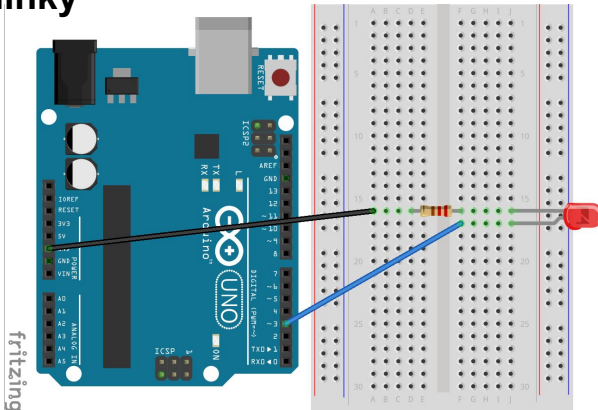# Intro to Arduino
Workshop with Shawn Hymel

Name:_____

Date:_____

Prerequisite: Download Arduino IDE from arduino.cc

1 Blinky
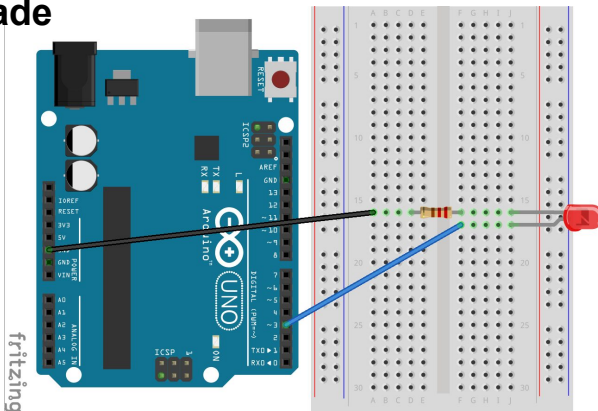


```
int led = 3;

void setup() {
  pinMode(led, OUTPUT);
}

void loop() {
  digitalWrite(led, HIGH);
  delay(500);
  digitalWrite(led, LOW);
  delay(500);
}
```

Challenge: Try making the LED blink like a heartbeat--twice in rapid succession and then wait before repeating
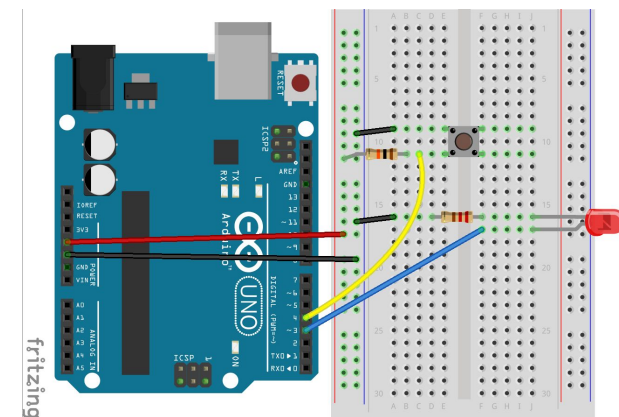
---

2 Fade


```
int led = 3;

void setup() {
  pinMode(led, OUTPUT);
}

void loop() {
  for ( int i = 0; i < 255; i++ ) {
    analogWrite(led, i);
    delay(10);
  }
}
```

Challenge: Try making the LED fade in and then out.
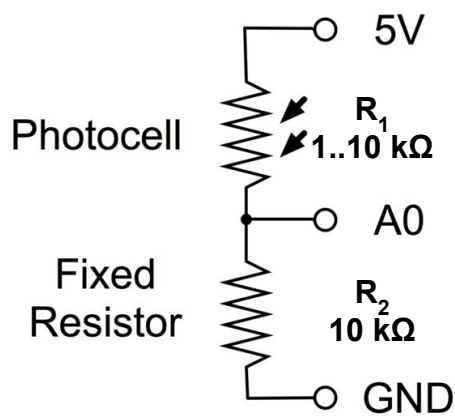
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3 Button


```
int led = 3;
int button = 4;

void setup() {
  pinMode(led, OUTPUT);
  pinMode(button, INPUT);
}

void loop() {
  int button_state = digitalRead(button);
  if ( button_state == LOW ) {
    digitalWrite(led, HIGH);
  } else {
    digitalWrite(led, LOW);
  }
}
```

Challenge: Have it so that a push-and-release of the button toggles the LED on or off.
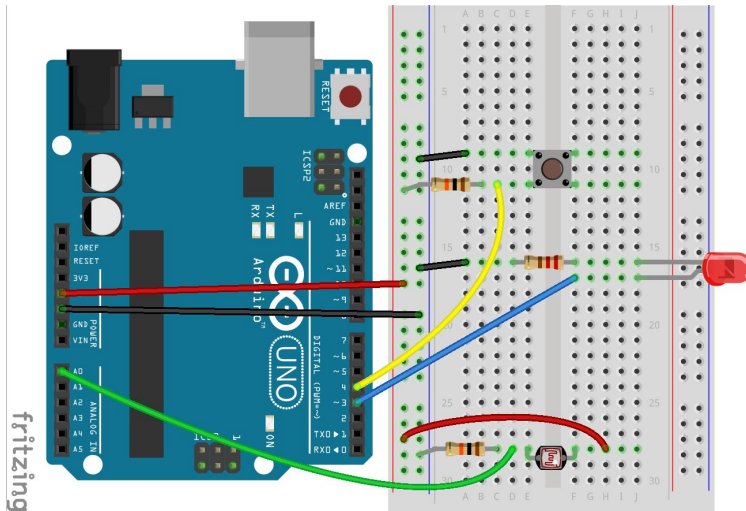
4 Photocell

$$V_{out} = V_{in} \cdot \frac{R_2}{R_1 + R_2}$$

5V

Photocell R_1
1..10 kΩ

A0

Fixed Resistor R_2
10 kΩ

GND

Light: 5V * 10k / (1k + 10k) = 4.55 V

Dark: 5V * 10k / (10k + 10k) = 2.5 V

```
int photocell = A0;

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

void loop() {
    int light = analogRead(photocell);
    Serial.println(light);
    delay(100);
}
```

Challenge:
Print out the measured voltage to the Serial Monitor. Hint: 0 is 0 V and 1023 is 5 V

5 Project

- Make a nightlight!
  - Pick a value as a threshold
  - Cover sensor: light comes on
- Challenge:
  - Make the nightlight continuous
  - The brightness of the LED is determined by the amount of ambient light
- Hardcore challenge:
  - If you did the toggle challenge, you might have noticed "missed" clicks due to "button bounce"
  - Debounce the button in software: write some code to fix this issue
- Secret bonus level:
  - Make something fun using the ultrasonic sensor (your choice!)
  - Read this tutorial on how to use it: https://bit.ly/2HCpmSb