Soirée Pratique
Sumo Robot Session 1

Part 1: Arduino Basics

http://www.ieee-sb-leuven.be/soireepratiques

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What is Soirée Pratique?

- After Soirée Technique, Soirée Pratique
- The concept:
  - Short session: about 2 hours
  - Learn about engineering techniques in a practical way
    - Soldering
    - Building robots
    - …
  - Only essential theory
  - Playful and hands-on

"Your hands-off approach isn't working."

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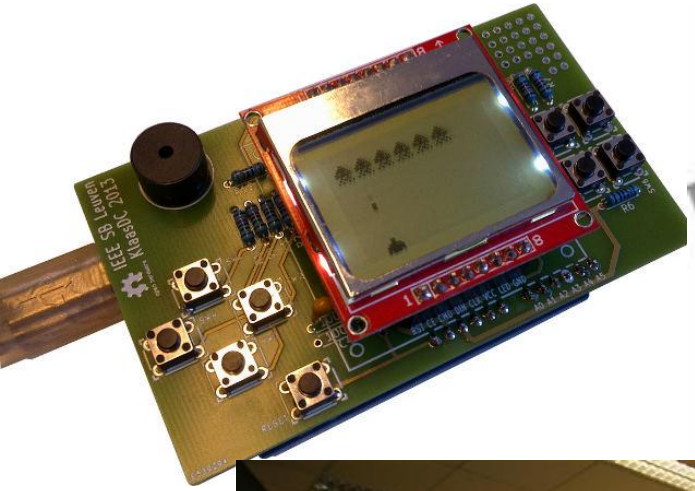
Soirée Pratique 2012-2013



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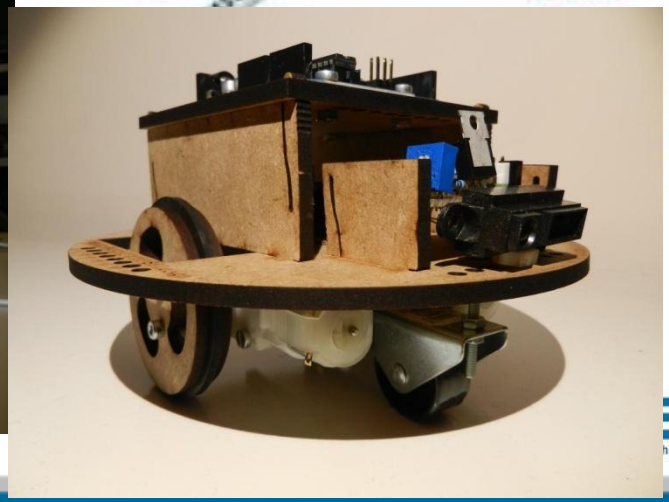
http://www.ieee-sb-leuven.be/
presents

Home Automation

Program your own domotics system!

- Completely wireless
- Compatible with:
  - Android, iOS,..
  - Smartphone, Tablet



Soirée Pratique 2012-2013

Soirée Pratique 2012-2013

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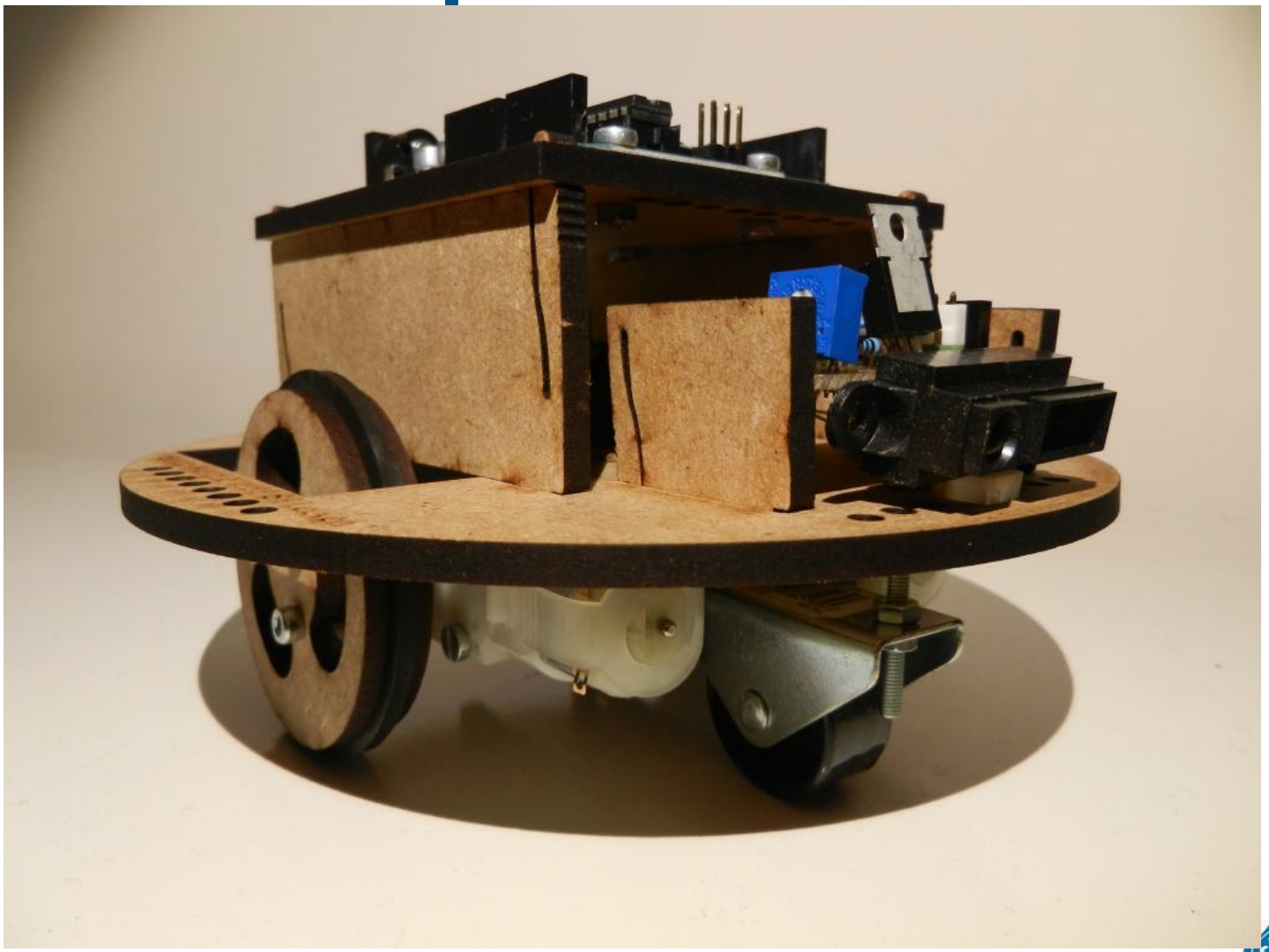
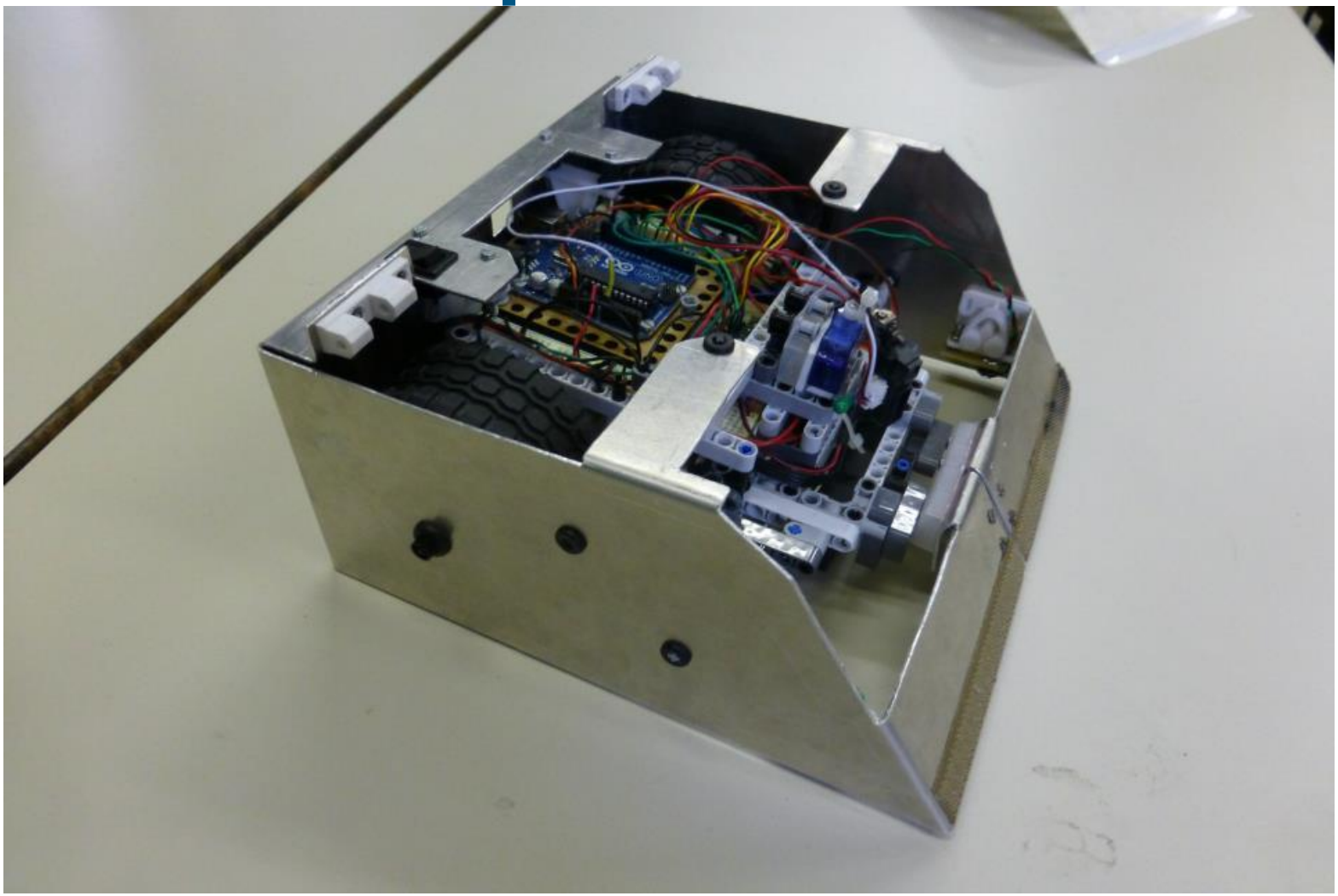
Soirée Pratique 2012-2013



Soirée Pratique 2013-2014



Soirée Pratique 2013-2014

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Soirée Pratique 2013-2014

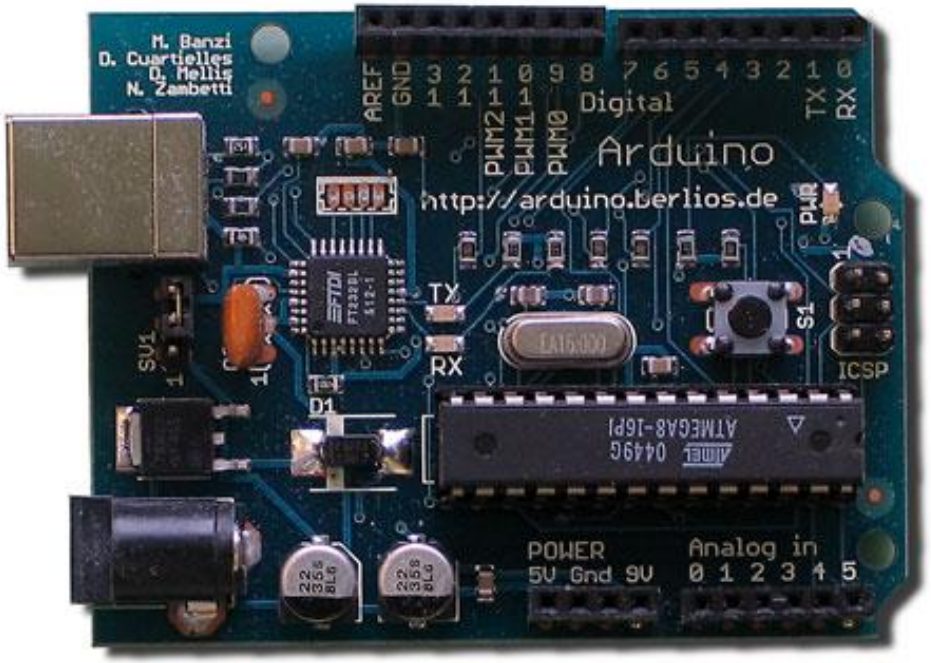
- 14/10 Robot sumo: Arduino Basics
- 21/10 Robot sumo: Motors
- 28/10 Robot sumo: Sensors
- 04/11 Robot sumo: Prog. and tweaking
- 18/11 Robot sumo: Training session
- 25/11 Ambilight
- 02/12 Robot Sumo Competition

Cost

- We can’t sponsor all components
- To keep the price low: bring your own things!
- We will propose “standard” solution, grouped in packages
- Page to order packages on the website: www.ieee-sb-leuven.be/soireepratiques

Brain package

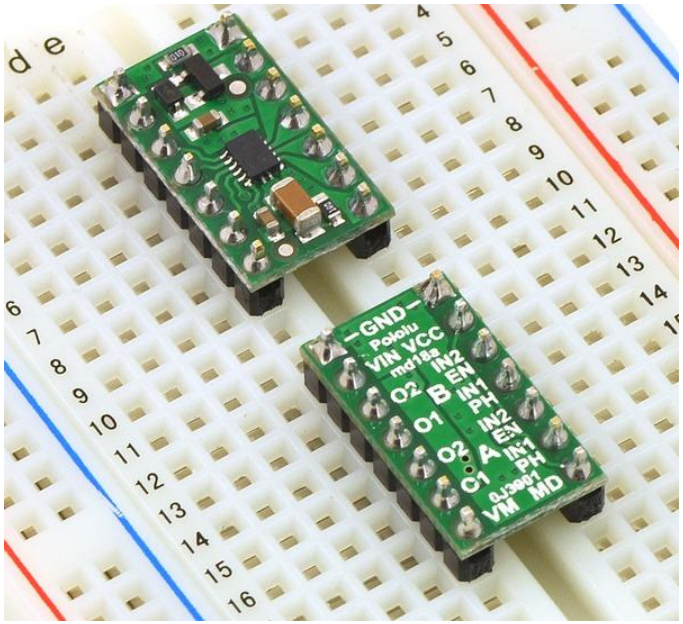
1. Arduino
2. Breadbord
3. Leds
4. Resistors
5. Usb-cable



- Alternatives: PIC, dwengo board ...

Motor package

1. 2 motors
2. Motor controller
3. Battery pack



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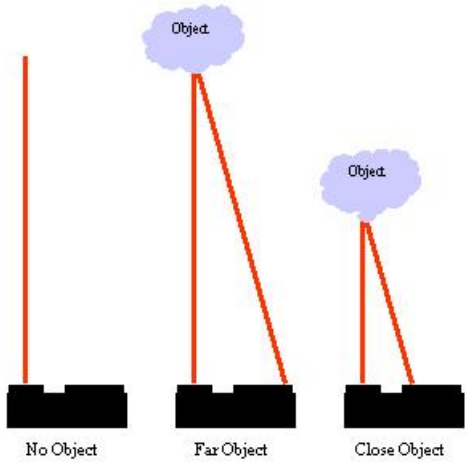
Sensor package

1. Long range
2. 2 Short range



- Alternatives: wire contactors, ultra sound...

Session 1: Arduino Basics
What is an Arduino?

- open-source electronics prototyping platform
- Arduino Uno: Atmega328 microcontroller
- Arduino programming language

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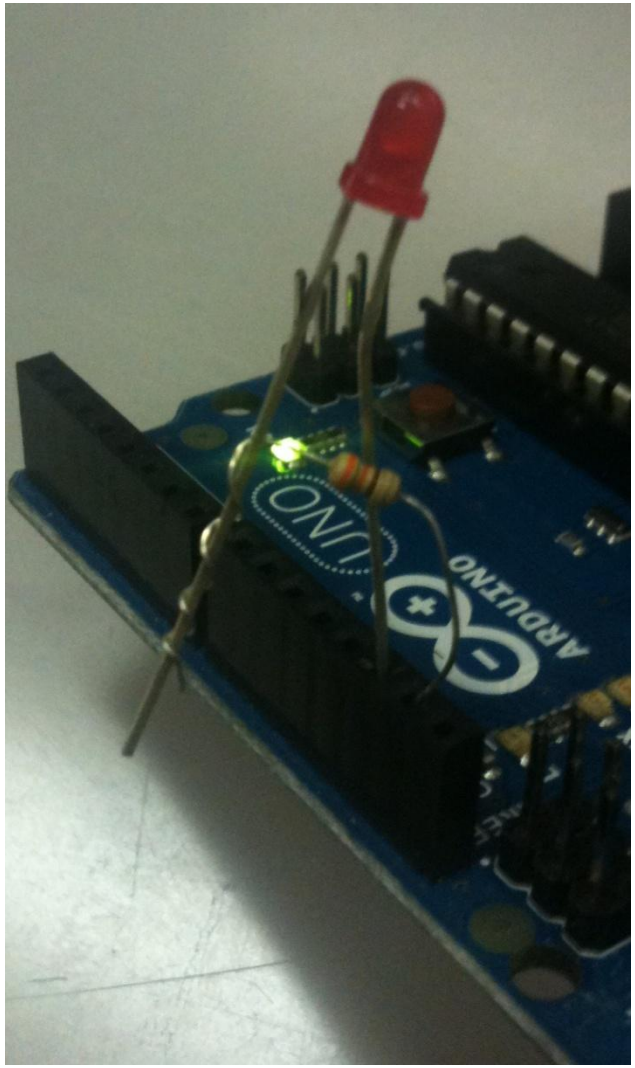
Session 1: Arduino Basics

http://www.ieee-sb-leuven.be/node/272

1. Installation
   - www.arduino.cc =>Software
2. Exercises
   - www.arduino.cc =>Learning

How to make a setup



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Soirée Pratique
Build your own robot
Session 1

Part 2: Scratch 4 Arduino

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What is scratch

- Children’s learning environment developed by the Lifelong Kindergarten Group at MIT Media Lab
- It's 100% free!
- Programming from 8 years old.
- Basic constructions (variables, assignment, loops, conditionals and calls to functions and actions)
- Focused on multimedia projects: typically a game or an animation with sophisticated designs, icons, sound and motion graphics

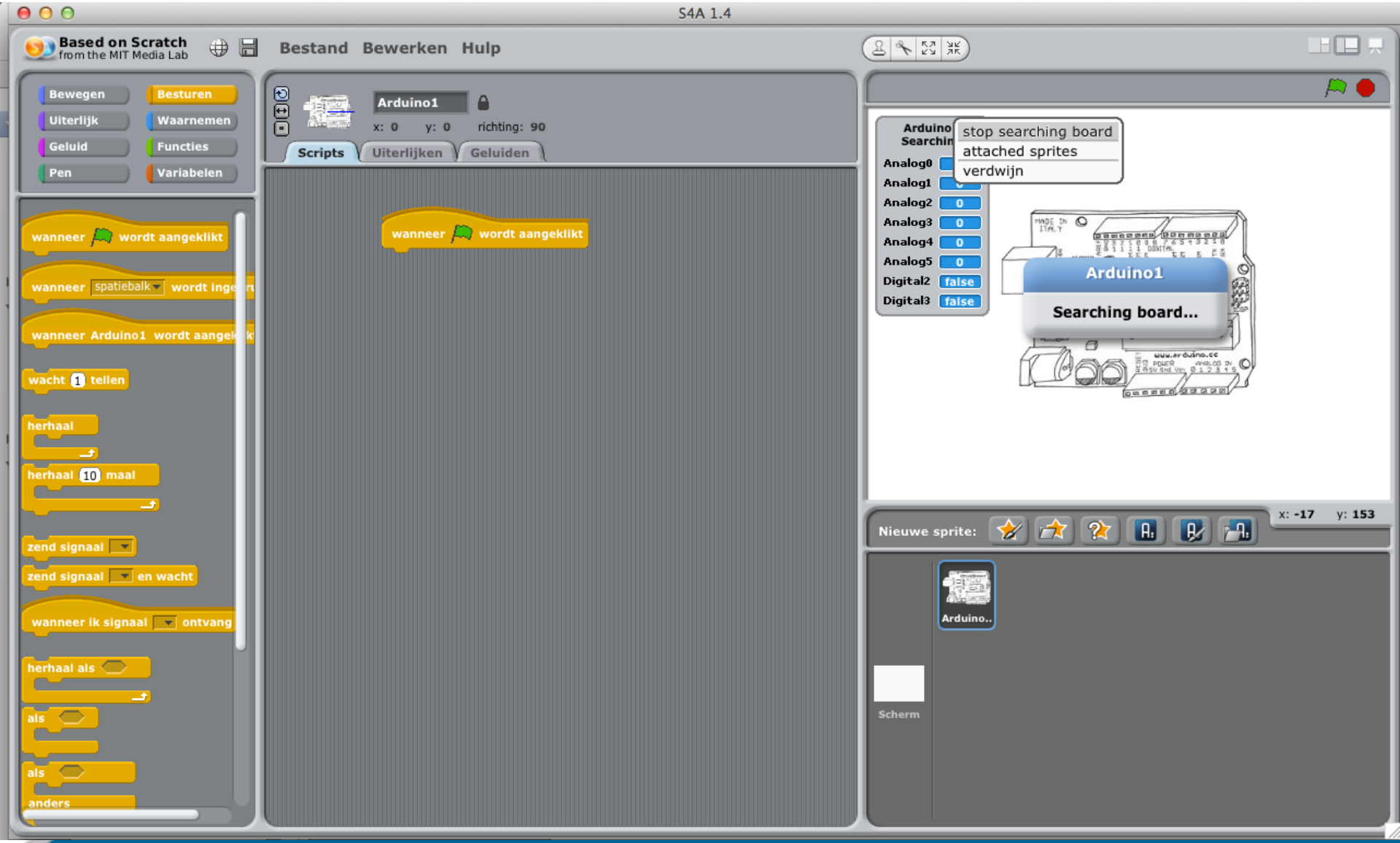
What is scratch4arduino

- Scratch modification
- Simple programming of the platform.
- New blocks for managing sensors and actuators, and a sensor report board
- High level interface with functionalities such as interacting with a set of boards through user events.

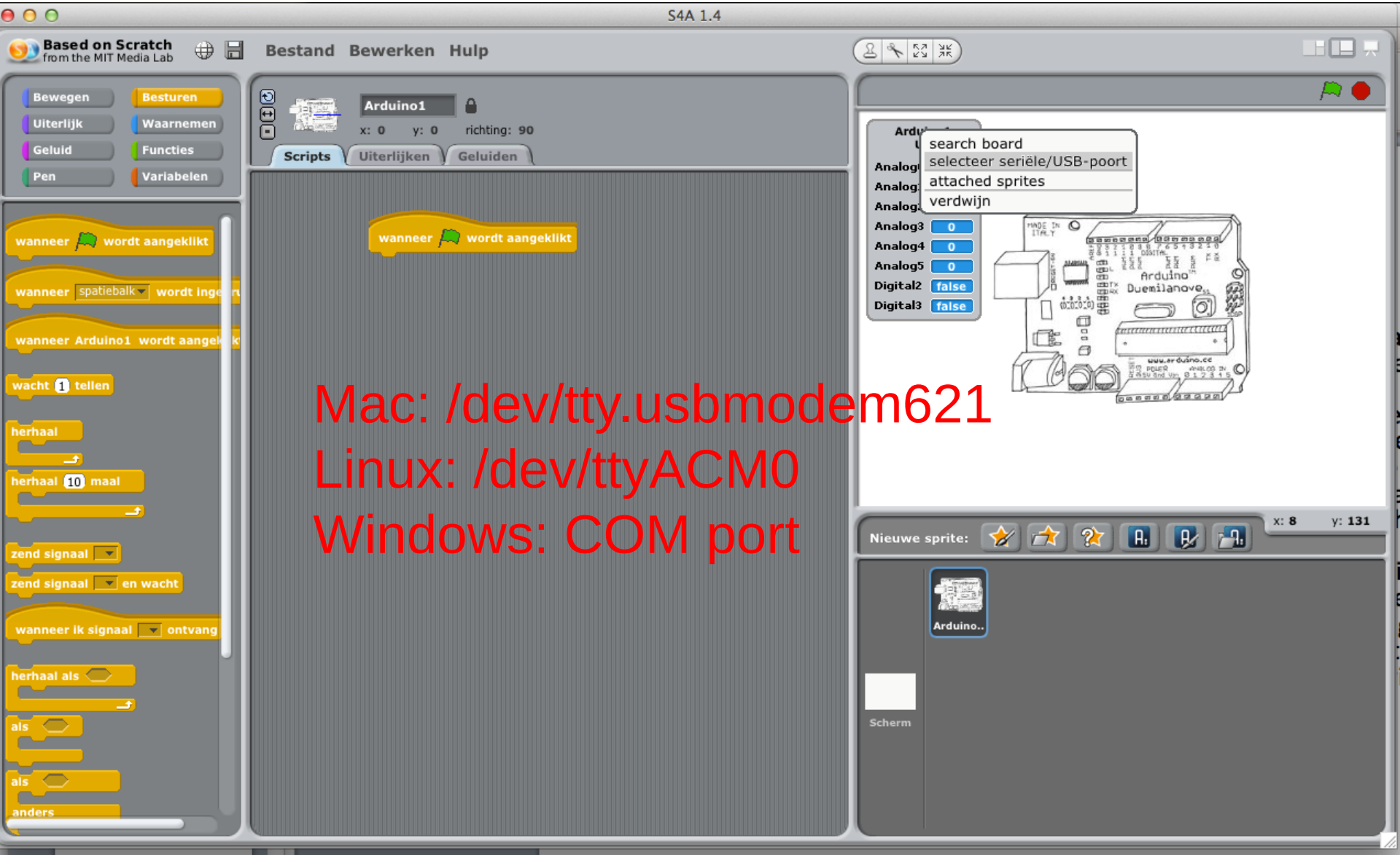
Installation

- 1. Download and install the Arduino environment + install the drivers if using Windows or Mac (http://arduino.cc/)
- 2. Download the latest scratch firmware (http://seaside.citilab.eu/scratch) upload it through the official environment.
- 3. Download and install S4A depending of the operating system we use: Windows, Mac or Linux. (http://seaside.citilab.eu/scratch)

Stop searching



Select serial port



Input/output configuration

- 6 analog inputs (analog pins)
- 2 digital inputs (digital pins 2 and 3)
- 3 analog outputs (digital pins 5, 6 and 9)
- 3 digital outputs (pins 10, 11 and 13)
- 4 special outputs to connect Parallax continuous rotation servomotors (digital pins 4, 7, 8 and 12)

S4A limitations

- Arduino = interface board
- S4A interacts with Arduino sending outputs state and receiving inputs state every 75 ms
- Any pulse width has to be greater than this time period
- A special program has to be loaded on arduino before running S4A
- PC + USB cable required continuously!

S4A 1.4

nd Bewerken Hulp

Arduino1

x: 0 y: 0 richting: 90

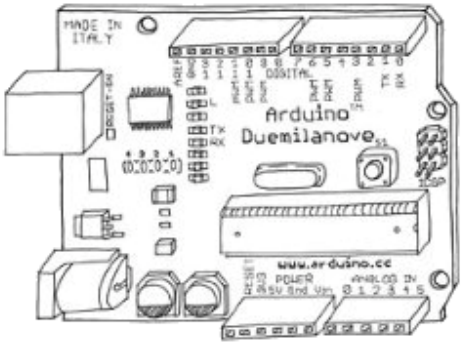
ts Uiterlijken Geluiden

wanneer wordt aangeklikt

Everything OK!

Arduino1
port: fd131

Analog0	150
Analog1	148
Analog2	148
Analog3	150
Analog4	148
Analog5	146
Digital2	false
Digital3	false



Nieuwe sprite:

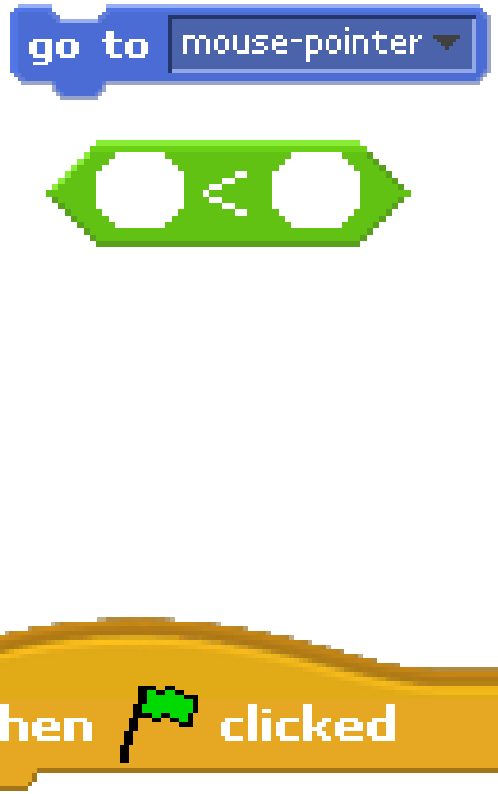
x: -394 y: -125

Arduino..

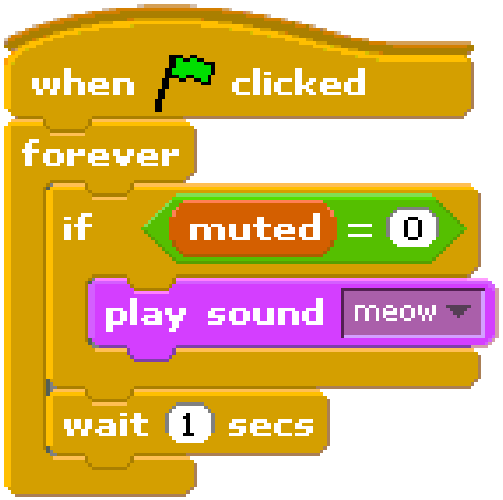
Scherm

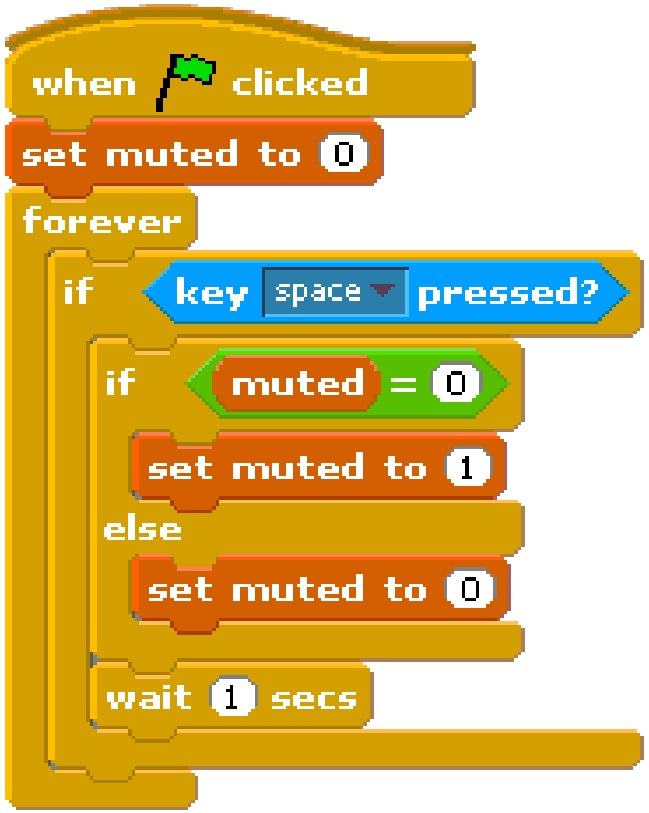
Coding

- Statement
- Boolean expression
- Condition
- Loop
- Variable
- Thread



Program


when clicked
forever
if muted = 0
play sound meow
wait 1 secs


when clicked
set muted to 0
forever
if key space pressed?
if muted = 0
set muted to 1
else
set muted to 0
wait 1 secs

References

- https://scratch-io.wikispaces.com/
- http://seaside.citilab.eu/scratch/arduino
- http://scratch.mit.edu
- http://cs.harvard.edu/malan/scratch/ (scratch for computer scientists)
- http://arduino.cc/