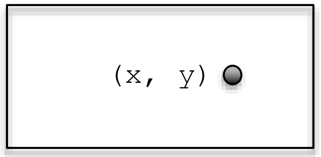
Assignment 0: Review Problems (40 points; due Monday, March 2nd at 11:59 PM)

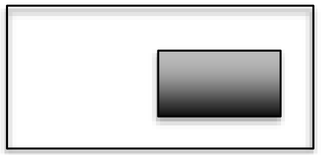
Rectangle Class

1. Create a Rectangle class to represent a rectangle. The class contains:

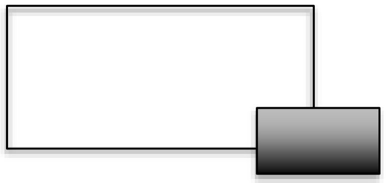
- Two double data fields named `x` and `y` for the center of the rectangle (by default, the values for `x` and `y` should be 0), along with accessor and mutator methods (NOTE: Assume the rectangle sides are parallel to the `x`- or `y`-axis)
- Two double data fields named `width` and `height` for the width and height of the rectangle (by default, the values for `width` and `height` should be 0), along with accessor and mutator methods
- A default constructor with no arguments to create a default rectangle
- A constructor that creates a rectangle with the specified `x, y, width` and `height`
- A method named `getArea`() that returns the area of this rectangle
- A method named `getPerimeter`() that returns the perimeter of this rectangle
- A method named `contains`(`double x, double y`) that returns `true` if the specified point (`x, y`) is inside this rectangle



- A method named `contains`(`Rectangle r`) that returns `true` if the specified rectangle `r` is inside this rectangle



- A method named `overlaps`(`Rectangle r`) that returns `true` if the specified rectangle `r` overlaps with this rectangle



You also need to write a Main class that creates five rectangles:

- Rectangle 1: default rectangle (no x, y, width or height given)
- Rectangle 2: x = 3, y = 4, width = 4, height = 40
- Rectangle 3: x = 4, y = 5, width = 2, height = 10
- Rectangle 4: x = -1.2, y = 3.6, width = 3.5, height = 35.9

- Rectangle 5: x = 2, y = 10, width = -5, height = -3

This Main class needs the method, main(), which will read in the width and height through the helper method, inputData().

```
Enter the width of the rectangle: 4
Enter the height of the rectangle: 40
```

There will also be a helper method, displayResults(),has a void return and displays the data in the following format (with 2 decimal places at all times):

```
The perimeter of the rectangle is: 88.00
The area of the rectangle is: 160.00
```

Finally, make sure to properly test the overlap() and contains() (both with a signle point, as well as a Rectangle object) functions are tested.

Input Validation: Do not accept negative numbers for height or width. If value entered is negative, assume the value to be 0.

Playing Games

2. The sporting world is full of athletes that play games. There are all types of athletes, including those that play baseball, basketball, football, and soccer. Every athlete has the following characteristics:

- Constructor (both a default constructor with name set to empty string and salary to 0.0, as well as a constructor that accepts values for name and salary)
- Name (type string)
- Salary (type double)

For name and salary, implement the accessor and mutator methods. In addition, implement the following function:

```
    double salaryPerGame()
```

Keep in mind that baseball players play 162 games (in Major League Baseball), basketball players play 81 games (in the NBA), football players play 16 games (in the NFL), and soccer players play 38 games (at least in the English Premier League).

Once you've created a base class for the athlete and derived classes for each of the 4 types of athletes, write a driver (test) program which shows salaries for each of the 4 types of athletes.

Write a function, `printSalary()`, that is part of the MainTwo class and will be a polymorphic function that takes in a base class argument.

Turn It In

For the program make sure and include the following comments at the top (do this on all homework assignments from now on – this is required):

```
// Your Name
// CS 23, Section #0131
// Assignment #, Problem #
// Summary of the code
```

Then, within the program, you will add pseudocode as appropriate to describe the steps of the program. This is in order to get in the habit of writing pseudocode and documenting your code. PSEUDOCODE IS REQUIRED FOR ALL PROGRAMS. Submit your source code and pseudocode by the due date to Canvas.

These files should be zipped in one .zip/.rar./gz/.tgz file that contains Main.java and Rectangle.java for problem #1, as well as MainTwo.java (which will have the `main()` method for problem #2), Athlete.java, BaseballPlayer.java, BasketballPlayer.java, FootballPlayer.java, and SoccerPlayer.java.