

AIR LAB  Arduino workshop
Creative coding Club # **LightPlay**

TENSOR, DARK MATTER Berlin (26. May - 01. October)

Agenda

- Intro: The lab, the theme, Arduino
- The kits: Distributing, setting up
- The IDE: Hello world!, the platform, structure and syntax
- Arduino coding: Sensors and actuators, LEDs, libraries
- Idea generation: I/O-combos, themes/context
- Work!
- Round-up

Welcome to
AIR LAB

LightPlay: Interacting with light

Why?
How?

Get your kits!

Sharing between
2-3 persons!

Arduino

Why?

Let's get started...

Arduino IDE

download->install->open

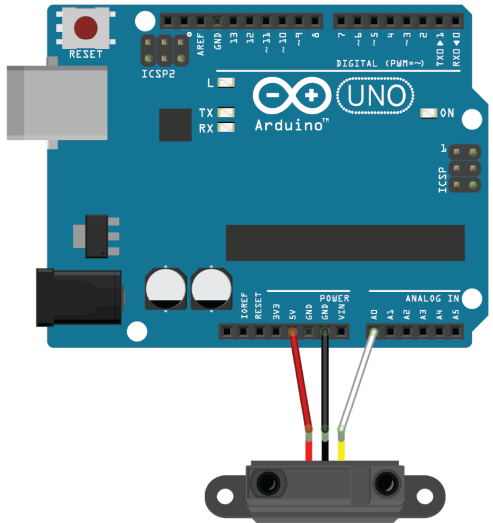
arduino.cc/en/software

Download our code examples

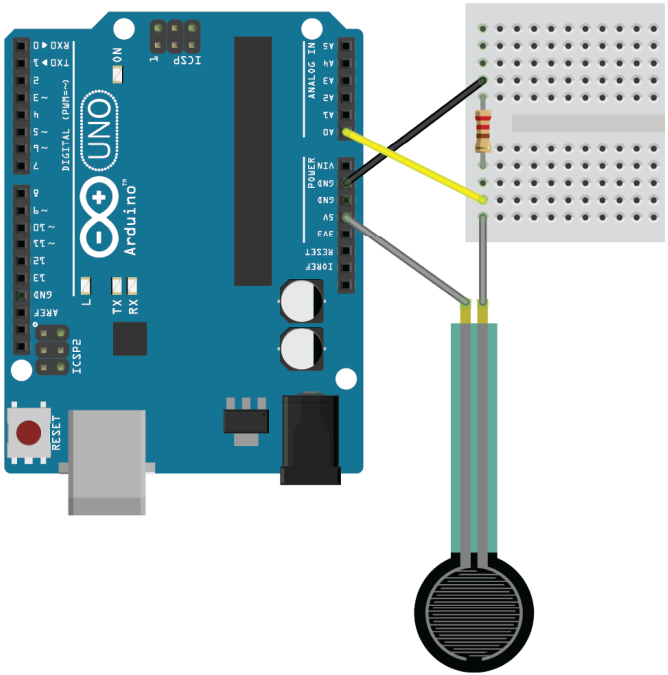
github.com/airlabitu/CCC-4/

SENSORS & ACTUATORS

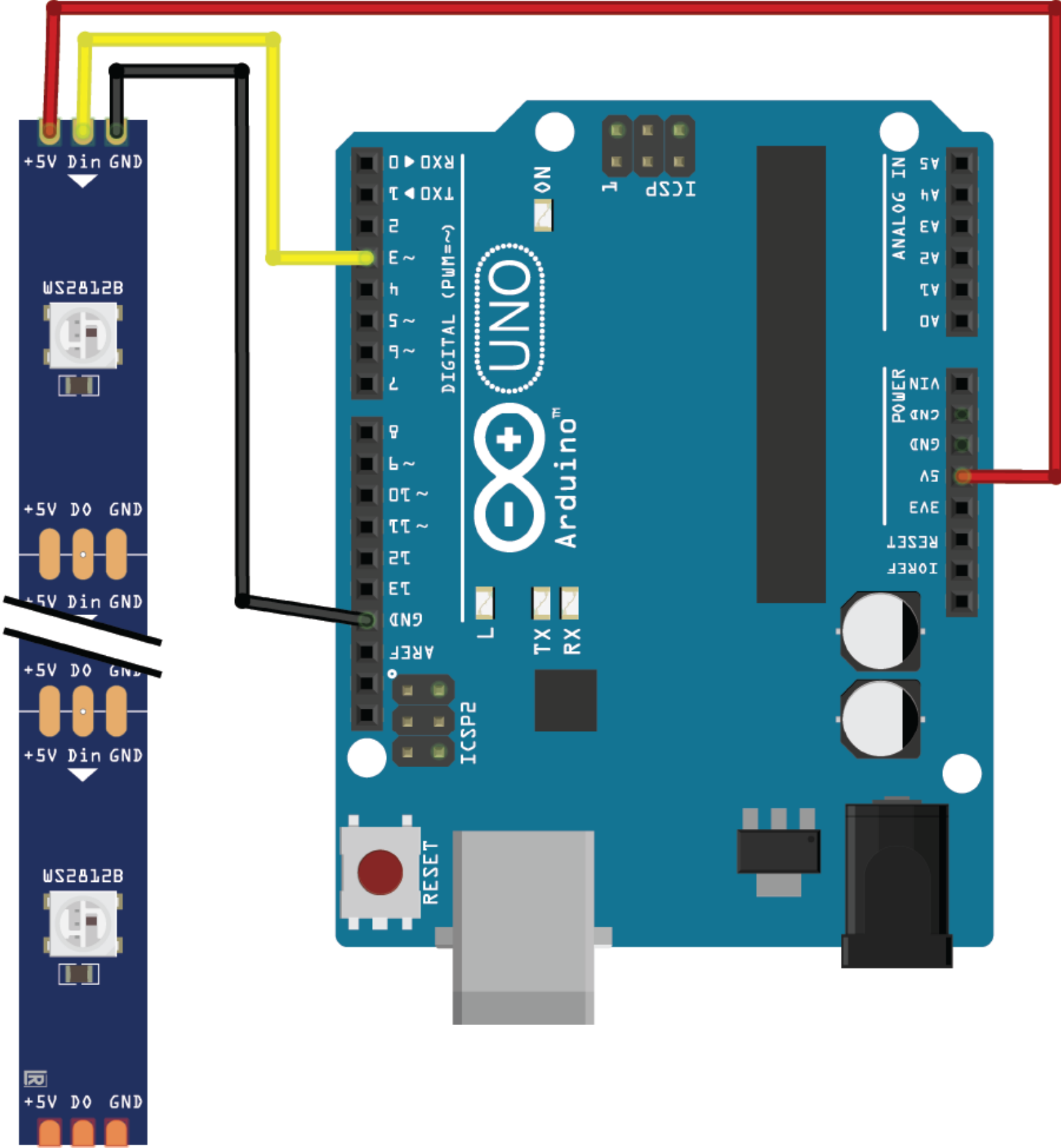
Proximity



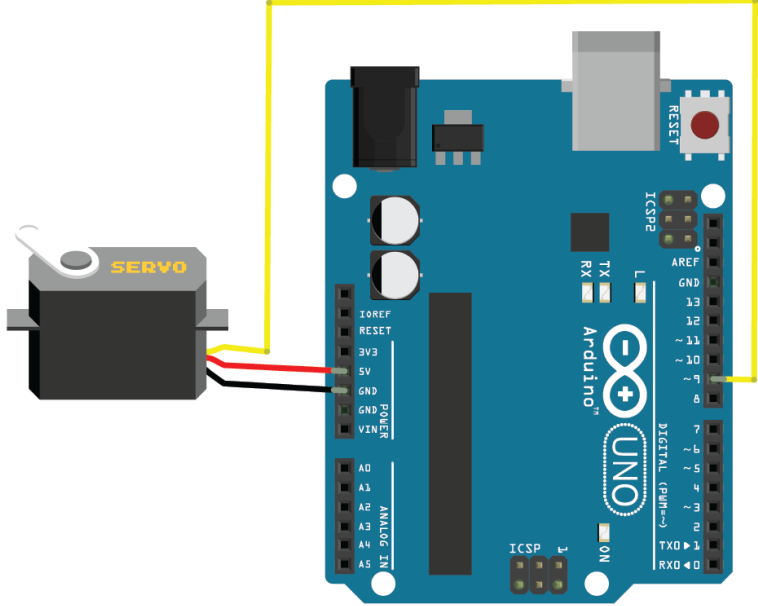
Force



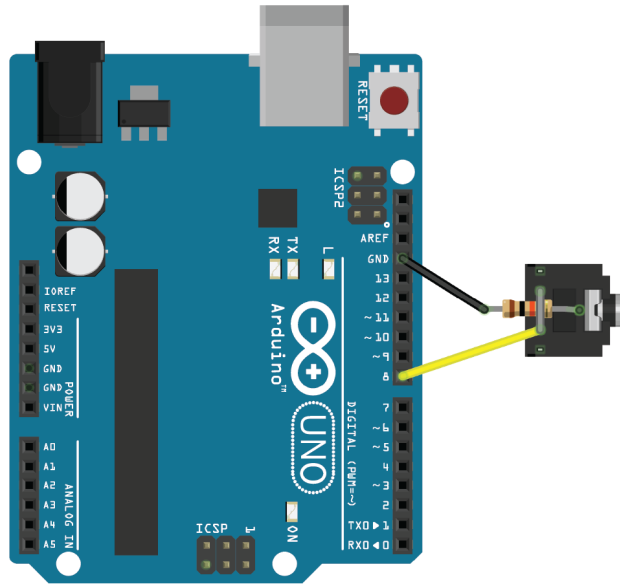
Light



Movement



Sound



Do your first thing...

Connect board (with USB cable)

Set board type (Tools->Board->Arduino AVR boards->Arduino Uno)

Select board/port (Tools->Port->your_port)

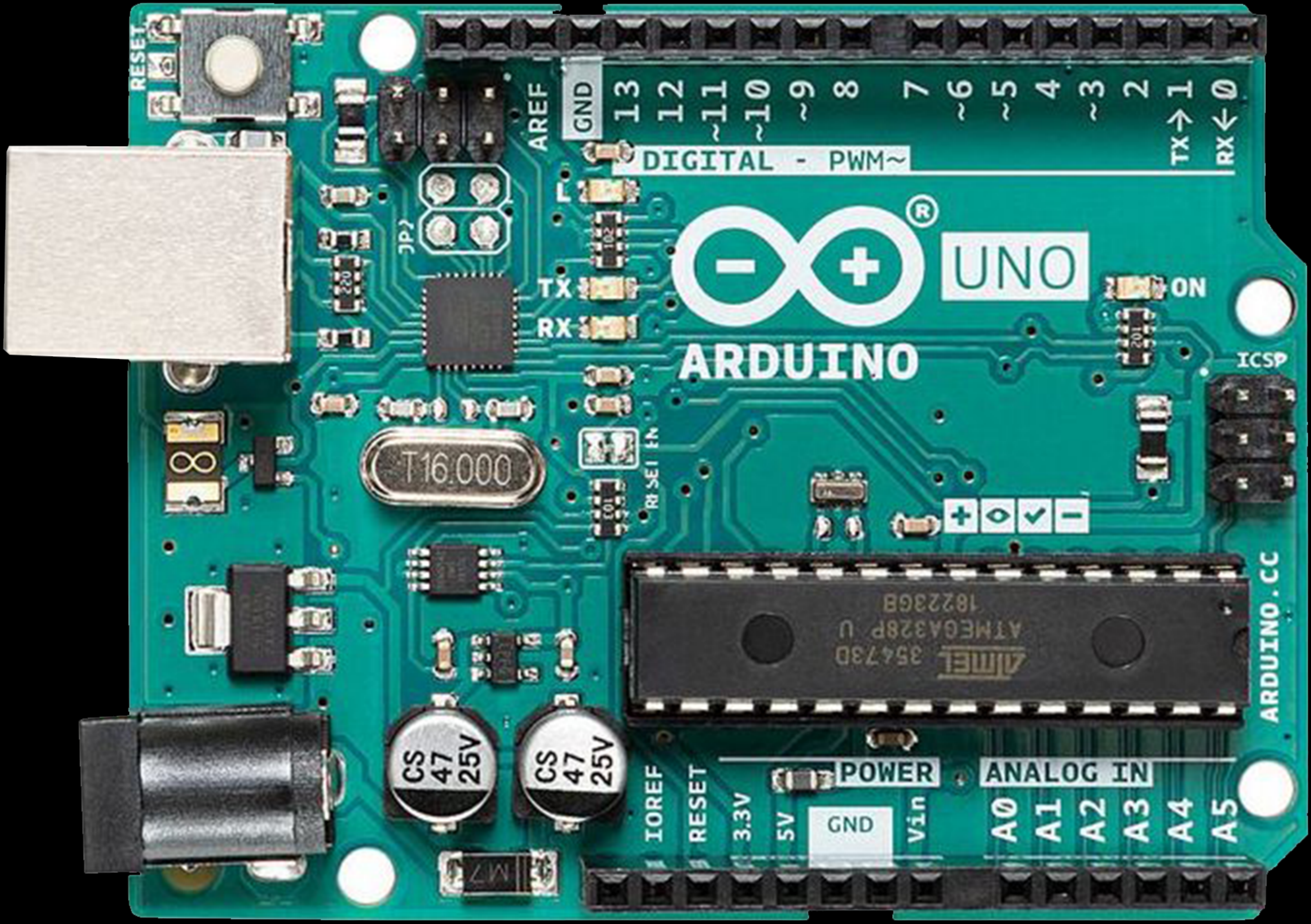
Upload your first code (File->Examples->Basic->Blink)

What is Arduino?

IDE (code editor)

Microcontrollers (compatible boards)

Add-on hardware (sensors, actuators, kit's, components, modules)



RESET

AREF

GND

13

12

~11

~10

~9

8

7

6

~5

4

~3

2

1

TX →

RX ←

0

DIGITAL - PWM ~



UNO

ARDUINO

ON

ICSP

T16.000

RESET FN

+ 0 ✓ -

ARDUINO.CC

ATMEL 35473D
ATMEGA328P U
18223GB

IOREF

RESET

3.3V

5V

GND

V_{in}

POWER

ANALOG IN

A0

A1

A2

A3

A4

A5



Select Board



sketch_feb27a.ino



```
1
2 // put your global scope variables here
3
4
5 void setup() {
6     // put your setup code here, to run once:
7
8 }
9
10 void loop() {
11     // put your main code here, to run repeatedly:
12
13 }
```

What is Arduino?

I/O pin functions:

- pinMode(..., ...)
- digitalWrite(..., ...)
- analogWrite(..., ...)
- analogRead(...)
- digitalRead(...)

Debugging functions:

- Serial.begin(...)
- Serial.println(...)

Other helpful functions:

- millis()
- map(..., ..., ..., ..., ...)
- random(..., ...)

External code resources (libraries)

- FastLED

Help and inspiration

The syntax : arduino.cc/reference/en/

Built-in examples: *File -> Examples*

Getting started : arduino.cc/en/Guide

Tutorials : docs.arduino.cc/tutorials/

Other peoples projects : projecthub.arduino.cc/

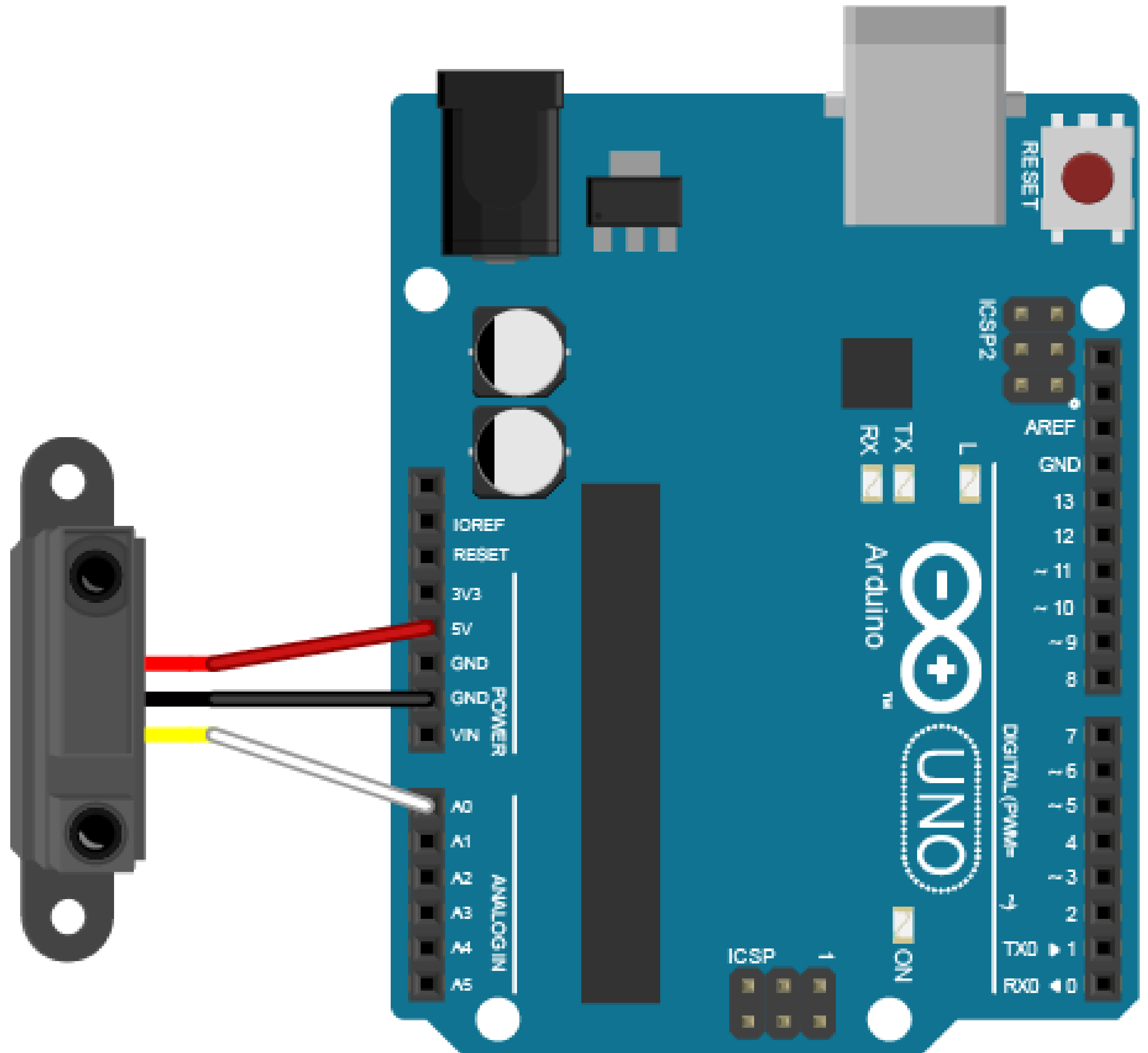
INPUT reading analog sensors

Arduino Uno

IR proximity sensor

Code

(File -> Examples -> Basic -> AnalogReadSerial)



INPUT reading analog sensors

Arduino Uno

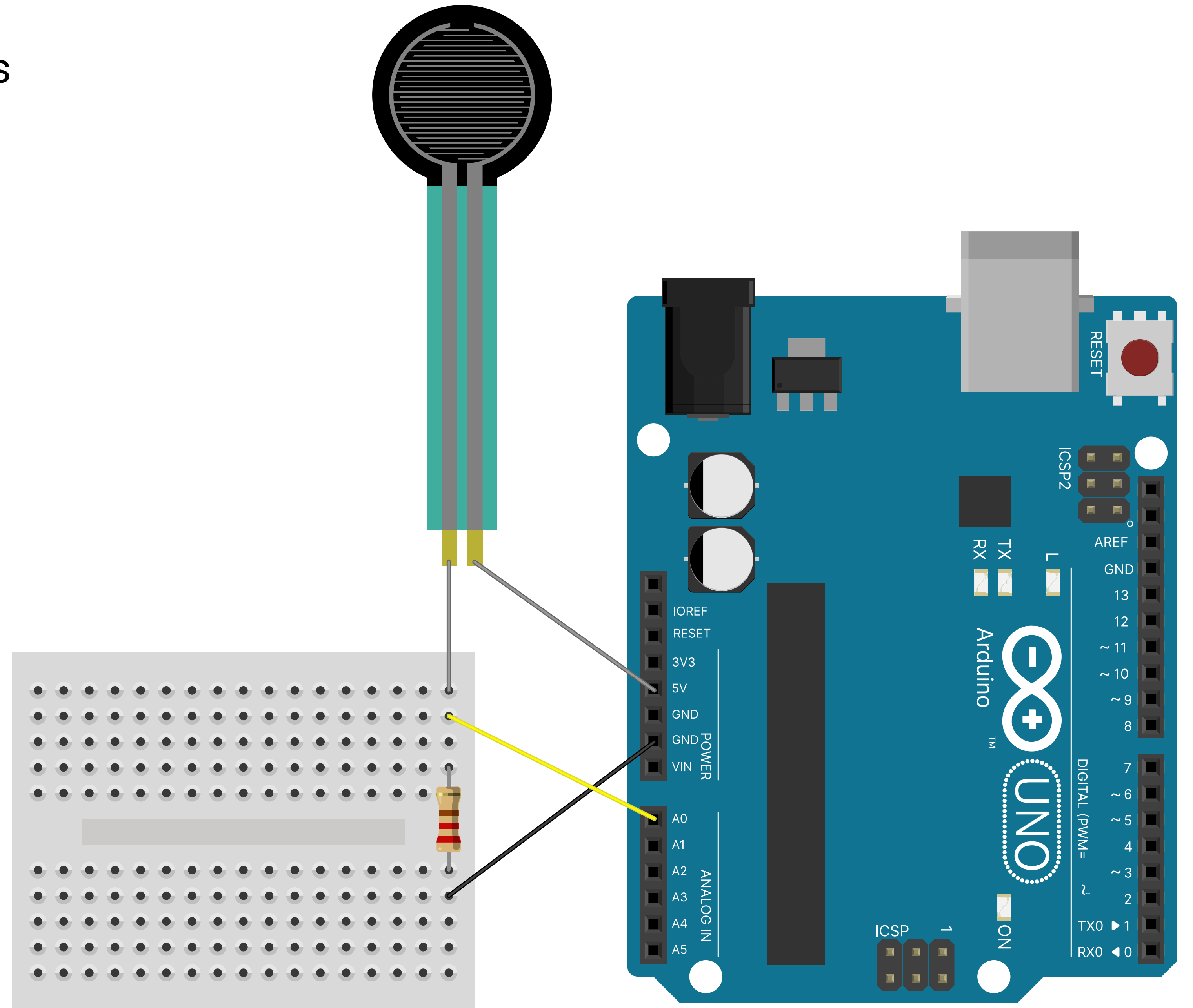
Force touch sensor

10K resistor

Breadboard

Code example

(File -> Examples -> Basic -> AnalogReadSerial)



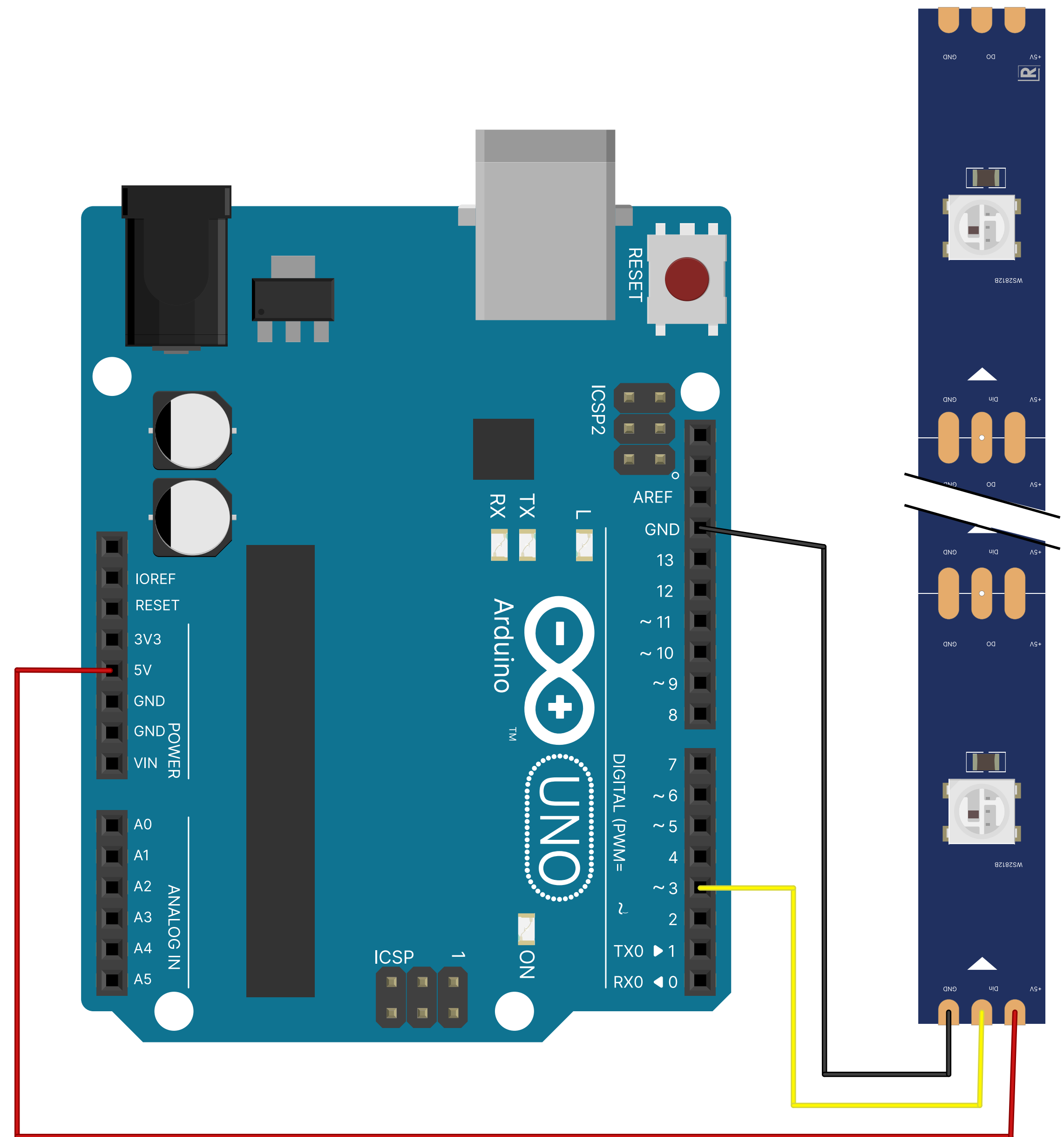
OUTPUT controlling addressable LEDs

Arduino Uno

LED strip

Code example

https://github.com/airlabitu/CCC-2/tree/main/arduino%20examples/LEDstrip_Barebone



Code libraries

What is a library?

- reusable code resource
- (interfacing hardware)

How to get a library?

- library manager
- internet (GitHub etc.)

Library documentation

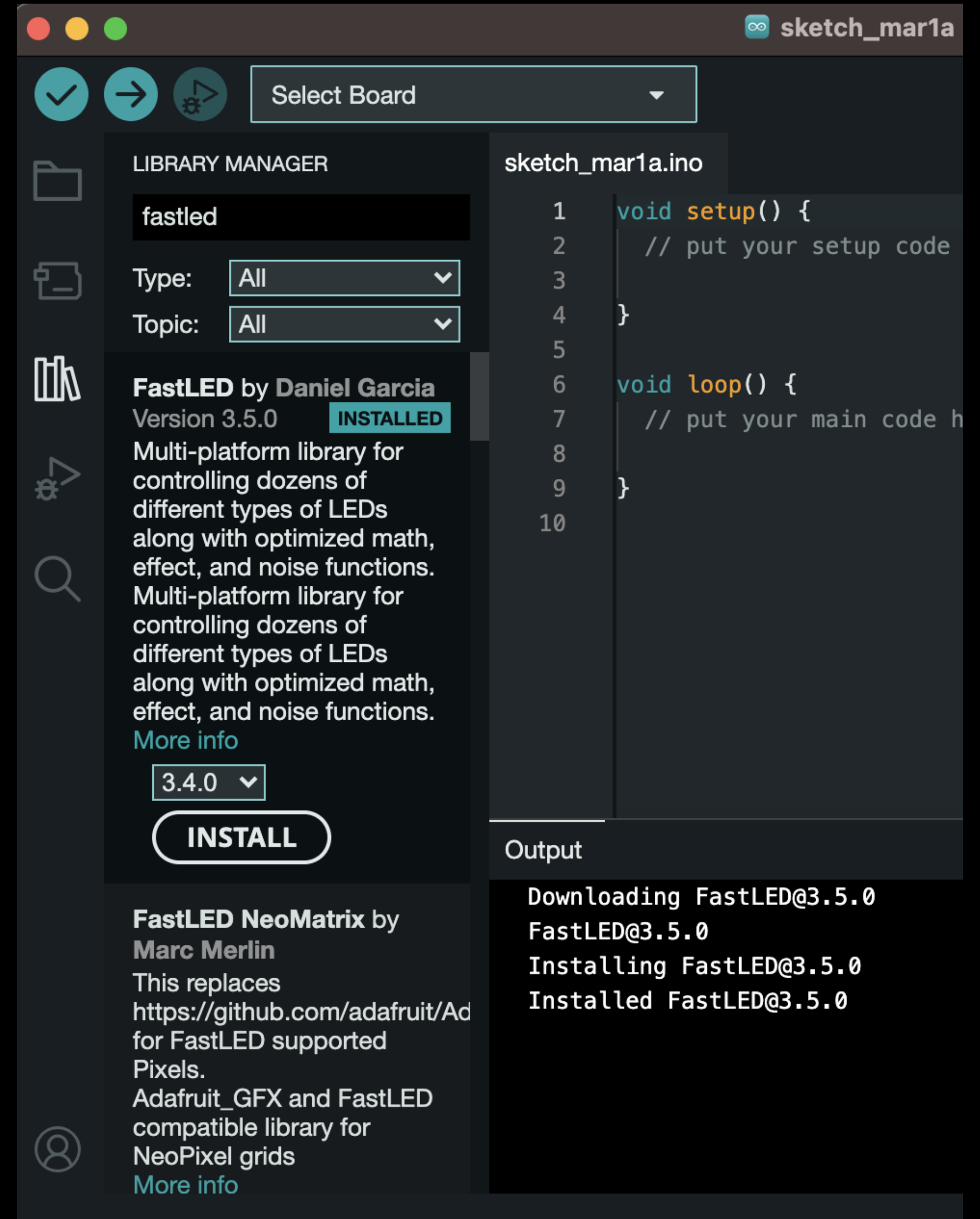
- [arduino.cc/reference/en/libraries/](https://www.arduino.cc/reference/en/libraries/)
- library website
- online tutorials and guides

FastLED

A library for controlling programmable LEDs

Install with library manager

- sketch -> include library -> manage libraries
- search: FastLED
- install: FastLED by Daniel Garcia, version 3.5.0



Idea generation:

Input/Output-combinations?

Themes? Locations?

Scales? Context?

Keywords:

Input/Output-combinations, themes, locations, scales, context

Pushing lights

Painting with lights

EKG as input

Music box

Moving lights

Pushing lights

Fading lights

Alarm lights

Adding digital elements
to existing things

Combining with sound input?

Pick a direction

Run with it!

Round up

What have you created?

Insights and ideas

Come find us online!

Opening hours, equipment overview,
book project support, research,
previous projects and... **EVENTS!**

- 14.09 CCC#4: Arduino [LightPlay]
- 22.09 Demo day
- 06.10 Friday Bar: meet-n-greet
- 02.11 CCC#5: TBA

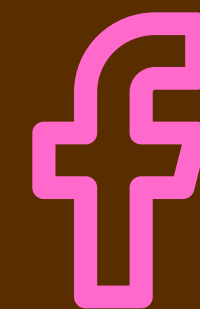
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