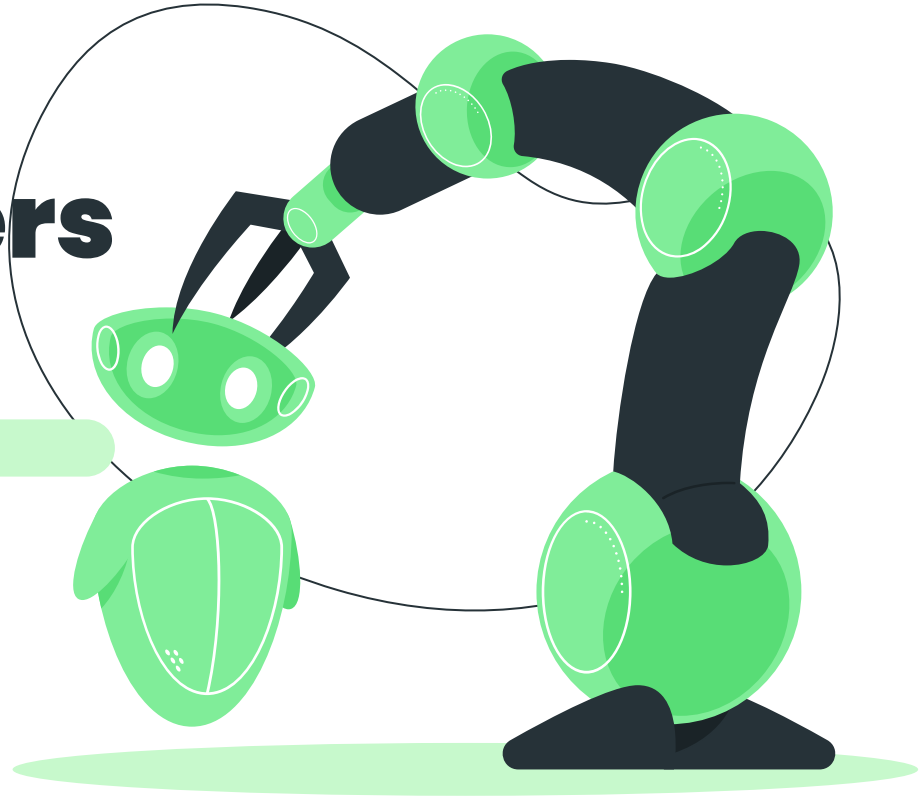
Microcontrollers For Artists

With Joe Fowler

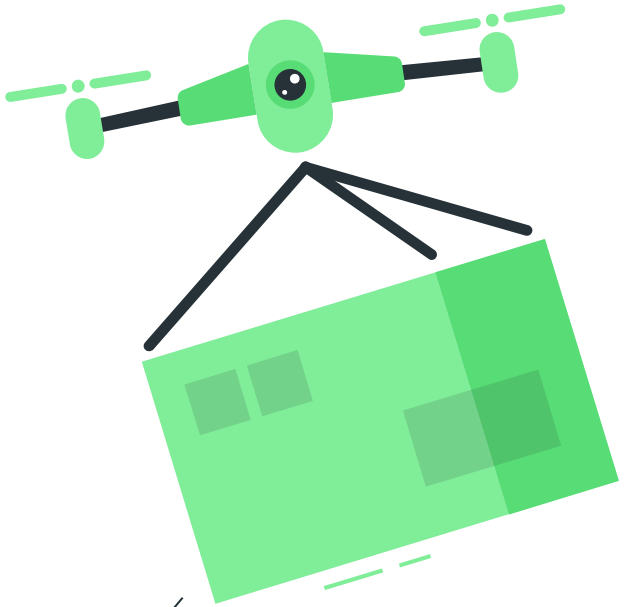


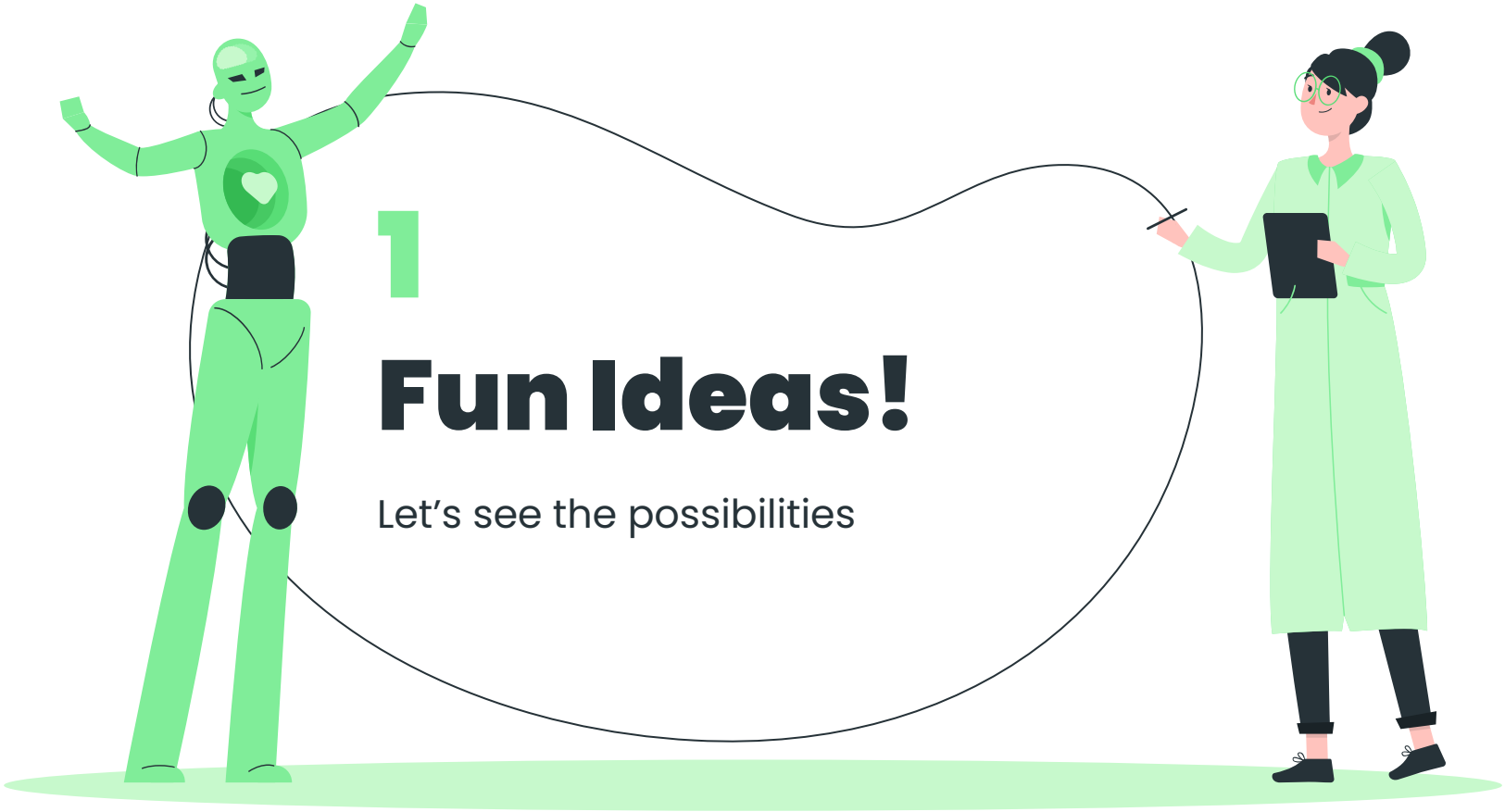
What Are We Doing?

Here is our plan for the workshop!

- **INTRO**
- **HARDWARE**
- **SOFTWARE**
- **1. Blink**
- **2. Basic Circuit**
- **3. Night Light**

What is a Microcontroller?





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Fun Ideas!

Let’s see the possibilities

Engineering

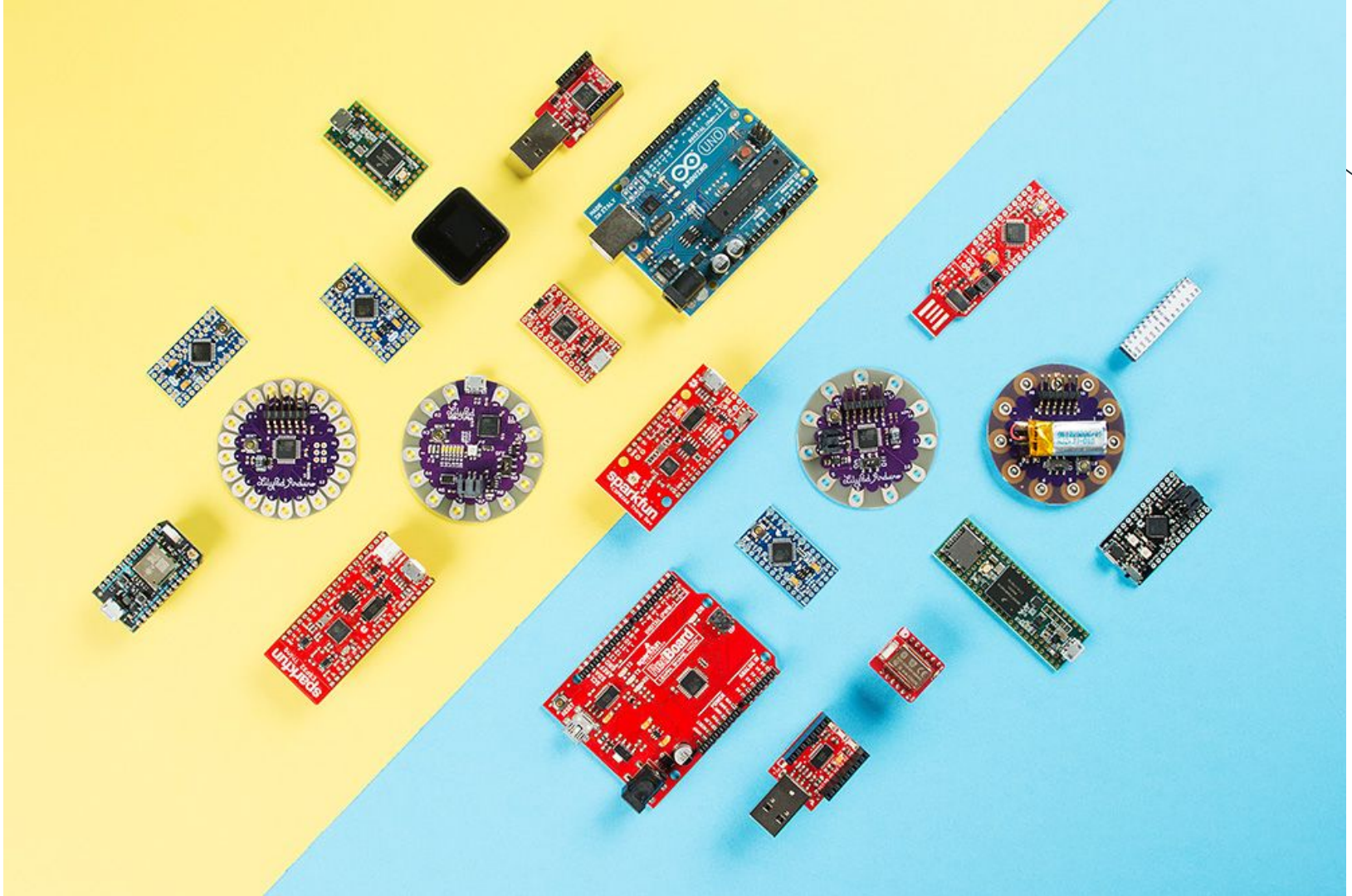
Artistic Projects

Awake - An Interactive Painting

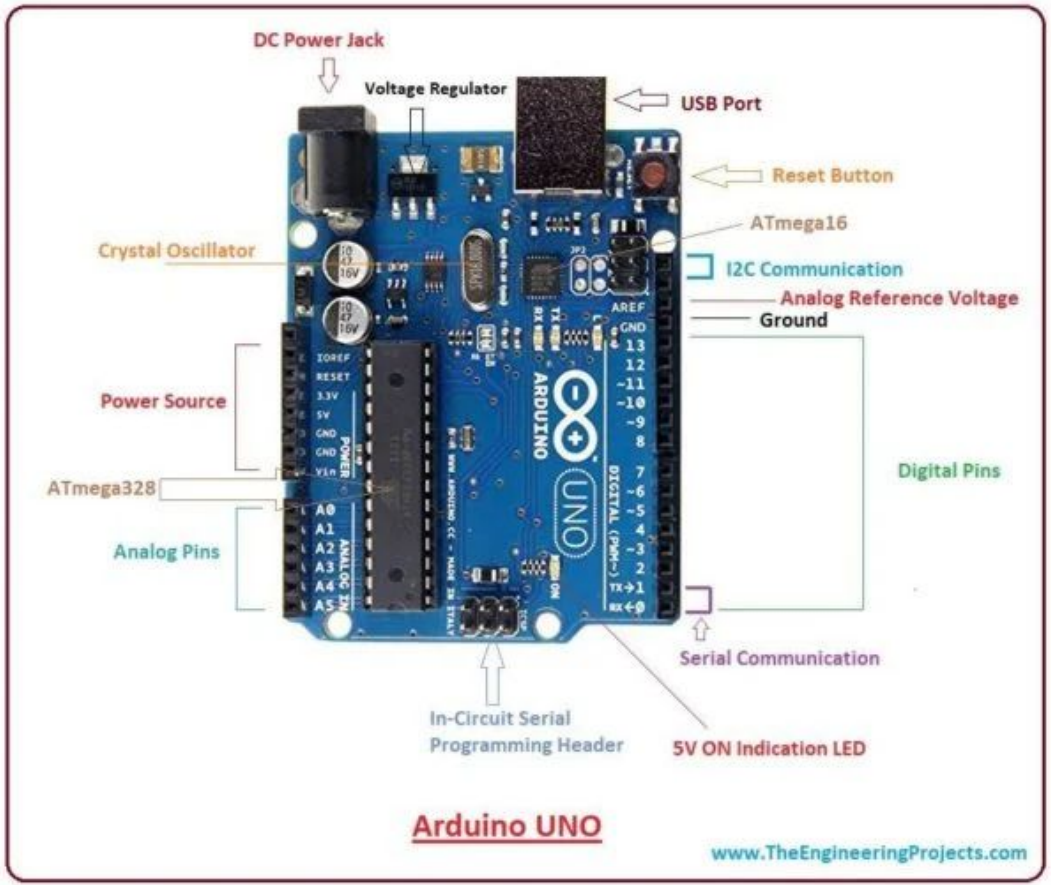
Pinokio

PATTERNS || Perpetual Useless

HARDWARE


UNO
sparkfun
RedBoard

Anatomy of an Arduino UNO

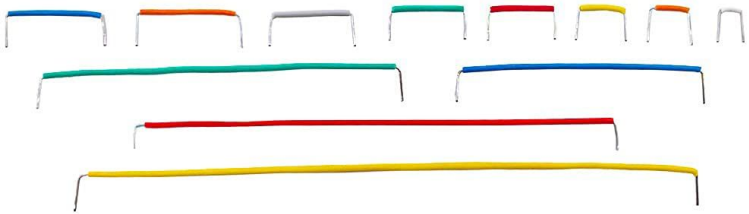


USB Cable

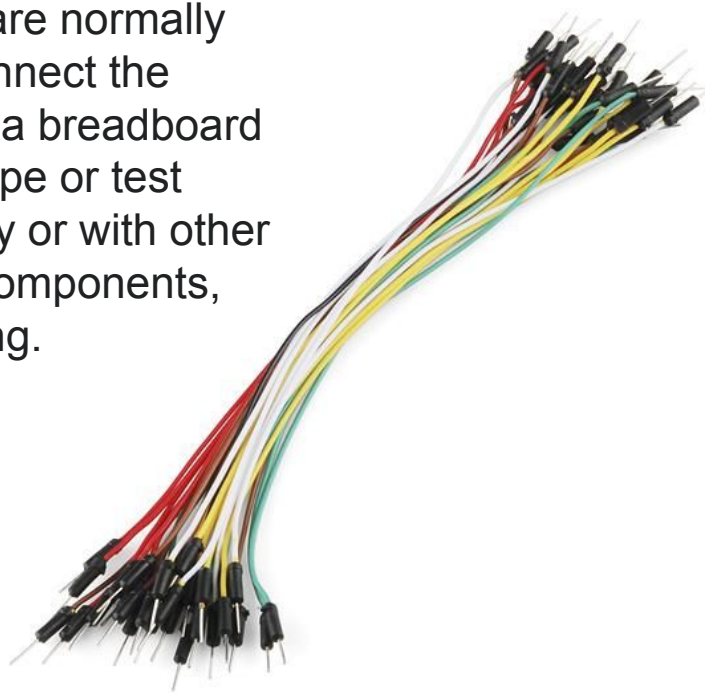
USB Cable - This allows you to connect your Arduino Uno to your personal computer for programming.

It also provides power to the Arduino.

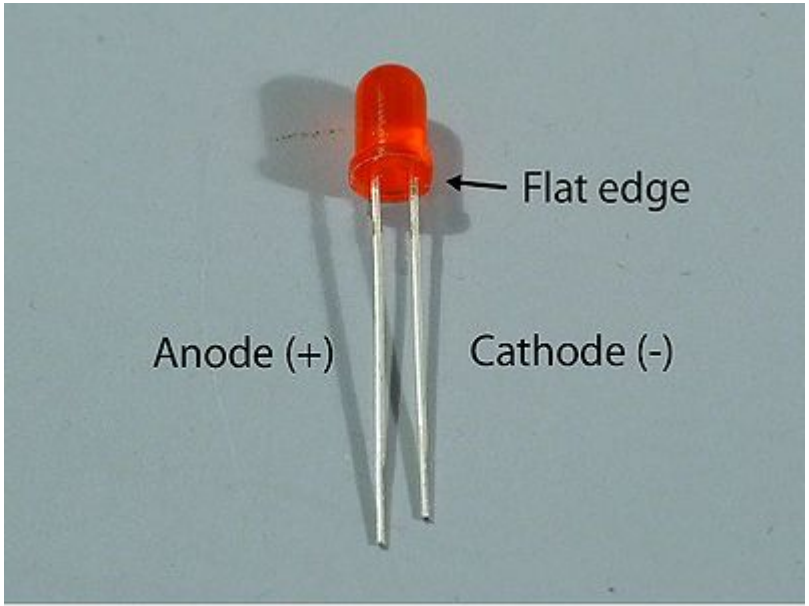
Jumper Wires

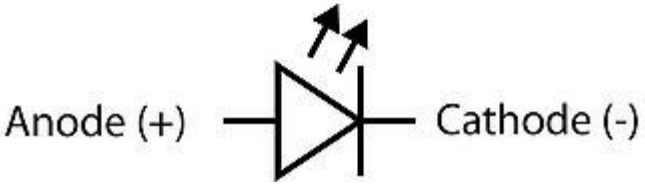


Jumper Wires are normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.



LEDs (Light Emitting Diodes)



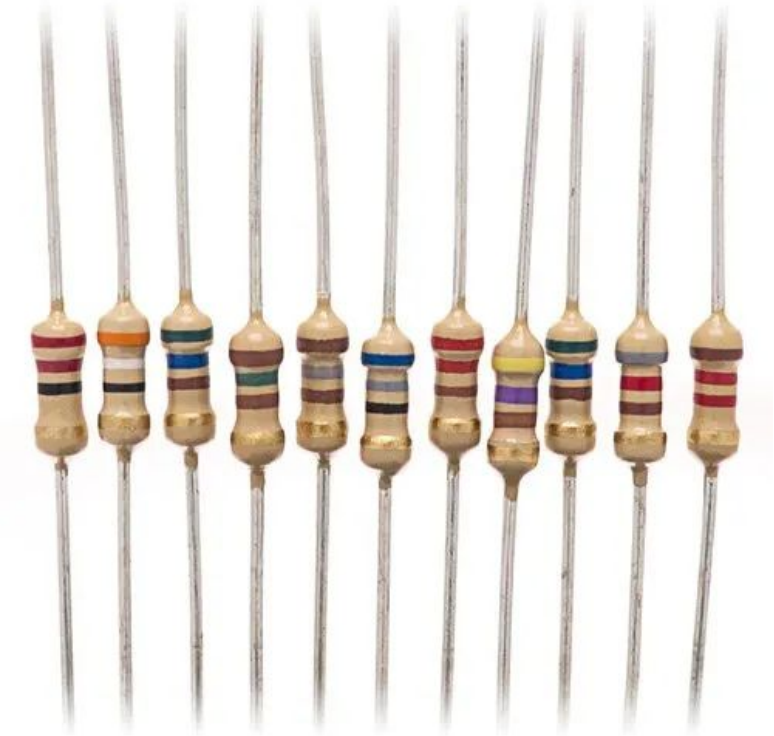


LEDs, being diodes, will only allow current to flow in one direction.

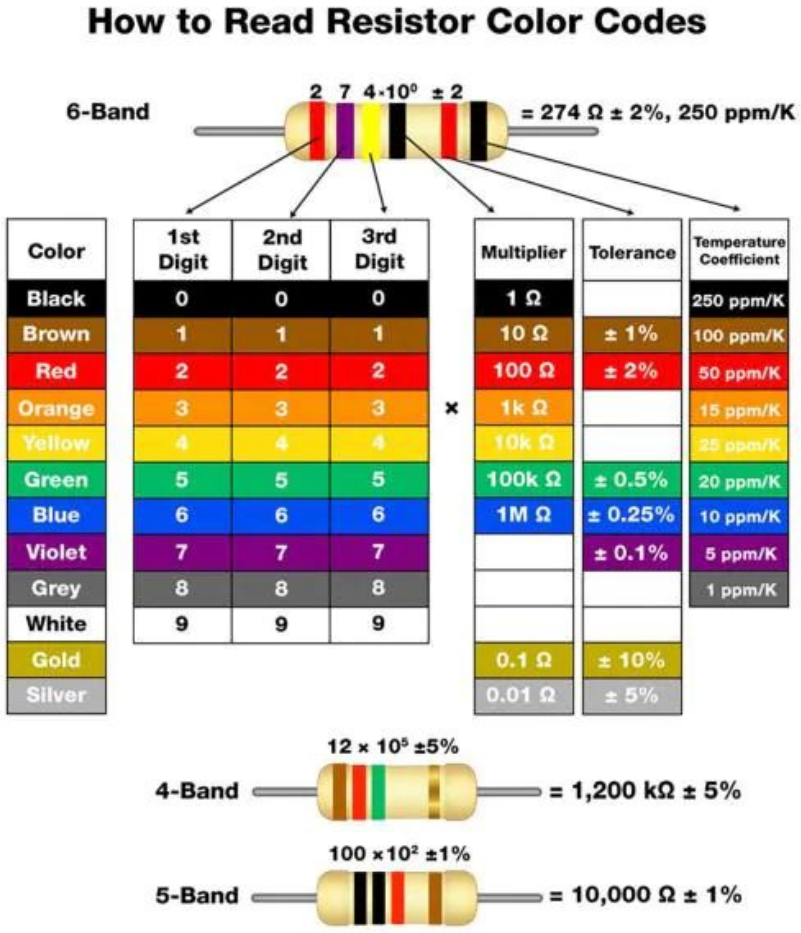
Electricity should flow
IN the Anode (LONG WIRE) and
OUT the Cathode (SHORT WIRE)

Resistors

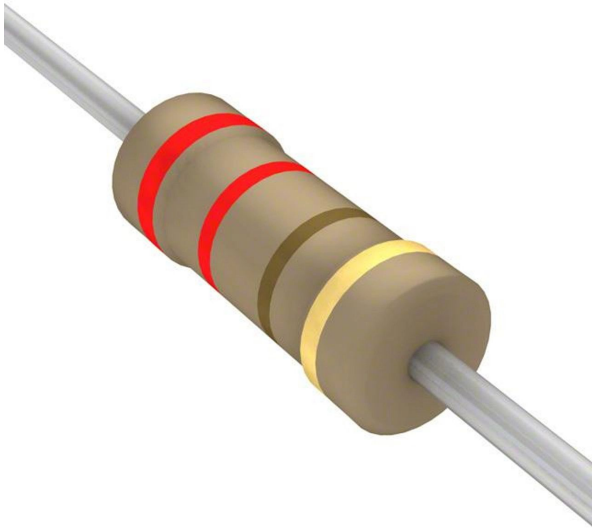
A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.



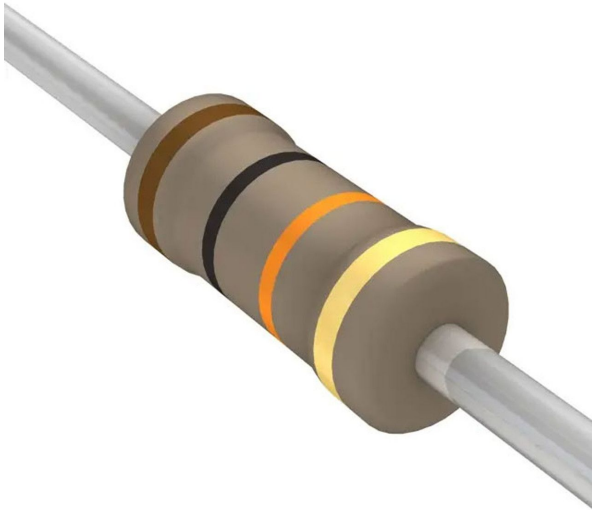
Resistors


How to Read Resistor Color Codes
6-Band
2 7 4·10⁰ ± 2
= 274 Ω ± 2%, 250 ppm/K
Color
1st Digit
2nd Digit
3rd Digit
Multiplier
Tolerance
Temperature Coefficient
Black 0 0 0 1 Ω 250 ppm/K
Brown 1 1 1 10 Ω ± 1% 100 ppm/K
Red 2 2 2 100 Ω ± 2% 50 ppm/K
Orange 3 3 3 × 1k Ω 15 ppm/K
Yellow 4 4 4 10k Ω 25 ppm/K
Green 5 5 5 100k Ω ± 0.5% 20 ppm/K
Blue 6 6 6 1M Ω ± 0.25% 10 ppm/K
Violet 7 7 7 ± 0.1% 5 ppm/K
Grey 8 8 8 1 ppm/K
White 9 9 9
Gold 0.1 Ω ± 10%
Silver 0.01 Ω ± 5%
12 × 10⁵ ±5%
4-Band
= 1,200 kΩ ± 5%
100 ×10² ±1%
5-Band
= 10,000 Ω ± 1%

Resistors



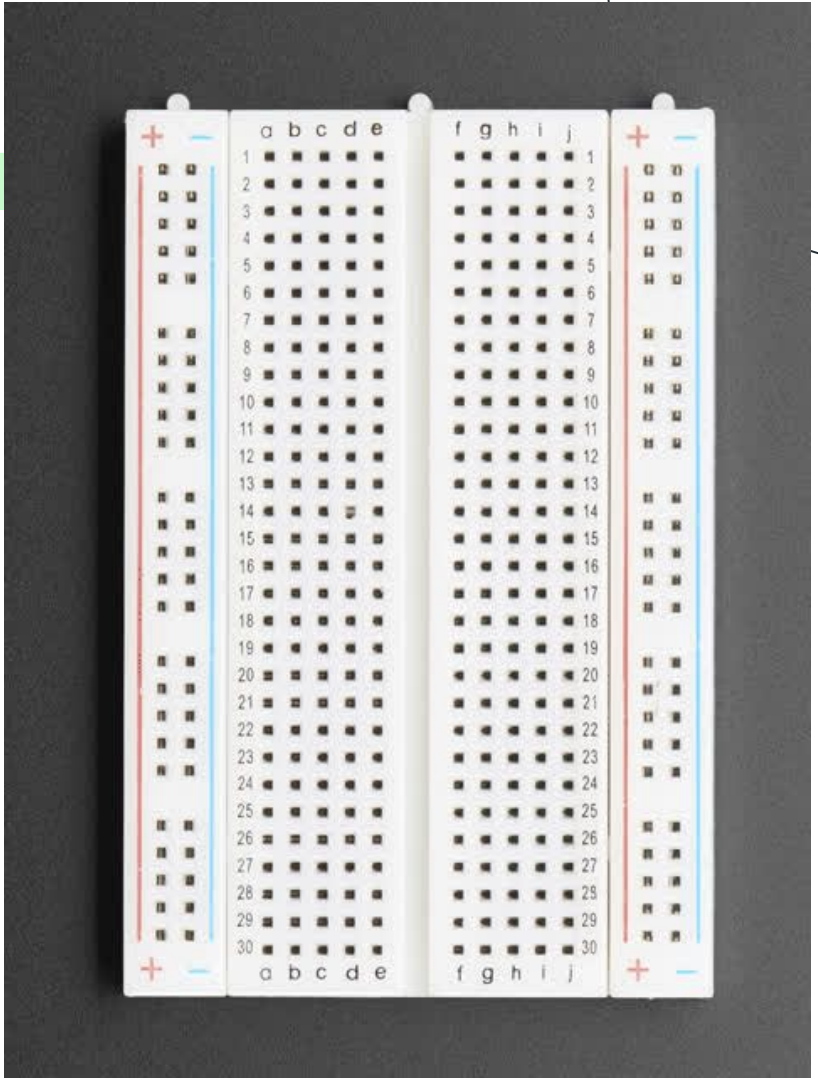
220 Ohm Resistor



10K Ohm Resistor

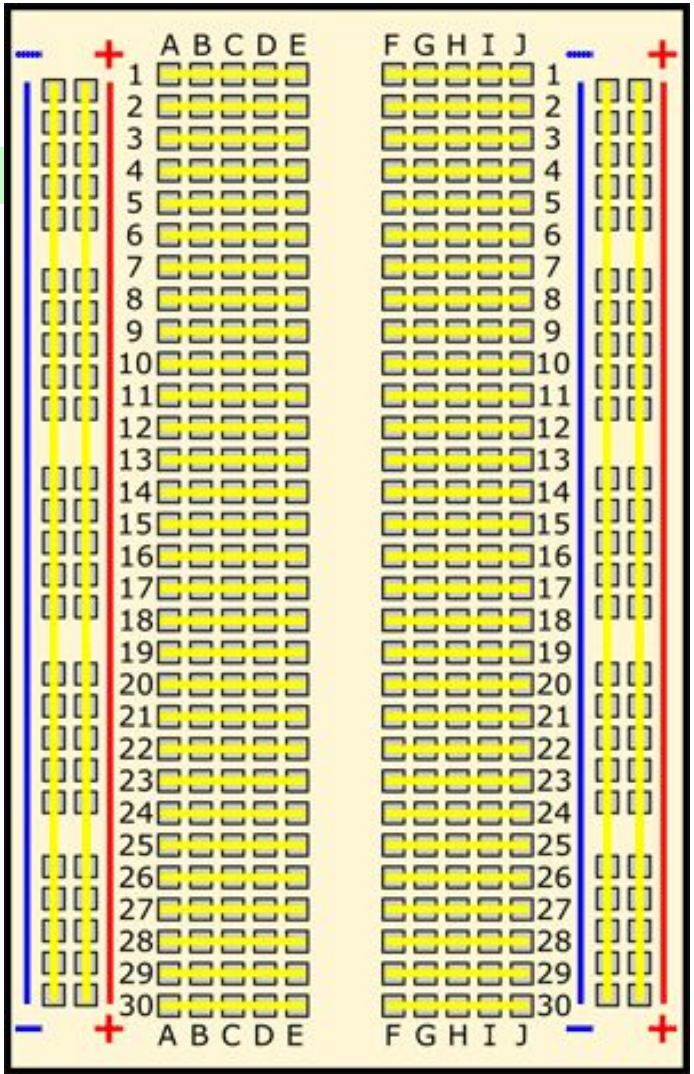
Breadboard

A breadboard is a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emitting diode).



Breadboard

Breadboard


A B C D E
F G H I J
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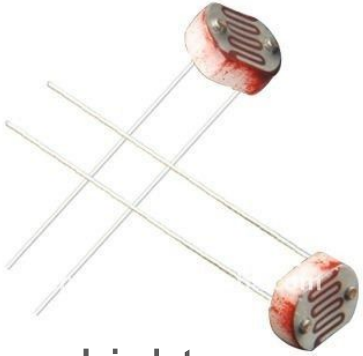
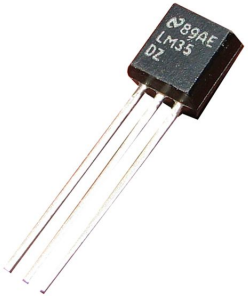
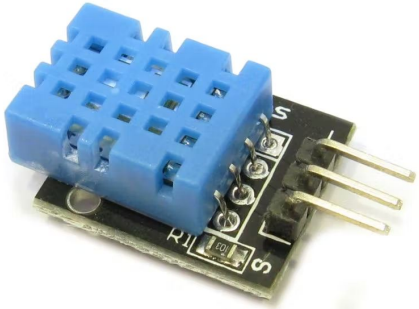
Sensors (Inputs)



Light



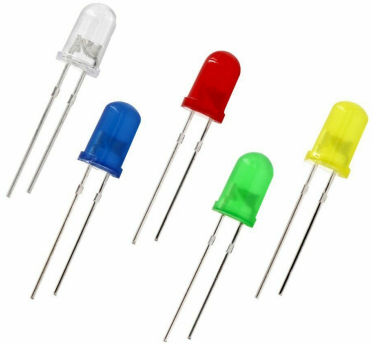
Temperature

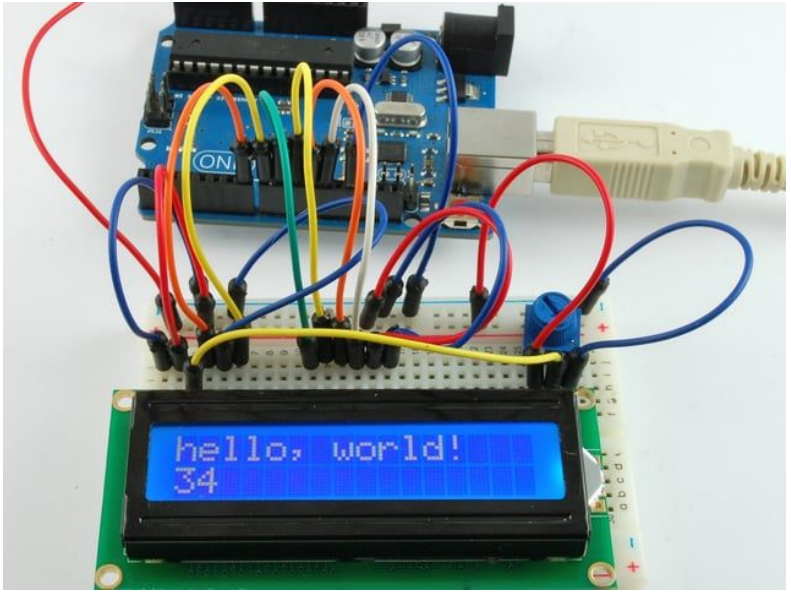


Humidity

Tilt

Actuators (Outputs)





SOFTWARE

ARDUINO IDE

The Arduino Integrated Development Environment contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus.

It connects to the Arduino hardware to upload programs and communicate with them.

SOFTWARE

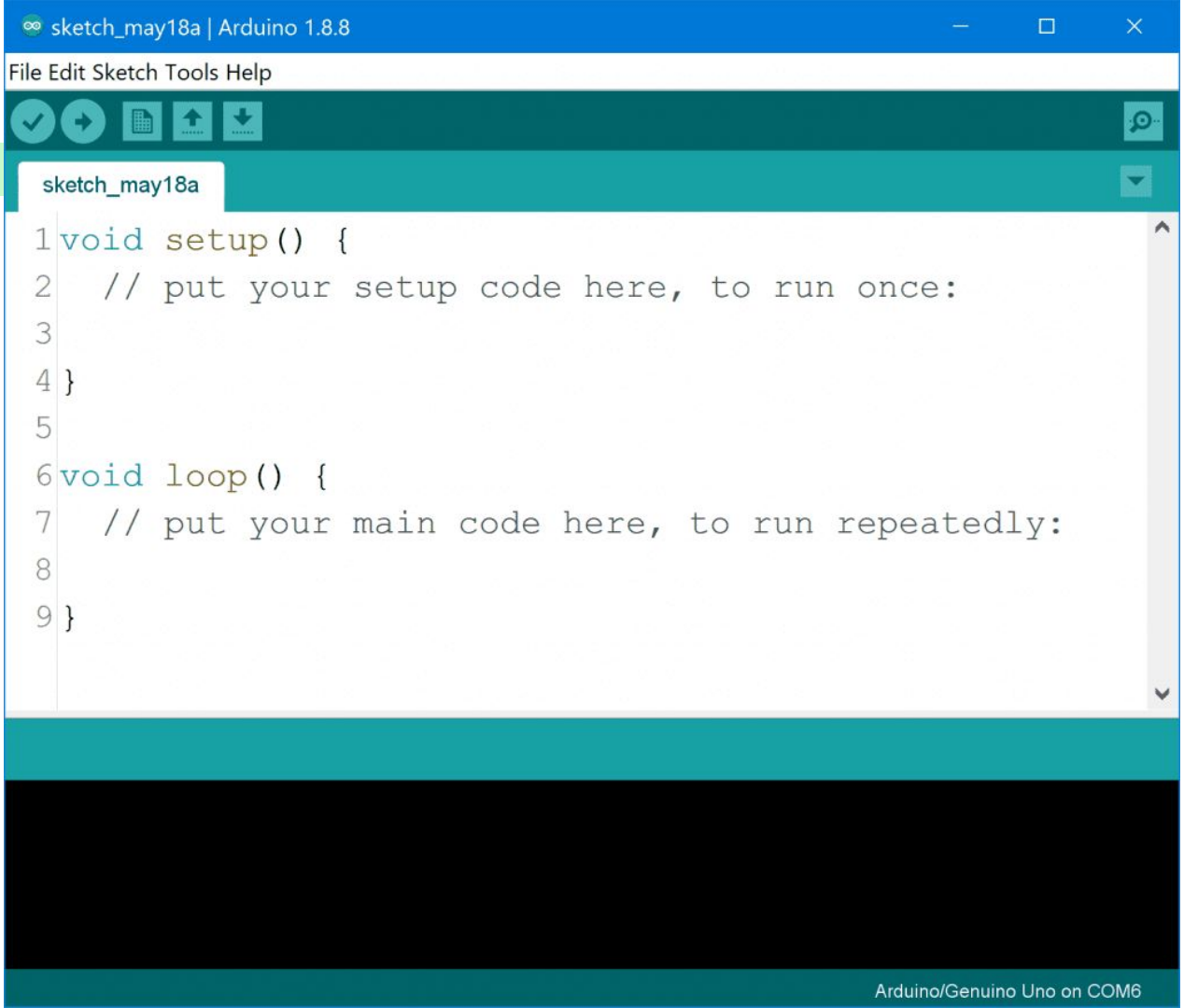
ARDUINO IDE

Please download the Arduino IDE. If you haven’t already. :)

https://www.arduino.cc/en/software

SOFTWARE

ARDUINO IDE


sketch_may18a | Arduino 1.8.8
File Edit Sketch Tools Help
sketch_may18a
1 void setup() {
2 // put your setup code here, to run once:
3
4 }
5
6 void loop() {
7 // put your main code here, to run repeatedly:
8
9 }
Arduino/Genuino Uno on COM6

Let’s Open Our First Sketch

1

Blink

Open Blink Sketch