Team Activity 1 - Classes and Objects

Team Members

Manager: _____

Presenter: _____

Recorder: _____

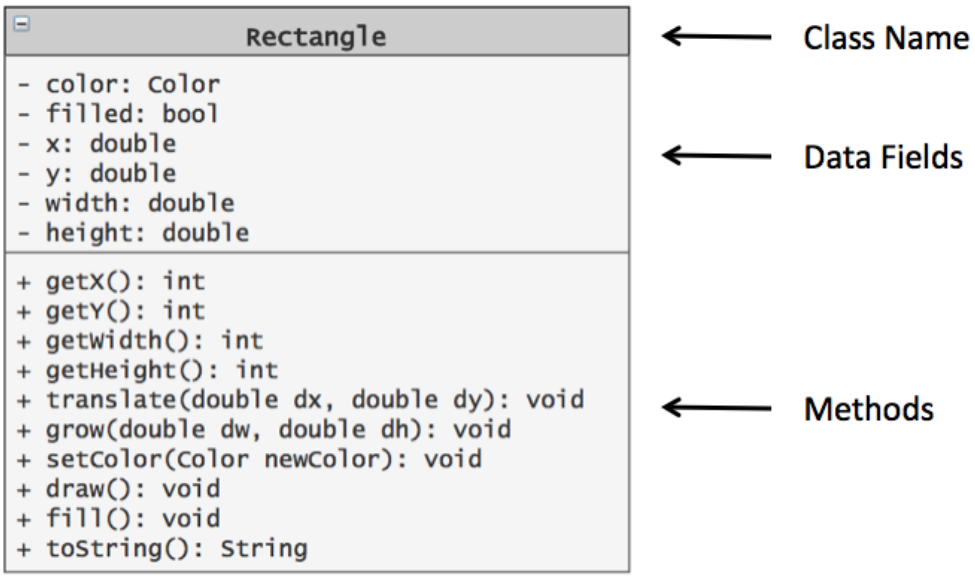
Technician: _____

Short summary of roles here.

Part 1: Class Definitions (?? min)

Classes and objects are the two main aspects of **object oriented programming**. A **class** defines a new data type, whereas an **object** is an *instance* of a particular clas. Objects store *data* belonging to the object in **fields** defined by its class. Objects also have *functionality* that can be activated by calling the **methods** that belong to its class.

A **UML diagram** is a graphical summary of the data and methods in a class. Below is the UML diagram for the Retangle class from the Simple Java Graphics[1] library written by Cay S. Horstmann.



Critical Thinking Questions

1. Identify one example of a data field given in the above UML diagram for the Rectangle class.

[1] http://horstmann.com/sjsu/graphics

a. What is the variable name of the data field?

b. What is the data type of the data field?

2. Identify one example of a Rectangle class method that takes no arguments.

   a. What is the method name?
   b. How do you know that the method does not take any arguments?
   c. Does the method return a value? If so, what type of value will it return?
   d. Do you think this method will modify one or more of the object's data fields? Why or why not?

3. Identify one example of a Rectangle class method that takes one or more arguments.

   a. What is the method name?
   b. What is the name and data type of each parameter for the method?
   c. Does the method return a value? How do you know?
   d. Do you think this method will modify one or more of the the object's data fields? Why or why not?

4. Imagine that you have a code segment that creates a rectangle (rect1) with the following values for each of its fields:

   - color: Magenta
   - filled: false
   - x: 50.0
   - y: 100.0
   - width: 200.0
   - height: 250.0

   Give the code to do each of the following to rect1:

   a. Change the color of rect1 to color Violet.
   b. Fill rect1.

c. Grow the width of rect1 by 100 units and the height by 200 units.

d. Get the width and height of rect1.

e. What values do you think will be returned by d.

Terminology Note

- Methods that return data about the object are called **accessors**.
- Methods that change an object's data are called **mutators**.

A method should do one thing, either provide access to object data values or mutate data values. Never both!

Part 2 - Classes in Java

In Java, Data fields are typically called *fields* or sometimes *instance variables*. They are listed at the top of the class definition and are marked as **private**.

Class methods are given after the instance variables in the class definition. Methods are typically **public** because they provide the interface for interacting with a class object.

```
public class Image {
  private String title;
```