Smart Textiles Techniques

Week 2: Hello Arduino!

Arduino consists of 2 parts

Hardware: The Arduino board

Software: The Arduino software

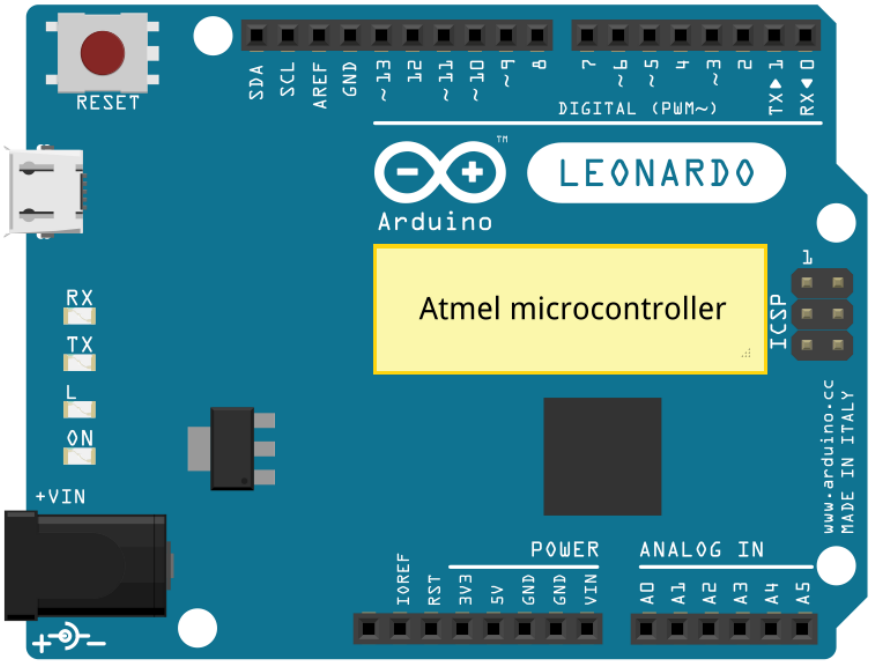
We write programs* (code) using the Arduino software which we send (upload) to the Arduino hardware.

* Program is another word for instructions.

Arduino Hardware

The black rails are referred to either as *pins* or *ports*.

Digital Input & Output
Serial Communication
Analog Output (& limited Analog Input)



External DC power supply:

Center positive
12V maximum
At least 250 mA output
2.1mm plug

Power supply for external components.

Analog Input

Arduino Software

3rd part... Arduino Community

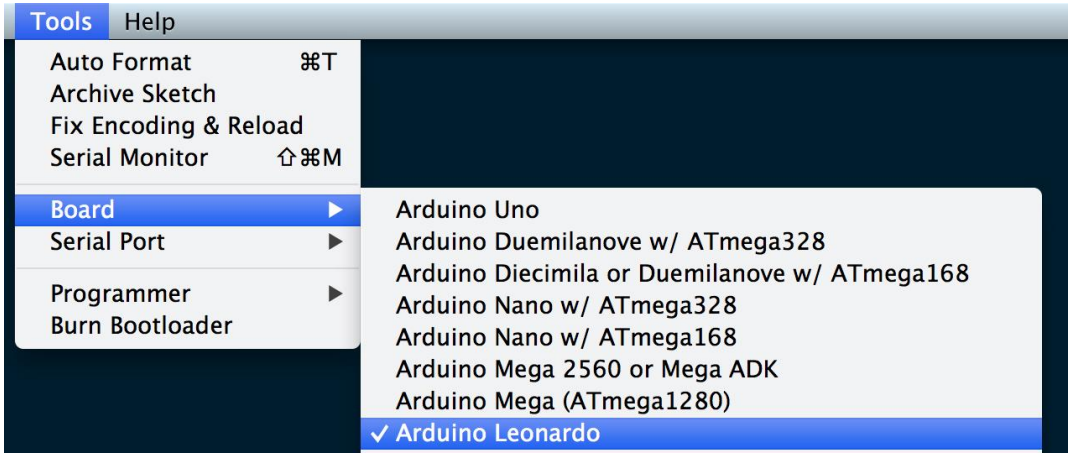
A key part of Arduino's success has been due to the community behind it.

Not only does the Arduino host a fantastic programming reference, it also has a very active user base which help solve problems online:

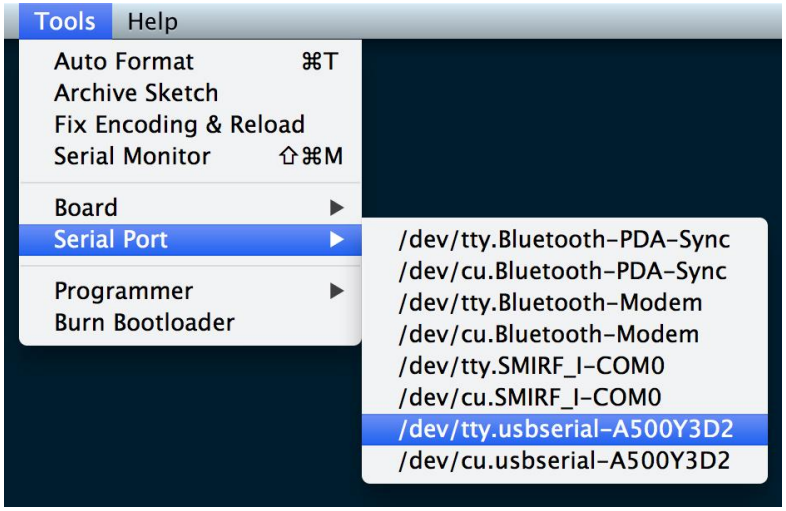
http://forum.arduino.cc/

http://playground.arduino.cc/

Connecting Software with Hardware



Select your Arduino.



Select your Arduino's port.

Plug Arduino in first!

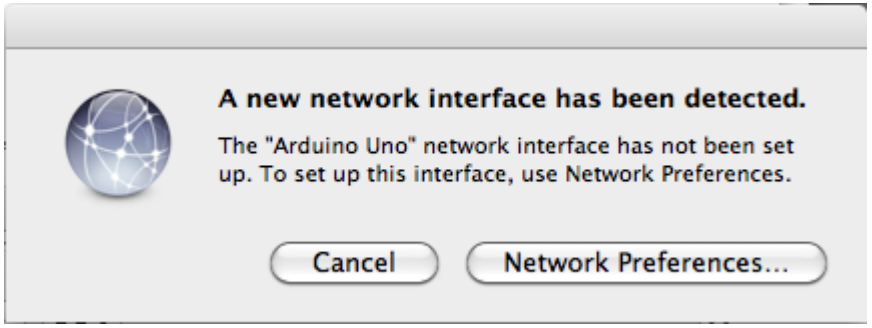
This will always be tty.usbserial-*something*

or

tty.usbmodem-*something*

Add Network Device (Mac Users)

When you plug in your Arduino, you may see a small popup window asking to add a new network device that looks like this:



Go ahead and do this (or the popup will return!)

Digital Signals

Digital signals are two state signals which can either be produced (OUTPUT) or received (INPUT) by the Arduino.

Digital signals are represented as:

5V or 0V

0 or 1

HIGH or LOW

Tonight's Code

We'll be relying on examples which come with the Arduino software tonight.

These can be found in:

File > Examples > 01. Basics > Blink

and

File > Examples > 02. Digital > Button

Circuit Diagrams

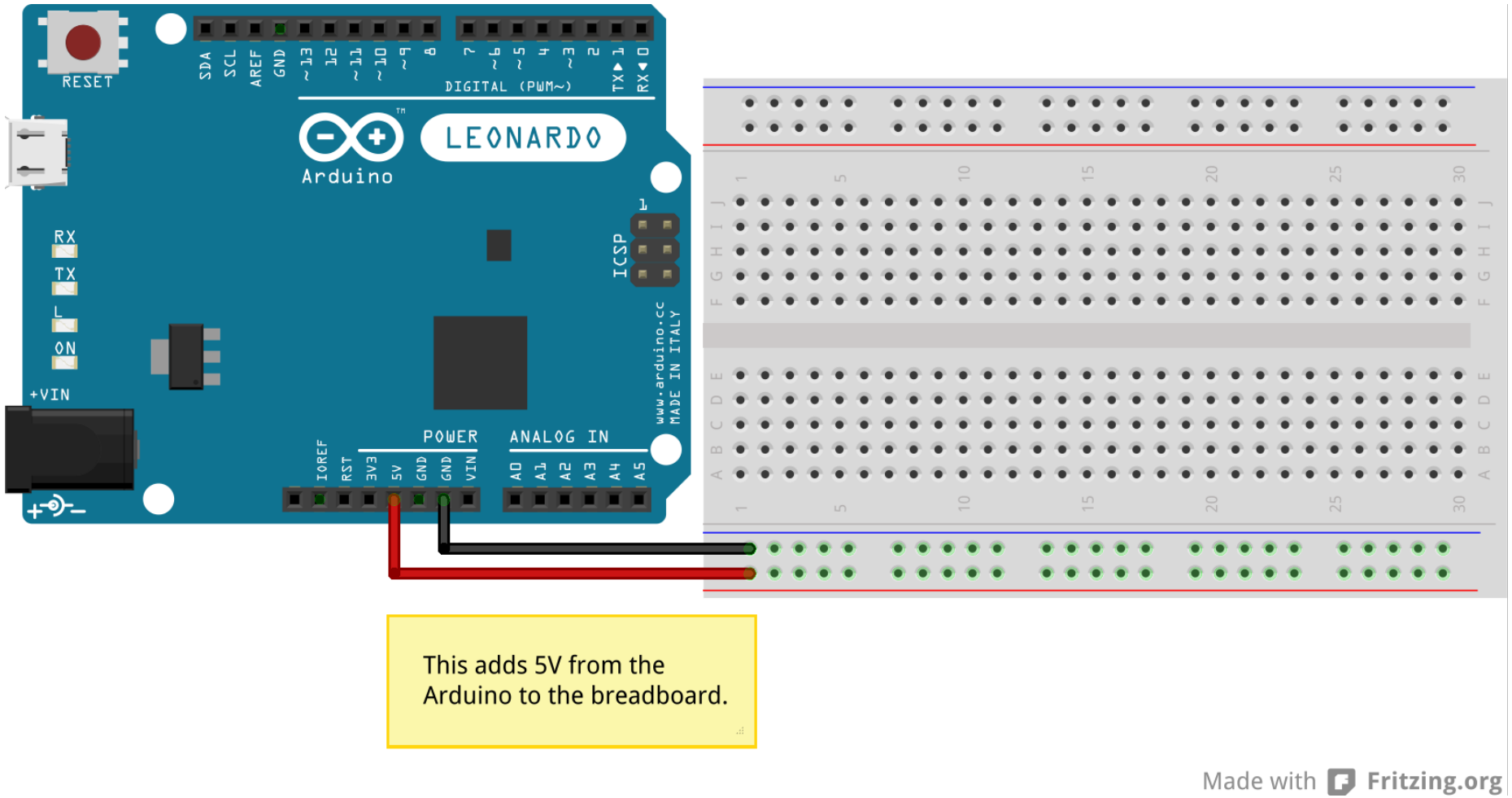
Getting power from the Arduino to the breadboard.

Connecting an LED.

Connecting LEDs in series to a single pin.

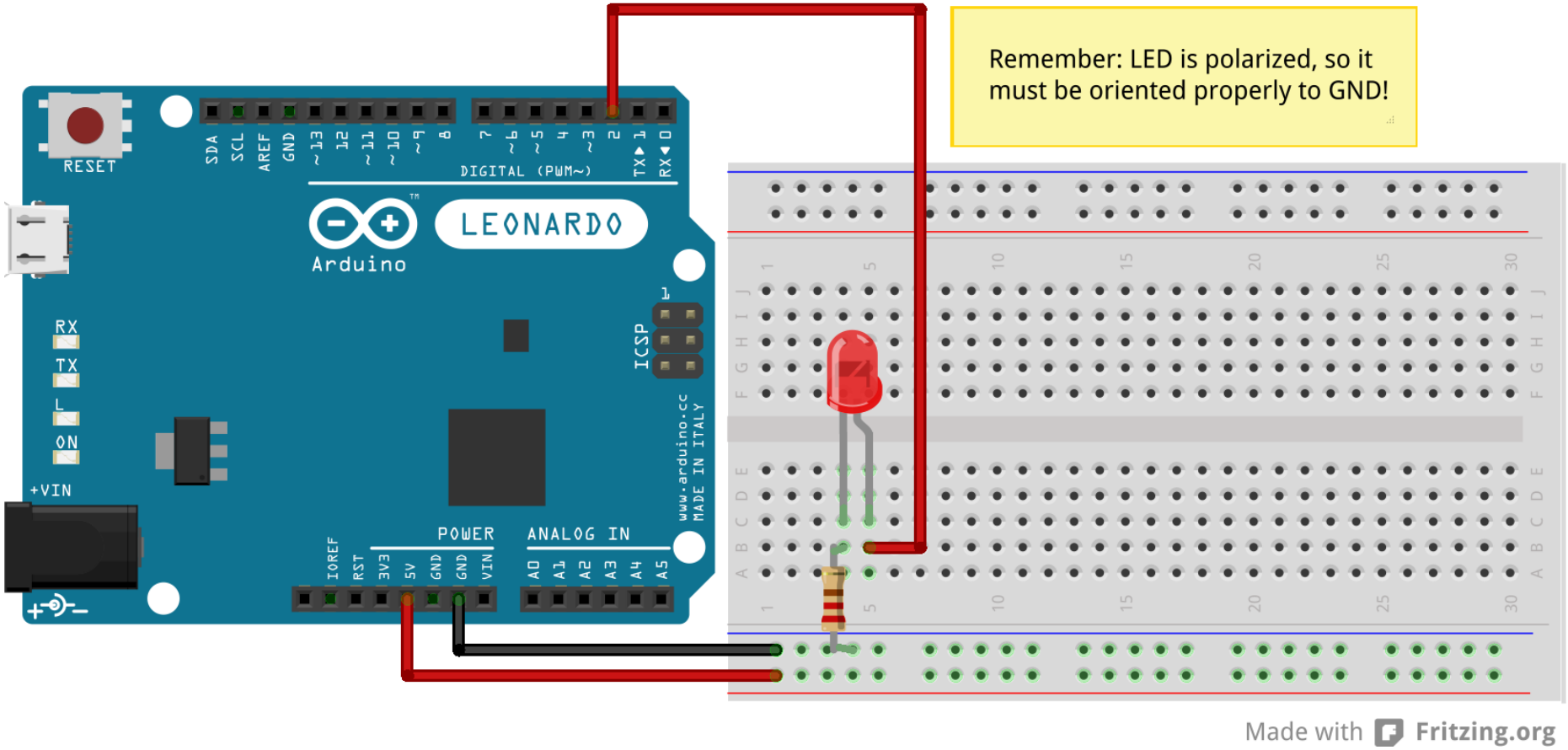
Connecting buttons/switches.

Getting Power from the Arduino



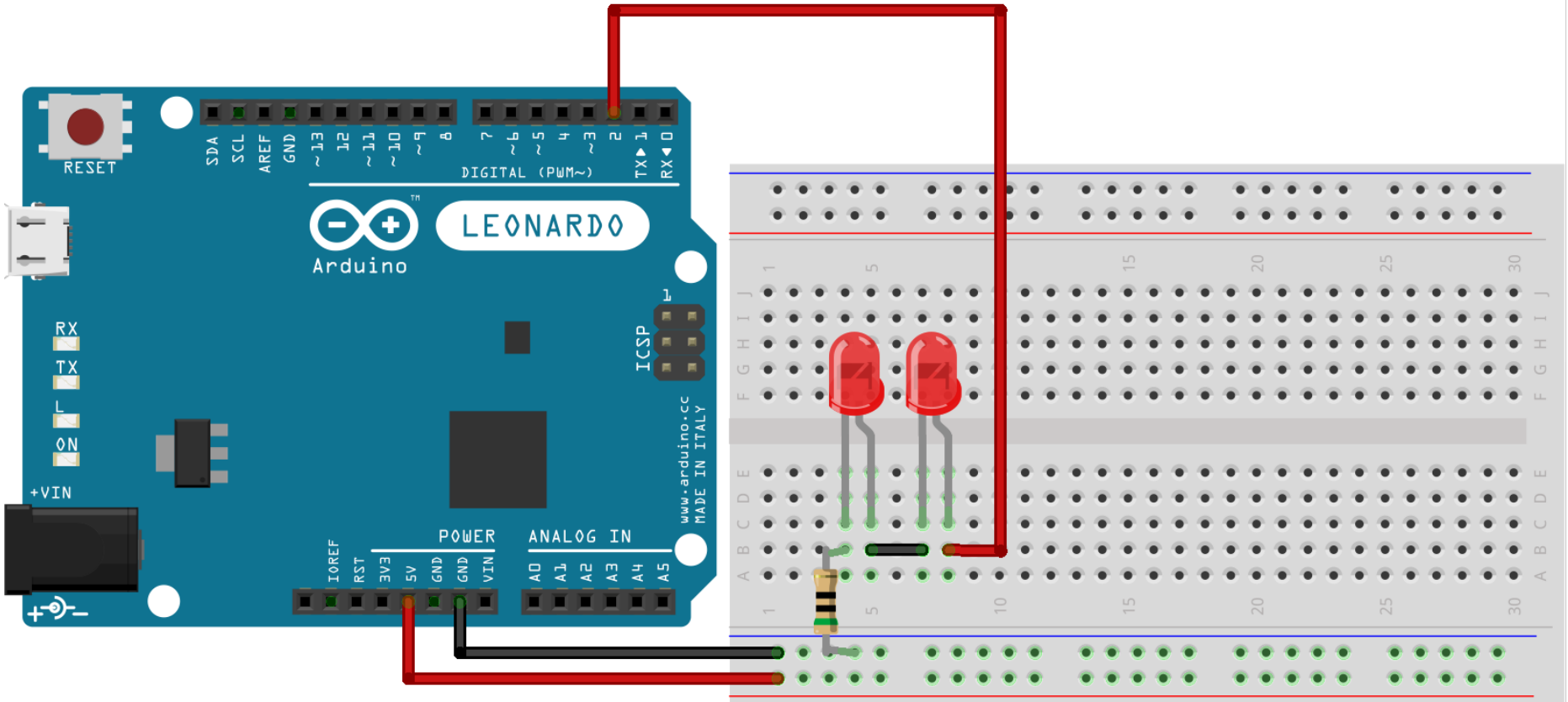
This adds 5V from the Arduino to the breadboard.

Connecting an LED to the Arduino



A 150Ω resistor is optimal, but 220Ω is more common.

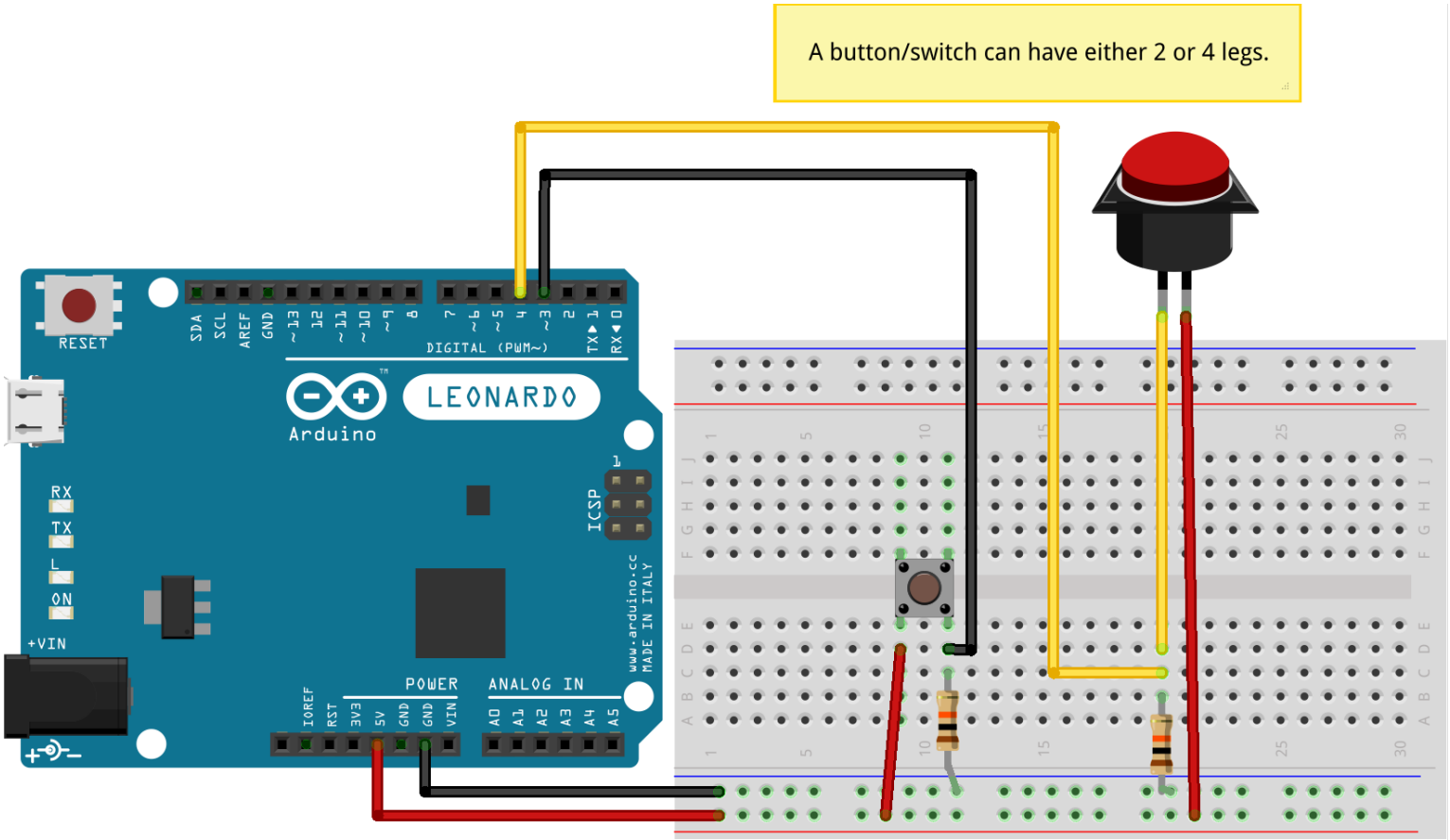
LED Series Circuit



Ohm's Law can be used to find optimal resistance:

5V - (2V + 2V) / .02A = 50Ω

Connecting Buttons/Switches



10KΩ is a standard pulldown resistor

LED + Button Combination