

Homework 2: Computing Areas of Shapes

Due: Jan. 25 at 11:55pm

This program should be completed using pair programming. (See Pair Programming Guidelines in Moodle.)

Your program will read descriptions of some shapes from `System.in` and will compute their areas. The program will then print the sum of the areas of all the shapes, and a description of the shape that has the largest area. If more than one shape is tied for largest area, you should print the description of the first of these largest shapes that is encountered in the input.

Your program should consist of a class named `Shapes`. Its main method should read input lines from `System.in`. Each input line describes one shape which is a colored triangle, square, rectangle, or circle, except the last line, which contains the single word `end`.

A triangle description consists of the word `triangle` followed by a string specifying a color and two doubles representing the base and altitude of the triangle. The area of a triangle can be computed by $0.5 * b * a$ where `b` is the base and `a` is the altitude.

A square description consists of the word `square` followed by a string specifying a color and one double representing the side of the square. The area of a square can be computed by $s * s$ where `s` is the side of the square.

A rectangle description consists of the word `rectangle` followed by a string specifying a color and two doubles representing the length and width of the rectangle. The area of a rectangle is given by $len * wid$ where `len` is the length and `wid` is the width.

A circle description consists of the word `circle` followed by a string specifying a color and one double representing the radius of the circle. The area of a circle can be computed by $Math.PI * r * r$ where `r` is the radius of the circle and `Math.PI` is a constant defined in the `java.lang.Math` class.

To receive full credit, your `Shapes` class should have a separate static method for computing the area of each shape. The main method of the class should read the description of a shape and call the appropriate method for computing its area.

Your program must read all the shape descriptions from the input, terminated by the word `end`, and then print the total area of all the shapes, and the type and color of the largest shape. The following shows an example input, and the output that your program should print when running on this input. Your output should conform to the format shown in this example. Your submitted program will be run on a different input to check its correctness.

Example input:

```
rectangle red 2.0 3.0
circle blue 1.5
square green 6.8
triangle yellow 4.0 2.5
rectangle orange 9.3 4.1
end
```

Expected output for this example input:

```
Total area = 102.43858347057704
Biggest shape is a green square
```

Submit one file named `Shapes.java` to Moodle before the assignment deadline. You do not need to submit the output of your program. Each partner should submit a file, following Pair Programming Guidelines.