# CS 1400 - Lab 6

Maximum Points: 10 pts.

**Lab Topics**

- implementing classes
- understanding and accessing instance variables
- implementing methods
- object construction
- constructors

## Use the following Coding Guidelines:

1) Download the template file Lab6.java from Blackboard and fill-in-the-blanks to create your Java program.
2) Give identifiers semantic meaning and make them easy to read (examples numStudents, grossPay, etc).
3) Keep identifiers to a reasonably short length.
4) Use uppercase for constants. Use upper camel case for classes. Use lower camel case for all other identifiers (variables, methods, objects).
5) Use tabs or spaces to indent code within blocks (code surrounded by braces). This includes classes, methods, and code associated with ifs, switches, and loops. Be consistent with the number of spaces or tabs that you use to indent.
6) Use white space to make your program more readable.
7) Use comments to explain how the parts of your program work.

## Lab Problem: Creating Quadrilaterals

Your job is to write a class definition (not a program, there is no main method) named Quadrilateral (saved in a file Quadrilateral.java). A Quadrilateral has four instance variables: **int side1, side2, side3, side4.**

The class Quadrilateral must include the following methods: (If your class does not contain any of the following methods, points will be deducted)

| Methods | Description of the Method |
|---|---|
| `default constructor` | No constructor should be specified |
| `public int getSide1()` | Returns side 1 |
| `public int getSide2()` | Returns side 2 |
| `public int getSide3()` | Returns side 3 |
| `public int getSide4()` | Return side 4 |
| `public void setSide1(int length)` | Sets side 1 |
| `public void setSide2(int length)` | Sets side 2 |
| `public void setSide3(int length)` | Sets side 3 |
| `public void setSide3(int length)` | Sets side 4 |
| `private boolean hasCongruentDiagonals (int side1, int side2, int side3, int side4)` | Returns true if a quadrilateral has congruent diagonals, otherwise returns false. Hint: to calculate the diagonals' size, use the Pythagorean theorem. This is a helper method. |
| `public boolean isRectangle()` | A quadrilateral shape is a Rectangle if side1 is equal to side 3, side 2 is equal to side 4, and it has congruent diagonals. |
| `public boolean isSquare ()` | A quadrilateral shape is a Square if it all sides are equal, and it has congruent diagonals. |

Save the Quadrilateral class in a file called **Quadrilateral.java** and write a program stored in **Lab6.java**, which has the main method to create new Quadrilateral object and to test what kind of Quadrilateral it is. A sample output is shown below.

## Helpful hints for doing this assignment:

- work on it in steps – write one method, test it with a test driver and make sure it works before going on to the next method
- always make sure your code compiles before you add another method
- your methods should be able to be called in any order

## Sample output: user input is in red

```
Enter the sides of the quadrilateral:
4
4
4
4
Sides: 4 4 4 4
        It is a rectangle
        It is a square

Check another Quadrilateral (y/n)? y
Enter the sides of the quadrilateral:

4
5
4
5
Sides: 4 5 4 5
        It is a rectangle
        It is not a square

Check another Quadrilateral (y/n)? y
Enter the sides of the quadrilateral:
3
4
5
6
Sides: 3 4 5 6
        It is a rectangle
        It is not a square

Check another Quadrilateral (y/n)? n
```

## Submit your homework by following the instructions below:

Upload your **Lab6.java and Quadrilateral.java** files on GradeScope. Make sure it is compiling and producing the expecting outputs. You are done.