Arduino + Processing

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Francisco Moreno
Francisco González

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Processing (programming language) - Wikipedia, the free encyclopedia

http://en.wikipedia.org/wiki/Processing_(programming_language)

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Processing (programming language)

From Wikipedia, the free encyclopedia

Processing is an open source programming language and integrated development environment (IDE) built for the electronic arts and visual design communities with the purpose of teaching the basics of computer programming in a visual context, and to serve as the foundation for electronic sketchbooks. The project was initiated in 2001 by Casey Reas and Benjamin Fry, both formerly of the Aesthetics and Computation Group at the MIT Media Lab. One of the stated aims of Processing is to act as a tool to get non-programmers started with programming, through the instant gratification of visual feedback. The language builds on the graphical capabilities of the Java programming language, simplifying features and creating a few new ones.

Contents [hide]

1 Features
- 1.1 Hello World
- 1.2 United States presidential election map

2 Related projects
- 2.1 Design By Numbers
- 2.2 Wiring, Arduino, and Fritzing
- 2.3 Mobile Processing
- 2.4 Processing.js
- 2.5 Spde
- 2.6 Processing in Clojure
- 2.7 Processing Monsters

3 Awards
4 License
5 Name
6 See also
7 Footnotes
8 References
9 External links

Processing

Paradigm	object-oriented
Appeared in	2001; 10 years ago
Stable release	1.5.0 (April 17, 2011; 2 days ago)
Typing discipline	strong
Influenced by	Design By Numbers, Java, OpenGL, PostScript, C
OS	Cross-platform
License	GPL, LGPL
Usual file extensions	.pde
Website	processing.org

Processing at Wikibooks

Features [edit]

Processing includes a "sketchbook", a minimal alternative to an integrated development environment (IDE) for organizing projects.

Every Processing sketch is actually a subclass of the PApplet Java-class which implements most of the Processing language's features.

When programming in Processing, all additional classes defined will be treated as inner classes when the code is translated into pure Java before compiling. This means that the use of static variables and methods in classes is prohibited unless you explicitly tell Processing that you want to code in pure Java mode.

Hello World [edit]

Arduino – Wikipedia, the free encyclopedia

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ad:
al appeal from
author Lilaroja

opedia

uino (disambiguation).

is article **needs additional citations for verification.**

ase help improve this article by adding reliable references. Unsourced material may be challenged and removed.

pril 2010)

lectronics prototyping platform, designed to
ectronics in multidisciplinary projects more
nsists of a simple open hardware design for
nel AVR processor and on-board I/O
ts of a standard programming language and
he board.[1]

med using a Wiring-based language (syntax
h some simplifications and modifications,
[1]

an be purchased pre-assembled; hardware
e for those who would like to assemble an
, clones of the Italian-made Arduino—with
—have been released by third parties.

an honorary mention in the Digital
2006 Prix Ars Electronica.[2][3]

Simple English
Türkçe
中文

The project began in Ivrea, Italy in 2005 to make a device for controlling student-built interaction design projects less expensively than other prototyping systems available at the time. As of February 2010 more than 120,000 Arduino boards had been shipped.[4] Founders Massimo Banzi and David Cuartielles named the project after a local bar named Arduino.[5] The name is an Italian masculine first name, meaning "strong friend". The English equivalent is "Hardwin", a namesake of Arduino d'Ivrea[6]

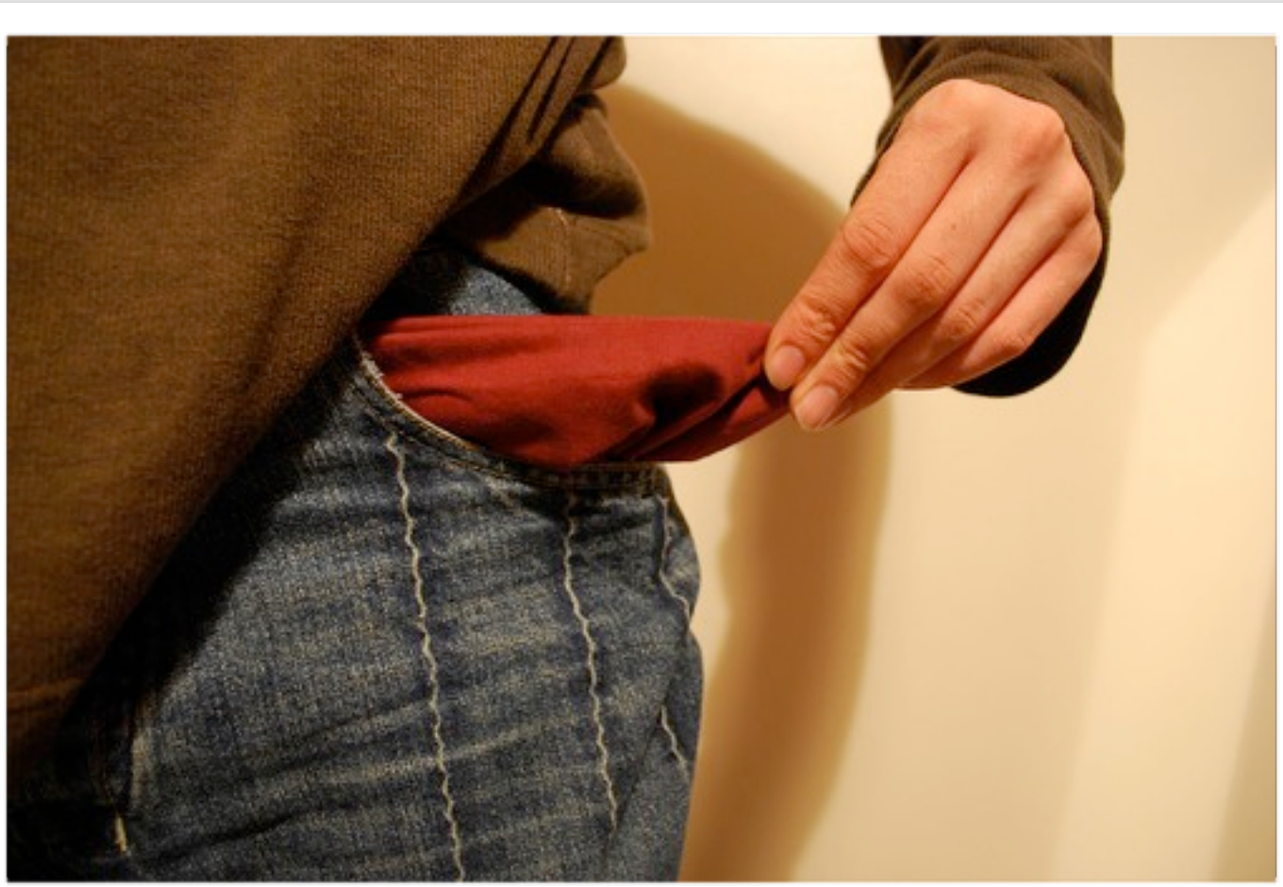
Contents [hide]

Arduino Software

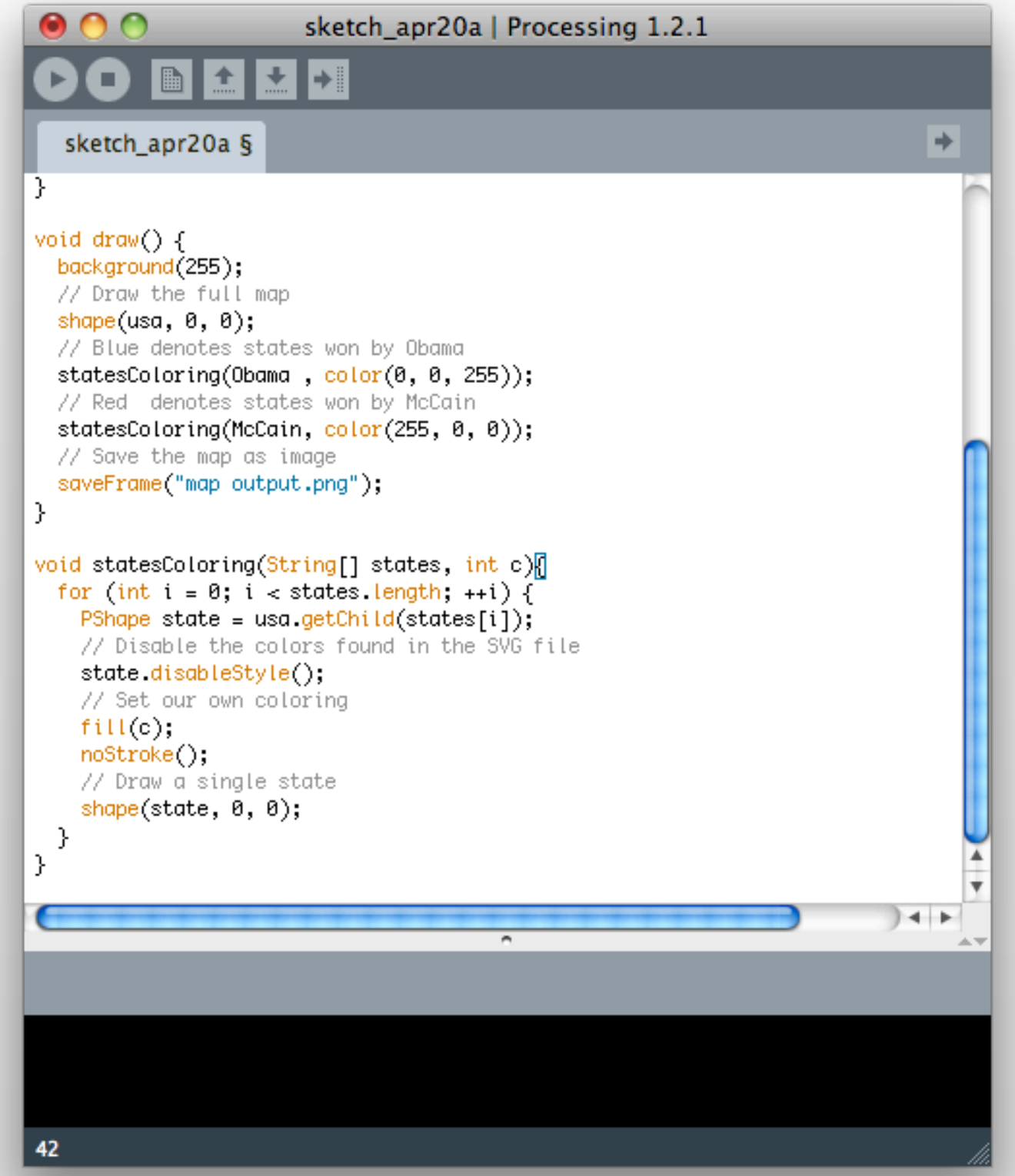
+

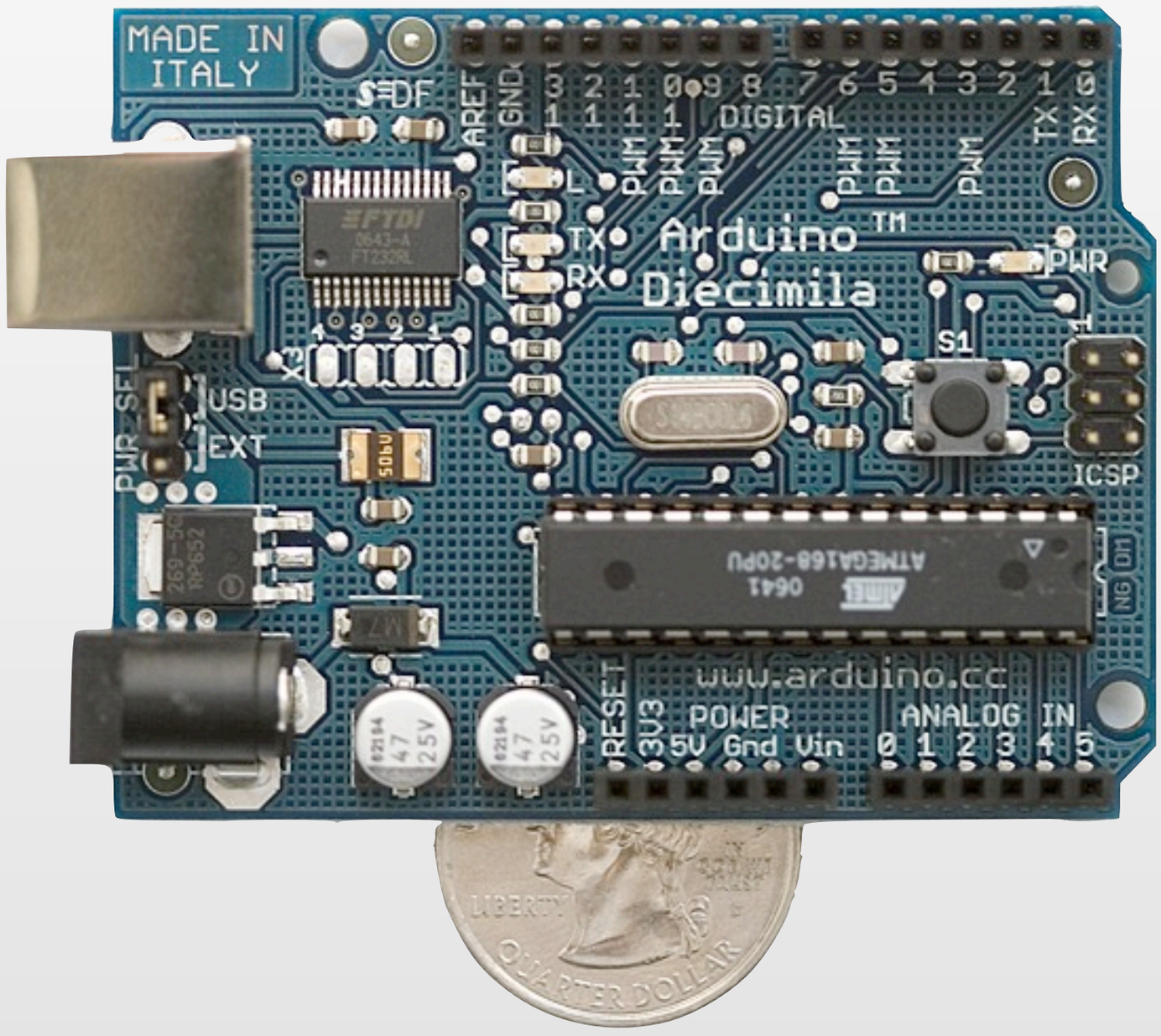
=

+



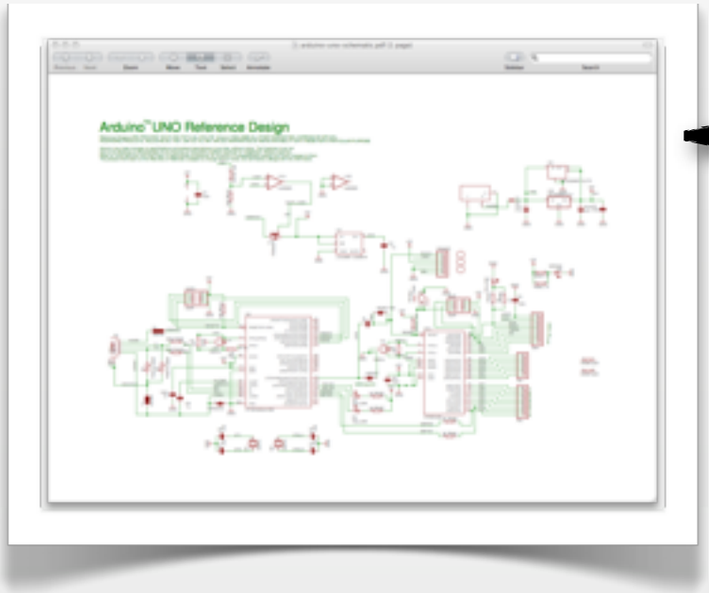

miracle of science
bar + grill


sketch_apr20a | Processing 1.2.1
sketch_apr20a §
}
void draw() {
background(255);
// Draw the full map
shape(usa, 0, 0);
// Blue denotes states won by Obama
statesColoring(Obama , color(0, 0, 255));
// Red denotes states won by McCain
statesColoring(McCain, color(255, 0, 0));
// Save the map as image
saveFrame("map output.png");
}
void statesColoring(String[] states, int c){
for (int i = 0; i < states.length; ++i) {
PShape state = usa.getChild(states[i]);
// Disable the colors found in the SVG file
state.disableStyle();
// Set our own coloring
fill(c);
noStroke();
// Draw a single state
shape(state, 0, 0);
}
}
42


MADE IN
ITALY
AREF
GND
DIGITAL
TX
RX
Arduino
TM
Diecimila
PWR
S1
ICSP
USB
EXT
PWR SEL
FTDI
ATMEGA168-20PU
www.arduino.cc
RESET
3V3
POWER
5V Gnd Vin
ANALOG IN
0 1 2 3 4 5
LIBERTY
QUARTER DOLLAR

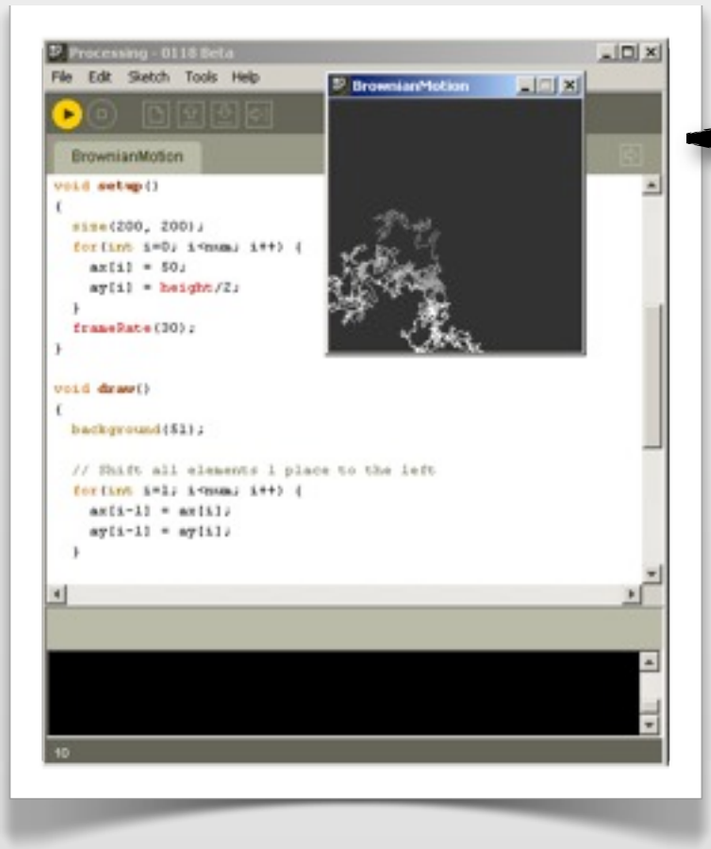
¿Qué son arduino y processing?

Todos los esquemas se pueden descargar desde la misma página de arduino: **http://arduino.cc**

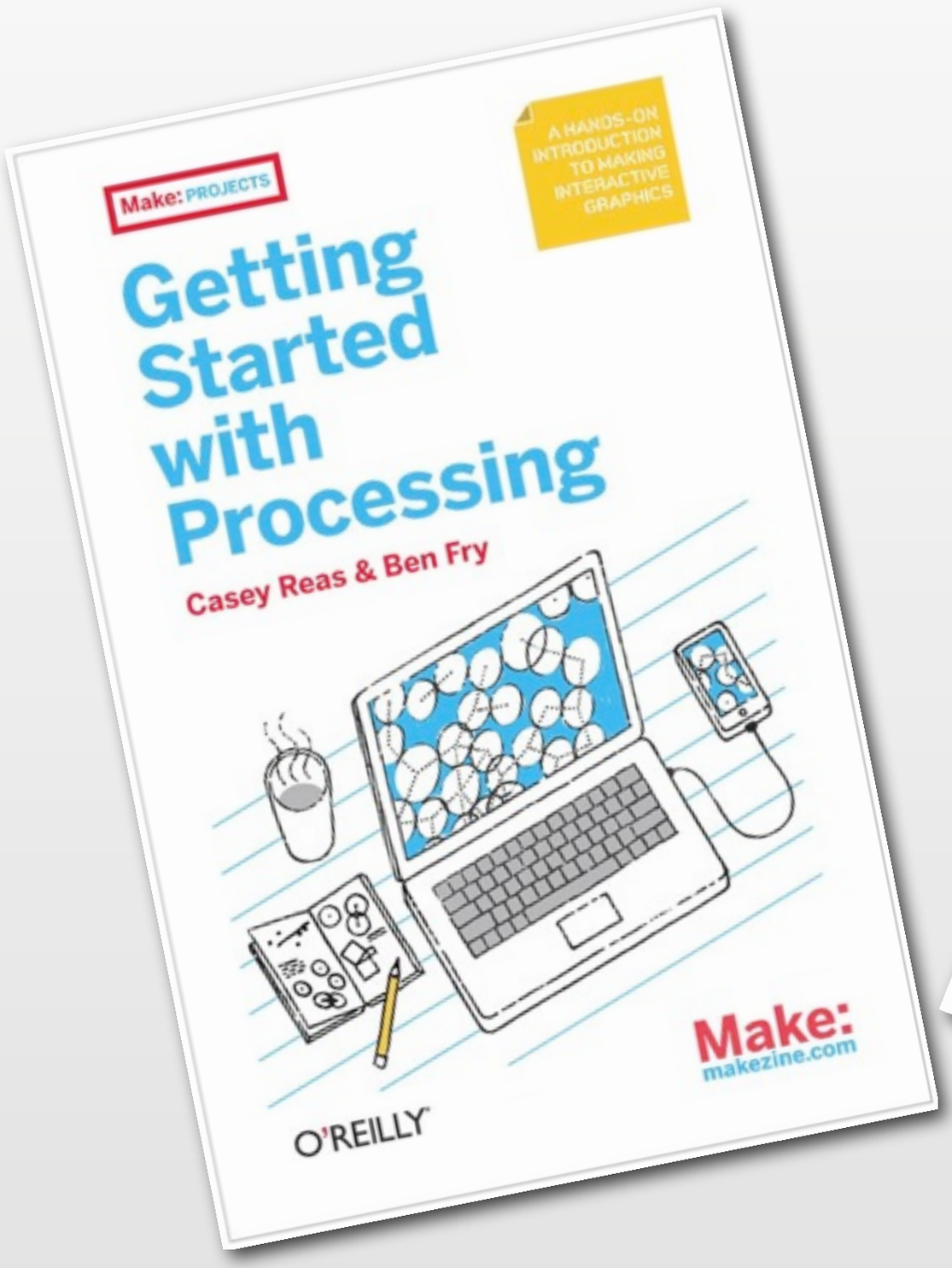


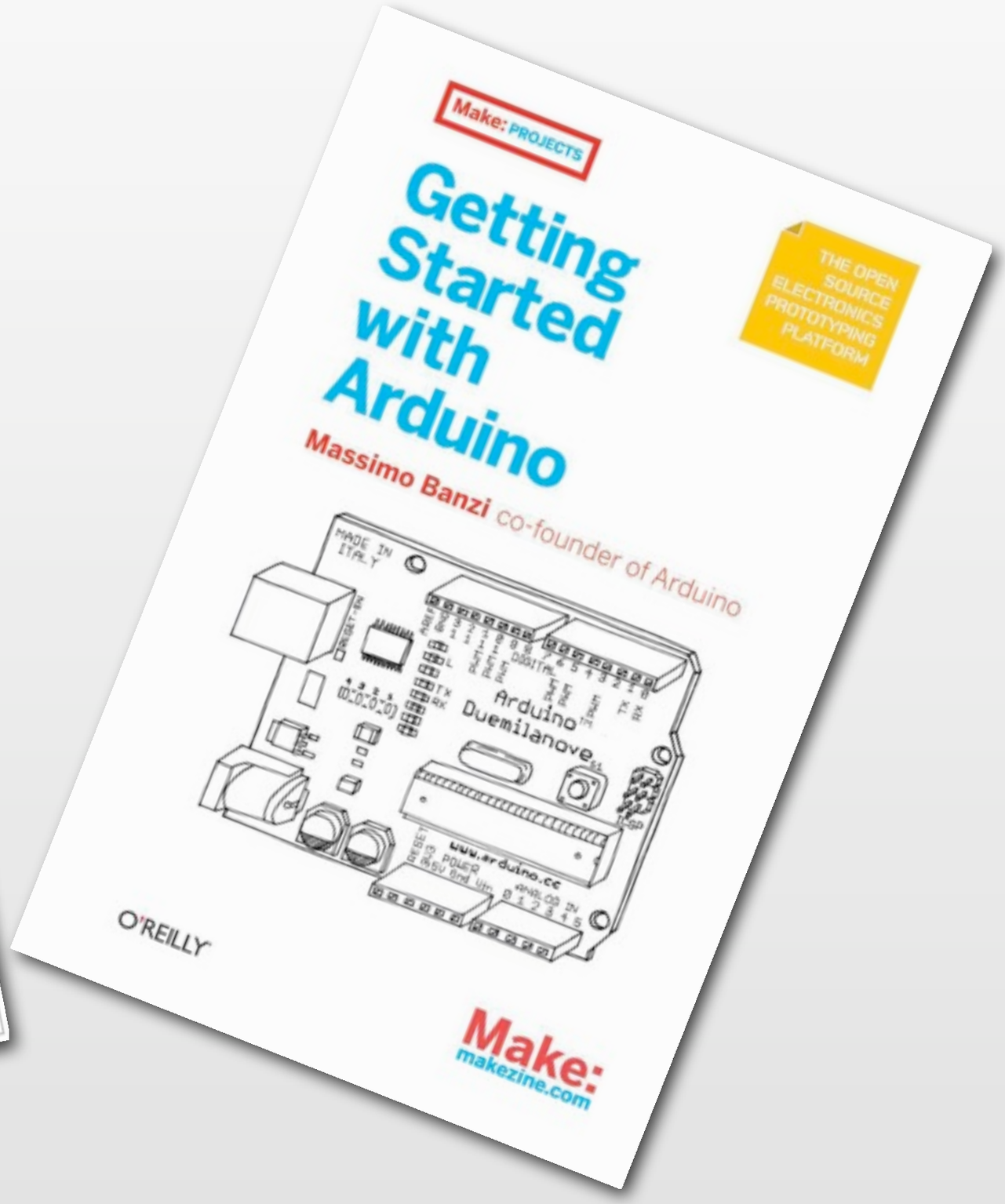
Hardware Libre

El lenguaje de programación, el IDE y todo el entorno necesario son libres. **http://processing.org/**



Software Libre


Make: PROJECTS
A HANDS-ON INTRODUCTION TO MAKING INTERACTIVE GRAPHICS
Getting Started with Processing
Casey Reas & Ben Fry
Make: makezine.com
O'REILLY


Make: PROJECTS
THE OPEN SOURCE ELECTRONICS PROTOTYPING PLATFORM
Getting Started with Arduino
Massimo Banzi co-founder of Arduino
MADE IN ITALY
Arduino Duemilanove
www.arduino.cc
O'REILLY
Make: makezine.com

Processing y Arduino Juntos

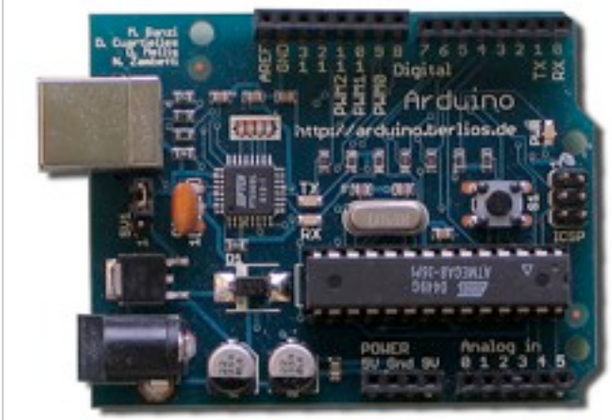
deviantart @Bootcoot

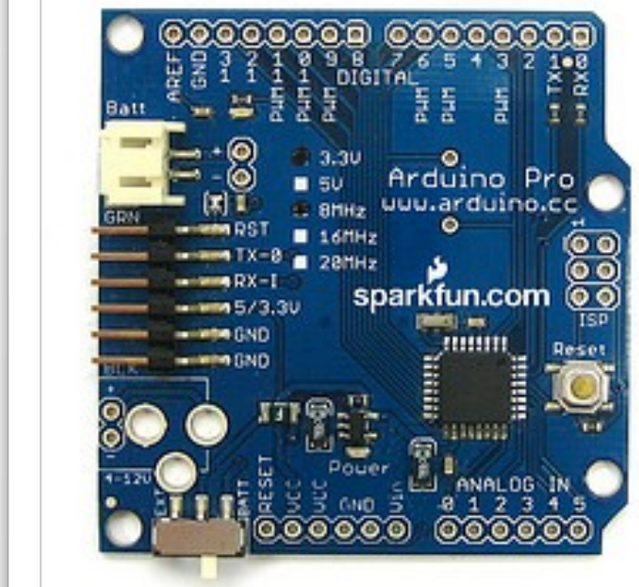
Arduino como HID

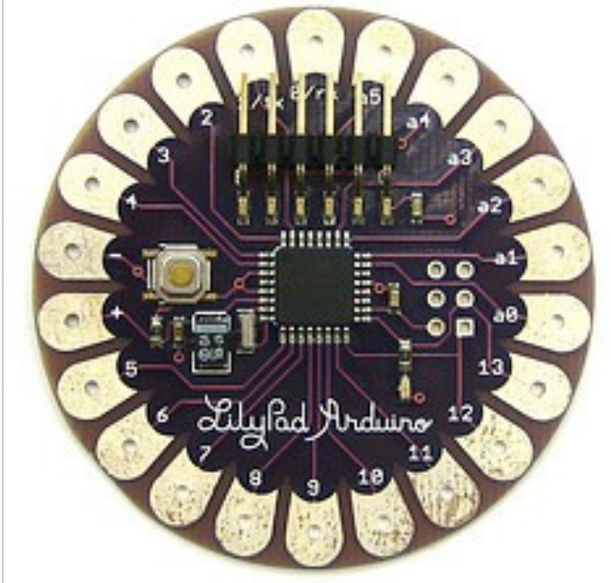
A human interface device or HID is a type of computer device that interacts directly with, and most often takes input from, humans and may deliver output to humans.

http://en.wikipedia.org/wiki/Human_interface_device

Hardware


Arduino
http://arduino.berlios.de
Digital
Analog in
POWER
ICSP


Arduino Pro
www.arduino.cc
sparkfun.com
DIGITAL
ANALOG IN
Batt
Power
Reset
ISP


LilyPad Arduino


MADE IN ITALY
UNO
ARDUINO

Tipos de E/S

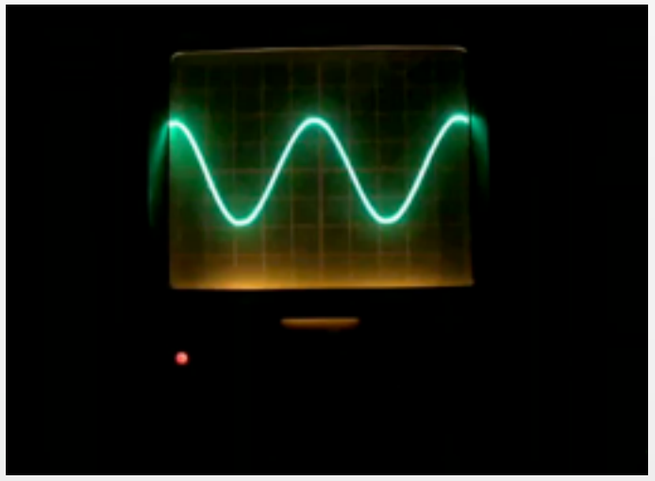
1. Entrada Analógica

2. Entrada/Salida Digital

3. Modulación por ancho de pulsos

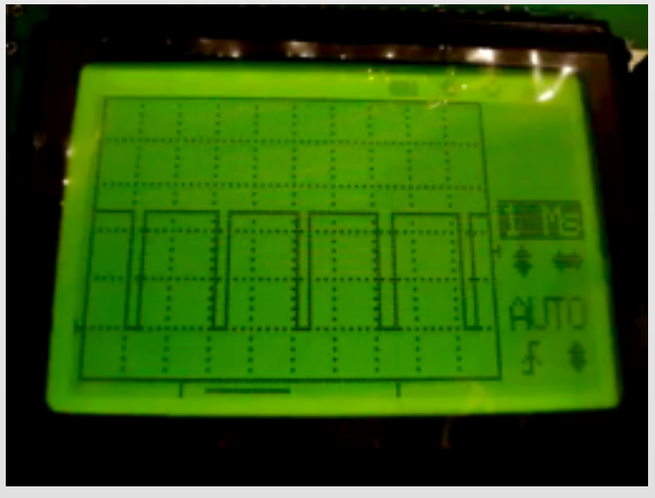
Tipos de E/S

1. Entrada Analógica



2. Entrada/Salida Digital

3. Modulación por ancho de pulsos



Sensores

1. Alcohol

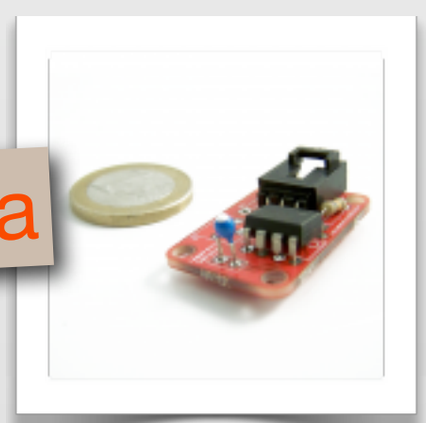
2. CO

3. Acelerómetros

4. Ultra Sonidos

5. Luz

6. Temperatura



¿Lenguaje?

deviantart @Frangelius

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Lenguaje e IDE

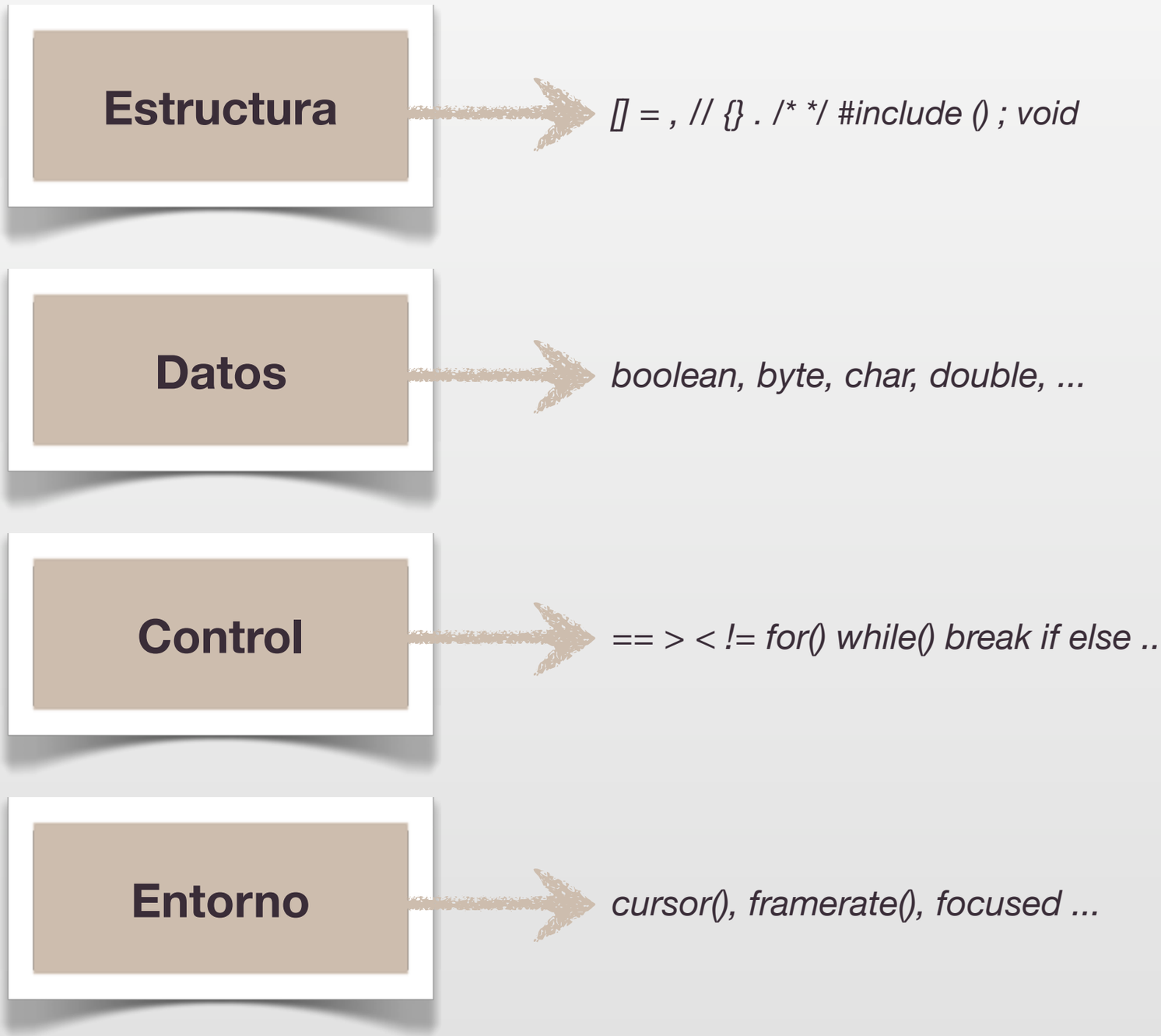
Processing: Creado por Casey Reas y Ben Fry. Sintaxis muy similar a Java. Público objetivo: artes electrónicas y "comunidades de diseño visual".

Wiring: Creado por Hernando Barragán. Es la biblioteca que encapsula todo el acceso a la E/S de los dispositivos.

Java Simplificado

Acceso al Hardware Simplificado

Lenguaje


Estructura
[] = , // {} . /* */ #include () ; void
Datos
boolean, byte, char, double, ...
Control
== > < != for() while() break if else ..
Entorno
cursor(), framerate(), focused ...

Lenguaje

Shape	Input	Output	Transform
Lights	Camera	Color	Image
Rendering	Typography	Math	Constants

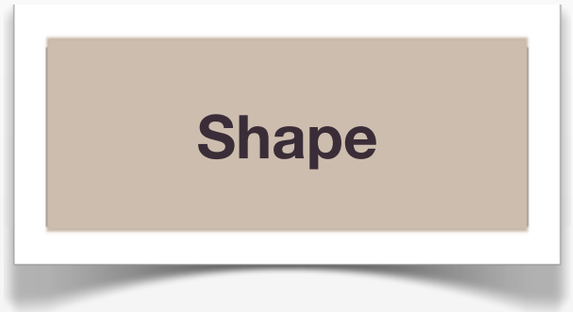
Lenguaje

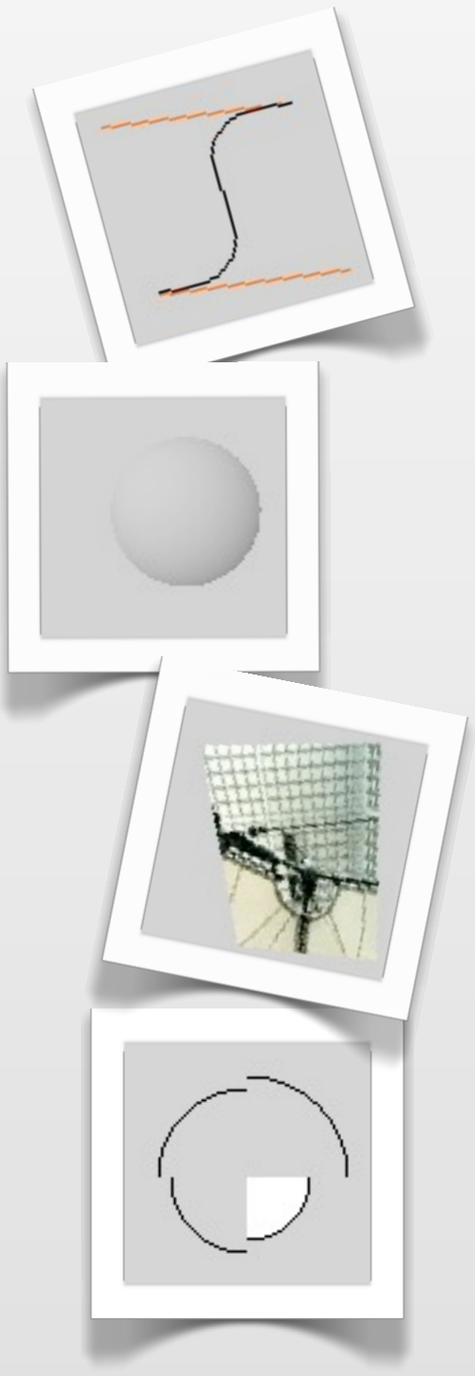
2D: arc(), line

3D: Sphere()

Vertex: texture(), vertex()

Curves: bezier(), curve()





Lenguaje

Time & Date: day()

Mouse: mouseX

Files: selectFolder()

Web: link()

Lenguaje

Shape	Input	Output	Transform
Lights	Camera	Color	Image
Rendering	Typography	Math	Constants

Bibliotecas

Serial → *Soporte de las comunicaciones entre el hardware y dispositivos externos vía puerto serie.*

Vídeo → *Usar cámaras, ver y crear vídeos.*

PDF → *Generar PDFs.*

OpenGL → *Soporte para exportación OpenGL.*

Bibliotecas

Minim → *Sonido de forma fácil.*

Javascript → *Interfaz con javascript. Conecta los applets con js.*

SVG → *Leer ficheros SVG. (Incluida ahora en el core).*

XML → *Leer datos XML. (Incluida ahora en el core).*

Bibliotecas externas

- 3D
- Animation
- Compila-tions
- Computer Vision
- Data and protocols
- Geometry
- Graphic Interface
- Import / Export
- Math
- Simulation
- Sound
- Tools
- Typogra-phy
- Video

Bibliotecas externas

- 3D
- OCD
- surfaceLib
- PeasyCam
- SuperPoint
- GestalT
- Patchy
- Unwra-pping Lib
- anar
- GLGra-phics
- Shapes 3D
- Proscene
- Hemesh

Bibliotecas externas

- 3D
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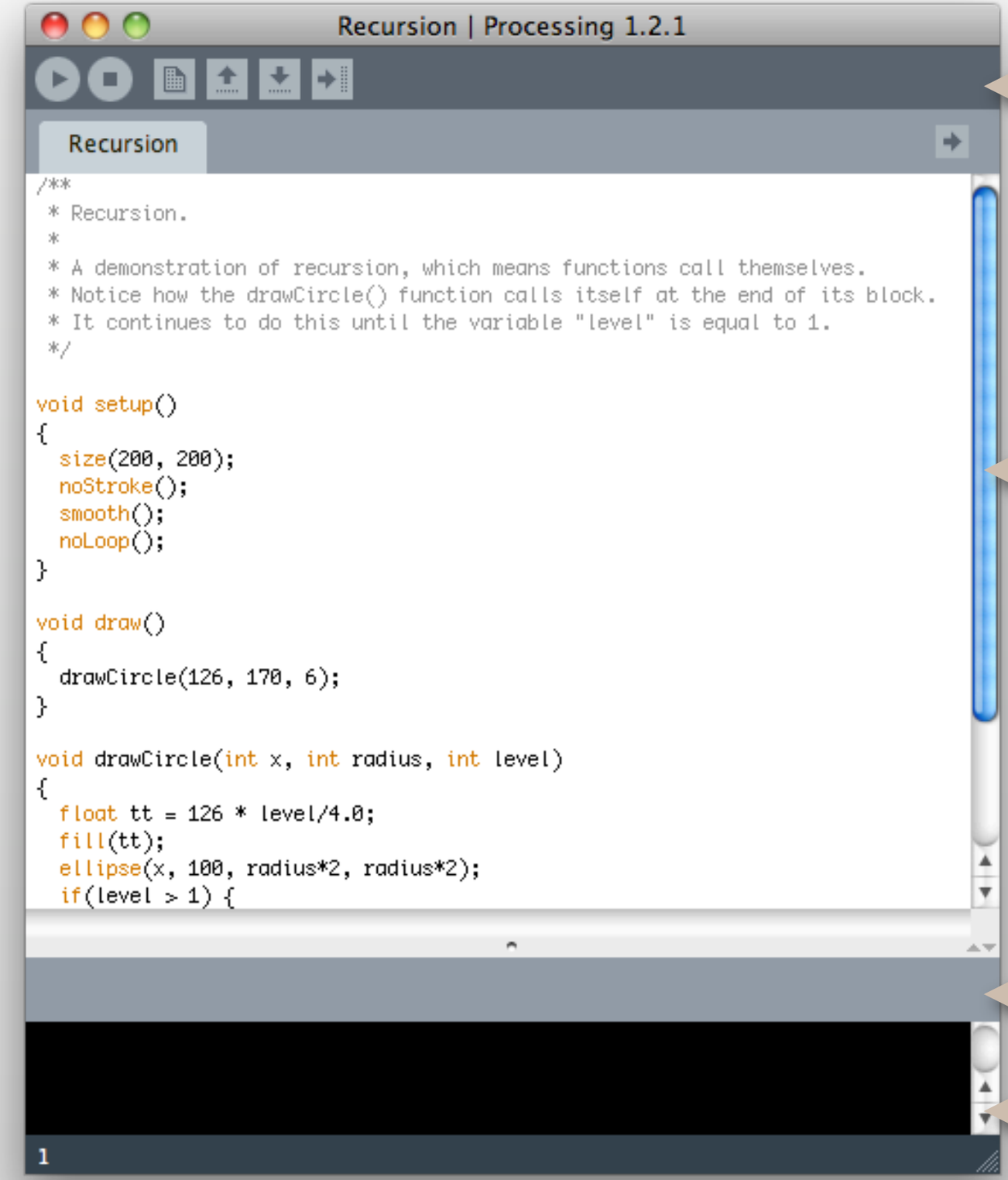
- Compila-tions
- Computer Vision
- Data and protocols
- Geometry
- Graphic Interface
- Import / Export
- Math
- Simulation
- Sound
- Tools
- Typogra-phy
- Video

IDE



Menú

Editor de texto

Área de mensajes

Consola

IDE

1. Sketches

Todo el código de nuestro proyecto se agrupa en un “sketch”. Cada sketch tiene su propio directorio.

2. Autoformato

Reformatea el código para permitir una mejor lectura “humana” por parte del mismo.

3. Compartir

Permite compartir tu trabajo con processing mediante un applet java que puedes empotrar en cualquier página web.

Instalacion

deviantart @wanasabi

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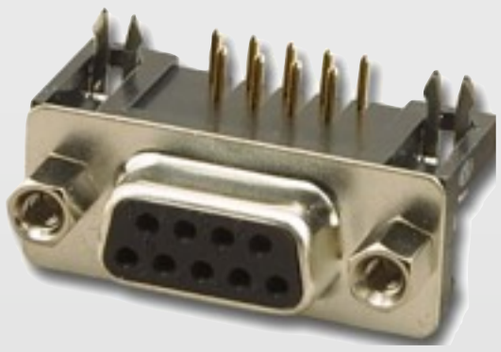
Paso a paso

1.

Instalar librerías de emulación de 32 bits para JAVA

Gentoo:

```
emerge emul-linux-x86-java
```



2.

Dotar al usuario de permisos sobre el puerto serie a usar

Gentoo:

```
sudo gpasswd -a $user uucp
```

Paso a paso

3.

Descargar el entorno

Gentoo:

```
wget http://
arduino.googlecode.com/
files/arduino-0022-64-2.tgz
```

4.

Descomprimir el paquete

Gentoo:

```
tar zxpvf
arduino-0022-64-2.tgz
```

Paso a paso

5.

Ejecutar

Gentoo:
`./arduino`

Paso a paso (modo consola)

Gentoo:

Dependencias:
Si tienes un S.O. de 64 bits necesitarás las bibliotecas de emulación de 32bits para java:
(En gentoo el nombre del paquete es: app-emulation/emul-linux-x86-java)
Necesitarás java y libXext.

Ejemplos de permisos para los puerto serie:

```
gerardo@funtoo-GNUardo ~ $ ls -lh /dev/ttyS*
crw-rw---- 1 root uucp 4, 64 Abr 25 11:51 /dev/ttyS0
crw-rw---- 1 root uucp 4, 65 Abr 25 11:51 /dev/ttyS1
crw-rw---- 1 root uucp 4, 66 Abr 25 11:51 /dev/ttyS2
crw-rw---- 1 root uucp 4, 67 Abr 25 11:51 /dev/ttyS3
```

Añadir al usuario al grupo uucp:

```
sudo gpasswd -a gerardo uucp

gerardo@funtoo-GNUardo ~ $ cat /etc/group | grep gerardo | grep uucp
uucp:x:14:uucp,gerardo
```

... después salir y volver a entrar en la sesión (o en la shell).

Descargar wiring / arduino:

```
wget http://arduino.googlecode.com/files/arduino-0022-64-2.tgz
```

Descomprimir el paquete:

```
tar zxpvf arduino-0022-64-2.tgz
```

y ejecutarlo:

```
./arduino
```

Voila!

Prácticas


amazon.co.jp
deviantart @Bootcoot
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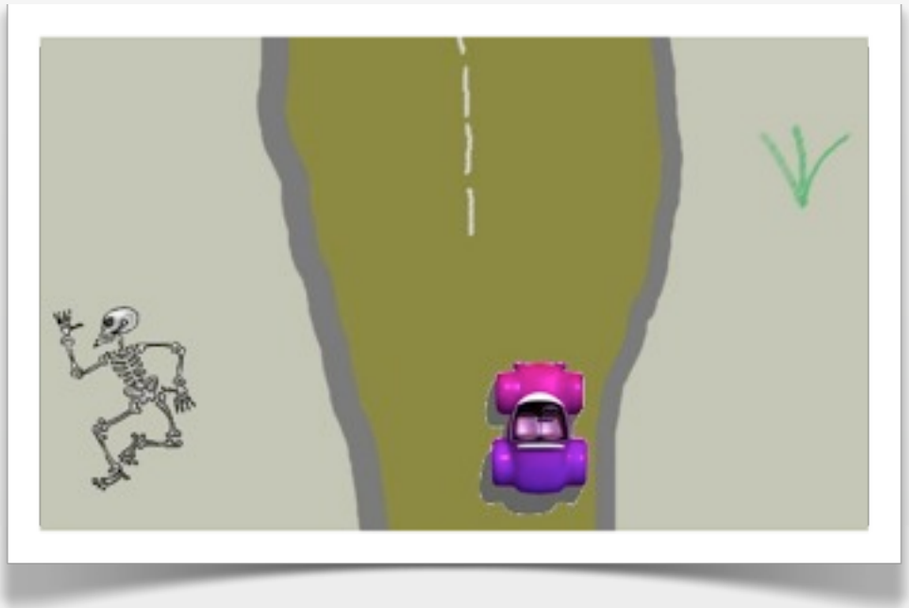
¿Qué vamos a hacer?

1. Juego de coches

Haremos un juego simple de coches.

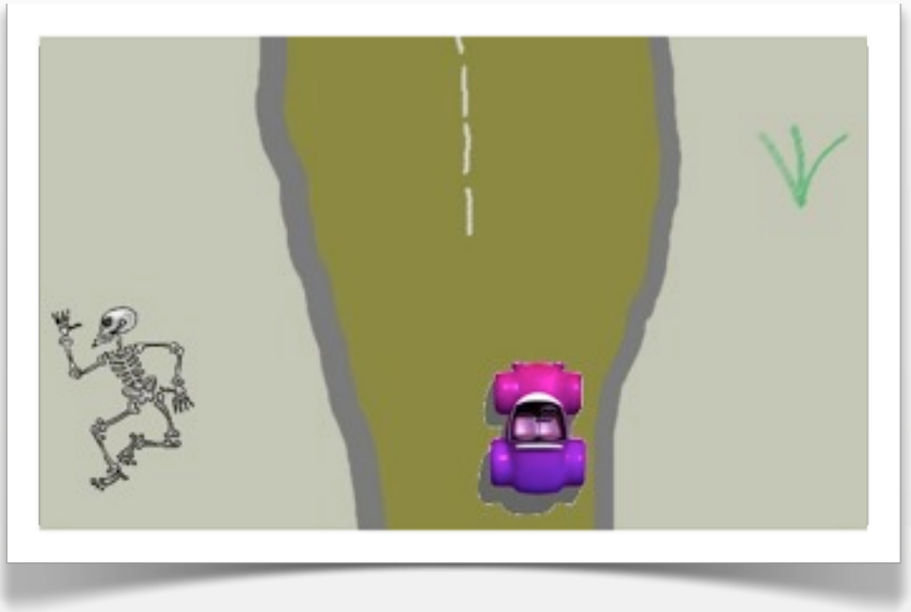


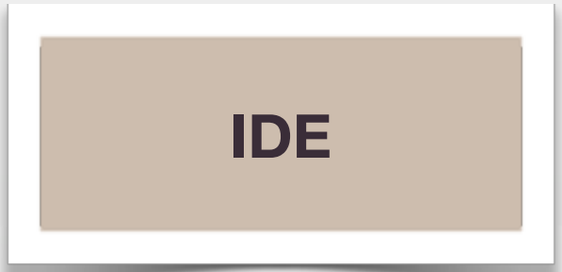
2. Interfaz de control

Trabajaremos con arduino y processing juntos creando una interfaz de control personalizado para el juego.

1. Juego de coches

Haremos un juego simple de coches.

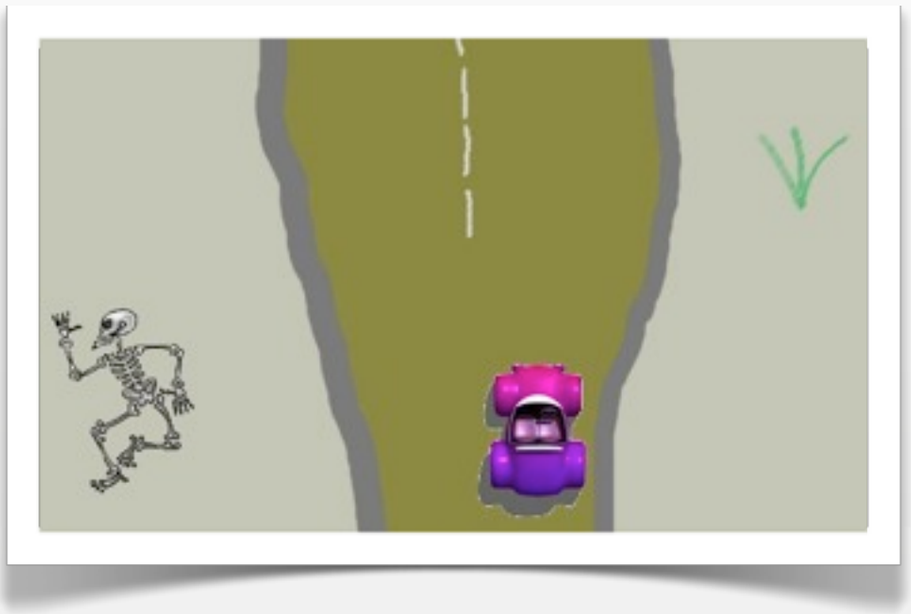




Exportación de nuestros proyectos, librerías, referencia.

1. Juego de coches

Haremos un juego simple de coches.



Lenguaje

Nuestro primer “sketch”, jugar con las shapes, inputs: teclado, ratón

```
void setup() {
  size(600, 200);
  frameRate(60);
  smooth();
  //
  projBox = new ProjBox();
  // if things aren't working comment-out the line above
  // find the arduinos serial port from the list in the output window
  // i.e. "/dev/tty.usbserial-A800eItJ"
  // then uncomment the line below, replacing the serial id with one from the list
  // projBox = new ProjBox("/dev/tty.usbserial-A800eItJ");
}
```

1. Juego de coches

Haremos un juego simple de coches.

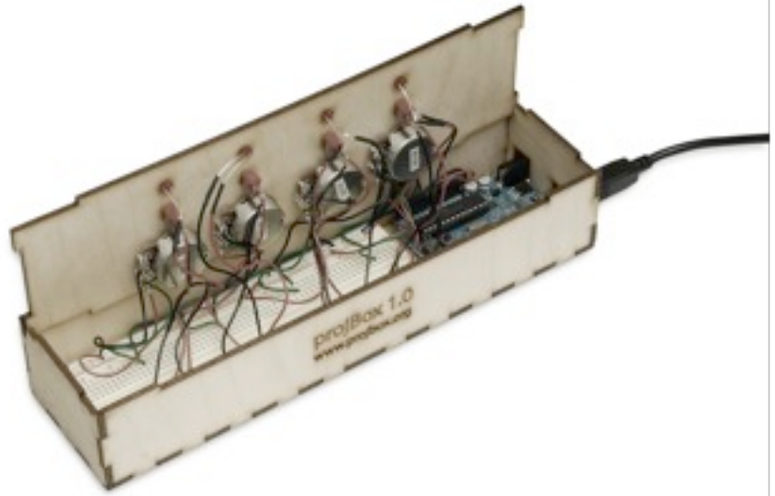
Caso práctico

```
void setup() {
  /* engine */
  size(600, 500);
  smooth();
  frameRate(60);

  /* sound */
  minim = new Minim(this);
  song = minim.loadFile("mysong.mp3");

  /* images */
  route = loadImage("route2.png");
  route_c = loadImage("route.png");
  caroff= loadImage("bumpy_car_top_lightoff.png");
  caron = loadImage("bumpy_car_top_lighton.png");
  night_img = loadImage("night.png");
  night_l_img = loadImage("night_l.png");

  /* behaviour variables */
  count = 0;
  carcenter = 600/2-100/2;
  light_on = false;
  night = false;
  speed = 0;
  nighting = 0;
```

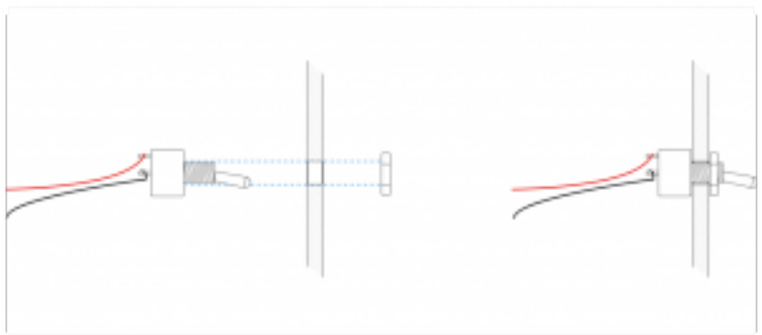
```
void draw() {

  tint(255, 255);
  update_android();

  image(route, 0, -4000+(count%3500));

  if (!light_on) {
    image(caroff, carcenter, 350);
  }
  else {
    image(caron, carcenter, 350);
  }
  if ( night && light_on) {
    image(night_l_img, -550+carcenter, 0);
  }
  else if ( night) {
    if (nighting <10){
      tint(0,nighting*12);
      nighting++;
    }
```

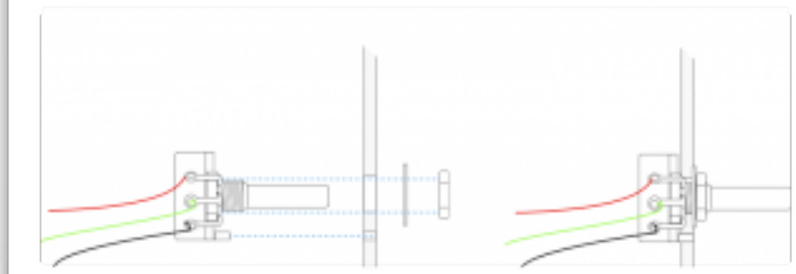
2. Inferfaz de control

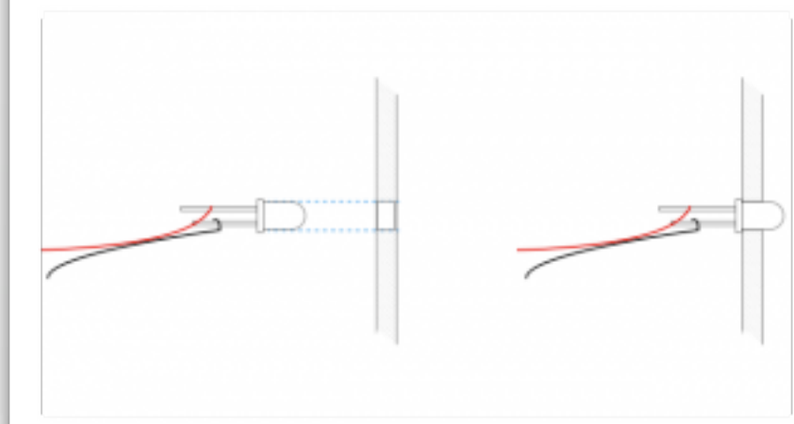
Trabajaremos con arduino y processing juntos creando una interfaz de control personalizado para el juego. Todo el diseño es de http://projbox.org



Esquema







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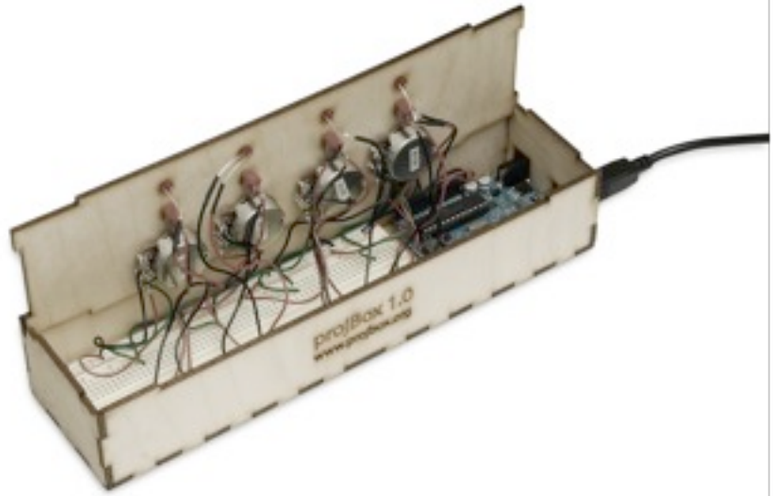
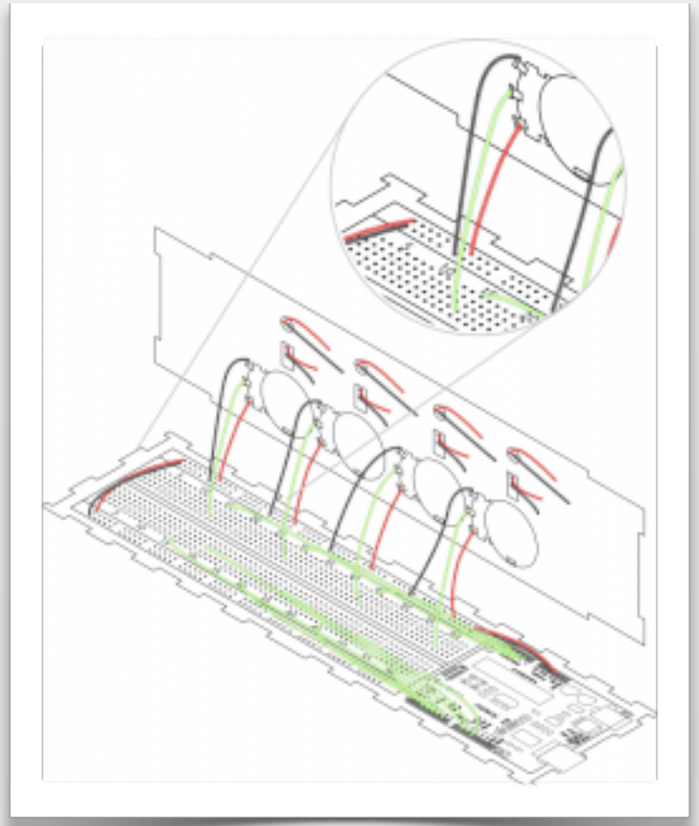
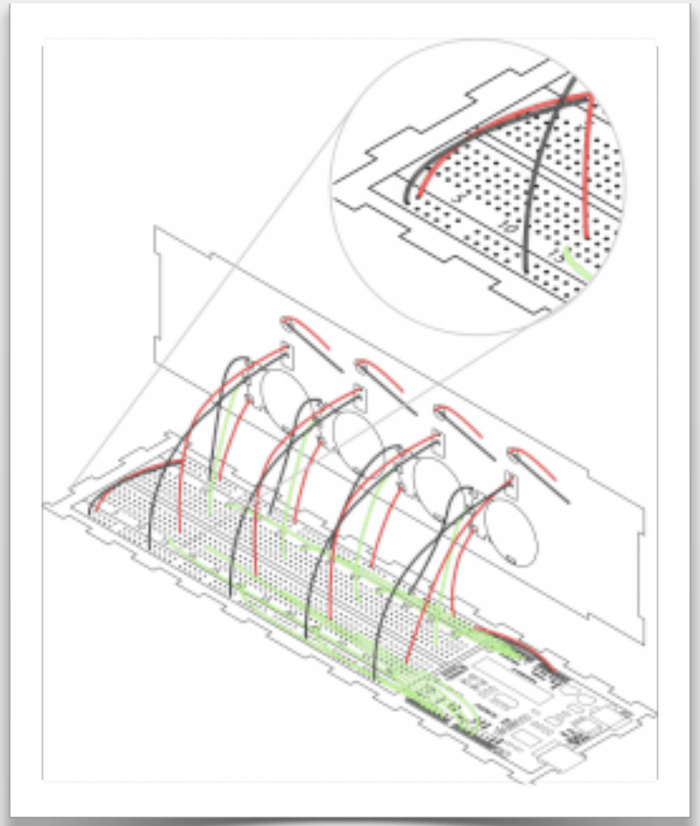
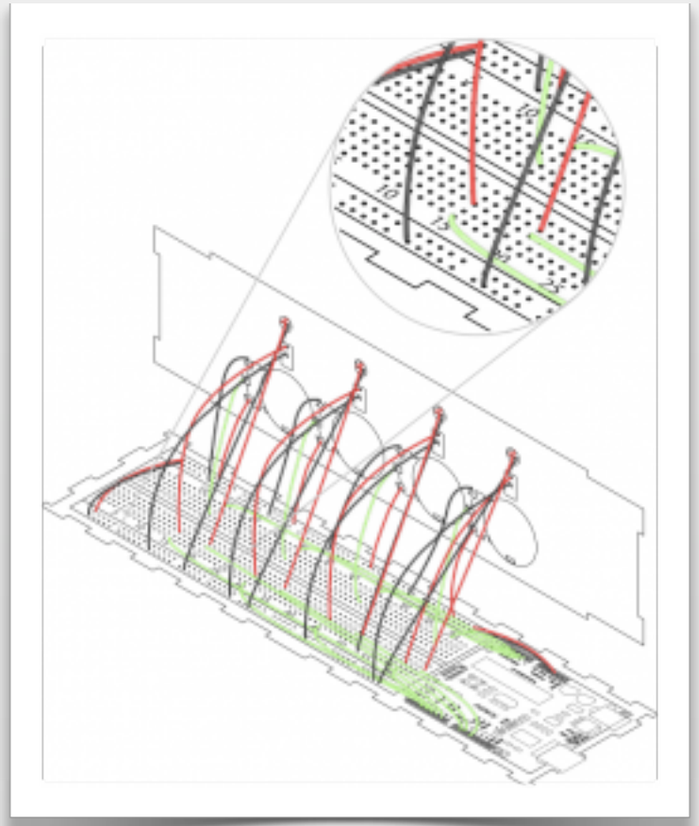


Esquema







Resumen

deviantart @Bootcoot

Resumen

1. Arduino y processing

Grandes ideas nacen en un bar y otras muchas en el MIT media lab.

2. Hardware

Nos vale con **cualquier** hardware arduino o compatible para empezar a hacer nuestros pinitos.

3. Software

Muy **fácil** de usar incluso para neófitos de la programación. La documentación es extensa.

Resumen

4. Practica

No tengas miedo de **fallar**, yo hago electrónica y software de ensayo y error ;)

5. Mezcla

Juntar software y hardware puede ayudarte a despertar toda tu **creatividad**.

6. Comparte

Entre todos podemos hacer una **comunidad** hispana fuerte y de referencia.

¡Gracias!

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