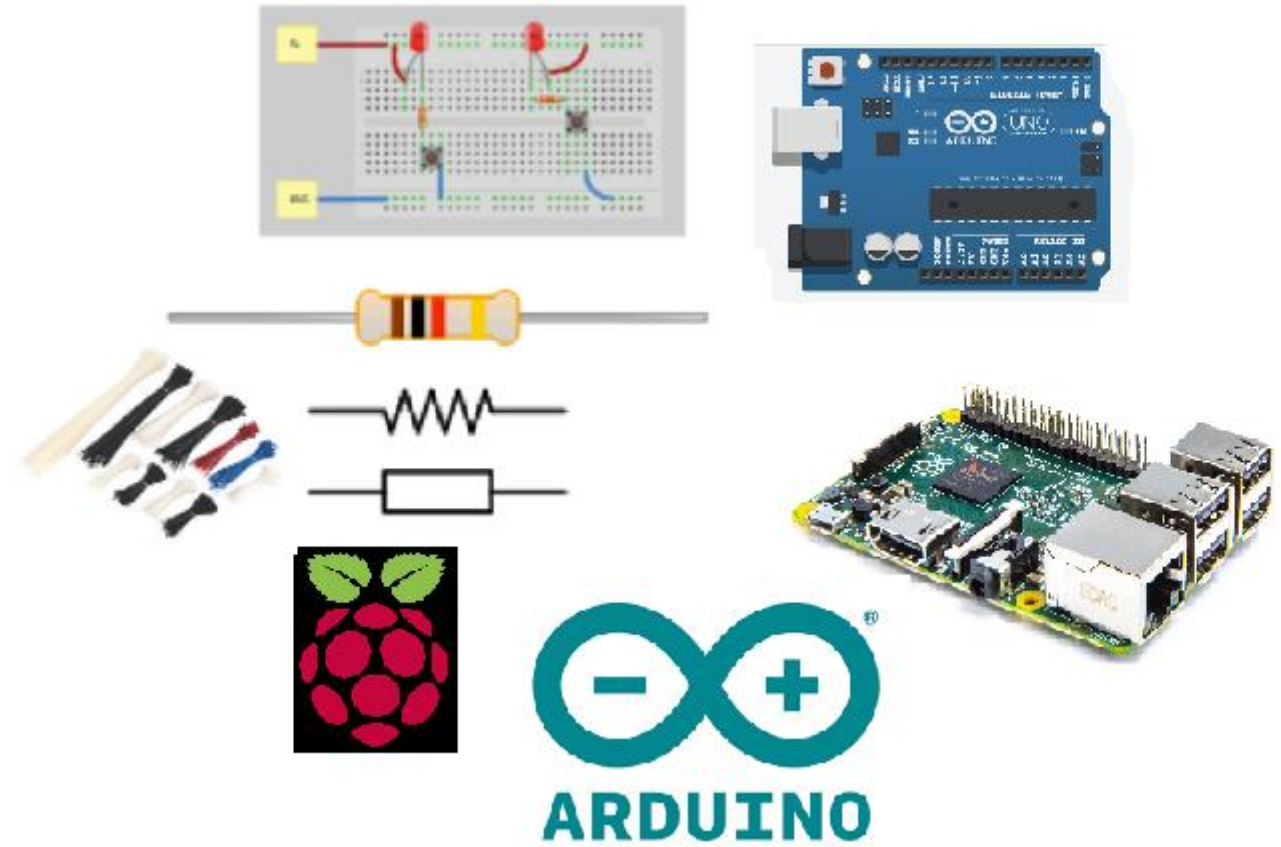




**Bodgers**

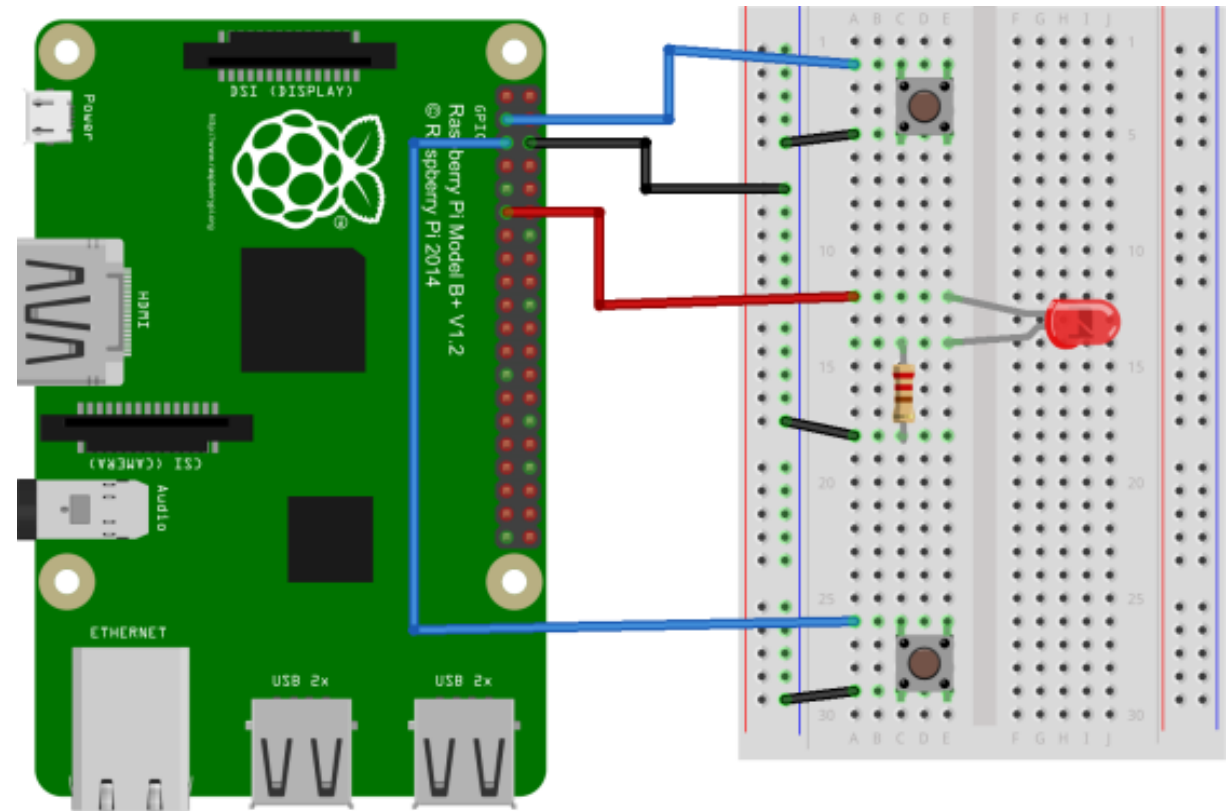
# Digital Making

Digital Makers use technology to make something and learn about that technology while doing so.



# Physical Computing

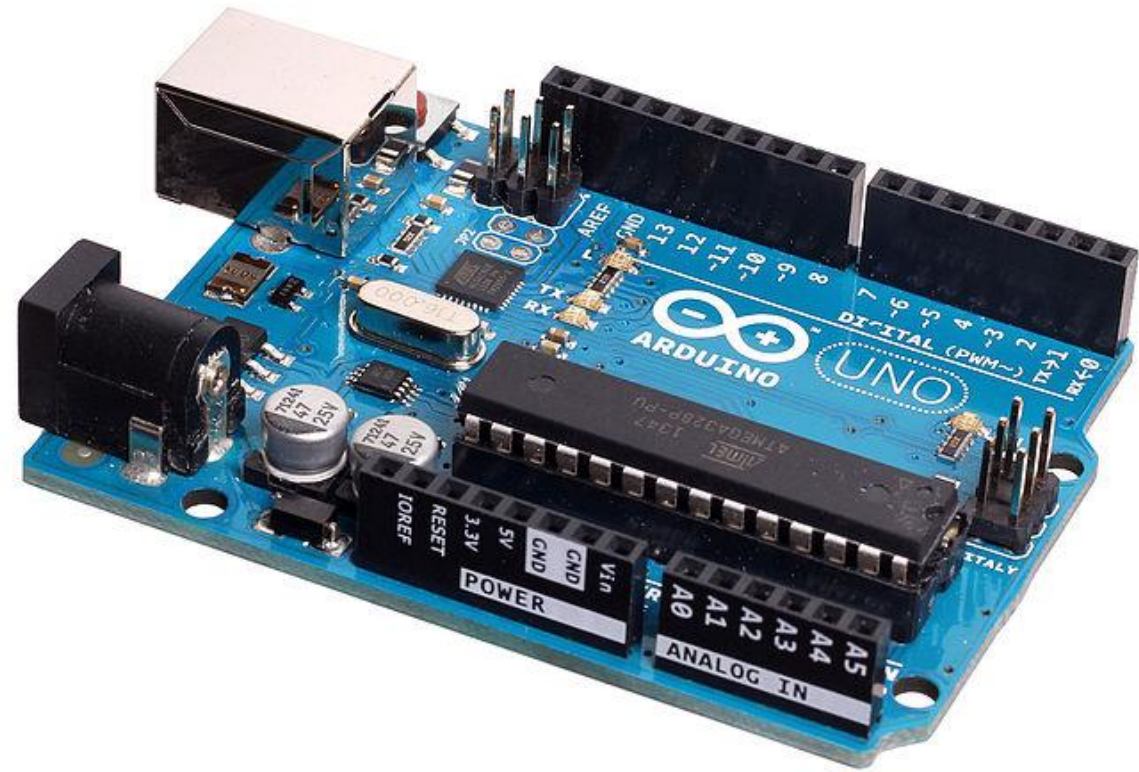
Building interactive gadgets using software and hardware that can sense and respond to the real world



fritzing

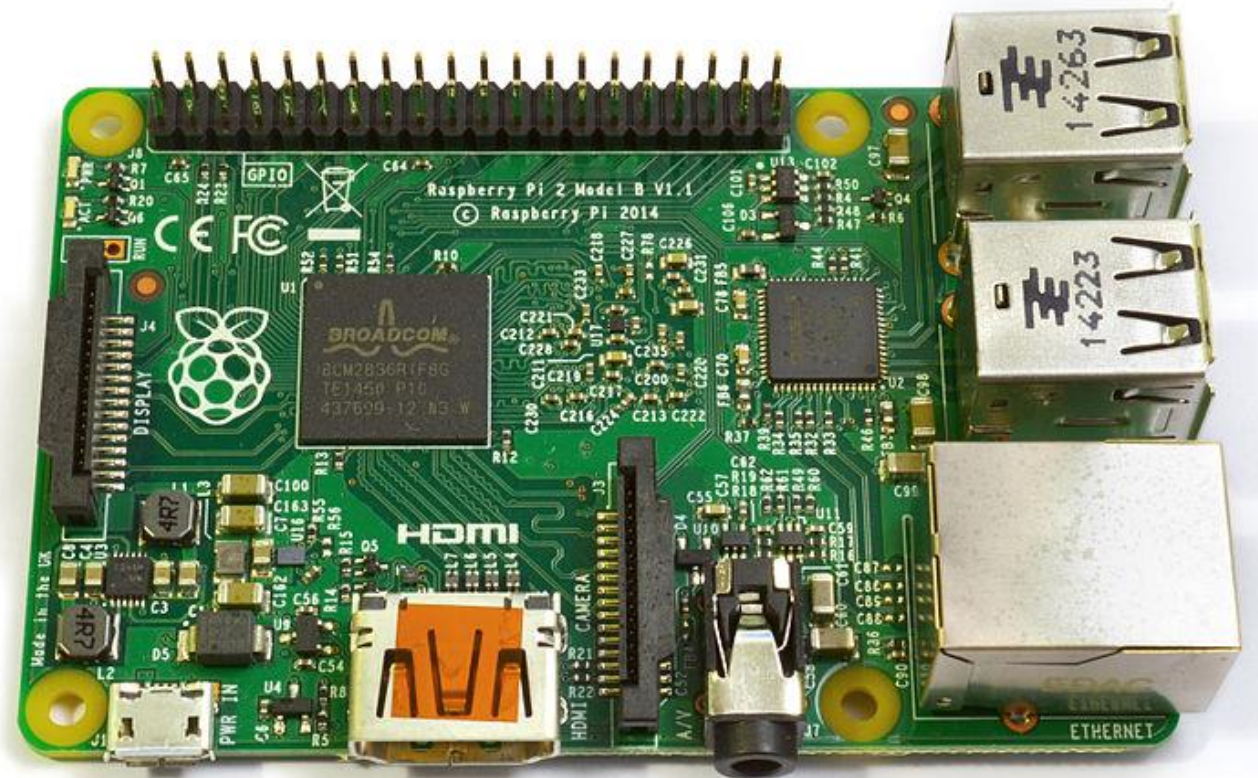
# Arduino

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It's intended for anyone making interactive projects.



# Raspberry Pi

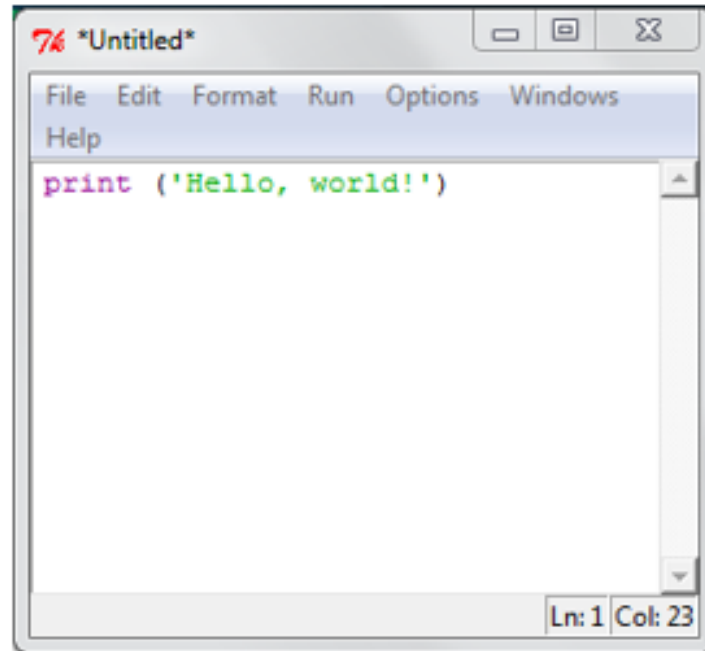
The Raspberry Pi is a tiny and affordable computer that you can use to learn Computer Science through fun, practical projects



# Python

Python is an interpreted high-level programming language for general-purpose programming. Python has a design philosophy that emphasizes code readability.

## Hello world in Python

A screenshot of a Python IDE window titled '\*Untitled\*'. The window has a menu bar with 'File', 'Edit', 'Format', 'Run', 'Options', 'Windows', and 'Help'. The main text area contains the code `print ('Hello, world!')`. The status bar at the bottom right shows 'Ln: 1 Col: 23'.

## Hello world in C

```
#include <stdio.h>

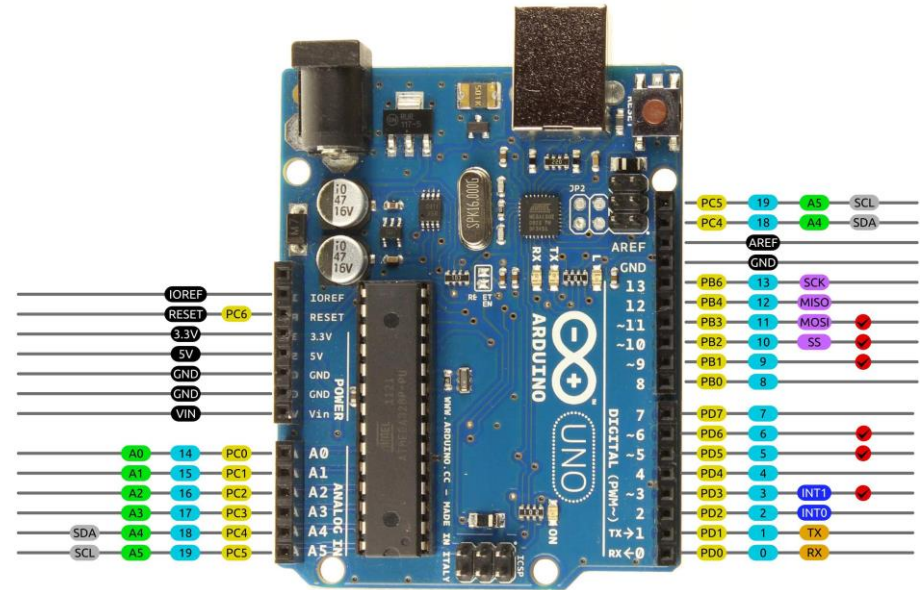
int main(void)
{
    printf("Hello, world!\n");
    return 0;
}
```

# GPIO Pins

A general-purpose input/output (GPIO) is an uncommitted digital signal pin on an integrated circuit or electronic circuit board whose behaviour—including whether it acts an input or output—is controllable by the user at run time

	Pin No.		
3.3V	1	2	5V
GPIO2	3	4	5V
GPIO3	5	6	GND
GPIO4	7	8	GPIO14
GND	9	10	GPIO15
GPIO17	11	12	GPIO18
GPIO27	13	14	GND
GPIO22	15	16	GPIO23
3.3V	17	18	GPIO24
GPIO10	19	20	GND
GPIO9	21	22	GPIO25
GPIO11	23	24	GPIO8
GND	25	26	GPIO7
DNC	27	28	DNC
GPIO5	29	30	GND
GPIO6	31	32	GPIO12
GPIO13	33	34	GND
GPIO19	35	36	GPIO16
GPIO26	37	38	GPIO20
GND	39	40	GPIO21

## Arduino Uno R3 Pinout

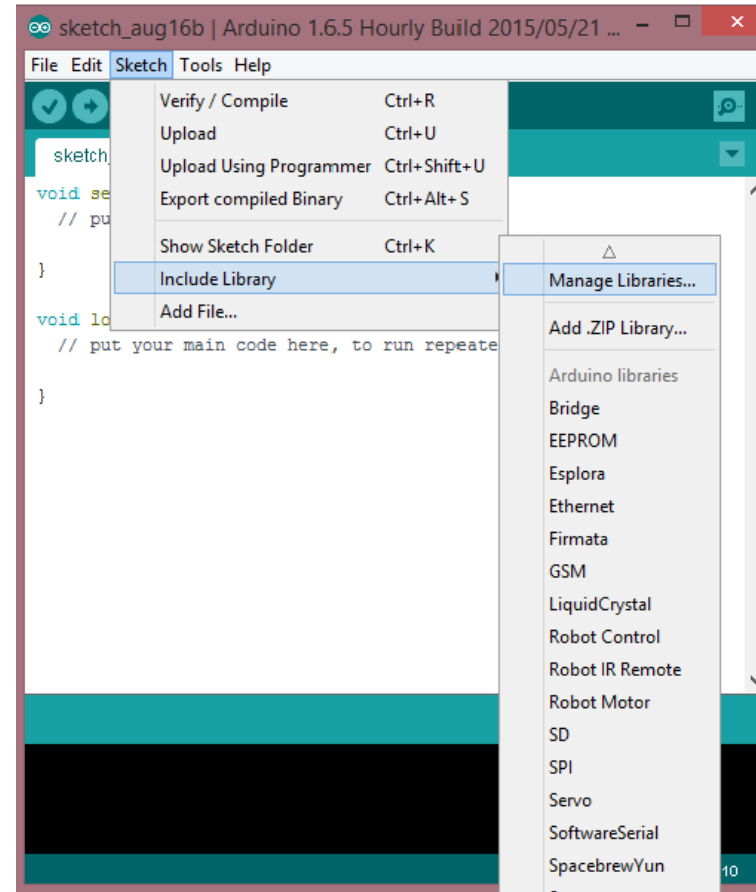


- AVR
- DIGITAL
- ANALOG
- POWER
- SERIAL
- SPI
- I2C
- PWM
- INTERRUPT

2014 by Bouni  
Photo by Arduino.cc

# Library

A library is a collection of functions that allows you to perform lots of actions without writing your own code.





# GPIO Zero

A simple interface to GPIO devices with Raspberry Pi.

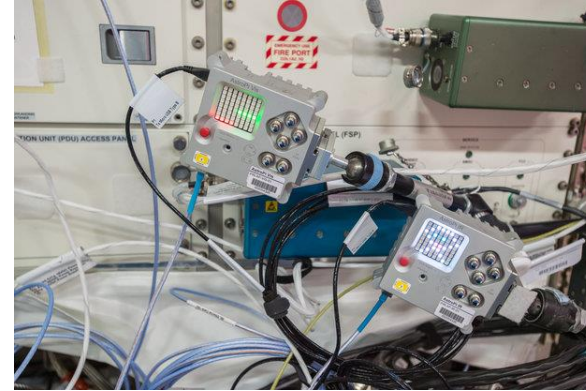
```
from gpiozero import LED
from time import sleep

led = LED(17)

while True:
    led.on()
    sleep(1)
    led.off()
    sleep(1)
```

# Astro Pi

Astro Pi is a series of competitions which allow European school students to run computer science experiments on the International Space Station.



# Sense Hat

The Sense HAT is an add-on board for Raspberry Pi, made especially for the Astro Pi mission



# Pygame Zero

PyGameZero is a beginner friendly wrapper around the powerful PyGame library for writing video games using Python. It's extraordinarily easy to write an entertaining game in only a few lines of Python code with PyGameZero.



# IDE

An integrated development environment (IDE) is a software application that provides comprehensive facilities to computer programmers for software development

```
1 #include <LiquidCrystal.h>
2 LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
3 #define DHT11_PIN 0 // ADC0
4
5 byte read_dht11_dat()
6 {
7     byte i = 0;
8     byte result=0;
9     for(i=0; i< 8; i++){
10
11
12         while(!(PINC & _BV(DHT11_PIN))); // wait for 50us
13         delayMicroseconds(30);
14
15         if(PINC & _BV(DHT11_PIN))
16             result |= (1<<(7-i));
17
18     }
```

```
1 #include <LiquidCrystal.h>
2 LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
3 #define DHT11_PIN 0 // ADC0
4
5 byte read_dht11_dat()
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14
15         if(PINC & _BV(DHT11_PIN))
16             result |= (1<<(7-i));
17         while((PINC & _BV(DHT11_PIN))); // wait '1' finish
18     }
```

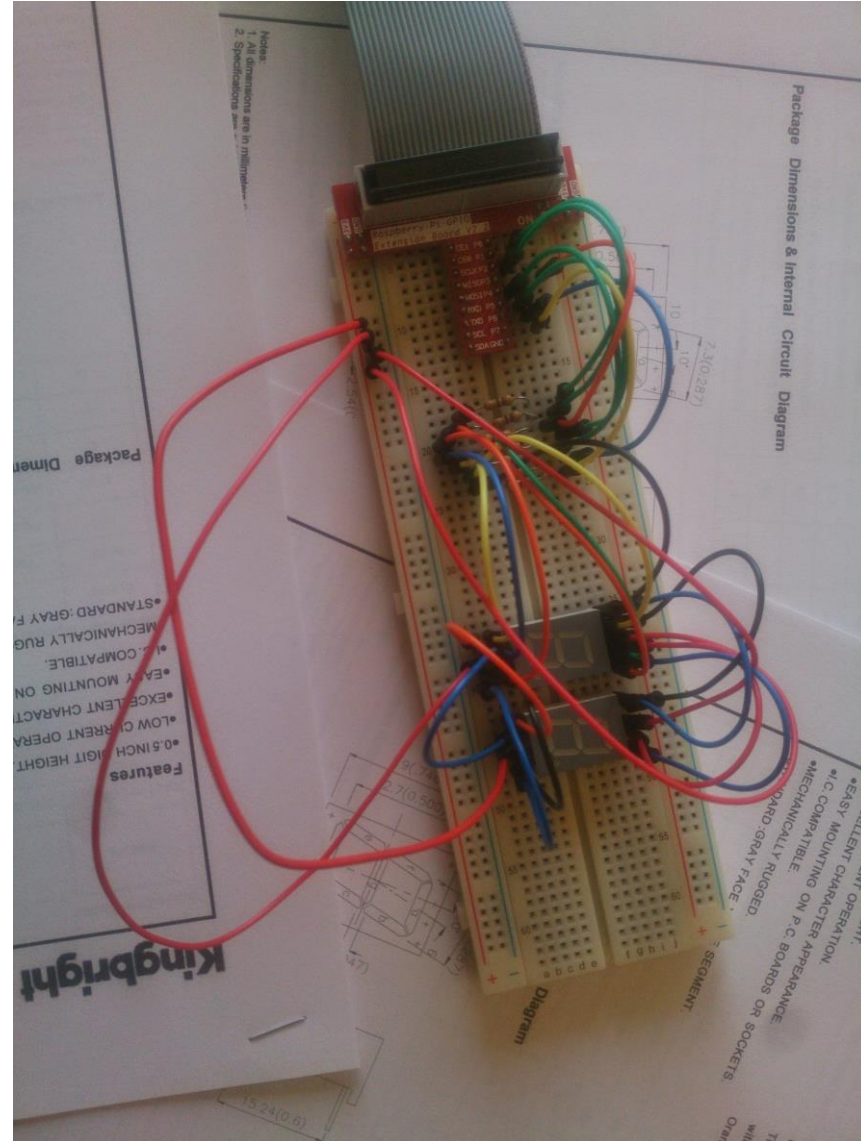
# Arduino Shields

Shields are boards that can be plugged on top of the Arduino PCB extending its capabilities. The different shields follow the same philosophy as the original toolkit: they are easy to mount, and cheap to produce.



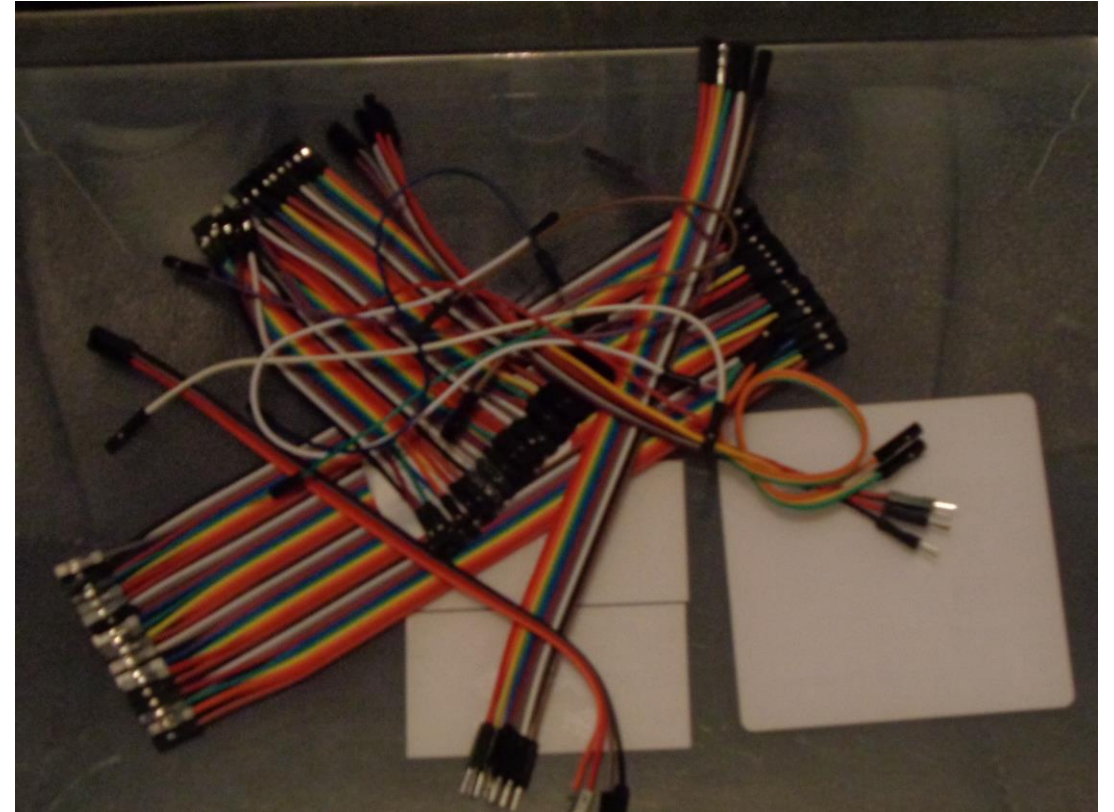
# Breadboards

The solderless breadboard (a.k.a. plugboard, a terminal array board) is used for prototyping of electronics. It is easy to use for creating temporary circuits and experimenting with circuit design.



# Jumper Wires

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed.





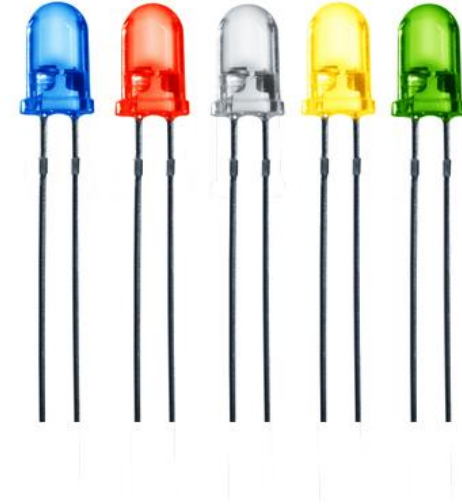
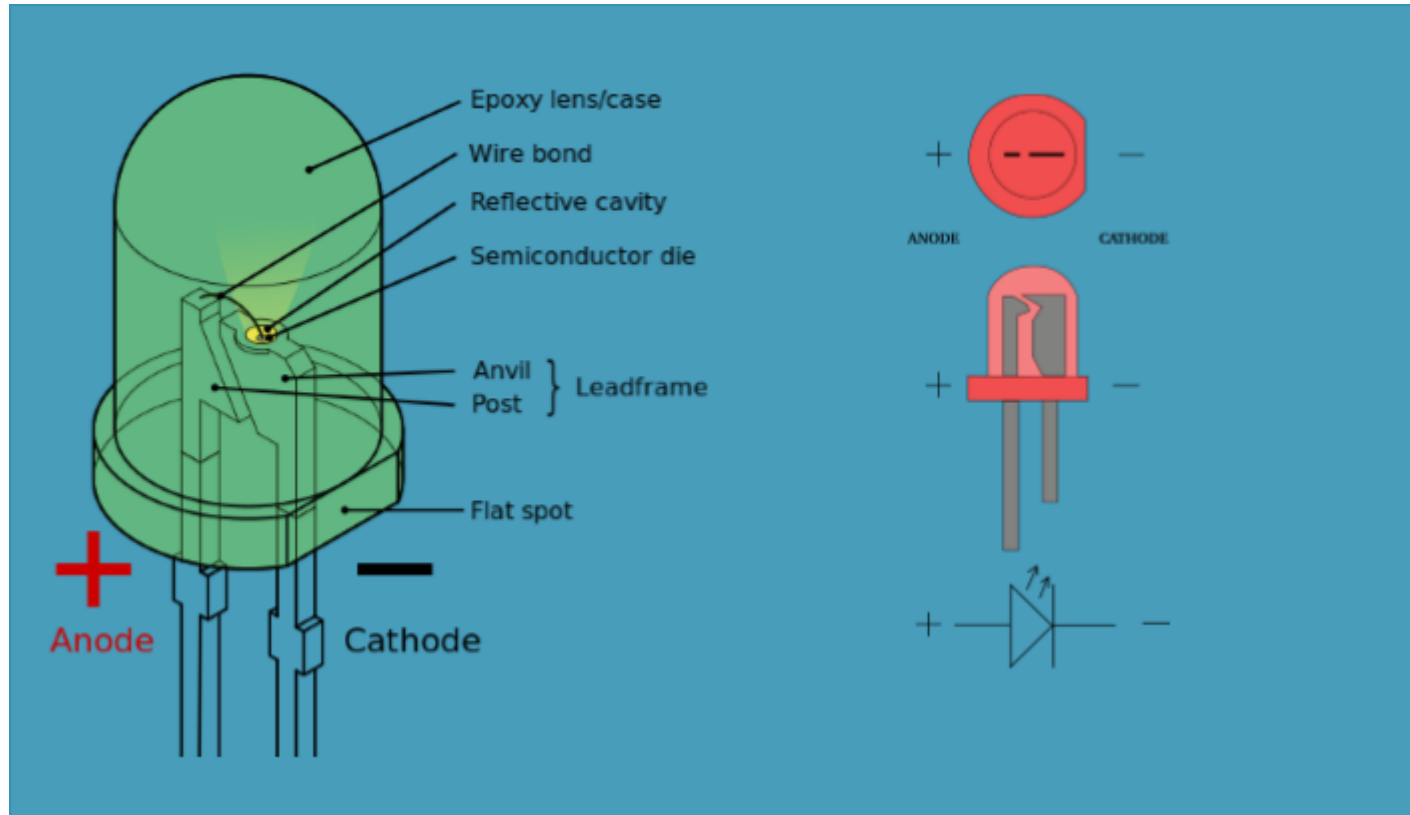
# push-buttons

A push-button or simply button is a simple switch mechanism for controlling some aspect of a machine or a process



# LEDs

A light-emitting diode (LED) is a two-lead semiconductor light source that emits light when a suitable current is applied to the pins.



# Resistors

In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.



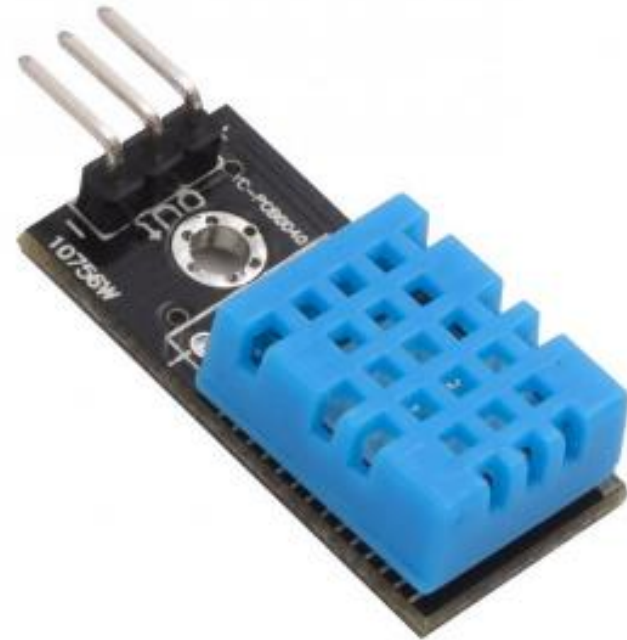
# HC-SR04

The HC-SR04 ultrasonic sensor uses sonar to determine distance to an object like bats do. It offers excellent non-contact range detection from 2cm to 400 cm.



# DHT11

The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and outputs a digital signal on the data pin.



# Tweets

Python has libraries for interfacing with many other applications such as Twitter and Gmail we can also open and edit files such as excel spreadsheets



# Robots

The Raspberry Pi or Arduino are excellent for controlling robots

