In this assignment you will create a 2 dimensional shape viewer. You will use the concepts of abstract class, inheritance, interface, and method overloading. You will define the interface DrawableShape and the following classes: Shape, Box, Oval, Text, and View2D. You can see the UML diagram of these classes below. Each ADT (class, interface) should be defined in a separate file (e.g., Shape will be defined in Shape.java).

Shape is an abstract class with a color, four int parameters (x, y, w, h) and an abstract draw method that implements interface DrawableShape. The Shapes in your scene will be read from a file named "scene.v2d" that will exist in your application's directory. The class View2D will contain an ArrayList<DrawableShape> named "scene" of shapes. View2D's paint() method will draw all the shapes in the scene ArrayList. This is an example of Polymorphism. For example a line in "scene.v2d" that describes a box with color (255, 128, 128), positioned at (10, 30) with a width of 390 and height of 390 would be:

```
Box 255 128 128 10 30 390 390
```

```
<shape> <red> <green> <blue> <x> <y> <w> <h>
```

The method signature for the Box constructor could be:

```
public Box(Color aColor, int anX, int aY, int aW, int aH)
```

An example line from "scene.v2d" that describes a Text positioned at (600, 90) with 4 "strings" in its message. All Text messages are displayed in black.

```
Text 600 90 4 Comp 182 Fall 2013
```

```
<shape> <x> <y> <count of strings> <s1> <s2> ... <sn>
```

The method signature for the Text constructor could be:

```
public Text(int anX, int aY, String msg)
```

Use the posted file Window182.java for your window class. The title of your window should be "*Group Names* P1 Fall 2013", for example, "Mike Barnes P1 Fall 2013".

Your program should open and read the posted file "scene.v2d". Change my name "Mike Barnes" to the name(s) of group memebers. For example, the existing line

```
Text 600 50 2 Mike Barnes
```

could become

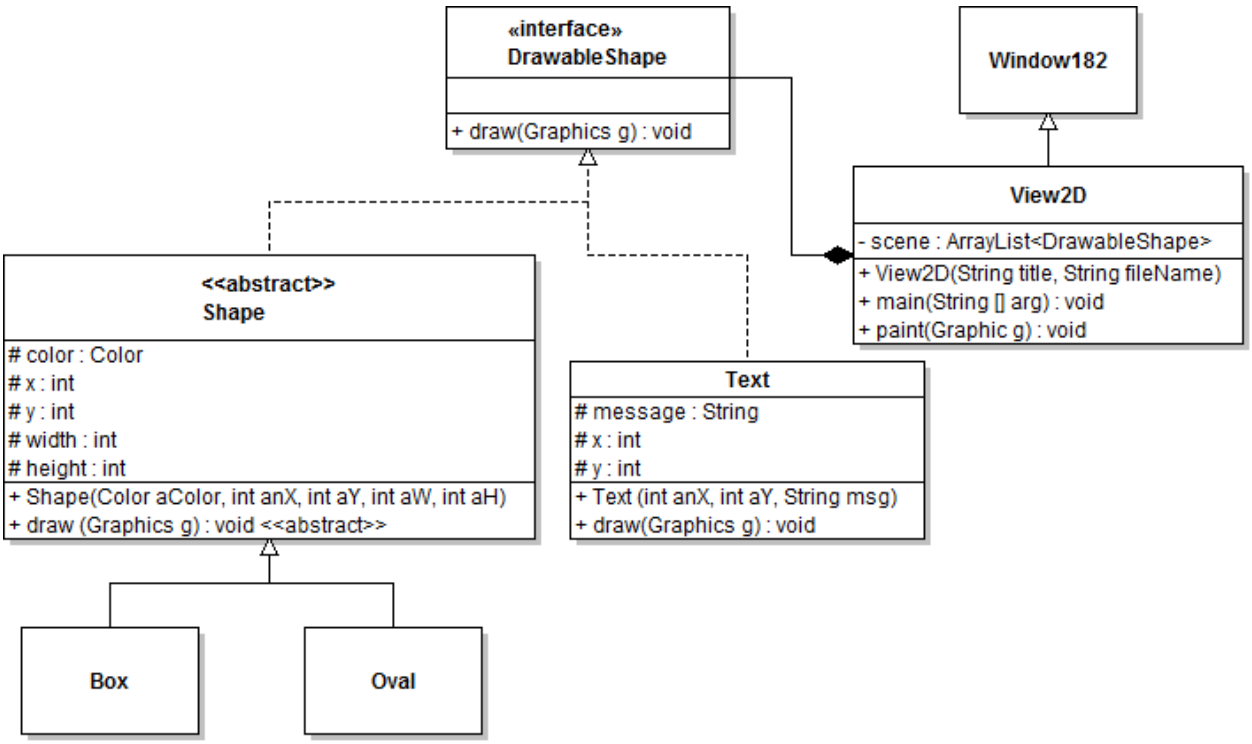
```
Text 600 50 5 Mike Barnes and Peter Smith
```

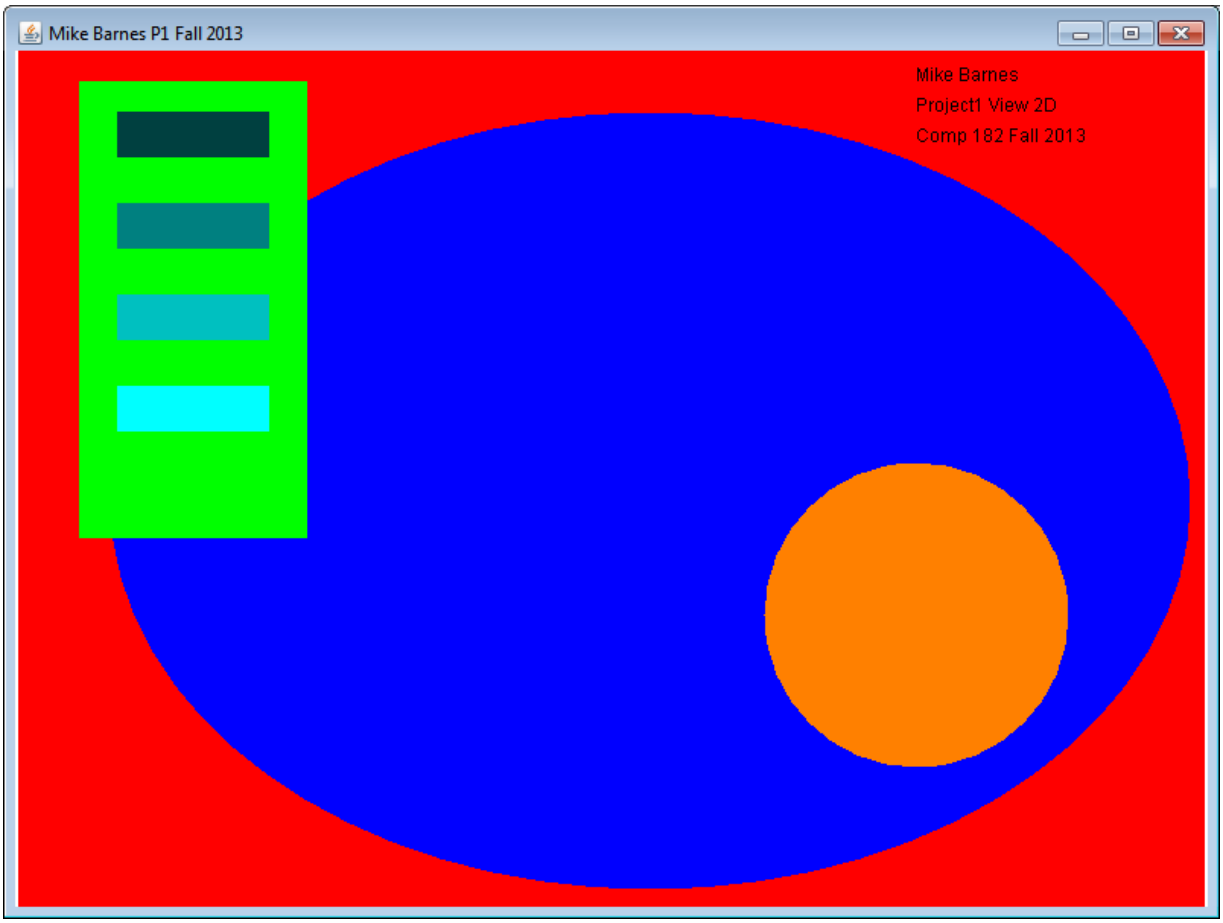
You must use the Scanner class to read each shape's data. You can read the values in one by one or process the file line by line (your choice). If you process the file line by line you should use String's split("\\s") method to generate an array of String holding each value and IntegerParseInt() to convert each string value to an int value (where appropriate). You must use "try"/"catch" file exception handling (not "throws"). Your program should not prompt for the file name; the fileName should be passed to View2D's constructor method. I will use my own (a different) "scene.v2d" test file when grading your program.

View2D's paint method should use an iterator to draw all the DrawableShapes in ArrayList<DrawableShape> scene. Lecture will discuss interfaces, generic types, ArrayList, and iterators soon. You could plan "phases" of implementation for this project. Thing about how to test intermediate subproblem solutions. Subproblems could be:

a) Compile, run, and understand WindowDemo.java. This enables you to understand how to draw rectangles, ovals, and text in Java and how to use Window182.creating the Shape inheritance classes (Shape, Box, Oval) and Text.
b) Create the View2D class without extending Window182. In the constructor, or in a method called by the constructor read the scene.v2d data file and print out the results to verify. Use try/catch exception handling.
c) Create DrawableShape, Shape, Box Oval, and Text classes. Have View2D construct objects while reading the input file (step B). Printout the name of the DrawableShapes constructed.
d) Create View2D's ArrayList<DrawableShape> scene and add the DrawableShape objects constructed in step C.
e) Have View2D extend Window182 and have the View2D's paint method draw all the DrawableShapes in the scene ArrayList.
f) Are you done, is it all correct?

You should submit your java files and documentation file (did you do anything "beyond" the project specification?) using Moodle. Every java file submitted must have a comment block at the beginning that provides the program assignment name, the names of every group member, the email of every group member, and a brief (paragraph) description about the design/purpose of the file. If you work in a group (2 is the largest group size) your group only needs to make one submission (under either group member's Moodle account).


«interface»
DrawableShape
+ draw(Graphics g) : void
Window182
View2D
- scene : ArrayList<DrawableShape>
+ View2D(String title, String fileName)
+ main(String [] arg) : void
+ paint(Graphic g) : void
<<abstract>>
Shape
color : Color
x : int
y : int
width : int
height : int
+ Shape(Color aColor, int anX, int aY, int aW, int aH)
+ draw (Graphics g) : void <<abstract>>
Text
message : String
x : int
y : int
+ Text (int anX, int aY, String msg)
+ draw(Graphics g) : void
Box
Oval


Mike Barnes P1 Fall 2013
Mike Barnes
Project1 View 2D
Comp 182 Fall 2013