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CS 106A

Handout #15A
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Solutions for Section #2

Based on a handout by Eric Roberts

1. The Fibonacci sequence

```
/*
 * File: Fibonacci.java
 * --------------------
 * This program lists the terms in the Fibonacci sequence up to
 * a constant MAX_TERM_VALUE, which is the largest Fibonacci term
 * the program will display.
 */

import acm.program.*;

public class Fibonacci extends ConsoleProgram {

   public void run() {
      println("This program lists the Fibonacci sequence.");
      int t1 = 0;
      int t2 = 1;
      while (t1 <= MAX_TERM_VALUE) {
         println(t1);
         int t3 = t1 + t2;
         t1 = t2;
         t2 = t3;
      }
   }

/* Defines the largest term to be displayed */
   private static final int MAX_TERM_VALUE = 10000;

}
```

2. Drawing a robot face

```
/* File: RobotFace.java                    */
/* This program draws a robot face.        */

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

public class RobotFace extends GraphicsProgram {

/* Parameters for the drawing */
   private static final int HEAD_WIDTH = 100;
   private static final int HEAD_HEIGHT = 150;
   private static final int EYE_RADIUS = 10;
   private static final int MOUTH_WIDTH = 60;
   private static final int MOUTH_HEIGHT = 20;

   public void run() {
      addFace(getWidth() / 2, getHeight() / 2);
   }

/* Adds the entire face centered at (cx, cy) */
   private void addFace(double cx, double cy) {
      addHead(cx, cy);
      addEye(cx - HEAD_WIDTH / 4, cy - HEAD_HEIGHT / 4);
      addEye(cx + HEAD_WIDTH / 4, cy - HEAD_HEIGHT / 4);
      addMouth(cx, cy + HEAD_HEIGHT / 4);
   }

/* Adds the head centered at (cx, cy) */
   private void addHead(double cx, double cy) {
      double x = cx - HEAD_WIDTH / 2;
      double y = cy - HEAD_HEIGHT / 2;
      GRect head = new GRect(x, y, HEAD_WIDTH, HEAD_HEIGHT);
      head.setFilled(true);
      head.setFillColor(Color.GRAY);
      add(head);
   }

/* Adds an eye centered at (cx, cy) */
   private void addEye(double cx, double cy) {
      double x = cx - EYE_RADIUS;
      double y = cy - EYE_RADIUS;
      GOval eye = new GOval(x, y, 2 * EYE_RADIUS, 2 * EYE_RADIUS);
      eye.setFilled(true);
      eye.setColor(Color.YELLOW);
      add(eye);
   }

/* Adds a mouth centered at (cx, cy) */
   private void addMouth(double cx, double cy) {
      double x = cx - MOUTH_WIDTH / 2;
      double y = cy - MOUTH_HEIGHT / 2;
      GRect mouth = new GRect(x, y, MOUTH_WIDTH, MOUTH_HEIGHT);
      mouth.setFilled(true);
      mouth.setColor(Color.WHITE);
      add(mouth);
   }
}
```