COSC 211: Programming Data Structure
Fall 2013

Lab #7: File I/O
Laboratory Exercises for Monday, November 4

The following laboratory exercise should be completed by the end of today's laboratory session. Upon completion of the exercise, you are expected to have the lab instructor or one of the lab assistants check the correctness of your program by demonstrating its execution. Make sure you have a printout of the source code ready before demonstrating your program. At that time, the lab instructor (or one of the slab assistants) will assign a grade for the completed program. If you have not completed exercise by the end of the laboratory session, you still have to make sure you submit a printout of your partially working program to get partial credit for your efforts**. Failure to do so will result in a grade of ZERO for the lab exercise**.

Exercise #1: Reading from and Writing to Text Files
Write a program that will read in a file containing shape data and calculate the area for each shape. The shape data and the calculated area will be written to a file. Each line of the input file will contain the shape name (a single String with no spaces) and the corresponding dimensions (all double). A square will have a side length, circle will have a radius, a rectangle will have a length and a width, and a triangle will have a base and a height. The following shows part of a typical data file:

```
Circle  2.5
Circle 12.7
Square 6.0
Triangle 12.5 6.2
Rectangle 12.1 5.6
Triangle 1.5 3.2
Square 7.3
```

The program should compute the area for each shape instance then write dimension(s) and the area to the corresponding output file. You will create an output file for each shape type. All circle data should be written to a file called "circles.txt", square data to "squares.txt", rectangle data to "rectangles.txt", and triangle data to "triangles.txt".

Use the given *Shape*, *Square*, *Circle*, *Rectangle*, and *Triangle* classes. *Areas.java* contains a skeleton of the program. Do the following:

1. Set up a Scanner object *scan* from the input file and PrintWriter objects *circles, squares, rectangles,* and *triangles* to the corresponding output files inside the *try* clause (see the comments in the program
2. Inside the while loop add code to read the input file—get the shape and based on the name, get the corresponding number of dimension values. Instantiate the corresponding shapeObj then compute the area. Write the dimension(s) and the area to the correct output file.
3. After the loop close the Scanner and PrintWriter objects in a *finally* block.
4. Think about the exceptions that could be thrown by this program:
   - A FileNotFoundException if the input file does not exist
   - A InputMismatchException if it can't read an *int* or *double* when it tries to – this indicates an error in the input file format

   Add a catch for each of these situations, and in each case give as specific a message as you can. The program will terminate if any of these exceptions is thrown, but at least you can supply the user with useful information.
5. Test the program. Test data is in the file *shapes.txt.* Be sure to test each of the exceptions as well.
6. Modify your program so that it prompts the user for the input filename. Test your program again.