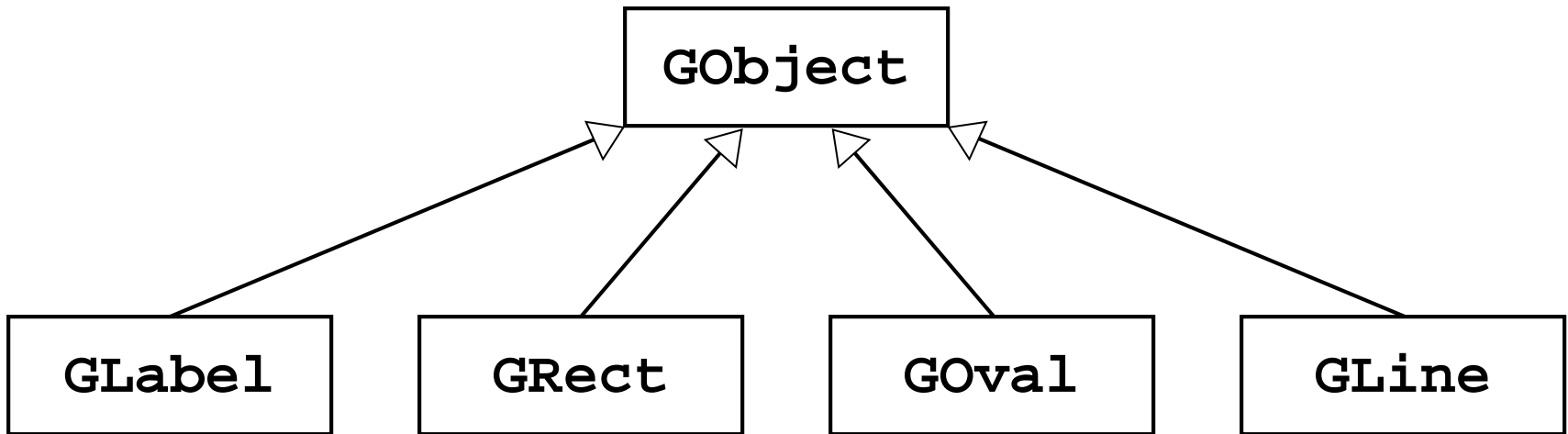


The GObject Hierarchy

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



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.

```
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);  
    }  
}
```

label

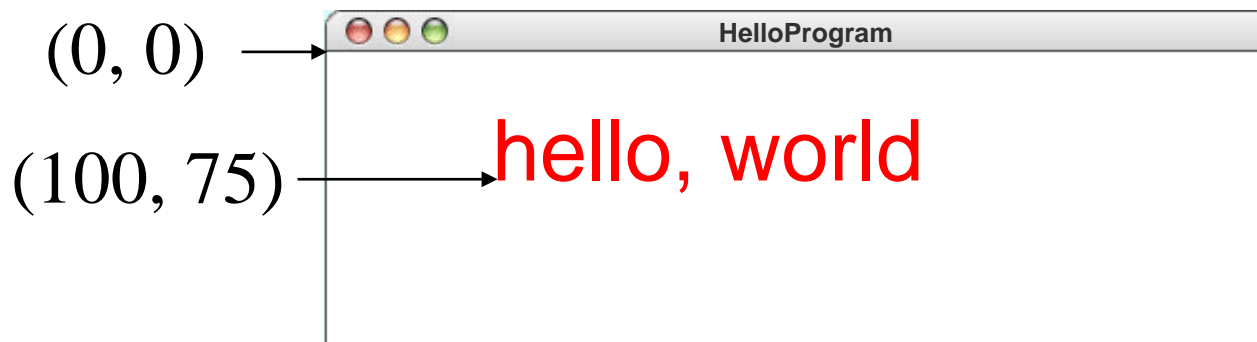
hello, world



skip simulation

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



Operations on the GObject Class

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

object.**setColor**(*color*)

Sets the color of the object to the specified color constant.

object.**setLocation**(*x*, *y*)

Changes the location of the object to the point (*x*, *y*).

object.**move**(*dx*, *dy*)

Moves the object on the screen by adding *dx* and *dy* to its current coordinates.

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

Color.BLACK

Color.RED

Color.BLUE

Color.DARK_GRAY

Color.YELLOW

Color.MAGENTA

Color.GRAY

Color.GREEN

Color.ORANGE

Color.LIGHT_GRAY

Color.CYAN

Color.PINK

Color.WHITE

Operations on the GLabel Class

Constructor

```
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

```
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 **PLAIN**, **BOLD**, **ITALIC**, or **BOLDITALIC**

size is an integer indicating the point size

Drawing Geometrical Objects

Constructors

new GRect(*x*, *y*, *width*, *height*)

Creates a rectangle whose upper left corner is at (*x*, *y*) of the specified size.

new GOval(*x*, *y*, *width*, *height*)

Creates an oval that fits inside the rectangle with the same dimensions.

new GLine(*x*₀, *y*₀, *x*₁, *y*₁)

Creates a line extending from (*x*₀, *y*₀) to (*x*₁, *y*₁).

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

object.**setFilled**(*fill*)

If *fill* is **true**, fills in the interior of the object; if **false**, shows only the outline.

object.**setFillColor**(*color*)

Sets the color used to fill the interior, which can be different from the border.

Size of Graphics Window

Methods provided by **GraphicsProgram** class

getWidth()

Returns the width of the graphics window.

getHeight()

Returns the height of the graphics window.

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