CS 2, Winter 2009: Quiz 1

Closed books, closed notes, closed computers, closed neighbors.
Ask if you have questions.
As with assignments, you will be graded on both correctness and clarity.

1. [25 points] Write a Processing sketch to display a window that looks like the following. The background is the default gray. Everything is totally opaque. The “egghead” is colored white, with no outline. The eyes are green, with no outline. The brow is a 5-pixel thick blue line (strokeWeight). The mouth is a 1-pixel thin red oval outline. The gridlines are spaced every 10 pixels, to help you determine positions and sizes—don’t draw them.
2. [25 points] Write a Processing sketch with the following behavior. A circle starts at a random position with a size of 1. Every frame, its size increases by 1 to a maximum of 20, then decreases by 1 back down to a minimum of 1, and so forth. If the mouse is pressed inside the circle (at its current size), it jumps to a new position. If the mouse is pressed outside the circle, the message “missed me!” is printed on the console (println).

// Variable declarations

```java
void setup()
{
}

void draw()
{
}

void mousePressed()
{
}
```
3. **[25 points]** Write three separate loops (for or while, your choice) to generate the following display in the default 100x100 window. Don’t worry about background, fill, and stroke. 100 points are placed at random positions in the top 10 pixels of the window. A set of concentric circles, of diameters 1, 2, 4, 8, 16, and 32, are drawn around a center at (50,40). Bars are drawn at $x$-coordinates 10, 20, 30, . . . , 90, extending from the bottom of the window up 5, 10, 15, . . . 45 pixels.
4. **[20 points]** Provide short answers to the following (5 points each).

   (a) Describe (in words or code) two different uses of sinusoids in generating dynamic behavior.

   (b) To let people save a few keystrokes, define a new function `circle` that takes as parameters a position and diameter, and draws the appropriate ellipse.

   (c) Suppose you wanted to generate a whole family of eggheads (from question 1). Give code for two modifications: to set one of the colors randomly and to position one of the objects randomly near where it is in the original.

   (d) Write a boolean expression that will be true if the mouse’s $x$ coordinate is in the middle 1/3 of the window and the button is not pressed.