Bonus 5

Requirements:

- Create a Java project named yourStudentId_OOP_Bonus5
- Read instructions and create classes needed. You are supposed to add 5 classes (*Shape, Square, Circle, Triangle, and Tester*) to the project.
- All instance variables are private. Please use public interfaces to access private variables.

Description:

There are different types of shape such as *Square, Circle*, and *Triangle* as below. These three types of shapes have similar attributes inherited from a general shape class, but also have some different attributes and methods for themselves (i.e., the mathematical formulas for each shapes area and perimeter are different). Please read the following class diagram and implement the result.

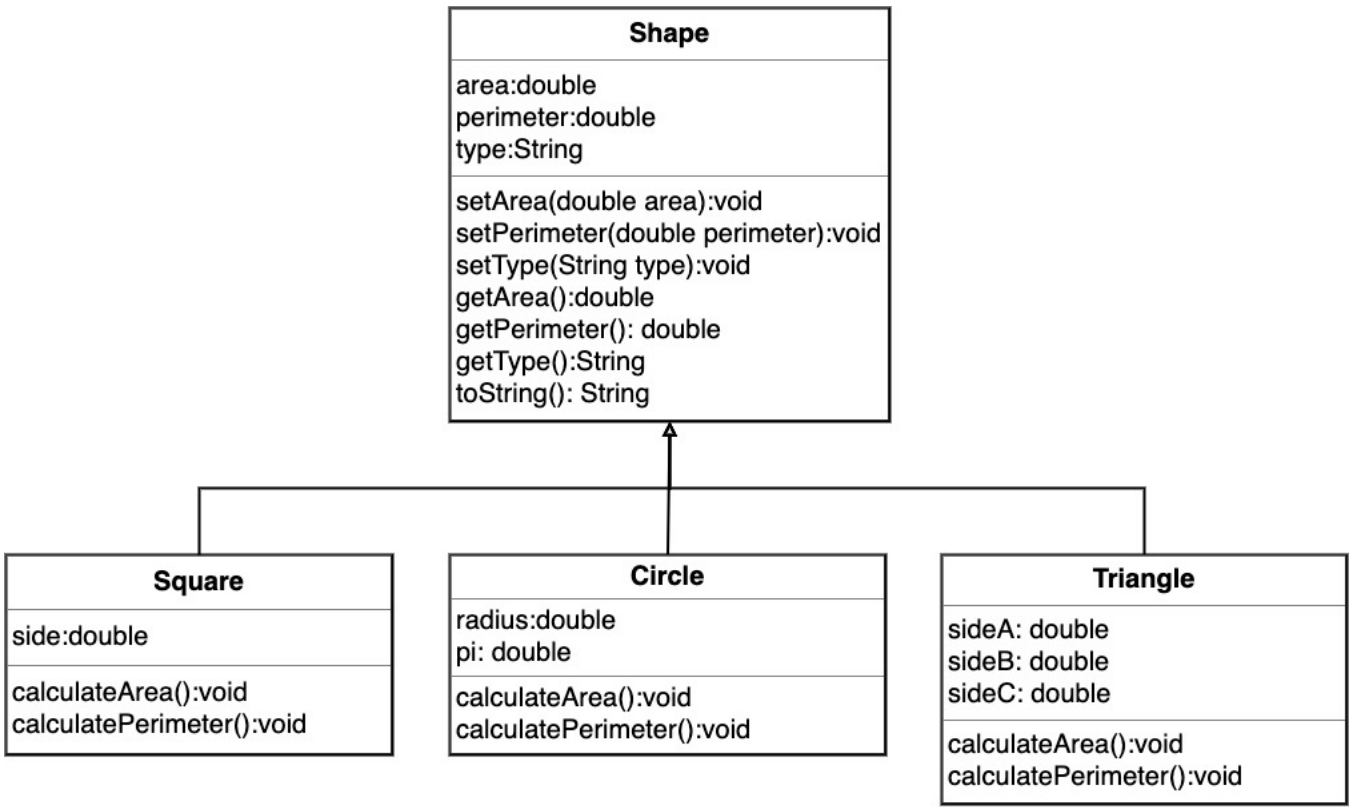

Figure 1.

1. **Create *Shape* class**

Shape	
Modifier and type	**Method (or Variable) and description**
Instance variable	
double	area The area of the shape.
double	perimeter The perimeter of the shape.
String	type The type of the shape.
Instance methods	
-	3 getter for 3 attributes (getArea(), getPerimeter(), getType()). 3 setter for 3 attributes (setArea(...), setPerimeter(...), setType(...)).
String	toString() Return a *String* object including the area and perimeter of the shape as example. **Example:** **[Area:15.00, Perimeter:16.00]**

2. **Create *Square* class**

Square	
Modifier and type	**Method (or Variable) and description**
Instance variable	
double	side The side of the *Square* object.
Constructor	
Square(double side) Enable to instantiate the object of *Square* with given *side.* Besides, set up the type name of the shape and call the corresponding methods that calculate area and perimeter.	
Instance methods	
void	calculateArea() Calculate the area of the shape and call corresponding method to set the *area* instance variable.
void	calculatePerimeter() Calculate the perimeter of the shape and call corresponding method to set the *perimeter* instance variable.

3. **Create *Circle* class**

Circle	
Modifier and type	**Method (or Variable) and description**
Instance variable	
double	radius The radius of the *Circle* object.
double	pi The ratio of the circumference of a circle to its diameter. (You should assign it as 3.14).
Constructor	
Circle(double radius) Enable to instantiate the object of *Circle* with given *radius.* Besides, set up the type name of the shape and call the corresponding methods that calculate area and perimeter.	
Instance methods	
void	calculateArea() Calculate the area of the shape and call corresponding method to set the *area* instance variable.
void	calculatePerimeter() Calculate the perimeter of the shape and call corresponding method to set the *perimeter* instance variable.

4. **Create *Triangle* class**

Triangle	
Modifier and type	**Method (or Variable) and description**
Instance variable	
double	sideA The sideA of the triangle.
double	sideB The sideB of the triangle.
double	sideC The sideC of the triangle.
Constructor	
public Triangle(double sideA, double sideB, double sideC) Enable to instantiate the object of *Triangle* with given *sideA, sideB,* and *sideC.* Besides, set up the type name of the shape and call the corresponding methods that calculate area and perimeter.	
Instance methods	
void	calculateArea() Calculate the area of the shape and call corresponding method to set the *area* instance variable.
void	calculatePerimeter() Calculate the perimeter of the shape and call corresponding method to set the *perimeter* instance variable.

5. **Follow the steps below to implement the code in *Tester* class**

a. Create three type of shape objects named *square*, *circle*, and *triangle*. The square with the side of 8, the *circle* with the radius of 6, and the triangle with three sides of 3, 4, and 5.

b. Create an array named *shapes* to store all the shapes mentioned above.

c. Write a static method named *presentResult* and return the string format as the following output.

d. Use *"for-each"* concept and call *presentResult(...)* method to print the result as sample output in the main method. **(You can refer this week's presentation p.20).**

Sample output

```
Square [[Area:64.00, Perimeter:32.00]]
Circle [[Area:113.04, Perimeter:37.68]]
Triangle [[Area:6.00, Perimeter:12.00]]
```

Submission: Submit your project as **".zip file"** via Moodle. No other submissions will be graded.

Reminder: Please zip the whole project.

Deadline: Tomorrow's midnight (for both Mon56 and Tue23)