CS 1063 Lab 5: Drawing and Comparing Circles

The `Circles` Class

Objectives

- Call methods with parameters and return values.
- Use the DrawingPanel and Graphics classes.
- Use if statements to control return values and print statements.

Hand-in Requirements

All projects and laboratories will be submitted electronically through Blackboard. Zip up your entire lab directory to submit as the source. (Right click on the lab folder and follow **Send To > Compressed (zipped) Folder** or **7-Zip > Add to "lab5.zip"**.) The lab folder should include the following:

- `Circles.java`
- [`DrawingPanel.java`](DrawingPanel.java)
- `CirclesOutput.txt`

Task

Ask the user for information to draw three circles in a DrawingPanel. Print information about the circles. Each item of information should correspond to a different static method.

Similar to previous programs, your program should start by printing

```
Lab 5 written by YOURNAME
```

Details

The DrawingPanel should be 400x300.

Circles

Ask the user for the center and radius of each circle. Use the `fillOval` method to draw the circles. Note that the parameters to `fillOval` (the upper-left corner and the width and height of the bounding box) need to be calculated from the information provided by the user (the center and the radius). Also, fill the circles using three different colors.

Methods

Each of the following items should be performed by a separate static method. Each method might have up to six parameters. Each circle is described by three values: the x and y values of the center, and the radius.

1. One static method should have parameters for the radiuses of two circles (two parameters), and the method should return `-1` if the first circle is smaller, return `0` if the two circles have the same size, or return `1` if the first circle is larger. Based on the return value from this method, the main method should print a line of output like:

   ```
   The green circle is smaller than the red circle.
   ```

2. Another static method should have parameters for the radiuses and locations of two circles (six paramters), and the method should return `1` if the circles intersect or return `0` if the circles do not intersect (alternatively, you could return `true` or `false`). If `(x1,y1)` and `(x2,y2)` are the centers of the circles and if `r1` and `r2` are their radiuses, then the circles intersect if the distance between the centers, the square root of:

   $$(x1 - x2)^2 + (y1 - y2)^2$$

   is less than or equal to `r1 + r2`. Based on the return values from this method, the main method should print a line of output like:

   ```
   The blue circle intersects the red circle.
   ```

3. (Optional) Given a circle, return `1` if the circle is completely within the window, return `0` if the circle is partially within the window, or return `-1` if the circle is completely outside the window. The program should print something appropriate.

Note that each method needs to be called three times. If your circles are blue, green, and red, then the first method needs to be called for three pairs: blue and green, blue and red, and green and red.

If you find it is more convenient to return values other than `-1`, `0`, and `1`, you are free to do so. However, your methods must return values that your main method uses to print the results. You are also free to implement any additional methods that you like. Remember to put the results of the print statements into a file named `CirclesOutput.txt`.

Rubric

Your program should compile without any errors. A program with more than one or two compile errors will likely get a zero for the whole

assignment.

The following criteria will also be used to determine the grade for this assignment:

- [2 points] If your submission includes the following:
  - The main method prints "Lab 5 written by [...]".
  - Your submission was a Zip file named `lab5.zip` containing a folder named `lab5`, which contains the other files.
  - If your Java program was in a file named Circles.java.
  - If the output of your Java program was in a file named `CirclesOutput.java`.
  - If your program contains a comment that describes what the program does and contains a comment describing each method.
  - If your program is indented properly.
- [3 Points] If the main method inputs the values for three circles from the user.
- [3 points] If the main method correctly draws the three circles in a DrawingPanel with three different colors.
- [4 Points] If the main method calls a method to compare the sizes of two circles. This method should have two parameters, should return the correct value, and should NOT print anything. The main method should call this method three times.
- [4 Points] If the main method calls a method to determine if two circles intersect. This method should have six parameters, should return the correct value, and should NOT print anything. The main method should call this method three times.
- [4 points] If the program correctly prints out the results of the above two methods based on their return values.

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