**1** Write the following code fragment as a `for` loop.                                               (3)

```
int i = 0;
while (i < 10) {
  ellipse(i, i, i, i);
  i++;
}
```

**2** Write the following code fragment as a `while` loop.                                            (3)

```
for (int i = 0; i < width; i = i + 5)
  line(i, 0, i, height);
```

**3** A common error beginning programmers face with the `for`-loop is illustrated in the code segment below:   (5)

```
for (int i = 0; i < 100; i = i + 5);
  line(i, 0, i, height);
```

   (a) Identify the error in the code above.

   (b) This type of error is actually a *semantic* error. That is, Processing accepts the code as valid; however, it will not do what appears to be intended by the programmer. What happens when the above code fragment is run and why?

**4** Use nested loops to create a grid of Processing Bees based on your work on the Processing Bee program from Assignment #3.   (5)
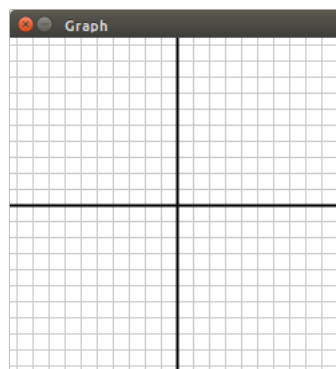**Note:** Your program should include as many bees as possible based on the `width` and `height` of the drawing canvas. You may include some padding between consecutive bees for aesthetic reasons if you wish.

**5** Redesign your `Dartboard` program from Assignment #3 to use loops wherever possible in order to drastically reduce the number of individual lines of code.   (10)
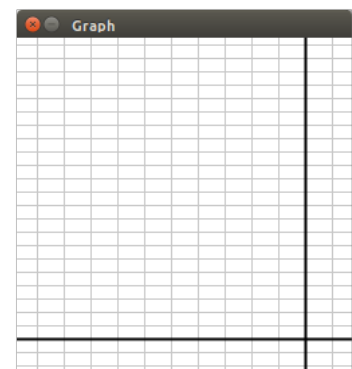
**6** Although the Processing drawing canvas has a pixel coordinate statement wherein the top-left coordinate is always `(0, 0)` and the bottom-right coordinate is always `(width, height)`, it is often important to offer different "views" of data, requiring a transformation of the coordinate system. Implement a program that will store values for `xMin`, `xMax`, `xStep`, `yMin`, `yMax`, and `yStep` and produces a coordinate grid, including coordinate axis. This will allow us to produce a "window" system similar to many popular graphing calculators. See below for a number of examples.   (20)
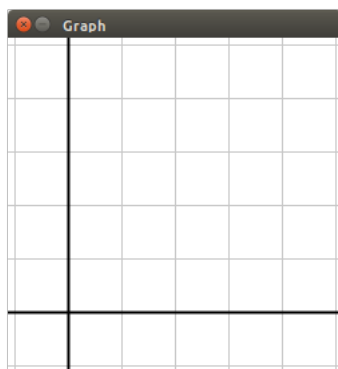


| xMin | -5 | yMin | -5 |
|------|----|------|----|
| xMax | 25 | yMax | 25 |
| xStep | 5 | yStep | 5 |

| xMin | -10 | yMin | -10 |
|------|-----|------|-----|
| xMax | 10 | yMax | 10 |
| xStep | 1 | yStep | 1 |

| xMin | -100 | yMin | 0 |
|------|------|------|---|
| xMax | 10 | yMax | 100 |
| xStep | 10 | yStep | 5 |