CSSE 220 Day 5

More WordGames
Introduction to Java Graphics

Check out *IntroToJavaGraphics* from SVN

Questions?

Today

- Review of WordGames
- Time to work on the rest of WordGames
- Basics of Java graphics
  - Follow along in your own Eclipse
    - You'll need the examples for homework
  - Stop me if I'm going too fast
    - This isn't a typing speed contest

```java
1  /**
2   * A NameDropper puts "foo says " before its given string, where foo is the name
3   * that the particular NameDropper drops.
4   *
5   * @author David Mutchler. Created December 4, 2009.
6   */
7  public class NameDropper implements StringTransformable {
8
9      private String nameToDrop;
10
11     /**
12      * Sets "Madonna" as this NameDropper's name to drop.
13      */
14     public NameDropper() {
15         this.nameToDrop = "Madonna";
16     }
17
18     /**
19      * Sets the given String as this NameDropper's name to dr
20      *
21      * @param nameToDrop
22      */
23     public NameDropper(String nameToDrop) {
24         this.nameToDrop = nameToDrop;
25     }
26
27     /**
28      * Returns the String that results from putting "foo says
29      * string, where foo is the name that this particular Nam
30      *
31      * @param stringToTransform
32      * @return the String that results from putting "foo says
33      *         string, where foo is the name that this partic
34      *         drops.
35      */
36     @Override
37     public String transform(String stringToTransform) {
38         return this.nameToDrop + " says " + stringToTransform;
39     }
40 }
```

WordGames review

Today's in-class quiz:

1. Why does NameDropper need a field?

2. How is the field initialized?

3. How many constructors does NameDropper have?

4. Why does NameDropper have more than one constructor? That is, what is the difference between them?

5. Write a statement that declares and constructs a NameDropper using the no-parameter constructor.

6. Write a statement that declares and constructs a NameDropper using the one-parameter constructor.

7. What is the name of the *explicit* parameter of the transform method in the NameDropper class?

8. What keyword do we use to refer to the *implicit* parameter of the methods in the NameDropper class?

9. What are two reasons why we use "*this*" to refer to the implicit argument when implementing a constructor or method, even though *Big Java* typically doesn't?

10. Why are fields in Java usually private?

11. List several types of Strings that together form reasonable test "coverage" for the NameDropper's *transform* method.

Continue working on WordGames.
Ask questions as needed!

Tips for the rest of WordGames

1. If statements:

```
if (x < 12) {
  System.out.println("x is small");
}
```
◦ Use % for modulus:
```
if (x % 2 == 0) {
  System.out.println("x is even");
}
```
2. For loops:
```
for (int i = 0; i < 10; i += 2) {
  System.out.println("next even is " + i);
}
```

Simplest Java Graphics Program

```java
import javax.swing.JFrame;
/**
 * From Ch 2, Big Java.
 * @author Cay Horstmann
 */
public class EmptyFrameViewer {
  /**
   * Draws a frame.
   * @param args ignored
   */
  public static void main(String[] args) {
    JFrame frame = new JFrame();
    frame.setSize(300,400);
    frame.setTitle("An Empty Frame");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setVisible(true);
  }
}
```

This code is already in your project for today

Creates a graphics frame object

Configures it

Display the frame

Tells Java to exit program when user closes the frame

Q1

Live Coding

>> **MyViewer** and **MyComponent**
(Based on RectangleViewer and RectangleComponent from Big Java)

Schedule page has link to detailed instructions if you want them

Other Shapes

- `new Ellipse2D.Double(double x, double y,`
  `                     double w, double h)`
- `new Line2D.Double(double x1, double y1,`
  `                   double x2, double y2)`
- `new Point2D.Double(double x, double y)`
- `new Line2D.Double(Point2D p1, Point2D p2)`
- `new Arc2D.Double(double x, double y,`
  `              double w, double h,`
  `              double start, double extent,`
  `              int type)`

- Try these!
  - Add an ellipse and both kinds of lines to MyComponent

Interlude

- Ivan Sutherland's Sketchpad
  - 1962
  - The first GUI?
  - The first object-oriented system

- Alan Kay narrating video of Sketchpad:
  - http://www.youtube.com/watch?v=495nCzxM9PI

Adding Text

- To add some text to a component:
  - `graphics2.drawString("some text", x, y);`

- You can change the font *before* drawing the text:
  - `Font f = new Font("Times New Roman, Font.PLAIN, 72);`
  `graphics2.setFont(f);`

Style. Other alternatives are:
Font.BOLD,
Font.ITALIC, and
Font.BOLD | Font.ITALIC

Font size in points

Colors

- To change the Graphics2D object's "pen" color:
    - `Color c = …;  // see below`
      `graphics2.setColor(c);`
- Lots of colors:
    - `new Color(red, green, blue)`, all from 0 to 255
    - `Color.RED`, `Color.WHITE`, etc. (see Javadocs)
    - `new Color(red, green, blue, alpha)`, all from 0 to 255. `alpha` is transparency
- To fill interior of shape:
    - `graphics2.fill(box);`