

Name: _____

Practice Quiz — Programming & Electronics — Spring 2015

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

Processing & Programming

1. Describe, in your own words, when you might use a **while** loop.

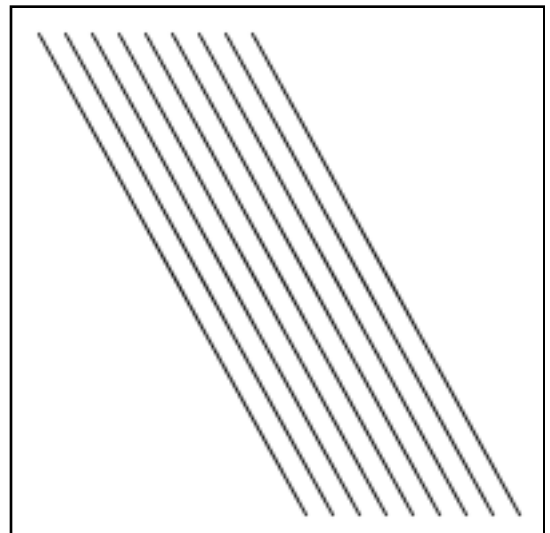
2. Describe, in your own words, when you might use an **if** statement

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

```
int i = 0;
while (i < 15) {
    i = i + 2;
}
```

4. Write code that produces the following canvas.

Canvas (200 x 200)



Name: _____

5. Trace the following code.

For each new variable or variable change, 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.)

```
size(200, 200);
background(255);

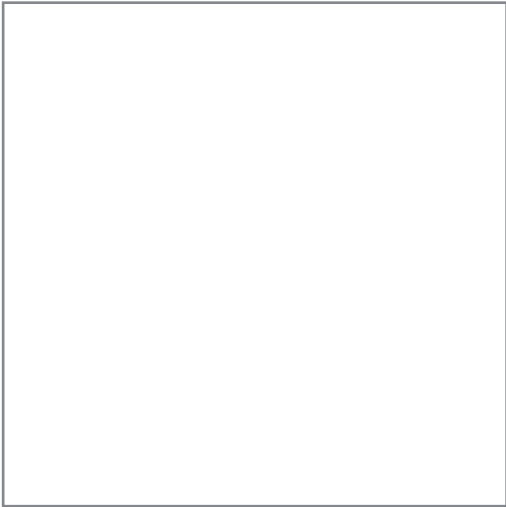
stroke(0);

int x = 10;
while (x < width) {
  if (x < 45 || x > 155) {
    line(x, 10, x, height-10);
  } else {
    line(x, 10, x, height/2);
  }
  x = x + 20;
}
```

Computer Memory

Name	Value

Canvas (width: height:)



6. Analyze the code below to answer the following questions; the left block contains the Spark class, while the right block contains the rest of the code.

```
class Spark {
  float x, y, vx, vy, r = 13;
  color c, blue = color(120, 50, 255);

  Spark() {
    x = random(r, width-r);
    y = random(r, height-r);
    vx = random(-1, 1);
    vy = random(-1, 1);
    c = color(random(255), 255, 255);
  }

  void draw() {
    fill(c);
    for (Spark s : sparks) {
      if (s != this &&
          dist(x, y, s.x, s.y) < r * 5) {
        strokeWeight(4);
        stroke(blue);
        line(x, y, s.x, s.y);
        fill(blue);
      }
    }
    noStroke();
    ellipse(x, y, r * 2, r * 2);
  }

  void step() {
    x += vx;
    y += vy;
    if (x < r) { vx = abs(vx); }
    if (x > width-r) { vx = -abs(vx); }
    if (y < r) { vy = abs(vy); }
    if (y > height-r) { vy = -abs(vy); }
  }
}
```

```
ArrayList<Spark> sparks =
  new ArrayList<Spark>();

void setup() {
  size(500, 500);
  colorMode(HSB);
  for (int i = 0; i < 20; i += 1) {
    sparks.add(new Spark());
  }
}

void draw() {
  background(255);
  for (Spark s : sparks) {
    s.draw();
    s.step();
  }
}
```

- How many objects are created in the code above? Circle each statement that creates a new object.
- How many times does the `noStroke` function get called each frame in the code above?

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Arduino & Electronics

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

Control the brightness of an LED

`digitalWrite`

Blink an LED periodically

`digitalRead`

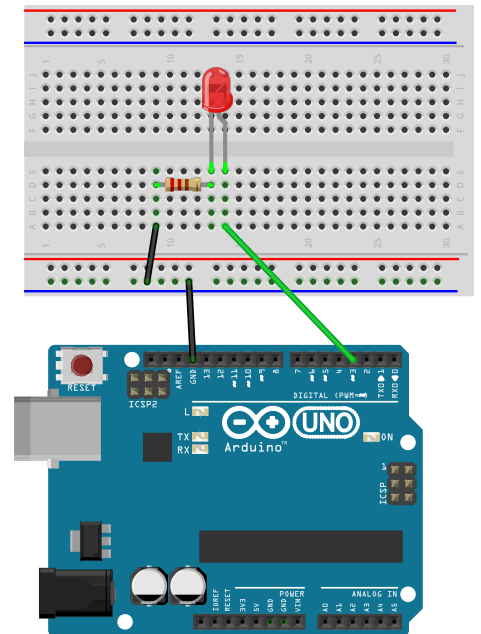
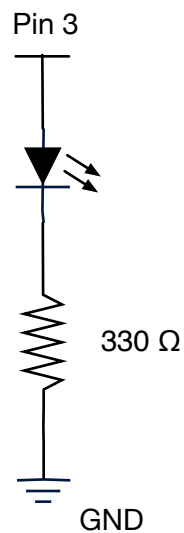
Read a value from a potentiometer

`analogWrite`

Determine if a button is pressed

`analogRead`

8. Write an Arduino program that blinks the LED in this circuit 20 times per second.



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9. Draw lines representing wires on the Arduino and breadboard below that correspond to the following schematic.

