

## INTRODUCTION TO JAVA FOR NON-C PROGRAMMERS

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### LABS

- ❶ Create an **enum** named **Color** with values for your five favorite colors.  
(Solution: *Color.java*)
- ❷ Create an abstract class named **Shape**. Provide fields for x and y coordinates (the location of the shape), as well as color. Add **gets** and **sets** as well as appropriate constructors. Add an abstract method called **getArea()**.  
(Solution: *Shape1.java*)
- ❸ Develop two child classes of **Shape**: **Rectangle** and **Circle**. A **Rectangle** has a width and height, a **Circle** has a radius. Provide **gets** and **sets** for each field and appropriate constructors. Implement the **getArea()** method in each subclass. (Hint: Find **java.lang.Math** in the Java API documentation for usage information on **Math.PI** and the **Math.pow()** method for calculating  $\pi r^2$ .)  
(Solutions: *Rectangle1.java*, *Circle1.java*)
- ❹ Write a tester program that contains a **main()** method that creates an array of three **Shapes**. Store two **Rectangles** and a **Circle** in the array. Loop through the array, printing out the area of each shape.  
(Solution: *ShapeTester.java*)
- ❺ Create an interface named **Drawable** with the **void** method **draw()** declared inside of it.  
(Solution: *Drawable.java*)
- ❻ Retrofit **Shape** to implement **Drawable**, putting the actual implementation code in **Rectangle** and **Circle**. Don't worry about doing any graphics for drawing, just print out a simple message indicating the type, coordinates, and color of each shape you are "drawing."  
(Solutions: *Shape2.java*, *Circle2.java*, *Rectangle2.java*)
- ❼ Modify your tester program to store an array of **Drawable**, instead of **Shape**. Call the **draw()** method on each, instead of the **getArea()** method.  
(Solution: *DrawableTester.java*)

- ⑧ (Optional) Create a class named **Text** that implements **Drawable** and has a **String** field called **value**. Add **gets** and **sets**, as well as an appropriate constructor. Have **Text**'s **draw()** method print the **value** field. Modify your tester program so that a **Text** object is added into the array instead of one of the **Rectangles**.  
(Solutions: *Text.java*, *DrawableTester2.java*)
- ⑨ (Optional) Change the **Shape** class so that it implements the **Comparable** interface. Add the **compareTo()** method to the **Shape** class using the area of the shape as the sort criteria. Test out your changes.  
(Solutions: *Shape3.java*, *Rectangle3.java*, *Circle3.java*, *ShapeTester2.java*)