

Aviso: cambio de horario GIMP

**Cambio de horario
del
taller de GIMP
del 5 de noviembre
será a las 16:00**

Taller sobre arduino

Universidad de Granada

22-10-2012



ElCacharreo.com

José Antonio Vacas

Introducción a Arduino: Presente

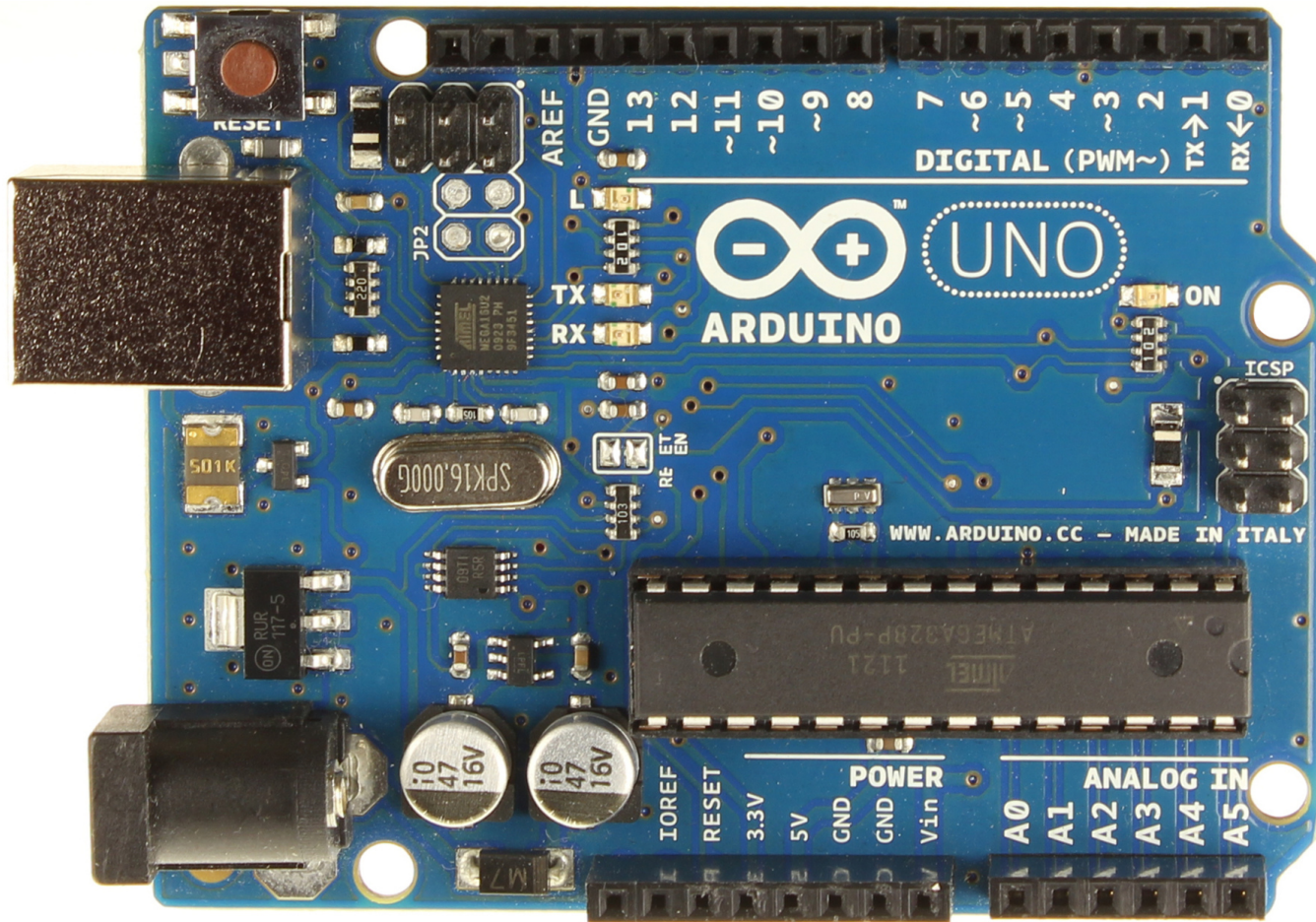


José Antonio Vacas Martínez

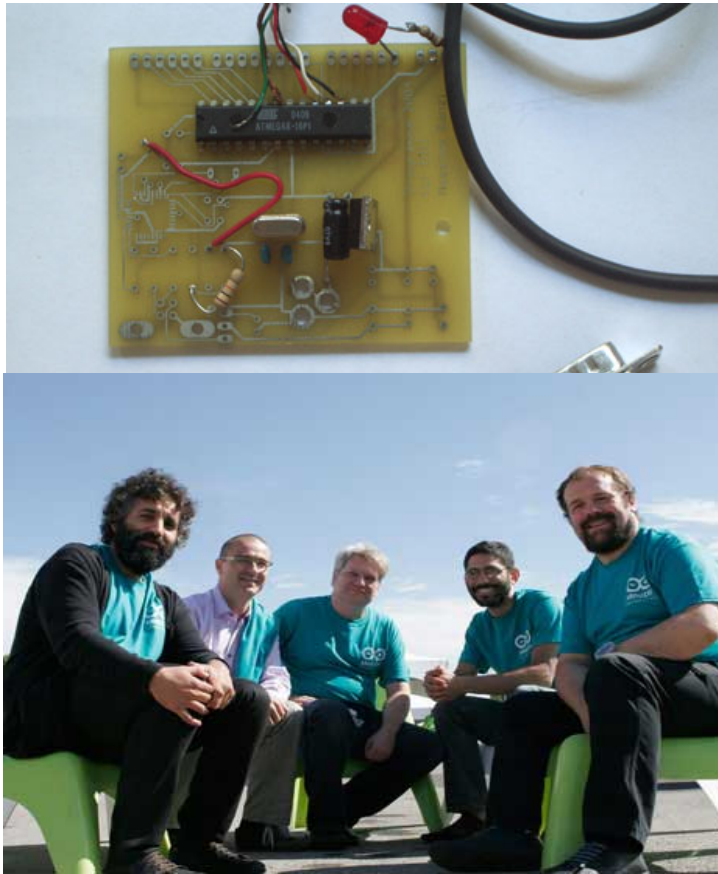
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Introducción a Arduino: Presente



Introducción a Arduino: Historia



- Maximo Banzi 2005
- Un bar le da nombre
- Made in Italy
- Computación física
- Precio objetivo 30\$
- 100% free source

David Cuartielles

Gianluca Martino

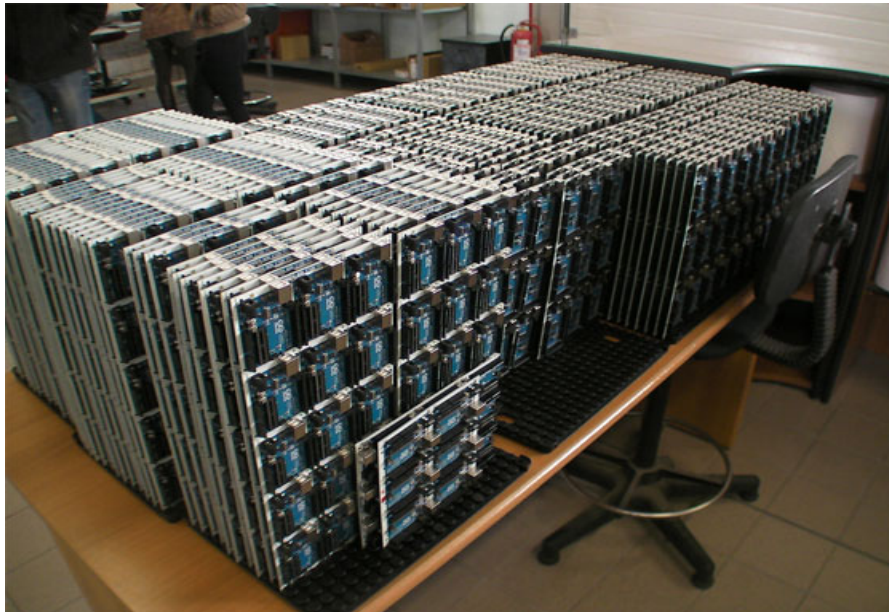
Tom Igoe

David Mellis

Massimo Banzi



Introducción a Arduino: Presente



300.000 en Mayo de 2011

Uno
Leo
Ethernet
Mega
Mini
Pro
LilyPad
Bluetooth



Introducción a Arduino: Futuro

- Due: ARM 32bits (Presentada 22/10)
- Wifi
- Android ADK
- ...



¿Dónde comprar?

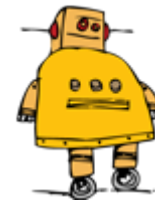
- <http://store.arduino.cc>
- <http://www.bricogeek.com/shop/>
- <http://www.cooking-hacks.com/>
- <http://shop.voipminic.com/>
- ...



Introducción a Arduino: Futuro

Makers

Make:
technology on your time



[MakeProjects](#)

[Instructables](#)

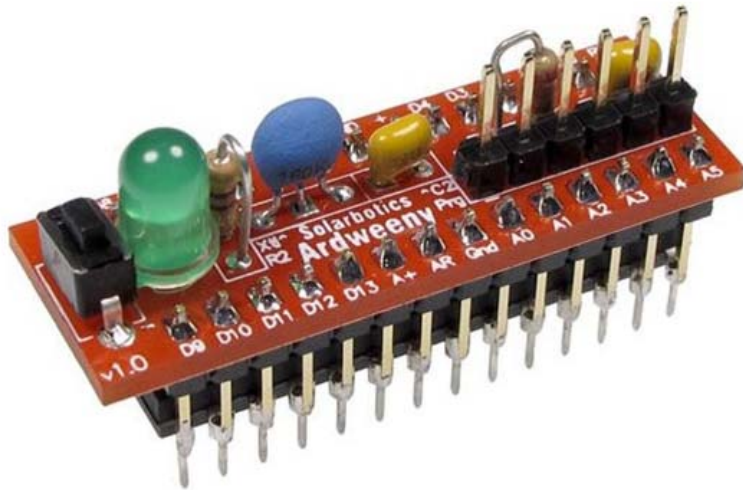


Introducción a Arduino: Futuro

¿Gratis como la cerveza?

[software libre](#)

[hardware libre](#)



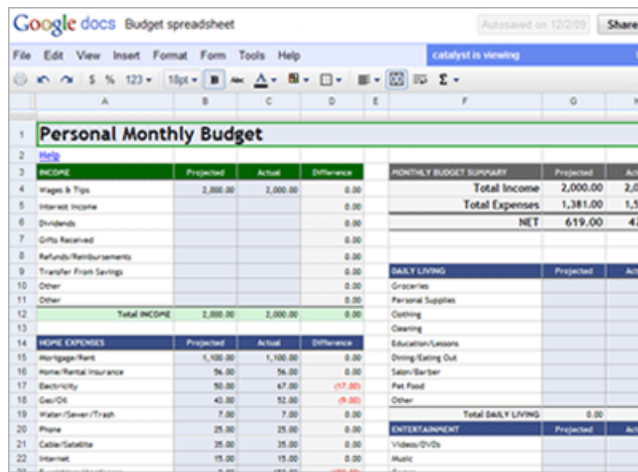
[ejemplo](#)
[como montarlo](#)



Introducción a Arduino: Presente

Hablando de
Hardware

Hablando de Colaboración



Google docs Budget spreadsheet

File Edit View Insert Format Form Tools Help

Personal Monthly Budget

	Projected	Actual	Difference		Projected	Actual
				MONTHLY BUDGET SUMMARY		
INCOME				Total Income	2,000.00	2,000.00
Wages & Tips	2,000.00	2,000.00	0.00	Total Expenses	1,381.00	1,381.00
Interest Income			0.00	NET	619.00	619.00
Dividends			0.00			
Gifts Received			0.00			
Refunds/Reimbursements			0.00			
Transfer From Savings			0.00			
Other			0.00			
Total INCOME	2,000.00	2,000.00	0.00			
				DAILY LIVING		
				Projected Actual		
				Groceries		
				Personal Supplies		
				Clothing		
				Cleaning		
				Education/Lessons		
				Dining/Eating Out		
				Salon/Barber		
				Pet Food		
				Other		
				Total DAILY LIVING		
				0.00		
				ENTERTAINMENT		
				Projected Actual		
				Video/DVDs		
				Music		

Trabajo colaborativo



Introducción a Arduino: Futuro

Free University?

- [Udacity](#): Sebastian Thrunel
- [Coursera](#): Stanford, Berkeley y Michigan.
- [Mit](#): [6002x](#) sobre electrónica y circuitos. ¡¡Certificados!!
- [Khan academy](#): 3000 vídeos
- [Yale Open Courses](#): física, química, idiomas, historia,



Introducción a Arduino: Proyectos

Alimentador de mascotas activado por twitter



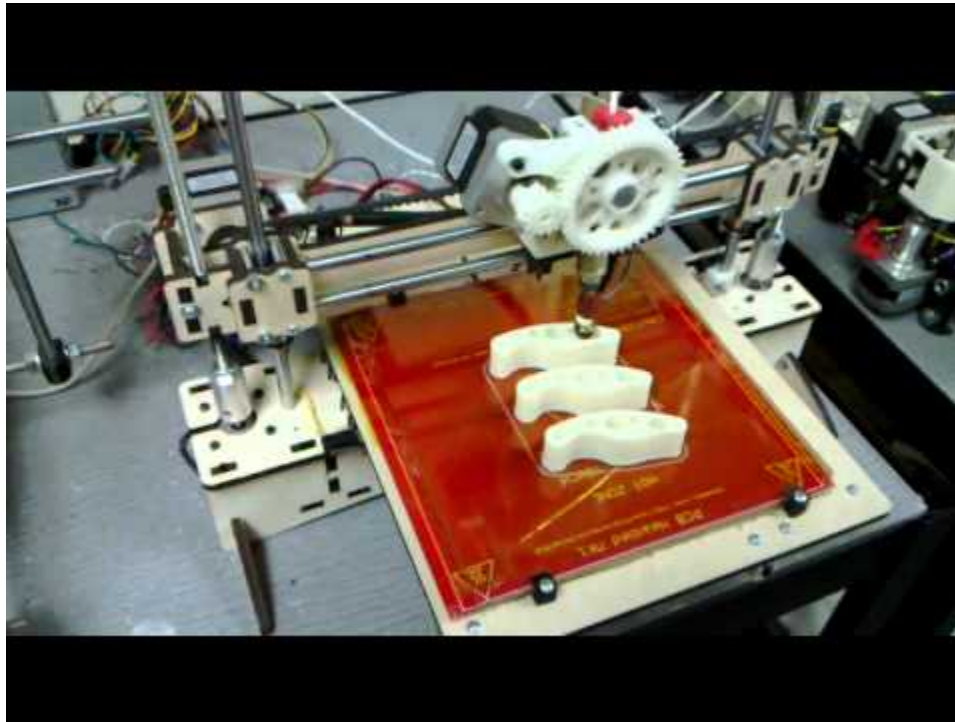
Introducción a Arduino: Proyectos

Cafetera que twittea



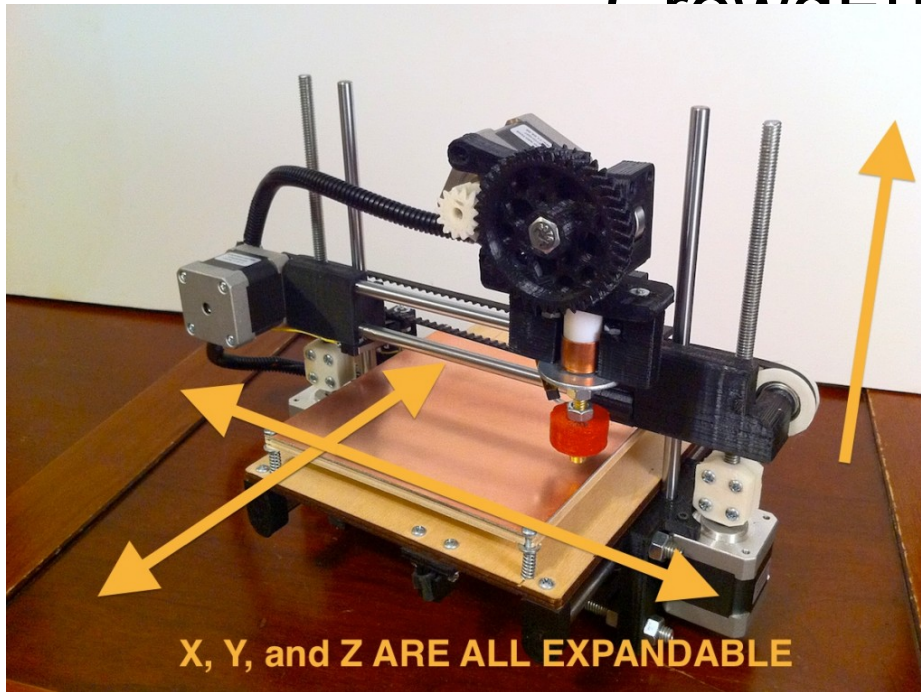
Introducción a Arduino: Proyectos

Impresoras 3D: [PrintrBot](#), [RepRap](#), ...



Introducción a Arduino: Proyectos

Impresoras 3D: CrowdFunding



[PrintrBot](#)

¿[Financiación?](#)



Introducción a Arduino: Hardware

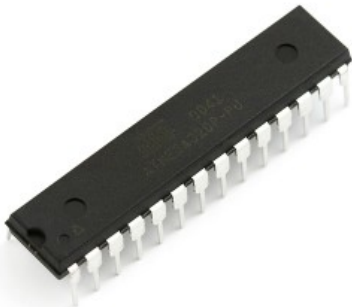
Las comparaciones son odiosas

Microcontrolador

16MHz

1Kb

16Kb



"PC"

3GHz x 200

4Gb x 4000

1Tb x 62500

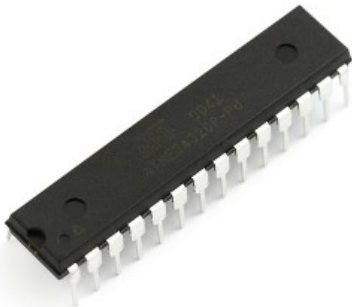


Introducción a Arduino: Hardware

Auto...

Microcontrolador
Autocontenido
Autoprogramable
Ad eternum

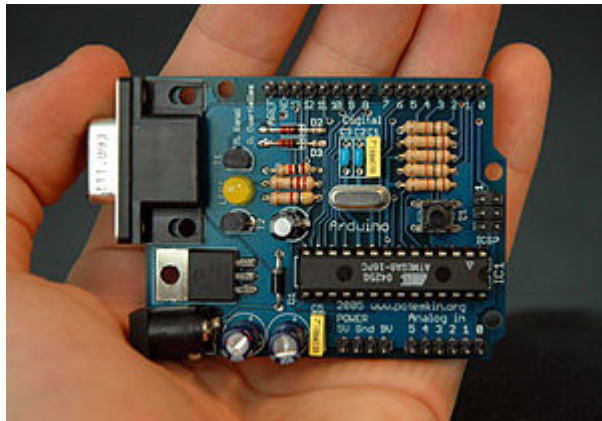
"PC"



Introducción a Arduino: Hardware

Cuestión de tamaño

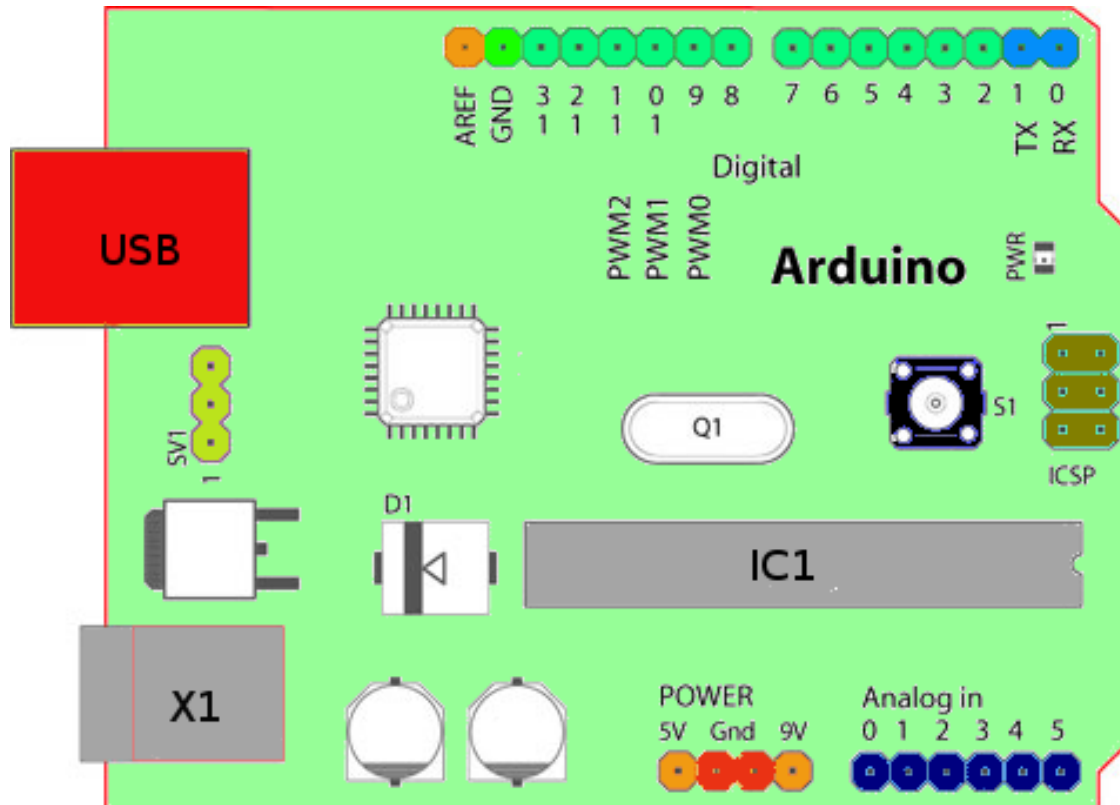
Arduino



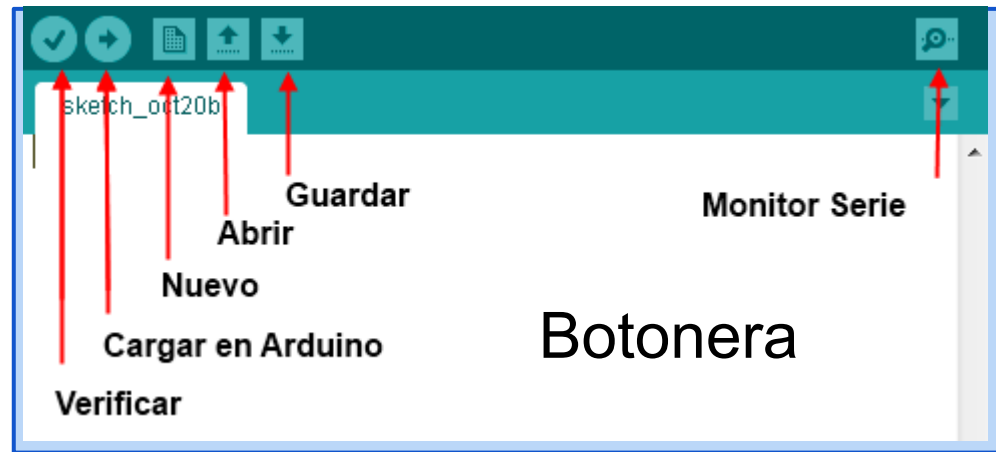
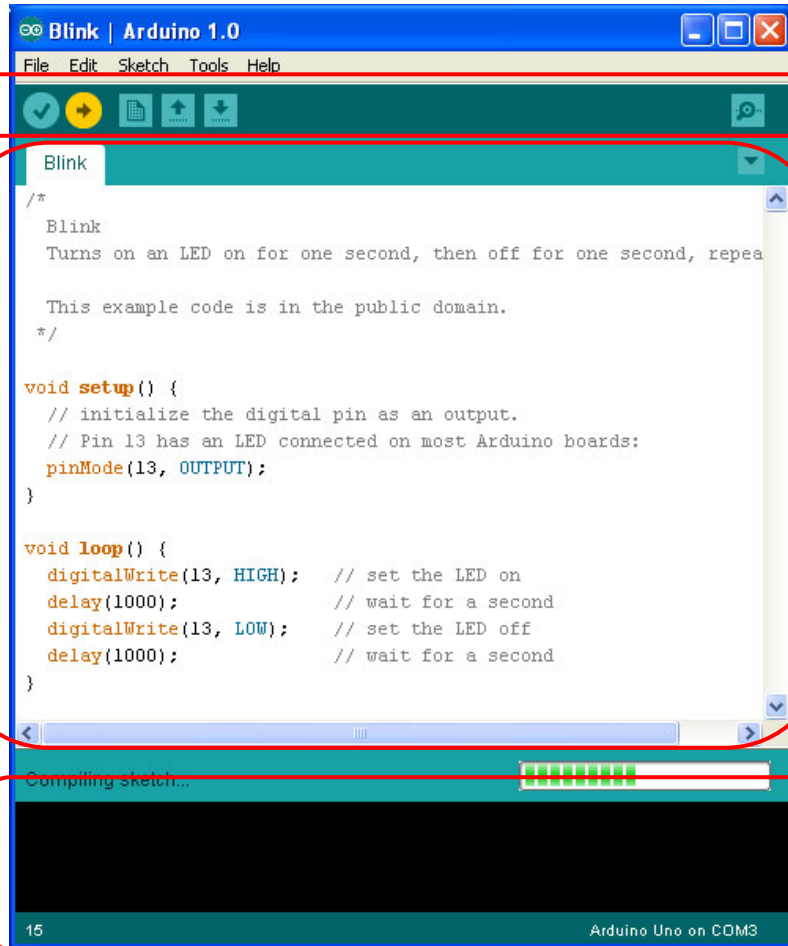
Microcontrolador



Introducción a Arduino: Hardware



IDE: uso

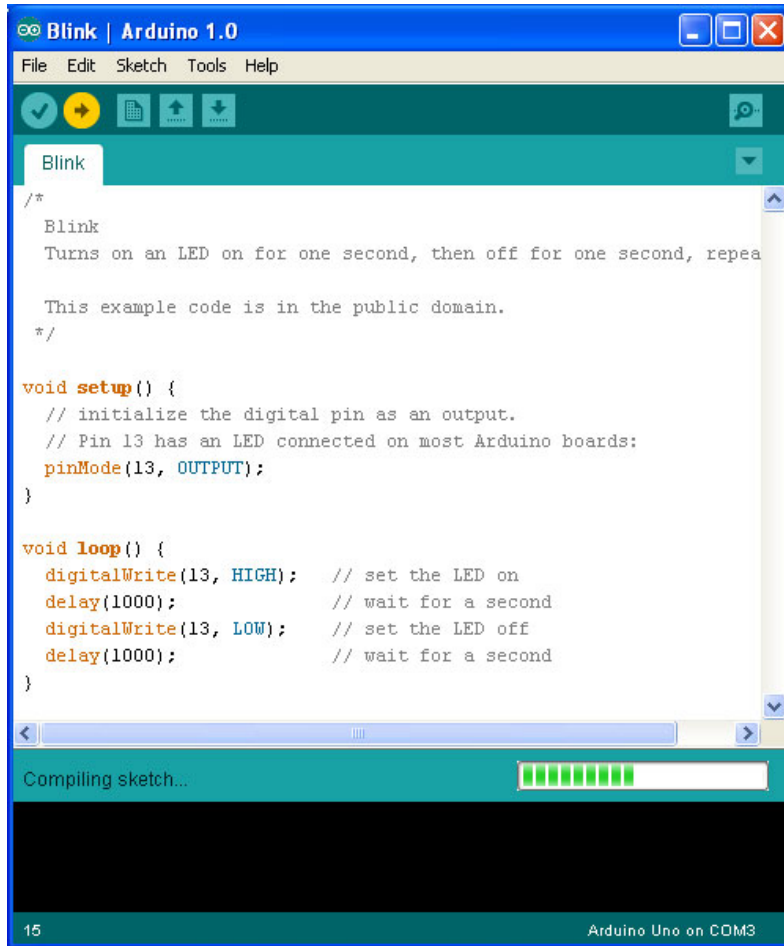


Editor

Depuración



IDE: menú



```
/*
 * Blink
 * Turns on an LED on for one second, then off for one second, repeats.
 *
 * This example code is in the public domain.
 */

void setup() {
  // initialize the digital pin as an output.
  // Pin 13 has an LED connected on most Arduino boards:
  pinMode(13, OUTPUT);
}

void loop() {
  digitalWrite(13, HIGH); // set the LED on
  delay(1000);           // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);           // wait for a second
}
```

- Preferencias
- Directorio de usuario
- Ejemplos
- Sketches
- Formato automático
- Añadir espacios
- Ayuda



Programando Arduino: Lenguaje

```
void setup()  
{}
```

```
void loop()  
{}
```

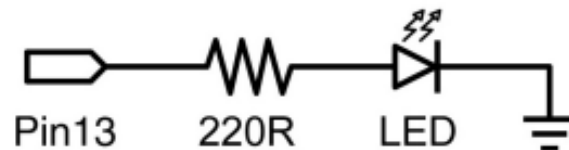
[Guía de referencia de Arduino](#)

[Librerías](#)



El mundo digital: salidas

digital output



This is the basic 'hello world' program used to simply turn something on or off. In this example, an LED is connected to pin13, and is blinked every second. The resistor may be omitted on this pin since the Arduino has one built in.

```
int ledPin = 13;           // LED on digital pin 13

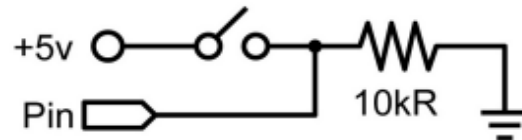
void setup()               // run once
{
  pinMode(ledPin, OUTPUT); // sets pin 13 as output
}

void loop()                // run over and over again
{
  digitalWrite(ledPin, HIGH); // turns the LED on
  delay(1000);                // pauses for 1 second
  digitalWrite(ledPin, LOW);  // turns the LED off
  delay(1000);                // pauses for 1 second
}
```



El mundo digital: entradas

digital input



This is the simplest form of input with only two possible states: on or off. This example reads a simple switch or pushbutton connected to pin2. When the switch is closed the input pin will read HIGH and turn on an LED.

```
int ledPin = 13;           // output pin for the LED
int inPin = 2;            // input pin (for a switch)

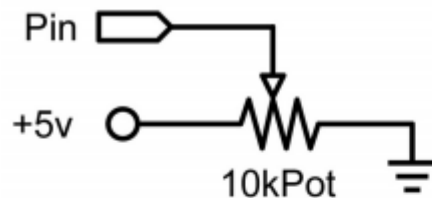
void setup()
{
  pinMode(ledPin, OUTPUT); // declare LED as output
  pinMode(inPin, INPUT);   // declare switch as input
}

void loop()
{
  if (digitalRead(inPin) == HIGH) // check if input is HIGH
  {
    digitalWrite(ledPin, HIGH); // turns the LED on
    delay(1000);                // pause for 1 second
    digitalWrite(ledPin, LOW);  // turns the LED off
    delay(1000);                // pause for 1 second
  }
}
```



El mundo analógico: entradas

potentiometer input



Using a potentiometer and one of the Arduino's analog-to-digital conversion (ADC) pins it is possible to read analog values from 0-1024. The following example uses a potentiometer to control an LED's rate of blinking.

```
int potPin = 0;    // input pin for the potentiometer
int ledPin = 13;  // output pin for the LED

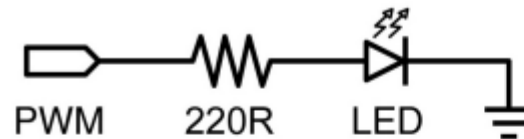
void setup()
{
  pinMode(ledPin, OUTPUT); // declare ledPin as OUTPUT
}

void loop()
{
  digitalWrite(ledPin, HIGH); // turns ledPin on
  delay(analogRead(potPin));  // pause program
  digitalWrite(ledPin, LOW);  // turns ledPin off
  delay(analogRead(potPin));  // pause program
}
```



El mundo analógico: salidas

pwm output



Pulsewidth Modulation (PWM) is a way to fake an analog output by pulsing the output. This could be used to dim and brighten an LED or later to control a servo motor. The following example slowly brightens and dims an LED using for loops.

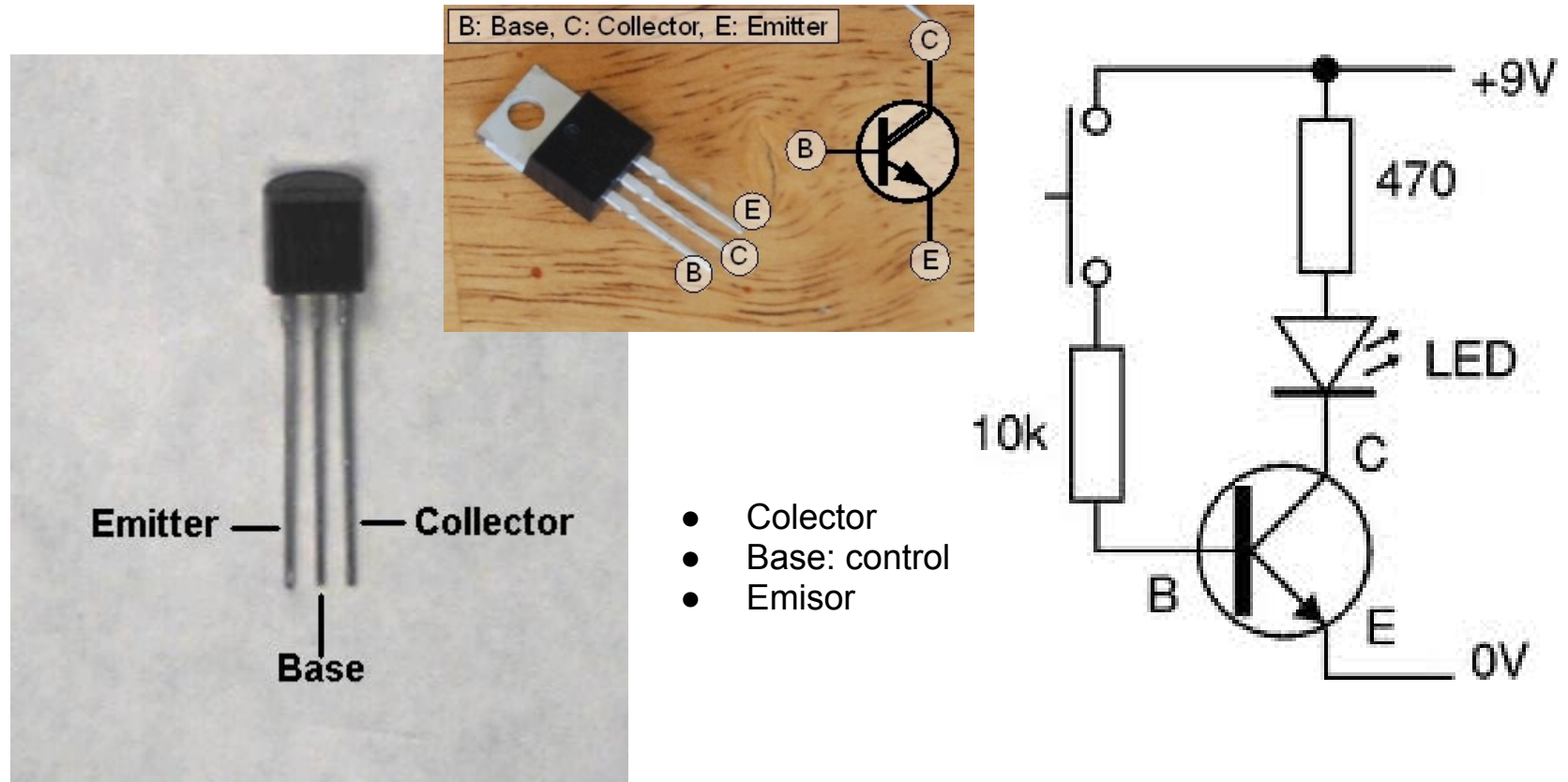
```
int ledPin = 9;    // PWM pin for the LED

void setup(){}    // no setup needed

void loop()
{
  for (int i=0; i<=255; i++) // ascending value for i
  {
    analogWrite(ledPin, i); // sets brightness level to i
    delay(100);            // pauses for 100ms
  }
  for (int i=255; i>=0; i--) // descending value for i
  {
    analogWrite(ledPin, i); // sets brightness level to i
    delay(100);            // pauses for 100ms
  }
}
```

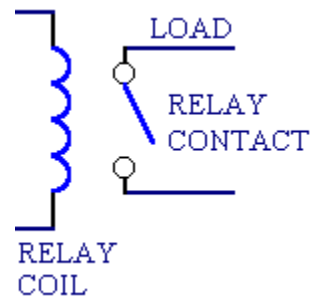


Usando potencia: Transistor



Usando potencia: Relé

Un relé es un interruptor eléctrico que se puede accionar remotamente de manera eléctrica con una corriente mucho menor que la es capaz de activar.



Reciclando hardware



Reciclando hardware

	Impresoras	Videos	Lectores DVD	Coches RF
Motores	X	X	X	X
Led	X	X		
Laser			X	
Drivers	X	X	X	X
Componentes	X	X	X	X



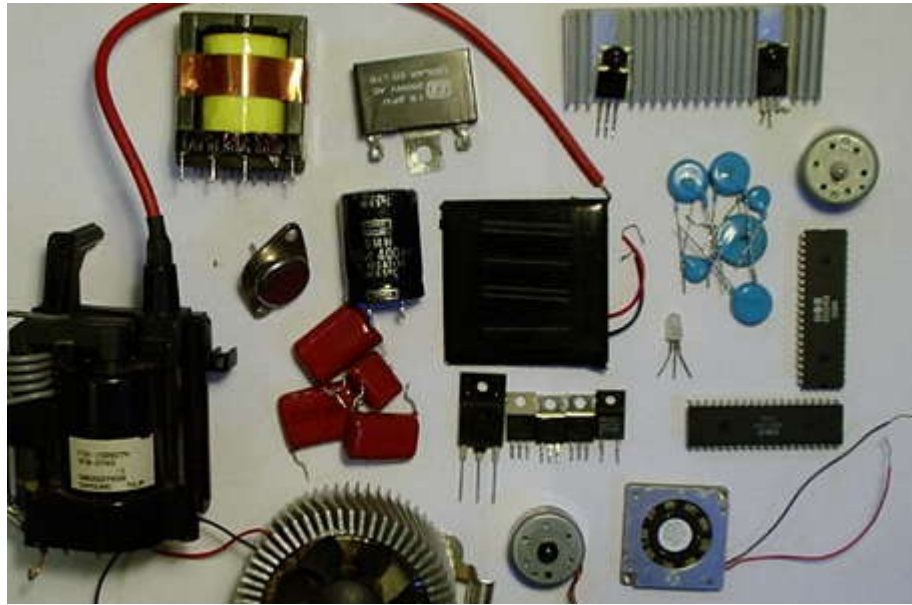
Reciclando hardware: Samples

samples (muestras): Texas Instruments y Maxim

- Lista de fabricantes que proporcionan samples de instructables
- Fabricantes que proporcionan samples segun ladyada
- En **hack a day** han recopilado también fuentes



Reciclando hardware: Todo gratis



<http://www.instructables.com/id/How-To-Get-FREE-Electronic-parts/?ALLSTEPS>

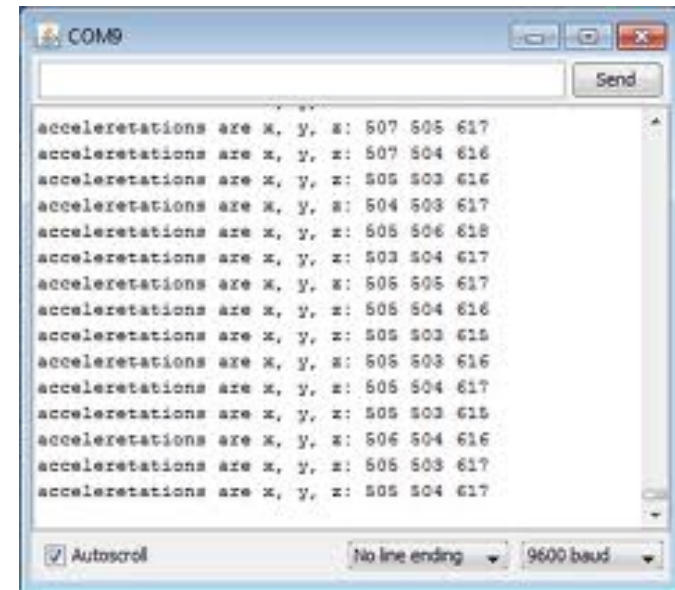
<http://blog.elcacharreo.com/2012/04/13/de-donde-obtener-material-electronico-gratis/>



Comunicaciones: introducción

Comunicando con el pc:

```
void setup() {  
  Serial.begin(9600);  
  
  int i=0;  
  void loop() {  
    Serial.print("hola ");  
    Serial.println(i);  
  }  
}
```



Comunicaciones: el puerto serie

Comandos via serie

Functions

- begin()
- end()
- available()
- read()
- peek()
- flush()
- print()
- println()
- write()
- SerialEvent()



Comunicaciones: SPI, I2C, OneWire

Ejemplo I2C

Ejemplo OneWire del ide

Ejemplos



Fuentes

arduino
arduino programing notebook
freedduino



Conclusiones

Gracias por vuestra atención

