

Section Solutions #2

Based on a handout by Eric Roberts and Mehran Sahami

Problem One: The Robot Face

```
import acm.program.*;
import acm.graphics.*;
import java.awt.*;

public class RobotFace extends GraphicsProgram {
    /* Constants controlling the size of the robot head. */
    private static final double HEAD_WIDTH = 150;
    private static final double HEAD_HEIGHT = 250;

    /* The radius of each eye. */
    private static final double EYE_RADIUS = 10;

    /* The width and height of the mouth. */
    private static final double MOUTH_WIDTH = 60;
    private static final double MOUTH_HEIGHT = 20;

    public void run() {
        /* Determine the coordinates of the center of the window. */
        double xCenter = getWidth() / 2.0;
        double yCenter = getHeight() / 2.0;

        /* Draw each piece. */
        addHead(xCenter - HEAD_WIDTH / 2, yCenter - HEAD_HEIGHT / 2);
        addEye(xCenter - HEAD_WIDTH / 4, yCenter - HEAD_HEIGHT / 4);
        addEye(xCenter + HEAD_WIDTH / 4, yCenter - HEAD_HEIGHT / 4);
        addMouth(xCenter - MOUTH_WIDTH / 2, yCenter + HEAD_HEIGHT / 4);
    }

    /**
     * Draws the robot head.
     *
     * @param x The x coordinate of the upper-left corner of the robot head.
     * @param y The y coordinate of the upper-left corner of the robot head.
     */
    private void addHead(double x, double y) {
        drawRectangle(x, y, HEAD_WIDTH, HEAD_HEIGHT, Color.GRAY);
    }

    /* (Continued next page) */
}
```

```

/**
 * Draws a rectangle with the indicated properties.
 *
 * @param x The x coordinate of the upper-left corner of the rectangle.
 * @param y The y coordinate of the upper-left corner of the rectangle.
 * @param width The width of the rectangle.
 * @param height The height of the rectangle.
 * @param color The color to use for the rectangle.
 */
private void drawRectangle(double x, double y, double width, double height,
                           Color color) {
    GRect rect = new GRect(x, y, width, height);
    rect.setFilled(true);
    rect.setColor(color);
    add(rect);
}

/**
 * Draws a circle centered at the indicated location.
 *
 * @param xCenter The x coordinate of the center of the circle.
 * @param yCenter The y coordinate of the center of the circle.
 * @param radius The radius of the circle.
 * @param color The color of the circle.
 */
private void drawCenteredCircle(double xCenter, double yCenter,
                                double radius, Color color) {
    /* Compute the coordinates of the upper-left corner of the circle,
     * which we need when we create the oval, from the center and radius.
     */
    double x = xCenter - radius;
    double y = yCenter - radius;

    GOval circle = new GOval(x, y, 2 * radius, 2 * radius);
    circle.setColor(color);
    circle.setFilled(true);
    add(circle);
}

/**
 * Draws an eye centered on the indicated position.
 *
 * @param xCenter The x coordinate of the center of the eye.
 * @param yCenter The y coordinate of the center of the eye.
 */
private void addEye(double cx, double cy) {
    drawCenteredCircle(cx, cy, EYE_RADIUS, Color.YELLOW);
}

/**
 * Draws the robot mouth at the indicated position.
 *
 * @param x The x coordinate of the upper-left corner of the mouth.
 * @param y The y coordinate of the upper-left corner of the mouth.
 */
private void addMouth(double x, double y) {
    drawRectangle(x, y, MOUTH_WIDTH, MOUTH_HEIGHT, Color.WHITE);
}
}

```

Problem Two: Fizz Bazz Buzz

```
import acm.program.*;

public class FizzBazzBuzz extends ConsoleProgram {
    public void run() {
        int numRounds = readInt("How many rounds? ");

        /* Play a number of rounds given by the number the user entered. */
        for (int i = 0; i < numRounds; i++) {
            /* First check for divisibility by 15. If we don't do this test
             * first, then we might print the wrong message out.
             */
            if (i % 15 == 0) {
                println("Buzz");
            }
            /* Now, check for all the remaining conditions. */
            else if (i % 3 == 0) {
                println("Fizz");
            } else if (i % 5 == 0) {
                println("Bazz");
            } else {
                println(i);
            }
        }
    }
}
```