

Arduino - Temperature Sensor & Photoresistor - Tinkercad Circuits Version

Temperature Sensor

TINKERCAD Copy of (in-class) Arduino - temperature sensor - starter Saving... Code Start Simulation Send To

The screenshot shows a Tinkercad workspace for a 'Copy of (in-class) Arduino - temperature sensor - starter' project. The top half displays a breadboard setup with an Arduino Uno, a TMP36 temperature sensor, and three LEDs (Red, Green, Blue). A USB cable is connected to the Arduino. The code editor on the right contains the following sketch:

```
Text
6 const int LOWER_BOUND=148;
7 const int UPPPER_BOUND=158;
8
9 int val = 0; //variable to hold analog reading
10
11 void setup() {
12   pinMode(RED, OUTPUT);
13   pinMode(GRN, OUTPUT);
14   pinMode(BLU, OUTPUT);
15 }
16
17 void loop() {
18   val = analogRead(TEMP);
19
20   //LED is Blue
21   if (val < LOWER_BOUND) {
22     digitalWrite(BLU, HIGH);
23     digitalWrite(GRN, LOW);
24     digitalWrite(RED, LOW);
25   }
26
27   else if (val > UPPPER_BOUND) {
28     digitalWrite(RED, HIGH);
29     digitalWrite(GRN, LOW);
30     digitalWrite(BLU, LOW);
31   }
32
33   else {
34     digitalWrite(GRN, HIGH);
35     digitalWrite(BLU, LOW);
36     digitalWrite(RED, LOW);
37   }
38
39 }

```

The bottom half shows a detailed schematic diagram of the circuit. The Arduino Uno is labeled 'U1'. It has its 5V pin connected to a 220Ω resistor (R1) which goes to the non-inverting input (V₊) of an op-amp U2. The inverting input (V₋) of U2 is connected to ground (GND) through a 220Ω resistor (R1). The output of U2 is connected to the V₊ pin of another op-amp U1. The V₋ pin of U1 is connected to ground (GND) through a 220Ω resistor (R2). The output of U1 is connected to the base of a PNP transistor D1. The collector of D1 is connected to the Arduino's digital pin 13. The emitter of D1 is connected to ground (GND) through a 220Ω resistor (R3). The Arduino's GND pin is also connected to ground (GND). The Arduino's 3.3V pin is connected to the U1's V_{DD} pin. The Arduino's AREF pin is connected to the U1's V_{REF} pin. The Arduino's A0 pin is connected to the U1's IN_A pin. The Arduino's A1 pin is connected to the U1's IN_B pin. The Arduino's A2 pin is connected to the U1's IN_C pin. The Arduino's A3 pin is connected to the U1's IN_D pin. The Arduino's A4 pin is connected to the U1's IN_E pin. The Arduino's A5 pin is connected to the U1's IN_F pin. The Arduino's SDA pin is connected to the U1's SDA pin. The Arduino's SCL pin is connected to the U1's SCL pin.

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Photoresistor

TINKERCAD Copy of (in-class) Arduino - photoresistor - starter

The screenshot shows a Tinkercad workspace for an Arduino Uno. On the left is a breadboard diagram with a blue Arduino Uno board. A red box highlights the connection between the Arduino's A0 pin and an analog input on the breadboard. A yellow box highlights the connection between the Arduino's digital pin 9 and a white LED connected to ground. A black box highlights the connection between the Arduino's GND pin and the common ground rail on the breadboard. The code editor on the right contains the following Arduino sketch:

```
1 const int LIGHT=0;
2 const int WLED=9;
3 const int MIN_LIGHT=200;
4 const int MAX_LIGHT=900;
5
6 int val = 0;
7
8 void setup() {
9   pinMode(LIGHT, INPUT);
10  Serial.begin(9600);
11 }
12
13 void loop() {
14   val = analogRead(LIGHT);
15   val = map(val, MIN_LIGHT, MAX_LIGHT, 255, 0);
16   val = constrain(val, 0, 255);
17   analogWrite(WLED, val);
18 }
```

The serial monitor window is empty.

Circuit Diagram:

The circuit diagram illustrates the internal connections of the Arduino Uno. It shows the 5V power source (U1_5V) connected to the Arduino's VIN pin and the GND pin. The Arduino's AREF pin is connected to the non-inverting input of an operational amplifier U1 (an LM358). The inverting input of U1 is connected to the Arduino's A0 pin through a 10kΩ resistor (R2). The output of U1 is connected to the Arduino's digital pin 9 through a 220Ω resistor (R3) and a white LED (D1). The Arduino's GND pin is connected to the common ground rail. The Arduino's AREF pin is also connected to the Arduino's 3.3V pin. The Arduino's AREF pin is also connected to the Arduino's 3.3V pin.

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