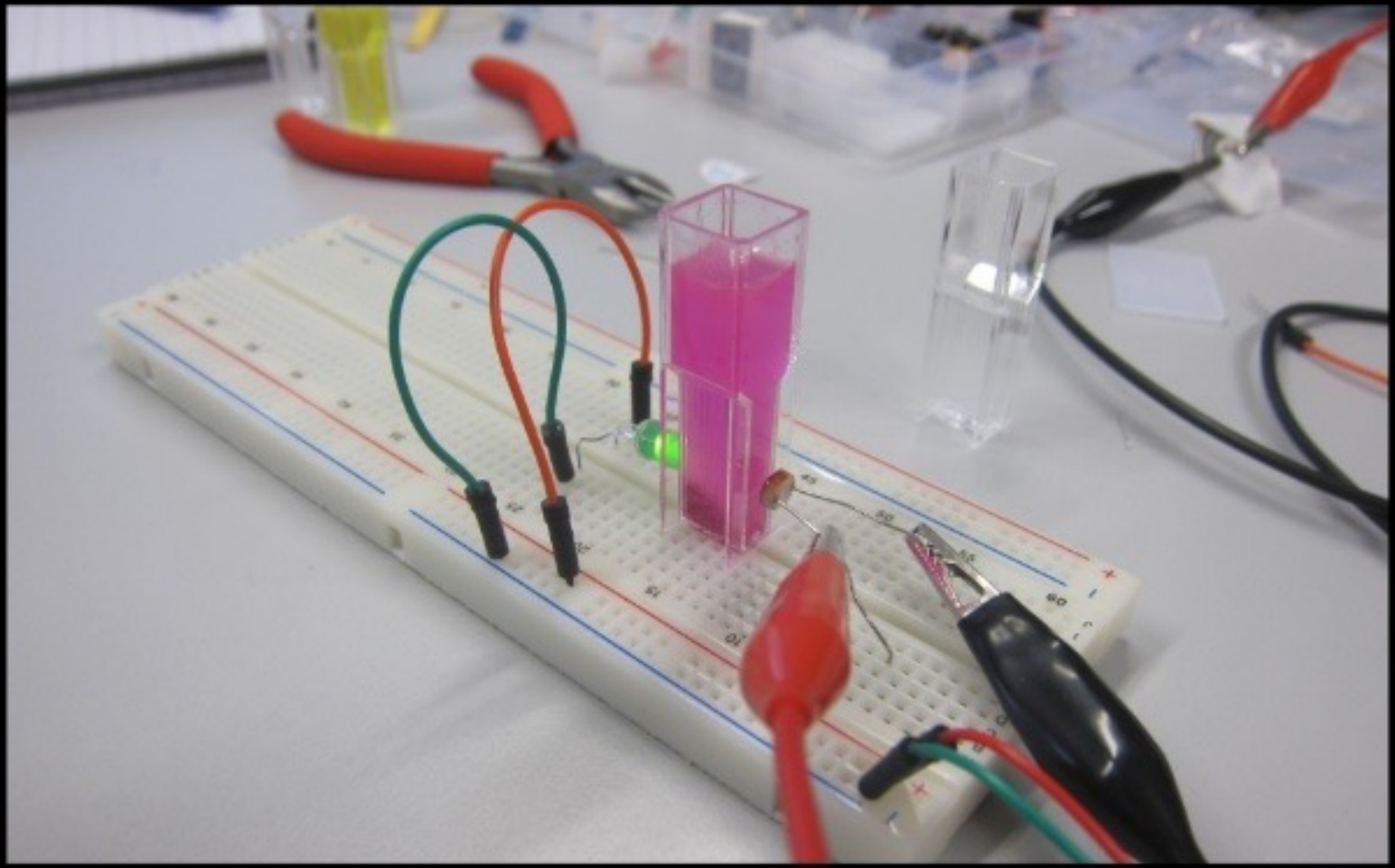
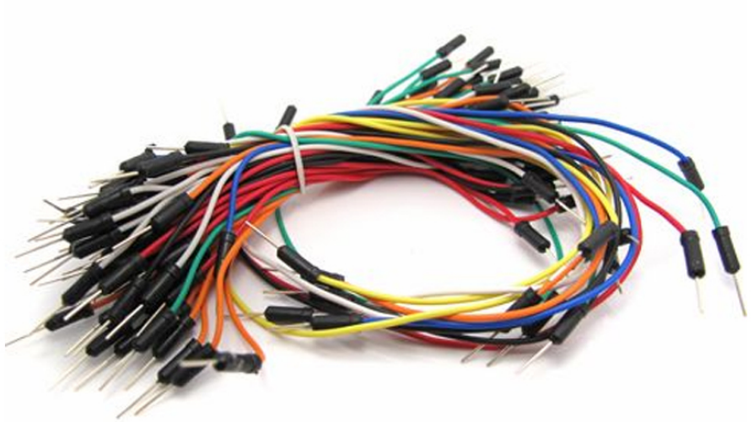
DIY Turbidity Meter

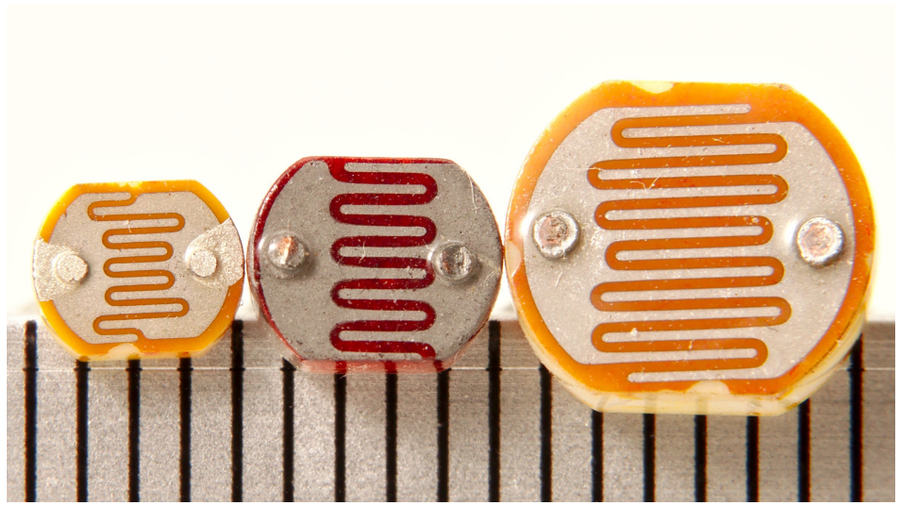


Samsung
ACCELERATOR


Lōtik
A Samsung Accelerator company

Materials





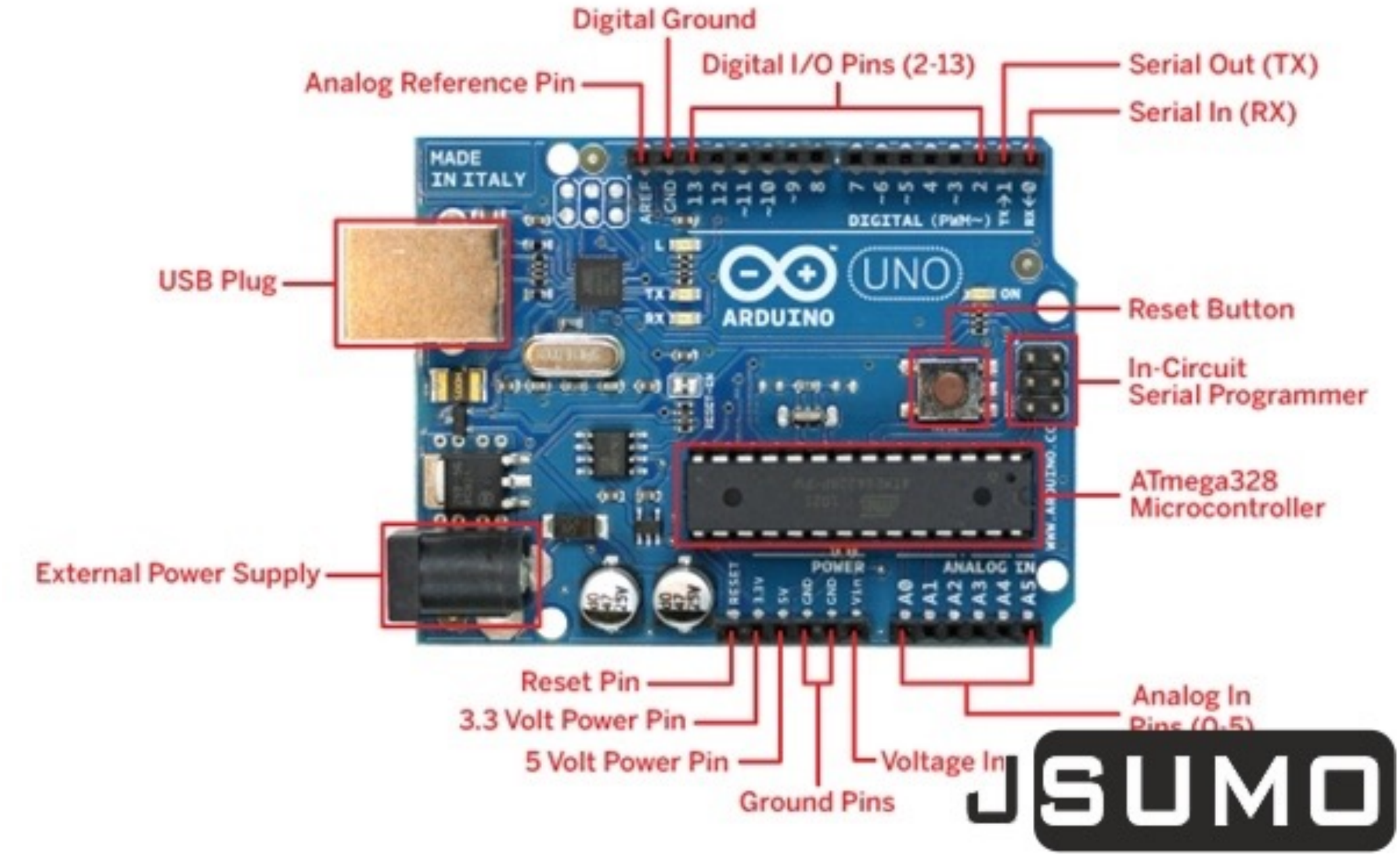
Plan

- Learn what Arduino is and complete setup(15’)
- Form groups and follow workshop steps(60’)
- Demo (15’)

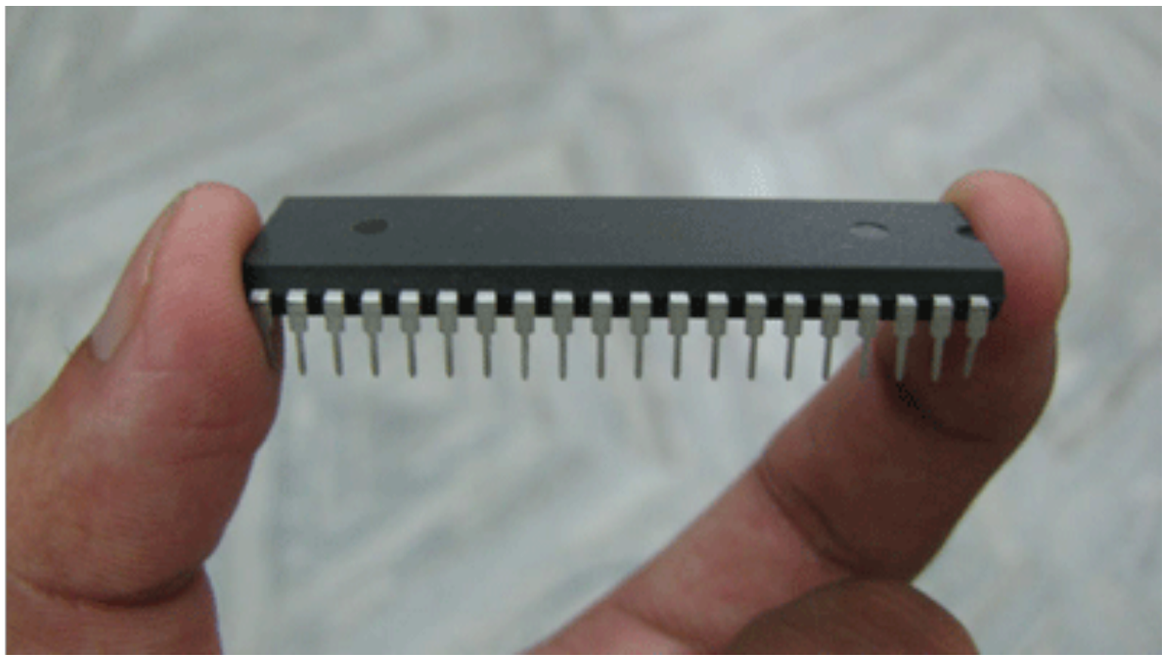
Before we start

- No silly questions
- If it doesn’t work it’s probably the hardware :)
- We’re here to experiment and learn from each other
- Code of conduct: be excellent with each other

Arduino

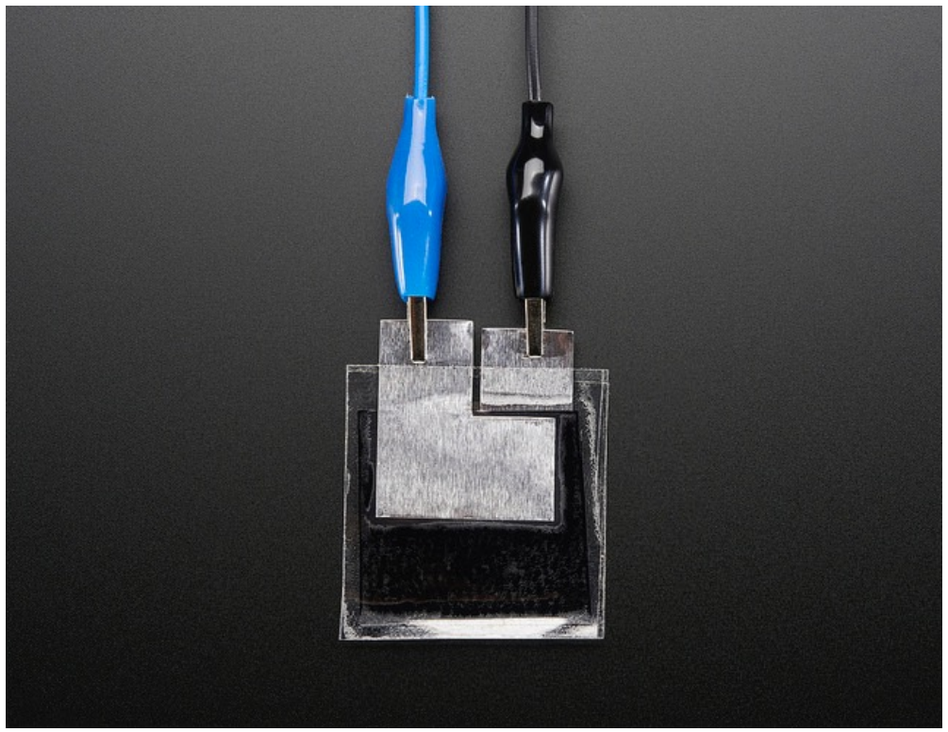

Digital Ground
Analog Reference Pin
Digital I/O Pins (2-13)
Serial Out (TX)
Serial In (RX)
USB Plug
Reset Button
In-Circuit
Serial Programmer
ATmega328
Microcontroller
External Power Supply
Reset Pin
3.3 Volt Power Pin
5 Volt Power Pin
Ground Pins
Voltage In
Analog In
MADE
IN ITALY
DIGITAL (PWM~)
UNO
ARDUINO
POWER
ANALOG IN
JSUMO

Microcontroller



A microcontroller is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals.

Examples Input

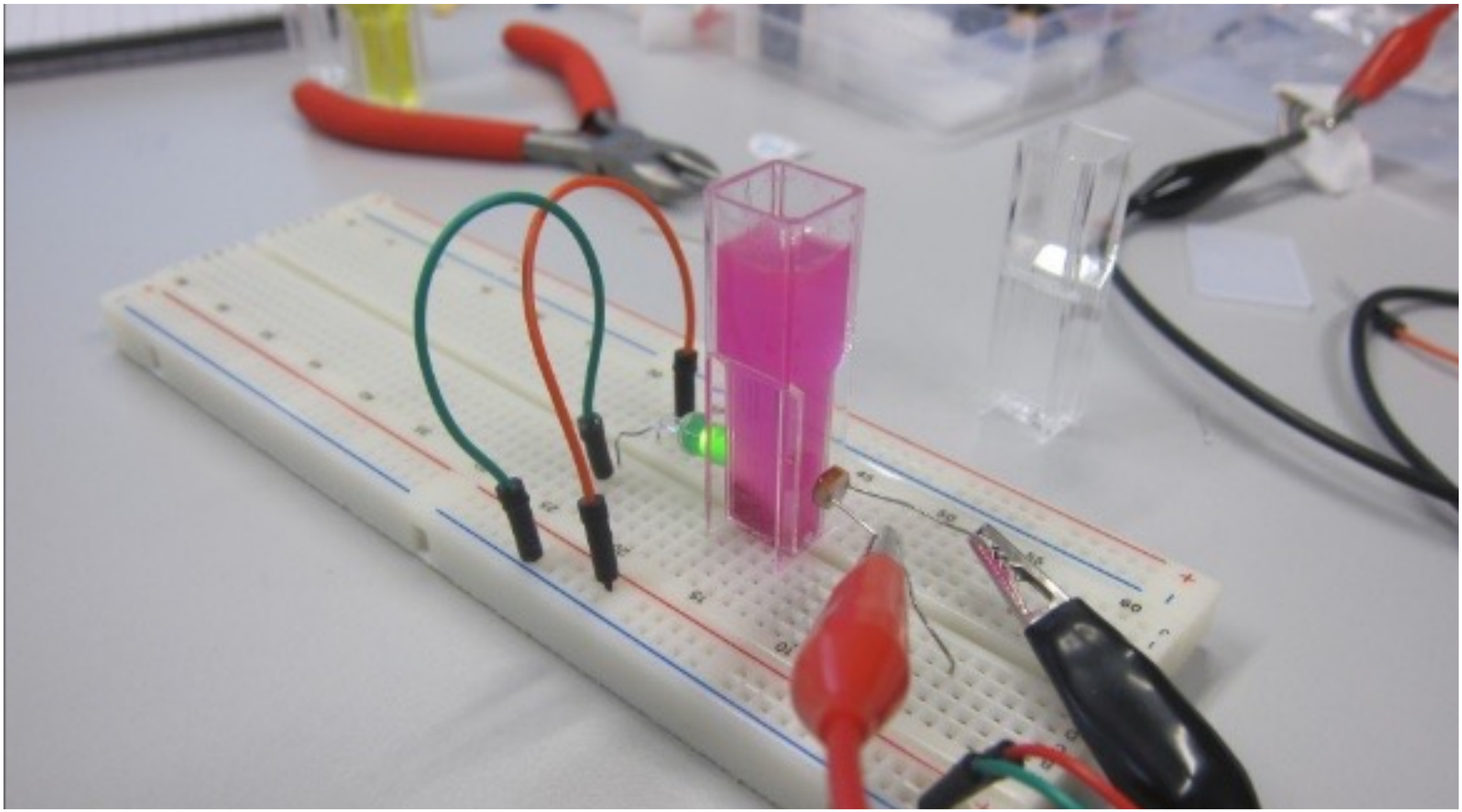


- **Conductive tape**
- **Conductive thread**
- **Anything that conducts electricity**

Examples output

- **Sound (buzzer)**
- **Light (Led)**
- **LCD (text)**

Diy Turbidity

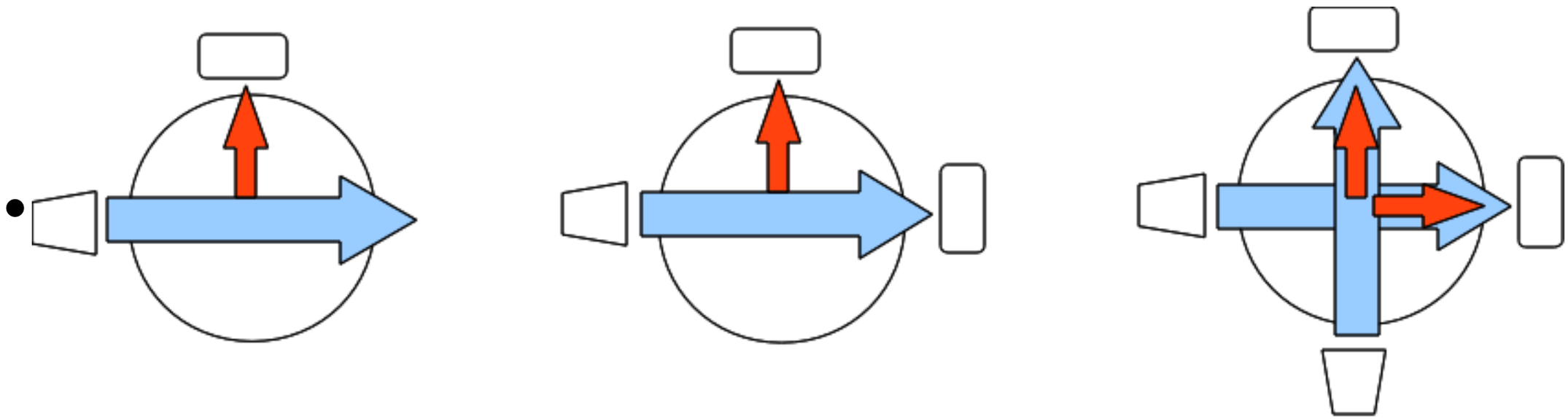


Turbidity (NTU)

Water Samples:

Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles that are generally invisible to the naked eye, similar to smoke in air. The measurement of turbidity is a key test of water quality.

Measuring Turbidity

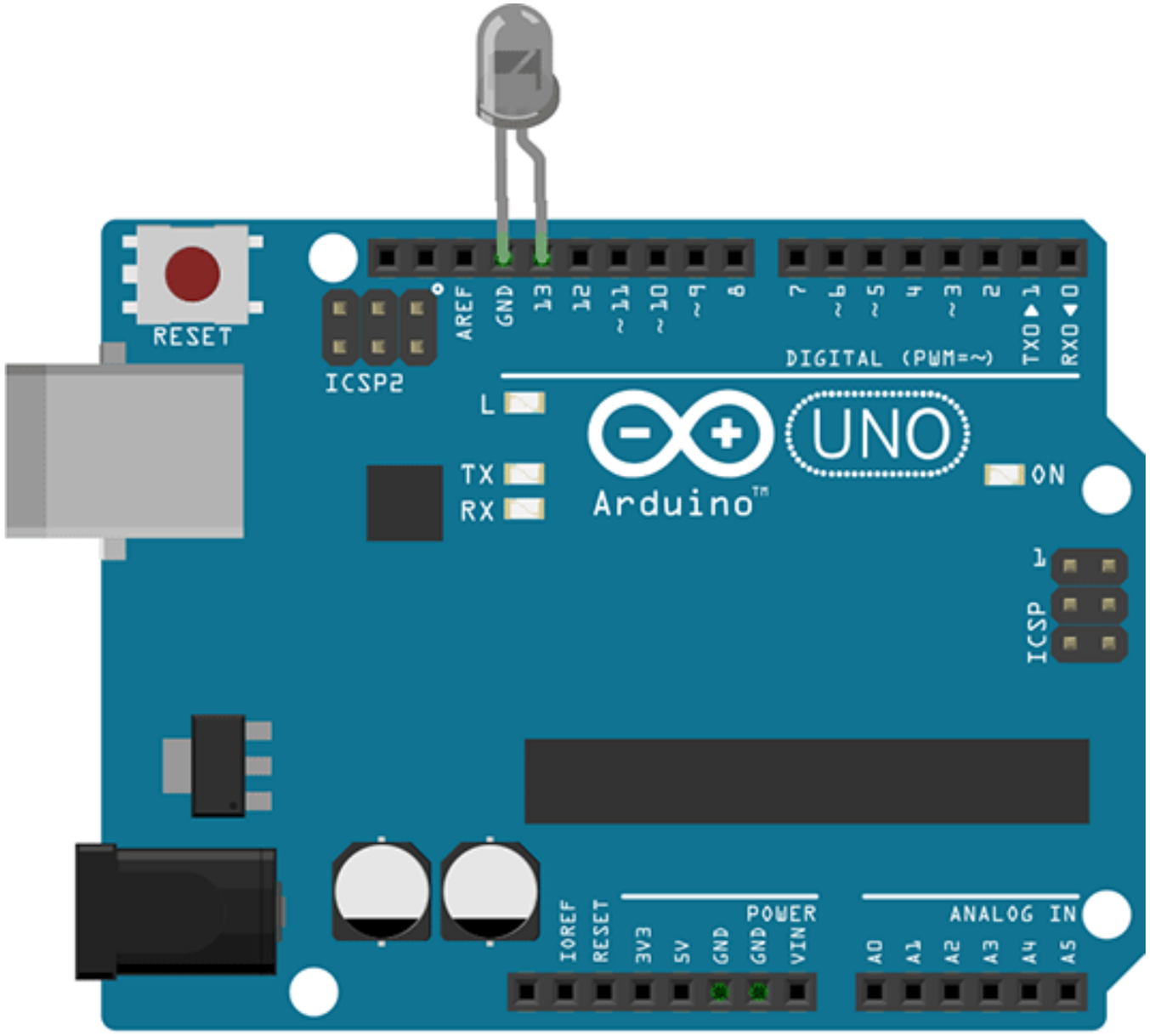


Hacking time!

Hacking time

- Let’s make teams
- **1st step**: Make an Led blink!
- **2nd step**: Connect the light sensor and get data from it.
- **3rd step**: Connect both light sensor and LED to measure water Turbidity
- Demo time (20’)

Hello World (Blinky)

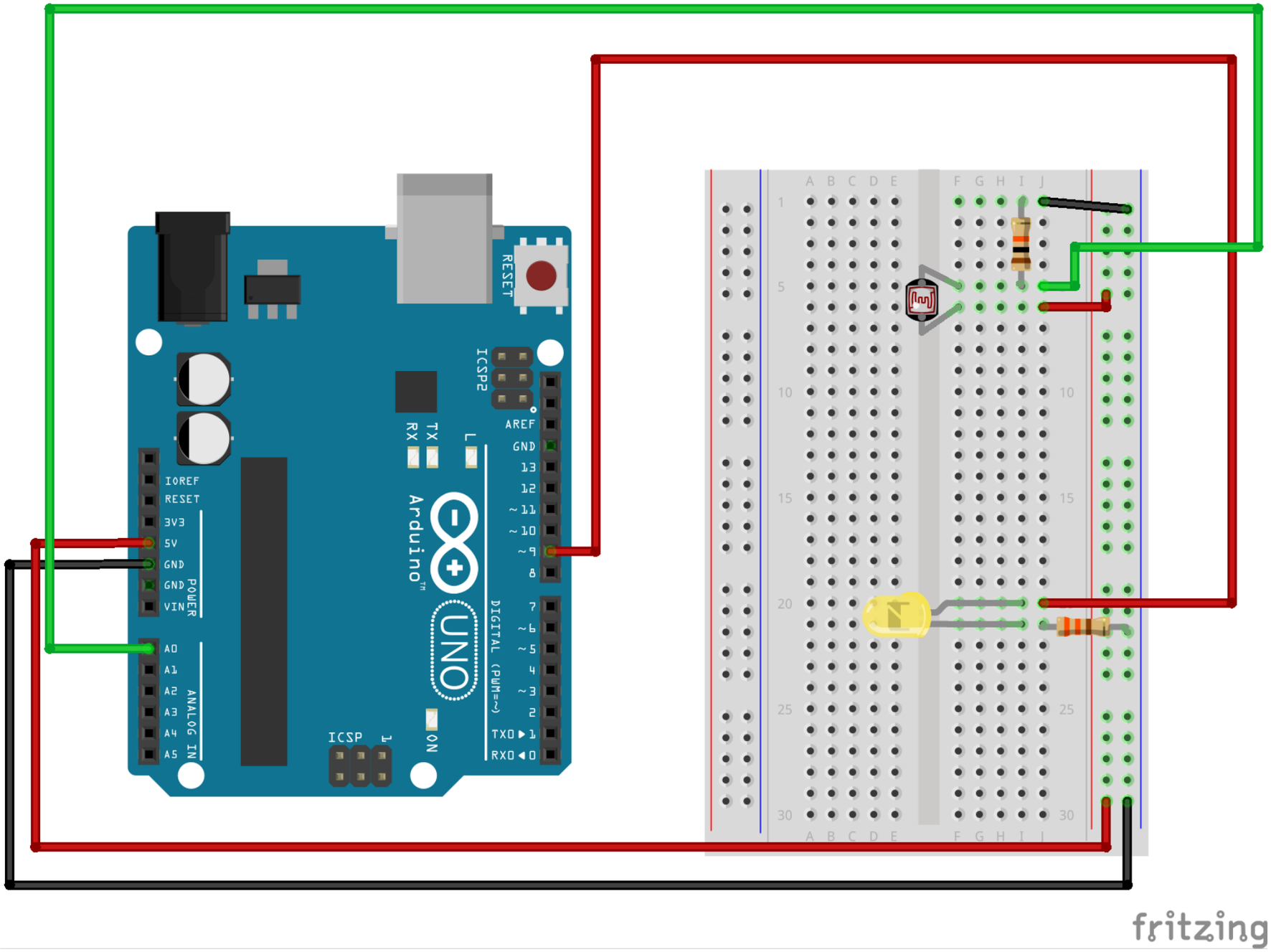


Hello World in Hardware

```
void setup() {
  // initialize digital pin 13 as an output.
  pinMode(2, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(2, HIGH);   // turn the LED on (HIGH is the voltage level)
  delay(1000);              // wait for a second
  digitalWrite(2, LOW);    // turn the LED off by making the voltage LOW
  delay(1000);              // wait for a second
}
```

DIY Turbimeter

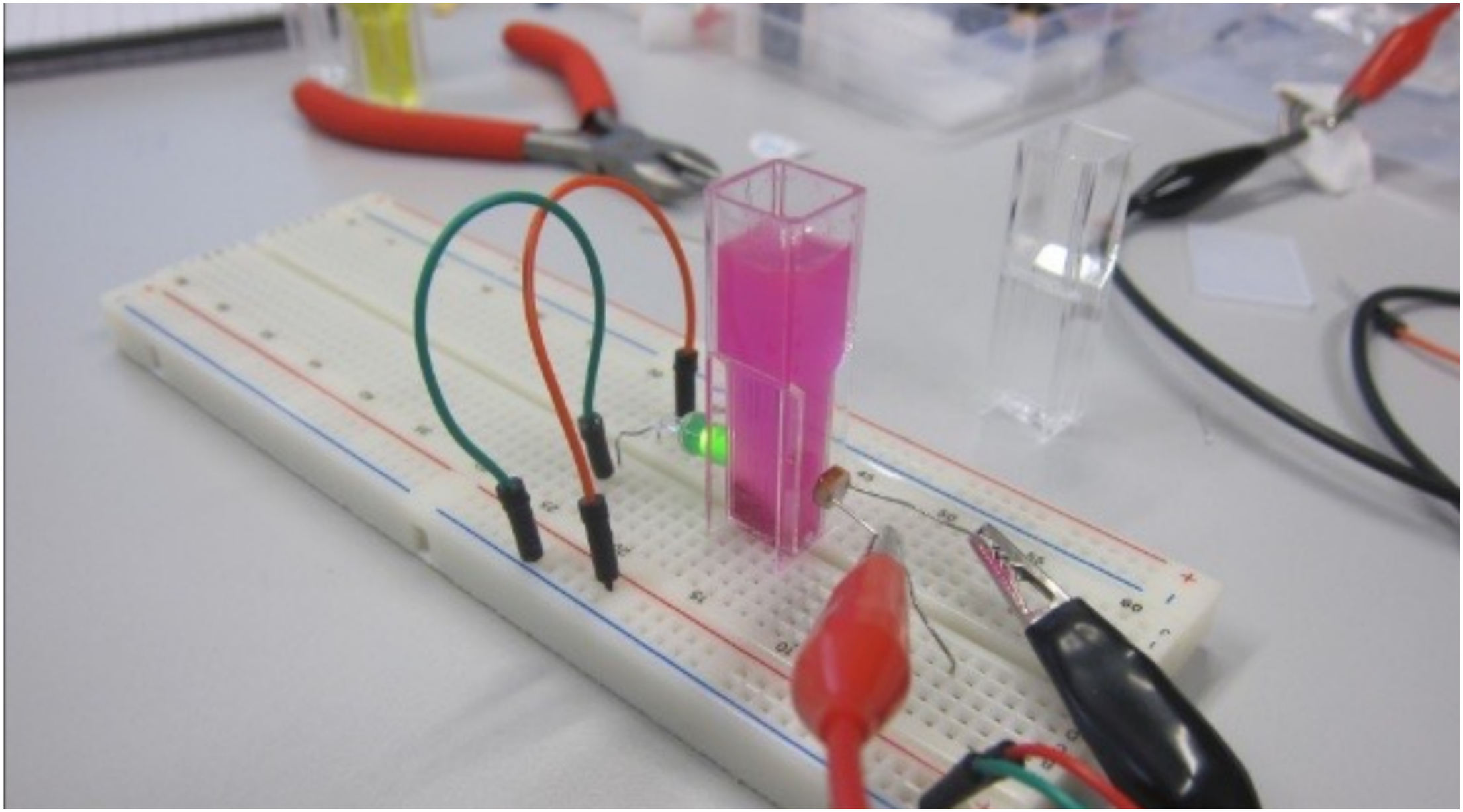


Light sensor + Led

```
void setup() {
  Serial.begin(9600);
  pinMode(9, OUTPUT);
}
```

```
void loop() {
  digitalWrite(9, HIGH);
  int sensorFront = analogRead(A0);
  Serial.println(sensorFront);
  delay(200);         // delay in between reads for stability
}
```

Final setup



Now it’s your turn!

- Can you brainstorm of different ways to measure and test water quality

- How else you can we use hardware and software to improve the way people are using and reusing water

- Prepare a 2 min problem/solution pitch to share at the end

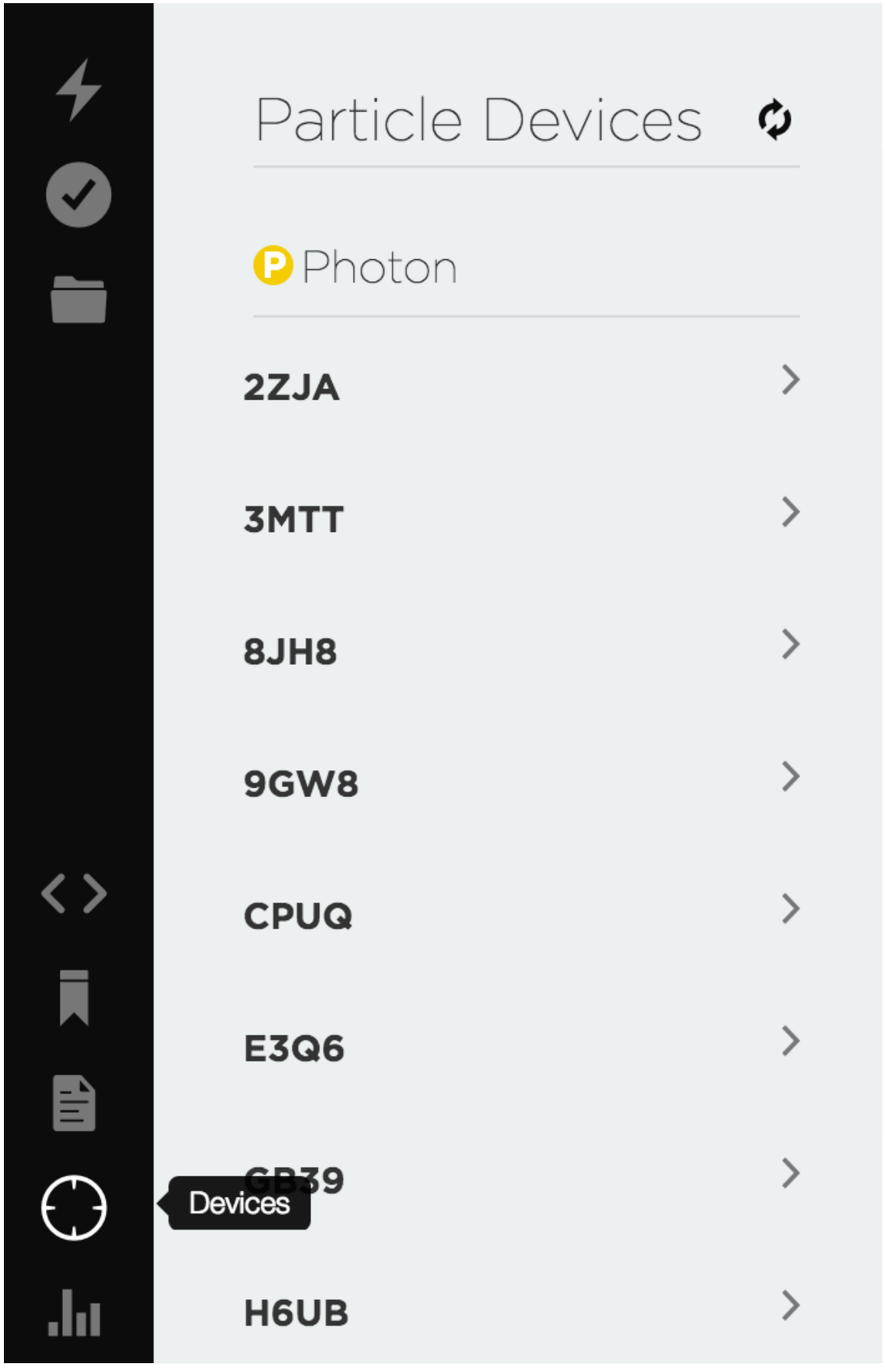
Github repo
for the workshops

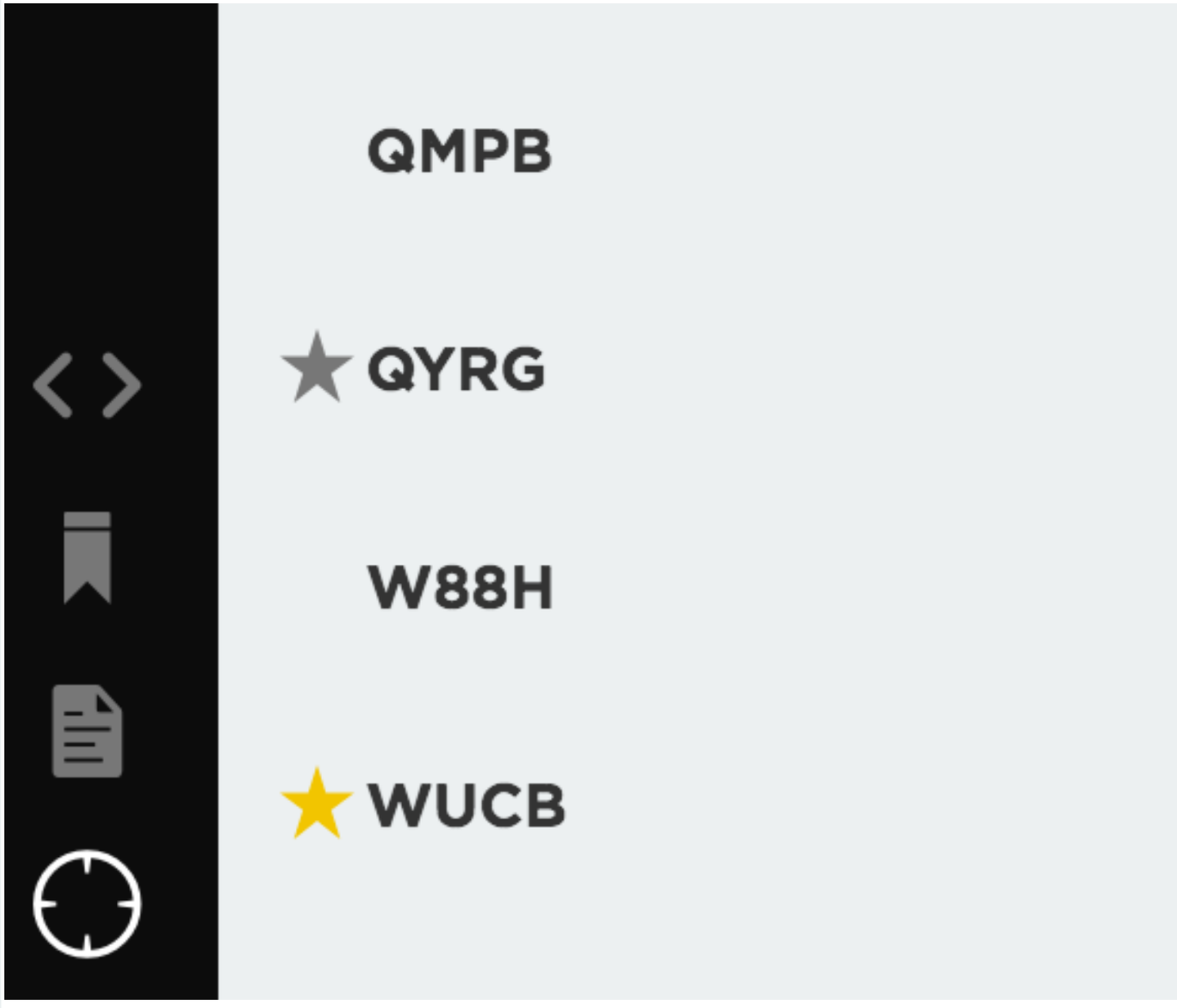
- https://github.com/stefania11/DIY_Turbidity/

Demo time!

If y’re using photon

- Go to https://build.particle.io/
- Log-in with particle@lotik.io


Particle Devices
Photon
2ZJA
3MTT
8JH8
9GW8
CPUQ
E3Q6
GB39
H6UB
Devices


QMPB
QYRG
W88H
WUCB

```
char result_light[64];

void setup() {
  Serial.begin(9600);
  pinMode(9, OUTPUT);

}

void loop() {
  digitalWrite(9, HIGH);
  int sensorFront = analogRead(A0);
  sprintf(result_light, "%d", sensorFront);

  Particle.publish("Light", result_light); /
  Serial.println(sensorFront); //print resul
  delay(1000);          // delay in between re
}
```

Check results

- https://dashboard.particle.io/