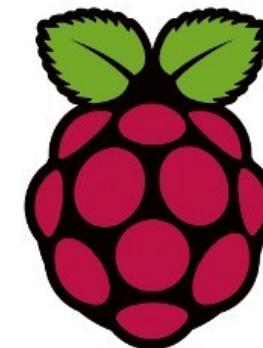


Tecnologies creatives a l'aula Ús d'Arduino i Raspberry Pi

FORUM 2016
(O)
E



Jordi Binefa i Martínez

Responsable d'R+D+i a



JESUITES El Clot
Escola del Clot

4, 5, 7 i 8 de juliol

Professor de cicles formatius a

Tecnologies creatives a l'aula

Distribució de les quatre sessions

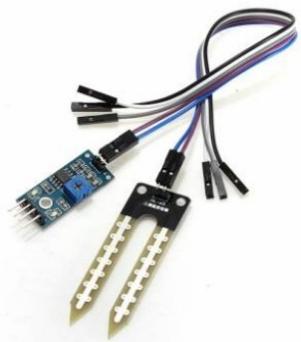
- * Introducció i Arduino 1a part
- * Arduino 2a part
- * Raspberry Pi
- * Comunicació entre Raspberry Pi i Arduino

FòRUM 2016

Tecnologies creatives a l'aula

Interacció amb el món físic

Sensors



**Lectura
d'informació**

Actuadors



**Escriptura
d'informació**

Tecnologies creatives a l'aula

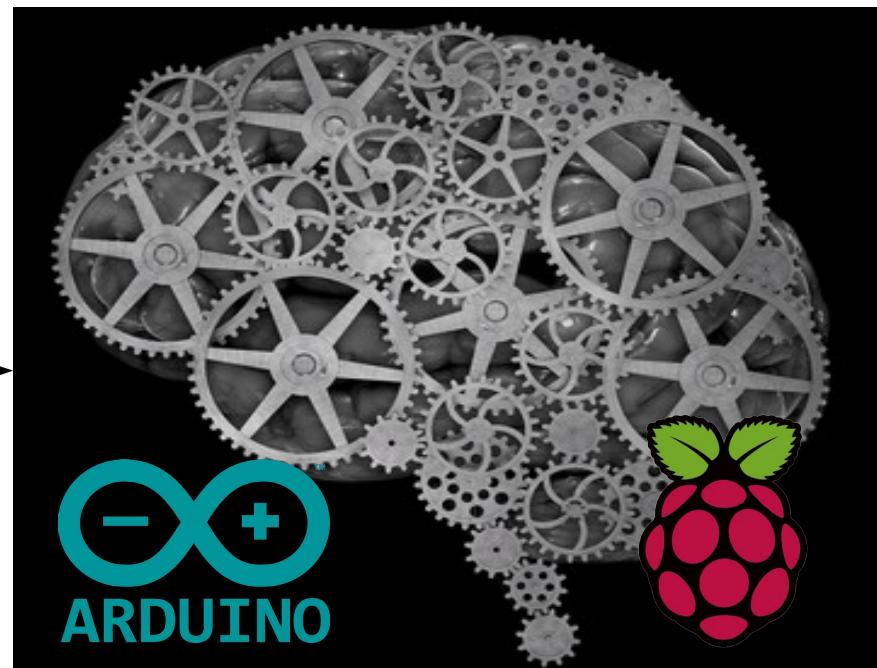
Automatització del món físic



Sensors



**Sortida
de sensors
Escriptura -->**



Actuadors



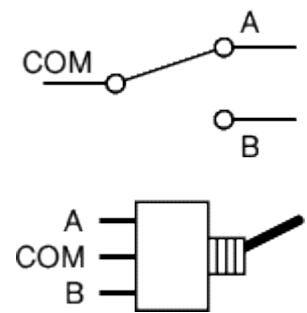
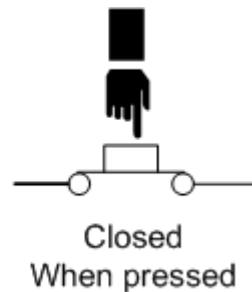
**Entrada
d'informació
--> Lectura**

**Sortida
d'informació
Escriptura -->**

**Entrada
d'actuadors
--> Lectura**

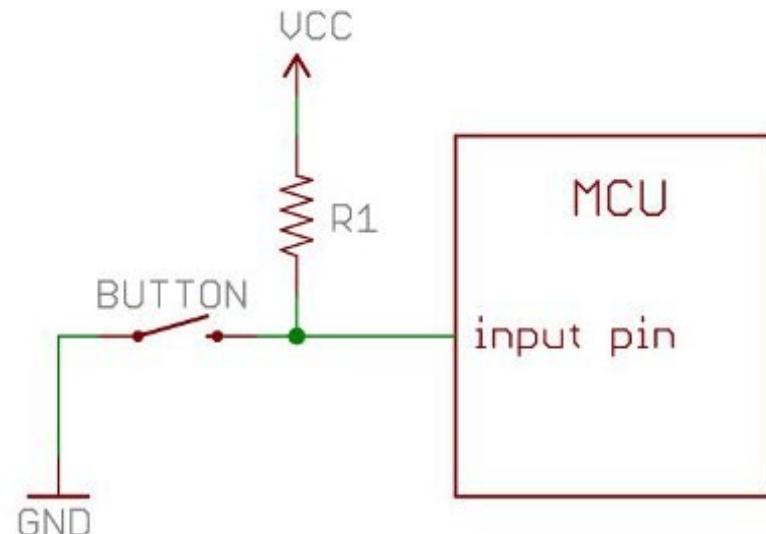
Tecnologies creatives a l'aula

Lectura de l'estat d'un sensor digital



**Cert : 1.8v, 3.3V,
5V**
Fals : 0v

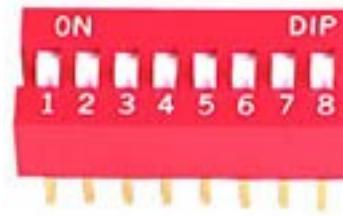
True / False
High / Low



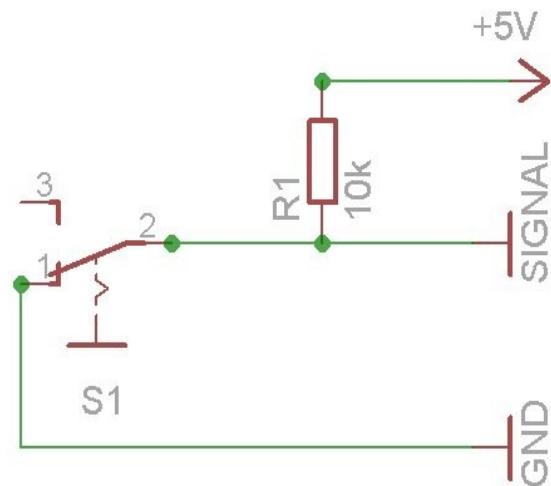
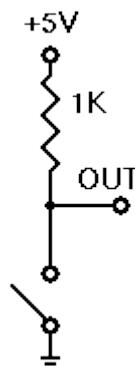
Tecnologies creatives a l'aula

Lectura de l'estat d'un sensor digital

uSW : Microrruptor (dip-switch, microswitch)

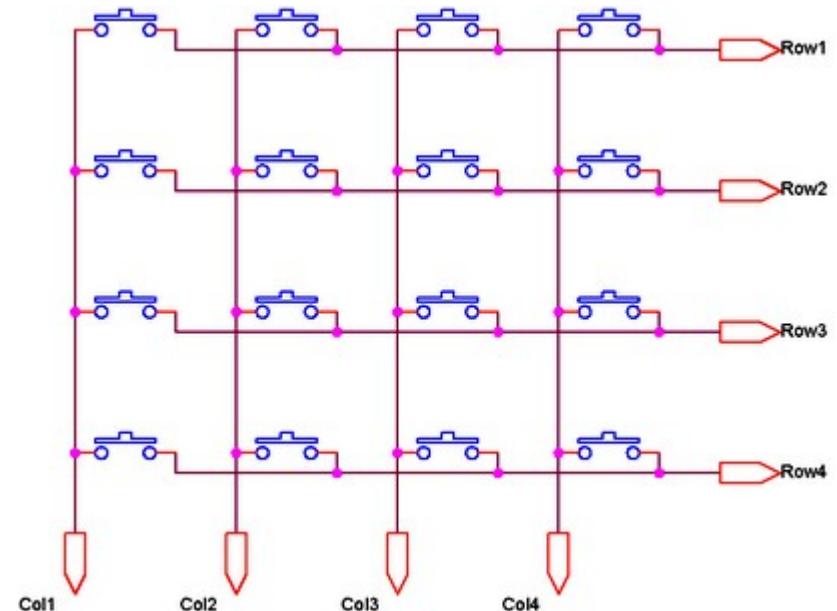


Pull-up : Connexió d'un resistor a alimentació per assegurar un nivell lògic a una entrada digital



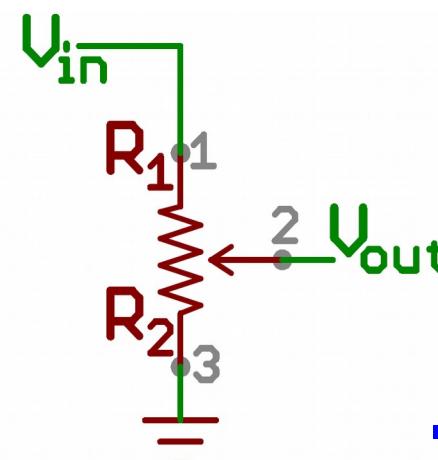
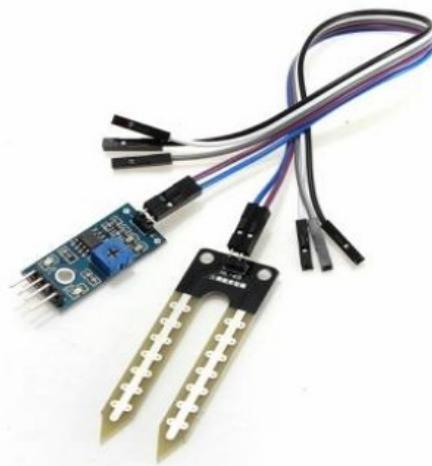
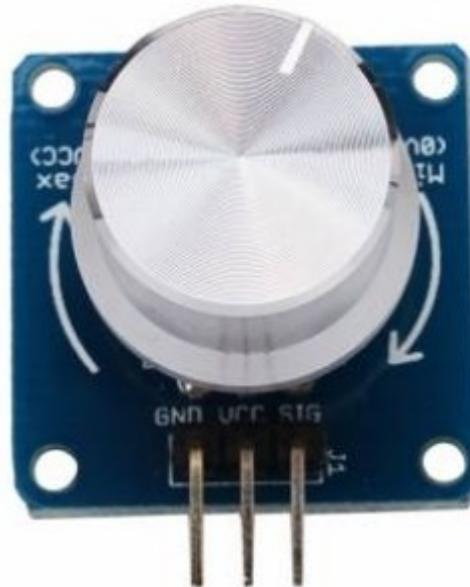
Tecnologies creatives a l'aula

Lectura de la informació d'un teclat



Tecnologies creatives a l'aula

Lectura d'informació analògica

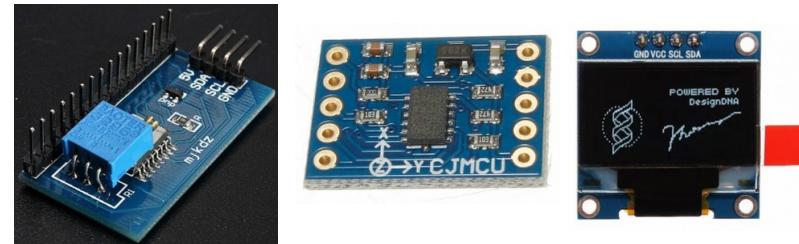


**0..3,3V
0..5V
0..10V
-10..10V**

Tecnologies creatives a l'aula

Protocols I2C (TWI), SPI i 1-Wire

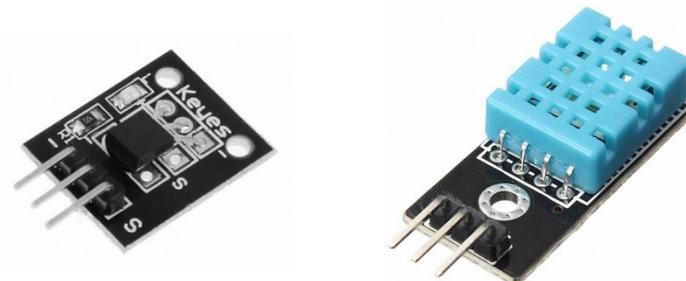
I2C : Inter-Integrated Circuit



SPI : Serial Peripheral Interface Bus



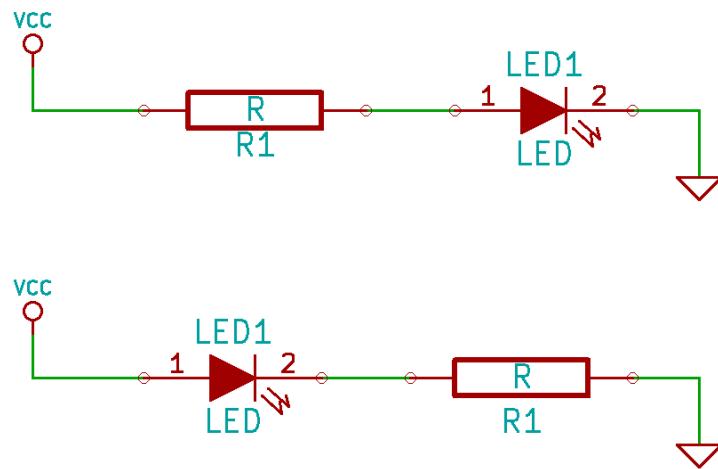
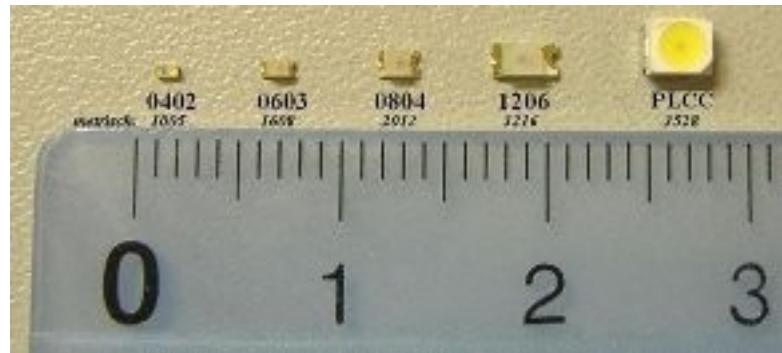
1-Wire



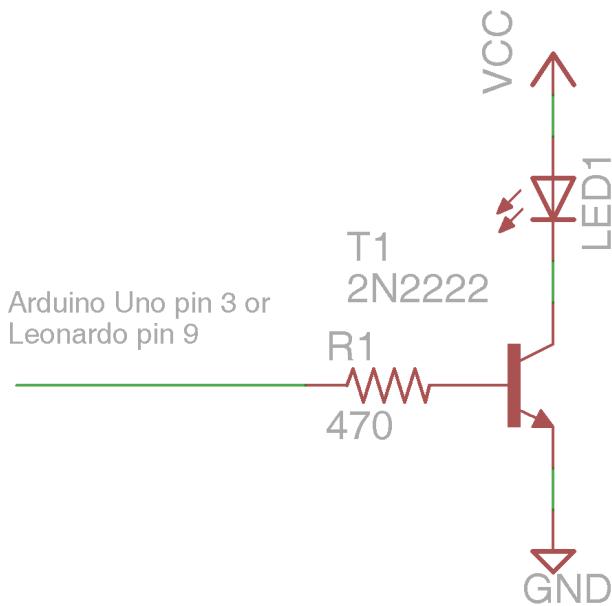
Tecnologies creatives a l'aula

Escriptura d'estat a un actuador digital

LED : Díode emissor de llum



to Arduino Uno pin 3 or
Leonardo pin 9



Tecnologies creatives a l'aula

Escriptura d'estat a un actuador digital

Relé : Sistema electromecànic que modifica l'estat d'un commutador. Amb una tensió de control petita s'activa un electroimant podent controlar tensions molt superiors.

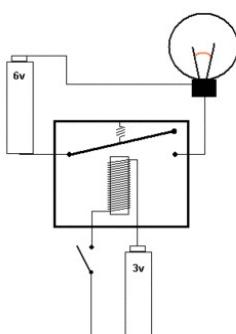


Figure 1: Relay off

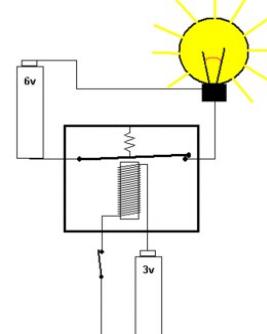
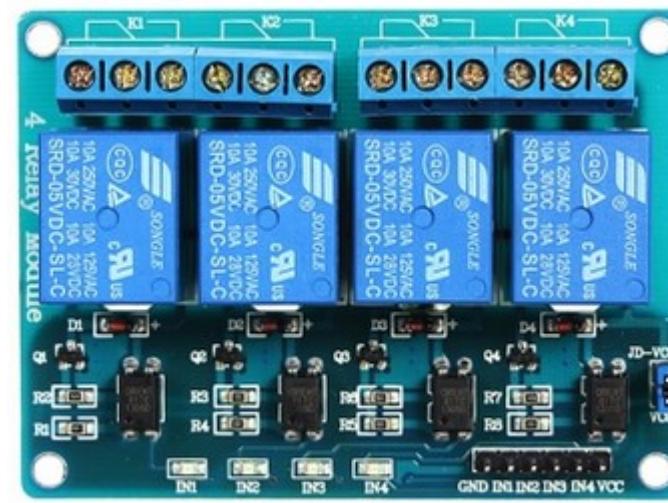
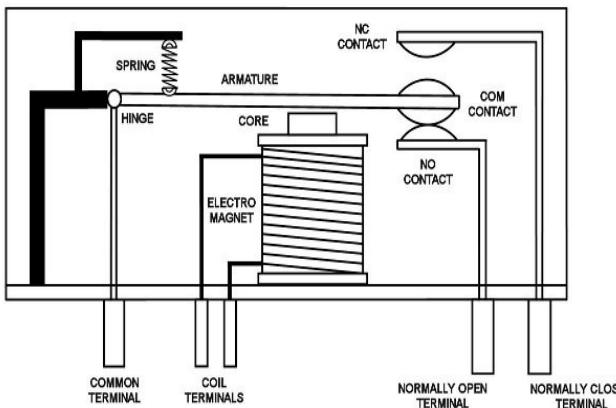
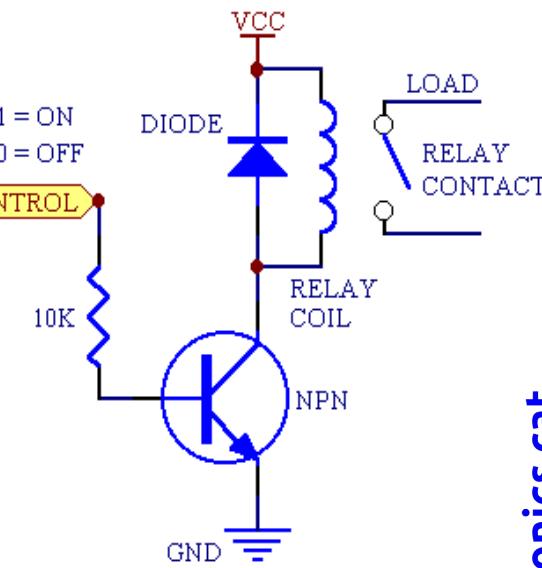


Figure 2: Relay on



LOGIC 1 = ON
LOGIC 0 = OFF

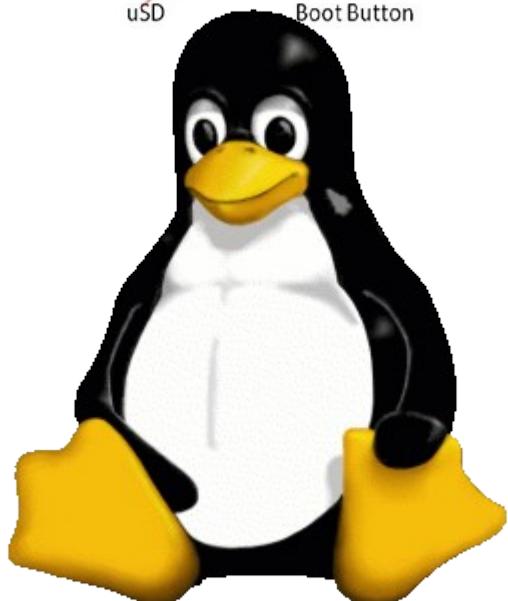
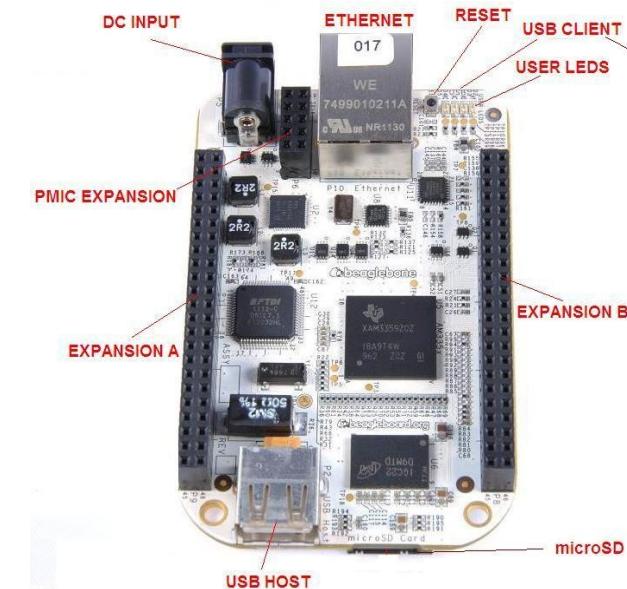
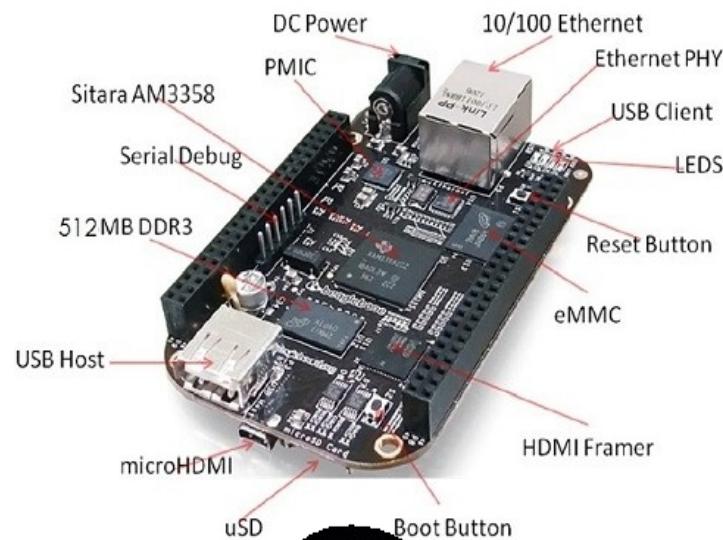
CONTROL





Tecnologies creatives a l'aula

Processadors de 32 bits





Tecnologies creatives a l'aula

Família d'Arduinos i Teensy



Arduino Uno



Arduino Leonardo



Arduino Due



Arduino Yún



Arduino Tre



Arduino Micro



Arduino Robot



Arduino Esplora



Arduino Mega ADK



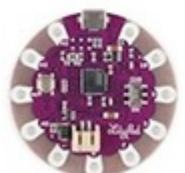
Arduino Ethernet



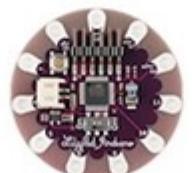
Arduino Mega 2560



Arduino Mini



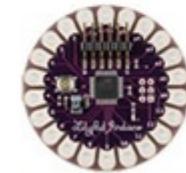
LilyPad Arduino USB



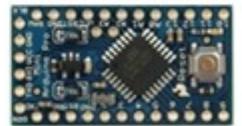
LilyPad Arduino Simple



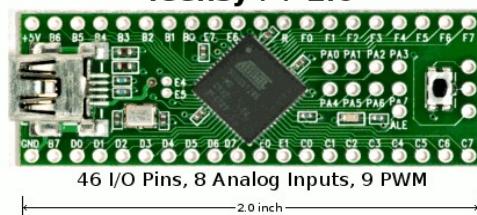
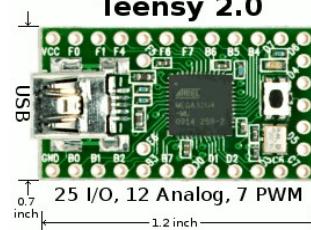
LilyPad Arduino SimpleSnap

LilyPad Arduino
Teensy 2.0

Arduino Nano

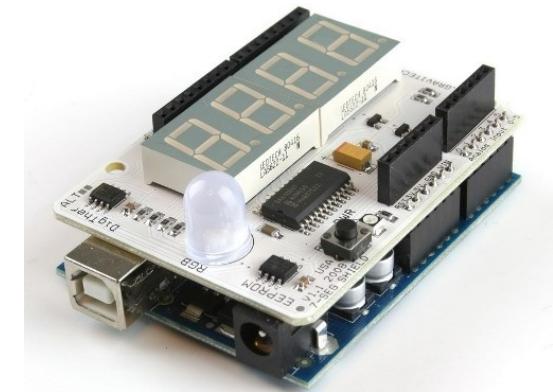
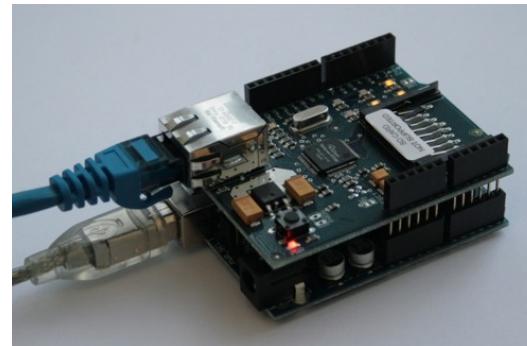
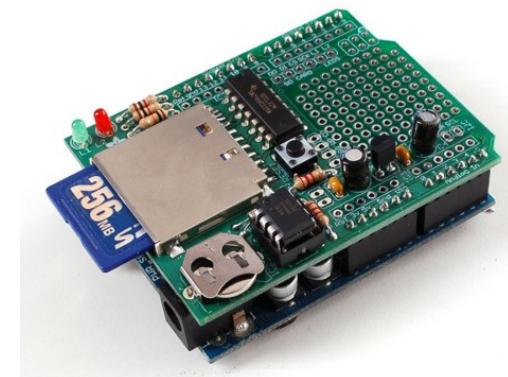


Teensy++ 2.0



Tecnologies creatives a l'aula

Plaques complementàries (shield / hat)

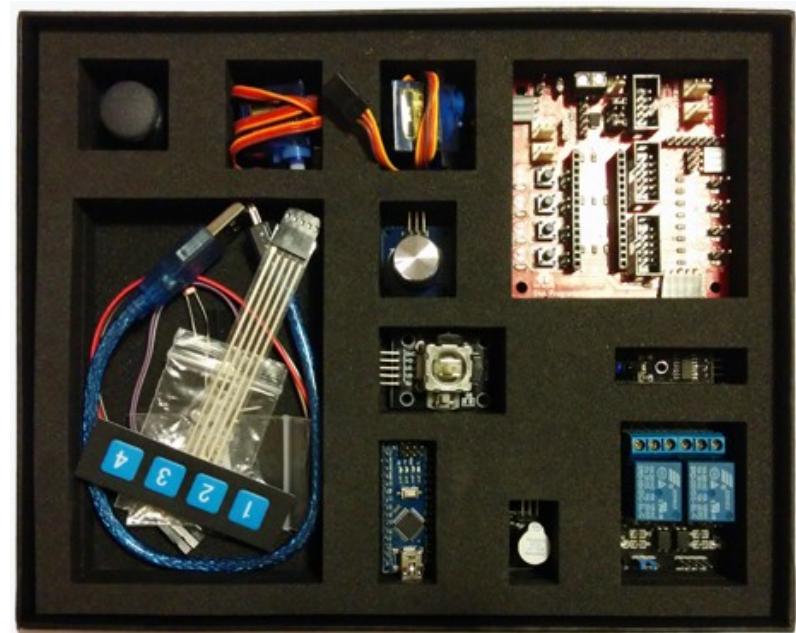


La majoria de plaques complementàries venen amb biblioteques i arxius de capçalera que acceleren el procés de funcionament.

<http://arduino.cc/en/pmwiki.php?n>Main/ArduinoShields>

Technologies creatives a l'aula

Make It !



<http://www.makeit.cat>

Tecnologies creatives a l'aula

Alguns llenguatges de programació

SCRATCH



#include <stdio.h>
{ main(void)
{ printf("Hello, World!\n");
}
return 0;
}

C/C++

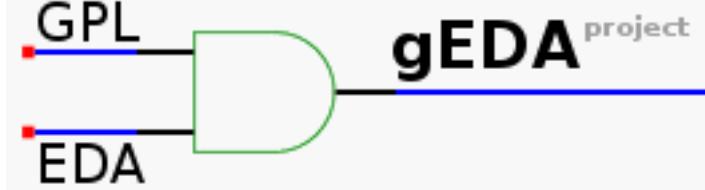


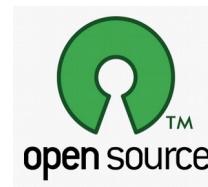
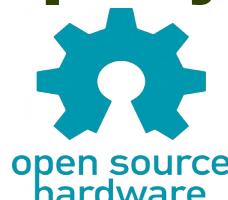
ArduBlock



e_c tecnologies creatives a l'aula

El perquè de la introducció a l'aula del maquinari lliure

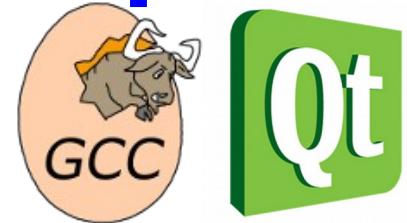
- Preus baixos (www.banggood.com)
- Promoció STEM (Science, Technology, Engineering and Maths)
- Disseny accessible
 - KiCad, gEDA
 

 - Circuits impresos (www.pcbway.com)
- Munió de projectes de codi obert



Tecnologies creatives a l'aula

Exemple: Trepant / fresadora - qtCnc

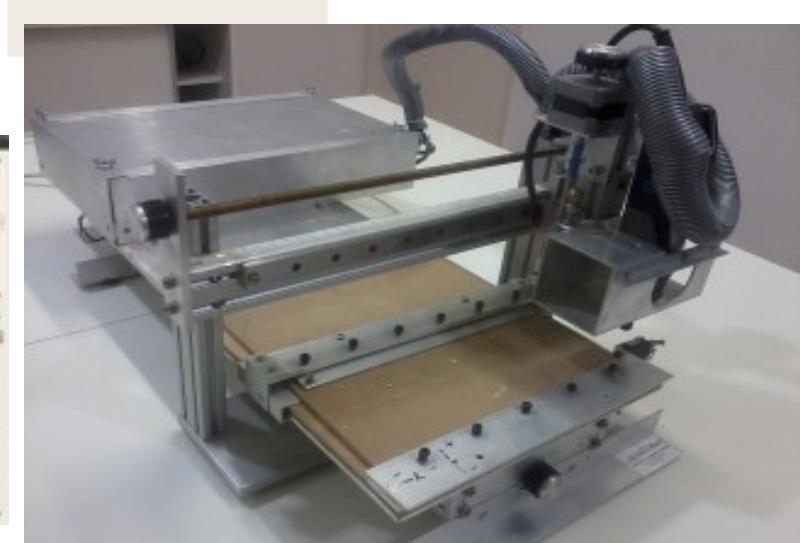
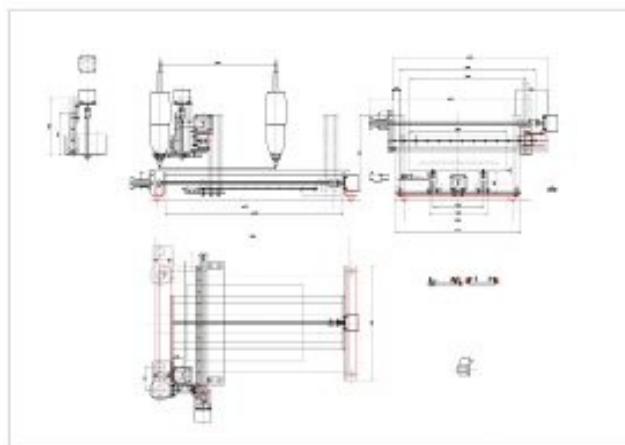
- Programari allotjat a sourceforge.net :
(<http://sourceforge.net/projects/qtnc/files/>)



Home

Name	Modified	Size	Downloads
Desktop Software	2011-12-21		
FirmwareAtmega	2011-12-21		

Totals: 2 Items





Technologies creatives a l'aula

Eines per a simular

Simulate Arduino online and easily create custom circuit boards

Design and simulate circuit boards with our breadboard, schematic and PCB editor. Share your designs and collaborate as a team.

Get started designing electronics online!

Show me an example!

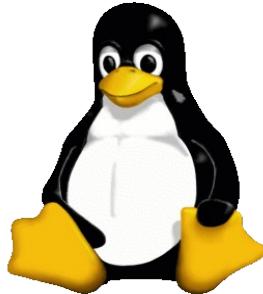
DRAW CONDUCTIVE TRACES

Easily create and simulate Circuit Scribe sketches online.

<http://123d.circuits.io/>

Tecnologies creatives a l'aula

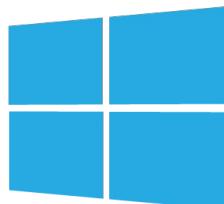
Sistemes operatius



Els sistemes basats en GNU/Linux permeten fer metadistribucions



debian **ubuntu**



Els sistemes propietaris no permeten fer metadistribucions

Tecnologies creatives a l'aula

Metadistribució basada en Debian



- Els alumnes poden tenir una còpia funcional sense cap mena de restricció legal



Gnome3 / Gnome clàssic / LXDE

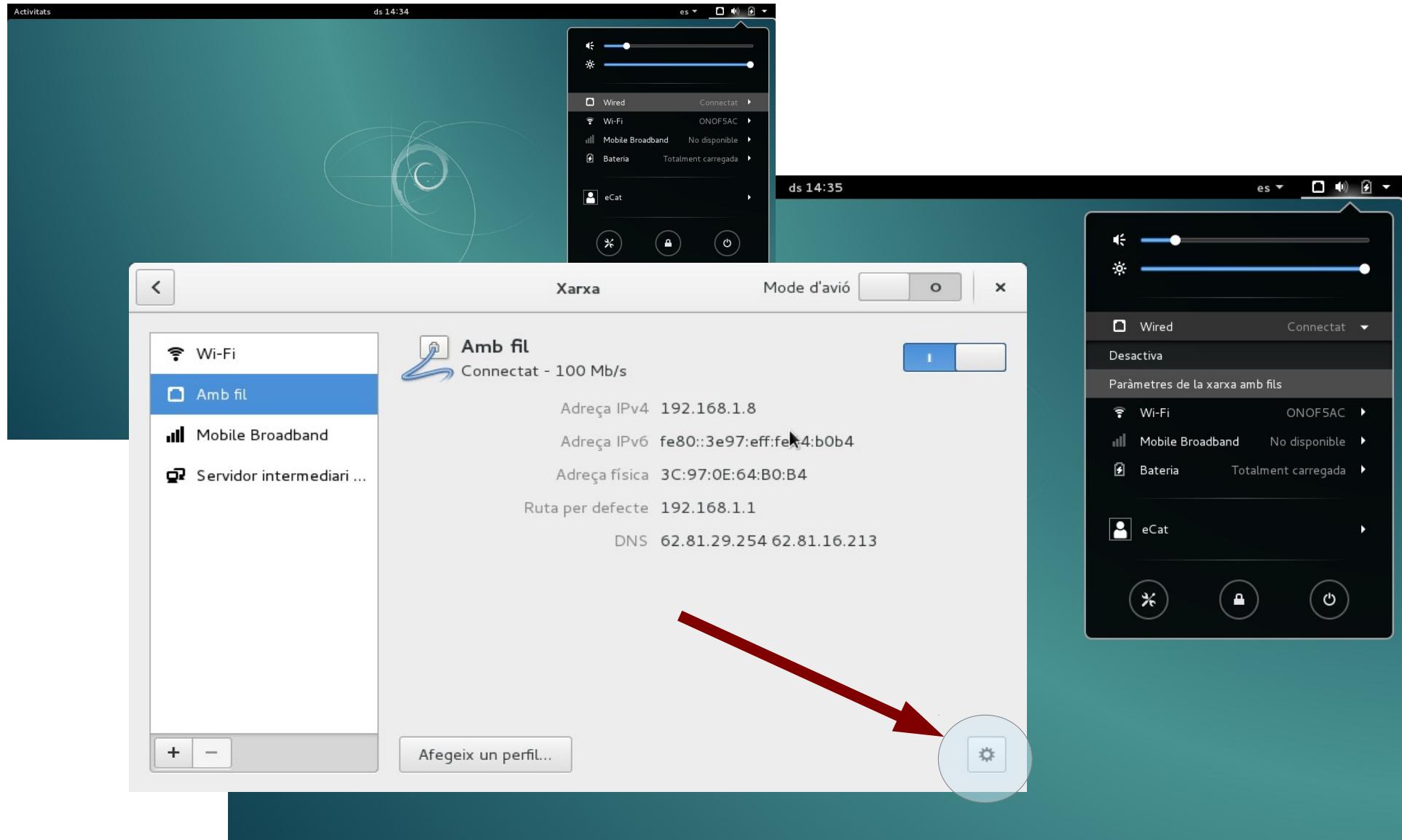
- Uuaris :

- Primari o **root** (#). Contrasenya : **clot**
- Usuari **ecat** (\$). Contrasenya : **clot**



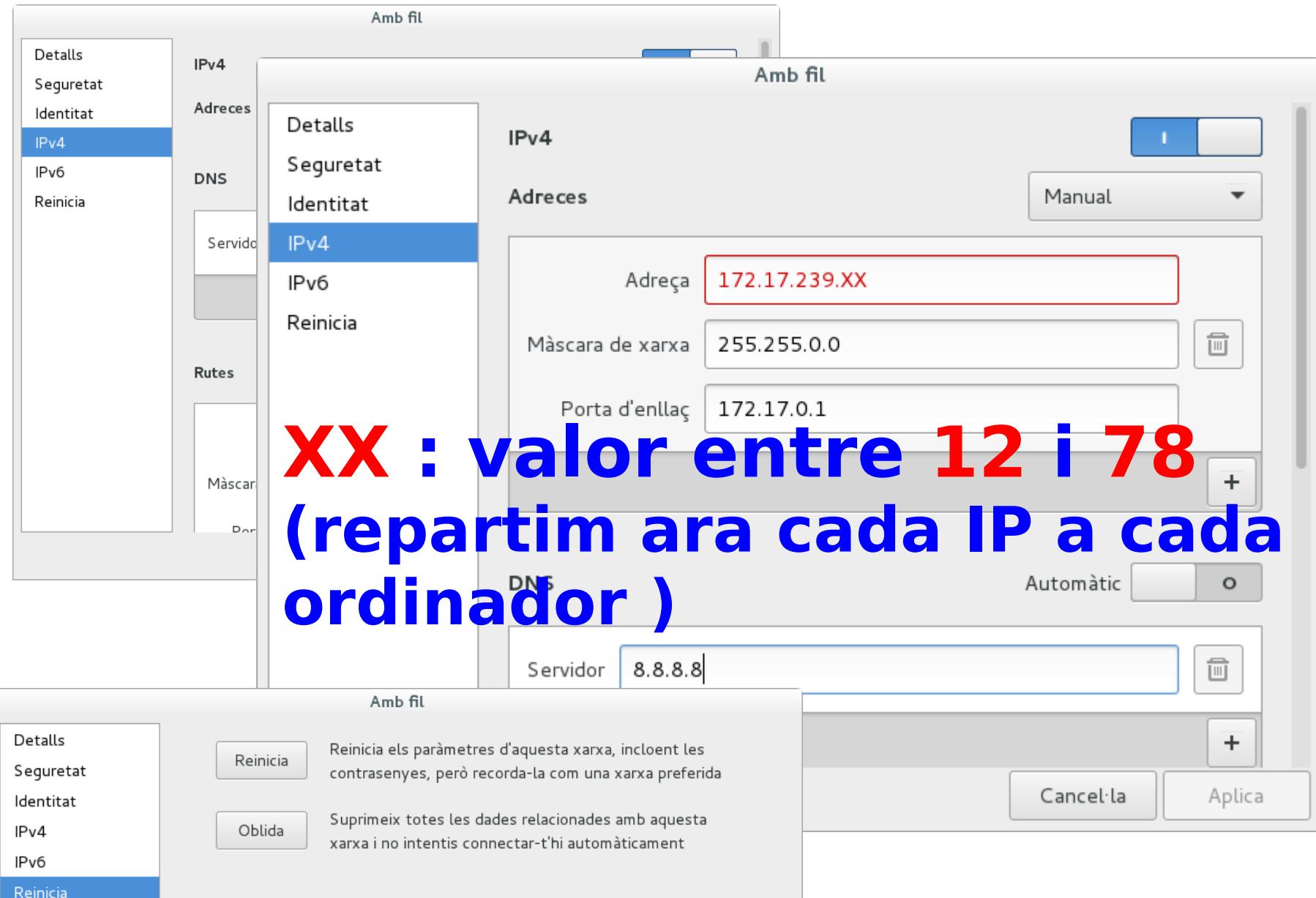
Tecnologies creatives a l'aula

Assignació d'IP



Tecnologies creatives a l'aula

Assignació d'IP



**XX : valor entre 12 i 78
(repartim ara cada IP a cada ordinador)**



Tecnologies creatives a l'aula

Reconeixement de les plaques de comunicació

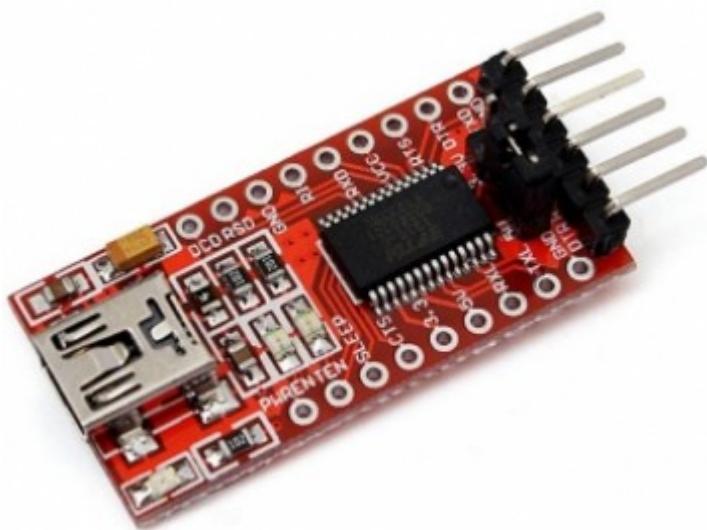
ecat@ecatian:~\$ lsusb

```
ecat@ecatian:~$ lsusb
Bus 004 Device 002: ID 8087:0024 Intel Corp. Integrated Rate Matching Hub
Bus 004 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 003 Device 005: ID 5986:0299 Acer, Inc
Bus 003 Device 004: ID 0461:4d81 Primax Electronics, Ltd Dell N889 Optical Mouse
Bus 003 Device 003: ID 0bdb:1926 Ericsson Business Mobile Networks BV
Bus 003 Device 002: ID 8087:0024 Intel Corp. Integrated Rate Matching Hub
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 002: ID 0781:5581 SanDisk Corp.
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 005: ID 0403:6001 Future Technology Devices International, Ltd FT232 USB-Serial (UART) IC
Bus 001 Device 004: ID 0403:6001 Future Technology Devices International, Ltd FT232 USB-Serial (UART) IC
Bus 001 Device 003: ID 1a40:0101 Terminus Technology Inc. 4-Port HUB
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
ecat@ecatian:~$ ls /dev/ttyUSB*
/dev/ttyUSB0  /dev/ttyUSB1
ecat@ecatian:~$ ls /dev/ttyUSB* -ls
0 crw-rw---- 1 root dialout 188, 0 jun 27 14:53 /dev/ttyUSB0
0 crw-rw---- 1 root dialout 188, 1 jun 27 14:53 /dev/ttyUSB1
ecat@ecatian:~$
```

ecat@ecatian:~\$ ls /dev/ttyUSB* -ls

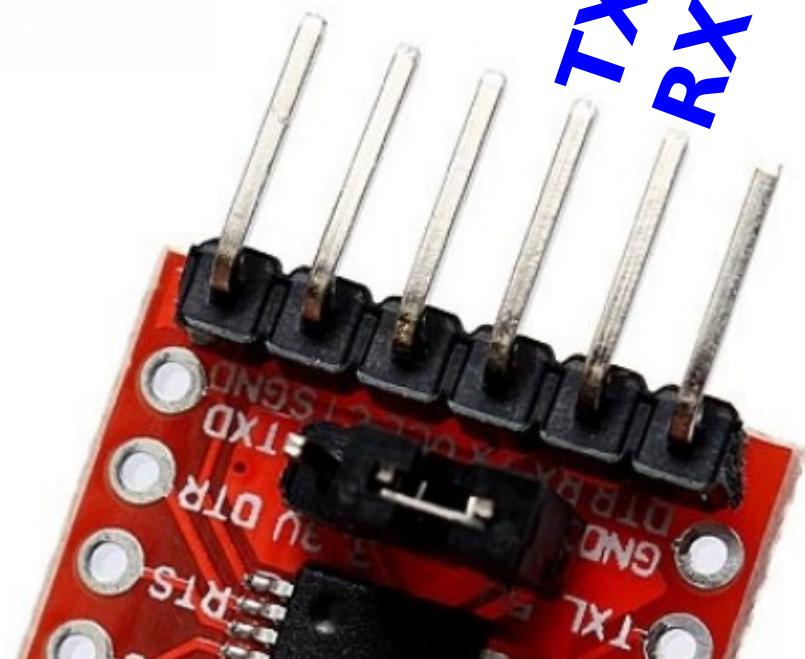
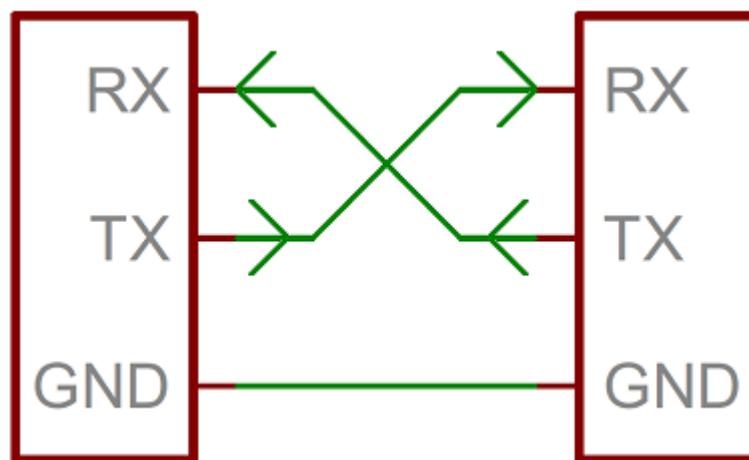
Tecnologies creatives a l'aula

Plaques de comunicació



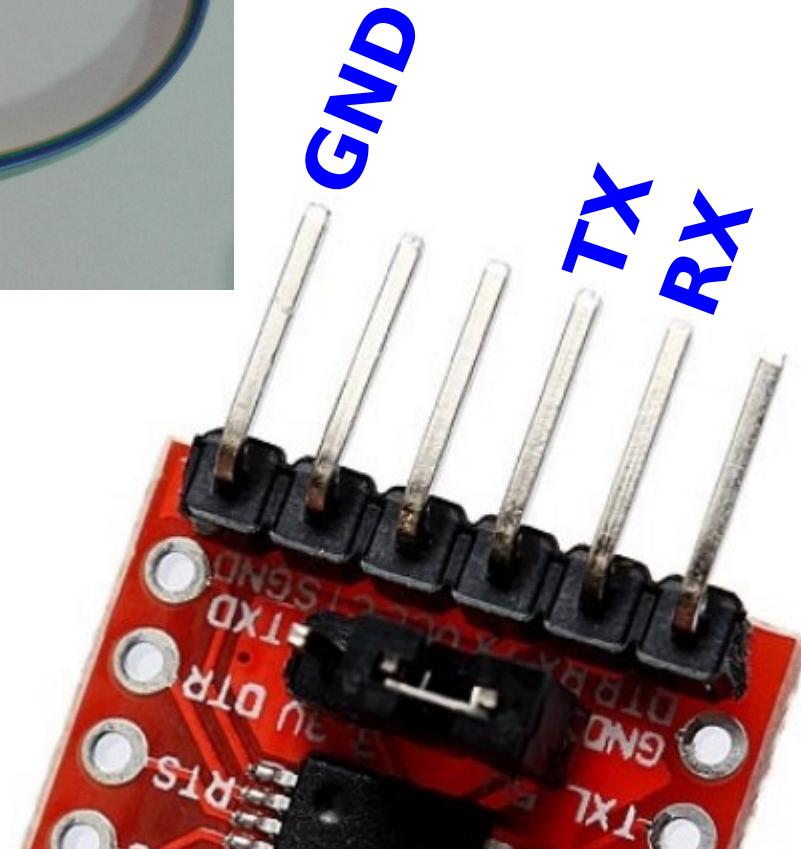
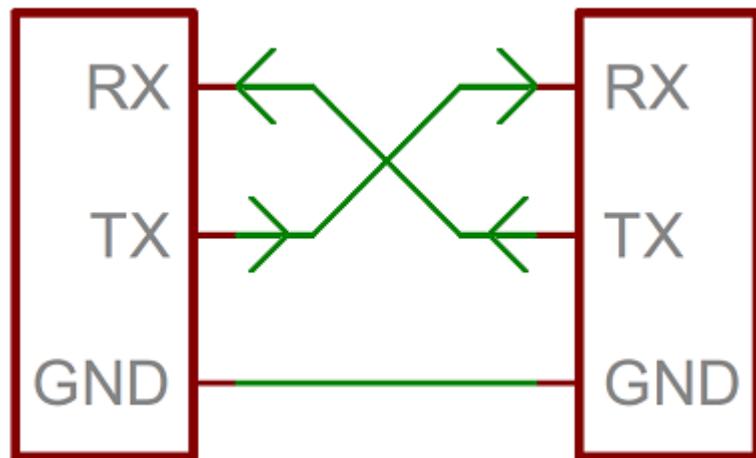
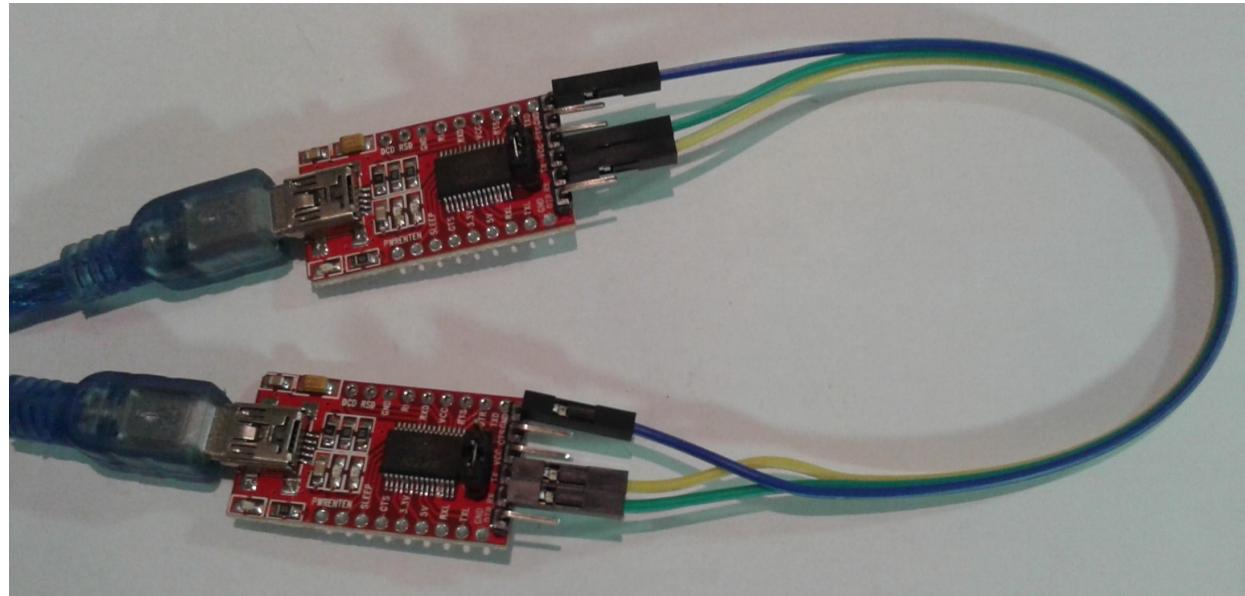
GND

TX
RX



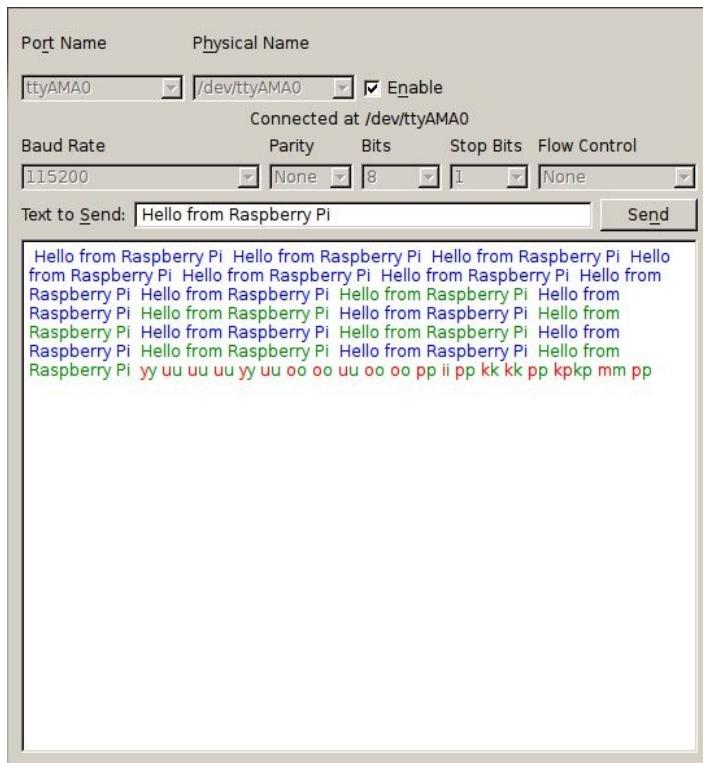
Tecnologies creatives a l'aula

Plaques de comunicació



Tecnologies creatives a l'aula

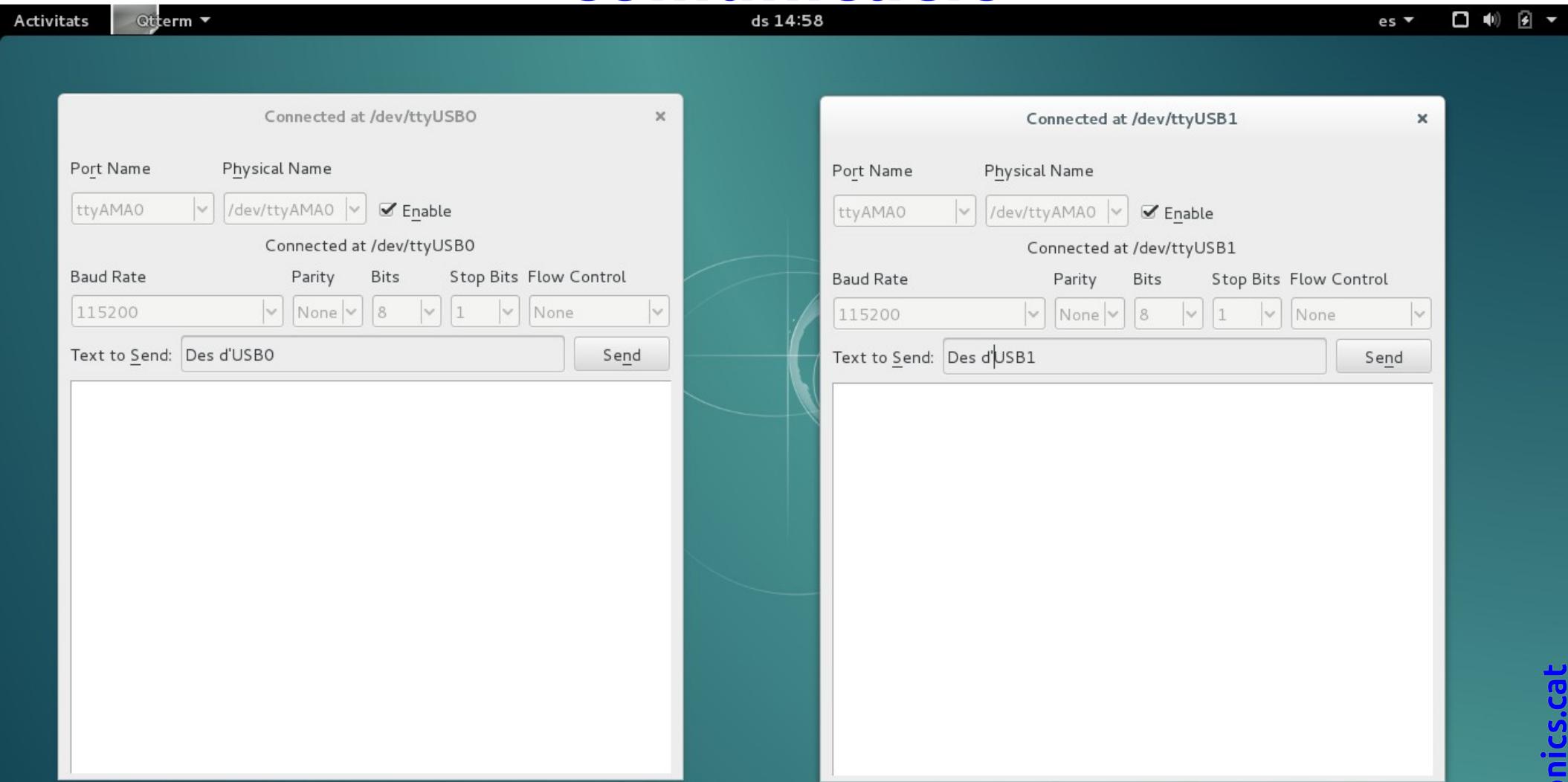
qtTerm



<http://code.google.com/p/qtterm/>

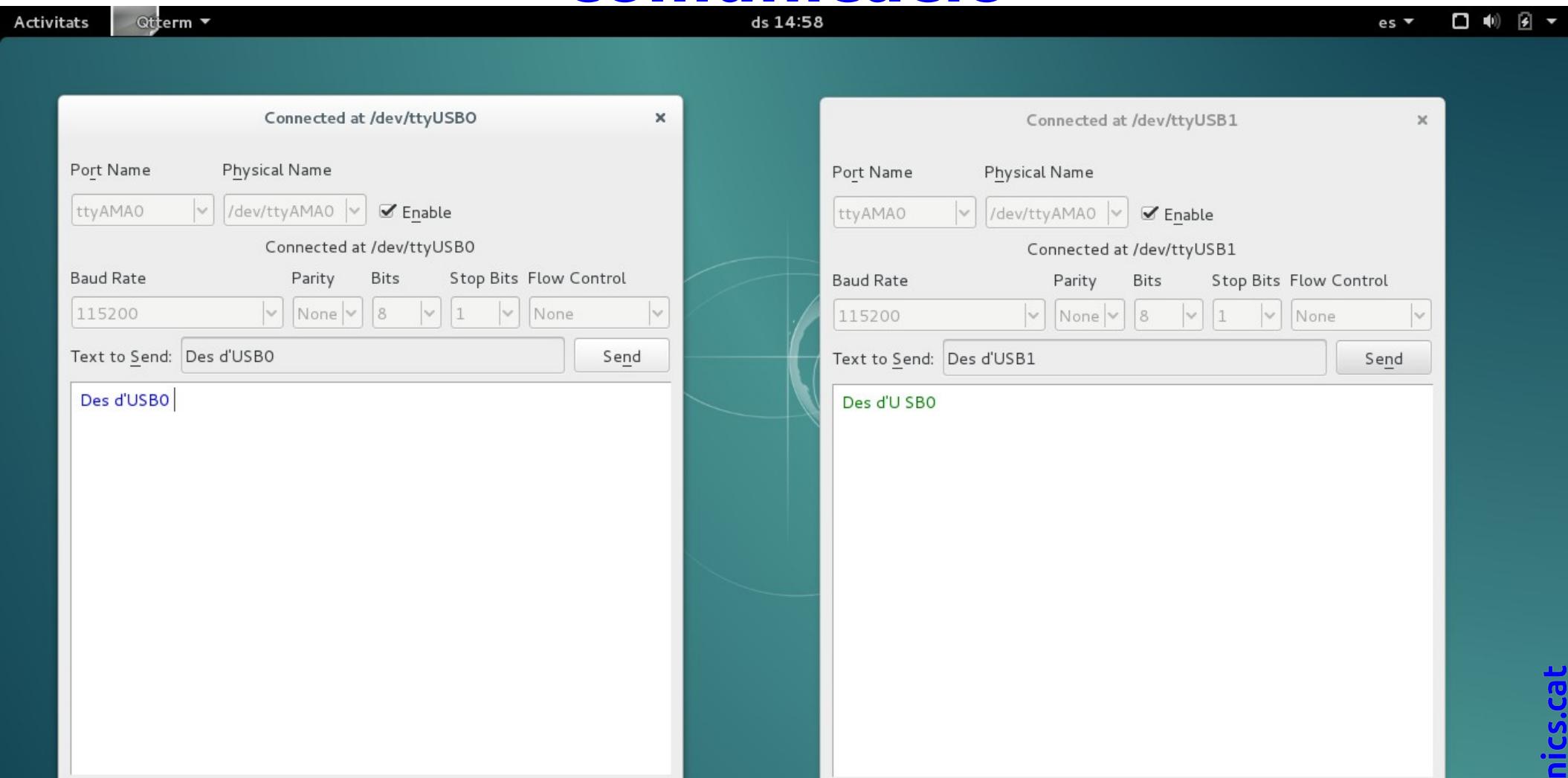
Tecnologies creatives a l'aula

Ús del qtTerm amb les plaques de comunicació



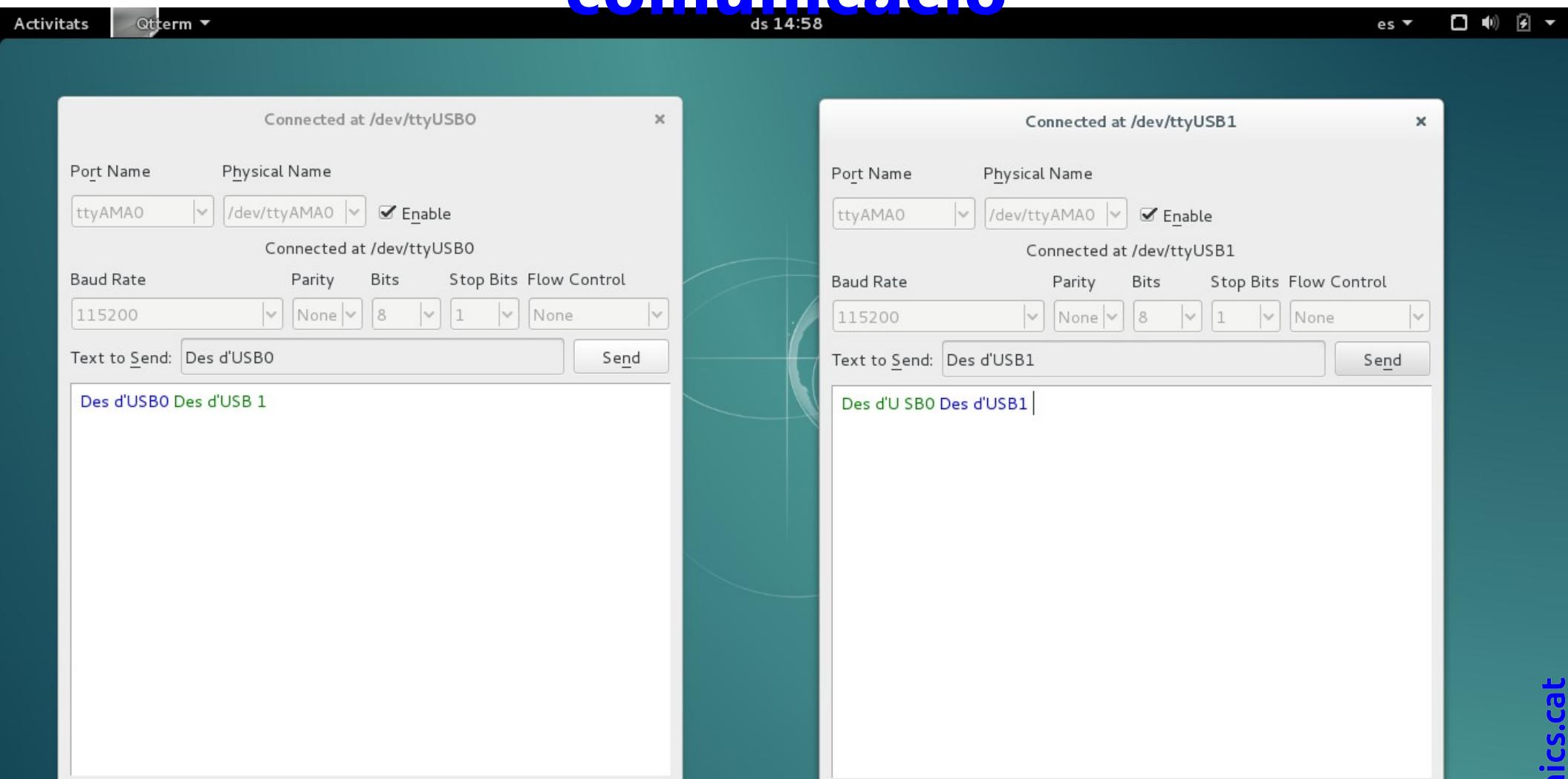
Tecnologies creatives a l'aula

Ús del qtTerm amb les plaques de comunicació



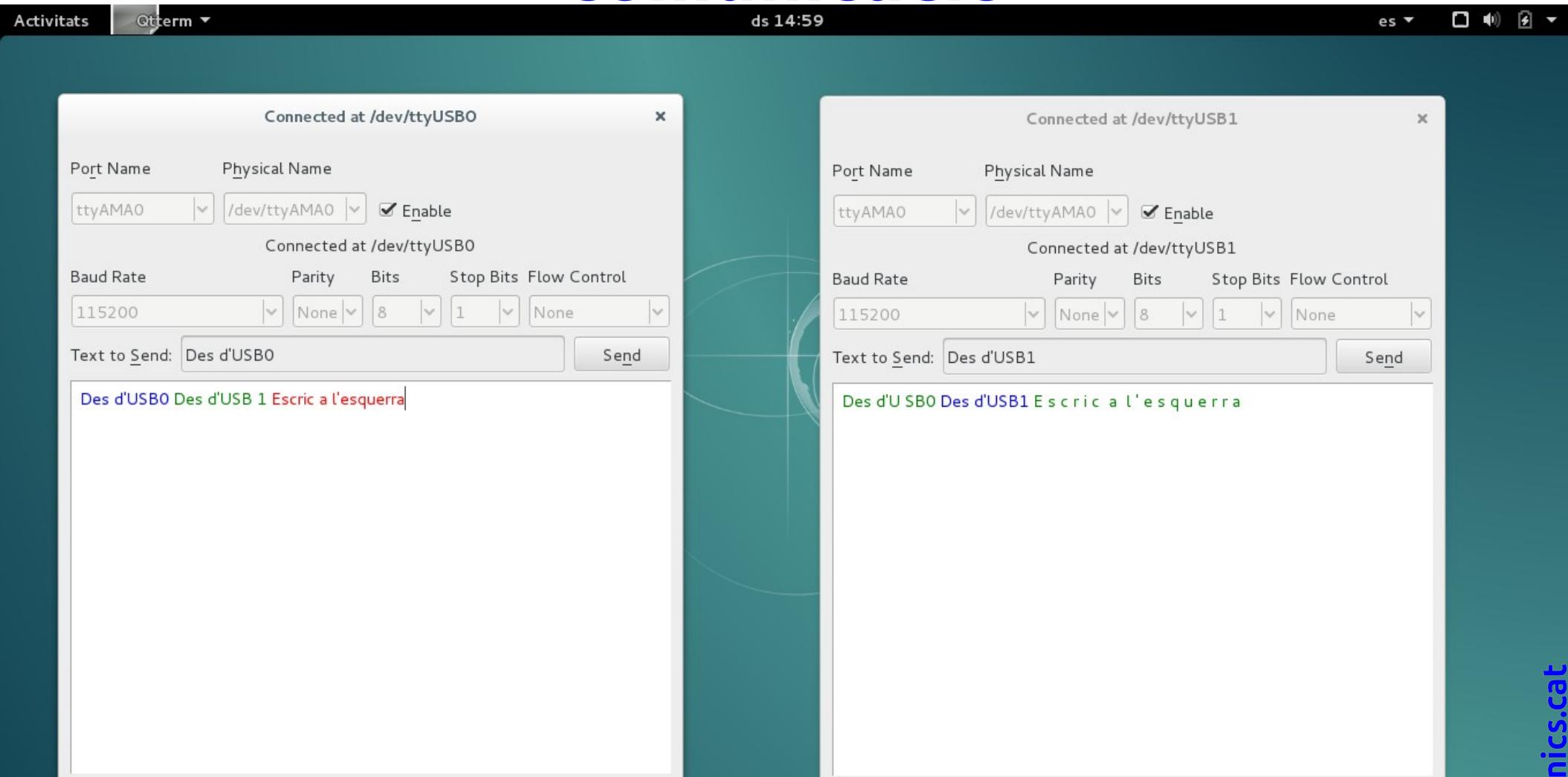
Tecnologies creatives a l'aula

Ús del qtTerm amb les plaques de comunicació



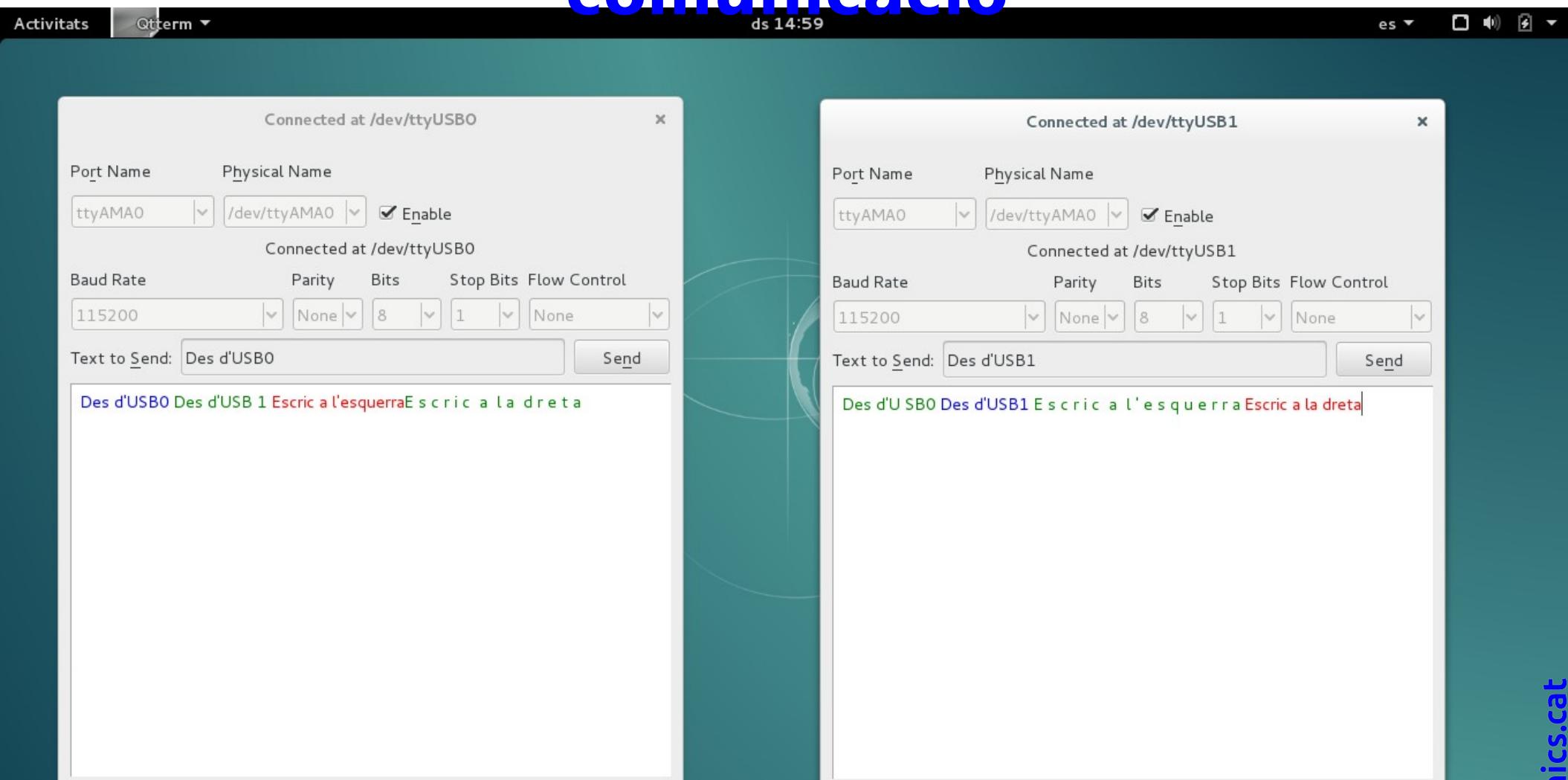
Tecnologies creatives a l'aula

Ús del qtTerm amb les plaques de comunicació



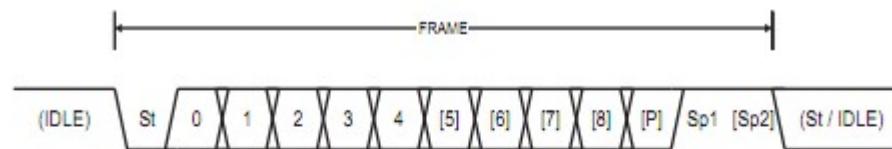
Tecnologies creatives a l'aula

Ús del qtTerm amb les plaques de comunicació



Tecnologies creatives a l'aula

Senyal de comunicació sèrie



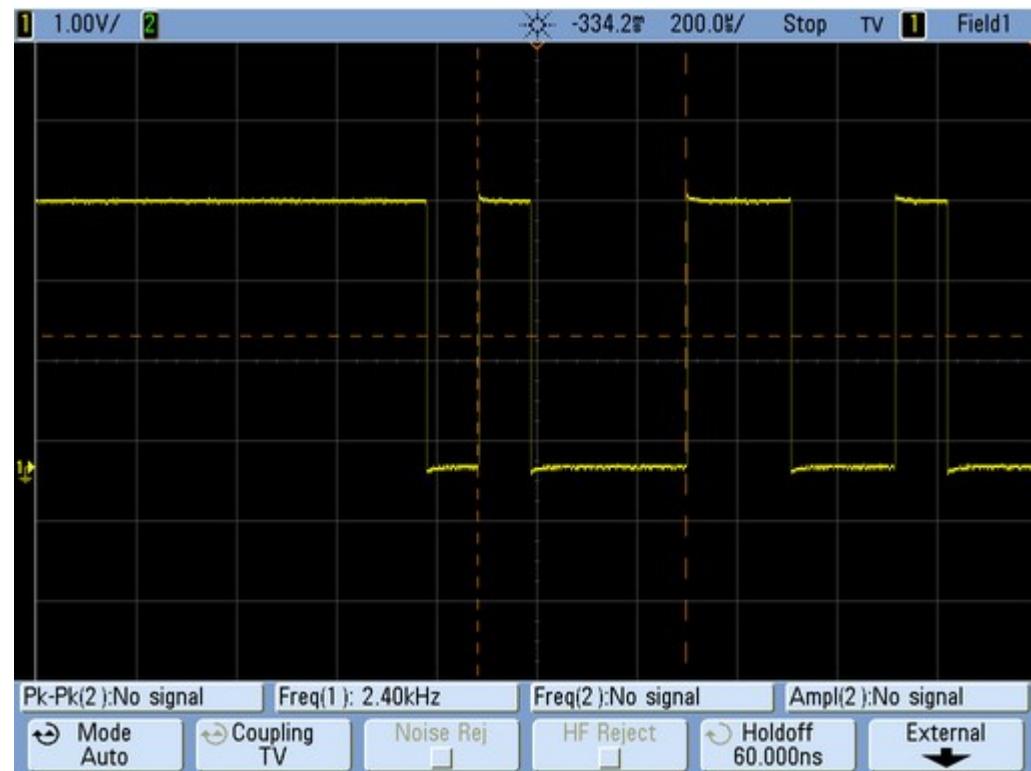
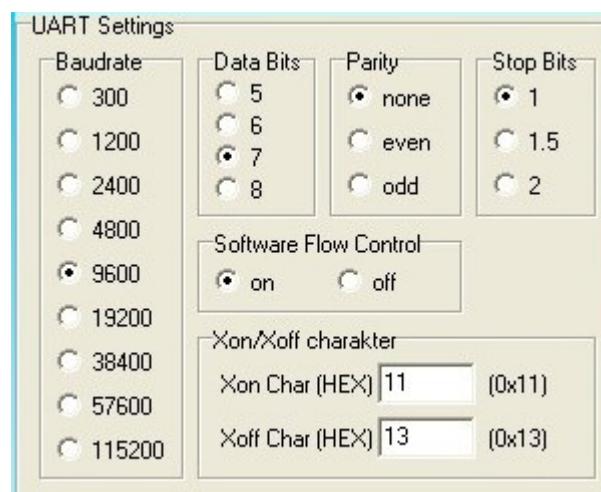
St Start bit, always low.

(n) Data bits (0 to 8).

P Parity bit. Can be odd or even.

Sp Stop bit, always high.

IDLE No transfers on the communication line (RxDn or TxDn). An IDLE line must be high.



Tecnologies creatives a l'aula

Comunicació amb minicom

ecat@ecatian:~\$ minicom -b 9600 -o -D /dev/ttyUSB1

```

ecat@debian8: ~
Fitxer Edita Visualitza Cerca Terminal Ajuda

Welco+-----+
OPTIO          Minicom Command Summary
Compi
Port           Commands can be called by CTRL-A <key>
Press          Main Functions          Other Functions
[0] Dialing directory..D run script (Go)....G | Clear Screen.....C
Send files.....S Receive files.....R | cOnfigure Minicom..O
comm Parameters....P Add linefeed.....A | Suspend minicom....J
Capture on/off....L Hangup.....H | eXit and reset....X
send break.....F initialize Modem...M | Quit with no reset.Q
Terminal settings..T run Kermit.....K | Cursor key mode....I
lineWrap on/off....W local Echo on/off..E | Help screen.....Z
Paste file.....Y Timestamp toggle...N | scroll Back.....B
Add Carriage Ret...U

Select function or press Enter for none.■
+-----+
CTRL-A Z for help | 9600 8N1 | NOR | Minicom 2.7 | VT102 | Offline | ttyUSE

```

```

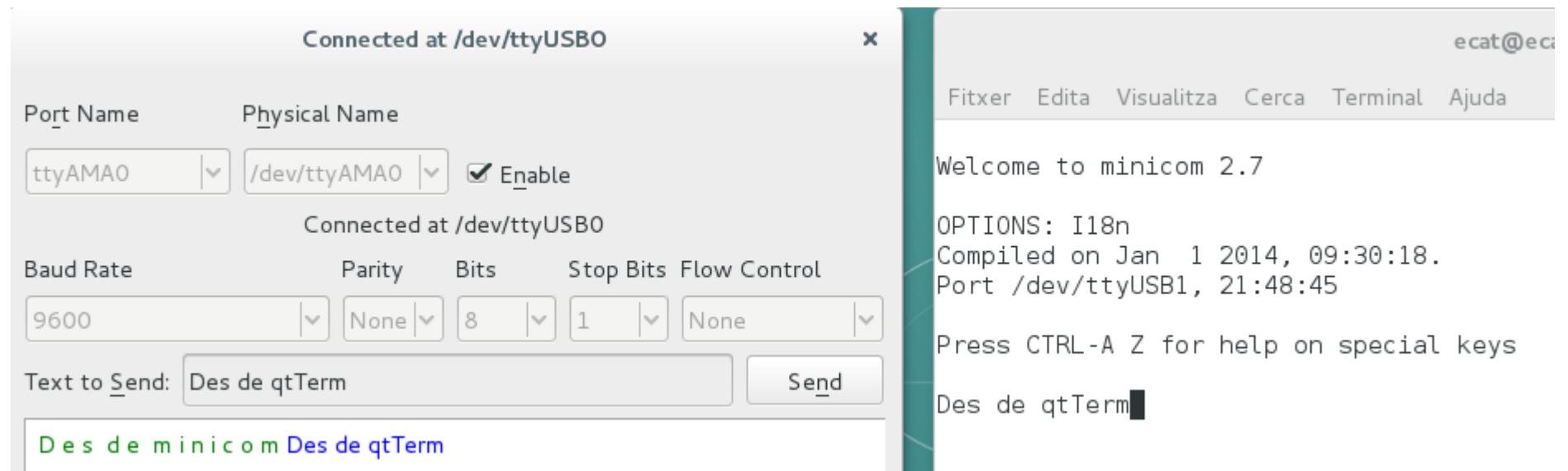
+-----[configuration]----+
| Filenames and paths
| File transfer protocols
| Serial port setup
| Modem and dialing
| Screen and keyboard
| Save setup as dfl
| Save setup as..
| Exit +
+----+ A - Serial Device      : /dev/ttyUSB0
|     B - Lockfile Location  : /var/lock
|     C - Callin Program    :
|     D - Callout Program   :
|     E - Bps/Par/Bits       : 9600 8N1
|     F - Hardware Flow Control : No
|     G - Software Flow Control : No
+-----[conf:                         Change which setting? ■
| Filenames
| File tran:
| Serial port setup
| Modem and dialing
| Screen and keyboard
| Save setup as dfl
| Save setup as..
| Exit
+----+

```

Deseu com a «per defecte» al finalitzar la configuració sense «Hardware Flow Control»

Tecnologies creatives a l'aula

Comunicació qtTerm amb minicom

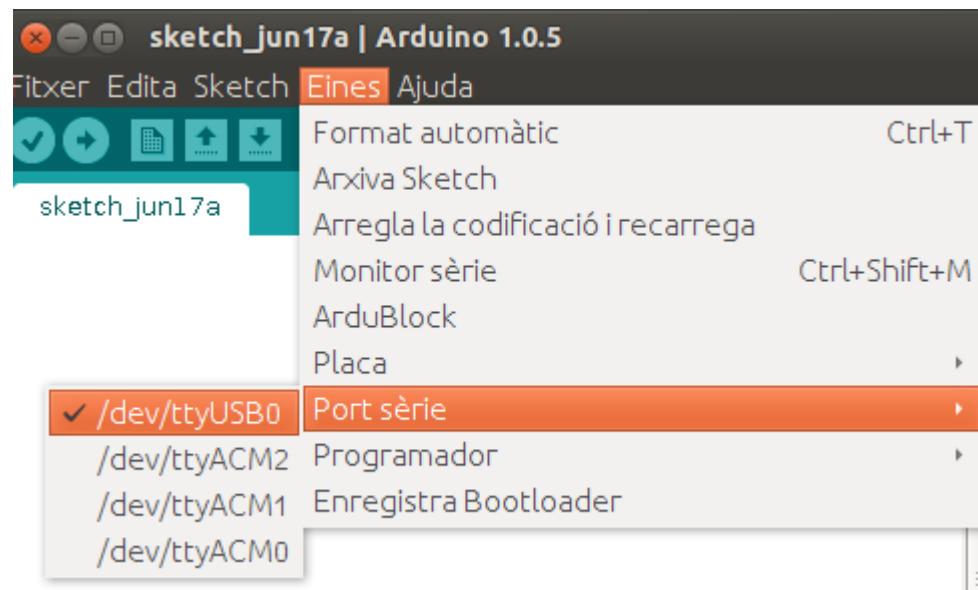
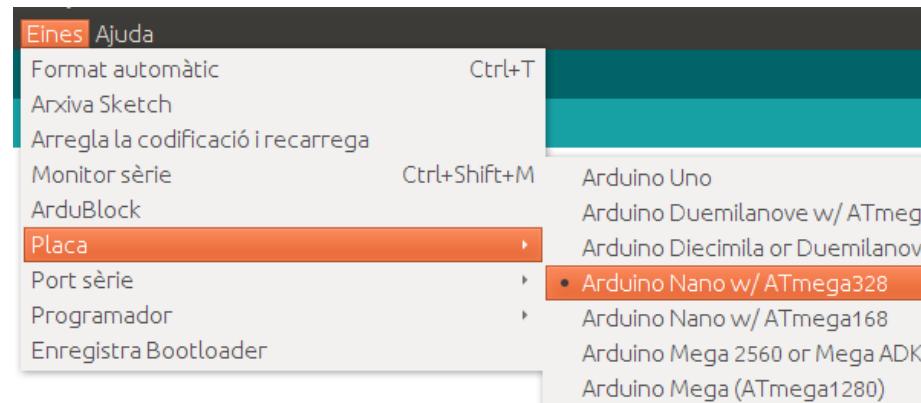


qtTerm està configurat a /dev/ttyUSB0 a 9600-N-8-1

```
ecat@ecatian:~$ minicom -b 9600 -o -D /dev/ttyUSB1
```

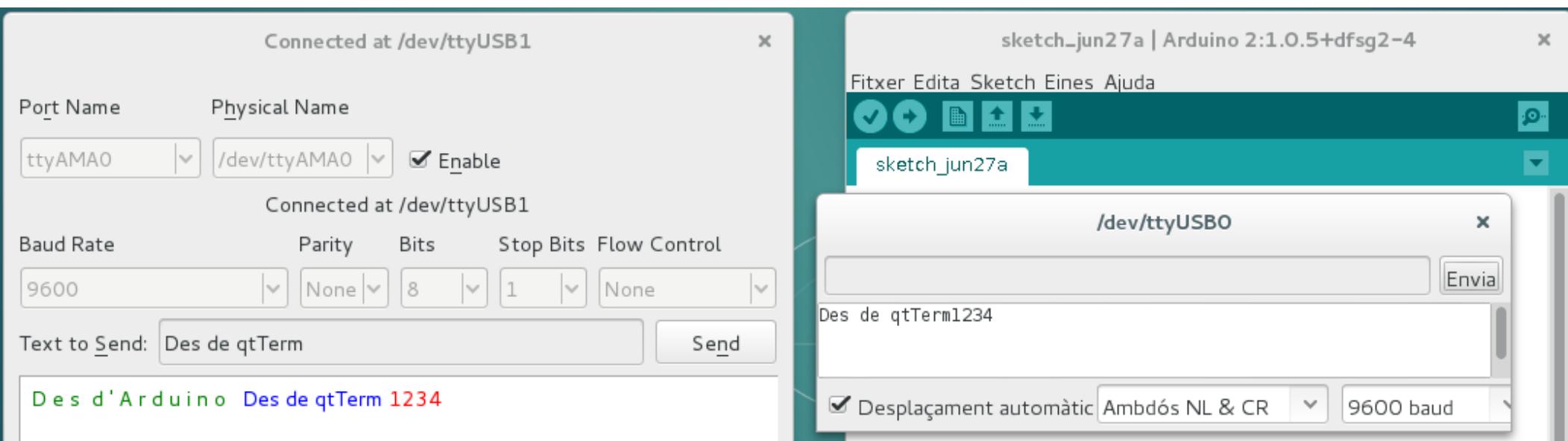
Tecnologies creatives a l'aula

Comunicació qtTerm amb IDE d'Arduino



Tecnologies creatives a l'aula

Comunicació qtTerm amb IDE d'Arduino



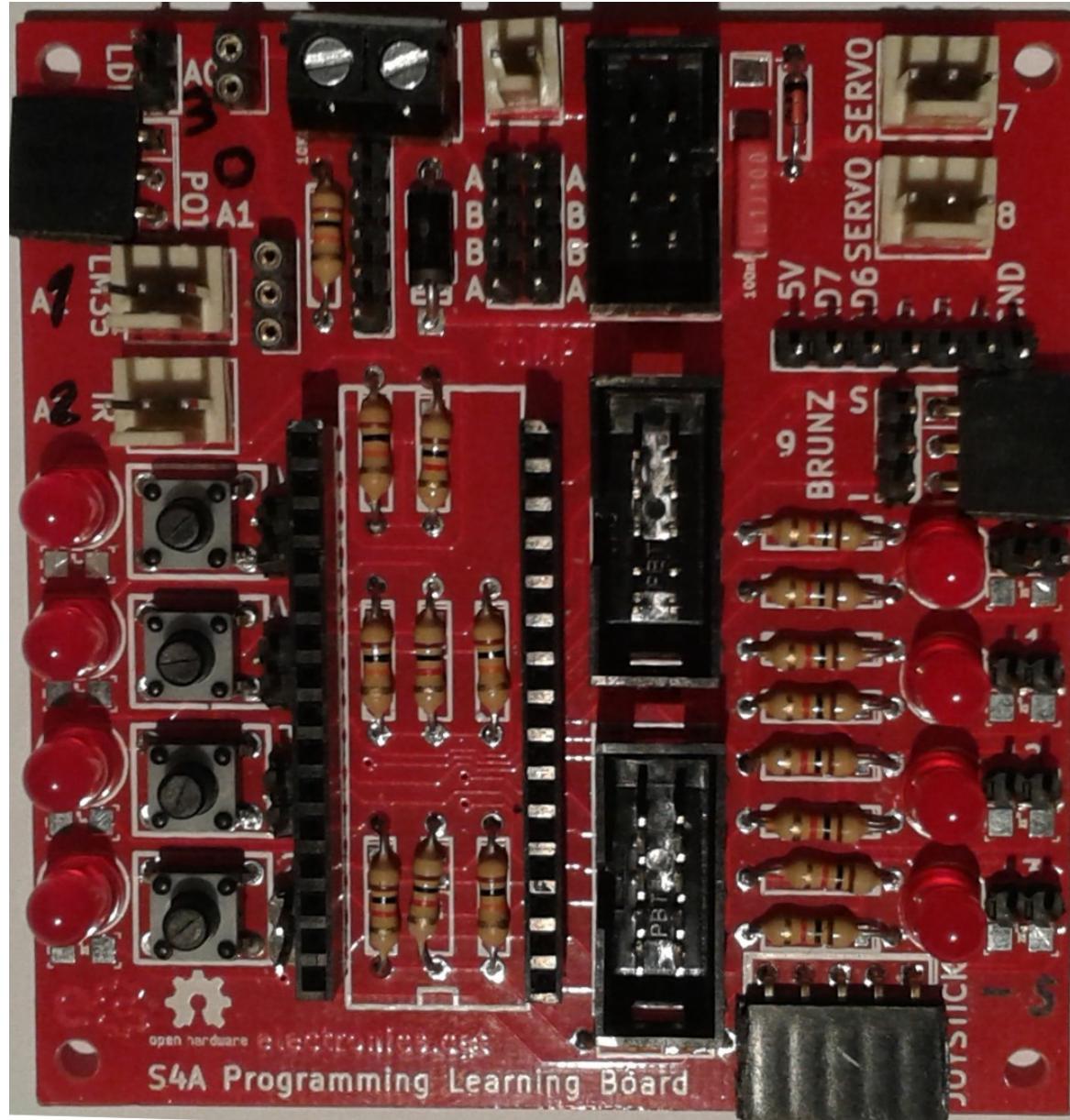
qtTerm està configurat a /dev/ttyUSB1 a 9600-N-8-1

IDE d'Arduino està configurat a /dev/ttyUSB0 a 9600

El monitor sèrie de l'IDE d'Arduino és a Eines/Monitor sèrie

Technologies creatives a l'aula

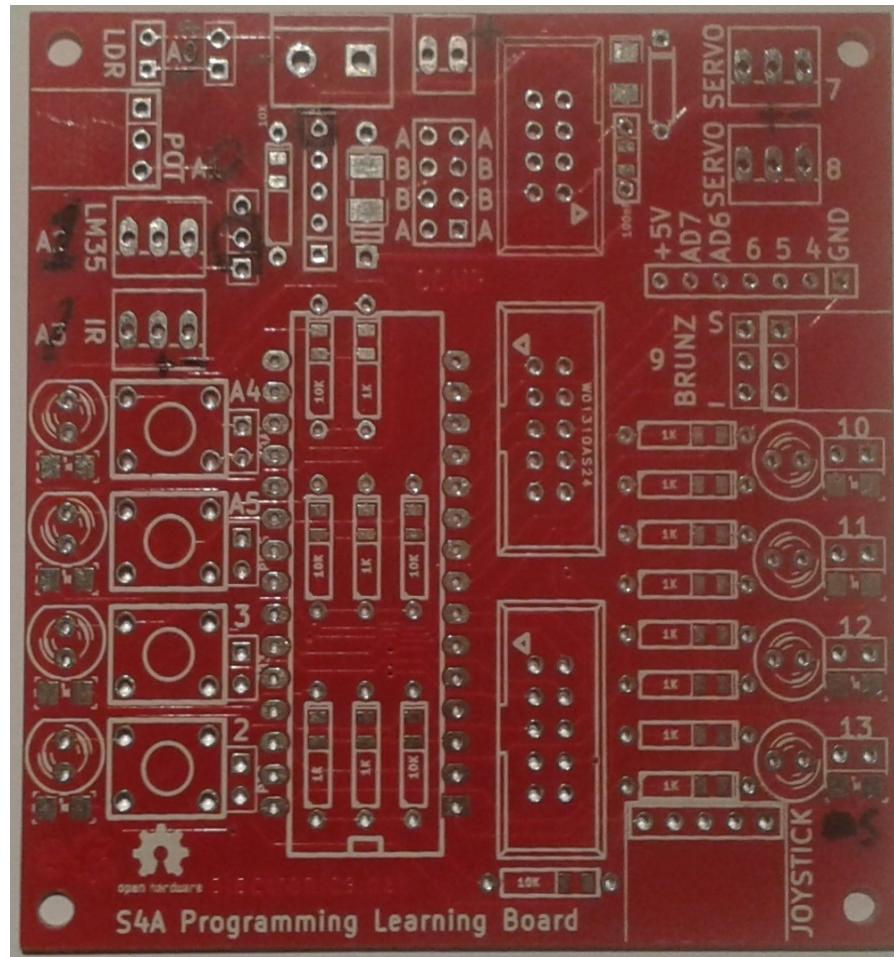
La placa S4A Programming Learning Board



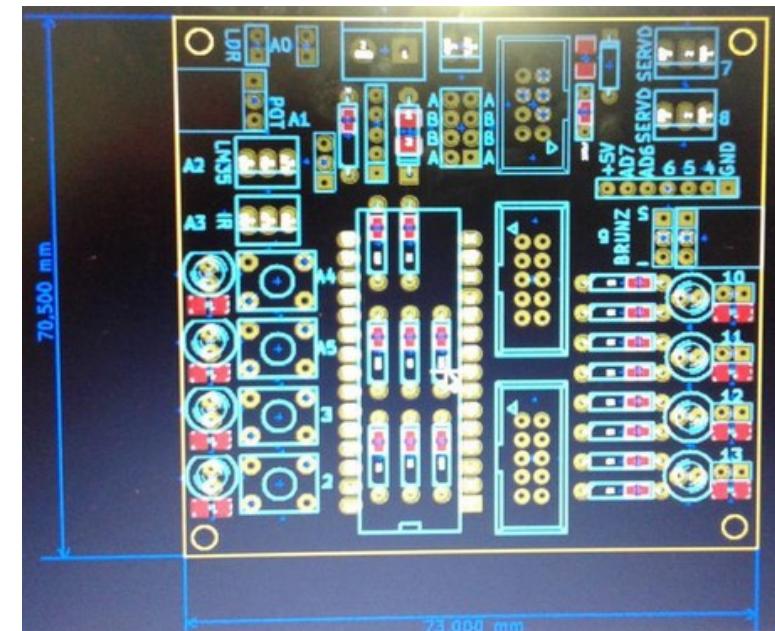
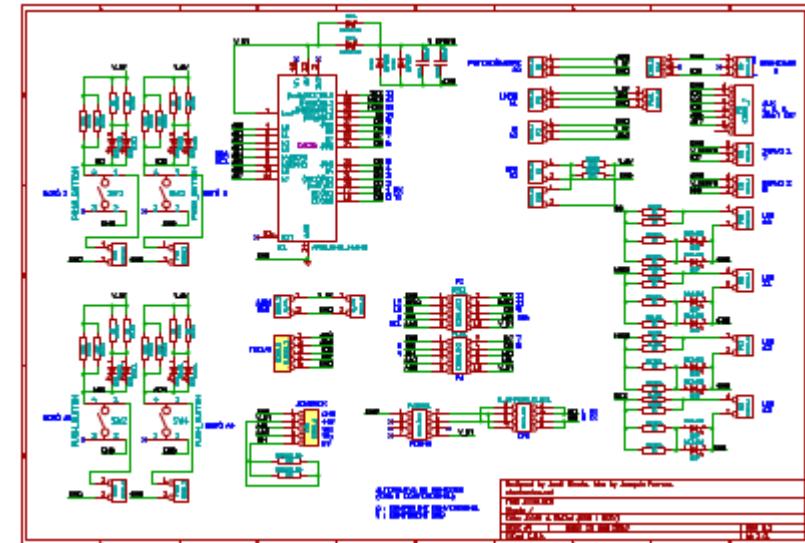


Technologies creatives a l'aula

La placa S4A Programming Learning Board



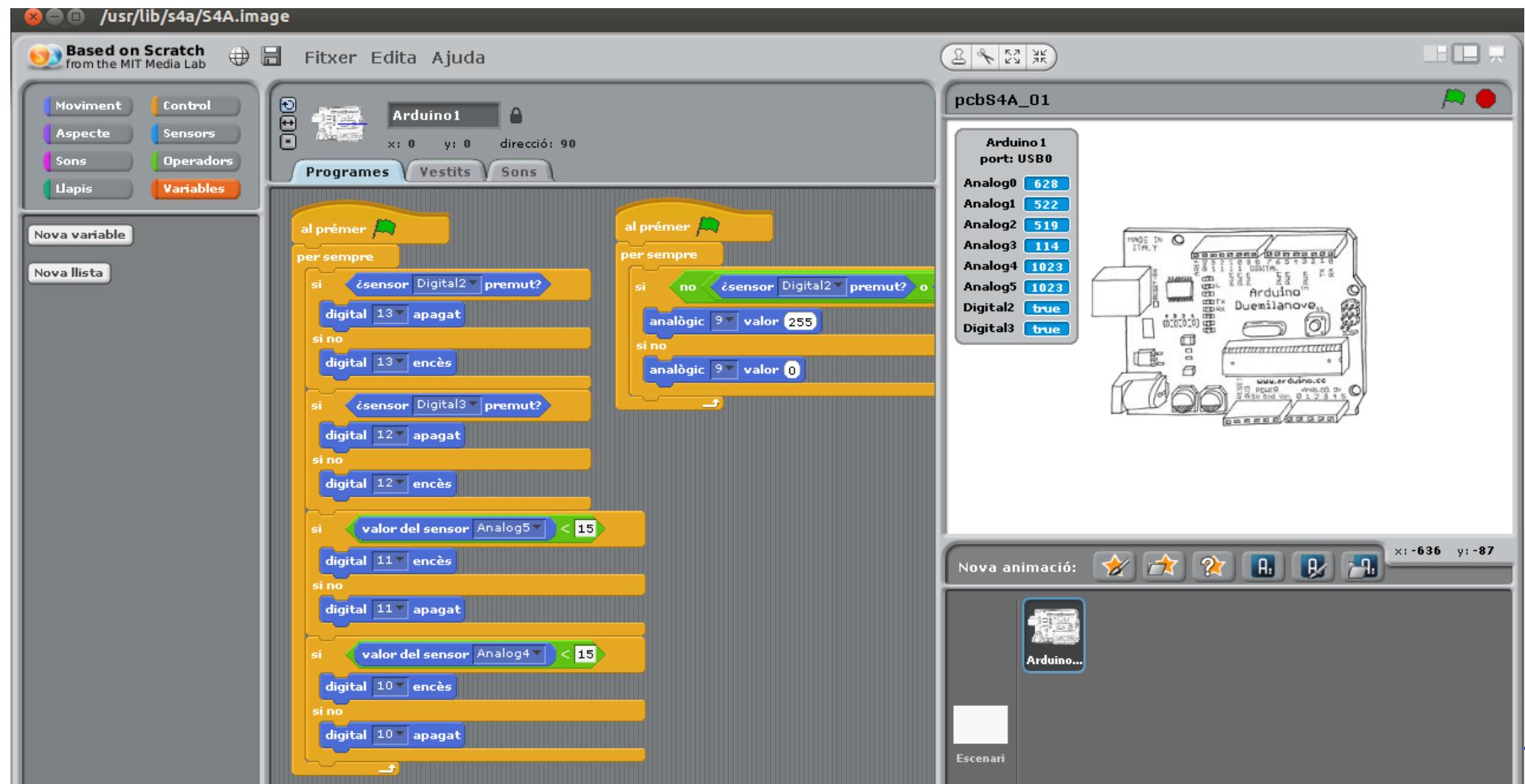
Placa desenvolupada amb l'entorn de disseny integrat de programari lliure





Tecnologies creatives a l'aula

Ús d'S4A



www.s4a.cat



Tecnologies creatives a l'aula Ús d'S4A

El microprogramari és el programari del maquinari

Català

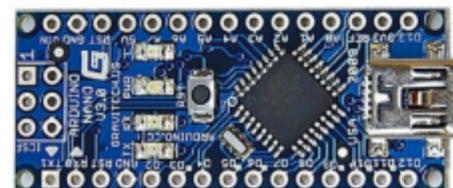
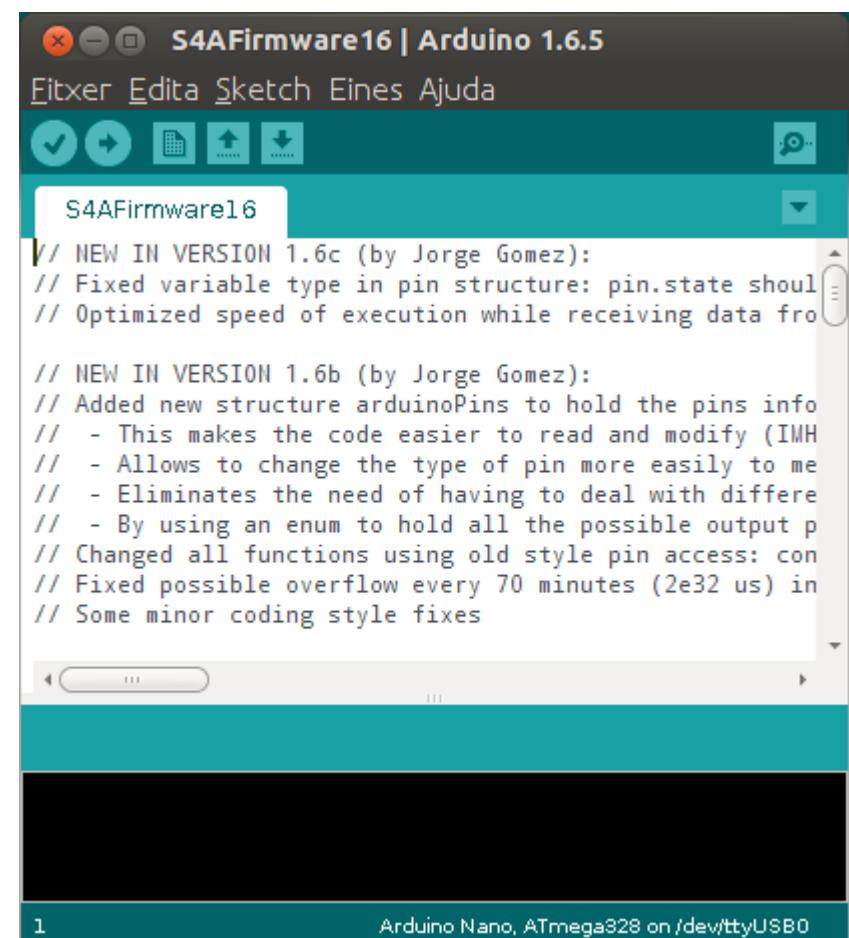
Programari
Maquinari
Microprogramari



Arduino Nano

Anglès

Software
Hardware
Firmware

```
// NEW IN VERSION 1.6c (by Jorge Gomez):
// Fixed variable type in pin structure: pin.state should
// Optimized speed of execution while receiving data fro

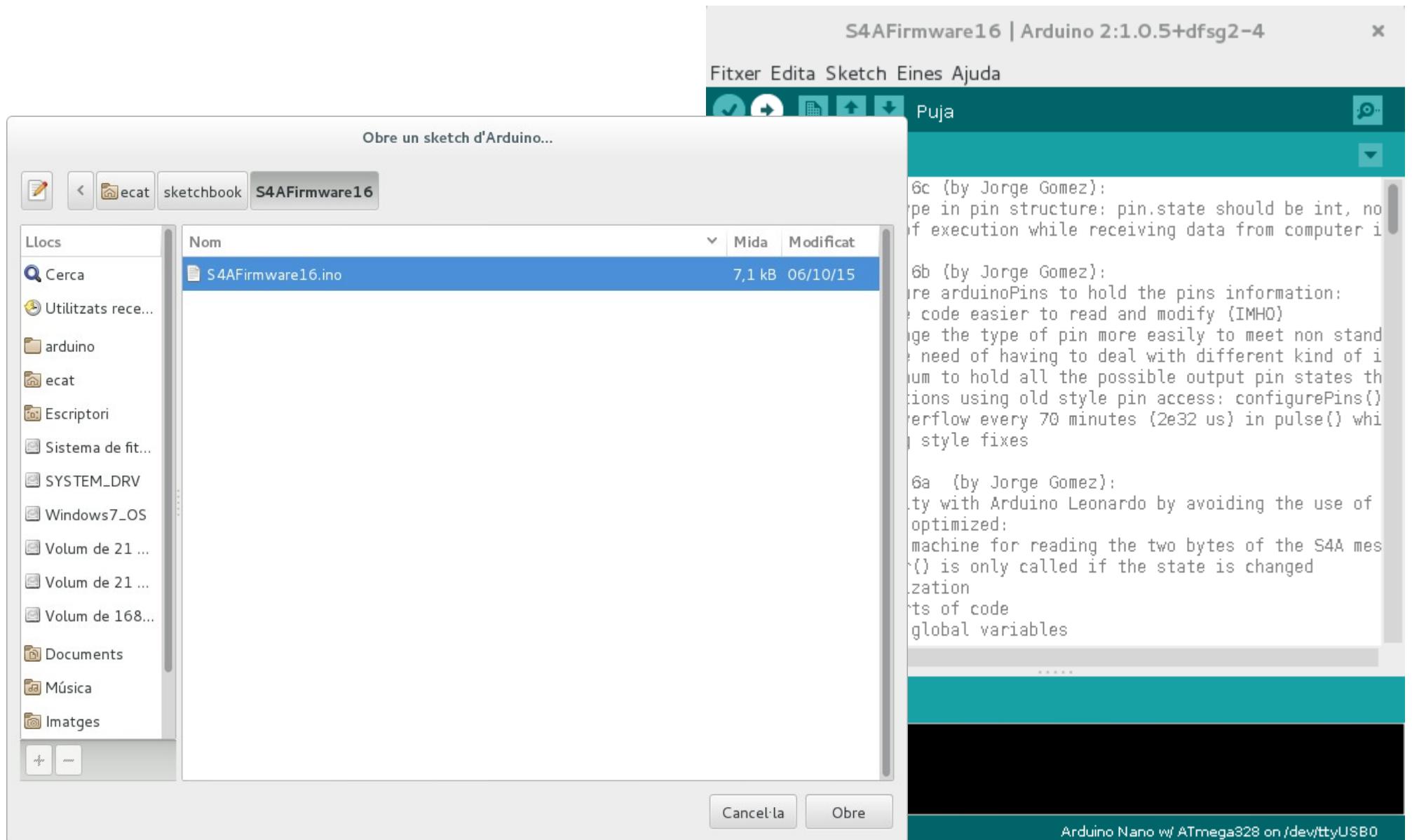
// NEW IN VERSION 1.6b (by Jorge Gomez):
// Added new structure arduinoPins to hold the pins info
// - This makes the code easier to read and modify (IMH
// - Allows to change the type of pin more easily to me
// - Eliminates the need of having to deal with differe
// - By using an enum to hold all the possible output p
// Changed all functions using old style pin access: con
// Fixed possible overflow every 70 minutes (2e32 us) in
// Some minor coding style fixes
```

1 Arduino Nano, ATmega328 on /dev/ttyUSB0

Microprogramari per l'Arduino per funcionar amb l'S4A :
<http://vps34736.ovh.net/S4A/S4AFirmware16.ino>

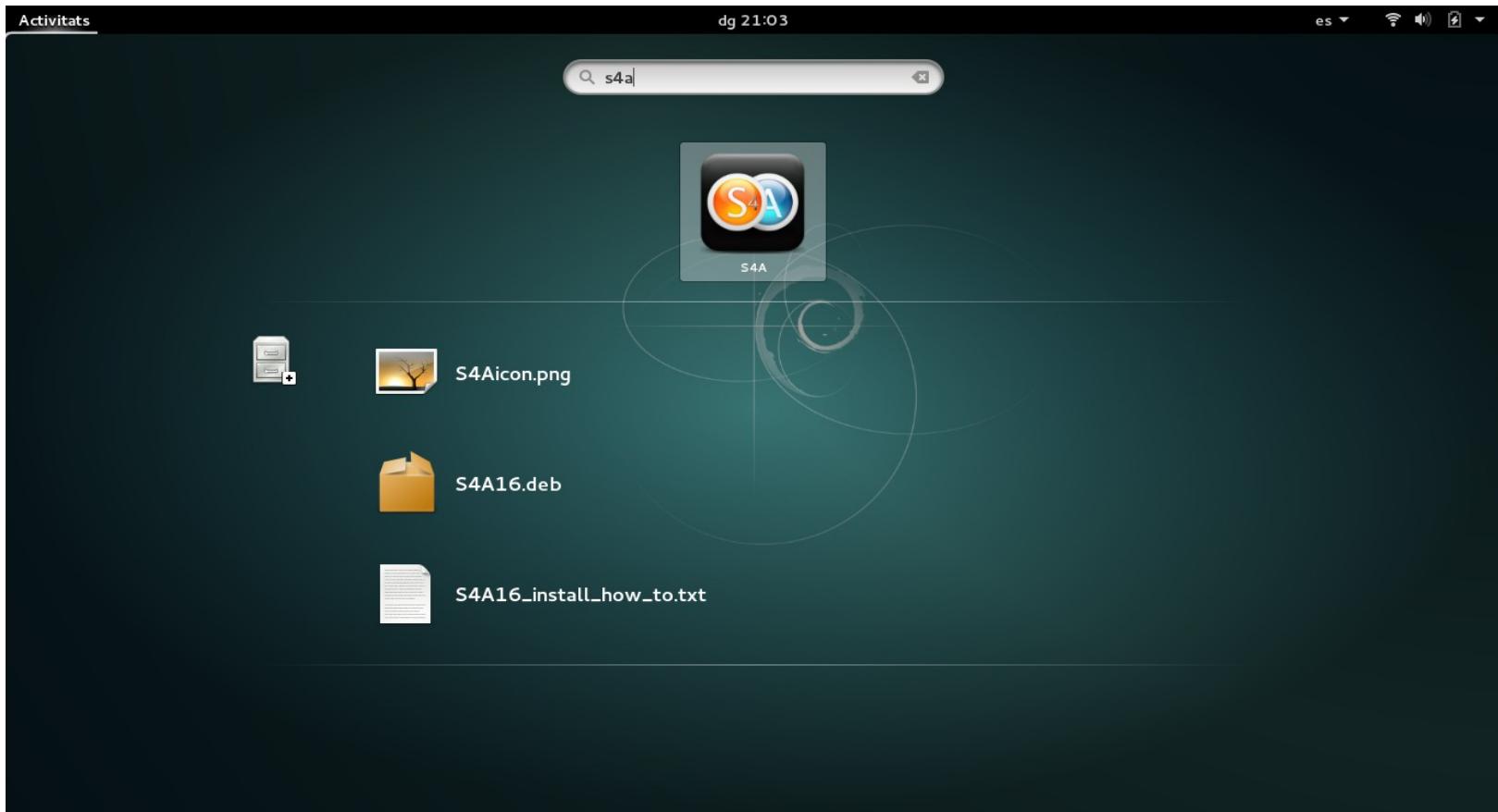
Tecnologies creatives a l'aula

Ús d'S4A



Tecnologies creatives a l'aula

Ús d'S4A

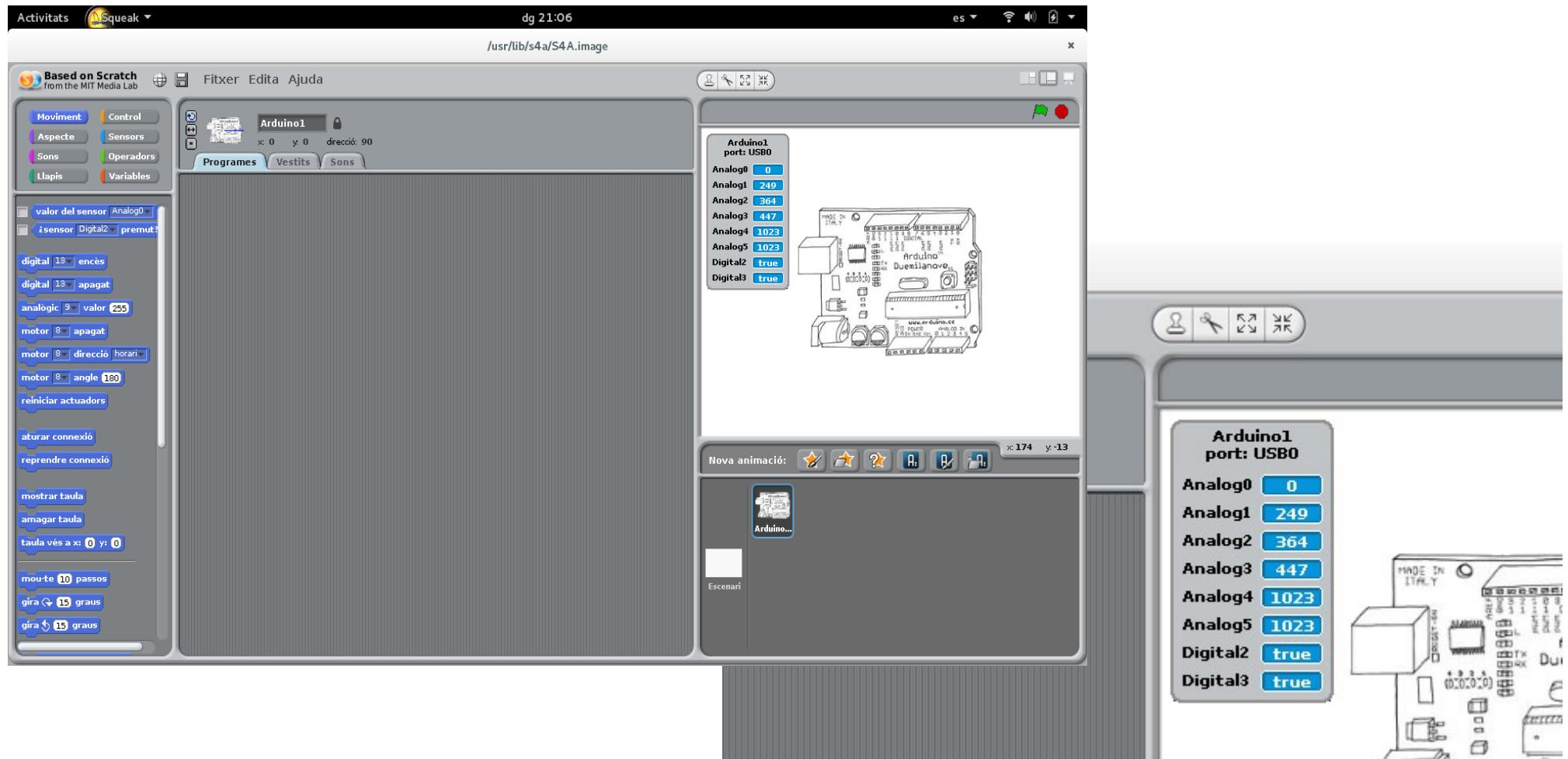


Connecteu la placa S4A PLB al vostre ordinador i premeu la supertecla (botó amb la icona d'una finestra a l'esquerra de la barra espaiadora) i després escriviu S4A i ho seleccioneu amb el ratolí.



Tecnologies creatives a l'aula

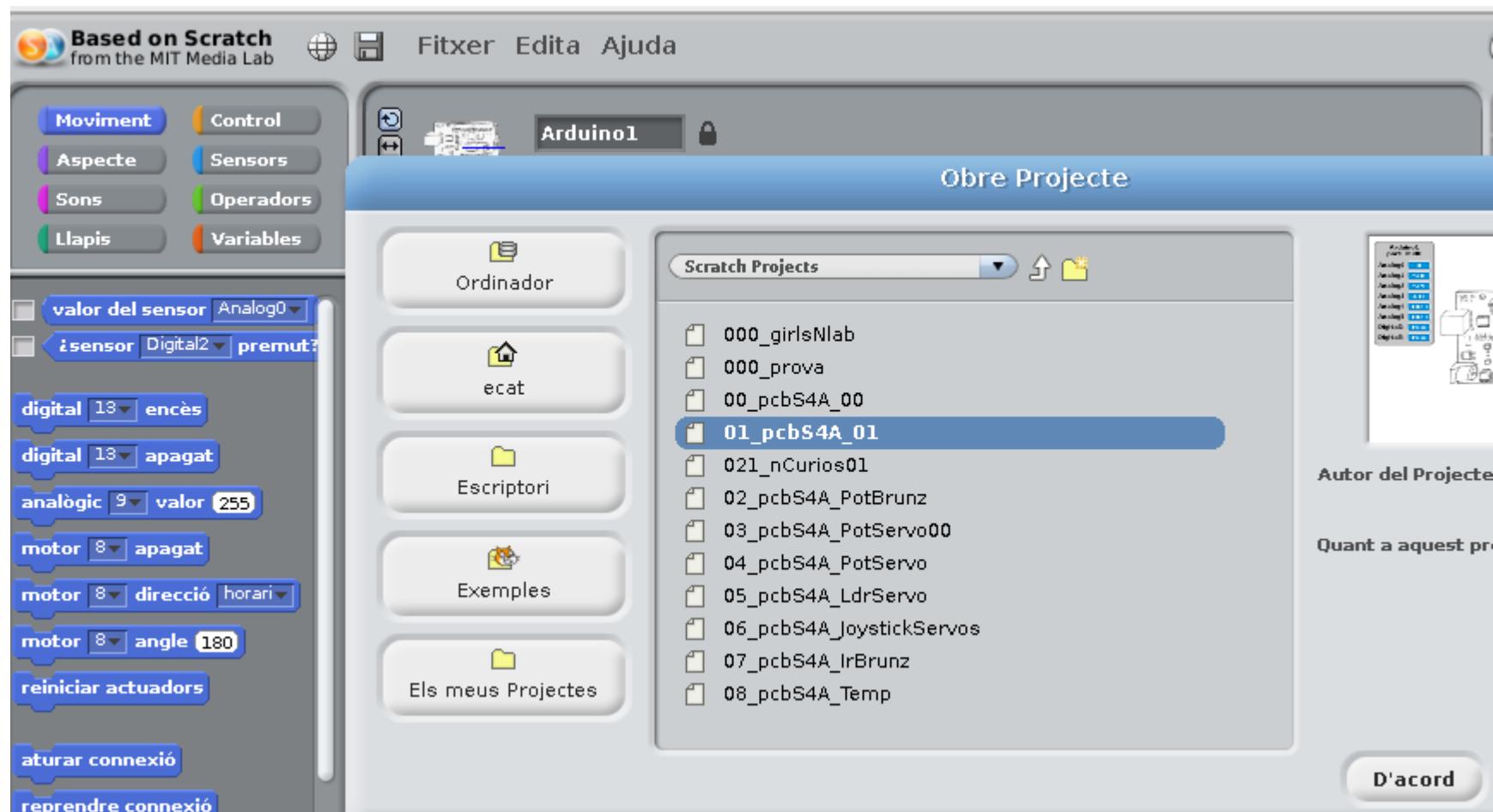
Ús d'S4A



Un cop es detecta la placa, apareixen nombres que es van movent al panell d'entrades analògiques i digitals.

Tecnologies creatives a l'aula

Ús d'S4A

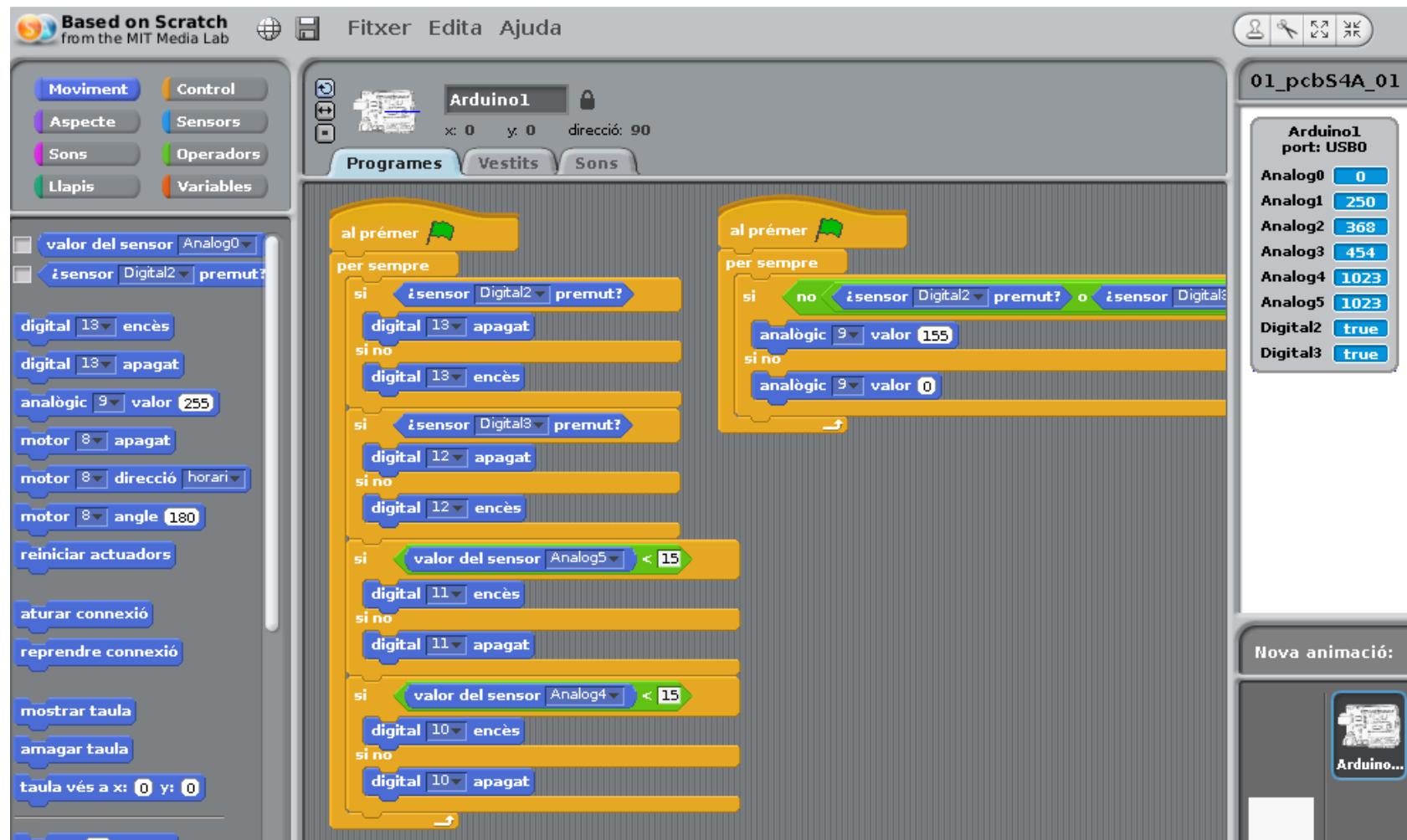


Obriu l'arxiu 01_pcbS4A_01



Tecnologies creatives a l'aula

Ús d'S4A



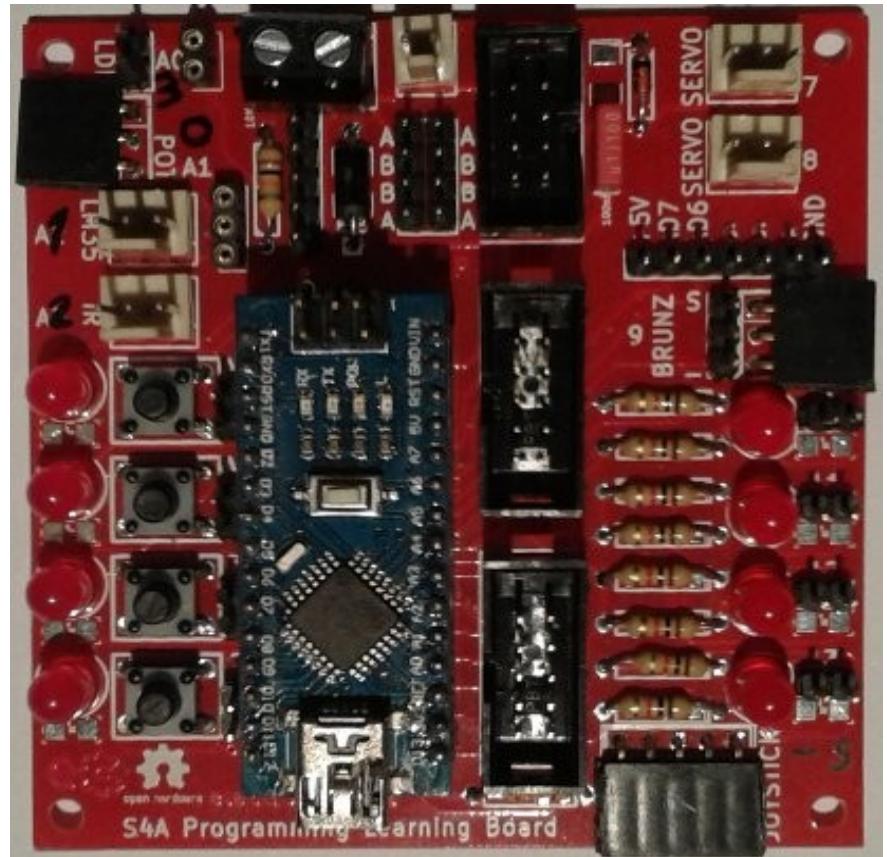
Us apareixerà un programa com aquest

Tecnologies creatives a l'aula

Ús d'S4A



A5
A4
3
2

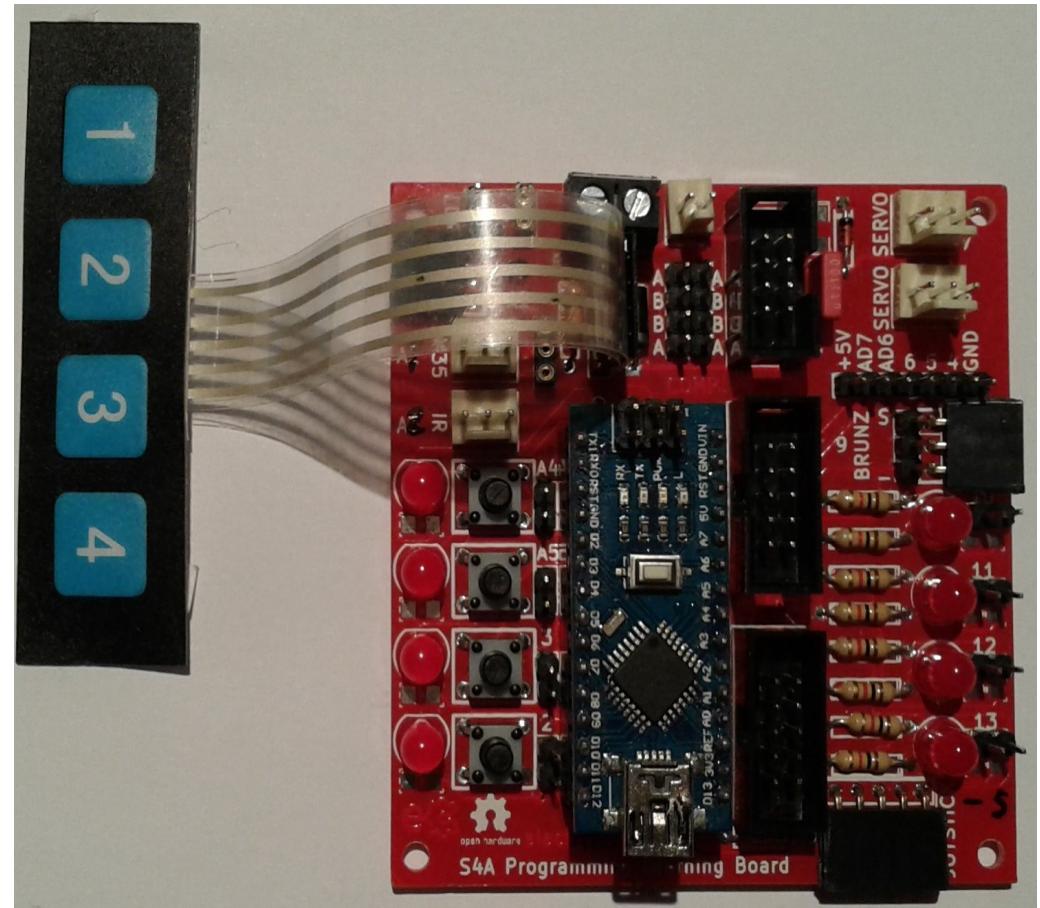


Premeu la bandera verda de l'S4A
I després premeu els botons de la placa



Tecnologies creatives a l'aula

Ús d'S4A

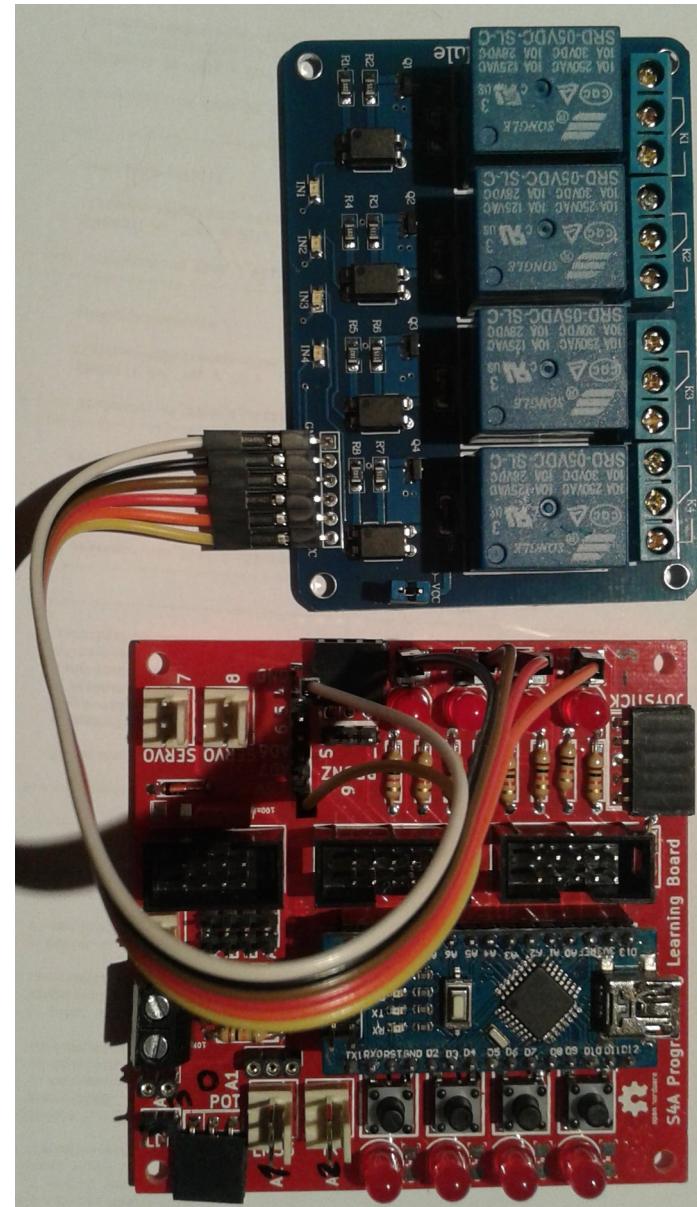


Connecteu el teclat de membrana. Torneu
A prémer la bandera verda de l'S4A
i després premeu els botons del nou teclat.

Potser haureu de canviar el número 15 per un
altre de superior.

Tecnologies creatives a l'aula

Ús d'S4A



Tecnologies creatives a l'aula

Com funciona un relé

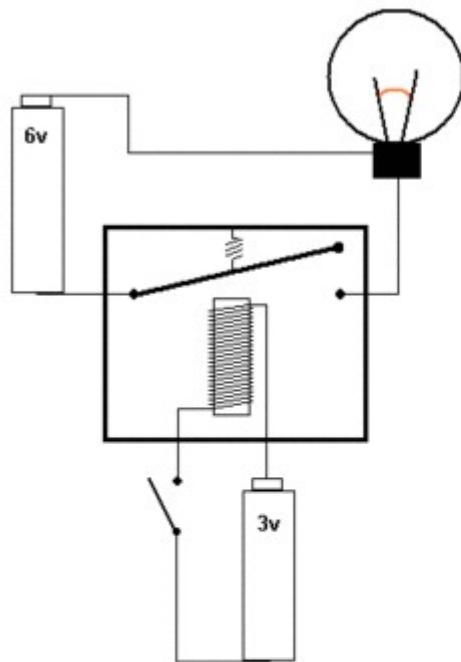


Figure 1: Relay off

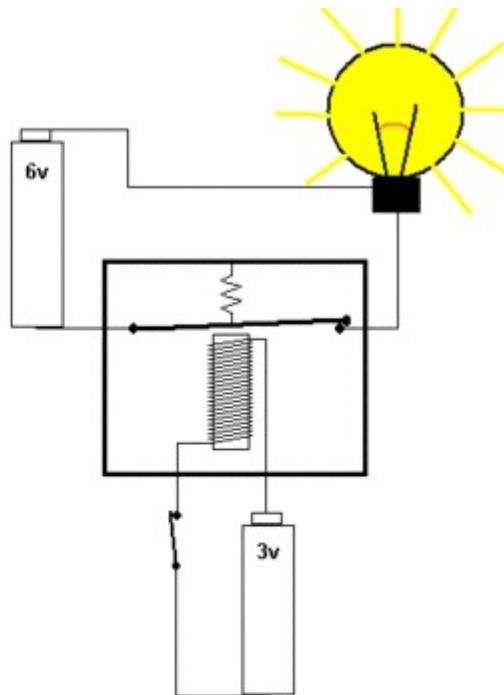
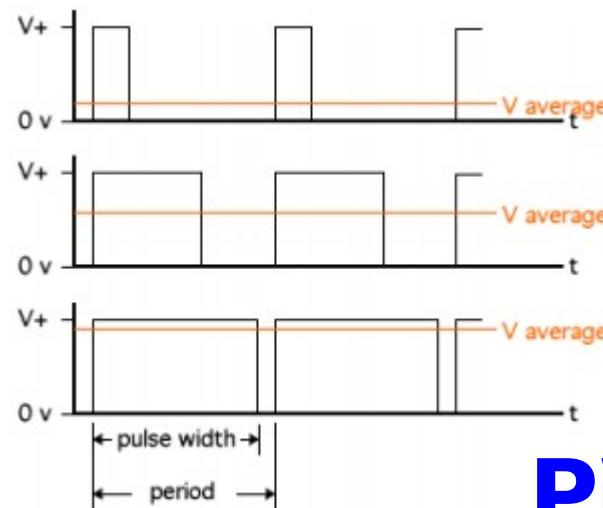
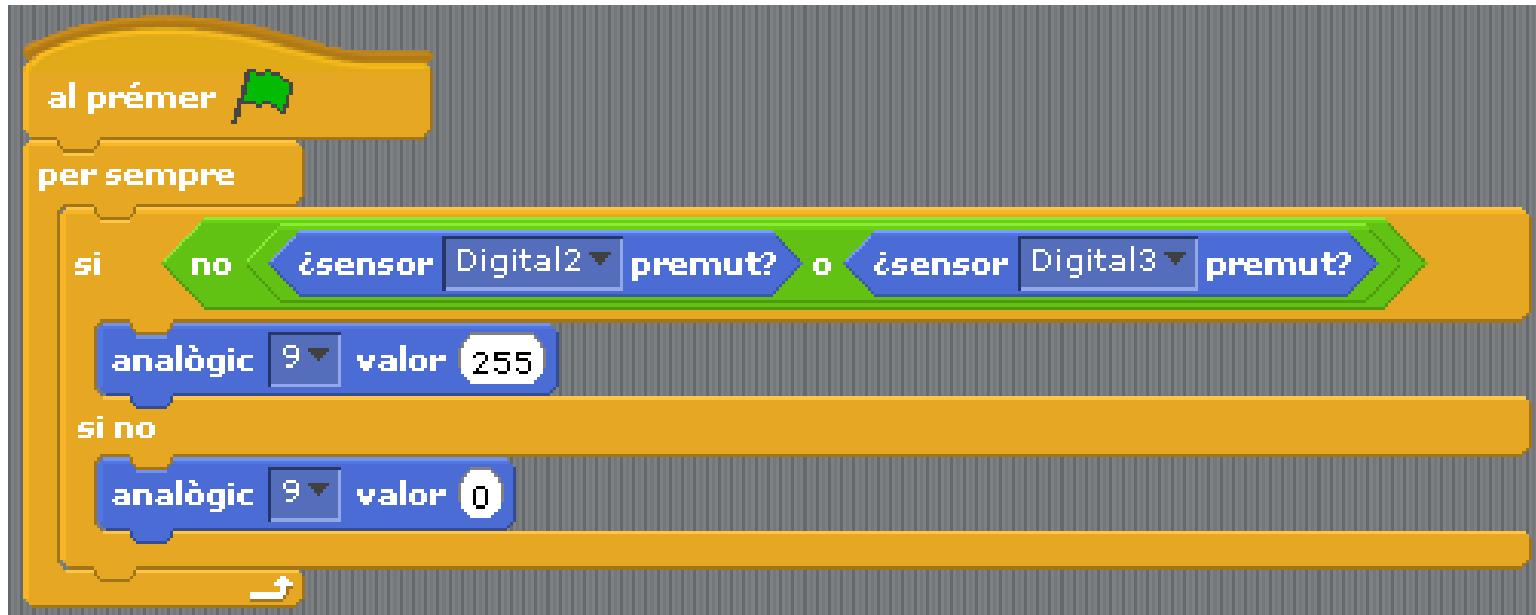


Figure 2: Relay on



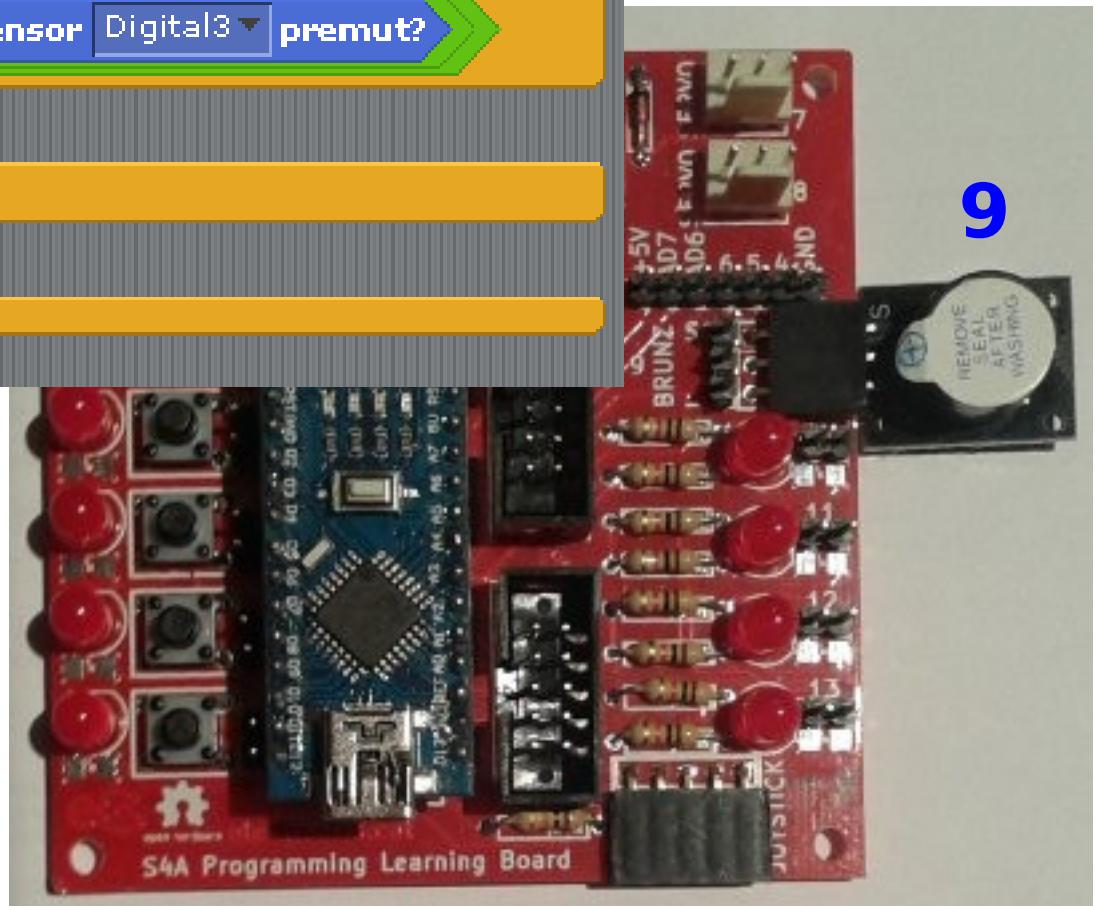
Tecnologies creatives a l'aula

Ús d'S4A - El brunzidor



A4
A5
3
2

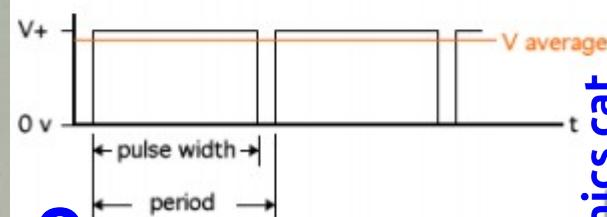
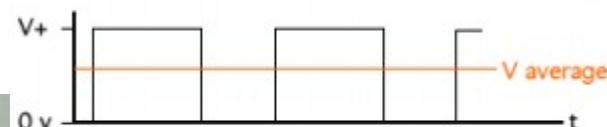
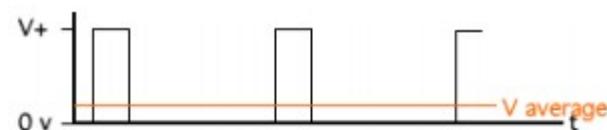
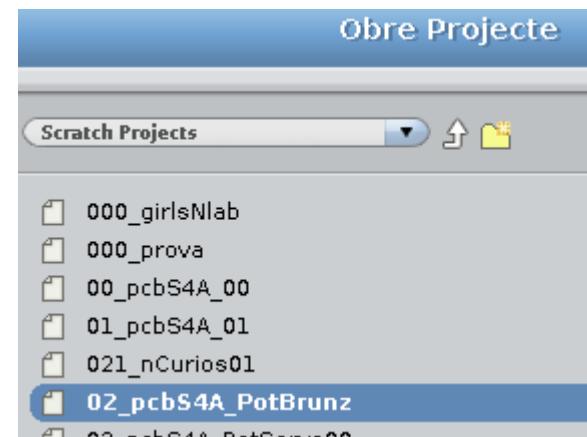
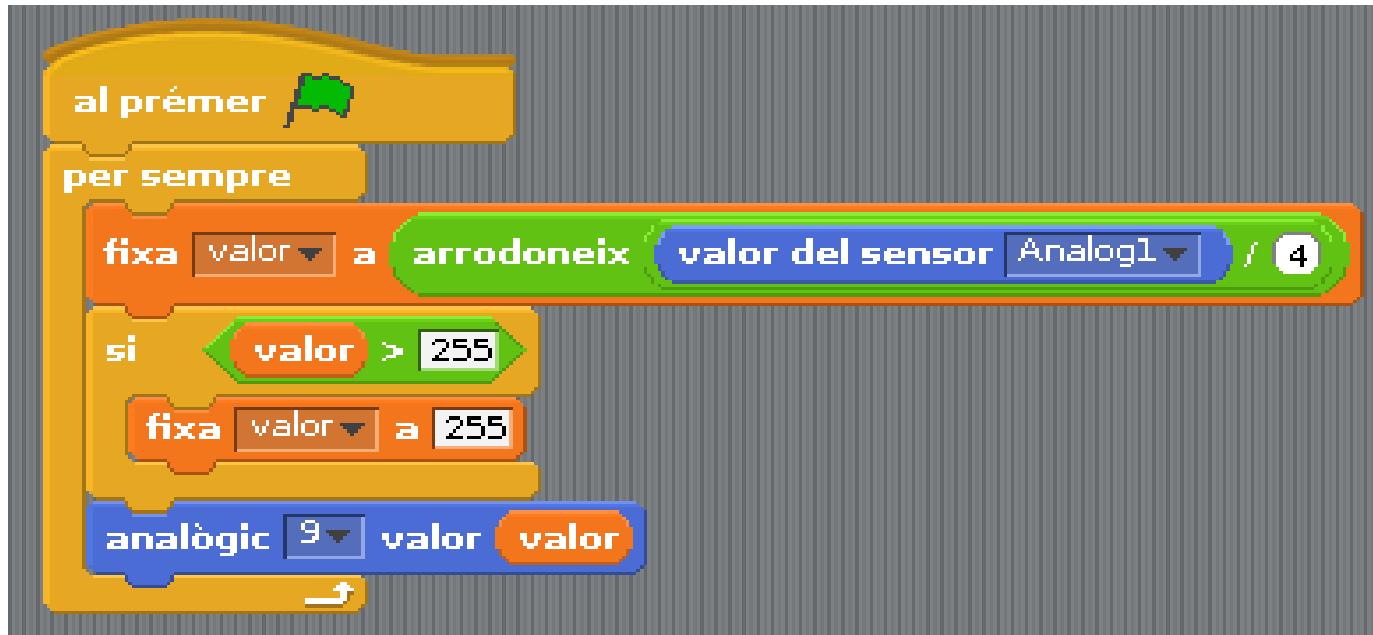
PWM





Tecnologies creatives a l'aula

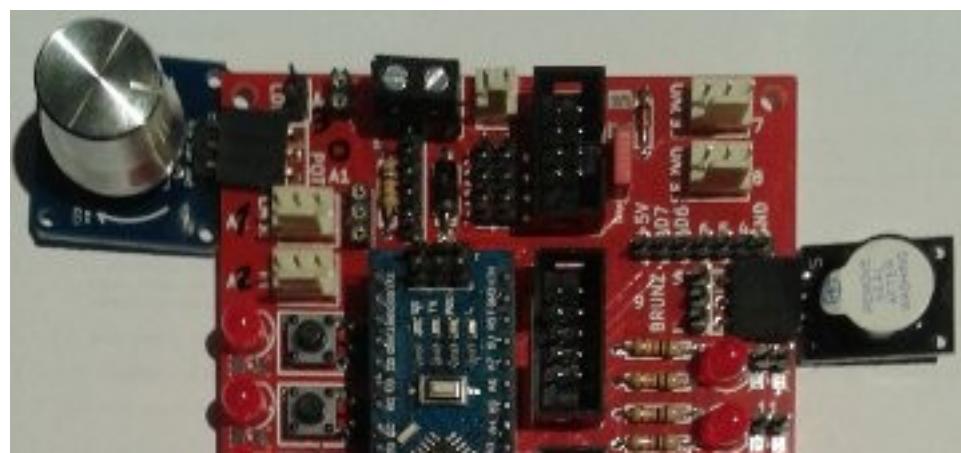
Ús d'S4A - Potenciómetre i brunzidor



9

Verifiqueu que està seleccionat Analog1 i no Analog0

A1





Tecnologies creatives a l'aula

Ús d'Snap for Arduino

Per a l'Snap for Arduino i l'Scratch 2.0 offline
 el microprogramari
 és el Firmata estàndar

Català

Programari
 Maquinari
 Microprogramari



Arduino Nano

Anglès

Software
 Hardware
 Firmware



```
StandardFirmata | Arduino 2:1.0.5+dfsg2-4
Fitxer Edita Sketch Eines Ajuda
StandardFirmata
any host computer software package.
To download a host software package, please click on the following link:
to open the download page in your default browser.
http://firmata.org/wiki/Download
*/
Copyright (C) 2006-2008 Hans-Christoph Steiner. All rights reserved.
Copyright (C) 2010-2011 Paul Stoffregen. All rights reserved.
Copyright (C) 2009 Shigeru Kobayashi. All rights reserved.
Copyright (C) 2009-2011 Jeff Hoefs. All rights reserved.

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formatted using the GNU C formatting and indenting
Guardat enllistat.

1 Arduino Nano w/ ATmega328 on /dev/ttyUSB0
```

Microprogramari per l'Arduino per funcionar amb l'Snap for Arduino i l'Scratch 2 Offline:
<http://binefa.cat/php/training/s4a/StandardFirmata.tar.gz>

Tecnologies creatives a l'aula

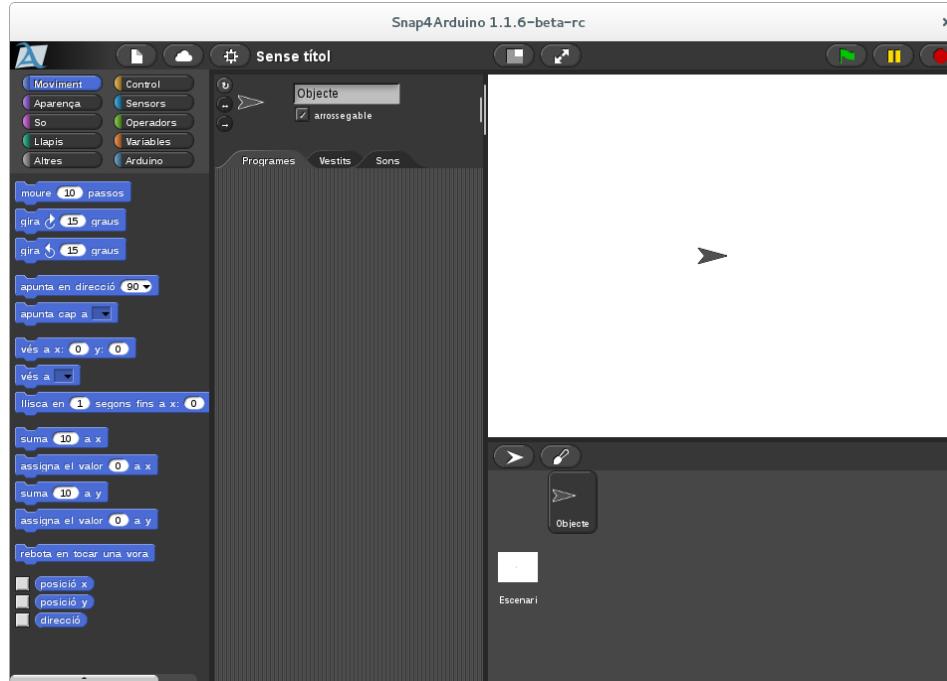
Ús d'Snap for Arduino

Feu la crida a Snap for Arduino des del terminal:

```
ecat@debian8: ~/Snap4Arduino

Fitxer Edita Visualitza Cerca Terminal Ajuda

ecat@debian8:~$ cd /home/ecat/Snap4Arduino
ecat@debian8:~/Snap4Arduino$ ./Snap4Arduino
```



Tecnologies creatives a l'aula

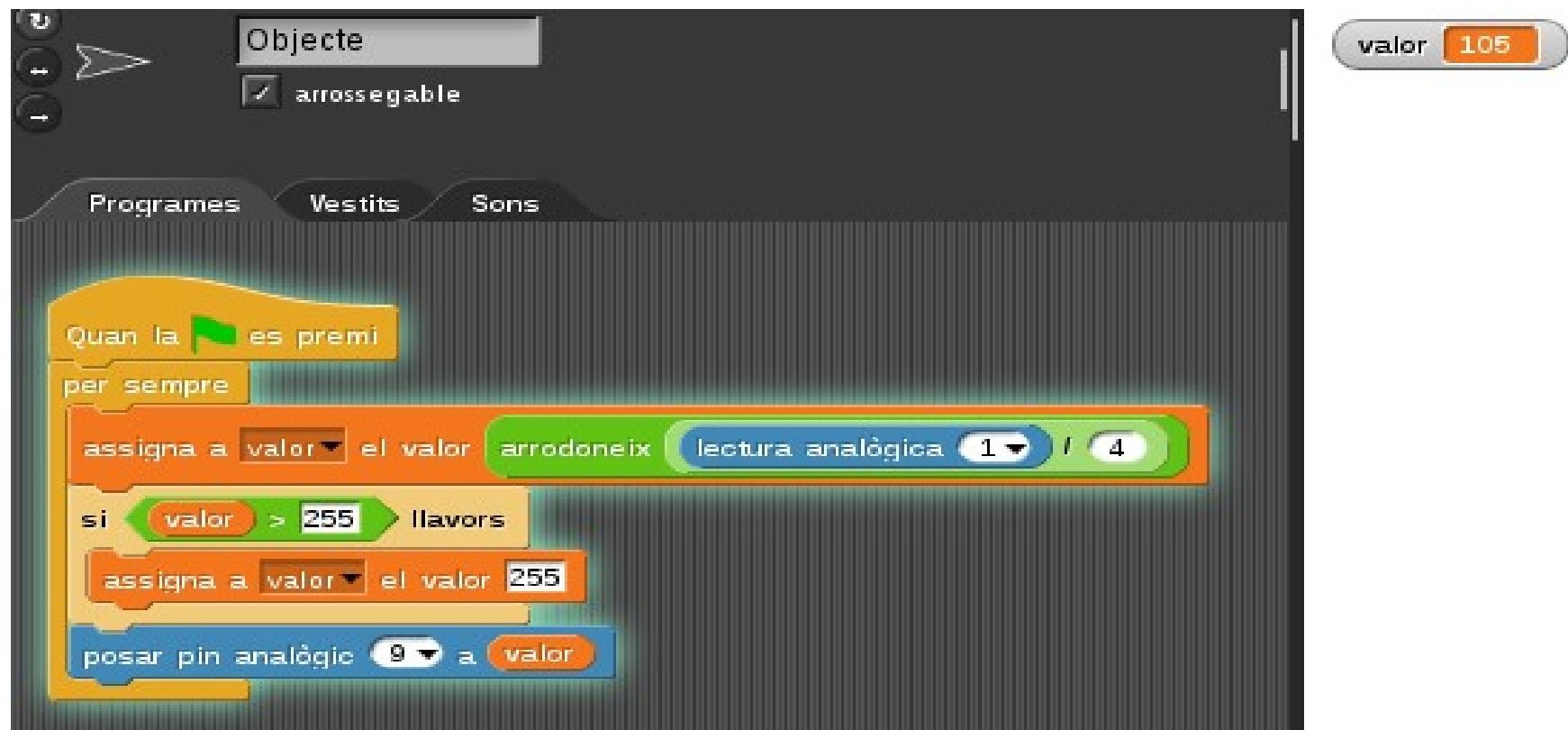
Ús d'Snap for Arduino



Assegureu-vos d'haver programat l'Arduino amb el programari del protocol Firmata estàndar. Quan connecteu l'Arduino seleccioneu el port /dev/ttyUSB0.

Tecnologies creatives a l'aula

Ús d'Snap for Arduino



La sortida PWM la interpreta com a sortida analògica

Tecnologies creatives a l'aula

Ús d'Snap for Arduino

Exercici

Implementeu a l'Snap for Arduino el control dels 4 relés des dels quatre botons del teclat de membrana i feu que soni el brunzidor quan es premen alhora els botons connectats a les entrades digital 2 i 3.



Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

Per a l'Snap for Arduino i l'Scratch 2.0 offline
 el microprogramari
 és el Firmata estàndar

Català

Programari
 Maquinari
 Microprogramari



Arduino Nano

Anglès

Software
 Hardware
 Firmware



```
StandardFirmata | Arduino 2:1.0.5+dfsg2-4
Fitxer Edita Sketch Eines Ajuda
StandardFirmata
* any host computer software package.
*
* To download a host software package, please click on the following link:
* to open the download page in your default browser.
*
* http://firmata.org/wiki/Download
*/
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Copyright (C) 2010-2011 Paul Stoffregen. All rights reserved.
Copyright (C) 2009 Shigeru Kobayashi. All rights reserved.
Copyright (C) 2009-2011 Jeff Hoefs. All rights reserved.

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version 2.1 of the License, or (at your option) any later version.

See file LICENSE.txt for further informations on licensing terms.

formatted using the GNU C formatting and indenting
Guardat enllistat.

1 Arduino Nano w/ ATmega328 on /dev/ttyUSB0
```

Per tant, si ja l'heu programat per a l'Snap for Arduino **no cal** tornar-ho a **reprogramar**

Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

s2aio

<https://github.com/MrYsLab/s2aio/wiki>

The Arduino Hardware Extension For Snap! and the Scratch 2.0 Offline Editor



s2a_fm

Previous version of **s2aio**

https://github.com/MrYsLab/s2a_fm



Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

ecat@debian8: ~/Baixades/scratch/s2a_fm-master

Fitxes Edits Visualitzar Cerca Terminal Ajuda

```
Could not instantiate PyMata - is your Arduino plugged in?
ecat@debian8:~/Baixades/scratch/s2a_fm-master$ ./s2a_fm.py /dev/ttyUSB0
s2a_fm version 1.5 Copyright(C) 2013-14 Alan Yorinks All Rights Reserved
```

Python Version 2.7.9 (default, Mar 1 2015, [GCC 4.9.2])

PyMata version 2.12 Copyright(C) 2013-16 Al

Opening Arduino Serial port /dev/ttyUSB0

Please wait while Arduino is being detected.
Board initialized in 0 seconds
Total Number of Pins Detected = 22
Total Number of Analog Pins Detected = 8
Please wait for Total Arduino Pin Discovery additional seconds.
Arduino Total Pin Discovery completed in 0 s
Starting HTTP Server!
Use <Ctrl-C> to exit the extension

Please start Scratch or Snap!
Scratch detected! Ready to rock and roll...

A un terminal:

```
$ cd /home/ecat/prg/s2a_fm-master
$ ./s2a_fm.py /dev/ttyUSB0
```

A un altre terminal:

```
$ cd /home/ecat/prg
$ ./Scratch2
```

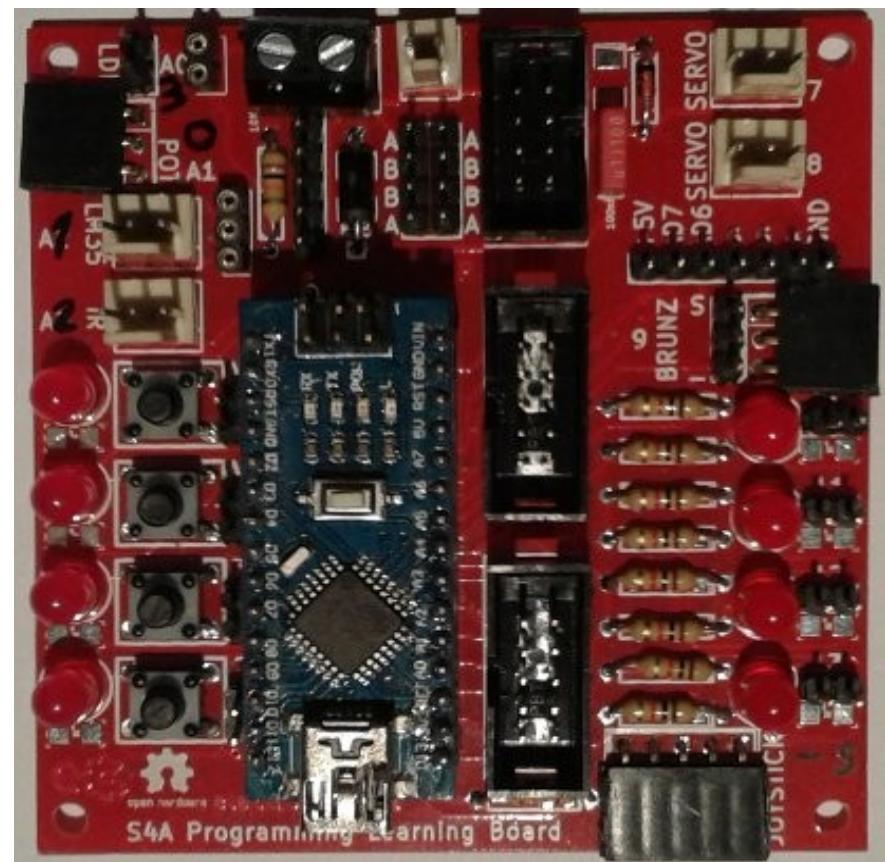
Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

sc2_prova00.sb2



A4
A5
3
2



A diferència dels programes anteriors, cal configurar si les potes són entrades o sortides.

Per a fer un programa des de zero cal carregar l'extensió de maquinari s2a_fm.s2e
<http://binefa.cat/php/training/s4a/codi.tar.gz>

Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

Ús del potenciómetre



Obriu el programa sc2_prova04_potA1.sb2

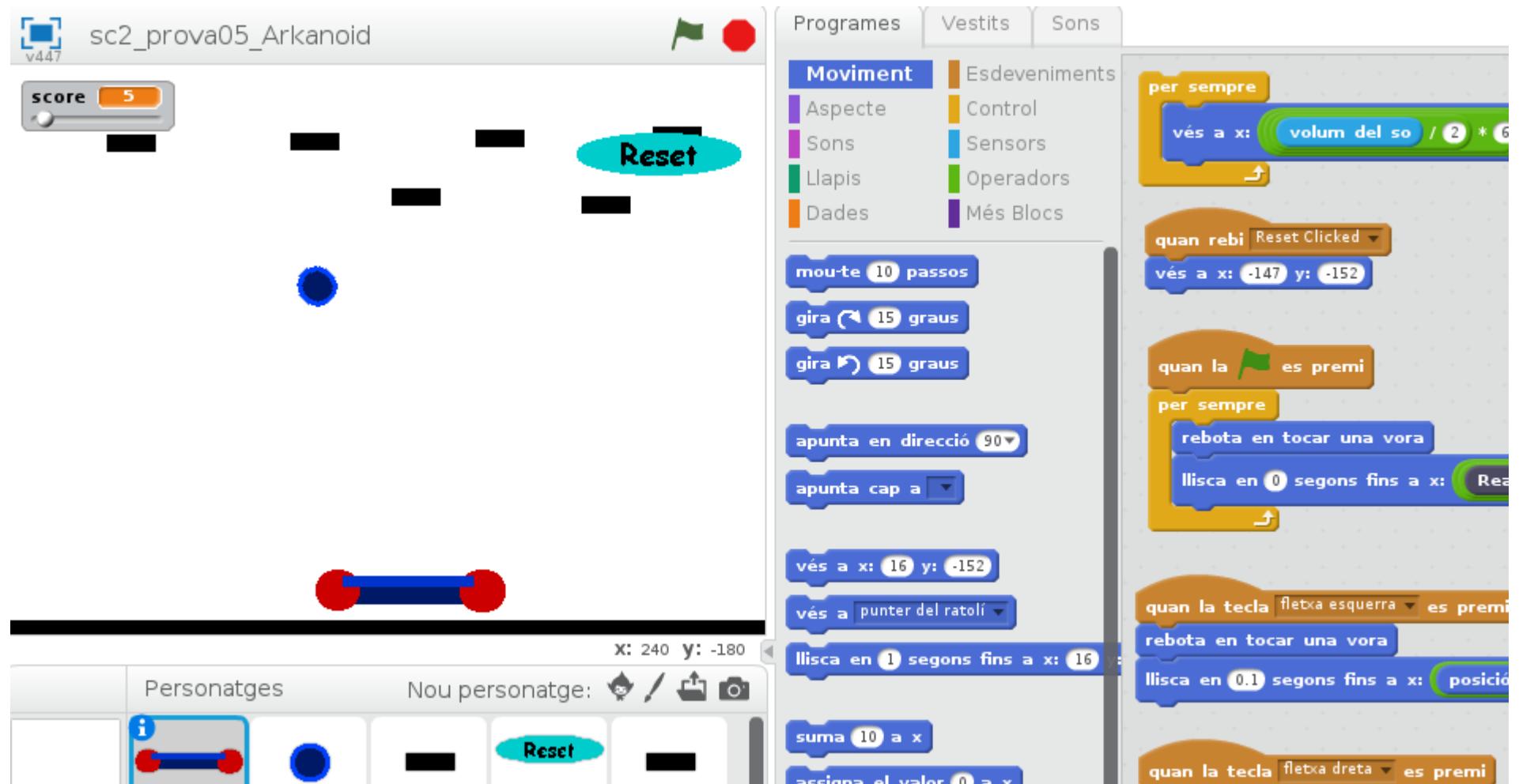
<http://binefa.cat/php/training/s4a/codi.tar.gz>



Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

sc2_prova05_Arkanoid.sb2



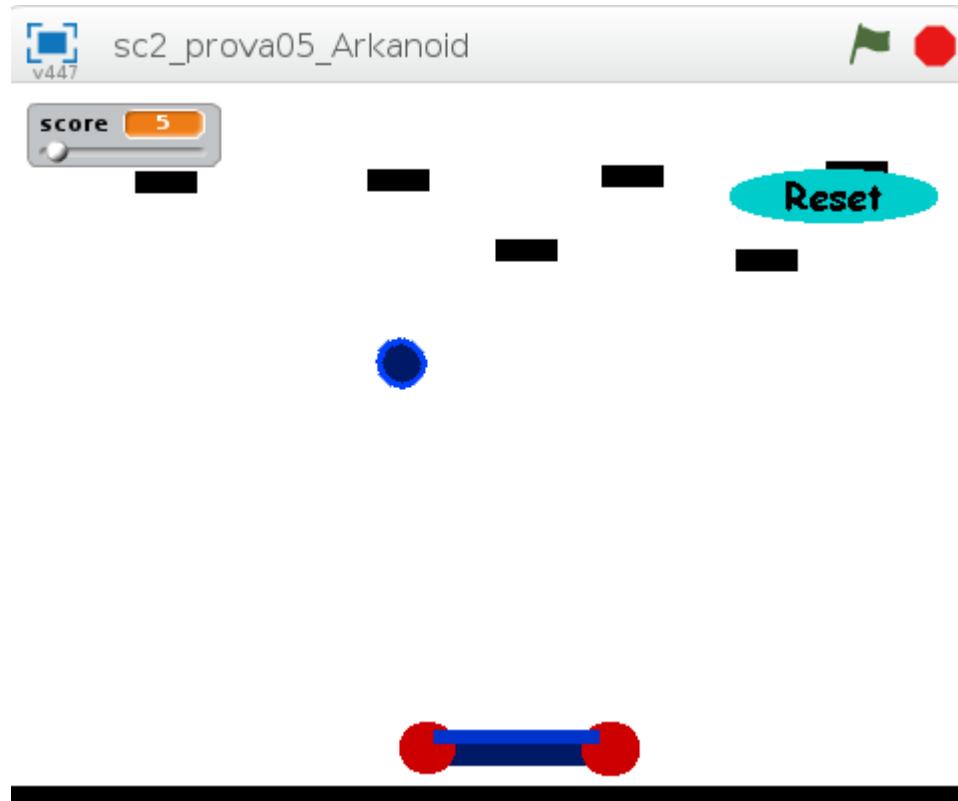
<http://binefa.cat/php/training/s4a/codi.tar.gz>



Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

sc2_prova05_Arkanoid.sb2



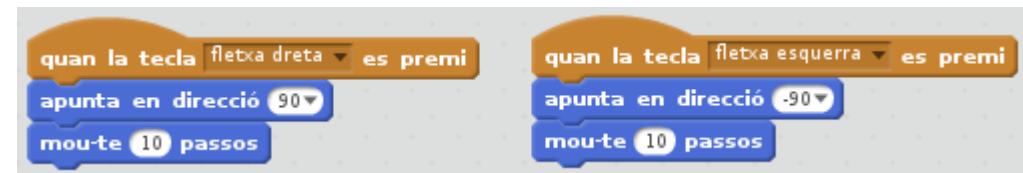
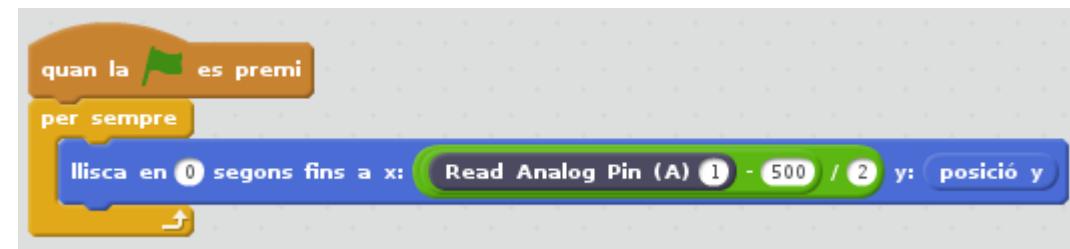
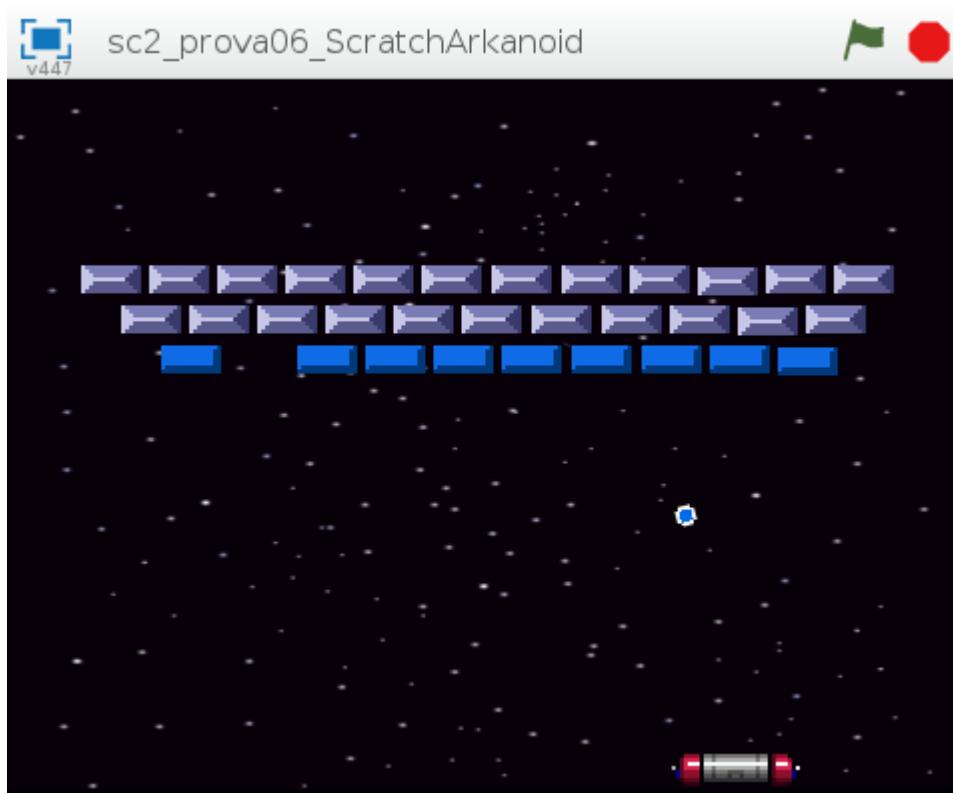
<http://binefa.cat/php/training/s4a/codi.tar.gz>



Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

sc2_prova06_ScratchArkanoid.sb2

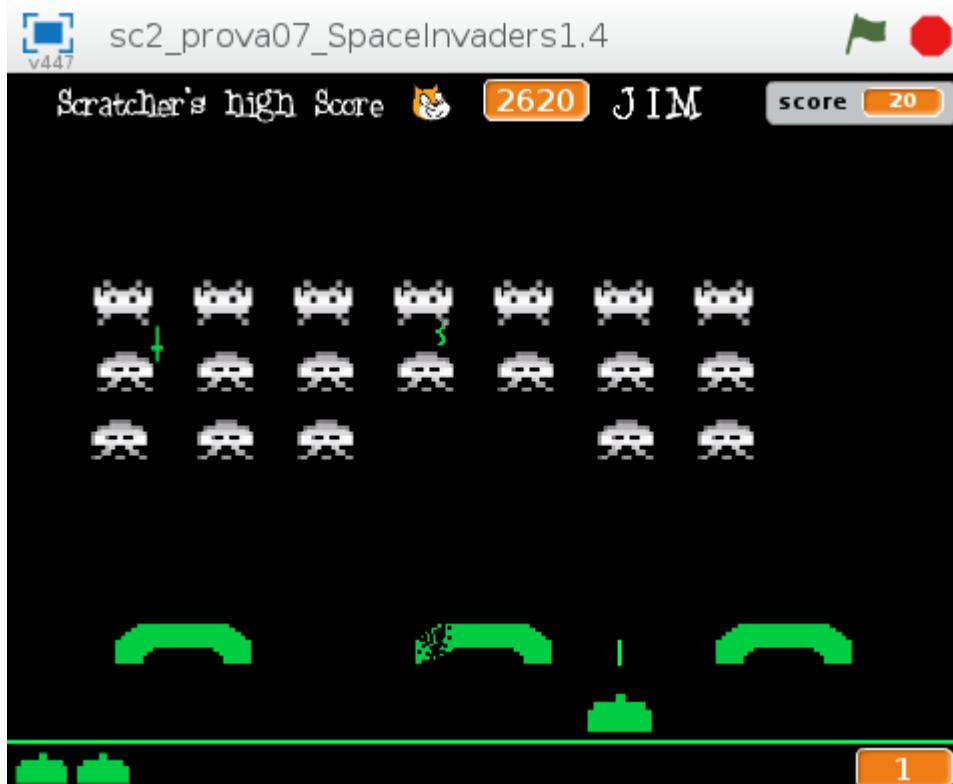




Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

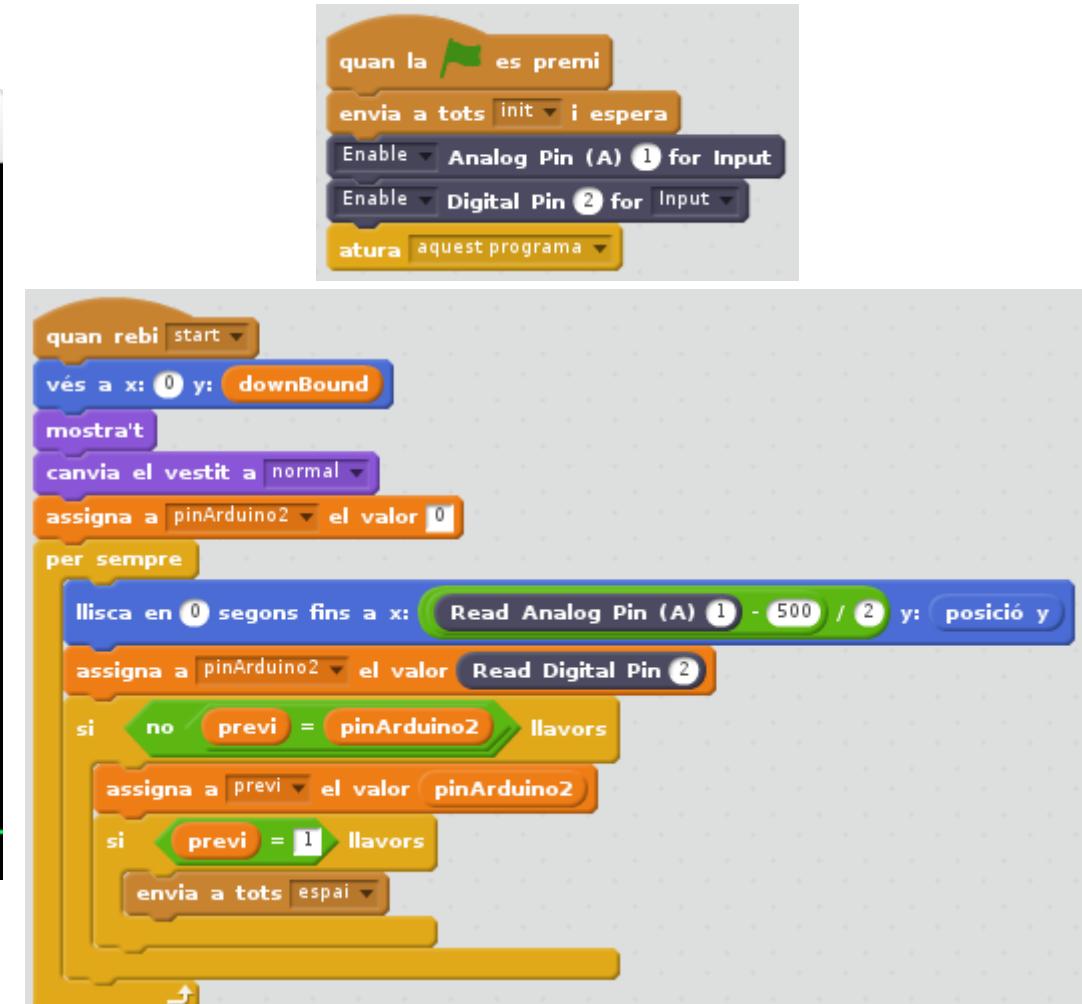
sc2_prova07_SpacelInvaders1.4.sb2



Podeu activar el volum.

Es fa servir el potenciómetre A1 per a moure la nau i el botó 2 per a disparar.

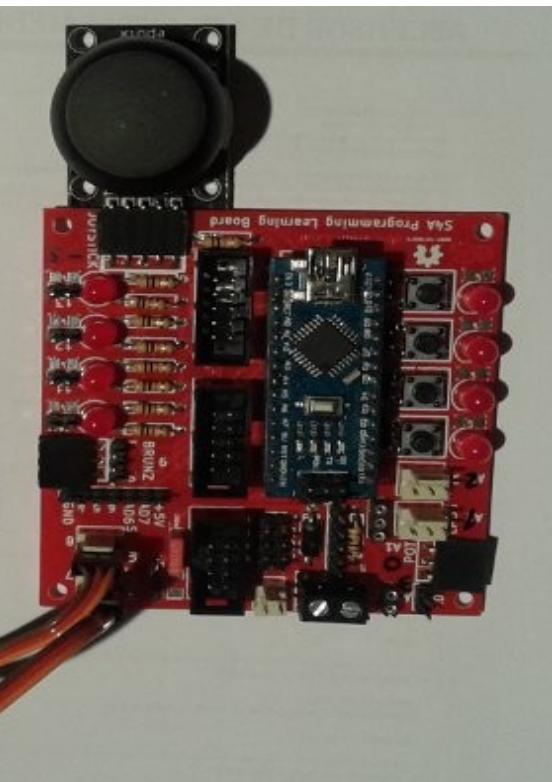
<http://binefa.cat/php/training/s4a/codi.tar.gz>



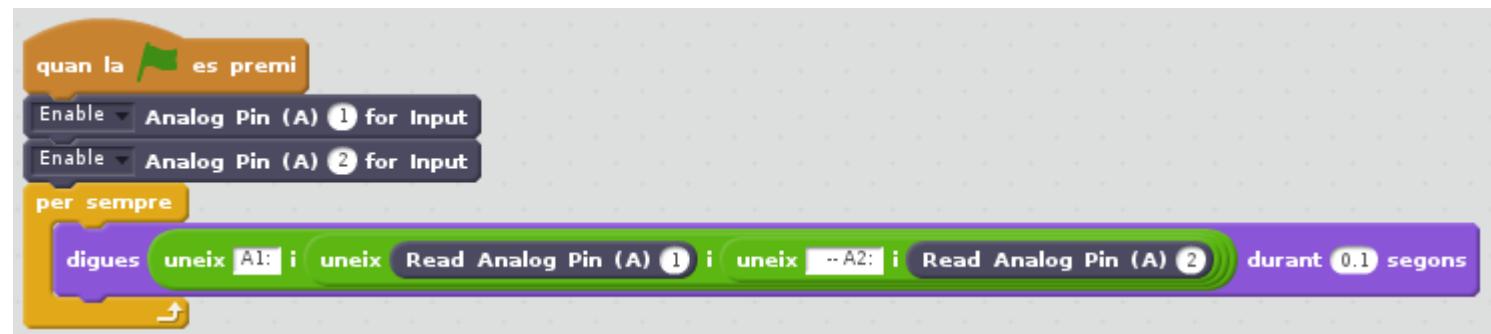
Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

Ús del joystick



sc2_prova08_JoystickA1A2.sb2

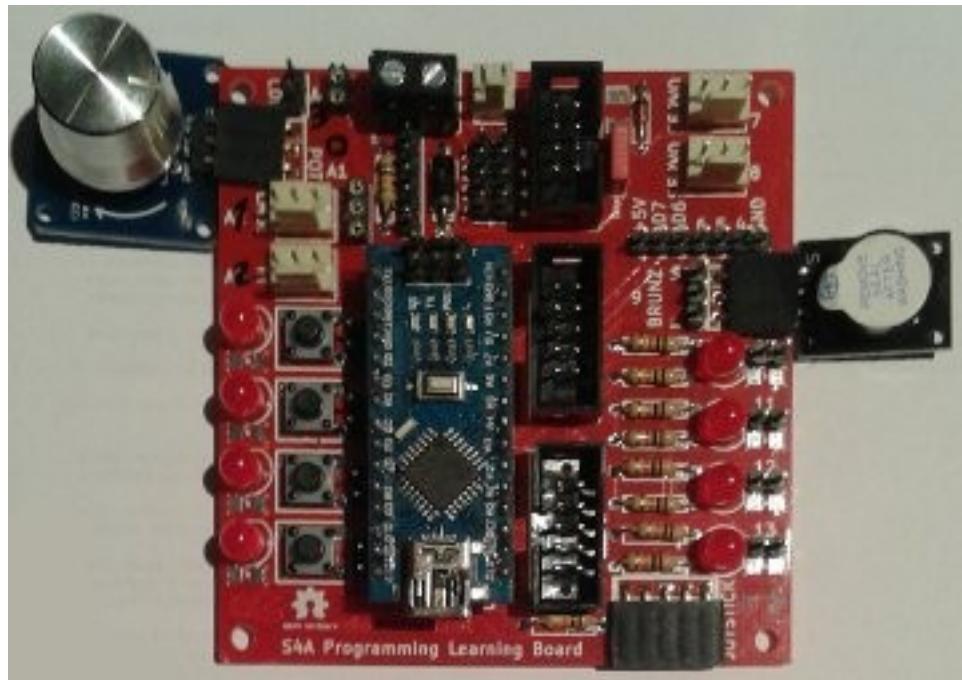


<http://binefa.cat/php/training/s4a/codi.tar.gz>

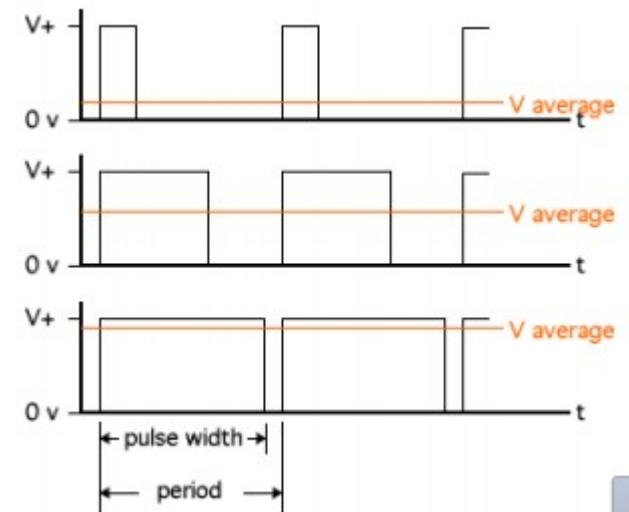
Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

sc2_prova09_potA1brunz.sb2



9



Tecnologies creatives a l'aula

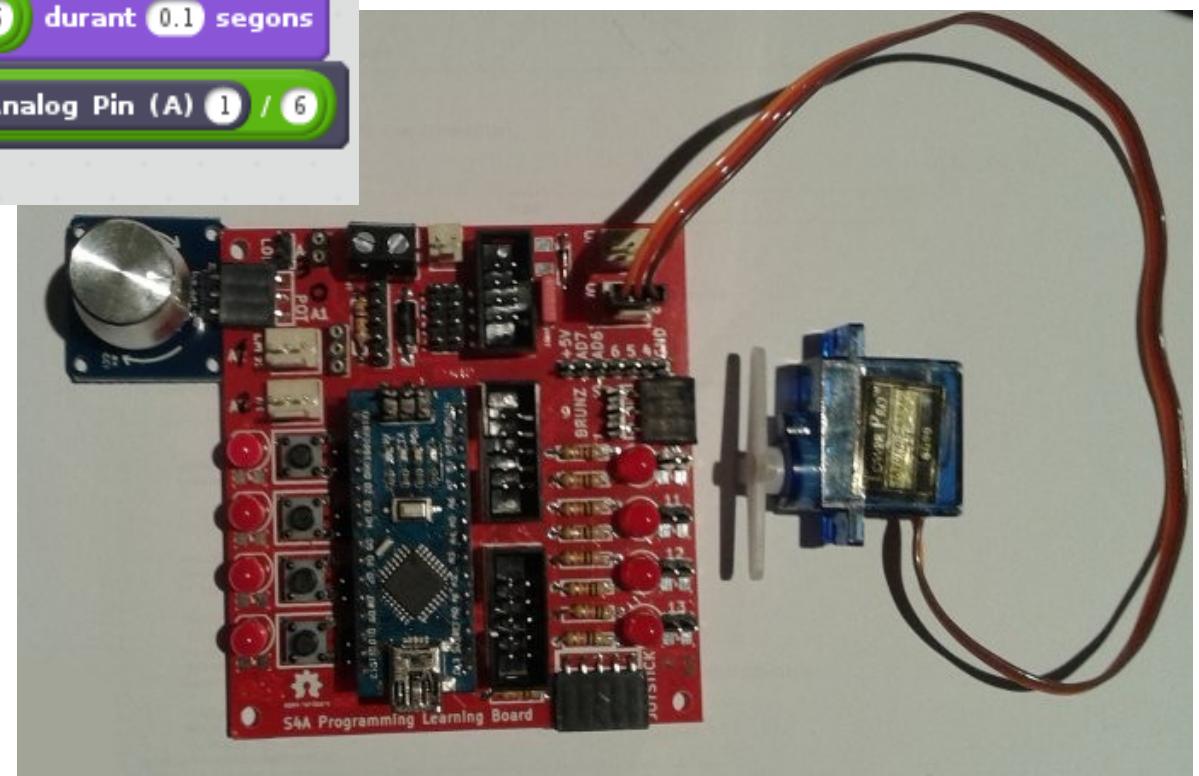
Ús d'Scratch 2.0 offline



sc2_prova10_potA1_servo7.sb2

Ús del servomotor (servo)

Abans de connectar el servo atureu
El programa en Python i l'Scratch.



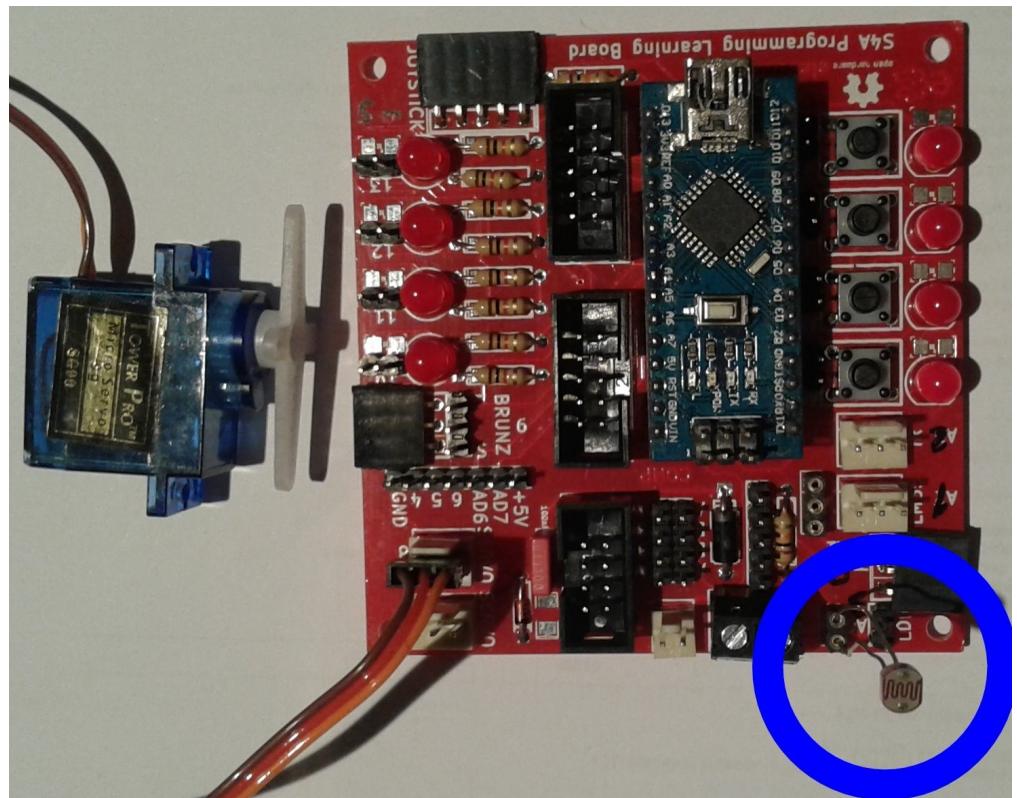
<http://binefa.cat/php/training/s4a/codi.tar.gz>

Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

Ús del fotoresistor (LDR)

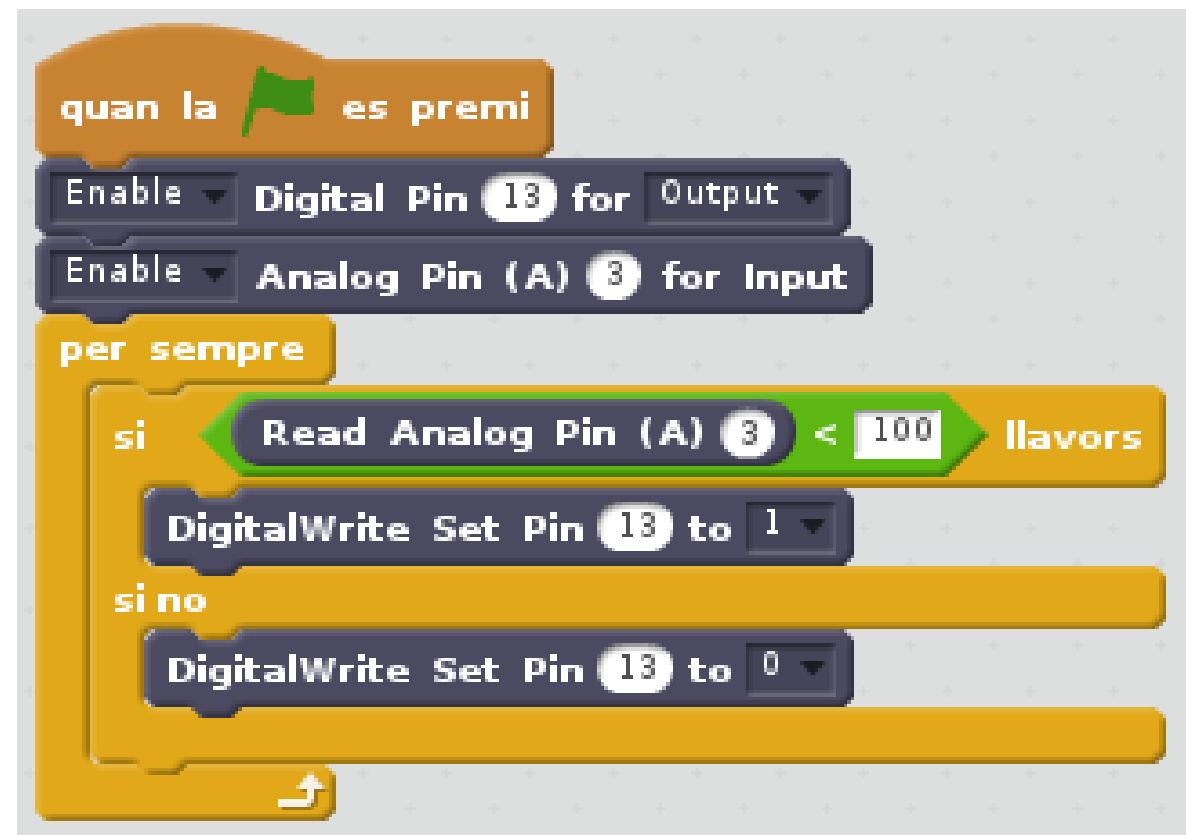
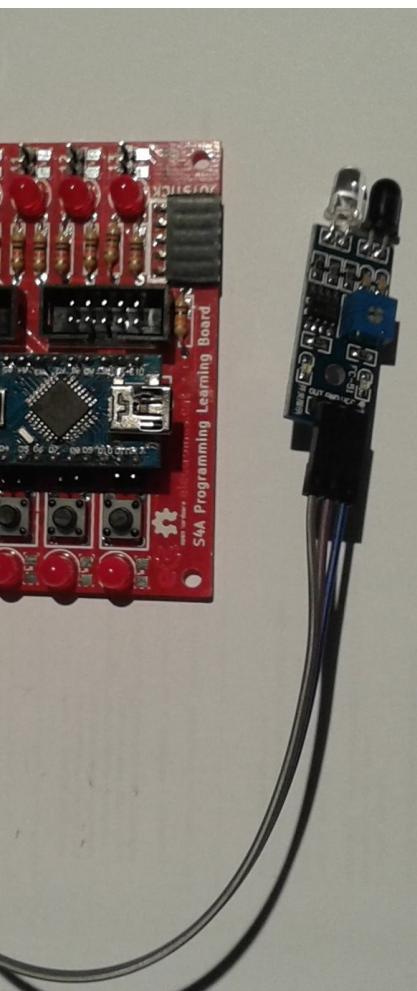
sc2_prova11_IdrA0_servo7.sb2



Tecnologies creatives a l'aula

Ús d'Scratch 2.0 offline

sc2_prova12irRelay.sb2

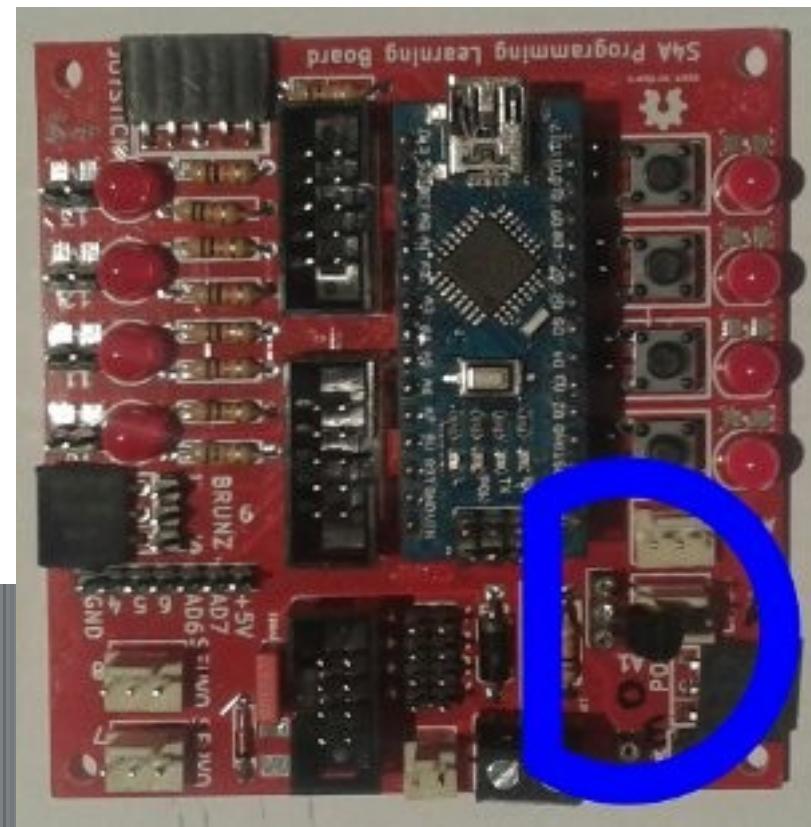
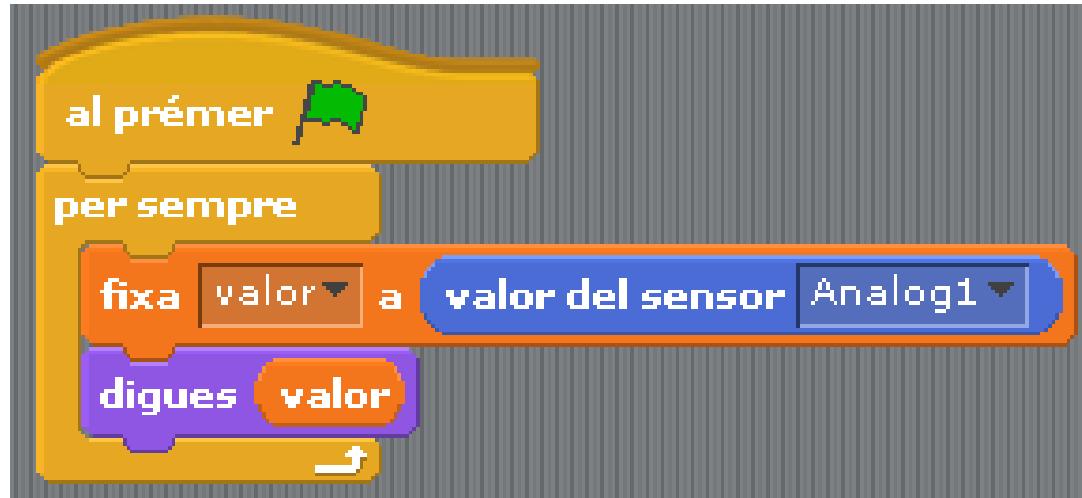


<http://binefa.cat/php/training/s4a/codi.tar.gz>

Tecnologies creatives a l'aula

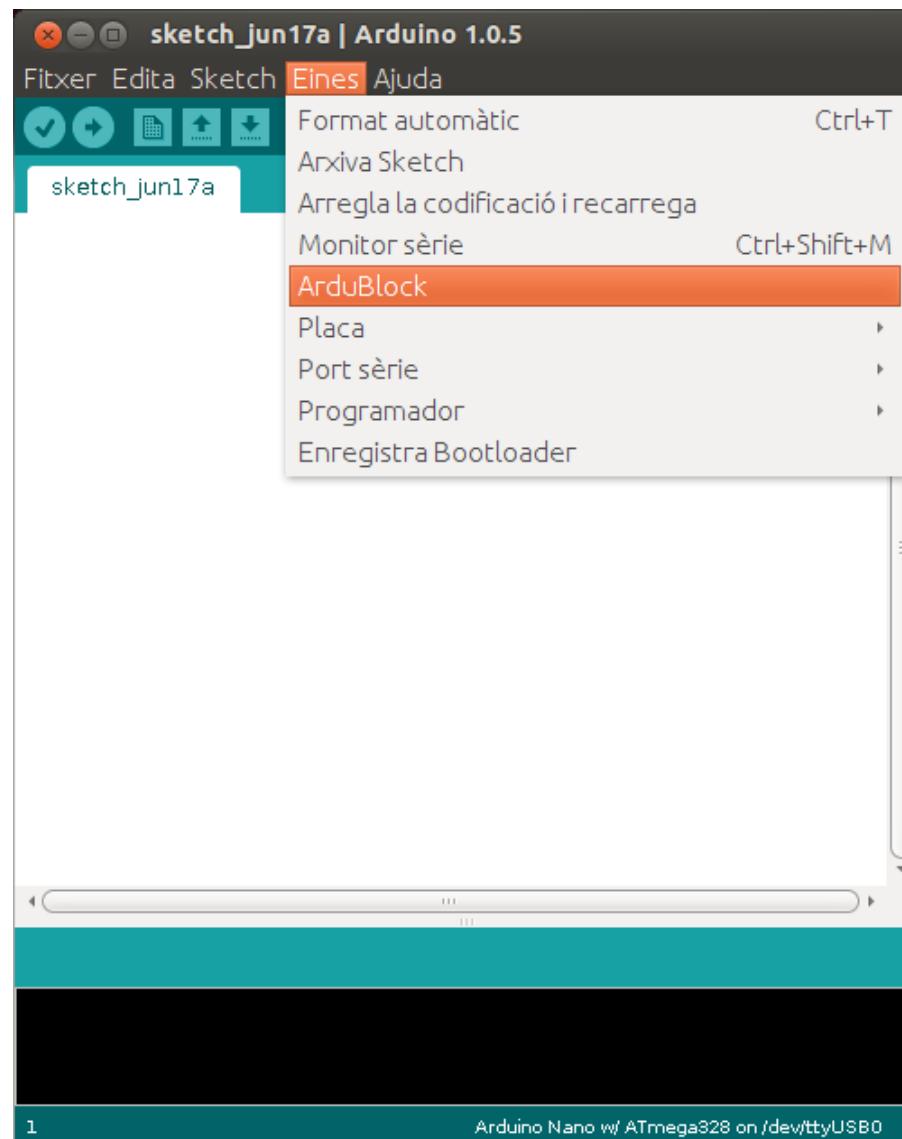
Ús d'Scratch 2.0 offline

Exercici: Implementeu aquest codi en Scratch 2.0



Tecnologies creatives a l'aula

Ús d'ArduBlock





Tecnologies creatives a l'aula

pr00.abp - Sortides digitals

ArduBlock pr00.abp *

Save load Upload

Control Pins Number/Constants Operators Utilities TinkerKit Blocks DFRobot Seeedstudio Grove

loop

```

do
    set digital pin # 13 HIGH
    Serial.println LED ON
    delay milliseconds 1000
    set digital pin # 13 LOW
    Serial.println LED OFF
    delay milliseconds 1000
  loop

```

sketch_jun17a | Arduino 1.0.5

Fitxer Edita Sketch Eines Ajuda

Format automàtic Arxiva Sketch Arregla la codificació i recarrega

Monitor sèrie Ctrl+Shift+M

ArduBlock Placa Port sèrie Programador Enregistra Bootloader

void setup()
{
Serial.begin(9600);
pinMode(13 , OUTPUT);
}

void loop()
{
digitalWrite(13 , HIGH);
Serial.print("LED ON");
Serial.println("");
delay(1000);
digitalWrite(13 , LOW);
Serial.print("LED OFF");
Serial.println("");
delay(1000);
}

/dev/ttyUSB0

Envia

LED OFF
LED ON
LED OFF

Desplaçament automàtic Sense s

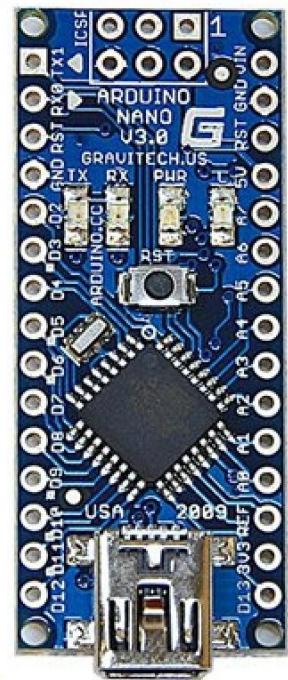
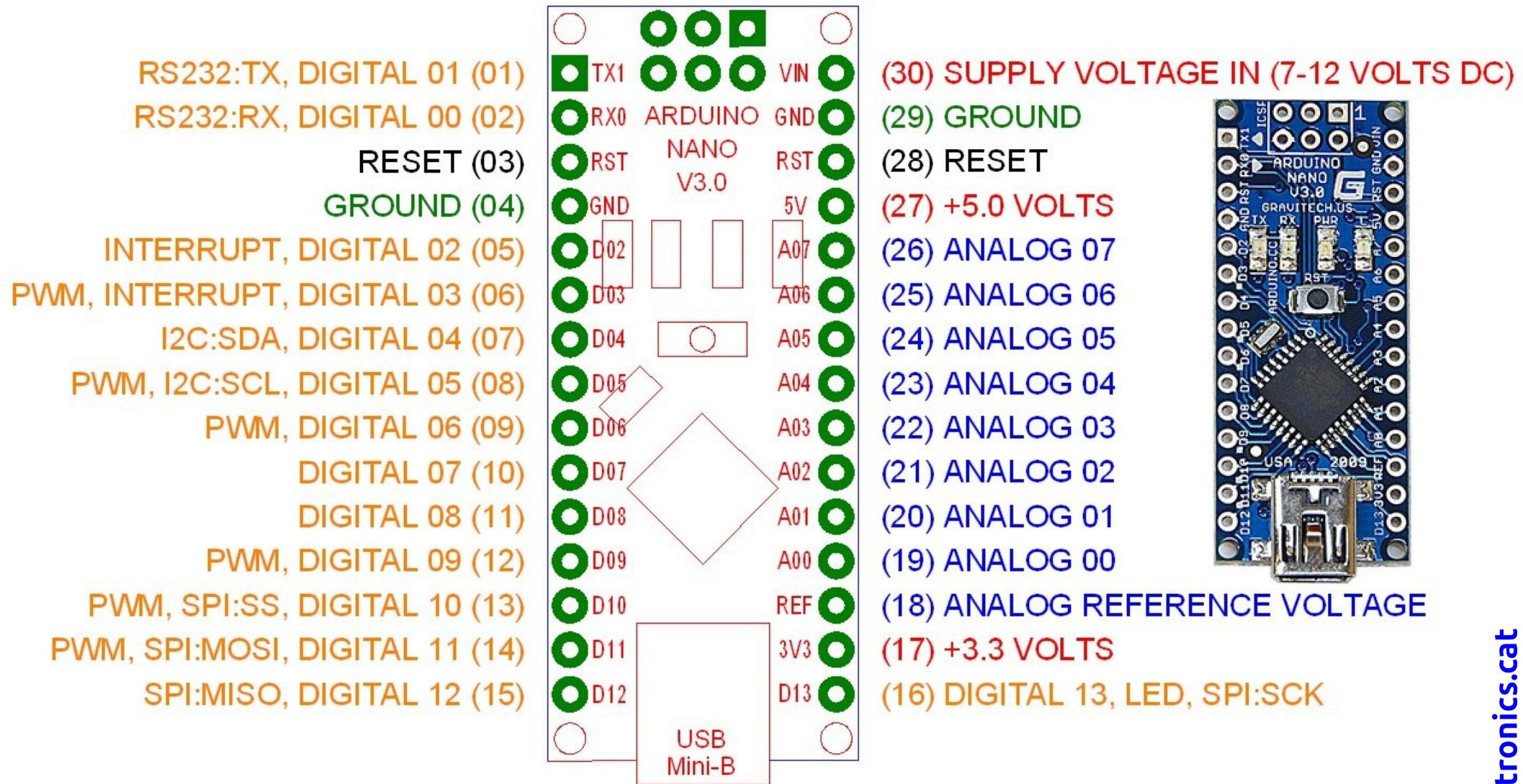


<http://www.binefa.cat/php/arduino/ardublock/pr00.abp>

electronics.cat

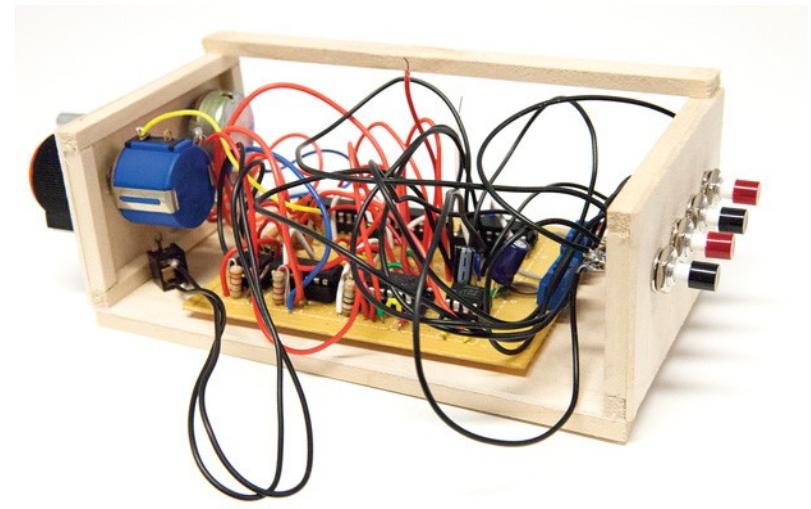
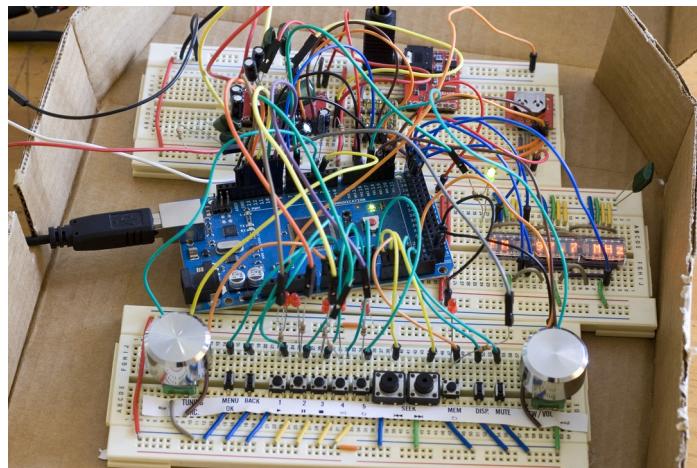
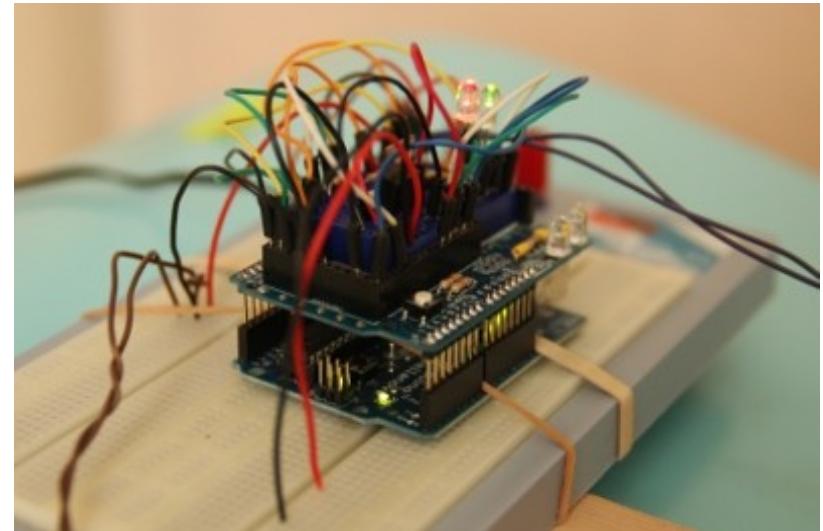
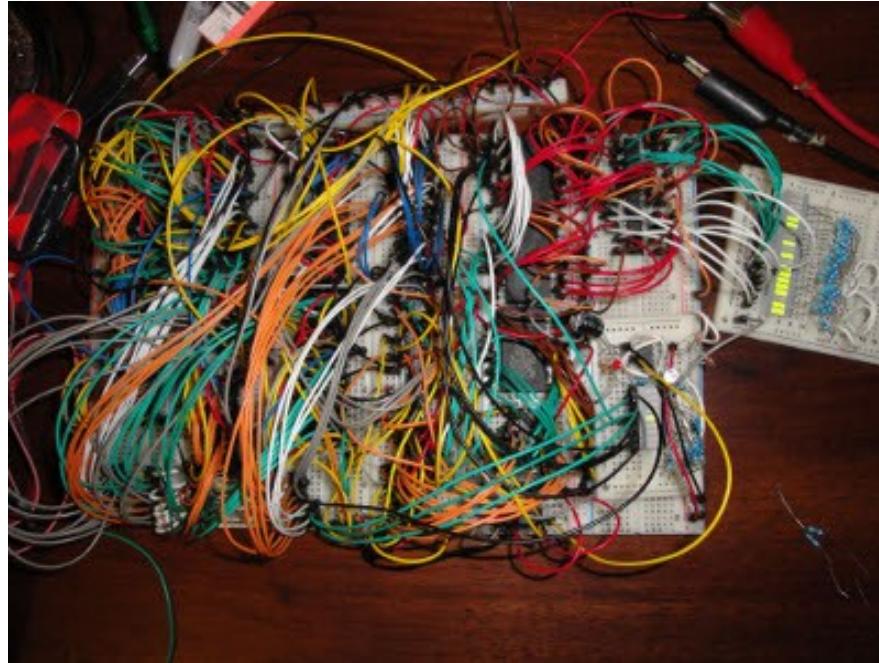
Tecnologies creatives a l'aula

Arduino Nano



Tecnologies creatives a l'aula

Inconvenients per a novells, ... i experts



Tecnologies creatives a l'aula

Maquinari orientat a alumne

BUS : Sistema digital que transfereix dades entre dispositius electrònics

GND	b7
b6	b5
b4	b3
b2	b1
b0	+5V

Cable pla
5x2 a 5x2
(0104A)



CTS / RTS

TX / RX

RX / TX

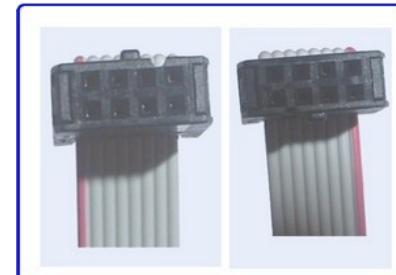
+5V	o	CTS / RTS
	x	
	x	
	o GND	

CTS / RTS

x

x

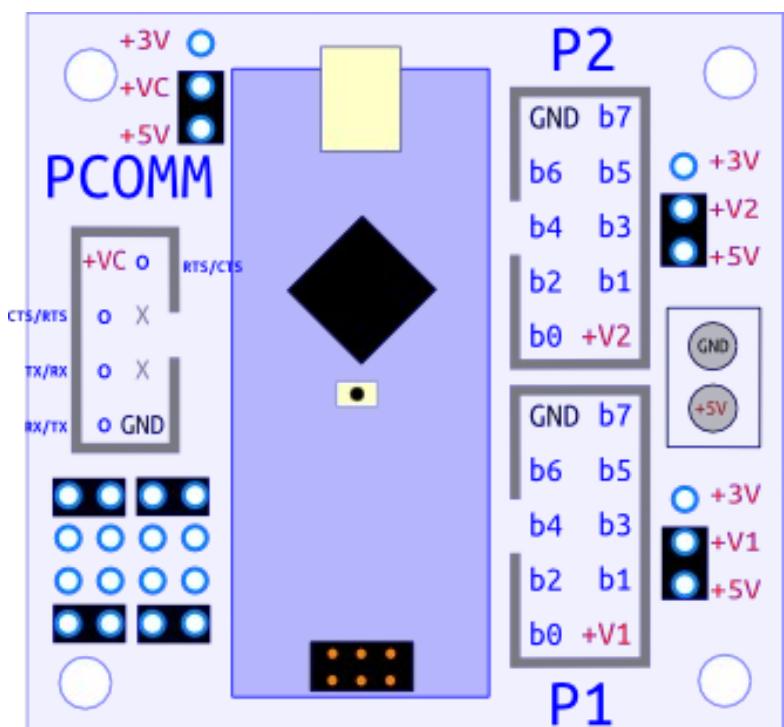
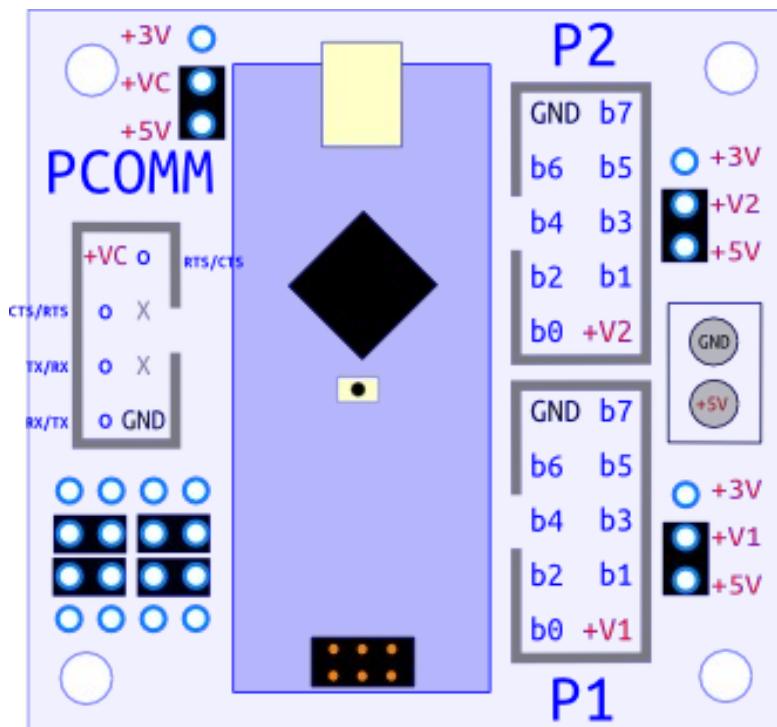
o GND



eCat System : Dos tipologies de BUS, dades (8 bits) i comunicacions

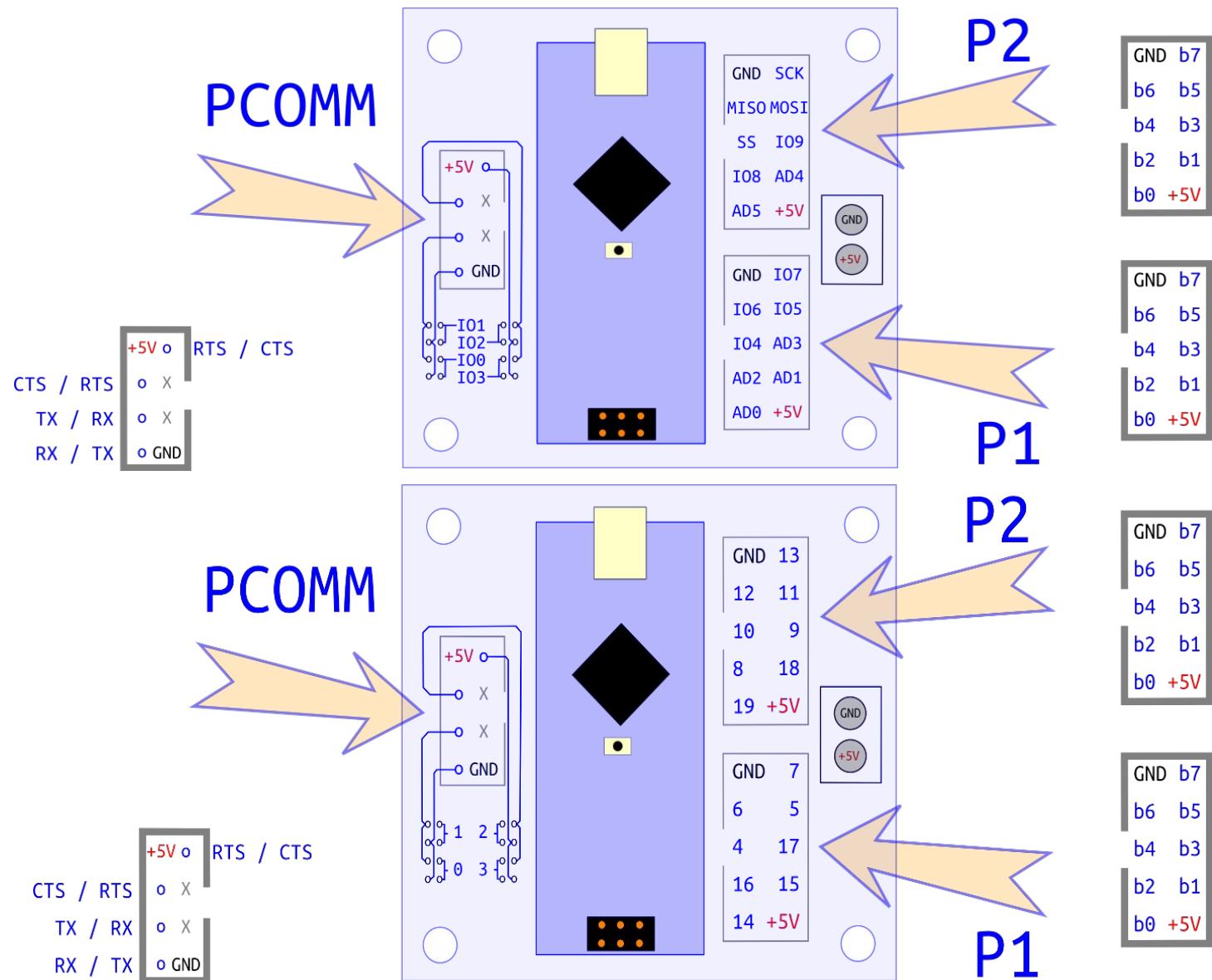
Tecnologies creatives a l'aula

nano-eCat



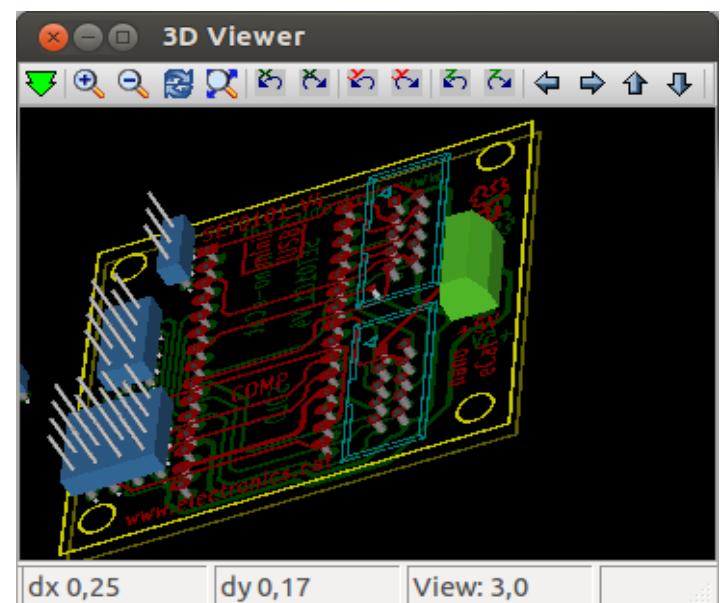
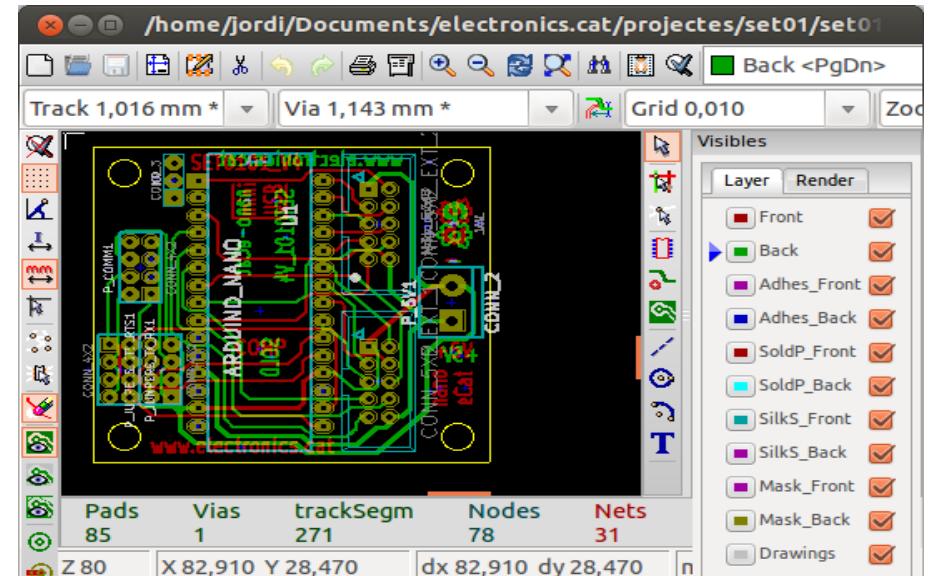
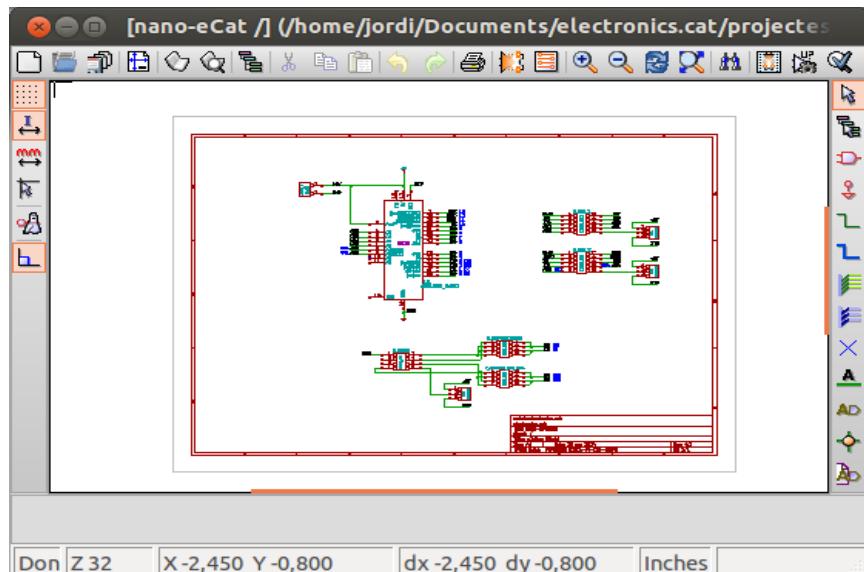
Tecnologies creatives a l'aula

nano-eCat



Tecnologies creatives a l'aula

Maquinari Iliure dissenyat amb KiCad





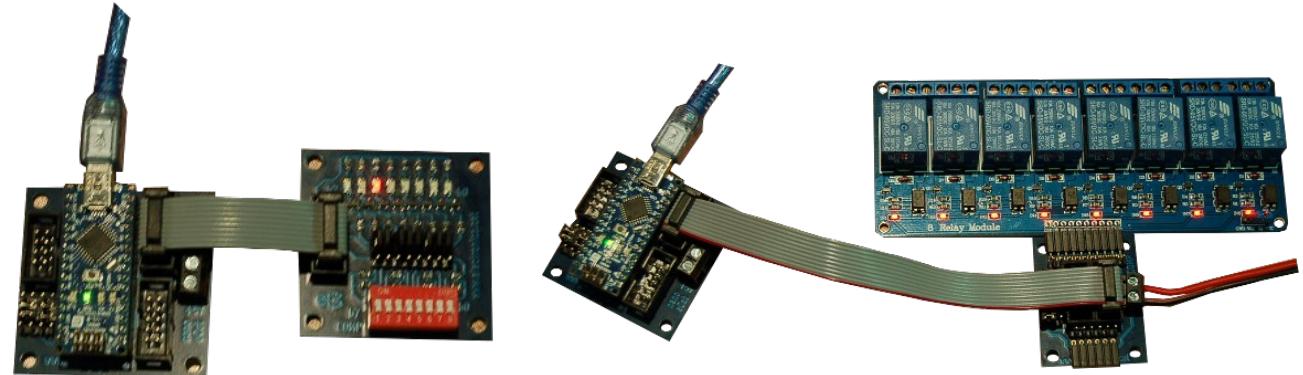
Tecnologies creatives a l'aula

pr00.abp - Sortides digitals

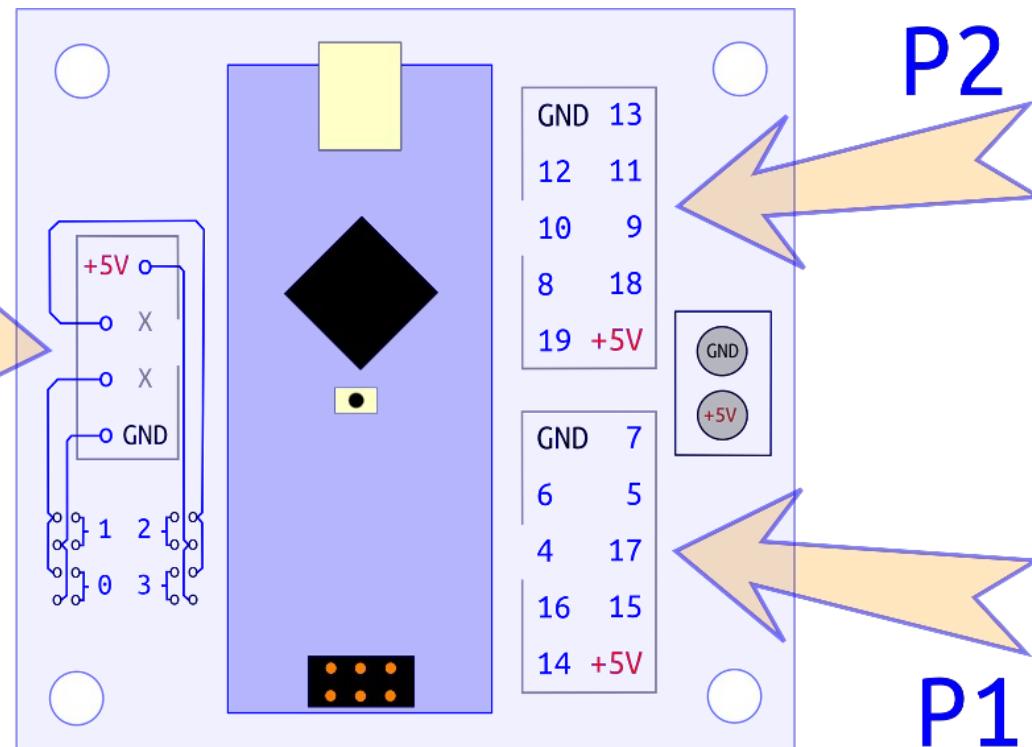
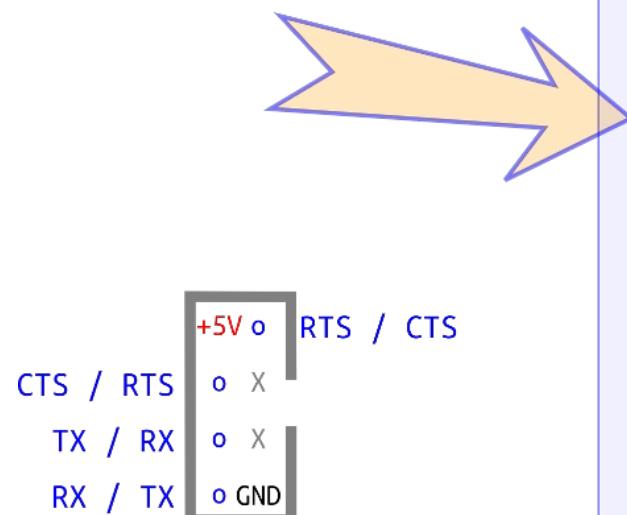
```

do
  set digital pin # 13 HIGH
  Serial println LED ON
  delay milliseconds 1000
  set digital pin # 13 LOW
  Serial println LED OFF
  delay milliseconds 1000
loop

```



PCOMM



GND	b7
b6	b5
b4	b3
b2	b1
b0	+5V

GND	b7
b6	b5
b4	b3
b2	b1
b0	+5V

Technologies creatives a l'aula

minicom -b 9600 -o -D /dev/ttyUSB0

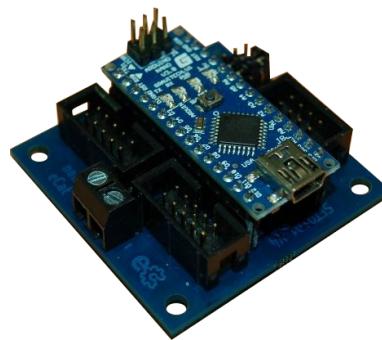
```
jordi@eCat:~/Documents/electronics.cat/projectes/arduino/install/arduino-1.0.5$ minicom -b 9600 -o  
-D /dev/ttyUSB1
```

```
Welcome to minicom 2.5
```

```
OPTIONS: I18n  
Compiled on May 2 2011, 10:05:24.  
Port /dev/ttyUSB1
```

```
Press CTRL-A Z for help on special keys
```

```
LED OFF  
LED ON  
LED OFF
```

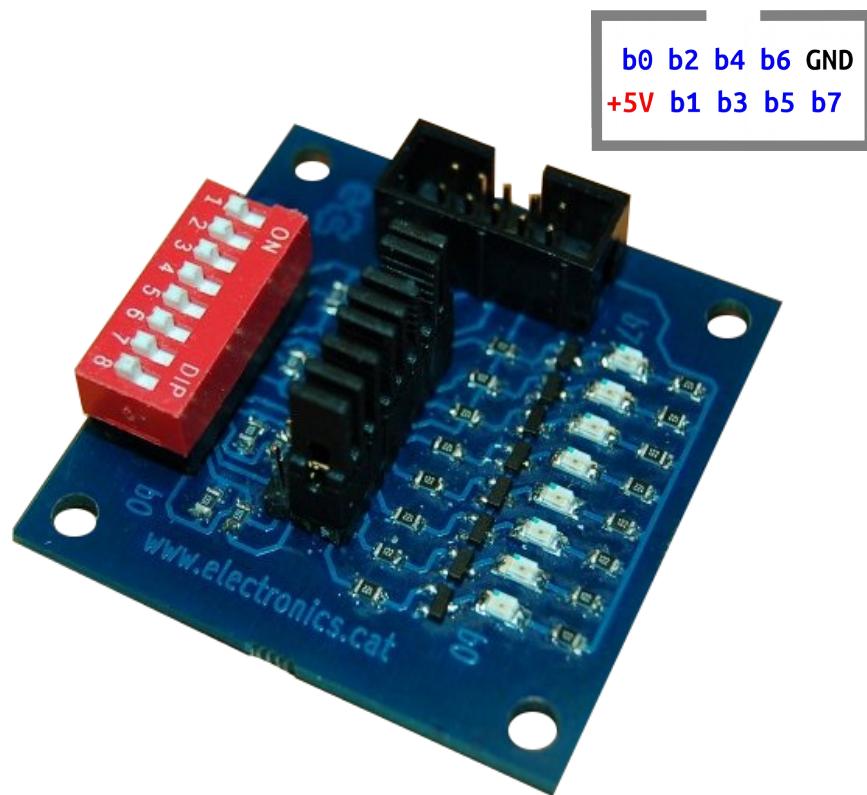


Tecnologies creatives a l'aula

Placa de microruptors i leds

uSW - LEDs

01_04 v3



**Placa configurable
d'entrades / sortides.**

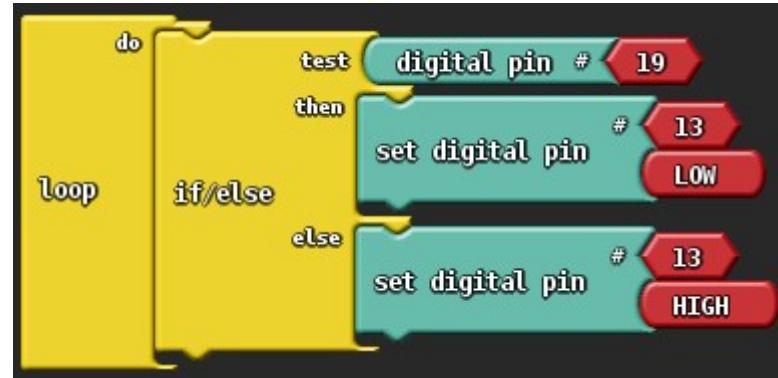
La configuració de cada bit es fa mitjançant un pont (jumper).

Les entrades es fan per microruptor (ON : zero lògic, OFF : u lògic).

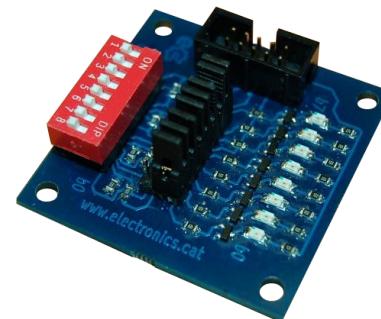
Les sortides es visualitzen mitjançant leds (apagat : zero lògic, encès : u lògic).

Tecnologies creatives a l'aula

pr01.abp - Entrades digitals



A la placa d'entrades i sortides, 01_04 v3, s'ha de configurar el pont del bit 7 de P2 (pin 13 d'Arduino) com a sortida i el bit 0 de P2 (pin 19 d'Arduino) com a entrada.



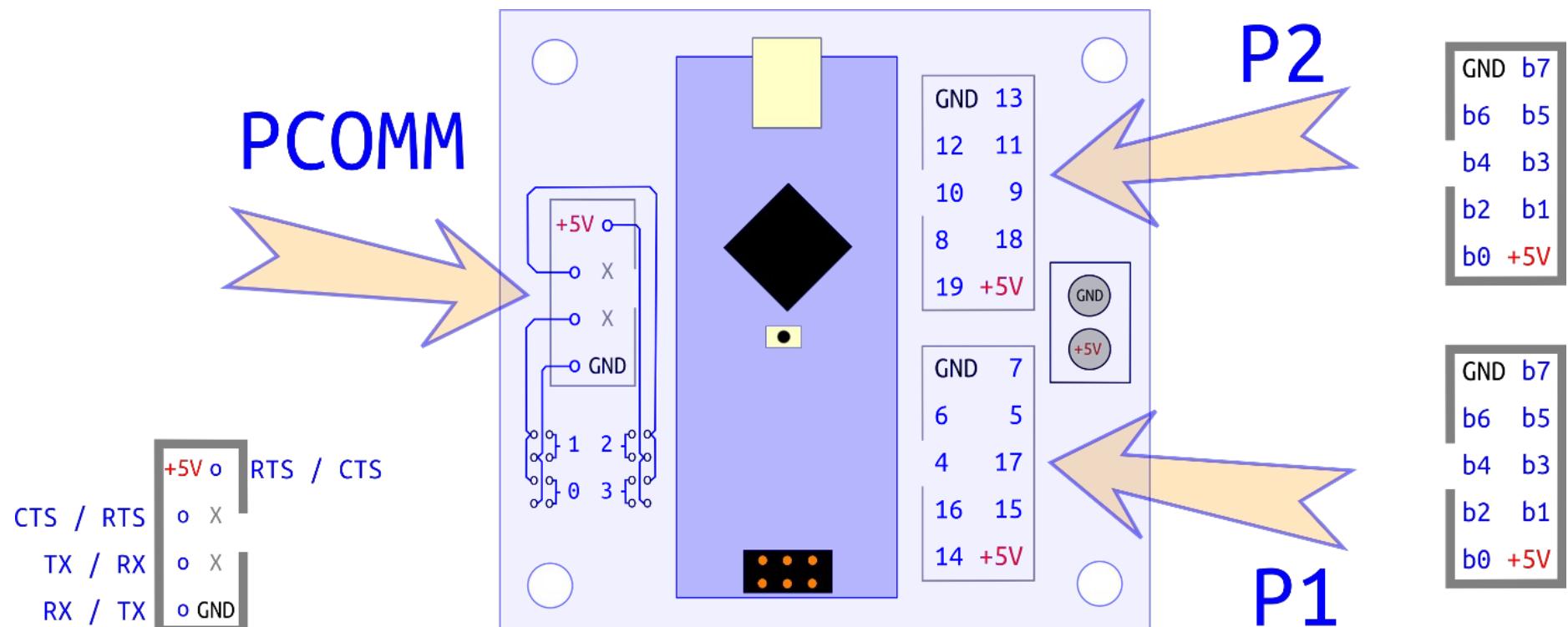
<http://www.binefa.cat/php/arduino/ardublock/pr01.abp>

Tecnologies creatives a l'aula

pr02.abp - Exercici

- Desenvolueu pr02_P2.abp per a crear una seqüència infinita des de b7 a b0 de P2 amb un interval de mig segon (500 ms) :

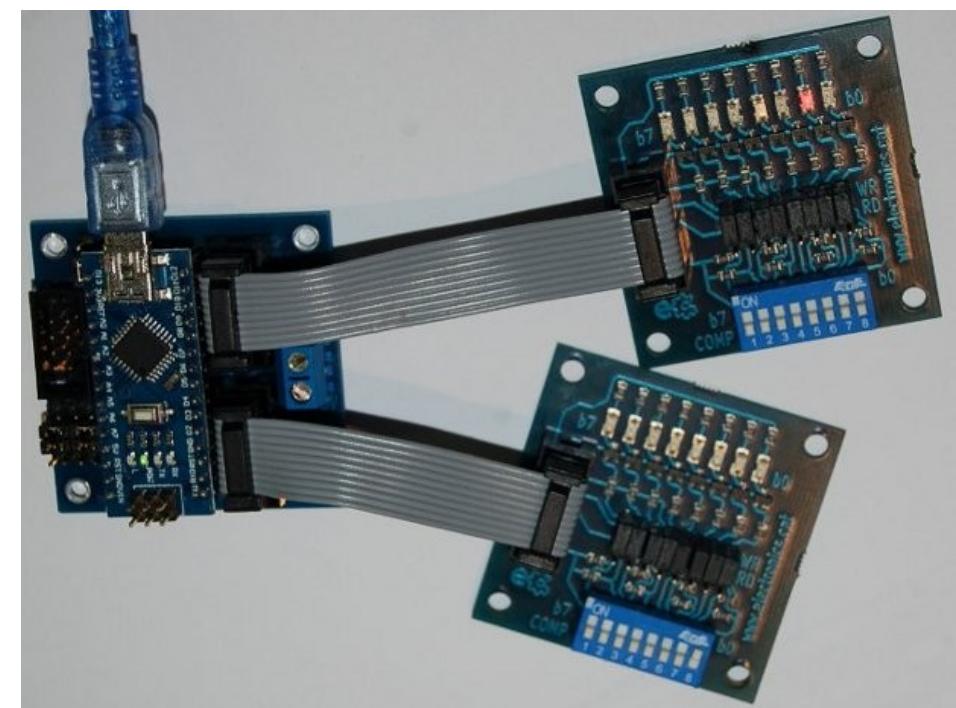
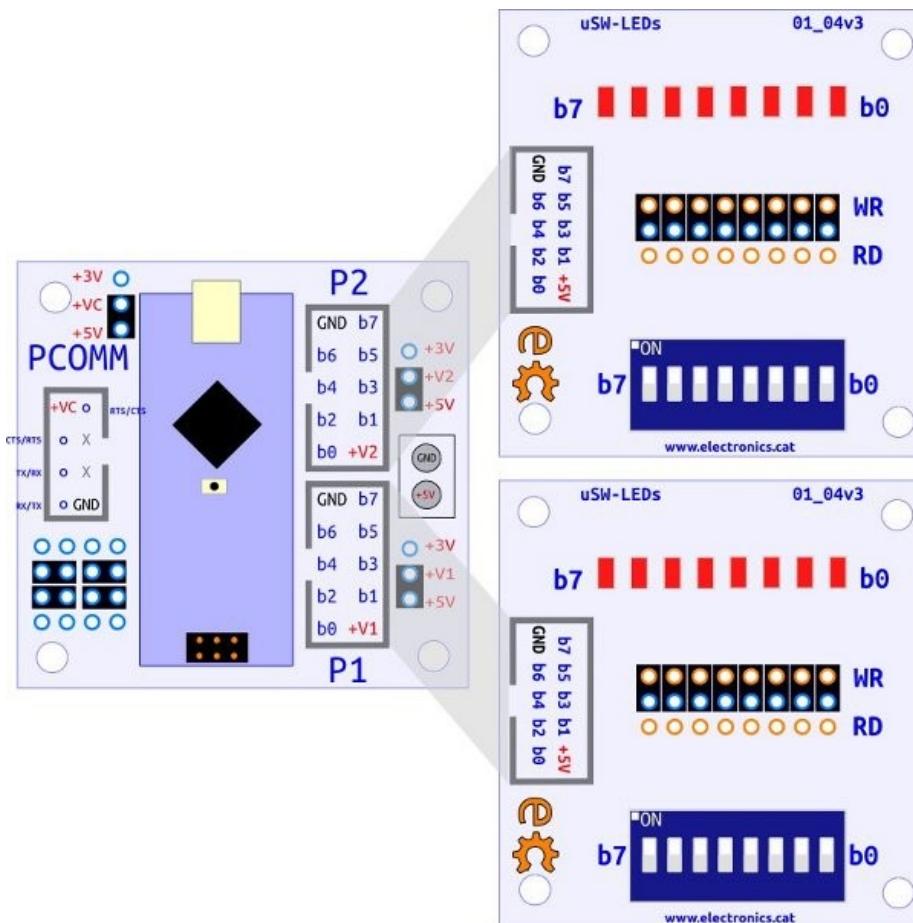
10000000, 00000000, 01000000, 00000000, 00100000, ... , 00000000, 00000001, 00000000



http://www.binefa.cat/php/arduino/ardublock/pr02_P2.abp
http://www.binefa.cat/php/arduino/ardublock/pr02_P1.abp

Tecnologies creatives a l'aula

pr02.abp - Exercici



Vídeo : <https://www.youtube.com/watch?v=efSOm-ZIIq0>

http://www.binefa.cat/php/arduino/ardublock/pr02_P2.abp
http://www.binefa.cat/php/arduino/ardublock/pr02_P1.abp

Tecnologies creatives a l'aula

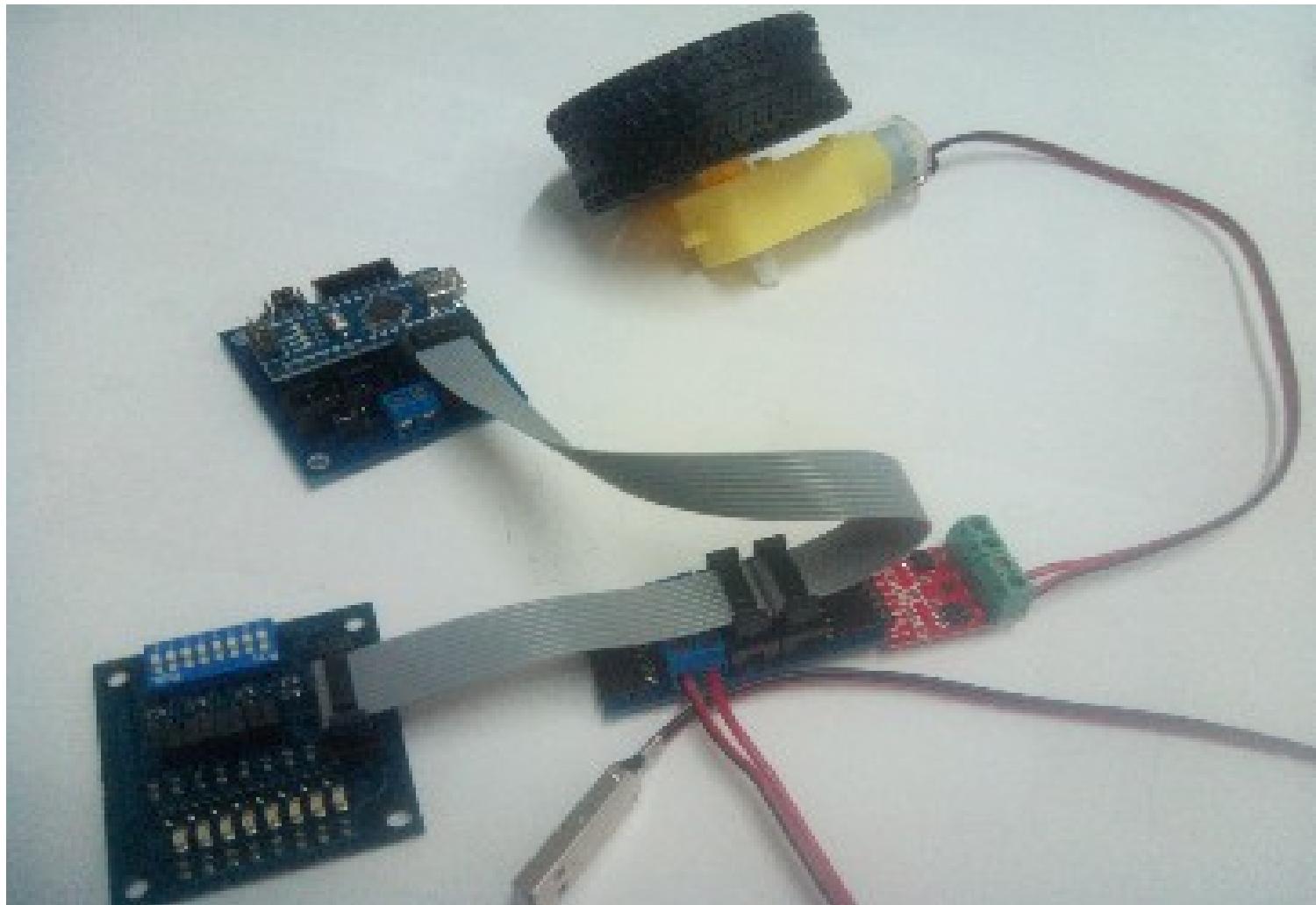
pr02.abp - Exercici



http://www.binefa.cat/php/arduino/ardublock/pr02_P2.abp
http://www.binefa.cat/php/arduino/ardublock/pr02_P1.abp

Tecnologies creatives a l'aula

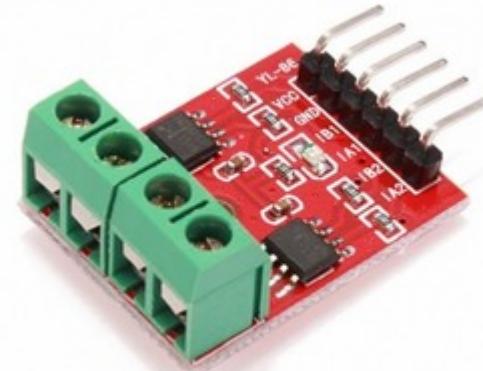
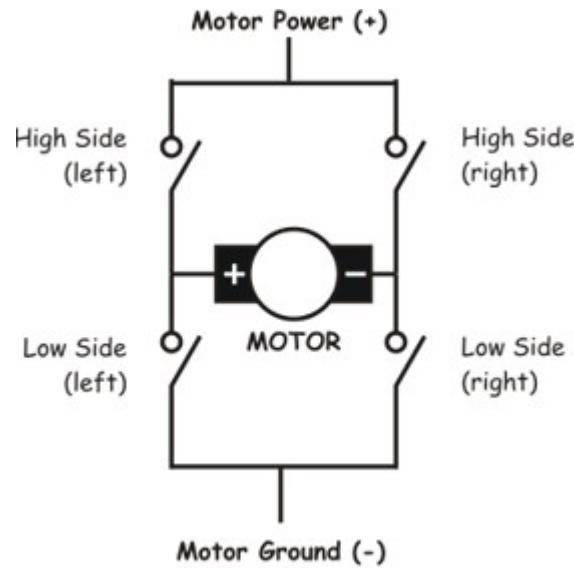
pr02.abp - Exercici



http://www.binefa.cat/php/arduino/ardublock/pr02_P2.abp
http://www.binefa.cat/php/arduino/ardublock/pr02_P1.abp

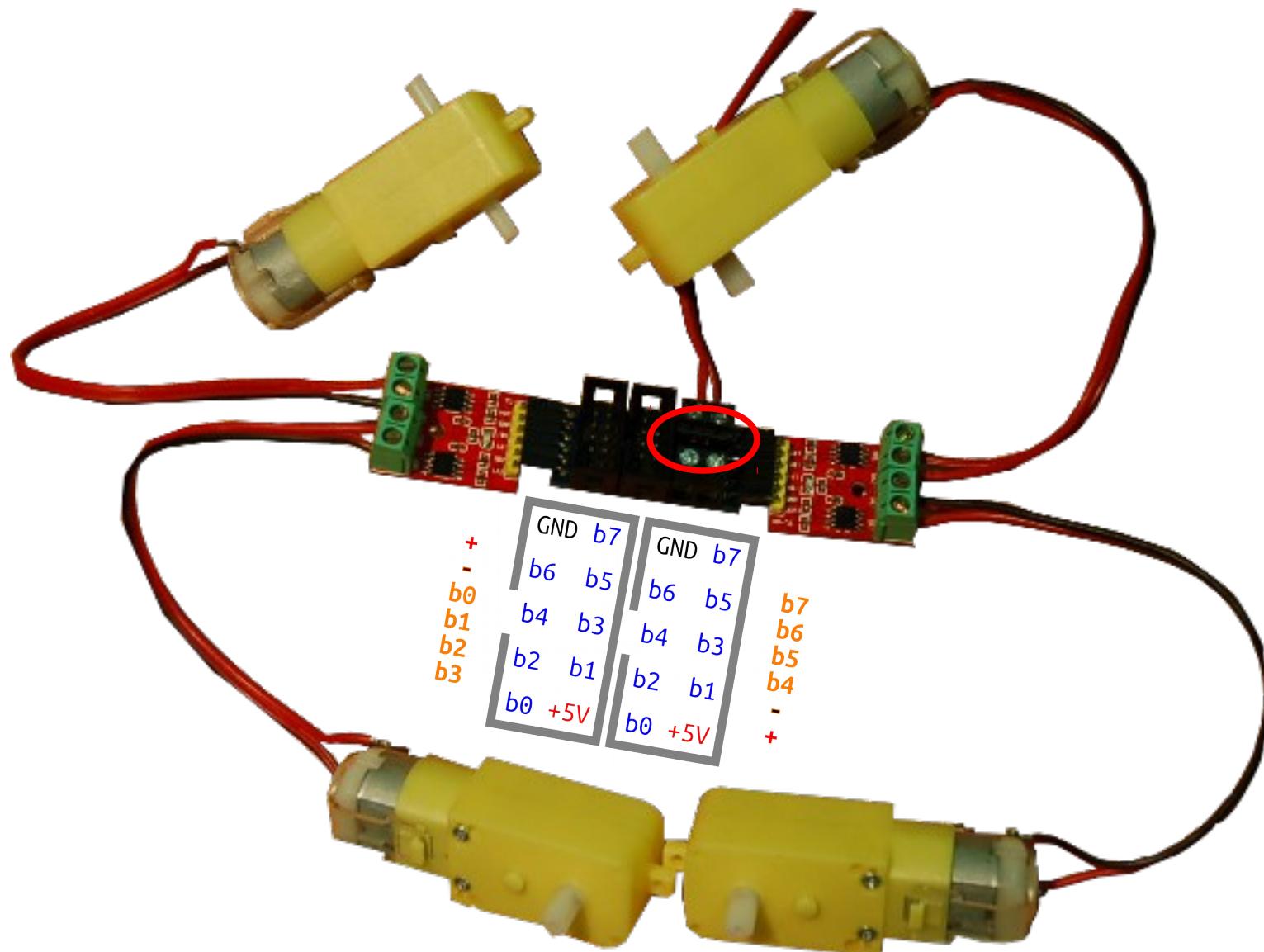
Tecnologies creatives a l'aula

Pont en H



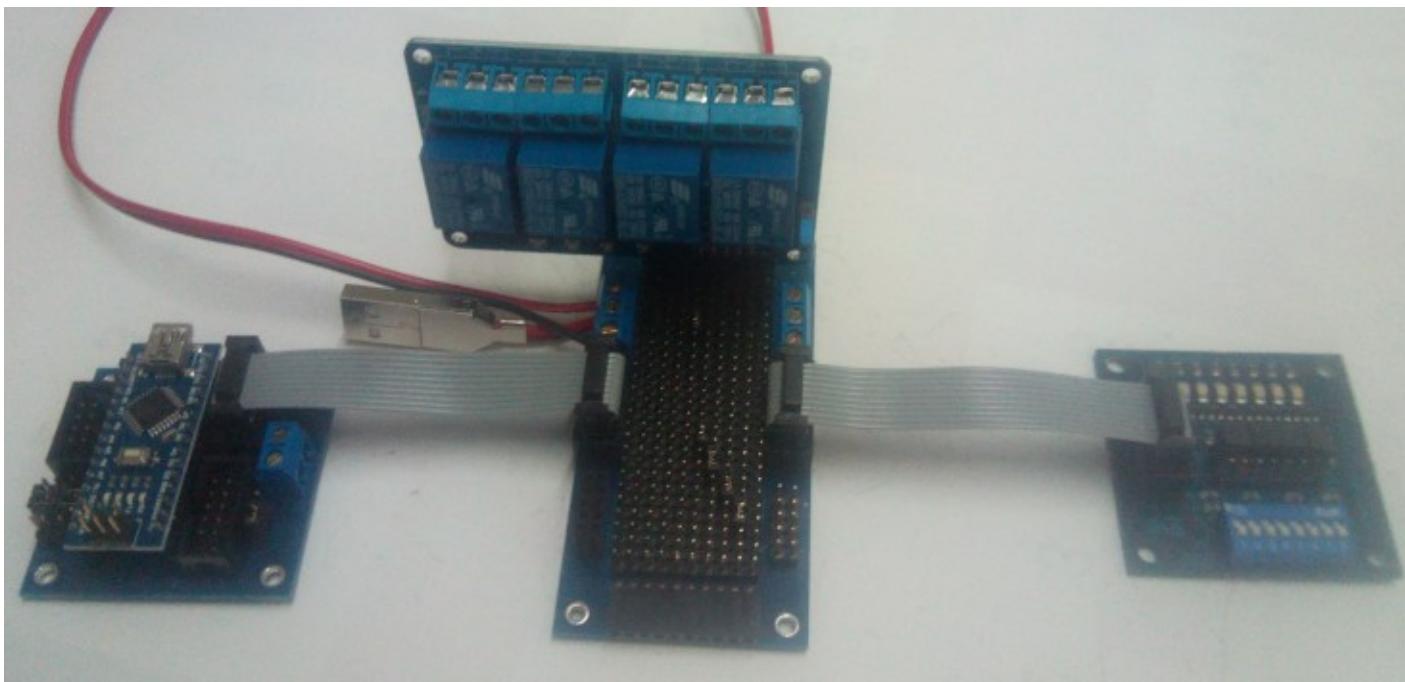
Tecnologies creatives a l'aula

Pont en H



Tecnologies creatives a l'aula

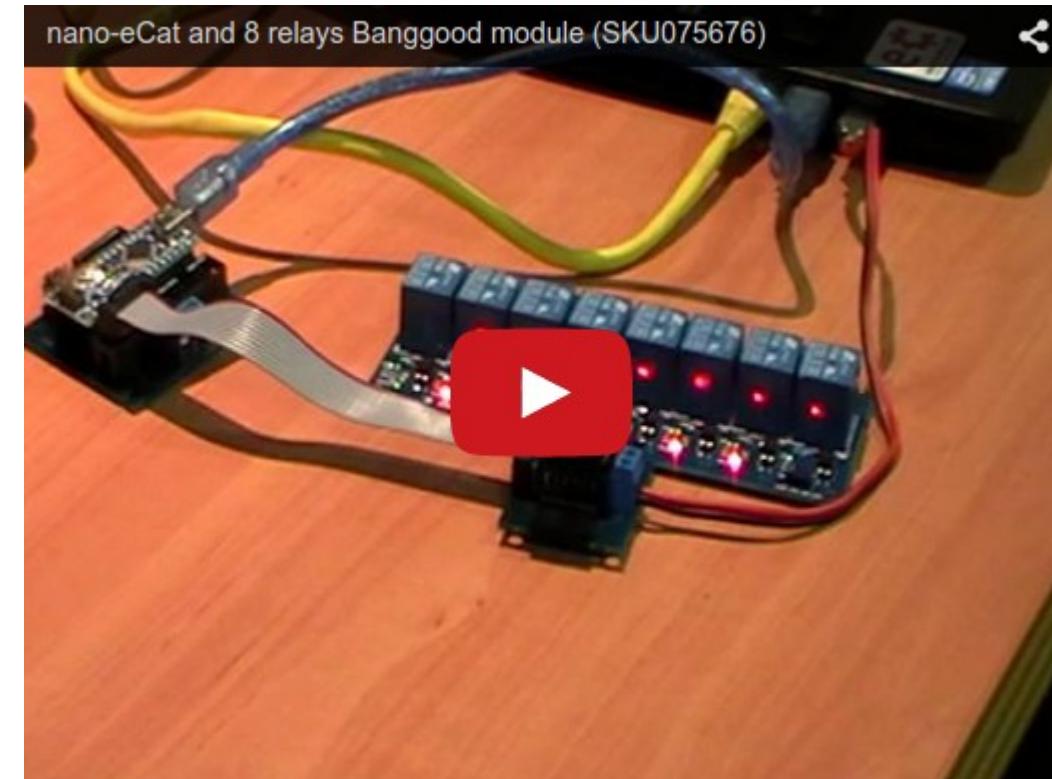
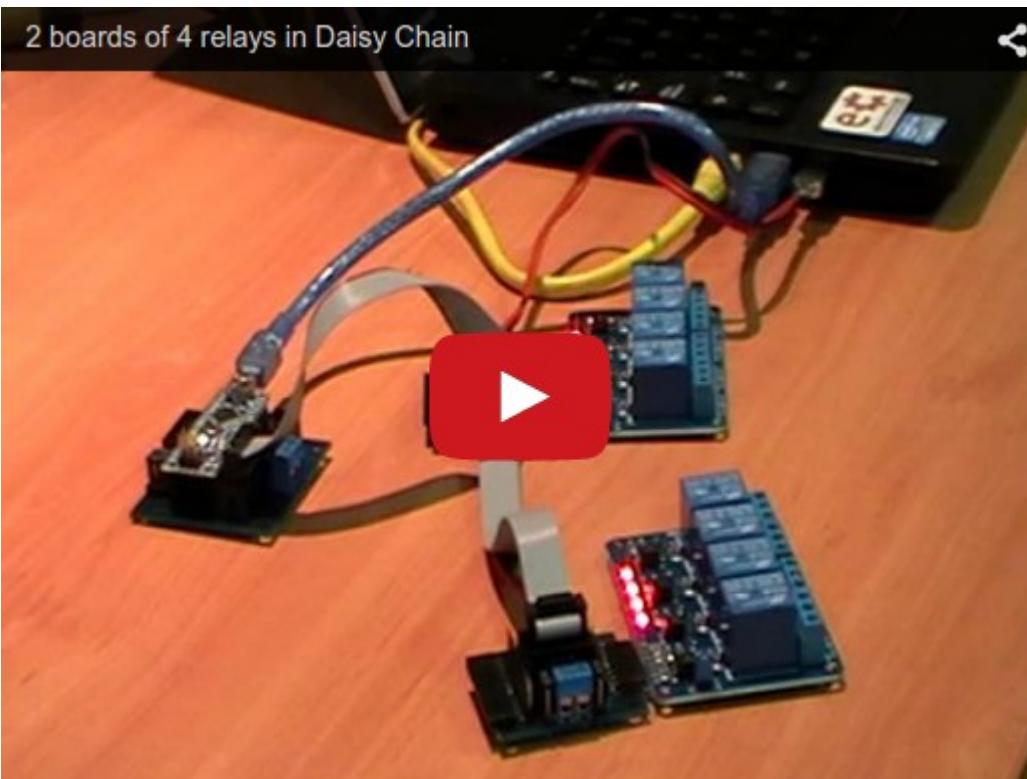
pr02.abp - Exercici



http://www.binefa.cat/php/arduino/ardublock/pr02_P2.abp
http://www.binefa.cat/php/arduino/ardublock/pr02_P1.abp

Tecnologies creatives a l'aula

pr02.abp - Exercici



<http://binefa.cat/blog/>

http://www.binefa.cat/php/arduino/ardublock/pr02_P2.abp
http://www.binefa.cat/php/arduino/ardublock/pr02_P1.abp

Maquinari

Concepte de relé

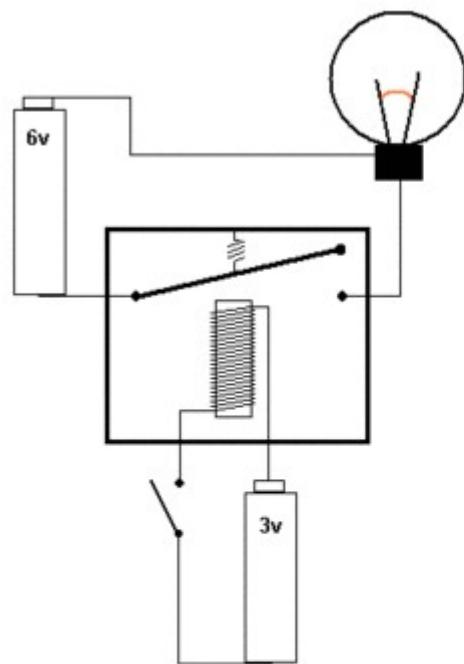


Figure 1: Relay off

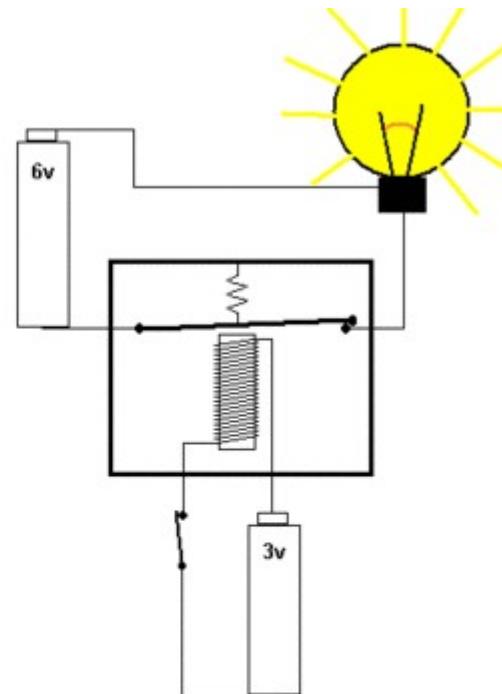
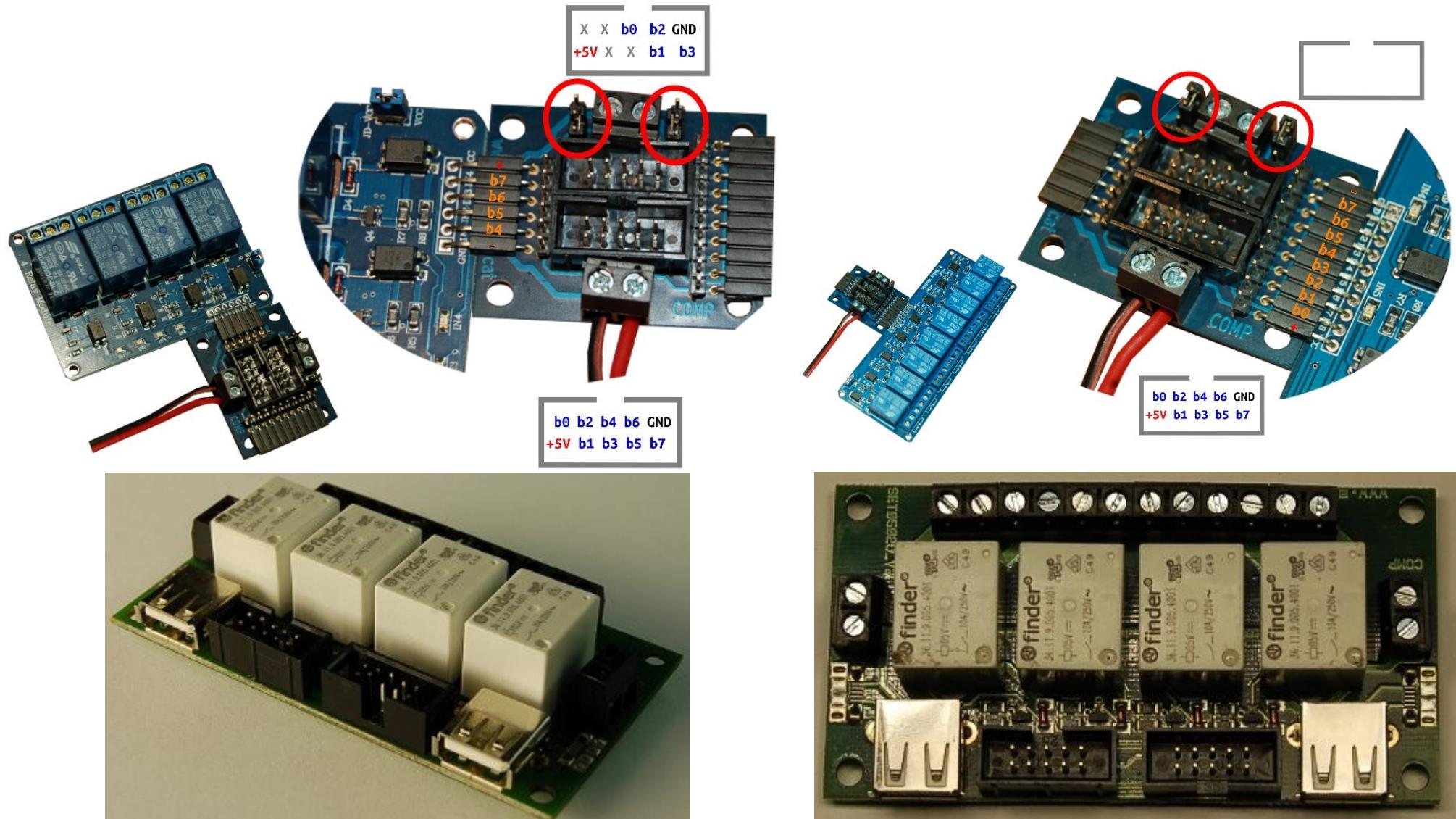


Figure 2: Relay on

Maquinari

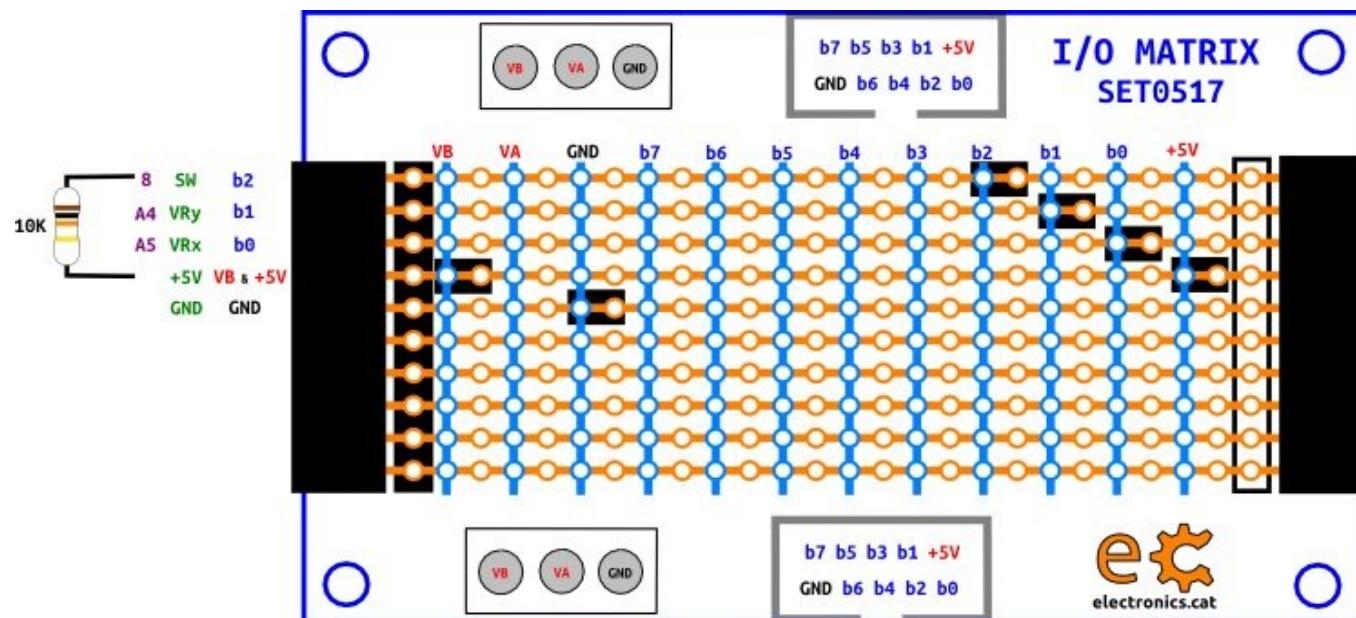
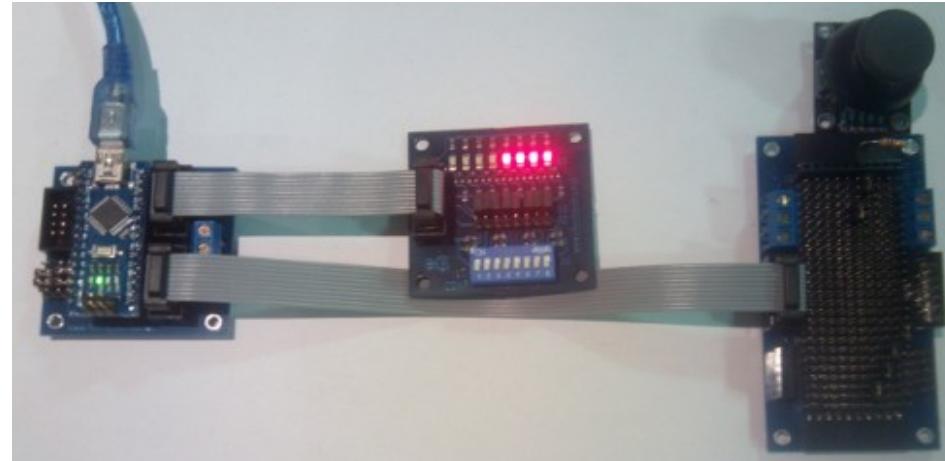
4 Relés - Placa set05_02



<http://electronics.cat/php/common/index.php?lang=ca&page=502>

Tecnologies creatives a l'aula

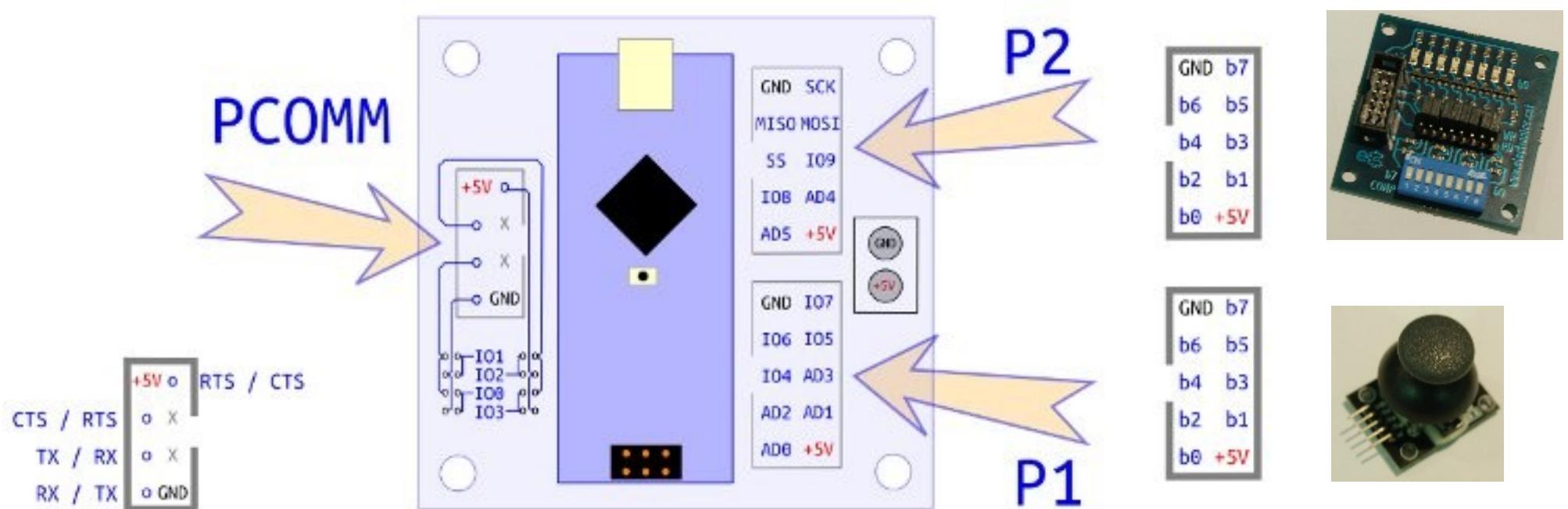
pr03vuMeter.abp - Exercici



<http://www.binefa.cat/php/arduino/ardublock/pr03vuMeter3bits.abp>
<http://www.binefa.cat/php/arduino/ardublock/pr03vuMeter8bits.abp>

Tecnologies creatives a l'aula

pr03vuMeter.app - Exercici



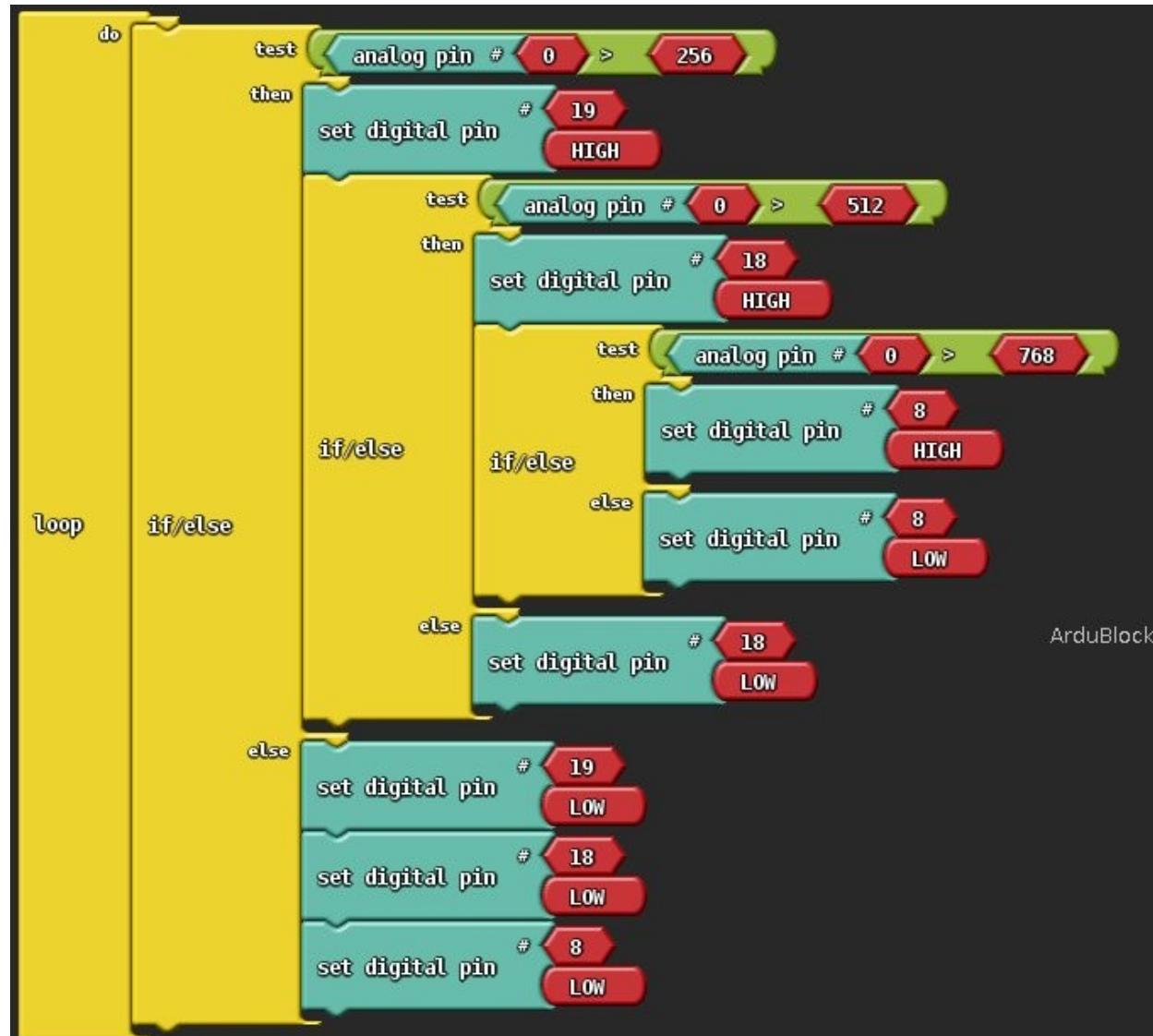
El valor analògic llegit màxim és 1023 i el mínim és 0

<http://www.binefa.cat/php/arduino/ardublock/pr03vuMeter3bits.app>
<http://www.binefa.cat/php/arduino/ardublock/pr03vuMeter8bits.app>



Tecnologies creatives a l'aula

pr03vuMeter3bits.abp - Exercici



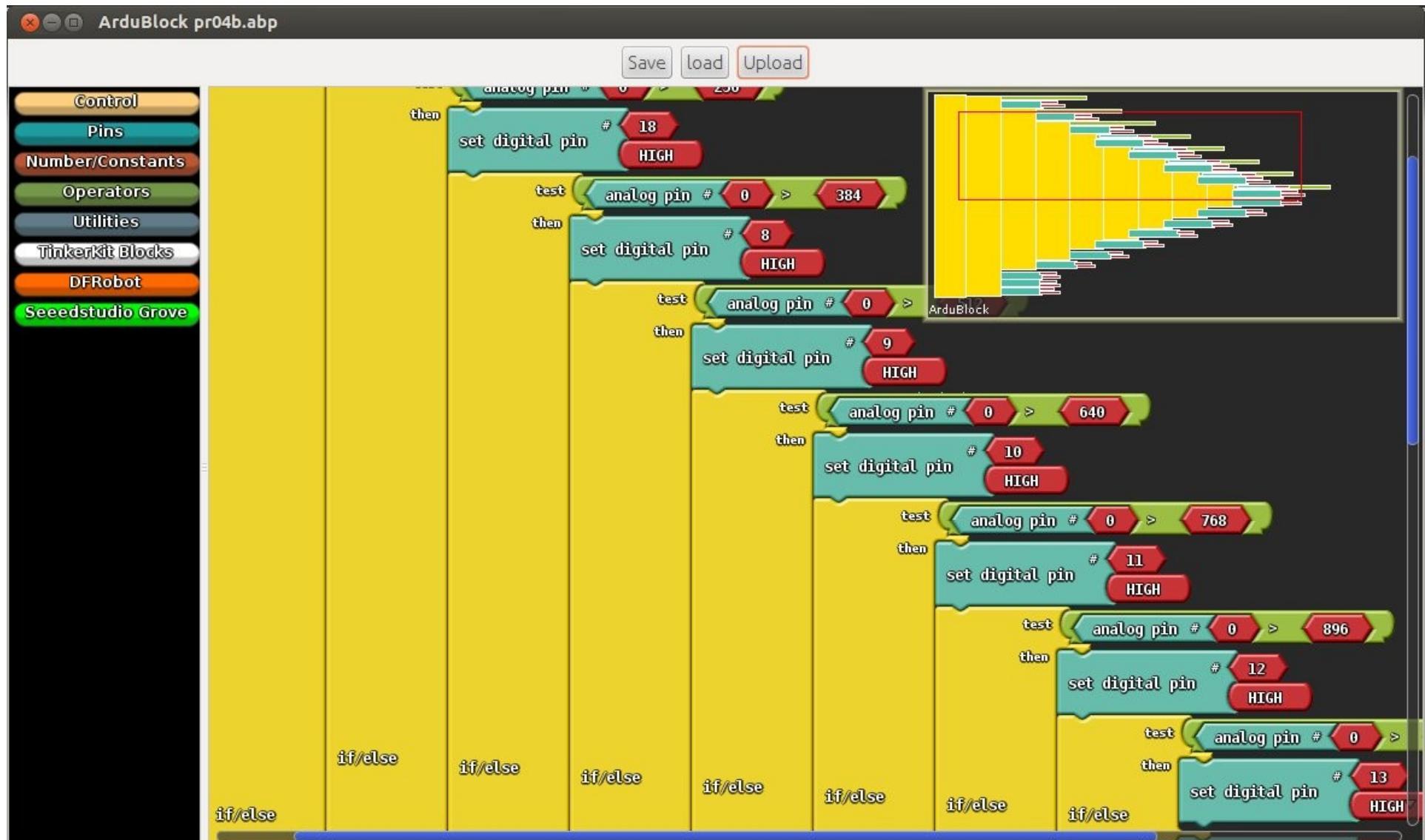
<http://www.binefa.cat/php/arduino/ardublock/pr03vuMeter3bits.abp>

<http://www.binefa.cat/php/arduino/ardublock/pr03vuMeter8bits.abp>



Tecnologies creatives a l'aula

pr03vuMeter8bits.abp - Exercici



<http://www.binefa.cat/php/arduino/ardublock/pr03vuMeter3bits.abp>

<http://www.binefa.cat/php/arduino/ardublock/pr03vuMeter8bits.abp>

Tecnologies creatives a l'aula

KIWIBOT



@_Leantec
@jo_pujol

<http://www.kiwibot.es>

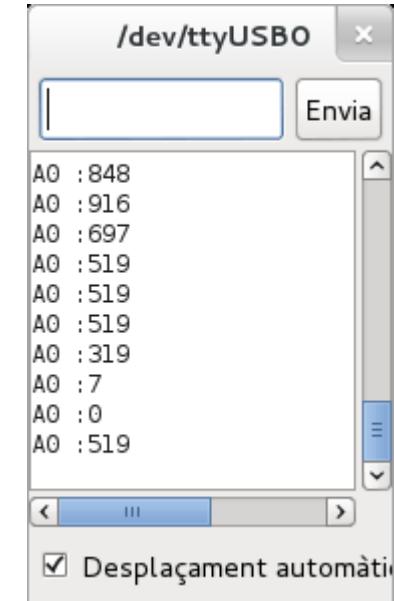


Tecnologies creatives a l'aula

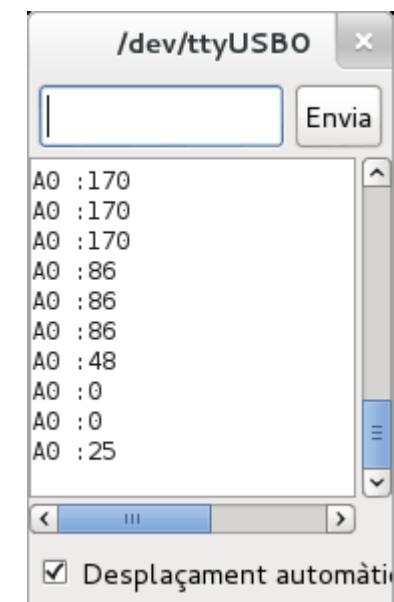
pr04joystick.abp - Exercici



<http://www.binefa.cat/php/arduino/ardublock/pr04joystick.abp>

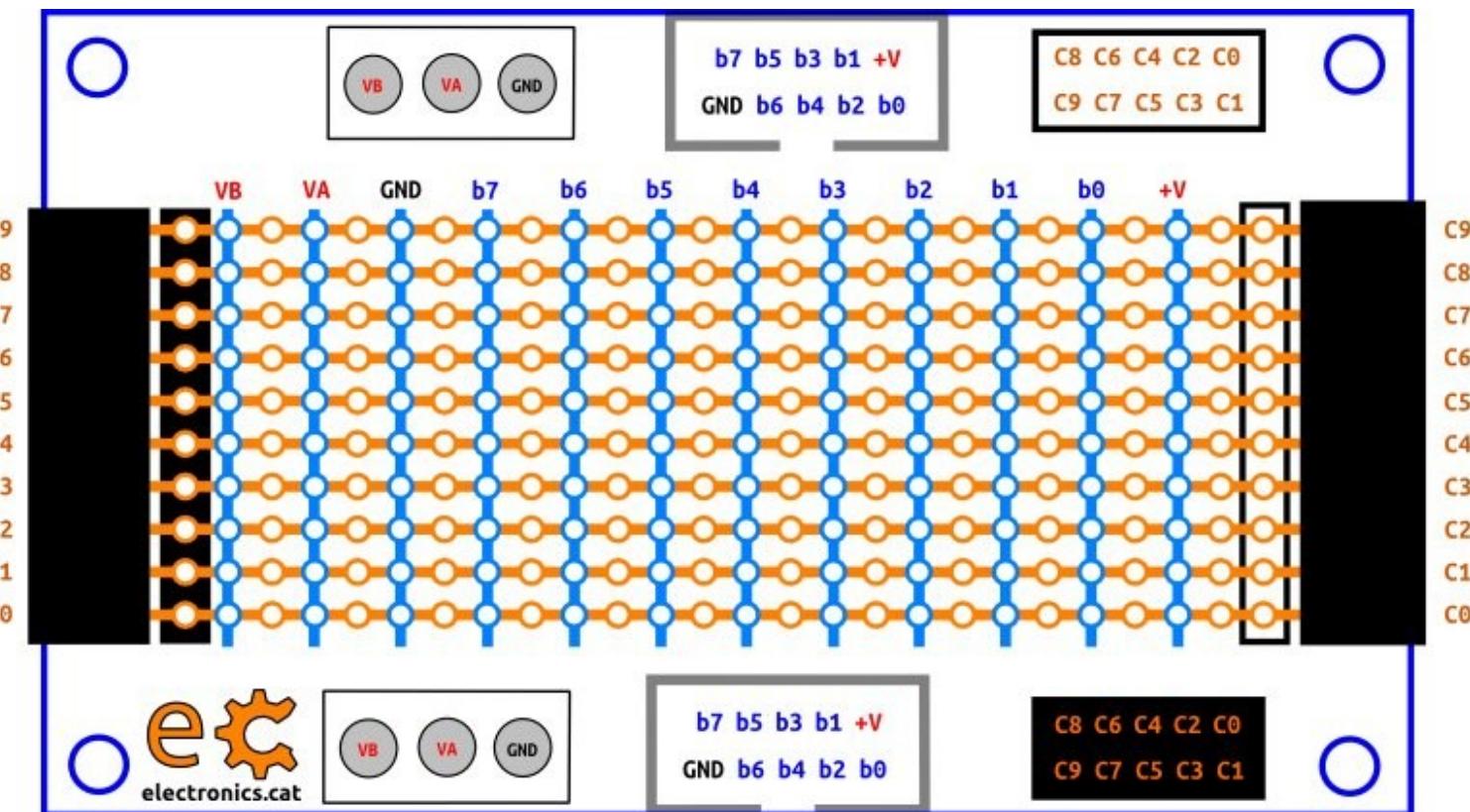


<http://www.binefa.cat/php/arduino/ardublock/pr04joystickB.abp>



Technologies creatives a l'aula

Matriu

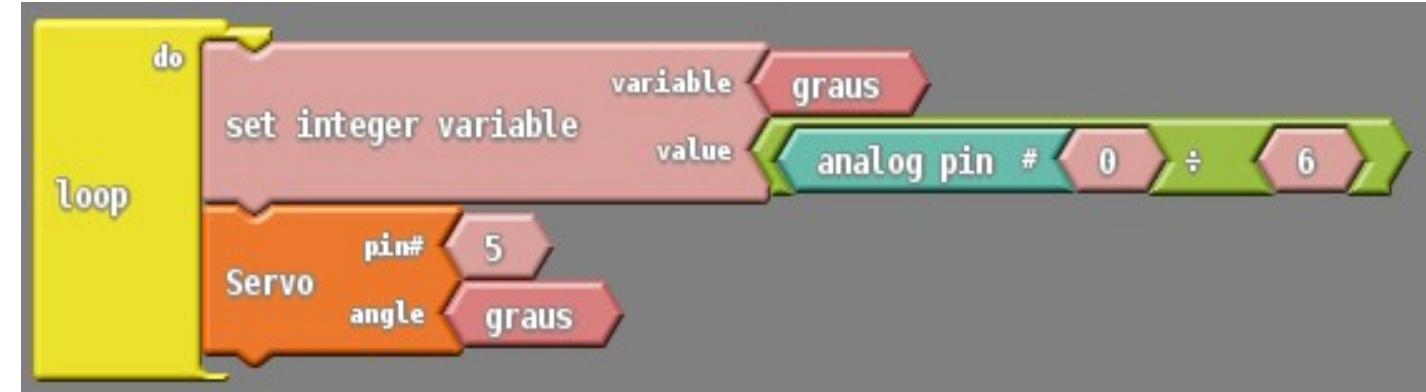
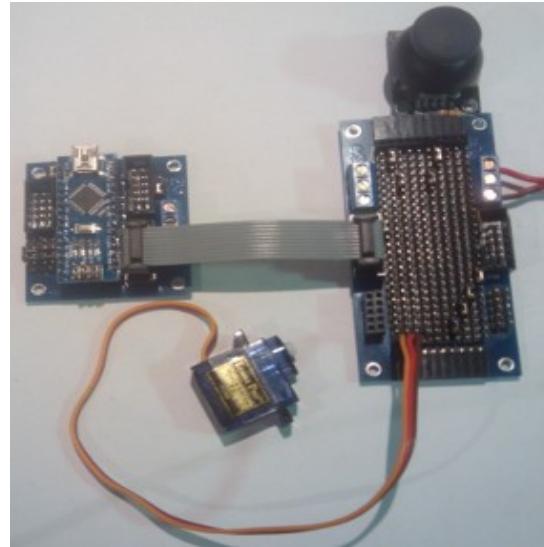


<http://electronics.cat/php/common/index.php?lang=ca&page=517>

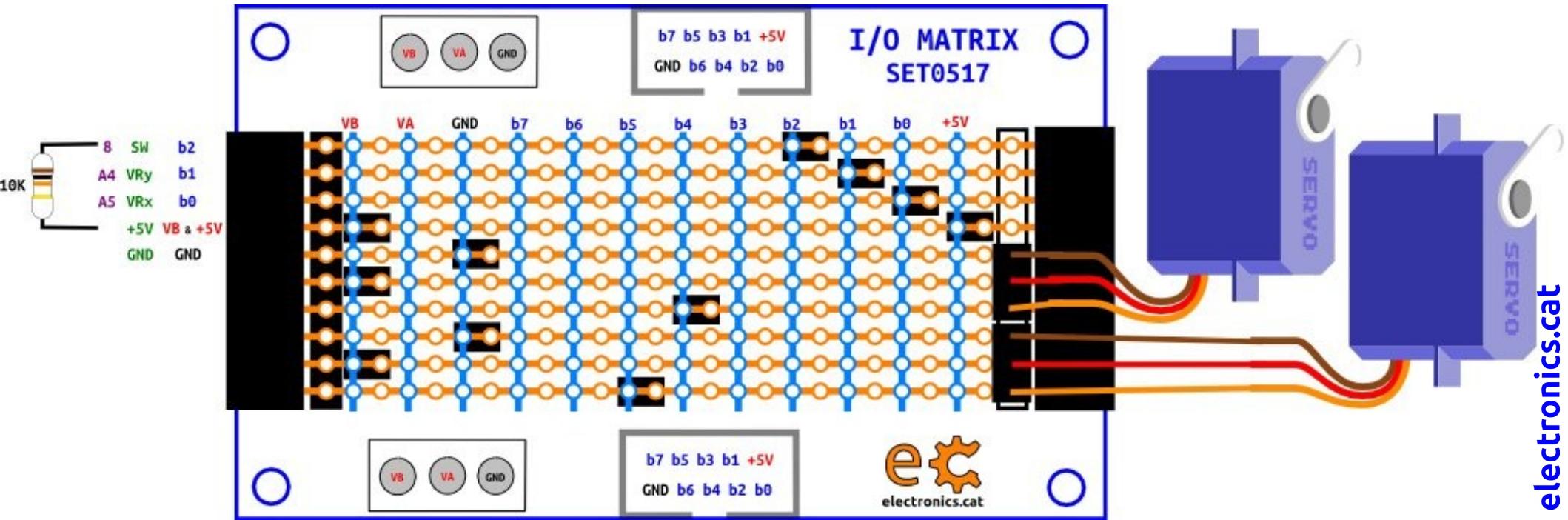


Technologies creatives a l'aula

pr04joystickServo.abp - Exercici

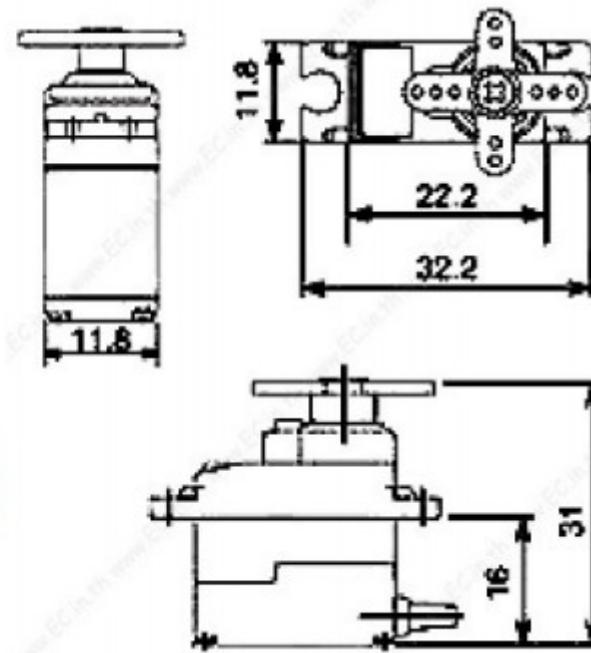


<http://www.binefa.cat/php/arduino/ardublock/pr04joystickServo.abp>



Technologies creatives a l'aula

Servo



Specifications

- Weight: 9 g
- Dimension: 22.2 x 11.8 x 31 mm approx.
- Stall torque: 1.8 kgf·cm
- Operating speed: 0.1 s/60 degree
- Operating voltage: 4.8 V (~5V)
- Dead band width: 10 μ s
- Temperature range: 0 °C – 55 °C

<http://datasheet.sparkgo.com.br/SG90Servo.pdf>

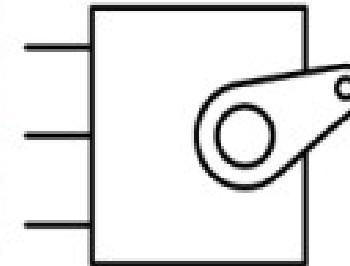
Technologies creatives a l'aula

Servo

PWM=Orange (ΠΓ)

Vcc = Red (+)

Ground=Brown (-)



1 - 2 ms
Duty Cycle

4.8 V (~5 V)
Power
and Signal

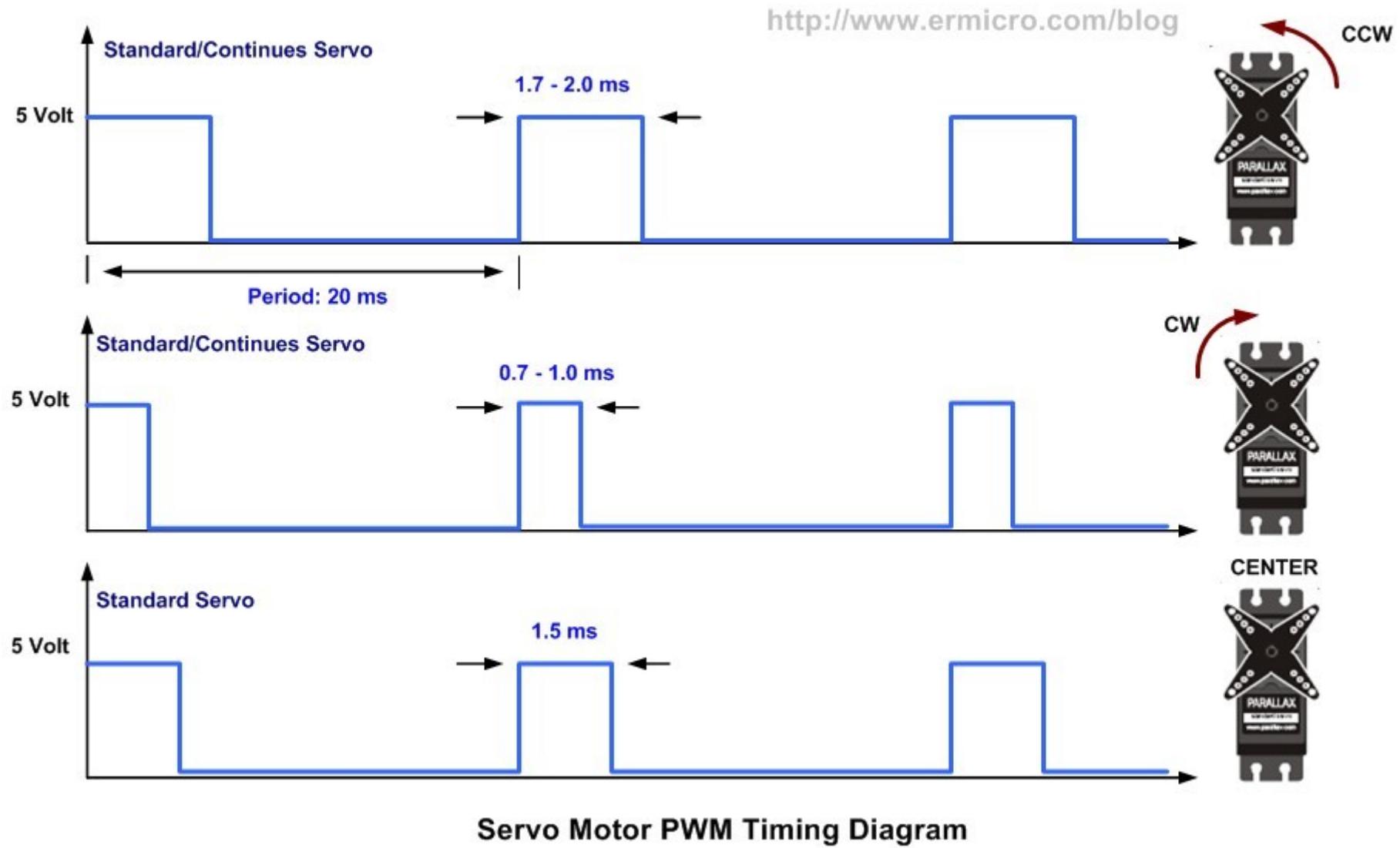


20 ms (50 Hz)
PWM Period

Position "0" (1.5 ms pulse) is middle, "90" (~2 ms pulse) is all the way to the right, "-90" (~1 ms pulse) is all the way to the left.

Technologies creatives a l'aula

Servo

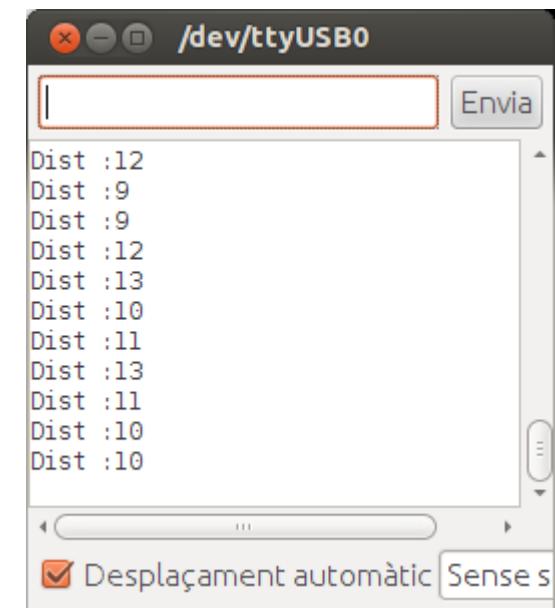
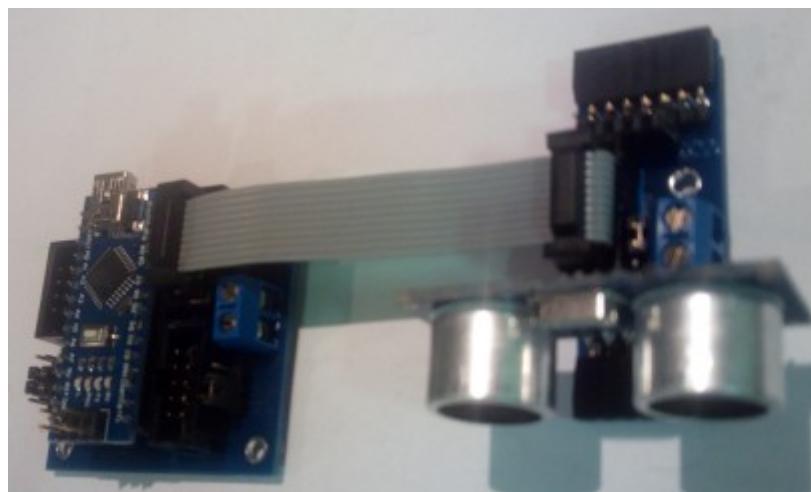
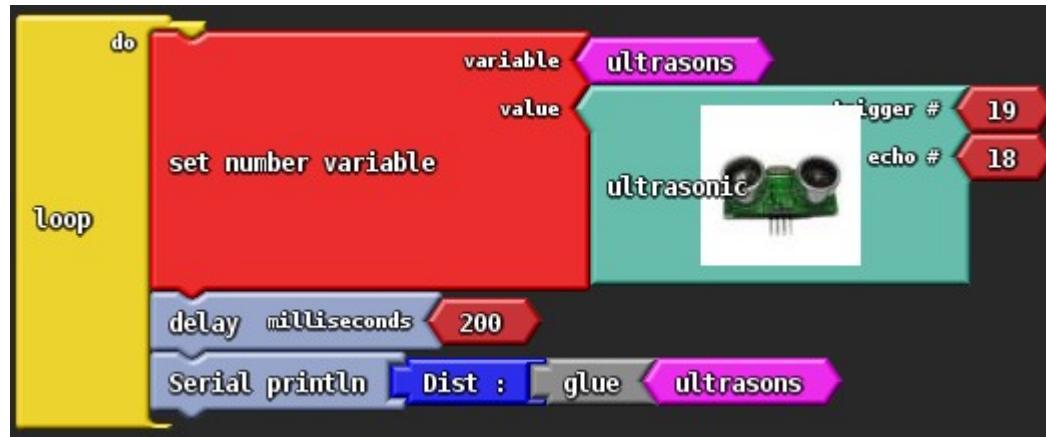


http://www.ermicro.com/blog/wp-content/uploads/2009/02/servo_01.jpg



Tecnologies creatives a l'aula

pr05ultrasons.abp Mesura ultrasònica



<http://www.binefa.cat/php/arduino/ardublock/pr05ultrasons.abp>

<http://www.binefa.cat/php/doc/pr002/>

Tecnologies creatives a l'aula

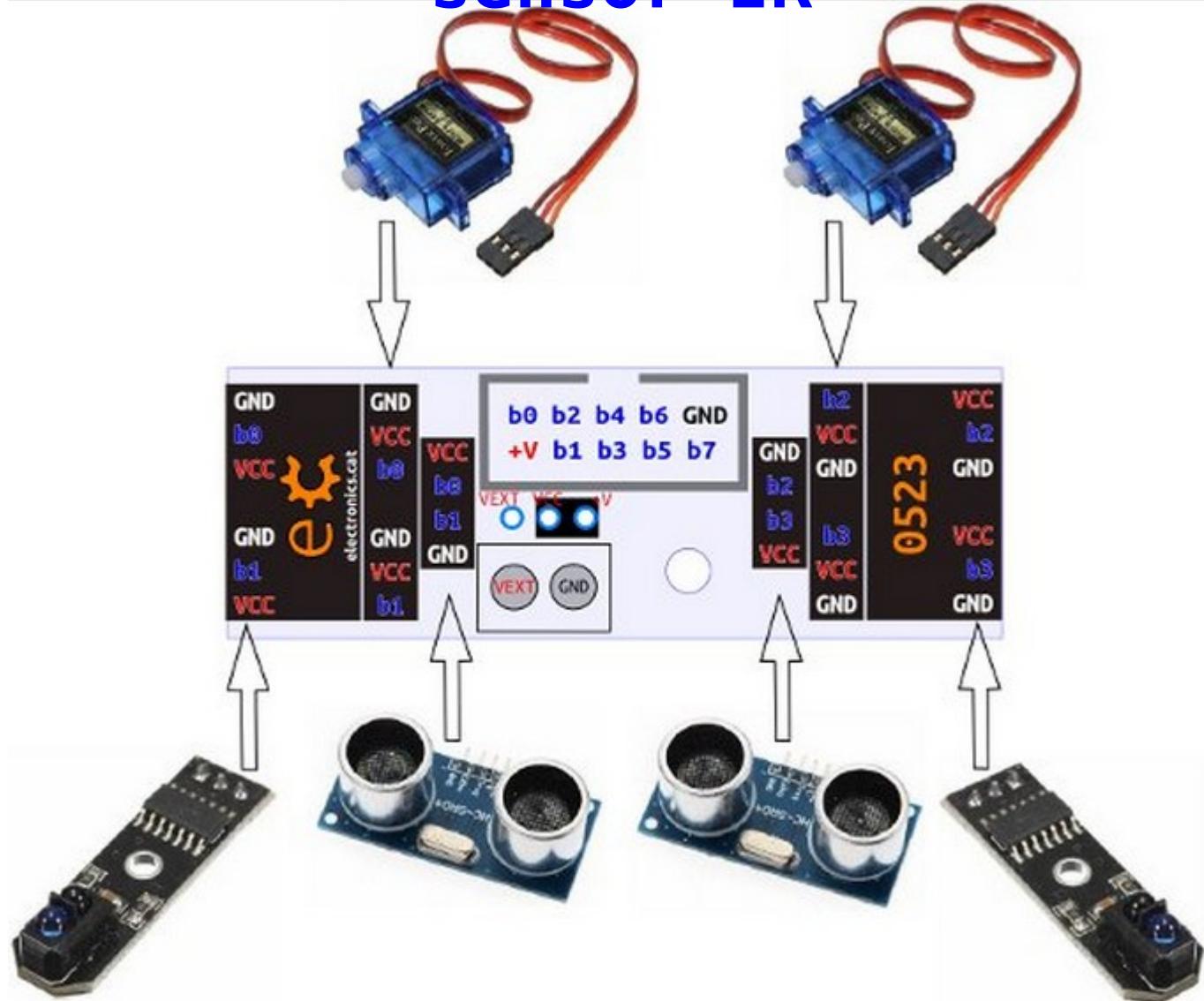
Exercici Ultrasons + Servo

Emprant l'ArduBlock feu que el servo es mogui en funció de la distància llegida pels ultrasons.

Haureu de tenir en compte que el servo accepta un valor mínim i un màxim.

Tecnologies creatives a l'aula

Connexions a la placa 0523 – Connexió sensor IR



Tecnologies creatives a l'aula

Exercici Ultrasons + Servo + sensor IR

Emprant l'ArduBlock feu que el servo es mogui en funció de la distància llegida pels ultrasons, en cas de que el sensor d'infrarojos detecti presència.

Haureu de tenir en compte que el servo accepta un valor mínim i un màxim.

eTecnologies creatives a l'aula

Arduino Nano + LCD + Joystick + Servo

```
#include <LiquidCrystal.h>
#include <Servo.h>

LiquidCrystal lcd(16, 17, 4, 5, 6, 7); // P1
//LiquidCrystal lcd(8,9,10,11,12,13); // P2
Servo servol; Servo servo2;

const int buttonPin = 8;
//const int buttonPin = 16;
int analogPinX = 5,analogPinY = 4;
//int analogPinX = 0,analogPinY = 1;
int buttonState = 0;

void setup() {
  // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  lcd.print("electronics.cat");
  pinMode(buttonPin, INPUT);
  servol.attach(10);
  servo2.attach(11);
  servol.write(90);
  servo2.write(90);
}
```

```
unsigned long int nAnalogValue2Degrees(unsigned long int nAnalogValue){
  return (nAnalogValue * 180) / 1023;
}

void loop() {
  buttonState = digitalRead(buttonPin);
  unsigned long int degX = nAnalogValue2Degrees(analogRead(analogPinX));
  unsigned long int degY = nAnalogValue2Degrees(analogRead(analogPinY));
  // set the cursor to column 0, line 1 (note: line 1 is the second row, since counting begins at 0)
  lcd.setCursor(0, 1);
  if (buttonState == HIGH) {
    lcd.print("F ");
  }else{
    lcd.print("N ");
  }
  lcd.print("X:");lcd.print(degX); lcd.print("d Y:");lcd.print(degY);lcd.print("d      ");
  servol.write(degX);
  servo2.write(degY);
}
```



<http://www.binefa.cat/php/doc/lcdJsServo/>

<http://www.binefa.cat/php/arduino/ardublock/lcdJsServo/lcdJsServo.ino>

eTecnologies creatives a l'aula

Arduino Nano + LCD + Joystick + Servo

```
#include <LiquidCrystal.h>
#include <Servo.h>

LiquidCrystal lcd(16, 17, 4, 5, 6, 7); // P1
//LiquidCrystal lcd(8,9,10,11,12,13); // P2
Servo servol; Servo servo2;

const int buttonPin = 8;
//const int buttonPin = 16;
int analogPinX = 5,analogPinY = 4;
//int analogPinX = 0,analogPinY = 1;
int buttonState = 0;

void setup() {
    // set up the LCD's number of columns and rows:
    lcd.begin(16, 2);
    lcd.print("electronics.cat");
    pinMode(buttonPin, INPUT);
    servol.attach(10);
    servo2.attach(11);
    servol.write(90);
    servo2.write(90);
}
```

<http://www.binefa.cat/php/doc/lcdJsServo/>

<http://www.binefa.cat/php/arduino/ardublock/lcdJsServo/lcdJsServo.ino>

e+Technologies creatives a l'aula

Arduino Nano + LCD + Joystick + Servo

```
unsigned long int nAnalogValue2Degrees(unsigned long int nAnalogValue){  
    return (nAnalogValue * 180) / 1023;  
}  
  
void loop() {  
    buttonState = digitalRead(buttonPin);  
    unsigned long int degX = nAnalogValue2Degrees(analogRead(analogPinX));  
    unsigned long int degY = nAnalogValue2Degrees(analogRead(analogPinY));  
    // set the cursor to column 0, line 1 (note: line 1 is the second row, since counting begins with 0):  
    lcd.setCursor(0, 1);  
    if (buttonState == HIGH) {  
        lcd.print("F ");  
    }else{  
        lcd.print("N ");  
    }  
    lcd.print("X:");lcd.print(degX); lcd.print("d Y:");lcd.print(degY);lcd.print("d ");  
    servol.write(degX);  
    servo2.write(degY);  
}
```

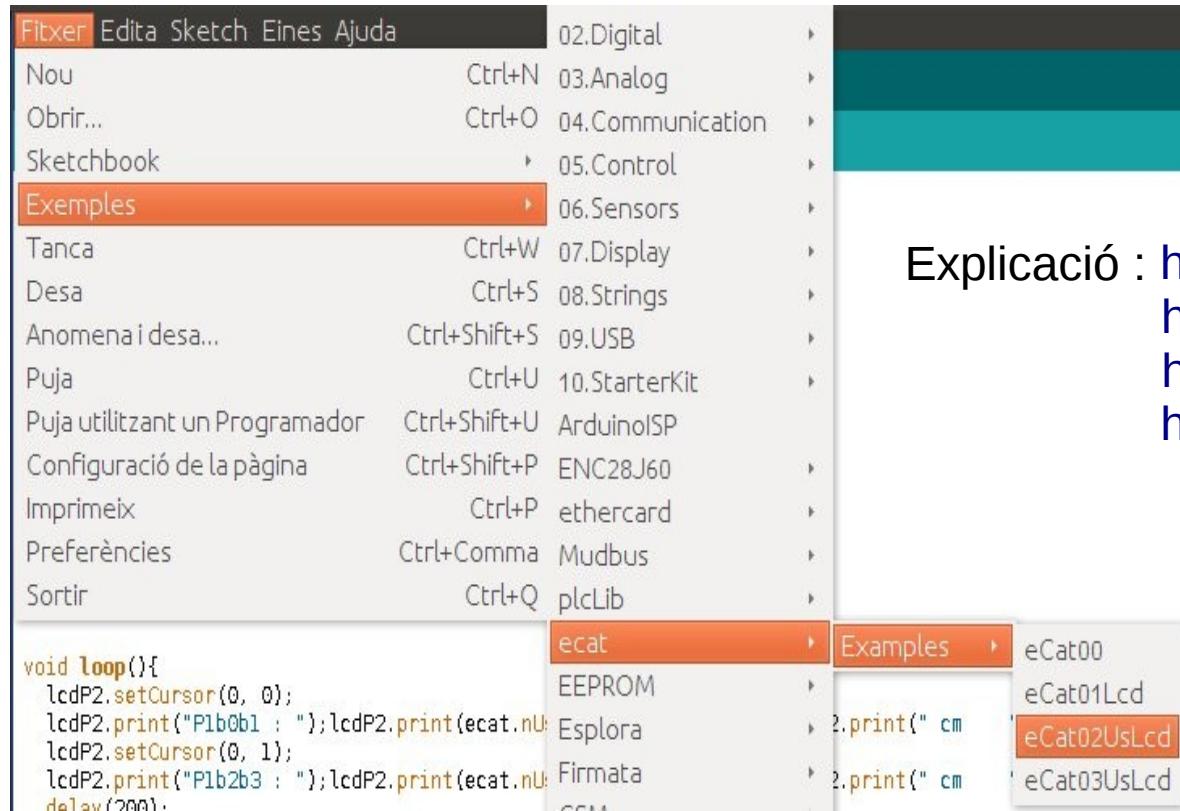
<http://www.binefa.cat/php/doc/lcdJsServo/>

<http://www.binefa.cat/php/arduino/ardublock/lcdJsServo/lcdJsServo.ino>

Tecnologies creatives a l'aula

Biblioteca **ecat.h** per a l'IDE d'Arduino

<http://www.electronics.cat/doc/arduinoLib/ecat.zip>



Explicació : <http://www.binefa.cat/php/doc/lib-eCat01/>
<http://www.binefa.cat/php/doc/lib-eCat02/>
<http://www.binefa.cat/php/doc/lib-eCat03/>
<http://binefa.cat/blog/?p=140>

Tecnologies creatives a l'aula

Biblioteca **ecat.h** per a l'IDE d'Arduino

<http://www.electronics.cat/doc/arduinoLib/ecat.zip>

Explicació : <http://www.binefa.cat/php/doc/lib-eCat01/>
<http://www.binefa.cat/php/doc/lib-eCat02/>
<http://www.binefa.cat/php/doc/lib-eCat03/>
<http://binefa.cat/blog/?p=140>

```

1 #include <ecat.h>
2
3 #define ROBOT_ATURAT      0
4 #define ROBOT_ENDAVANT     1
5 #define ROBOT_ENDARRERA    2
6 #define ROBOT_DRETA        3
7 #define ROBOT_ESQUERRA     4
8
9 String szMissatge;
10 Ecat ecat;
11 boolean bConnectat;
12 int nG,nA,nB,nEstatActual;
13
14 void setup(){
15   ecat.setupNibbleMode(NIBBLE_H_P1,OUTPUT);
16   ecat.vUltrasonicSensorP1b0b1_init();
17   pinMode(ecat.nPinP1B2,INPUT);
18   pinMode(ecat.nPinP1B3,INPUT);
19   pinMode(ecat.nPinP2B7,OUTPUT);
20   pinMode(ecat.nPinP2B6,INPUT);
21   pinMode(ecat.nPinP2B5,INPUT);
22   pinMode(ecat.nPinP2B4,INPUT);
23   ecat.setupNibbleMode(NIBBLE_L_P2,INPUT);
24   Serial.begin(9600);
25   nG = 150;
26   nA = nB = 30;
27   bConnectat = false;
28   nEstatActual = ROBOT_ATURAT;
29 }
30

```

<http://electronics.cat/downloads/code/robot08.ino>

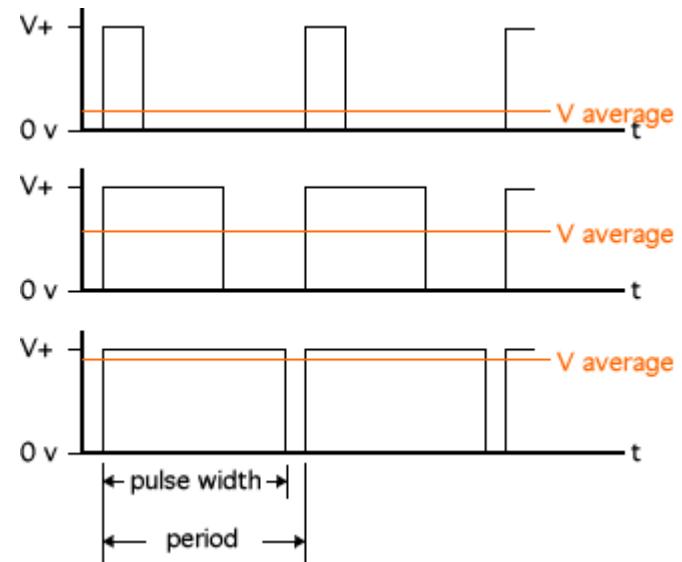
Tecnologies creatives a l'aula

Modulació per amplada de pols PWM

```

31  int nPwmA(){
32      int nAux = nG + nA;
33      if(nAux > 255)
34          nAux = 255;
35      return nAux;
36  }
37
38  int nPwmB(){
39      int nAux = nG + nB;
40      if(nAux > 255)
41          nAux = 255;
42      return nAux;
43  }
44
45  void vRobotAturat(){
46      nEstatActual = ROBOT_ATURAT;
47      ecat.vWriteHighNibbleP1(0x00);
48  }
49
50  void vRobotEndavant(){
51      //ecat.vWriteHighNibbleP1(B00000110);
52      nEstatActual = ROBOT_ENDAVANT;
53      digitalWrite(ecat.nPinP1B4,LOW);
54      analogWrite(ecat.nPinP1B5,nPwmA());
55      analogWrite(ecat.nPinP1B6,nPwmB());
56      digitalWrite(ecat.nPinP1B7,LOW);
57  }

```



Technologies creatives a l'aula

Preparant la comunicació BlueTooth

```
#include <ecat.h>

Ecat ecat;
boolean bP2B0;

void setup(){
    pinMode(ecat.nPinP2B7,OUTPUT);
    pinMode(ecat.nPinP2B0,INPUT);
    Serial.begin(9600);
    bP2B0 = digitalRead(ecat.nPinP2B0);
}

void loop(){
    String szMsg;

    while(Serial.available()){
        delay(3);
        char c = Serial.read();
        szMsg += c;
    }
    if(szMsg == "n"){
        digitalWrite(ecat.nPinP2B7,HIGH);
    }
    if(szMsg == "f"){
        digitalWrite(ecat.nPinP2B7,LOW);
    }
    if(bP2B0 != digitalRead(ecat.nPinP2B0)){
        bP2B0 = digitalRead(ecat.nPinP2B0);
        if(bP2B0){
            Serial.println("P2B0 HIGH");
        }else{
            Serial.println("P2B0 LOW");
        }
    }
    szMsg = "";
}
```



Technologies creatives a l'aula

Preparant la comunicació BlueTooth

```
#include <ecat.h>

Ecat ecat;
boolean bP2B0;

void setup(){
    pinMode(ecat.nPinP2B7,OUTPUT);
    pinMode(ecat.nPinP2B0,INPUT);
    Serial.begin(9600);
    bP2B0 = digitalRead(ecat.nPinP2B0);
}
```

Technologies creatives a l'aula

Preparant la comunicació BlueTooth

```

void loop(){
    String szMsg;

    while(Serial.available()){
        delay(3);
        char c = Serial.read();
        szMsg += c;
    }
    if(szMsg == "n"){
        digitalWrite(ecat.nPinP2B7,HIGH);
    }
    if(szMsg == "f"){
        digitalWrite(ecat.nPinP2B7,LOW);
    }
    if(bP2B0 != digitalRead(ecat.nPinP2B0)){
        bP2B0 = digitalRead(ecat.nPinP2B0);
        if(bP2B0){
            Serial.println("P2B0 HIGH");
        }else{
            Serial.println("P2B0 LOW");
        }
    }
    szMsg = "";
}

```

<http://electronics.cat/doc/hc06/bluetooth04.ino>

Tecnologies creatives a l'aula

Preparant la comunicació BlueTooth

Verifiqueu el funcionament del programa **bluetooth04.ino** interactuant amb qualsevol dels programes de comunicacions que coneixeu



<http://electronics.cat/doc/hc06/bluetooth04.ino>



Technologies creatives a l'aula

App Inventor

MIT App Inventor | Explore MIT App Inventor - Mozilla Firefox

MIT App Inventor | E... appinventor.mit.edu/explore/ Cerca Create!

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MIT App Inventor noted in US News & World Report.

MIT students use App Inventor to create UMATI, a crowdsourced app to track bus routes in Nairobi



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- MIT App Inventor Classic to MIT App Inventor 2 Converter Released
- MIT App Inventor usage triples over the 2014-2015 academic year

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<http://appinventor.mit.edu/>



Tecnologies creatives a l'aula

App Inventor

The screenshot shows the MIT App Inventor 2 interface. The project is named "prj00". The central area displays a screen titled "Screen1" featuring a photo of a ginger cat and the text "Gatet no és bufonet". The Components panel shows the following components:

- Screen1 (selected)
- Button1
- Label1
- Button2
- Sound1

The Properties panel for Screen1 includes the following settings:

- AboutScreen: (empty)
- AlignHorizontal: Left
- AlignVertical: Top
- AppName: prj00
- BackgroundColor: White
- BackgroundImage: None...
- CloseScreenAnimation: Default
- Icon: None...
- OpenScreenAnimation: Default
- ScreenOrientation: Unspecified
- Scrollable: (unchecked)

The palette on the left lists various components under "User Interface" such as Button, CheckBox, DatePicker, Image, Label, etc.

<http://binefa.cat/php/appinventor/prj00.aia>



Tecnologies creatives a l'aula

App Inventor



Components	Properties
<ul style="list-style-type: none"> Screen1 Button1 Label1 Button2 Sound1 	<p>Sound1</p> <p>MinimumInterval 500</p> <p>Source meow.mp3...</p>

<http://binefa.cat/php/appinventor/prj00.aia>

Tecnologies creatives a l'aula

App Inventor

Un cop us heu validat a l'App Inventor, importeu l'arxiu prj00.aia -Projects / Import projects (.aia) from my computer- i genereu l'arxiu prj00.apk -Build / App (save .apk to my computer)-.

Un cop generat l'arxiu .apk el passeu al vostre mòbil Android fent servir el cable USB, trametent-lo mitjançant correu electrònic o anant a l'adreça de sota mitjançant el vostre navegador.

A l'hora de fer la instal·lació el telèfon us avisarà de que la font del programa no és l'estàndard. Temporalment, doneu al vostre mòbil permisos per a fer una instal·lació des de font desconeguda.

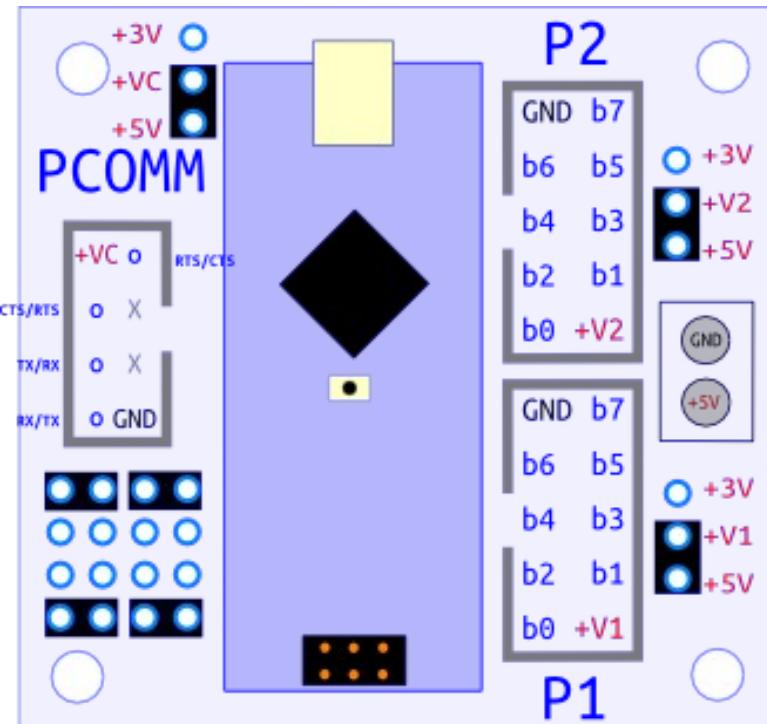
Verifiqueu el seu funcionament.

<http://binefa.cat/php/appinventor/prj00.aia>

<http://binefa.cat/php/appinventor/prj00.apk>

Tecnologies creatives a l'aula

Comunicació mitjançant BlueTooth



<http://electronics.cat/doc/hc06/bluetooth04.ino>

http://electronics.cat/doc/hc06/HC06_04b.aia

http://electronics.cat/doc/hc06/HC06_04b.apk

- Carregueu **bluetooth04.ino** a l'Arduino Nano
- Desconnecteu **cable mini-USB** de l'Arduino Nano
- Alimenteu **separadament** la placa nano-eCat (cal tornavís)
- Assegureu-vos de la posició dels ponts (jumpers) de comunicació
- Preneu nota del número identificador de Bluetooth
- Connecteu placa **set0525** a la nano-eCat
- Vinculeu el dispositiu BlueTooth al vostre mòbil Android (contrasenya : 1234)
- Proveu el f

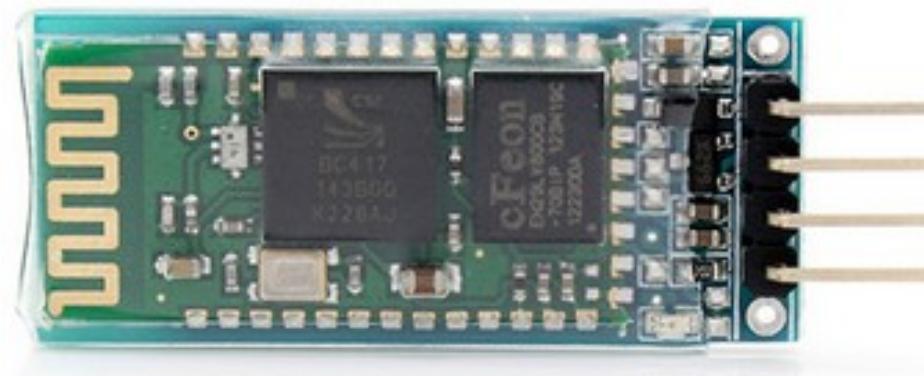


direccional

Tecnologies creatives a l'aula

Com trobar pel terminal el número ID del BlueTooth

```
$ hcitool scan  
Scanning ...  
98:D3:31:30:2C:0D  HC-06
```





Tecnologies creatives a l'aula

App Inventor - Comunicació mitjançant BlueTooth

Display hidden components in Viewer

Screen1

Seleccioneu dispositiu Bluetooth

Engegat Apagat

No està connectat

P2B0

Non-visible components

- BluetoothClient1
- Clock1

```

when ListPicker1 .BeforePicking
do set ListPicker1 . Elements to BluetoothClient1 . AddressesAndNames

when ListPicker1 .AfterPicking
do set ListPicker1 . Selection to call BluetoothClient1 .Connect
address ListPicker1 . Selection

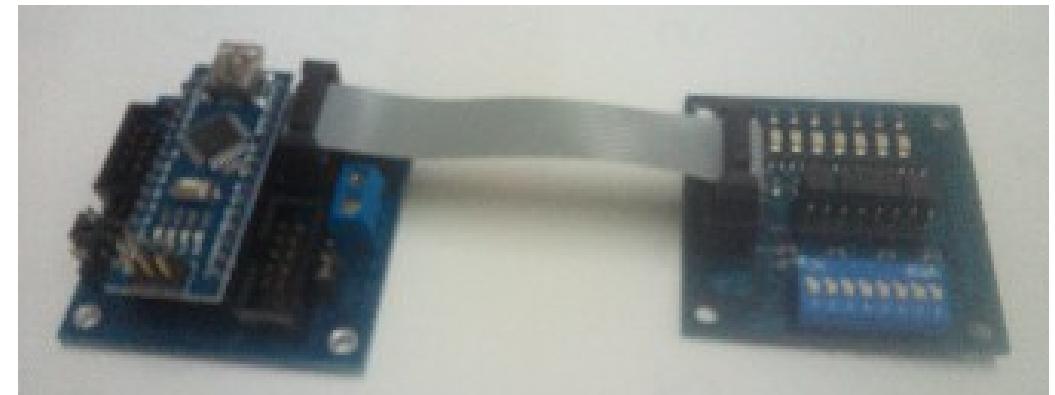
set Label1 . Text to " Connectat !!!! "
call BluetoothClient1 .SendText
text " k "
set Clock1 . TimerEnabled to true
set Clock1 . TimerInterval to 200

when Button1 .Click
do call BluetoothClient1 .SendText
text " n "

when Button2 .Click
do call BluetoothClient1 .SendText
text " f "

when Clock1 .Timer
do if call BluetoothClient1 .BytesAvailableToReceive > 0
then set Label2 . Text to call BluetoothClient1 .ReceiveText
numberOfBytes call BluetoothClient1 .BytesAvailableToReceive

```





Tecnologies creatives a l'aula

App Inventor -Comunicació mitjançant BlueTooth

```

when ListPicker1 .BeforePicking
do set ListPicker1 . Elements to BluetoothClient1 . AddressesAndNames

when ListPicker1 .AfterPicking
do set ListPicker1 . Selection to call BluetoothClient1 . Connect
address ListPicker1 . Selection
set Label1 . Text to " Connectat !!!! "
call BluetoothClient1 . SendText
text " k "
set Clock1 . TimerEnabled to true
set Clock1 . TimerInterval to 200

when Button1 .Click
do call BluetoothClient1 . SendText
text " n "

when Button2 .Click
do call BluetoothClient1 . SendText
text " f "

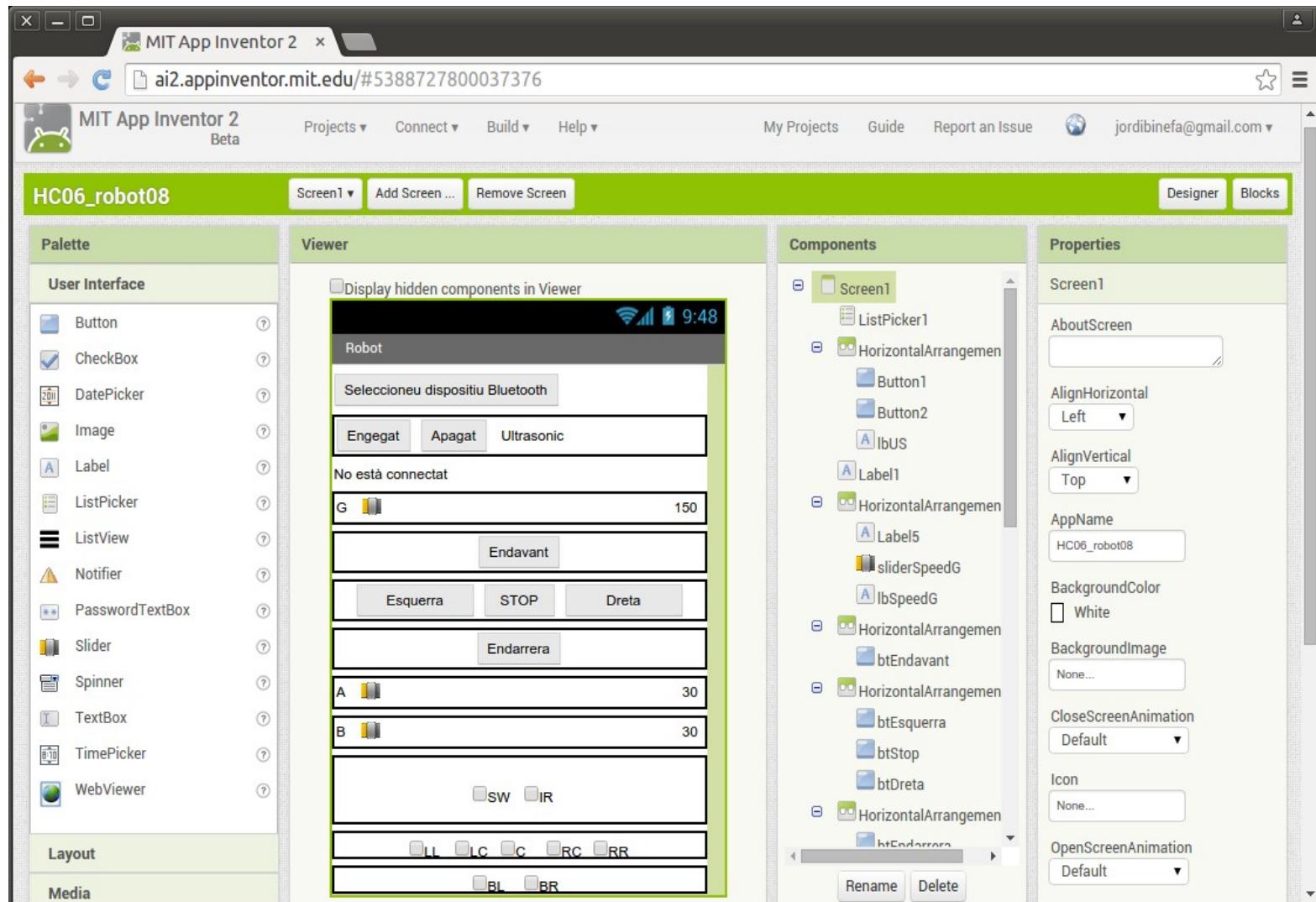
when Clock1 .Timer
do if call BluetoothClient1 . BytesAvailableToReceive > 0
then set Label2 . Text to call BluetoothClient1 . ReceiveText
numberOfBytes call BluetoothClient1 . BytesAvailableToReceive

```



Tecnologies creatives a l'aula

Programar al mòbil Android – App Inventor



<http://appinventor.mit.edu/>



Tecnologies creatives a l'aula

Programar al mòbil Android – App Inventor

The screenshot shows the MIT App Inventor 2 interface with the project titled "HC06_robot08". The code is organized into several blocks:

- when ListPicker1.AfterPicking**:
 - do set ListPicker1.Selection to call BluetoothClient1.Connect address ListPicker1.Selection
 - set Label1.Text to "Connectat!!!!"
 - call BluetoothClient1.SendText text "ask")
 - set Clock1.TimerEnabled to true
 - set Clock1.TimerInterval to 300
- when Button1.Click**:
 - do call BluetoothClient1.SendText text "on")
- when btEndavant.Click**:
 - do call BluetoothClient1.SendText text "fw")
- when btEndarrera.Click**:
 - do call BluetoothClient1.SendText text "bw")
- when btStop.Click**:
 - do call BluetoothClient1.SendText text "stop")

The left sidebar shows the blocks catalog under "Built-in" and "Screen1". The "Blocks" tab is selected.

http://electronics.cat/downloads/code/HC06_robot08.aia

<http://appinventor.mit.edu/>

Tecnologies creatives a l'aula

Arduino i App Inventor - Comunicació

```

147 void vManageMsg(){
148     vSliders();
149     if(szMissatge == "on"){
150         //digitalWrite(ecat.nPinP2B7,HIGH);
151         analogWrite(ecat.nPinP2B7,nG);
152     }
153     if(szMissatge == "off"){
154         digitalWrite(ecat.nPinP2B7,LOW);
155     }
156     if(szMissatge == "ask"){
157         bConnectat = true;
158         vInformaSensors();
159     }
160     if(szMissatge == "fw"){
161         vRobotEndavant();
162     }
163     if(szMissatge == "bw"){
164         vRobotEndarrera();
165     }
166     if(szMissatge == "st"){
167         vRobotAturat();
168     }
169     if(szMissatge == "le"){
170         vRobotEsquerra();
171     }
172     if(szMissatge == "ri"){
173         vRobotDreta();
174     }
175 }
```

<http://electronics.cat/downloads/code/robot08.ino>

http://electronics.cat/downloads/code/HC06_robot08.aia

Torn de preguntes ...



... i sessió pràctica.



Tecnologies creatives a l'aula

Presentació descarregable a : <http://binefa.cat/blog>

Correu electrònic de contacte : jordibinefa@electronics.cat



<https://twitter.com/JordiBinefa>

<https://twitter.com/electronicscat>



<http://es.linkedin.com/pub/jordi-binefa/13/717/90b>

Plaques aviat disponibles a :

<http://www.electronics.cat>

<http://www.makeit.cat>

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