

Arduino Light Meter

Introduction

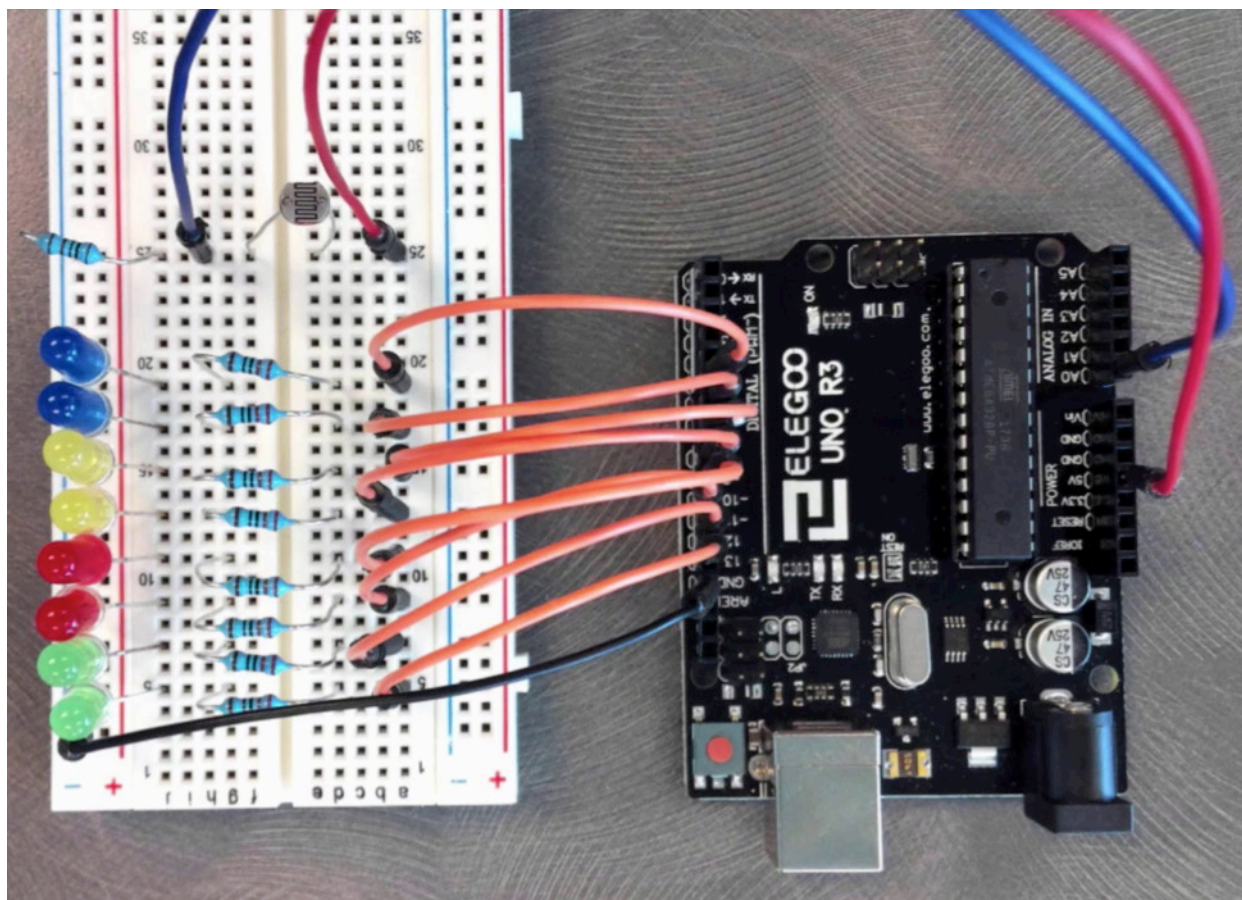
The Arduino microcontroller can be used to construct a simple light meter. The third video in the Arduino 101 video series deals with the construction of such a device. Here you will find a list of the required materials, a photo showing the assembled circuit and a copy of the code used in the video.

Materials

Arduino Uno R3	Red LED, 2
Blue LED, 2	Resistors, 220 Ω , 8
Breadboard	Resistor, 1 k Ω
Green LED, 2	USB cable
Jumper wires, male to male, 11	Yellow LED, 2
Photoresistor	

Procedure

1. Assemble the circuit as shown. Digital pins 5 through 12 are each connected to a 220 Ω resistor and an LED. Analog pin A0 is connected between the photoresistor and the 1 k Ω resistor.



2. Copy the following code into the Arduino IDE (details relating to the download and use of the Arduino IDE were given in video 2). Connect the Arduino to your computer with the USB cable, and upload the code.

//Light Meter Arduino Code

```
int l1 = 5;
int l2 = 6;
int l3 = 7;
int l4 = 8;
int l5 = 9;
int l6 = 10;
int l7 = 11;
int l8 = 12; //assign all of the LEDs to a specific pin
float voltage = 0; //a float has decimal points, which we will need for this application
```

```
void setup() {
  //declare all our pins to be outputs
  pinMode(l1, OUTPUT);
  pinMode(l2, OUTPUT);
  pinMode(l3, OUTPUT);
  pinMode(l4, OUTPUT);
  pinMode(l5, OUTPUT);
  pinMode(l6, OUTPUT);
  pinMode(l7, OUTPUT);
  pinMode(l8, OUTPUT);
}
```

```
void loop() {
  // put your main code here, to run repeatedly:
  int sensorvalue = analogRead(A0); //this is the raw value between 0 and 1023
  voltage = sensorvalue * (5 / 1023.0); // converts to a value of between 0 and 5
  //what follows are the tests for the voltage (light) levels
  if(voltage <= 1.0){
    digitalWrite(l1,LOW);
    digitalWrite(l2,LOW);
    digitalWrite(l3,LOW);
    digitalWrite(l4,LOW);
    digitalWrite(l5,LOW);
    digitalWrite(l6,LOW);
    digitalWrite(l7,LOW);
    digitalWrite(l8,LOW);
  }
  if(voltage > 1.0 && voltage <= 1.5){
    digitalWrite(l1,HIGH);
    digitalWrite(l2,LOW);
    digitalWrite(l3,LOW);
    digitalWrite(l4,LOW);
    digitalWrite(l5,LOW);
    digitalWrite(l6,LOW);
    digitalWrite(l7,LOW);
    digitalWrite(l8,LOW);
  }
  if(voltage > 1.5 && voltage <= 2.0){
    digitalWrite(l1,HIGH);
    digitalWrite(l2,HIGH);
    digitalWrite(l3,LOW);
    digitalWrite(l4,LOW);
    digitalWrite(l5,LOW);
    digitalWrite(l6,LOW);
    digitalWrite(l7,LOW);
    digitalWrite(l8,LOW);
  }
  if(voltage > 2.0 && voltage <= 2.5){
    digitalWrite(l1,HIGH);
    digitalWrite(l2,HIGH);
    digitalWrite(l3,HIGH);
    digitalWrite(l4,LOW);
    digitalWrite(l5,LOW);
    digitalWrite(l6,LOW);
    digitalWrite(l7,LOW);
    digitalWrite(l8,LOW);
  }
}
```

```
if(voltage > 2.5 && voltage <= 3.0){
  digitalWrite(l1,HIGH);
  digitalWrite(l2,HIGH);
  digitalWrite(l3,HIGH);
  digitalWrite(l4,HIGH);
  digitalWrite(l5,LOW);
  digitalWrite(l6,LOW);
  digitalWrite(l7,LOW);
  digitalWrite(l8,LOW);
}
if(voltage > 3.0 && voltage <= 3.5){
  digitalWrite(l1,HIGH);
  digitalWrite(l2,HIGH);
  digitalWrite(l3,HIGH);
  digitalWrite(l4,HIGH);
  digitalWrite(l5,HIGH);
  digitalWrite(l6,LOW);
  digitalWrite(l7,LOW);
  digitalWrite(l8,LOW);
}
if(voltage > 3.5 && voltage <= 4.0){
  digitalWrite(l1,HIGH);
  digitalWrite(l2,HIGH);
  digitalWrite(l3,HIGH);
  digitalWrite(l4,HIGH);
  digitalWrite(l5,HIGH);
  digitalWrite(l6,HIGH);
  digitalWrite(l7,LOW);
  digitalWrite(l8,LOW);
}
if(voltage > 4.0 && voltage <= 4.5){
  digitalWrite(l1,HIGH);
  digitalWrite(l2,HIGH);
  digitalWrite(l3,HIGH);
  digitalWrite(l4,HIGH);
  digitalWrite(l5,HIGH);
  digitalWrite(l6,HIGH);
  digitalWrite(l7,HIGH);
  digitalWrite(l8,LOW);
}
if(voltage > 4.5){
  digitalWrite(l1,HIGH);
  digitalWrite(l2,HIGH);
  digitalWrite(l3,HIGH);
  digitalWrite(l4,HIGH);
  digitalWrite(l5,HIGH);
  digitalWrite(l6,HIGH);
  digitalWrite(l7,HIGH);
  digitalWrite(l8,HIGH);
}
delay(100);
}

//end of code
```

Materials for the *Arduino Light Meter* are available from Flinn Scientific, Inc.

Catalog No.	Description
AP9875	Arduino Super Starter Kit
AP9876	Arduino Complete Starter Kit
AP9877	Arduino Mega Complete Starter Kit

Consult the [Flinn Scientific website](#) for current prices.