The Add2Integers Program

class Add2Integers extends ConsoleProgram {
    public void run() {
        println("This program adds two numbers.");
        int n1 = readInt("Enter n1: ");
        int n2 = readInt("Enter n2: ");
        int total = n1 + n2;
        println("The total is " + total + ".");
    }
}

n1  n2  total
17  25  42

This program adds two numbers.
Enter n1: 17
Enter n2: 25
The total is 42.

Graphic courtesy of Eric Roberts
The classes that represent graphical objects form a hierarchy, part of which looks like this:

```
  GObject
    └── GLabel
    └── GRect
    └── GOval
    └── GLine
```

Graphic courtesy of Eric Roberts
Sending Messages to a GLabel

The following program illustrates sending a message to an object. Note that the label doesn’t appear until it is added to the canvas.

```java
public class HelloProgram extends GraphicsProgram {
    public void run() {
        GLabel label = new GLabel("hello, world", 100, 75);
        label.setFont("SansSerif-36");
        label.setColor(Color.RED);
        add(label);
    }
}
```

Graphic courtesy of Eric Roberts
Graphics Coordinates

- Origin is upper left
- Everything measured in pixels (dots on the screen)
- x coordinates increase to the right
- y coordinates increase going down
- **GLabel** coordinates are baseline of first character

![Diagram showing coordinates](image.png)

Graphic courtesy of Eric Roberts
# Operations on the GObject Class

The following operations apply to all **GObjects**:

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>object.setColor(color)</code></td>
<td>Sets the color of the object to the specified color constant.</td>
</tr>
<tr>
<td><code>object.setLocation(x, y)</code></td>
<td>Changes the location of the object to the point (x, y).</td>
</tr>
<tr>
<td><code>object.move(dx, dy)</code></td>
<td>Moves the object on the screen by adding <code>dx</code> and <code>dy</code> to its current coordinates.</td>
</tr>
</tbody>
</table>

The standard color names are defined in the `java.awt` package:

<table>
<thead>
<tr>
<th>Color Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Color.BLACK</td>
<td>Color.RED</td>
<td>Color.BLUE</td>
</tr>
<tr>
<td>Color.DARK_GRAY</td>
<td>Color.YELLOW</td>
<td>Color.MAGENTA</td>
</tr>
<tr>
<td>Color.GRAY</td>
<td>Color.GREEN</td>
<td>Color.ORANGE</td>
</tr>
<tr>
<td>Color.LIGHT_GRAY</td>
<td>Color.CYAN</td>
<td>Color.PINK</td>
</tr>
<tr>
<td>Color.WHITE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Based on slides by Eric Roberts*
Operations on the GLabel Class

Constructor

```java
new GLabel(text, x, y)
```
Creates a label containing the specified text that begins at the point \((x, y)\).

Methods specific to the GLabel class

```java
label.setFont(font)
```
Sets the font used to display the label as specified by the font string.

The font is typically specified as a string in the form

```
"family-style-size"
```

- `family` is the name of a font family
- `style` is either \textbf{PLAIN}, \textbf{BOLD}, \textbf{ITALIC}, or \textbf{BOLDITALIC}
- `size` is an integer indicating the point size

Based on slides by Eric Roberts
Drawing Geometrical Objects

Constructors

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</thead>
<tbody>
<tr>
<td><code>new GRect(x, y, width, height)</code></td>
<td>Creates a rectangle whose upper left corner is at (x, y) of the specified size.</td>
</tr>
<tr>
<td><code>new GOval(x, y, width, height)</code></td>
<td>Creates an oval that fits inside the rectangle with the same dimensions.</td>
</tr>
<tr>
<td><code>new GLine(x_0, y_0, x_1, y_1)</code></td>
<td>Creates a line extending from (x_0, y_0) to (x_1, y_1).</td>
</tr>
</tbody>
</table>

Methods shared by the `GRect` and `GOval` classes

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><code>object.setFill(fill)</code></td>
<td>If <code>fill</code> is <code>true</code>, fills in the interior of the object; if <code>false</code>, shows only the outline.</td>
</tr>
<tr>
<td><code>object.setFillColor(color)</code></td>
<td>Sets the color used to fill the interior, which can be different from the border.</td>
</tr>
</tbody>
</table>
Size of Graphics Window

Methods provided by GraphicsProgram class

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>getWidth()</td>
<td>Returns the width of the graphics window.</td>
</tr>
<tr>
<td>getHeight()</td>
<td>Returns the height of the graphics window.</td>
</tr>
</tbody>
</table>

Note: receiver of these calls is the GraphicsProgram itself, so we don’t specify a separate object as receiver.

Based on slides by Eric Roberts