LAB TEST #1 – March 1, 2014

Student: _____

Be sure to read the following general instructions carefully:

- This lab test must be completed individually by all the students.
- You should submit the entire project using **Assignment link on Blackboard**.
- **Use Eclipse** whenever is possible for generating constructors, getter/setter methods, event handler methods, toString() methods, etc.

Exercise 1

Start a new Eclipse Java project. Name the project: **YourFullName_CXEC320MidTermTest**. For example: JohnSmith_**CXEC320MidTermTest**. **DO NOT** create a package in this project. Let Eclipse create the default package.

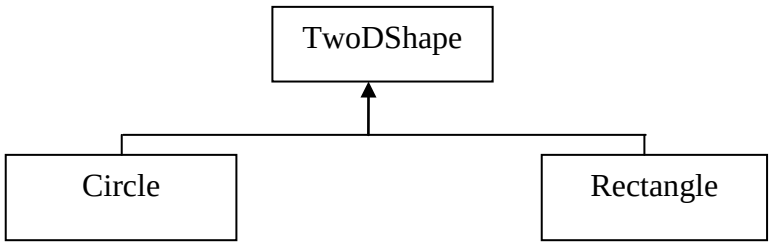
Create an **abstract class** called ***TwoDShape***. The class should declare the following variables:

- ***x***, an instance variable that describes the *coordinate x of upper-left corner (type double) for a two dimensional shape*
- ***y***, an instance variable that describes the *coordinate y of upper-left corner (type double) for a two dimensional shape*
- ***width***, an instance variable that describes the "*width" (type double) for a two dimensional shape*
- ***height***, an instance variable that describes the "*height" (type double) for a two dimensional shape*

Provide a **toString()** method that returns the information stored in instance variables.

Create the necessary getter and setter methods for each instance variable. Include *an **abstract method to compute the area*** (*public **abstract** double area()*) for a two dimensional shape and another abstract method to compute the perimeter (*public **abstract** double perimeter()*).

Create two concrete subclasses called *Circle* and *Rectangle*.

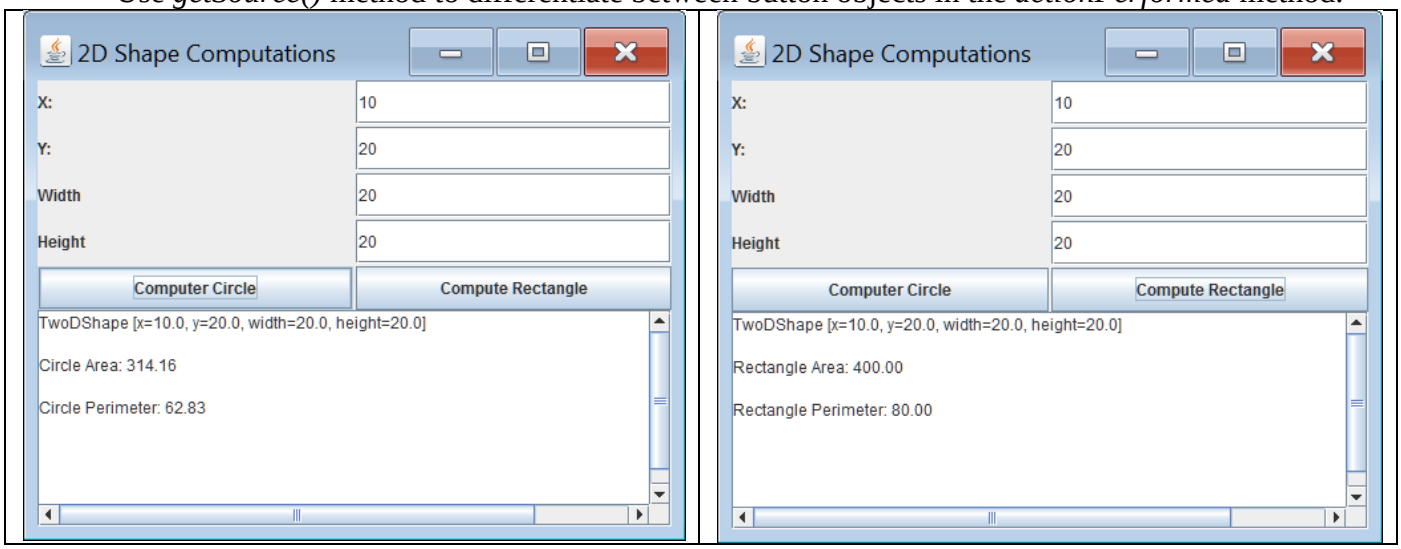


These subclasses should override abstract methods *area and perimeter* of class TwoDShape by providing different implementations based on definitions of *area* and *perimeter* for circles and rectangles. Note that

in Java a circle shape fits within the square specified by the *x*, *y*, *width*, and *height* arguments. Therefore, for circles, the radius should be calculated as half of width or height.

Write a GUI driver class that utilizes the shape hierarchy. In your GUI class you must implement an interaction with the user:

- Use `JTextField components` to allow user input information.
- Use JButton components to allow user to display the information as shown in the picture below.
- Use a `JTextArea component` method to display shape information including *area* and *perimeter* for both circle and rectangle shapes. Provide scrolling abilities.
- Use a GridLayout manager (5 rows, 2 columns)) to create the layout for your GUI.
- Use a JPanel object to hold the GUI components, except the JTextArea. Put this panel onto the center area of application's JFrame. Put the JTextArea onto the south area of application's JFrame.
- Register the JButton objects with an ActionListener object and handle the action event (click) in an inner class.
- Use *getSource()* method to differentiate between button objects in the *actionPerformed* method.



Evaluation:

1.	OOD (correct definition of classes)	- 25 marks
2.	GUI (correct implementation of UI)	- 35 marks
3.	User friendliness, exception handling	- 10 marks
	Total	**- 70 marks**