Intro to Arduino

Arduino Microcontroller
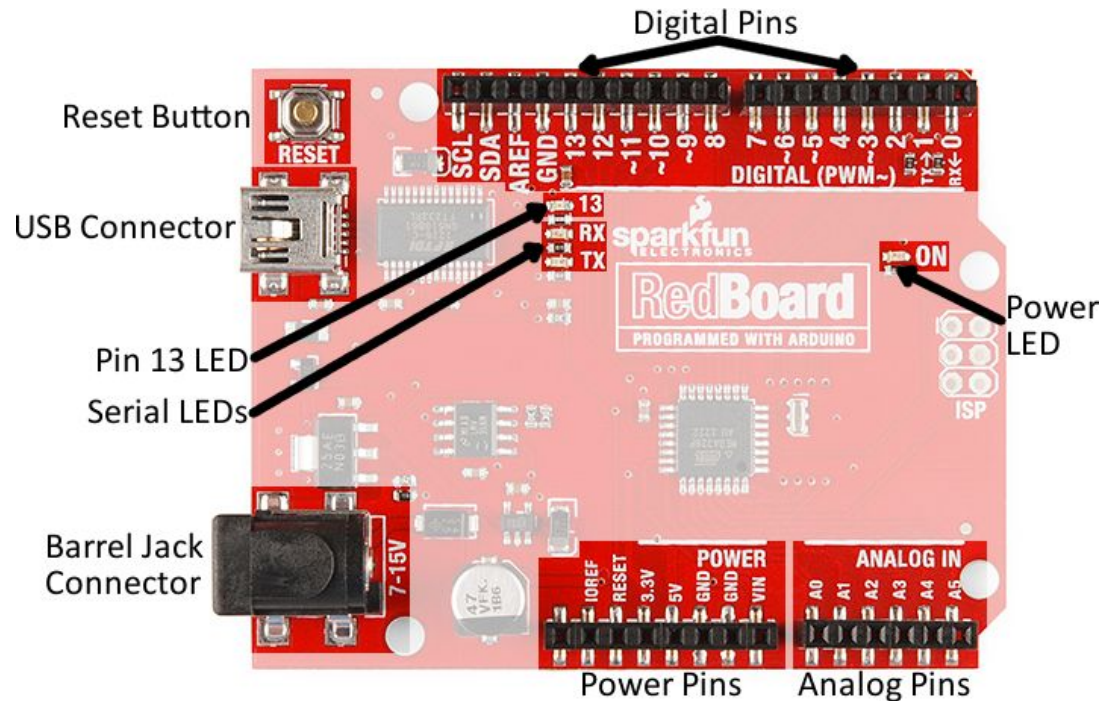
- Runs one Program at a time.
- Re-Programmable via USB
- Can run independent of computer (Barrel Jack pwr)
- Reset Button Re-Initiates Program.
- Pins: board inputs + outputs
- Power Pins: Provide Power
- Digital Pins: ON/OFF
- Analog Pins: Spectrum of Input/output values.

Supplying Power & Sending Signals

- In order to power an led or send a signal to the Arduino, you need to complete an electric circuit.

- When you connect a Pin to an LED, it supplies power to the light, but only if the other end is connected to a GND (ground pin).

- This completes the circuit, like connecting a light to both terminals of a battery.

Voltage, Current, Resistance

Current:
Less than 20mA

BATTERY 9V

RESISTOR ?

LED

$$V = I*R$$

R

+ V

LED
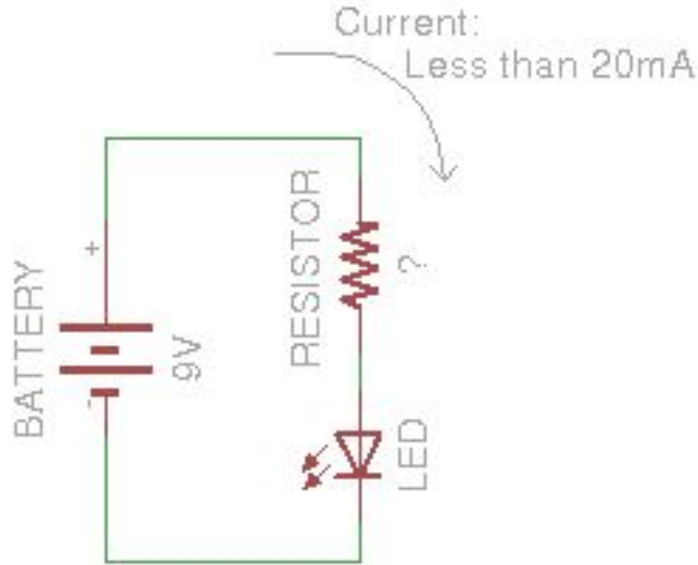
Voltage: 'Power' supplied to component.

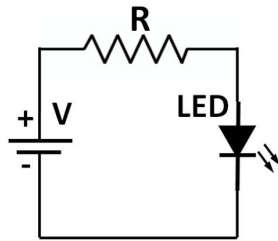Resistance: Resists, or 'Consumes' Voltage. An LED is also a Resistor.

Current: Can be thought of as the 'Bandwidth' of the circuit. If you have a lot of different circuits pulling from the same voltage source, it will reduce the power, *like having too many computers connected to the same wifi.*

For more in-depth explanation, see: https://learn.sparkfun.com/tutorials/voltage-current-resistance-and-ohms-law
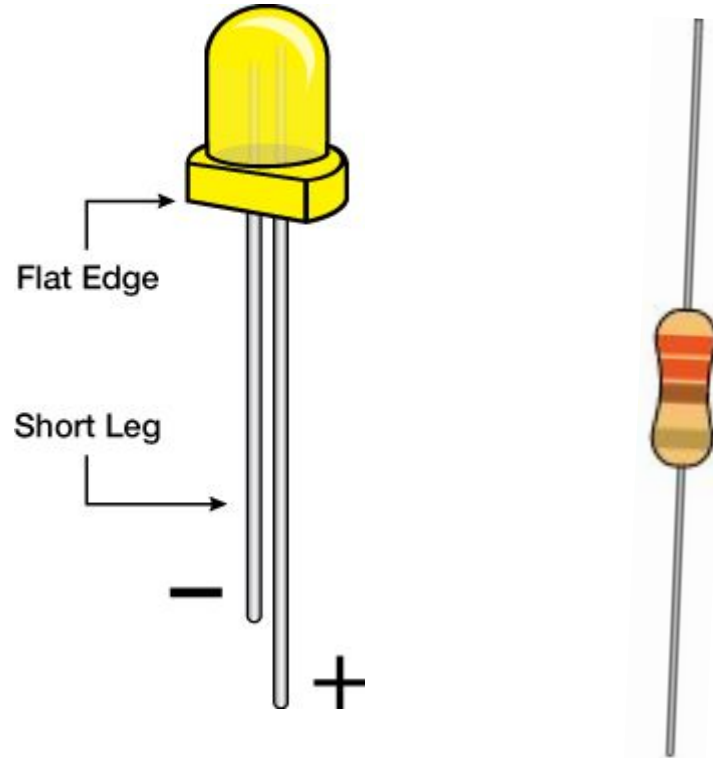
Components and Orientation

For Certain Components, the direction of the current flow is important, for others it isn't.

(-) = GND

(+) = PWR

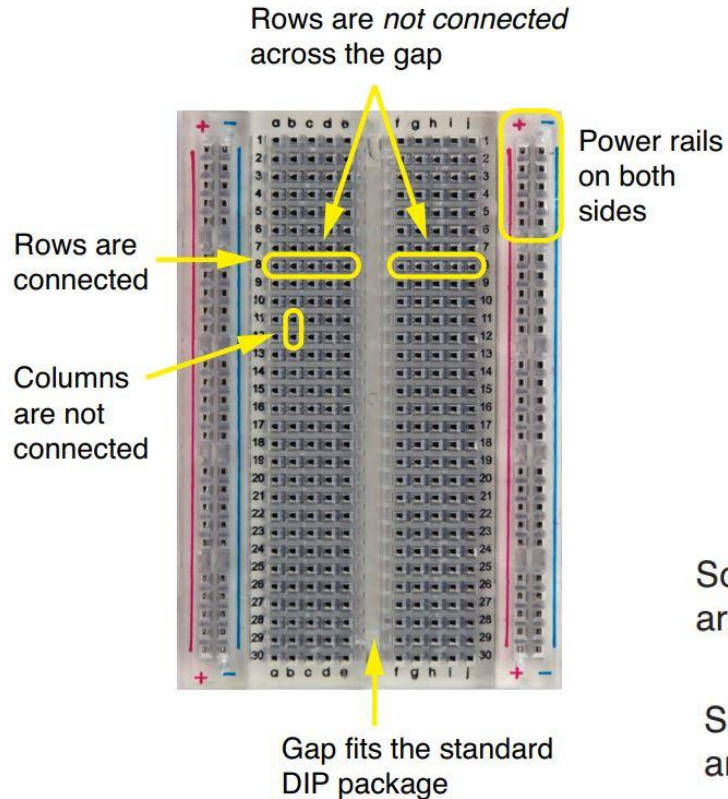LEDs: Directional (Polarized)

Resistors: Non-Directional (Non-Polarized)

Flat Edge

Short Leg

−

+

Tip: If a component is symmetrical, then it is probably Non-Polarized. If there are asymmetric markings or geometry, then it might be Polarized.

The Breadboard: Make Connections without Soldering

Rows are *not connected* across the gap

Power rails on both sides

Rows are connected

Columns are not connected

Gap fits the standard DIP package

Rows are Connected (12345...)

Columns are Not (abcde….)

(except power rails, which are connected vertically)

Breadboard

Schematic of breadboard

Sockets in a column are not connected

Sockets in a row are connected

Conductors along rows of breadboard
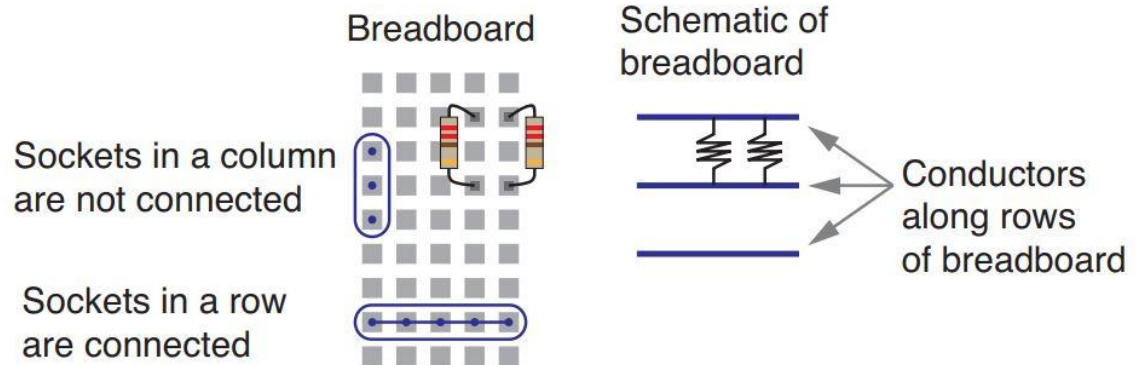
The Code: Basic Structure

- **Setup**

{Only Runs Once. Tell Arduino what pins you want to use, give them names, etc.}

- **Loop**

{Runs Continuously. Tell Arduino what pins to turn on/off, what inputs to look for, etc.}

- **Today**: Use Example Code, make small changes, see how the Arduino Responds. Pay attention to structure and keywords (will be colored).

  Curious about a term? Look it up in the Arduino Reference Library:

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