



ELECTRONICS TRAINING

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BARCELONATECH



WHO WE ARE



We are Oriol (right) and Roger (left), two engineering students from Barcelona who are staying in Cambodia to carry out a collaboration with Trash Is Nice, a plastic recycling station based in Phnom Penh.

Our fields of study are Physics and Artificial Intelligence respectively.

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- Acces Tinkercad Online
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- LED
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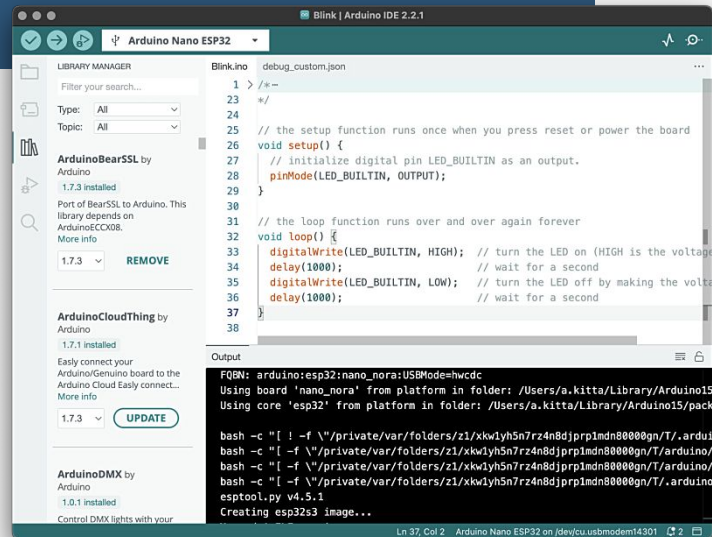
BASICS

- Navigation
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CODING

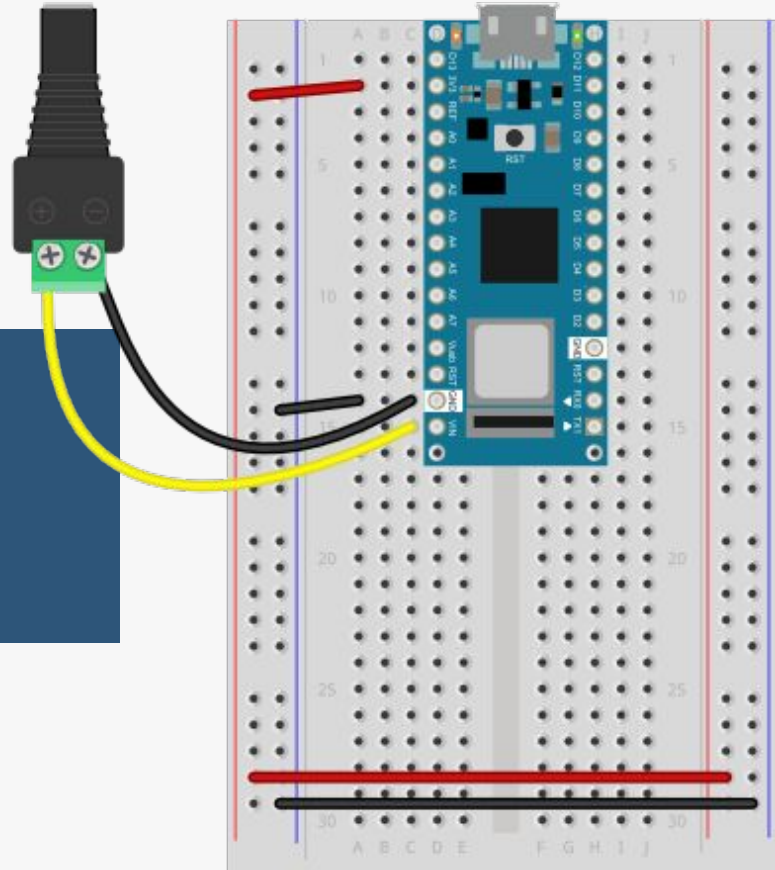
- Information entry
- Variables



SETUP

We will work with Autodesk Tinkercad, a free piece of software that lets us simulate arduino boards online, without the need of having a physical one.

Click [here](#) to access.



Create a circuit



Tinker ▾ Gallery Projects Classrooms Resources ▾



Oriol Baldris Vendrell

Classes

Designs

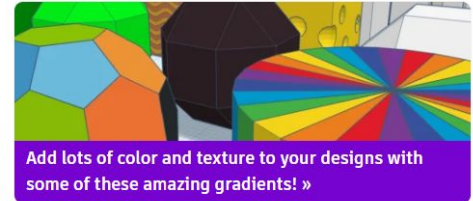
Tutorials

Challenges

Collections

+ Create collection

What's new



Your designs

+ Create

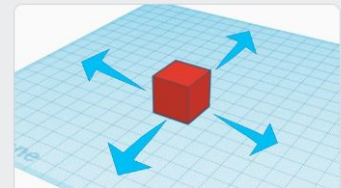
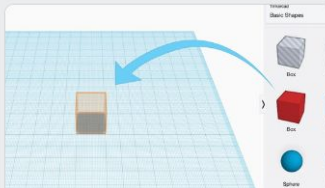
3D Design

Circuit

Codeblocks

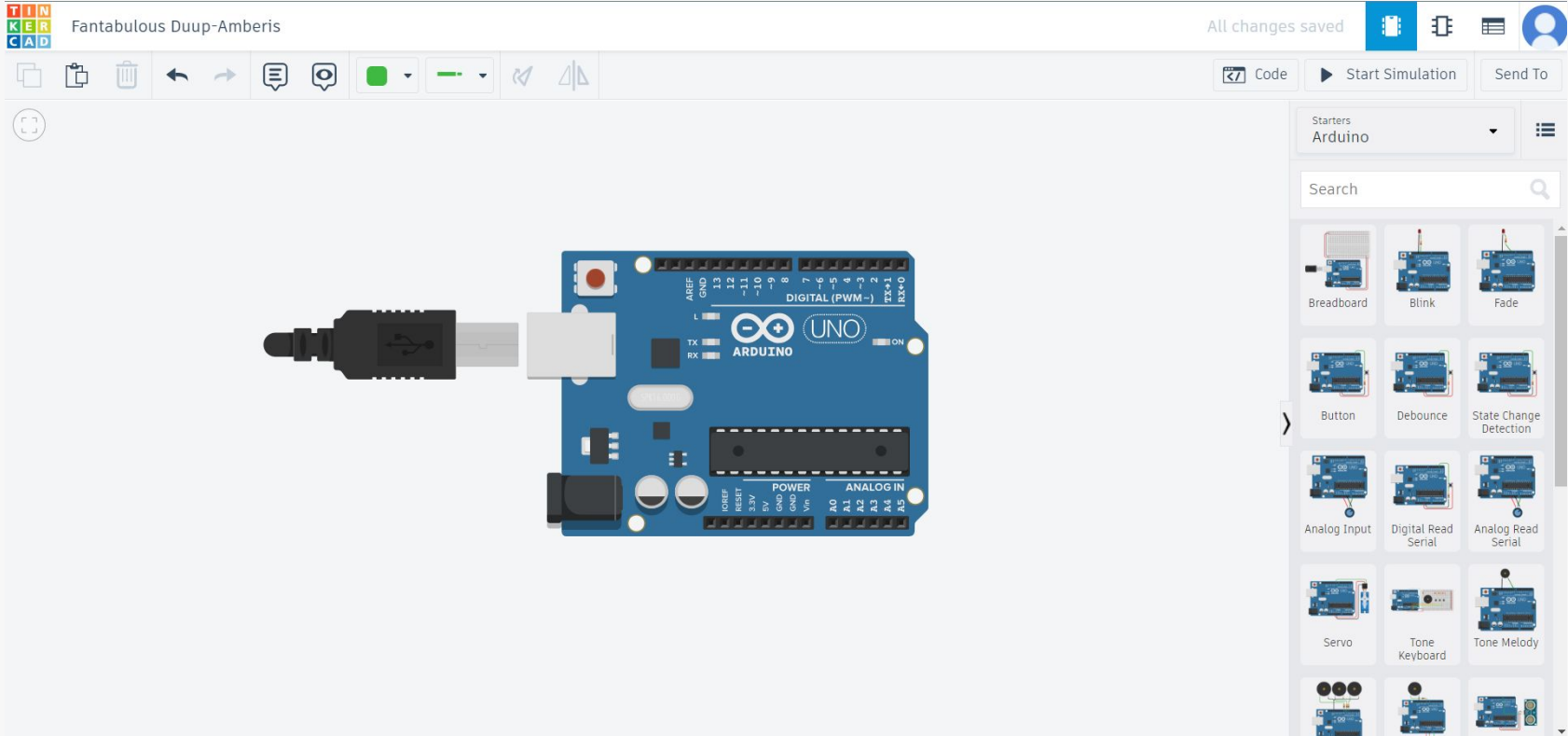
Create your first 3D design

Recycle bin

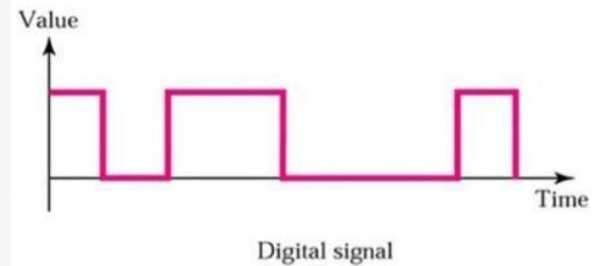
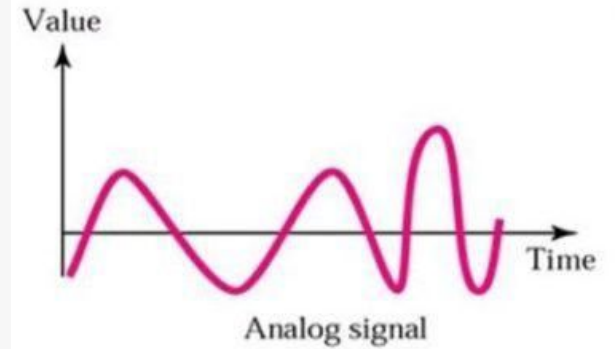
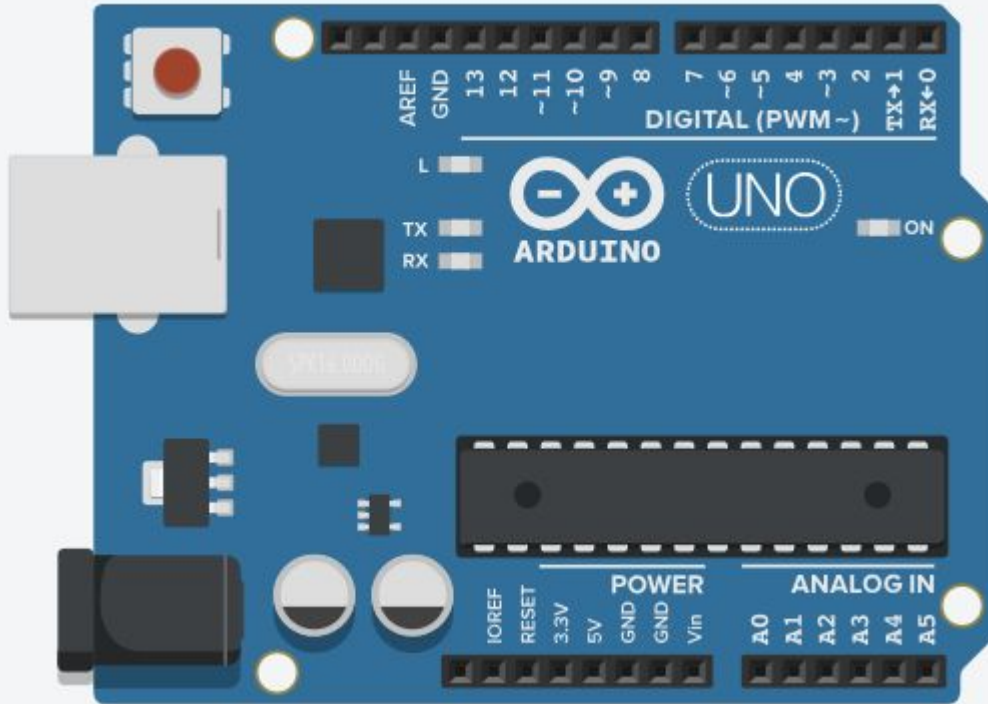


We will work with Arduino Uno board

What is Arduino?



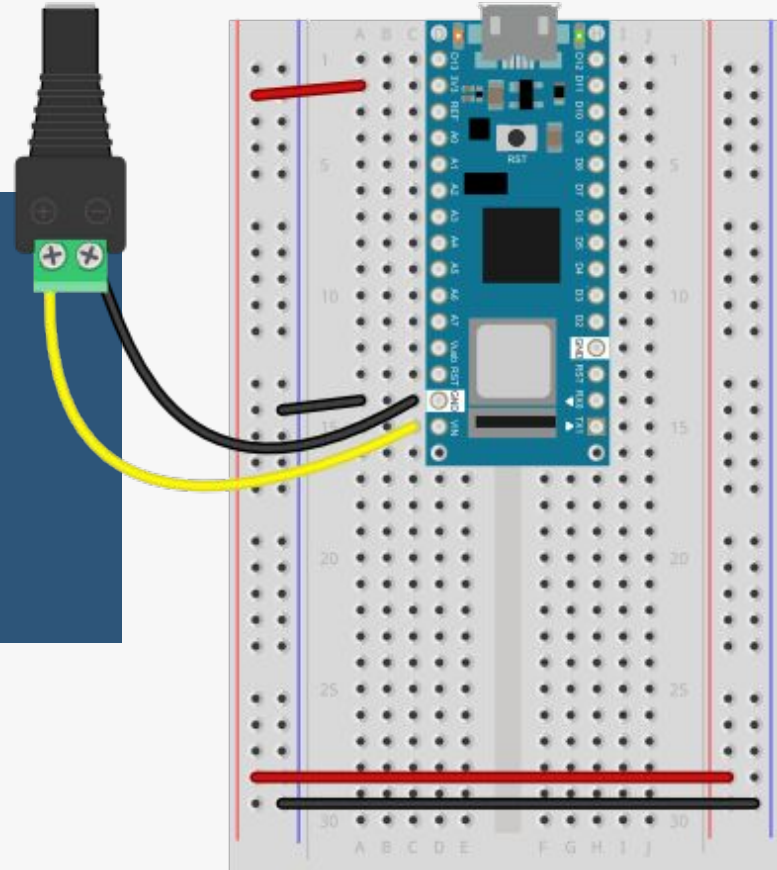
A look at our board



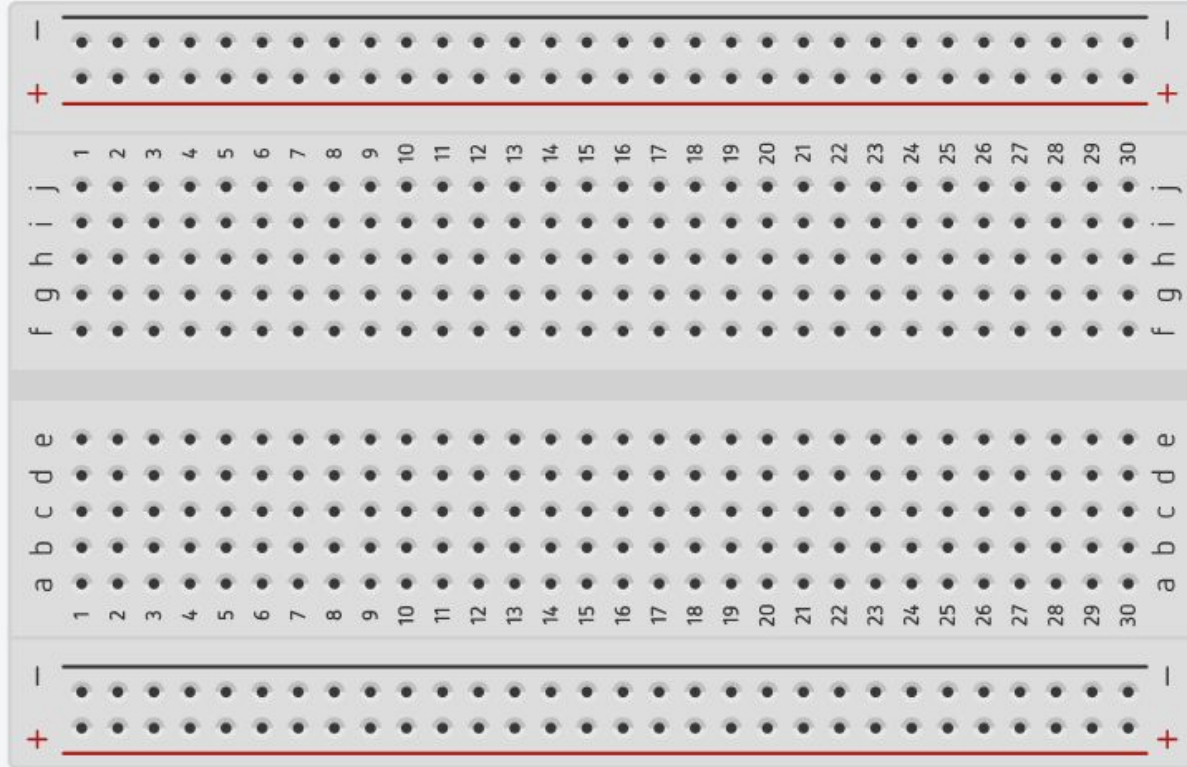
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PROJECT I: BLINK

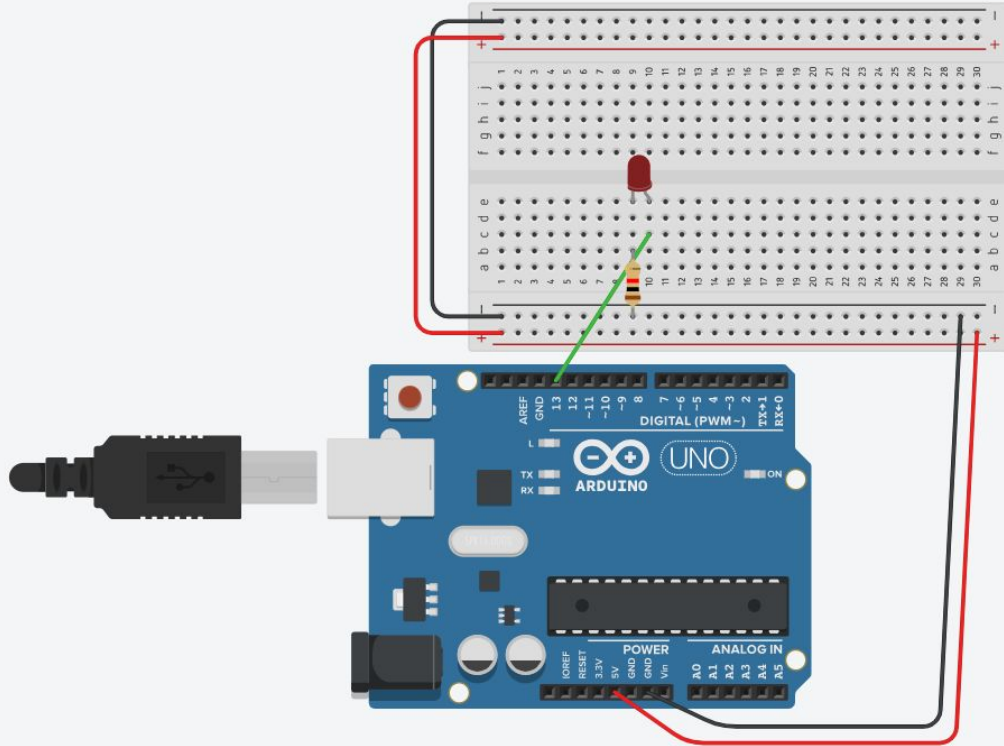
We will implement a blinking LED,
creating the circuit and the code.



2.0 Breadboard



2.1 Circuit



2.2 Code

```
void setup()  
{  
  pinMode(13, OUTPUT);  
}
```

The **setup** function helps us define our circuit setup, it will only be executed once at the beginning of the code.

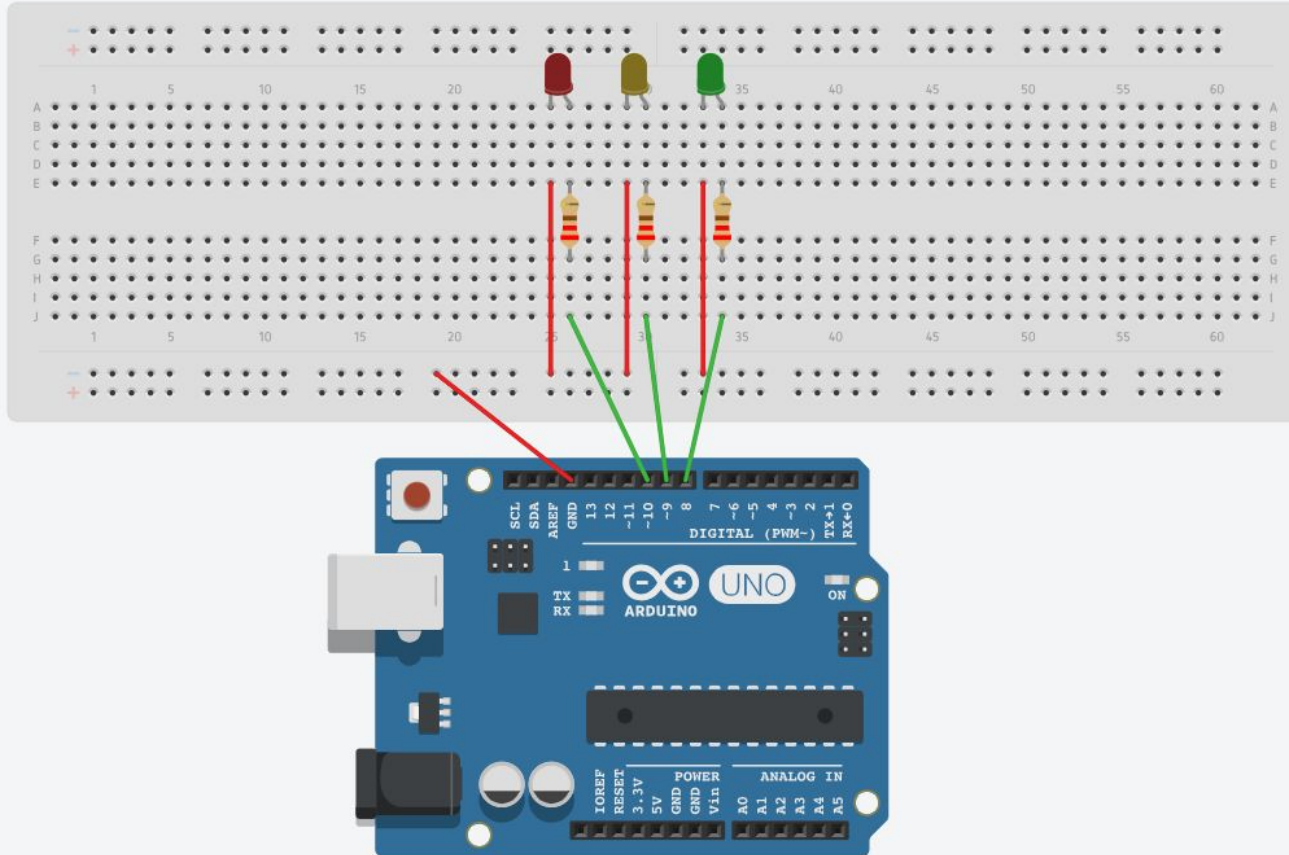
2.2 Code

```
void setup()
{
  pinMode(13, OUTPUT);
}

void loop()
{
  // Set PIN 13, the LED ON
  digitalWrite(13, HIGH);
  delay(500); // Wait for 500 millisecond(s)
  // Switch PIN 13, the LED OFF
  digitalWrite(13, LOW);
  delay(500); // Wait for 500 millisecond(s)
}
```

The function **loop** helps us define our main actions in the code, one after the other. It will continuously run in a loop for as long as we run our code.

2.3 Exercise: Traffic light

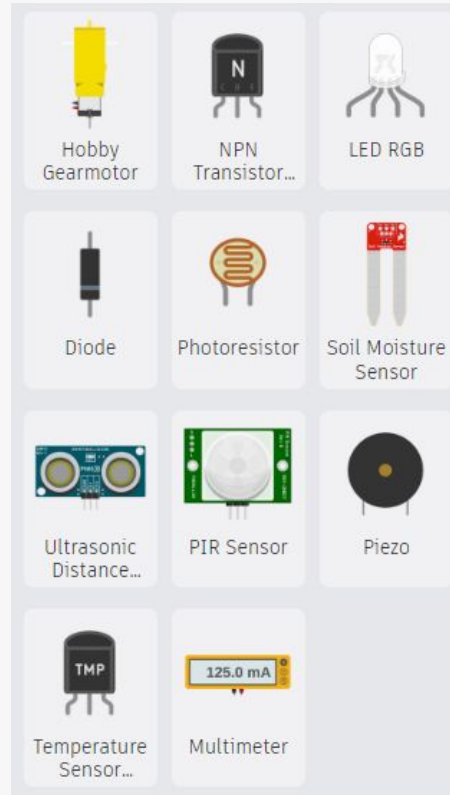


3

TEMPERATURE SENSOR

We will now introduce sensors and variables, in this case used to measure temperature.

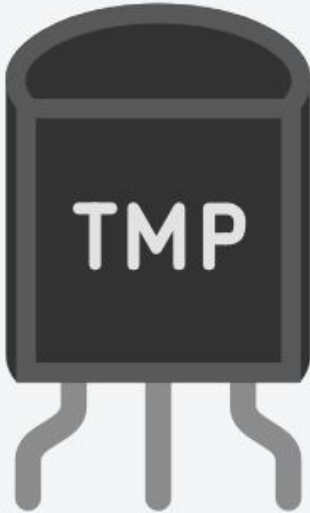
3.1 Sensors



Sensors receive an **input** current and extract an **output** current. This can be either digital or analogue.

It's very important to learn the **characteristics** of each sensor and how to use them.

3.2 Temperature sensor

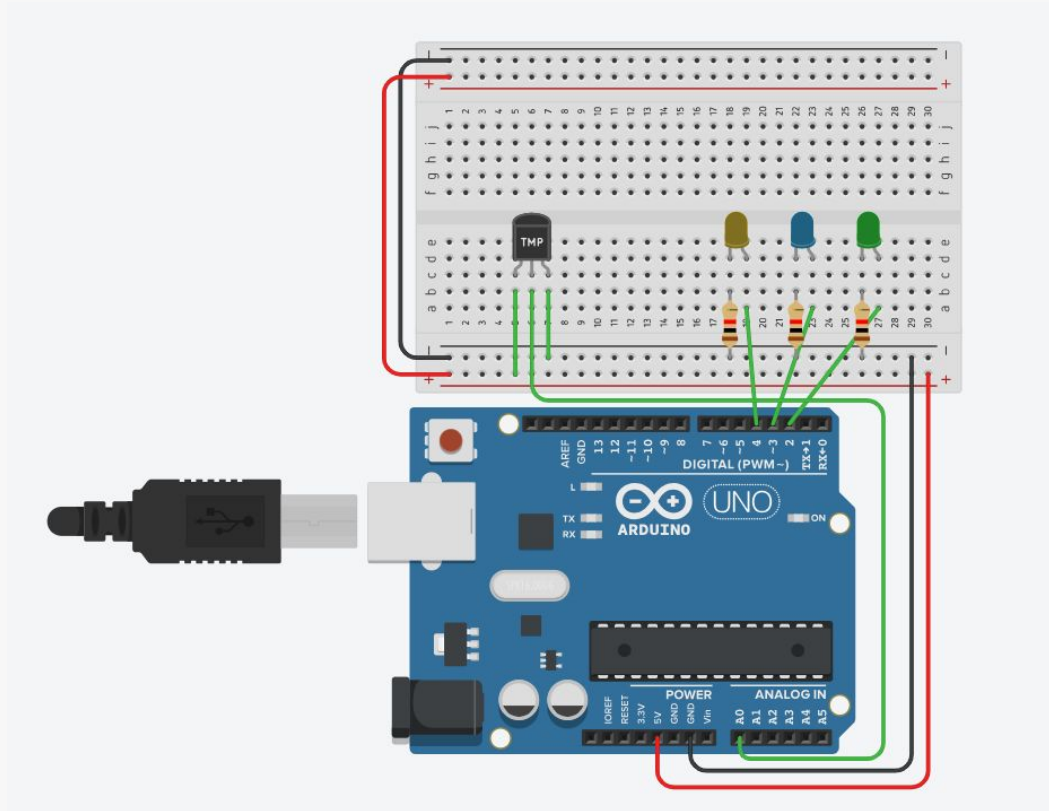


It has three “legs”:

- Voltage in
- Voltage out
- Ground

We have to find an appropriate connection in the board for each!

3.3 Circuit design



3.4 Coding: variables

We need a place to store our data (in this case, voltage and temperature).

These are variables!

Different types:

- Integer
- Float (decimal values)
- Double (decimal values with extra precision)

And a few more...

```
int baselineTemp = 0;  
int celsius = 0;  
int fahrenheit = 0;
```

3.4 Coding: if

We want something to happen **if** a condition is given.

We use the **if** statement to apply this.

```
if (celsius < baselineTemp) {  
    digitalWrite(2, LOW);  
    digitalWrite(3, LOW);  
    digitalWrite(4, LOW);  
}
```

4

PLANT WATERING

A bit more advanced project to
automatically water your plants.

4.1 Concept

We want to water our plants when humidity levels are below desired.

We sense moisture with a sensor.

We use a motor to open our water flow when moisture is too low.



THAT'S ALL FOLKS

Thank you for your interest.