangle** "is a" shape.
- A **right triangle** "has a" **hypotenuse** and two sides**,** denoted as **side1** and **side2**.
- A shape, a circle, or a right triangle "has an" **area.**

Requirements:

1. The "is a" relationship is modeled by ***public inheritance***.
2. The "has a" relationship is modeled by ***composition.***
3. The project contains four classes, i.e., **Shape, Point, Circle, and RTriangle.**
4. All classes must have a default **constructor**.
5. Class Point, Circle, and RTriangle must have a constructor initializer, which takes as many parameter as needed to initialize the data members.
6. Class Shape must have a **protected** data member **area** of type ***double*.**
7. All classes must have a public method called **calculate_area().**
8. Class Point must have two **public** data members ***x*** and ***y***, both of type ***int***.
9. Class Circle must have one **protected** data member named ***center*** that is an object or a pointer to an object of class **Point.**
10. Class Circle must have one **protected** data member **radius** of type ***double***.
11. Class RTriangle must have three **protected** data members **hypotenuse, side1** and **side2,** all of type **int**.
12. Class **Shape** is the **base class** for **Circle**, and **RTriangle.**
13. The constructor initializer for RTaiangle must validate the three sides by the equation that **$hypotenuse^2 = side1^2 + side2^2$.**
14. **The main driver** must declare an object of class Circle, and an object of class RTriangle, as show in the figure, and **print out** the corresponding data members and the area of each object.



Submit:

PRINT:

1. Draw the detailed UML class diagrams.
2. Complete source code (all necessary .h and .cpp files) with comments.
3. Testing snapshots in the shown on the right format.

Electronic submission (on my pen drive):

All of the above plus the exe file.

Don't forget to include as comments:

1. **Your name**
2. **CSC330 Lab2**