

Before You Begin

- Arduino IDE: <http://arduino.cc/en/Main/Software>
 - goo.gl/s3E92Y
- Teensyduino add-on: <https://www.pjrc.com/teensy/teensyduino.html>
 - goo.gl/WXy6IT
- Code for this lab:
 - goo.gl/nRQaJB

In Your Box

- Electronic doodad on a piece of plastic
- Little baggy of wiry things
- Loose wiry things that look almost just like the other ones
- Button
- Switch
- Fascinating novella in the form of a postcard data sheet
- USB Cable

Not in Your Box

- Collectors edition set of wires pre-cut into elegant and convenient lengths
- Please share with your neighbor if you can't figure out a way to get out of it

Actual Inventory For People Who Need To Know Actual Stuff

- 1 Teensy 3.1 board with soldered male headers already placed on a small solderless breadboard
- 3 or 4 Standard LEDs, only one is actually required for the exercises
- 3 or 4 10K Ω resistors, two of which are required for the exercises
- 3 or 4 220 Ω resistors, one of which is required
A small momentary switch (commonly known as a button)
- A small 2 position switch (an onoff style power switch is good)
- A small box of jumper wires.

WARNING

- Proceed at your own risk.
- We take no responsibility for your computer.
- You will be plugging electronics that I soldered and you've been fiddling with into your computer's USB.
- Even worse, you might need to install Java.

Arduino for Absolute Beginners

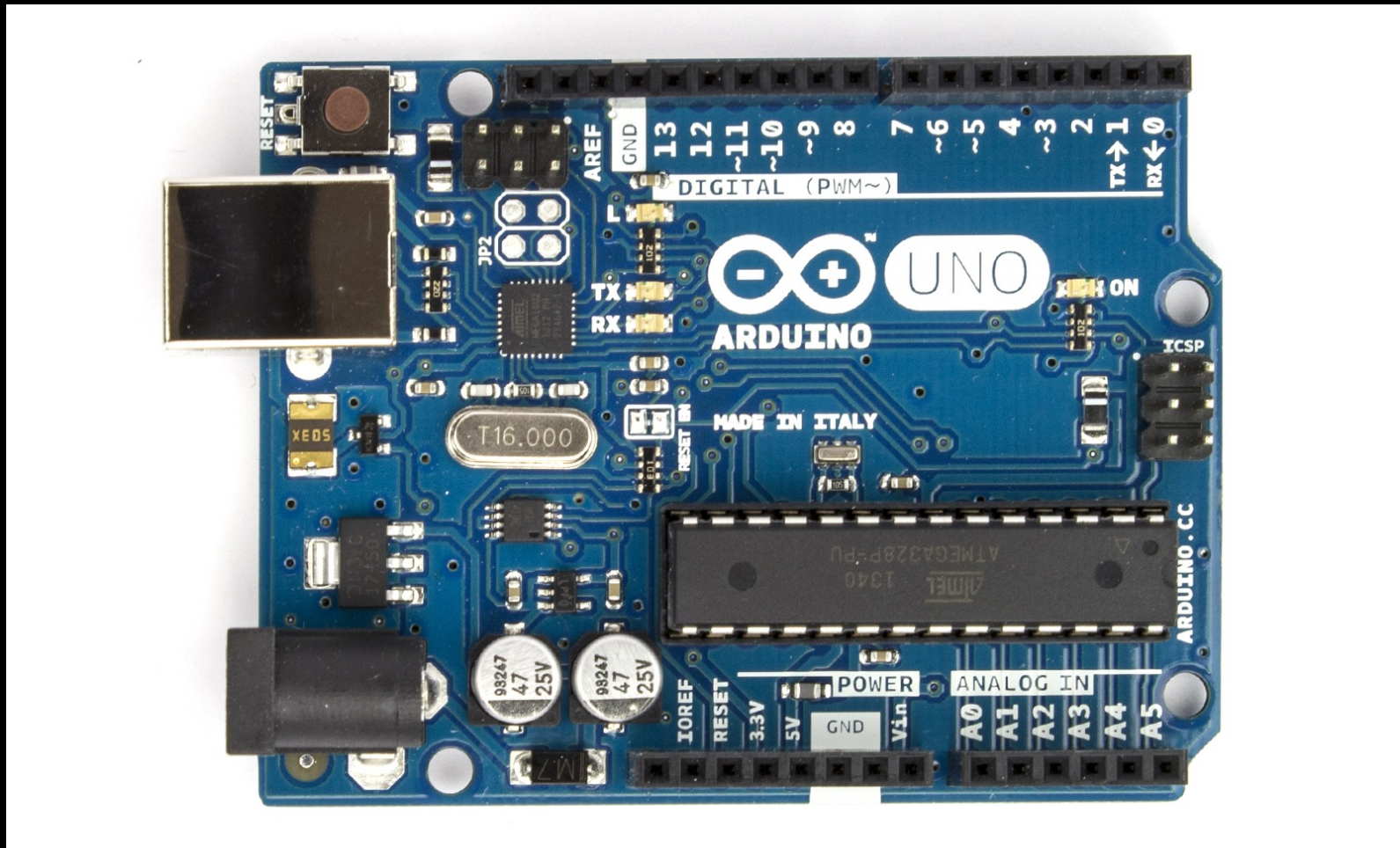
edward@eigerman.com

Introduction

- Do something useful with something cool.

What is Arduino

- It's Italian!
- Board based around a micro controller
- Open Source hardware and software
- An IDE
- Shields



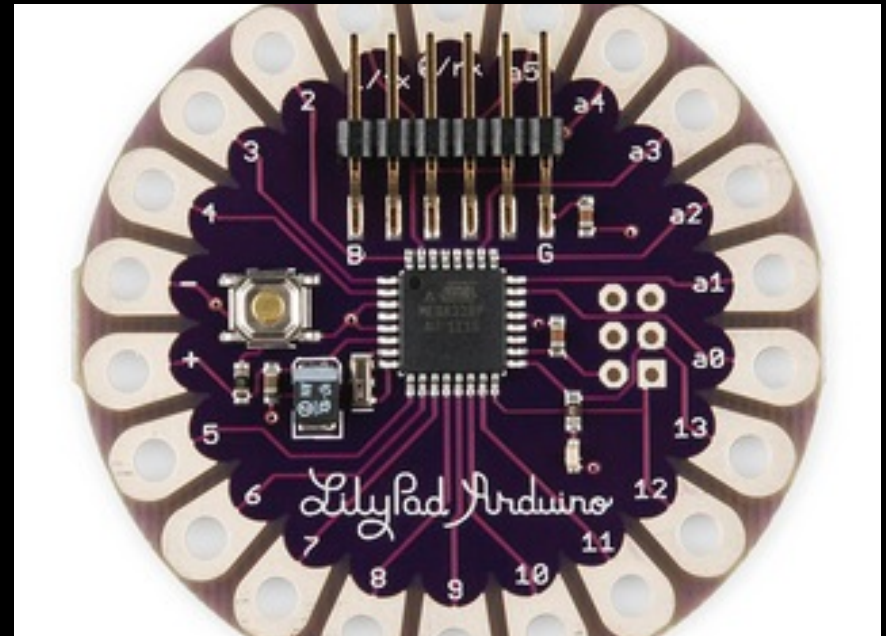
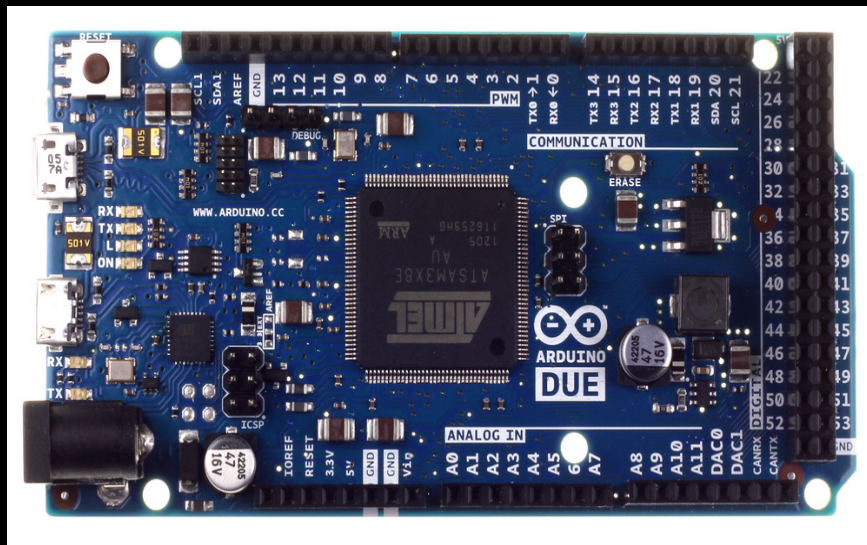
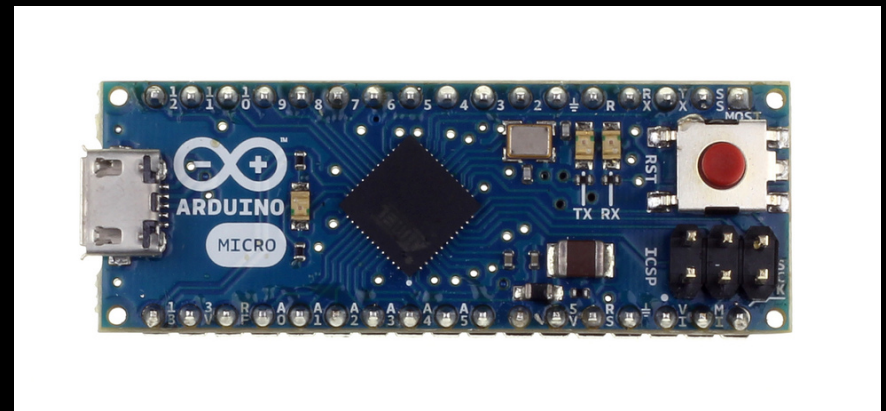
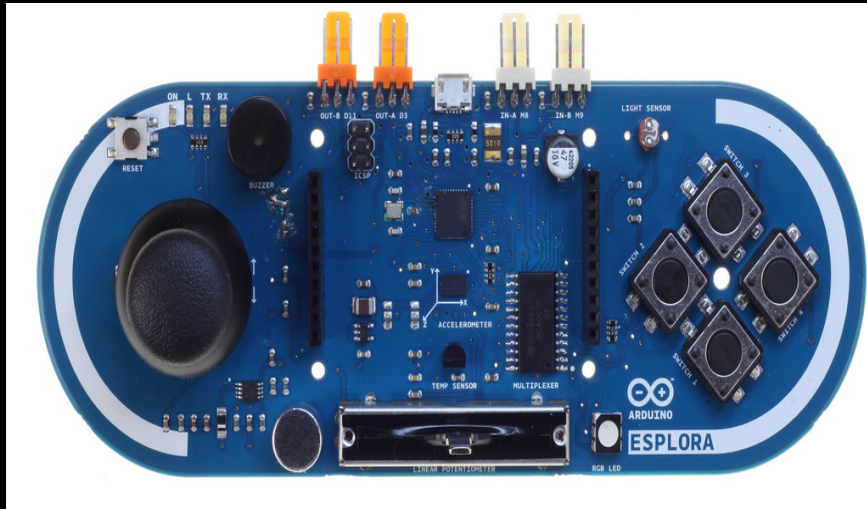
This is Arduino

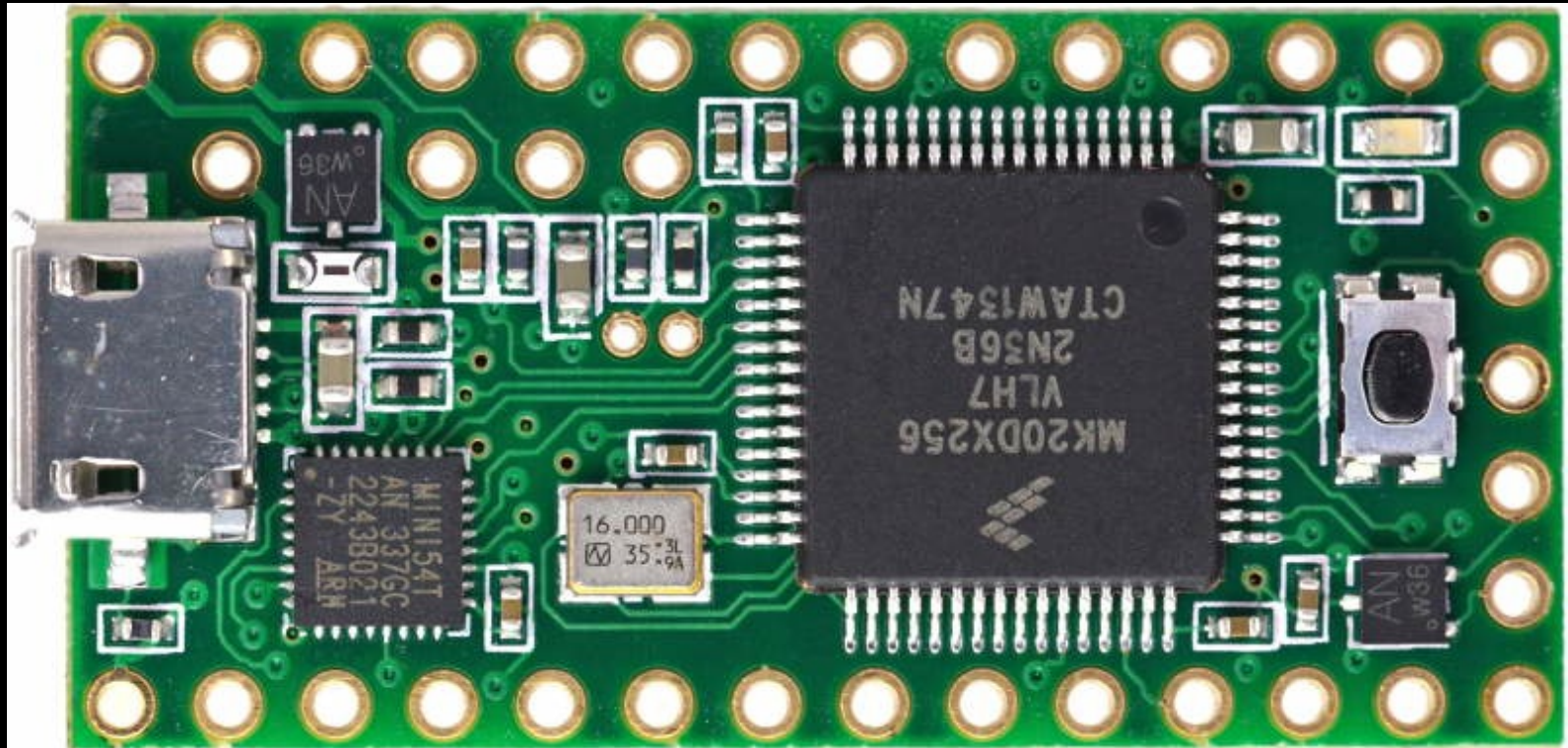
Arduino Uno to be exact

What is Arduino Not?

- A computer
 - Raspberry Pi
 - BeagleBone

Lots of Different Arduinos





Teensy 3.1

Arduino "Compatible" Board

Resources

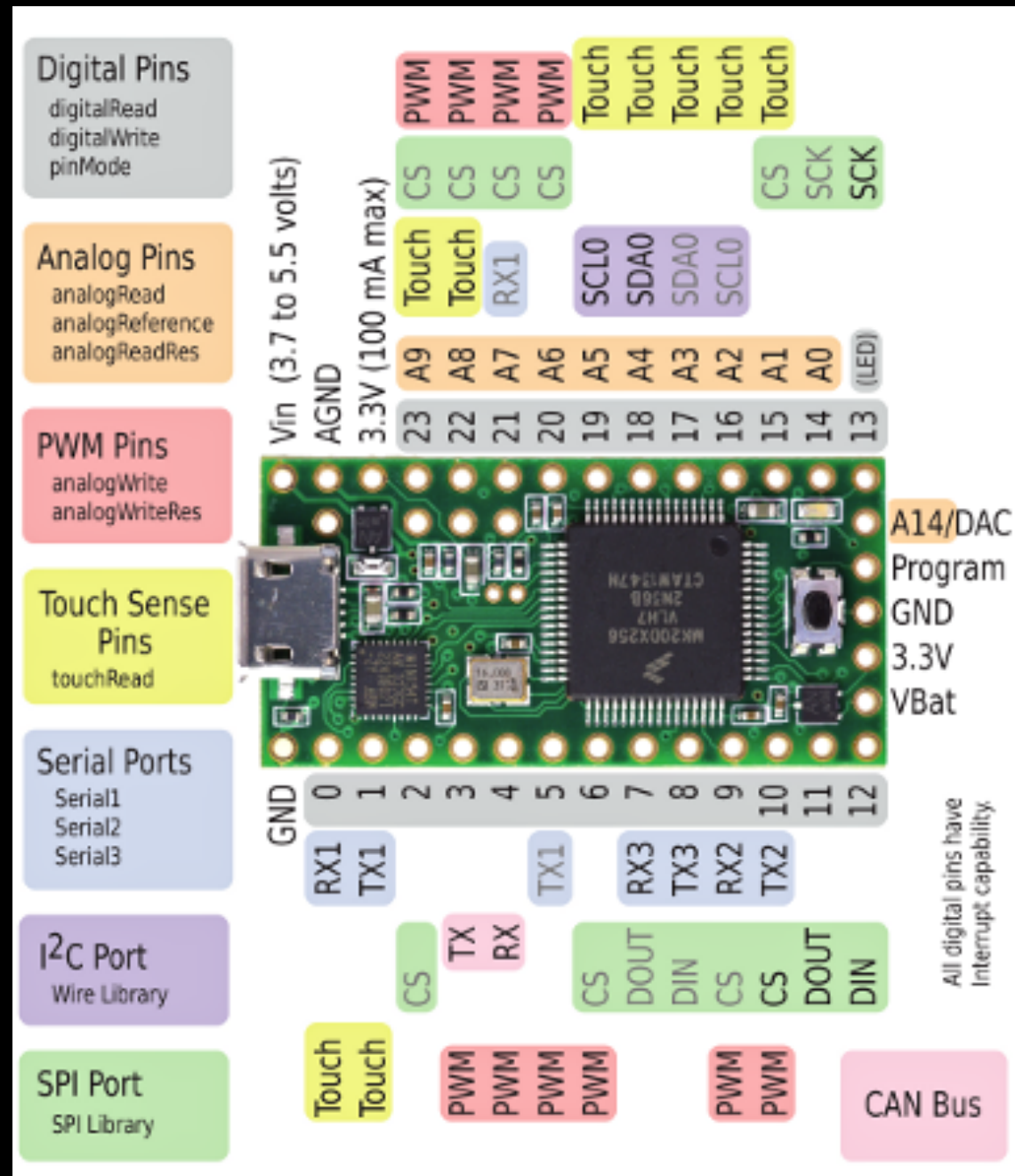
- Arduino - <http://www.arduino.cc/>
- Fritzing - <http://fritzing.org/>
- Codebender - <https://codebender.cc/>
- Teensy - <https://www.pjrc.com/>

Suppliers

- Sparkfun
- Adafruit
- Mouser
- RadioShack

Project

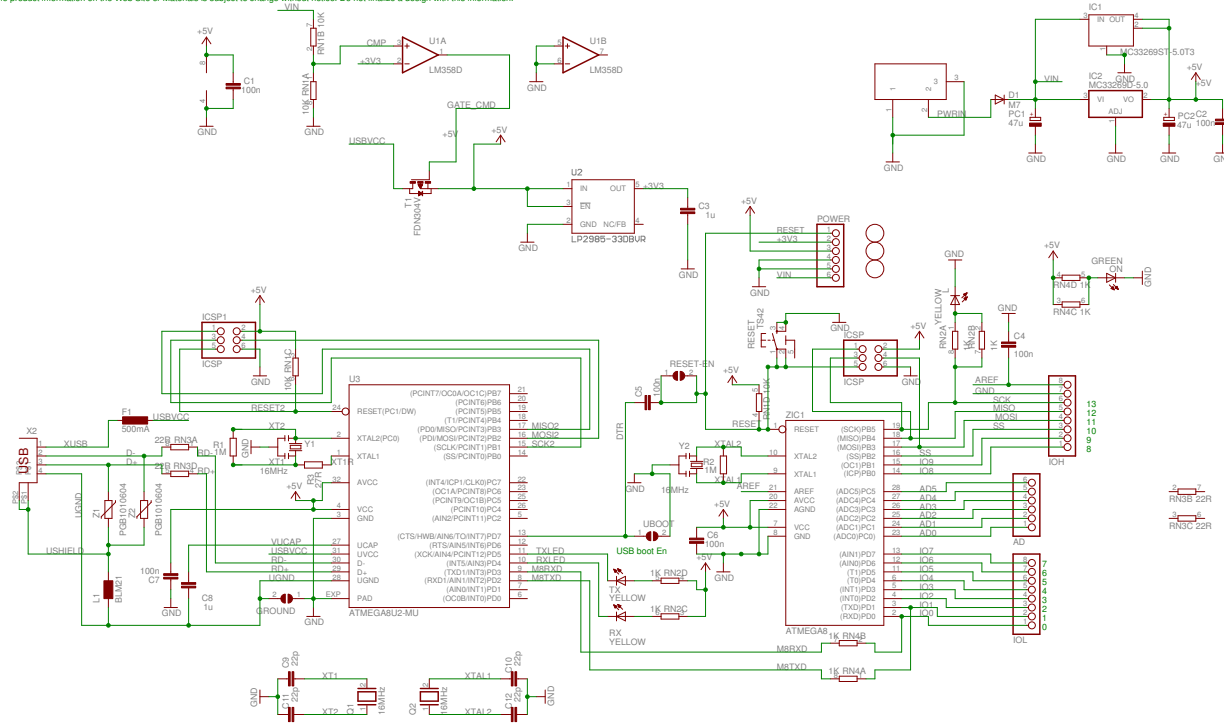
In-Depth,
but not too much
depth



Arduino™ UNO Reference Design

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Reading Schematics Is A Nuisance

Don't worry about it

LEDs, The Coolest Component

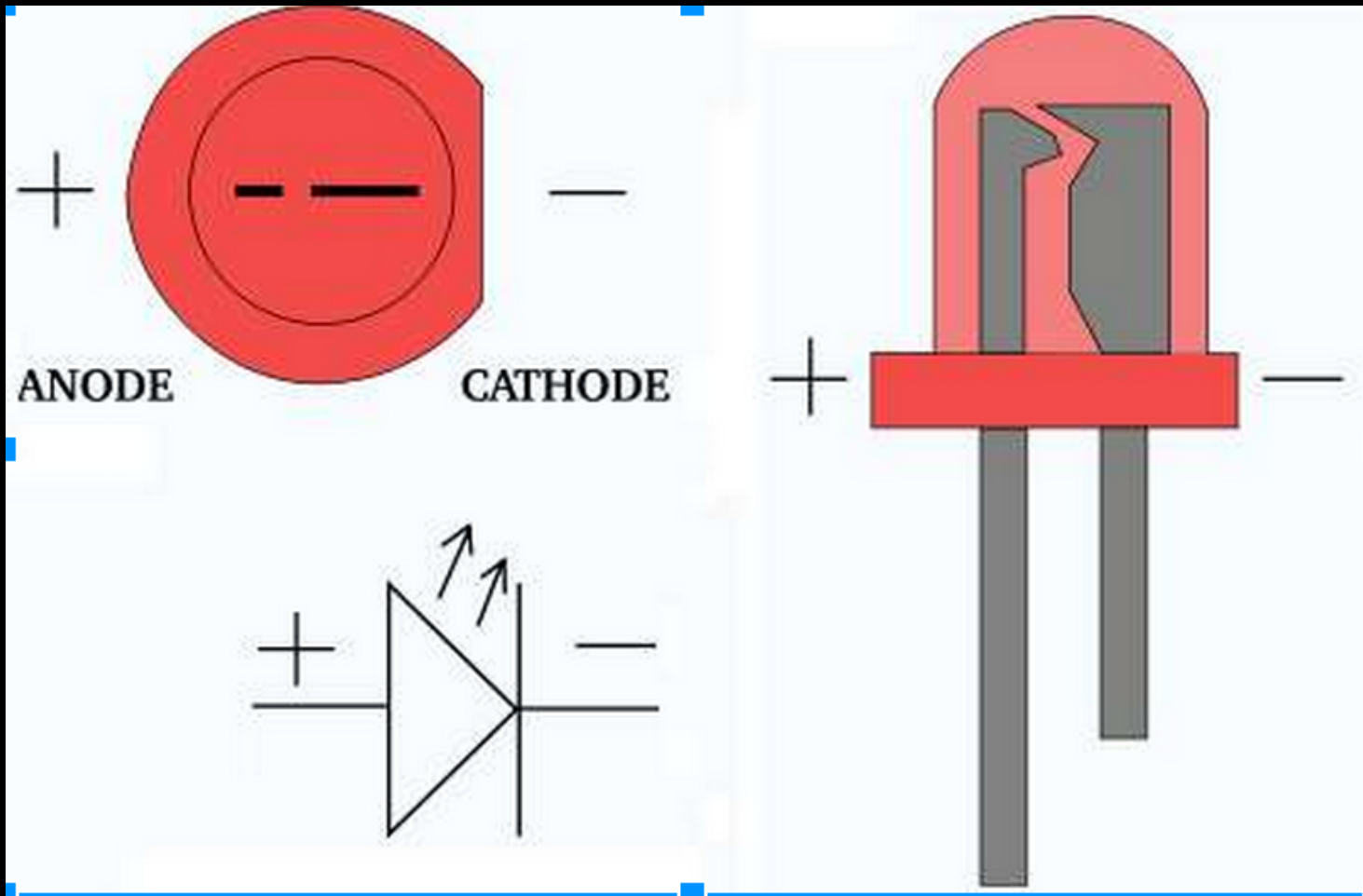
- Light Emitting Diodes
- Diodes are one-way power gates
- Always use a resistor
- Diodes offer no resistance, so if you connect + to - with one, that's a short
- Always use a resistor



diode

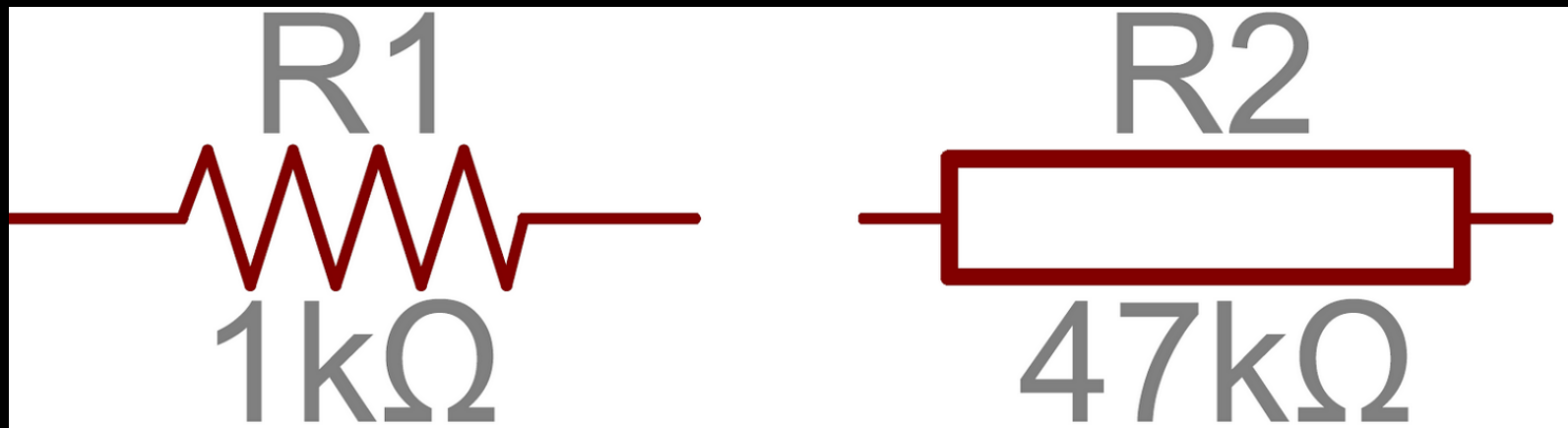


light emitting diode



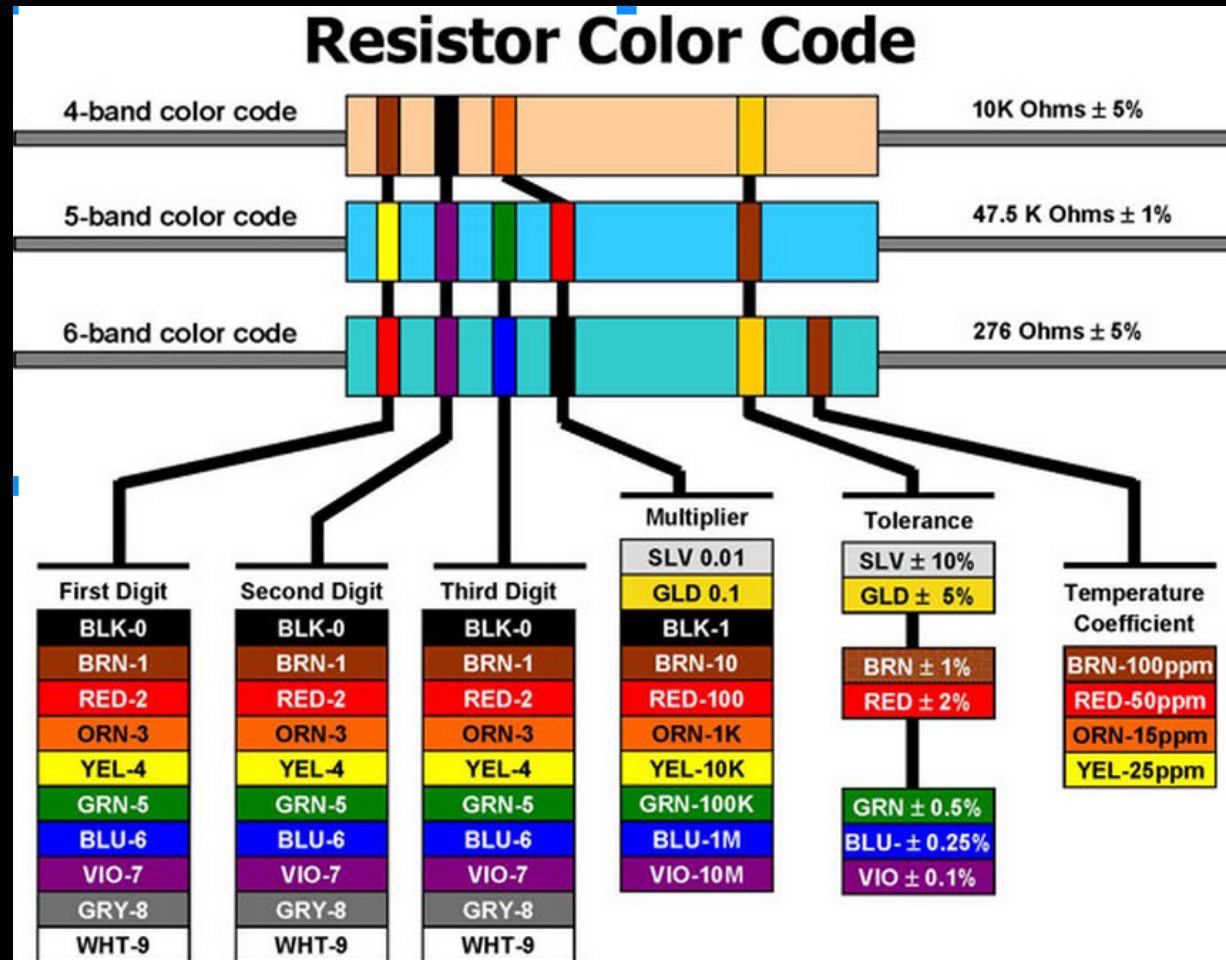
Which End Is Up?

Flat side and long leg = negative.
Usually.



Resistors, The Nerdiest Component

Electronic Choke Points
Measured in Ohms



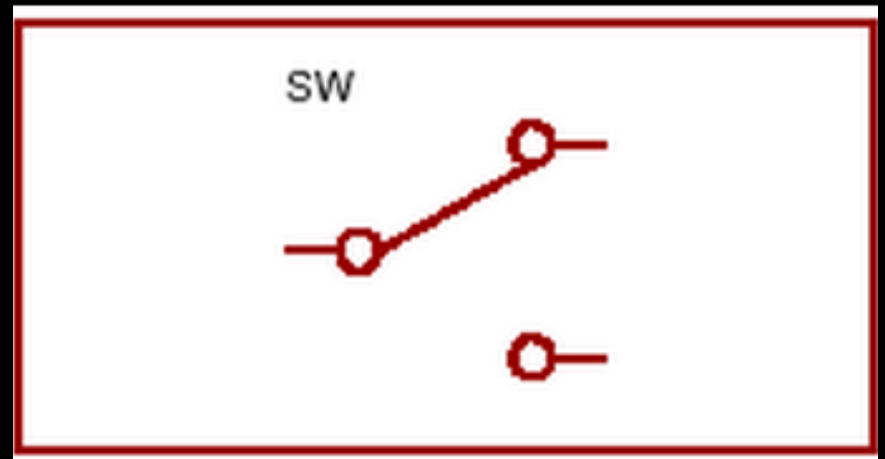
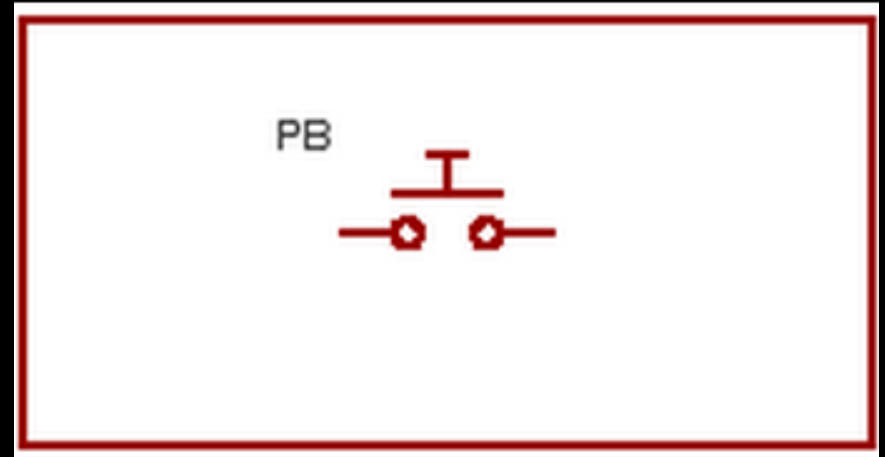
Reading Resistors

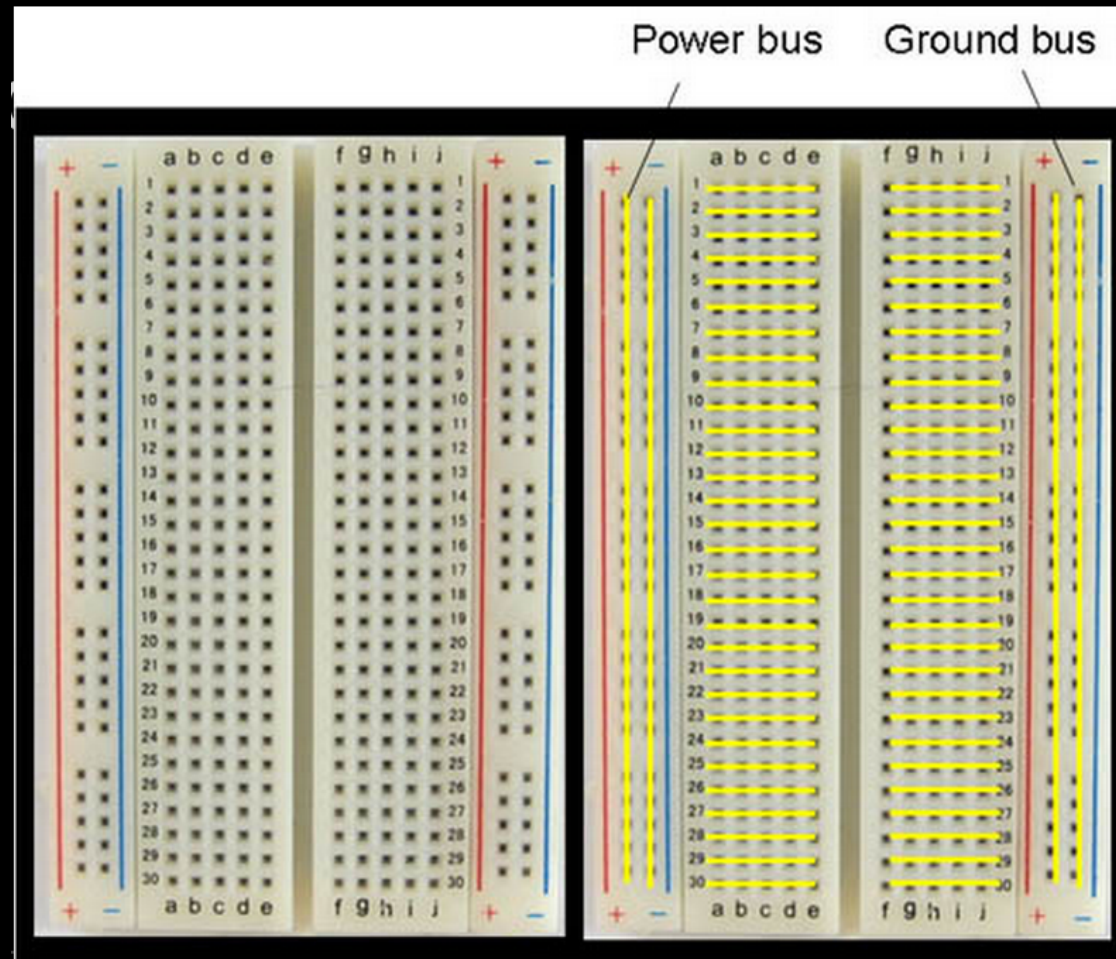
Brown, Black, Black, Red, Brown = 10K Ω

Red, Red, Brown, Gold = 220 Ω

Switches, The UI Component

Many kinds, all pretty simple

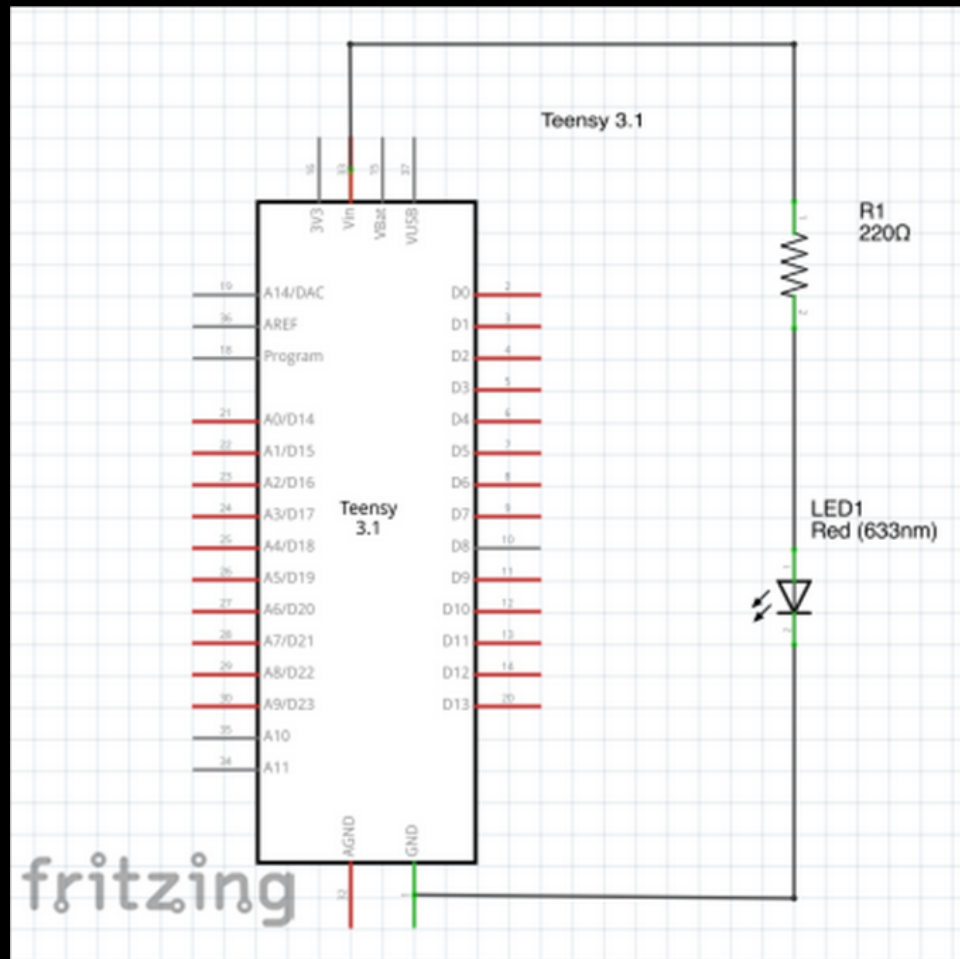




Breadboards

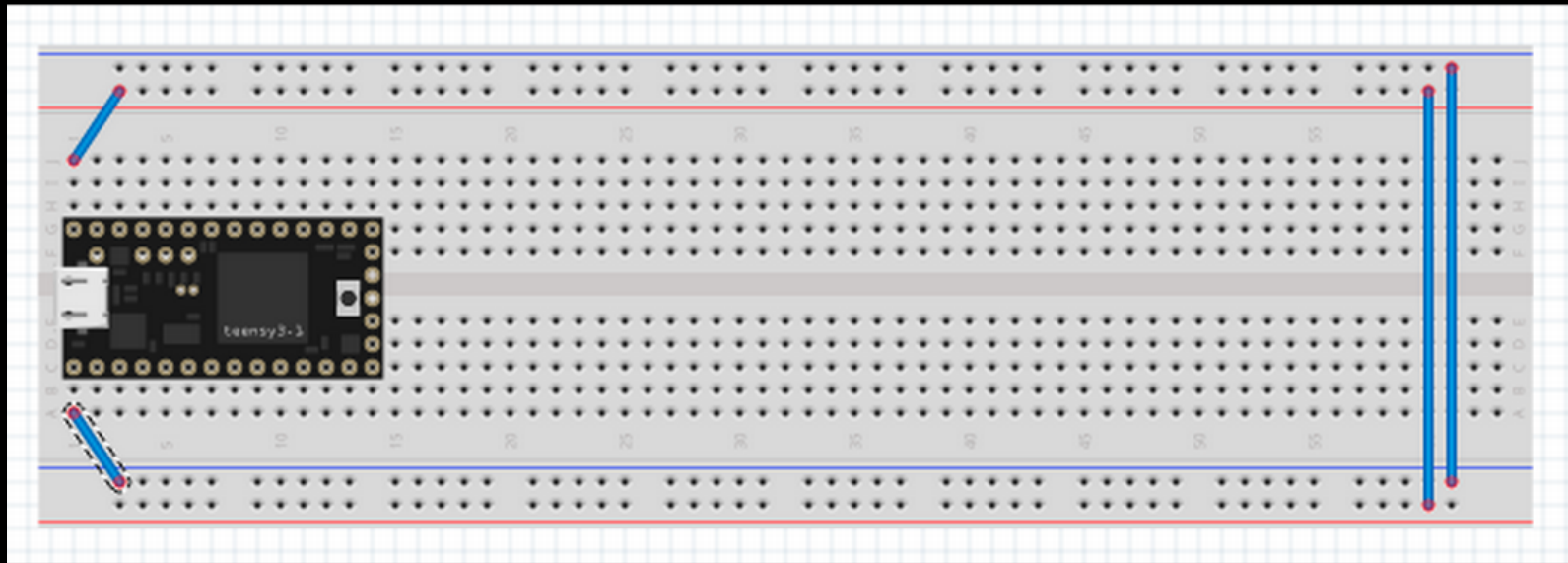
How Do They Work?

Exercise 1



Light Up An LED

An Electronic “Hello, World”

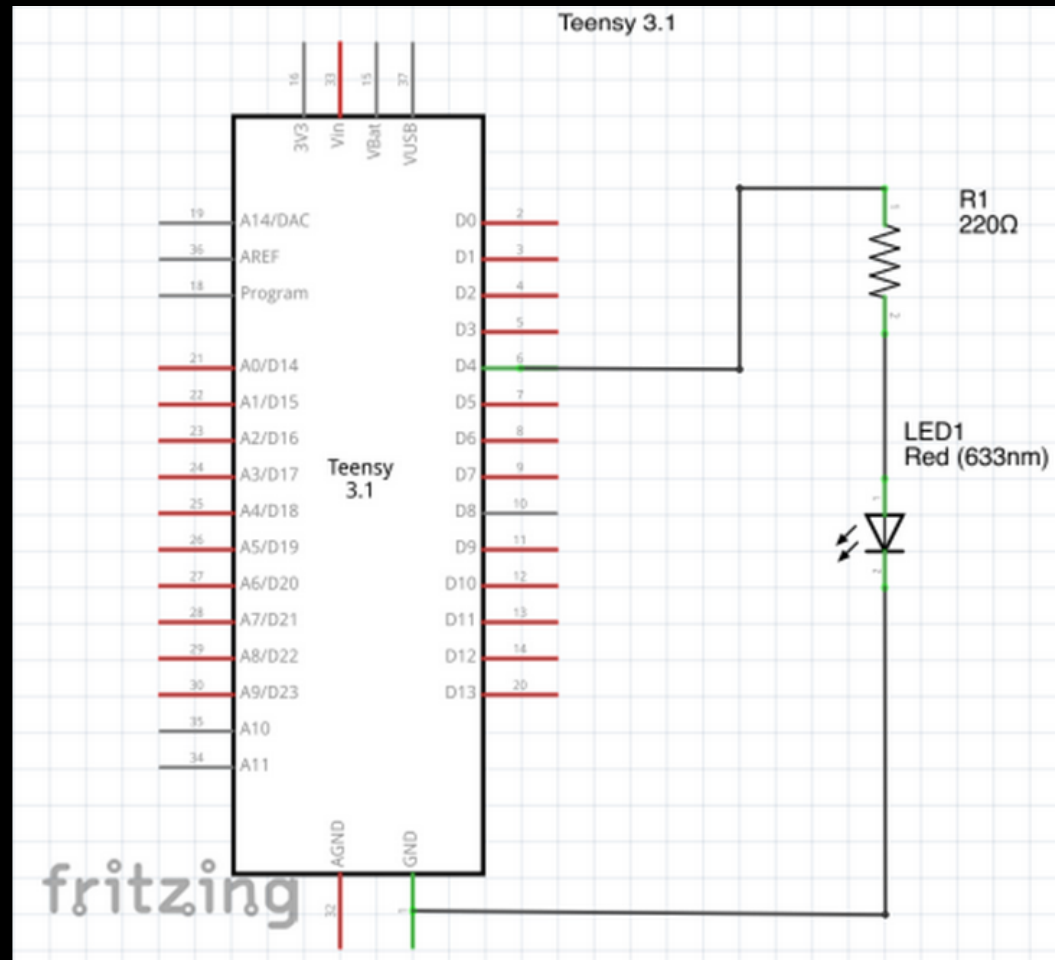


Do This



There Should Be Light, And You Should See That It Is Good

Exercise 2



Make it Blink

An Electronic "Hello \$USER"

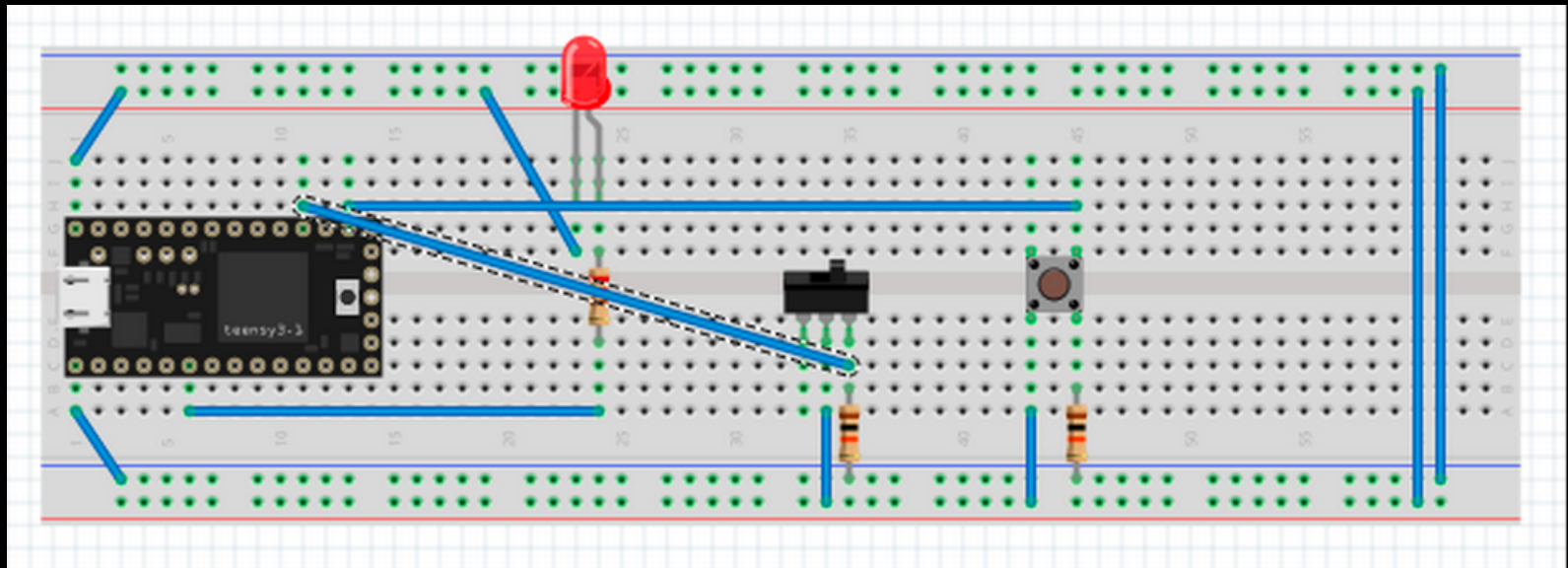
Arduino IDE Basics

- Bad News:
 - It's C
- Good News:
 - It's very simple
 - Lots of sample code on-line and built-in

Do This

- Launch Arduino.app
- Tools > Board > Teensy 3.1
- File > Examples > 01.Basics > Blink
- Upload! Blinking!
- Change “int led = 13;” to “int led = 4;”
- Upload! Better Blinking!

Exercise 3



Add A Button and A Switch

This is the most complicated thing we'll be doing

Time To Do Some Real Coding

To the IDE!..

Turn the LED on With The Button or the Switch

```
int led = 4;
int button1 = 14;
int switch1 = 16;

void setup() {
  pinMode(led, OUTPUT);
  pinMode(button1, INPUT);
  pinMode(switch1, INPUT);
}

void loop()
{
  if (digitalRead(button1) == HIGH) {
    digitalWrite(led, HIGH);
  } else {
    digitalWrite(led, LOW);
  }
  if (digitalRead(switch1) == HIGH) {
    digitalWrite(led, HIGH);
  } else {
    digitalWrite(led, LOW);
  }
}
```

Make A Mouse-Jiggler and Single Key Keyboard

```
int led = 4;
int button1 = 14;
int switch1 = 16;

void setup() {
  // put your setup code here, to run once:
  pinMode(led, OUTPUT);
  pinMode(button1, INPUT);
  pinMode(switch1, INPUT);
  Mouse.begin();
}

void loop() {
  if (digitalRead(button1)) {
    //send t while pressed
    Keyboard.print('t');
    digitalWrite(led, HIGH);
    //redButtonPressed = true;
  }
  else {
    digitalWrite(led, LOW);
    Keyboard.end();
  }
  if (digitalRead(switch1)) {
    //jiggle mouse while pressed
    Mouse.move(0, -10);
    delay(100);
    Mouse.move(0, 10);
    delay(100);
  }
}
```