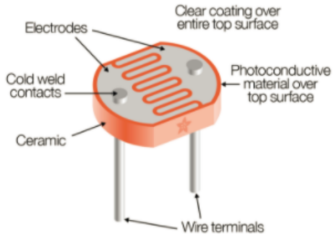
Analog Input & Output

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**.



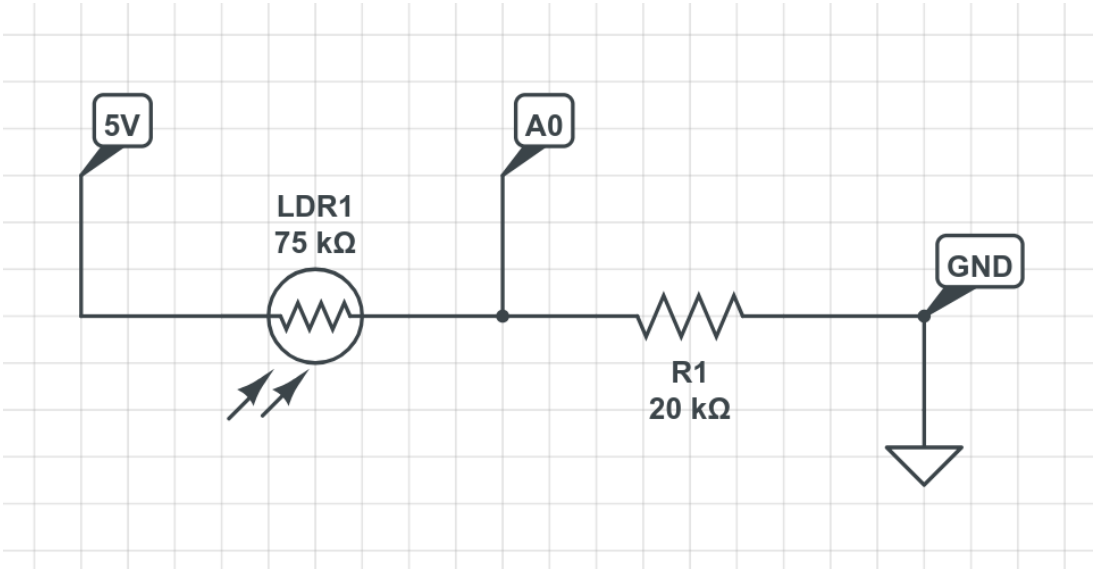


Figure 1: Photoresistor voltage divider

Wiring

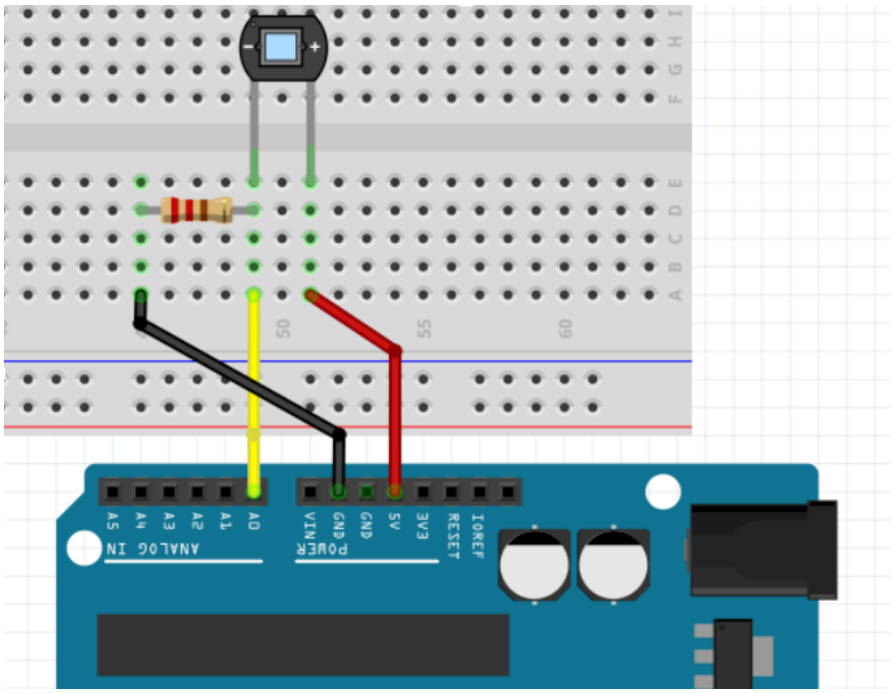


Figure 2: Photoresistor voltage divider on a breadboard

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

> 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`

```
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.

```
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

```
int light = 0;

void setup() {
    Serial.begin(9600);
}

void loop() {
    light = analogRead(A0);

    Serial.println(light);
}
```

> 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

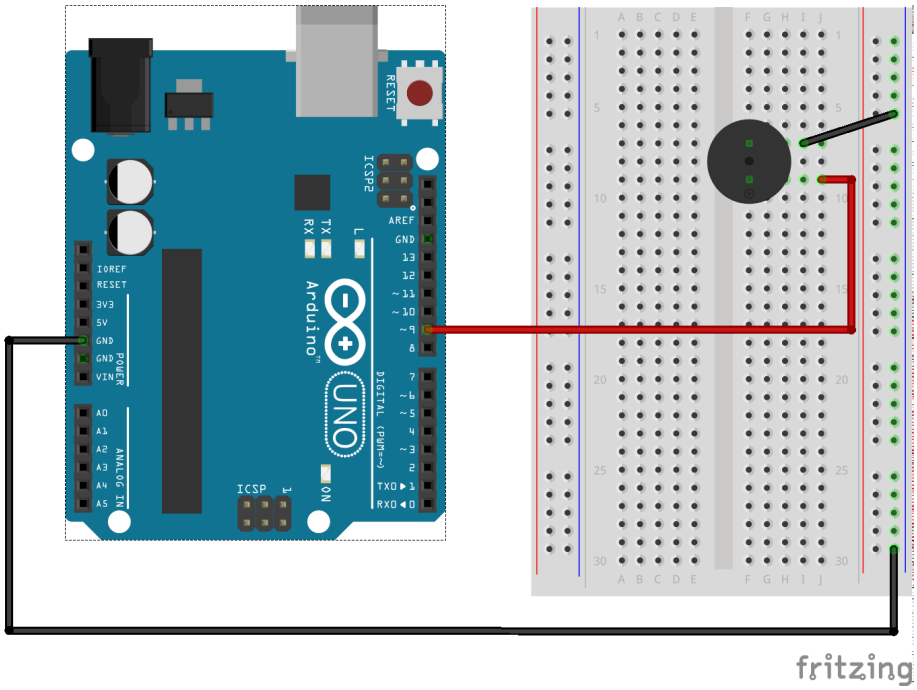


Figure 3: Piezo Buzzer

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)

```
// Create note frequency variable
int freq = 0;

void setup() {}

void loop() {
  // Increment `freq` and reset to initial value if too large
  if (freq < 255) freq = freq + 28;
  else freq = 0;

  // Set analog signal on Pin 9
  analogWrite(9, freq);

  // Wait in between notes
  delay(100);

  // Remove the signal on Pin 9
  analogWrite(9, 0);
  delay(100);
}
```