Practice Quiz — Programming & Electronics — Spring 2018

Full and partial credit will only be awarded with all work shown. Help me understand your thought process! Good luck.

# P5.js & Programming

1. Give an example, in your own words, when you might use an **if** statement in P5 (or Arduino).

2. Describe, in your own words, the role of the **condition** of a **while** or **for** loop.

3. In the following code, what is printed for the final value of the variable **z**, after all the code runs?

```
var z = 0;
while (z < 19) {
   z = z + 6;
}
println(z);
```

4. Write code that produces the following canvas.

**Canvas (200 x 200)**
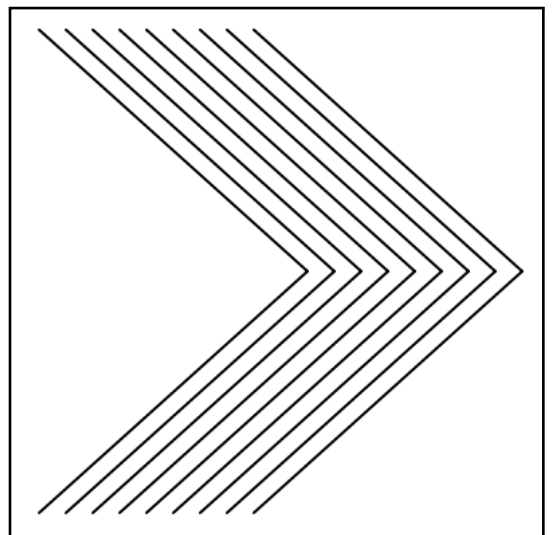
5. Trace the following code.

Every time there's a new variable, add it to the memory below. Every time a variable changes its value, update the computer memory at the bottom of the page. Show the result of each drawing command on the canvas at the bottom of the page.

Feel free to add notes to the code if you feel they will help me understand your thought process. (Hint: remember that || means "or" in the if condition below.)

```
function setup() {
  createCanvas(200, 200);
  background(255);

  var offset = height/5;
  stroke(0);

  for (var x = 10; x < height; x = x + 10) {
    if (x < 1 * offset || x > 2 * offset) {
      line(x, 10, x, offset);
      line(x, height - offset, x, height - 10);
    } else {
      line(x, 10, x, height - 10);
    }
  }
}

function draw() {
  // nothing to do here
}
```
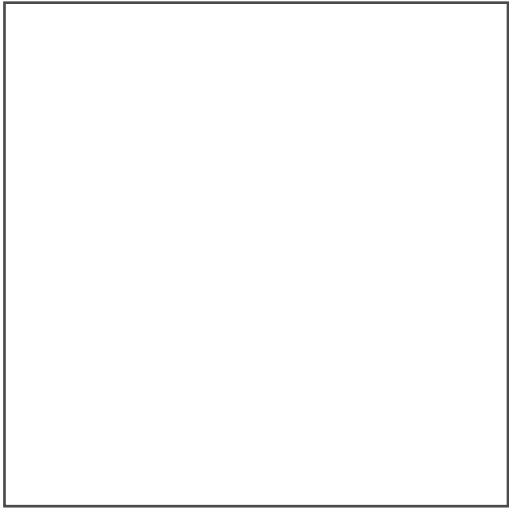
## Computer Memory

| Variable Name | Variable Value |
|---|---|
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## Canvas (width:        height:        )

6. Analyze the code below to answer the following questions. (This code intentionally includes concepts you do not need to be familiar with.)

```
var x = [];
var y = [];

var numPoints = 100;

function setup() {
  createCanvas(500, 500);
  colorMode(HSB, numPoints, 100, 100);

  var offset = width/50;
  x[0] = offset;
  y[0] = height/2;

  for (var i = 1; i < numPoints; i += 1) {
    var angle = random(Math.PI);
    x[i] = x[i-1] + offset * Math.sin(angle);
    y[i] = y[i-1] + offset * Math.cos(angle);
  }
}

function draw() {
  background(0, 0, 100, 10/numPoints);

  strokeWeight(3);
  for (var i = 0; i < 5; i += 1) {
    var index = Math.floor(random(numPoints - 1));
    var x1 = x[index], y1 = y[index];
    var x2 = x[index + 1], y2 = y[index + 1];
    stroke(index, 100, 100);
    line(x1, y1, x2, y2);
  }
}
```

a.  How many times does the **line** function get called each frame by the code above?



b.  In the **setup** function above, how many times does the **for** loop run its body block of code?

# Arduino & Electronics

7. Match the following inputs and outputs to the best command to interact with each:

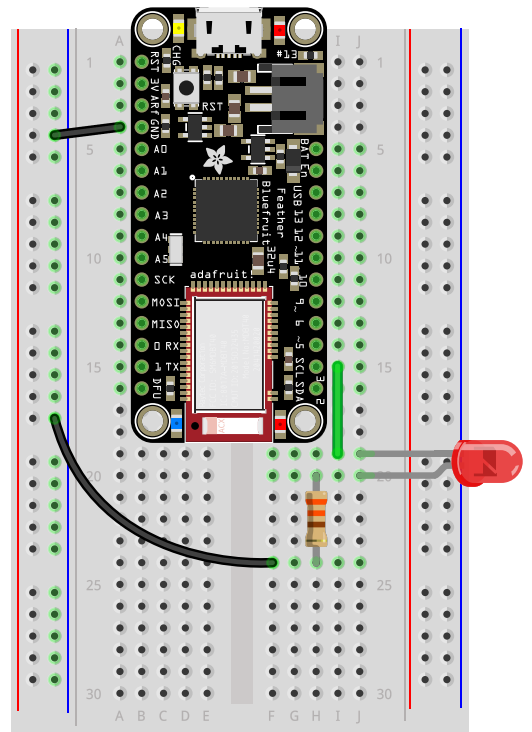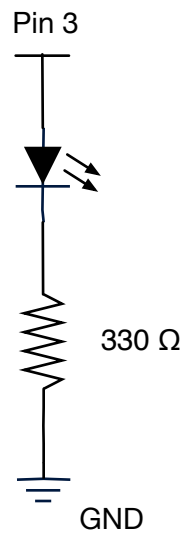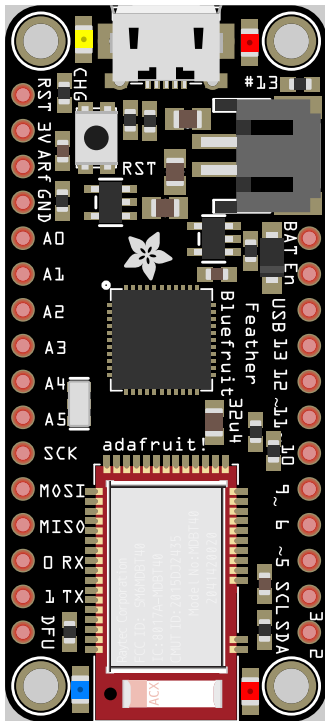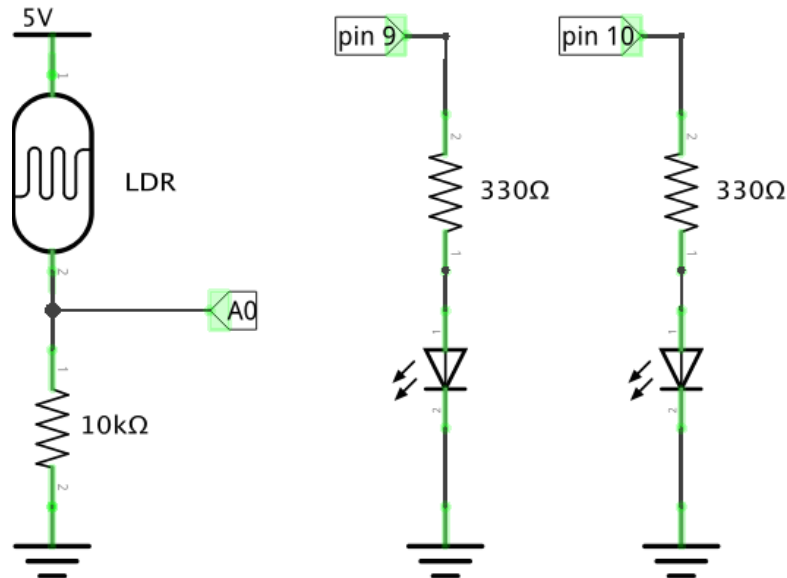| | |
|---|---|
| Control the speed of a motor | `digitalWrite` |
| Turn on or off an LED | `digitalRead` |
| Read a value from a potentiometer | `analogWrite` |
| Determine if an input is HIGH or LOW | `analogRead` |

8. Write an Arduino program that blinks the LED in this circuit 5 times per second.

Pin 3

330 Ω

GND

9. Draw lines from the legs of the components below to where on the breadboard you would place those components to build the schematic below. Also draw lines representing wires on the Feather and breadboard below that correspond to the connections in the schematic.



(not to scale)