

Analog Input & Output

Name: _____

Read a photoresistor's analog value from your circuit.

A photoresistor changes its resistance according to light, used right, we can get an analog value for **light intensity**.

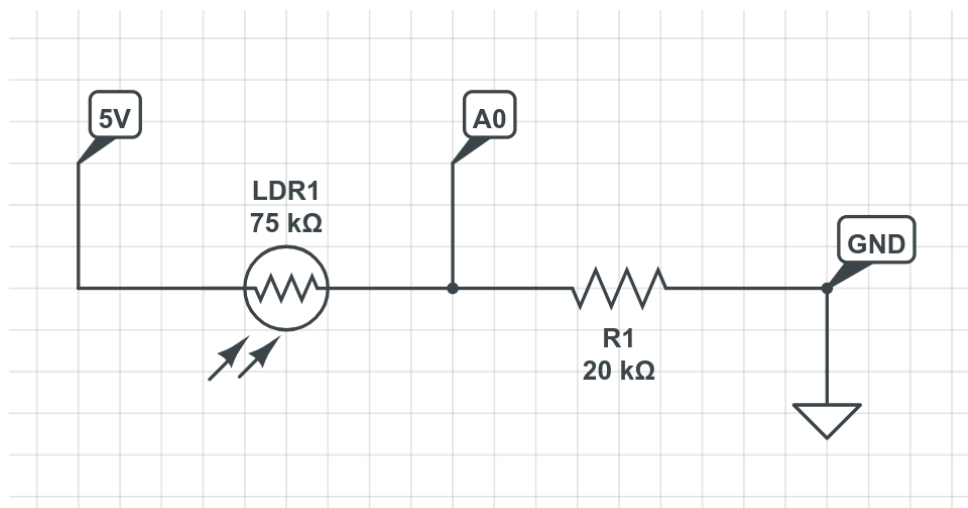
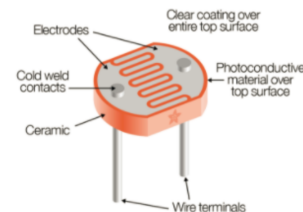


Figure 1: Photoresistor voltage divider

Wiring

The circuit requires a **resistor** and a **photoresistor** arranged in series.

The point in between both components (**A0**), is the analog value we want to read.

1. **Power (Arduino 5V):** photoresistor pin
2. **Ground (Black Wire):** resistor pin
3. **Signal (A0):** between the photoresistor and the resistor

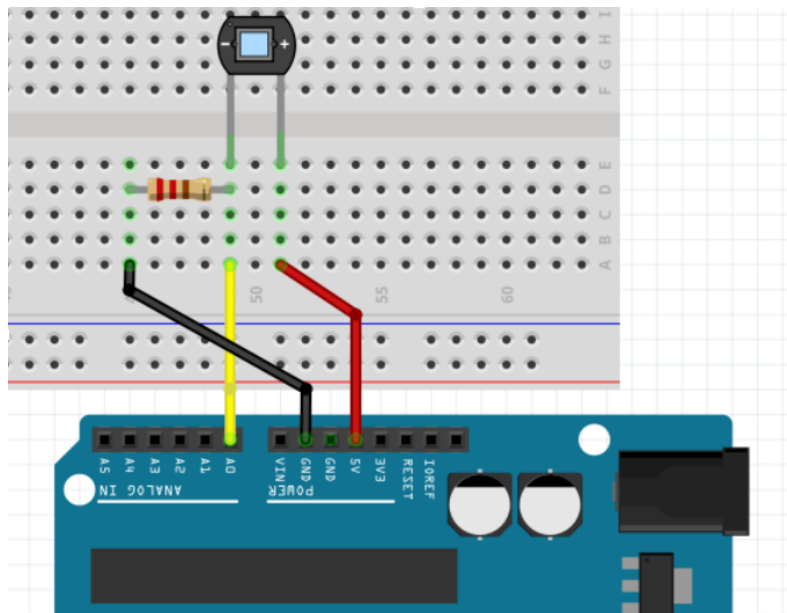


Figure 2: Photoresistor voltage divider on a breadboard

Note: Different types of variable resistors exist, you could use a thermistor for temperature readings instead of light intensity

Note: The ideal constant resistor would be between 10 to 30 k Ohms

Read analog values

Create an integer variable named `light` and set its initial value to 0

```
1 int light = 0;
```

This value should be declared globally (outside the `setup` and `loop` functions)

Read the analog value on pin `A0` and store it in our `light` variable.

```
1 light = analogRead(A0);
```

Simple analogRead code

Use the serial port to your advantage, you can print code variables in it to understand what is happening.

The code below reads the analog value on `A0` and prints it in the serial monitor

```
1 int light = 0;
2
3 void setup() {
4     Serial.begin(9600);
5 }
6
7 void loop() {
8     light = analogRead(A0);
9
10    Serial.println(light);
11 }
```

Challenge: If our analog value is greater than 512,
blink a LED on `Pin 8`, else blink a LED On `Pin 13`

Control an Active Piezo Buzzer

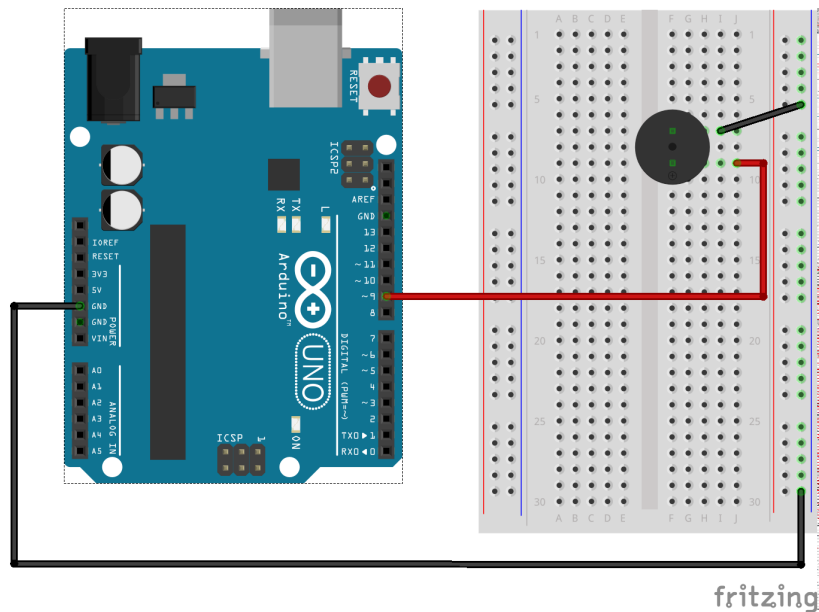


Figure 3: Piezo Buzzer

This code sends an analog signal to the piezo buzzer, the analog value sent represents the buzzer note frequency (in a 0 to 255 range)

```
1 // Create note frequency variable
2 int freq = 0;
3
4 void setup() {}
5
6 void loop() {
7     // Increment `freq` and reset to initial value if too large
8     if (freq < 255) freq = freq + 28;
9     else freq = 0;
10
11     // Set analog signal on Pin 9
12     analogWrite(9, freq);
13
14     // Wait in between notes
15     delay(100);
16
17     // Remove the signal on Pin 9
18     analogWrite(9, 0);
19     delay(100);
20 }
```

20 }