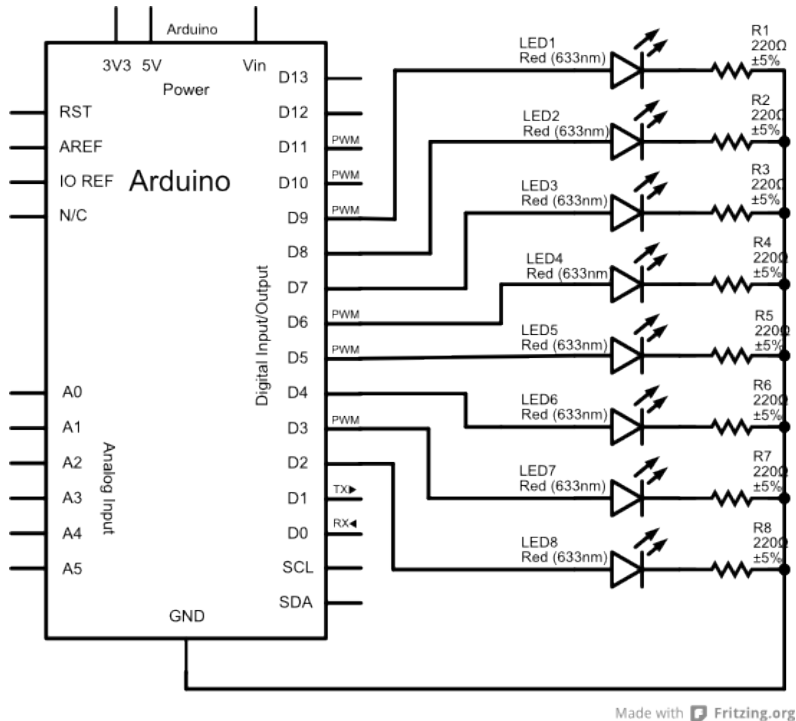# Arduino 101
Hands-on: LED Level

Project Description

This project will expand on the Blink Chaser sketch to use the LEDs as a level meter. It doesn't measure anything interesting yet, but it demonstrates the power of functions.
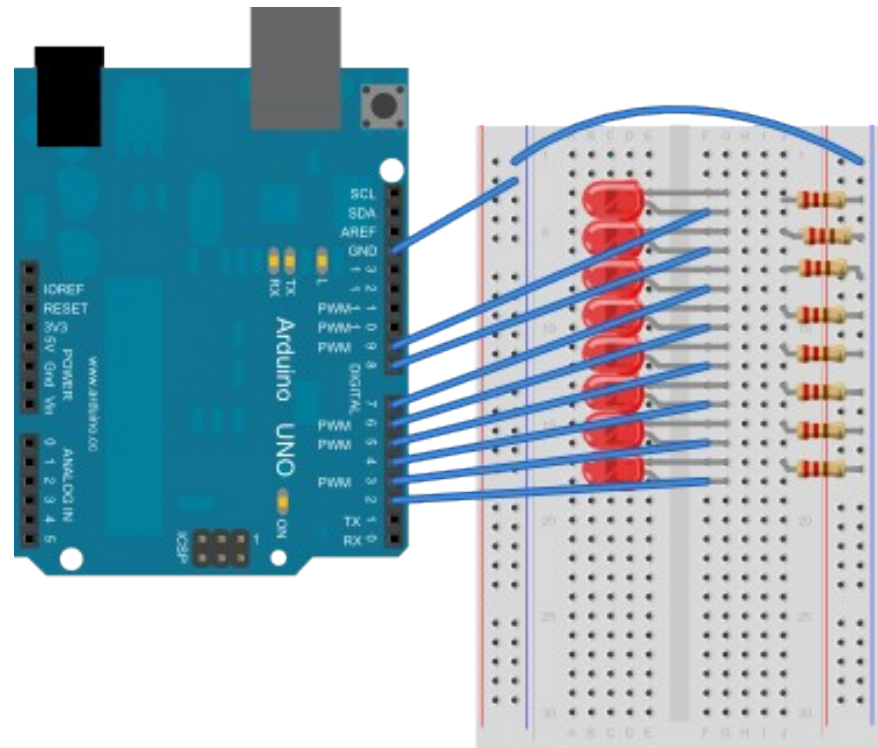
Required Parts

8 red LEDs
8 220Ω Resistors (red, red, black, black)

Schematic

Made with Fritzing.org

Circuit

Made with Fritzing.org

NOTES: This circuit is exactly the same as the Blink Chaser. You are connecting the Arduino pins to the anodes (long lead) of the LEDs. The cathodes (short lead) connect to a 220Ω resistor that connects to ground (blue rail). Don't forget to connect the GND pin from the Arduino to the blue ground rails!

Code

```
// LED Level Sketch for Arduino 101
// by Nick Borko

// function to set the LEDs to a specific level
void setLed(int level) {
  // iterate through the pins
  for (int pin = 2; pin <= 9; pin += 1) {
    // compare the pin to the level...
    if (pin < level + 2) {
      // LED is on
      digitalWrite(pin, HIGH);
    } else {
      // LED is off
      digitalWrite(pin, LOW);
    }
  }
}

void setup() {
  int pin;
  // initialize pins 2-9 to be output pins
  for (pin = 2; pin <= 9; pin += 1) {
    pinMode(pin, OUTPUT);
  }
}

void loop() {
  int level;
  // iterate from 0 to 7
  for (level = 0; level < 8; level += 1) {
    setLed(level);
    delay(100);
  }
  // and back from 8 to 1
  for (level = 8; level > 0; level -= 1) {
    setLed(level);
    delay(100);
  }
}
```

Discussion

Although the circuit is the same as the Blink Chaser circuit, the behavior of the LEDs is different. That's because even though the connections to the Arduino haven't changed, the program loaded in it has. This time we make use of a **function** to control the lighting of the LEDs.

A function is kind of a subprogram that can be called from other parts of the program. You have written some functions already: **setup()** and **loop()**. Although these functions are called automatically by the **Arduino Core**, they are written in exactly the same way as our new function, **setLed()**.

The **setLed()** function does not return a value back to the main program, so it is declared as **void**. It does, however, take a parameter called **level**, which is declared as an **int**. Parameters are used to pass information from the main program to the function for use inside the function and are said to be **passed by value**. This means that the value of the parameter variable inside the function is a **copy**, and changing it has no effect on the variable in the main program.

You can follow the logic of the **setLed()** function to see that it lights more than one LED at a time, depending on the value of the **level** parameter. We use **for** loops again in the main program to set different values for **level** by calling **setLed()** inside the loop body.