Week 2 Programme

By:

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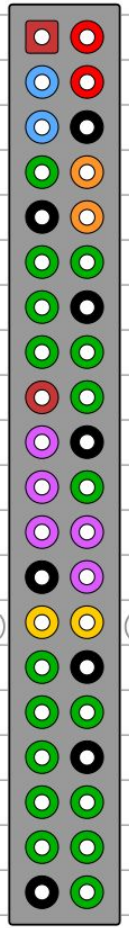
Raspbery PI GPIO

GPIO Pins

Raspberry Pi 3 GPIO Header

Pin#	NAME	NAME	Pin#
01	3.3v DC Power	DC Power 5v	02
03	GPIO02 (SDA1 , I²C)	DC Power 5v	04
05	GPIO03 (SCL1 , I²C)	Ground	06
07	GPIO04 (GPIO_GCLK)	(TXD0) GPIO14	08
09	Ground	(RXD0) GPIO15	10
11	GPIO17 (GPIO_GEN0)	(GPIO_GEN1) GPIO18	12
13	GPIO27 (GPIO_GEN2)	Ground	14
15	GPIO22 (GPIO_GEN3)	(GPIO_GEN4) GPIO23	16
17	3.3v DC Power	(GPIO_GEN5) GPIO24	18
19	GPIO10 (SPI_MOSI)	Ground	20
21	GPIO09 (SPI_MISO)	(GPIO_GEN6) GPIO25	22
23	GPIO11 (SPI_CLK)	(SPI_CE0_N) GPIO08	24
25	Ground	(SPI_CE1_N) GPIO07	26
27	ID_SD (I²C ID EEPROM)	(I²C ID EEPROM) ID_SC	28
29	GPIO05	Ground	30
31	GPIO06	GPIO12	32
33	GPIO13	Ground	34
35	GPIO19	GPIO16	36
37	GPIO26	GPIO20	38
39	Ground	GPIO21	40



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www.element14.com/RaspberryPi

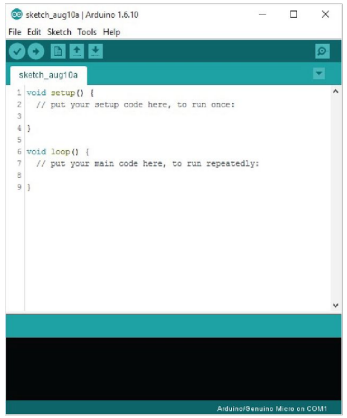
GPIO Zero Fun!

Let’s go to our github for the steps

https://github.com/ICL-DE/Gizmo/blob/master/Chapter_2_RPi/RPi_GPIO.md

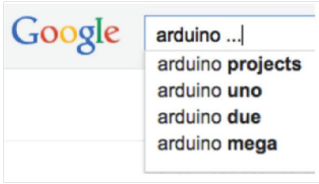
Arduino

What is Arduino?



Software
IDE

Hardware
Board



Community
Web

A bit of history

Arduino or Raspberry Pi?

- Arduino is a microcontroller motherboard
- Simple repetitive tasks
- Real-time control capabilities (Faster than Python)
- C/C++
- On board analog system
- Plug and play board
- More robust

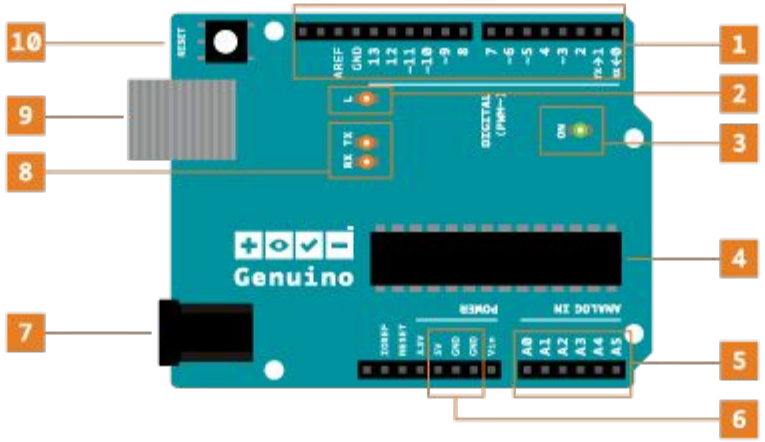
- A Raspberry Pi is a general-purpose computer
- When you need a full-fledged computer
- Intense calculations
- Python, C/C++, Java, node.js, GoLang, etc (Your choice).
- Multiple choice of OS
- High storage capacity

Rule of thumb

“Think about what you want your project to do. If you can describe it with less than two ‘and’s, get an Arduino, otherwise get a Raspberry PI.”

If you would like to learn more: “RPI_or_Arduino.md” @ ICL-DE/Gizmo

Hardware



1. Digital pins
2. Pin 13 LED
3. Power LED
4. ATmega microcontroller
5. Analog pins
6. GND and 5V pins
7. Power connector
8. TX and RX LEDs
9. USB port
10. Reset button

Configuring Pins

pinMode(pin number, mode)

OUTPUT - INPUT

Digital Pins

- **digitalRead**(pin)
- **digitalWrite**(pin, value)

HIGH - LOW

Analog Pins

- **analogRead**(pin)

  0 - 1023

- **analogWrite**(pin, value)

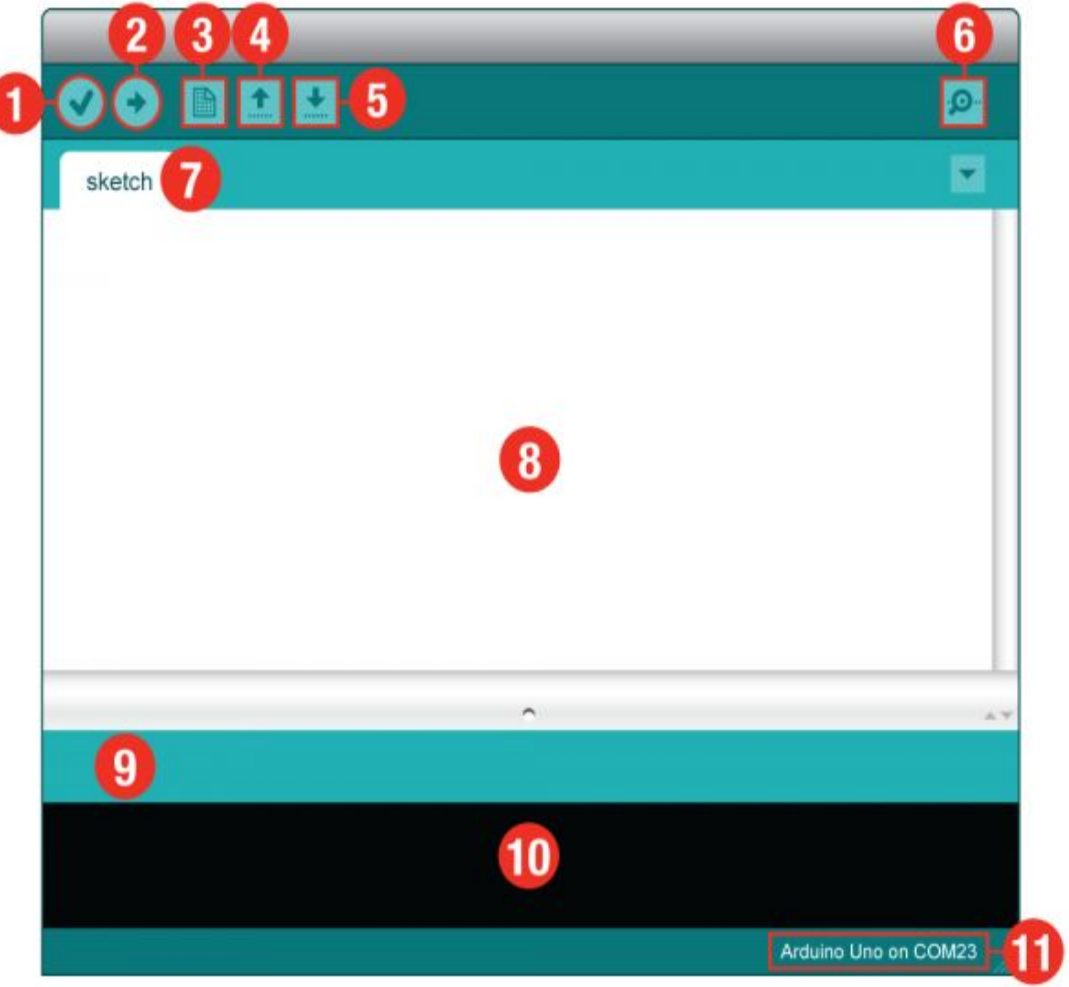
  0 - 255

Software

Download the IDE

Download the Arduino IDE from this link:

https://www.arduino.cc/en/Main/Software

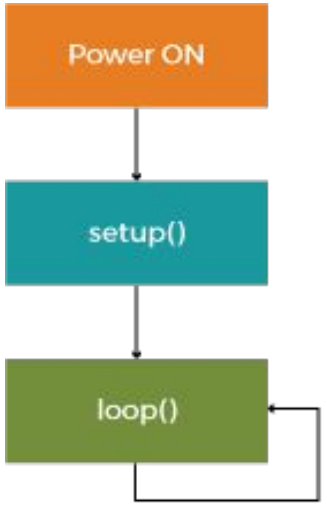


1. Verify
2. Upload
3. New
4. Open
5. Save
6. Serial Monitor
7. Sketch Name
8. Code Area
9. Message Area
10. Text Console
11. Board and Serial Port

Anatomy of a sketch.ino

```
void setup() {
 }

void loop() {
 }
```



Arduino Syntax

Check the syntax section in “Arduino_intro.md”@ ICL-DE/Gizmo

Your first sketch.ino

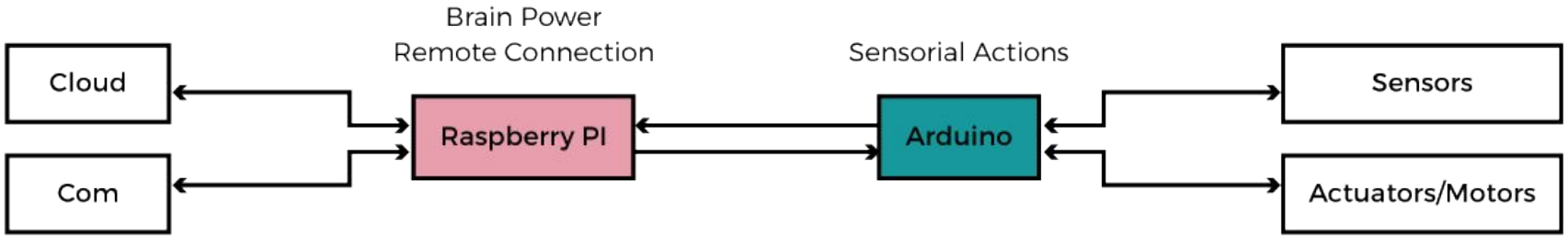
We have made a guide to create it here:
https://github.com/ICL-DE/Gizmo/blob/master/Chapter_3_Arduino/Arduino_intro.md

Raspberry PI + Arduino

A guide to connect them and have them talk to each other can be found here:

https://github.com/ICL-DE/Gizmo/blob/master/Chapter_4_Arduino+RPi/RPi_to_Arduino.md

Raspberry PI + Arduino
A bigger picture for Gizmo



Interesting Read

IOT AND M2M, WHAT'S THE DIFFERENCE?

http://www.incognito.com/blog/iot-and-m2m-whats-the-difference/

Homework

- Remote Controlled Traffic Light
  - Triggered remotely with your computer or another machine

- Think of how your RPi and Arduino can communicate with each other. I.e. how do they know if they are talking about button pressed, light intensity, turn motor?