CS111 Introduction to Computer Programming
Test #2

Name: _____

This Test is open-book (course textbook) and open-notes (your own notes from this class) and open-laptop, but closed-neighbor. You may not communicate with anyone during the Test, other than the Instructor. There are a total of 100 points possible.

Relax, take a deep breath, and pray ☺.

Your grade will be based upon both the correctness and quality of your solutions. Don't get stuck on one portion of the test, but look all of it over first. If you cannot completely solve something, do your best, and submit whatever you are able to, so that I will have more opportunity to award any applicable partial credit.

1. The CS111 Course Home Page submission link for this test includes the (slightly modified) source code for "GeometricObject.java", "Circle.java", "Rectangle.java", and "TestGeometricObject.java", as given in Section 13.2 of the textbook.

   Take the provided source code, and make ANY THREE (your choice) of the modifications listed below. If you choose to implement more than three of these modifications, you will receive full credit for the three you do the best, plus a little bit of extra credit for each additional one of sufficient quality.

   NOTE: For the Take-Home Version of Test 2, you must make ANY FIVE (your choice) of the modifications listed below.

(a) Change the body of TestGeometricObject's displayGeometricObject() method to consist of the single line "System.out.println(object);". Make appropriate changes to the *other* classes so that this single line prints the values of all data fields defined in both the superclass and the relevant subclass, as well as the area and perimeter.

(b) Make appropriate changes to override the equals() method of the Object class. Two Rectangle objects are equal if their color, filled, width, and height values are the same. Two Circle objects are equal if their color, filled, and radius values are the same. Add code to the main() method to check if two Circles are equal, and if two Rectangles are equal.

(c) Create an IllegalRectangleException class. Modify the constructor of the Rectangle class to throw an IllegalRectangleException object if an attempt is made to create a Rectangle with a width or height not greater than zero. Add an attempt to create a bad Rectangle to the main() method, and make appropriate changes to handle the exception.

(d) Modify the GeometricObject class to implement the Comparable interface based upon the *order of creation* (not the area) of the object, and define a static oldest() method for finding the older of two GeometricObject objects. Add code to the main() method to find the older of a Circle object and a Rectangle object.

(e) Modify the GeometricObject class to implement the Cloneable interface. Include any appropriate changes to your other classes. Add code to the main() method to clone a Circle object and a Rectangle object.

(f) Modify the GeometricObject class to implement the Serializable interface. Include any appropriate changes to your other classes. Add code to the main() method to serialize and deserialize a Circle object and a Rectangle object using a file named "Test2.dat".

~~~ END OF CS111 TEST #2 ~~~