

**CSCI 203: Introduction to Computer Science I**  
**Bucknell University**  
**Computer Science Department**

<http://www.eg.bucknell.edu/~csci203>

**Project 2**

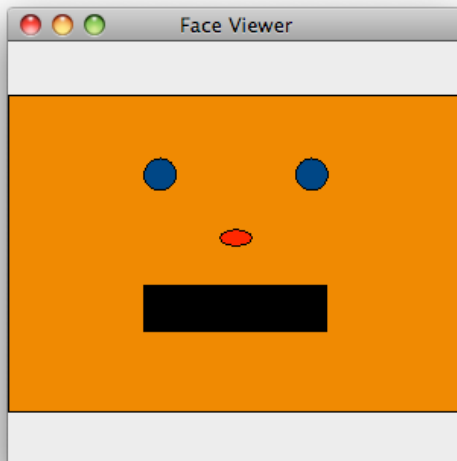
September 21, 2009

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## 1. Problem Description

Write a program that fills a window with a rectangular robot face with a black border. The face should fill the entire width of the window and the middle three-fourths of the vertical span of the window. As you resize the window, the face will continue to fill the window in this way. The eyes will adjust their positions and get larger and smaller as you adjust the window. The mouth should adjust its shape as well. Here is an example of the face you should draw:



## 2. Details

The eyes will be circles with a radius  $1/20$  of the height of the rectangle. The *center* of the left eye should be positioned so that its  $x$  coordinate is  $1/3$  the rectangle's width, and the  $y$  coordinate is a distance of  $1/4$  of the rectangle's height *from the top of the rectangle*. Similarly, the *center* of the right eye should be positioned so that its  $x$  coordinate is  $2/3$  of the rectangle's width, and the  $y$  coordinate is a distance of  $1/4$  of the rectangle's height *from the top of the rectangle*.

The bottom of the mouth should be  $3/4$  of the way down from the top of the rectangle. The left edge of the mouth should align with the left edge of the left eye, and the right edge of the mouth should align with the right edge of the right eye. The mouth height should be equal to three times the radius of the eye.

The  $x$  coordinate of the center of the nose should be centered with respect to the width of the face. The  $y$  coordinate of the center of the nose should be at the midpoint between the bottom of the eyes and the top of the mouth. The nose should be an ellipse whose height is the same as the eye radius, and the width is the same as the eye diameter.

Make the face orange, the nose red, the eyes blue, and the mouth black. Java's notion of orange and blue are not pleasing to your average Bucknell student. Define your own versions of orange and blue that are closer to the Bucknell colors, as shown. Note that the eyes, nose and face have a black outline.

## 3. Hints

- Use a `Rectangle2D` to draw the face and the mouth.

- Use doubles when doing your calculations to avoid problems with integer arithmetic. For example, use 1.0/3.0 when computing 1/3.

#### 4. What to Submit

Drag your `proj2-xyz01` folder in the the drop box with your instructor's name, *not* the lab drop box.