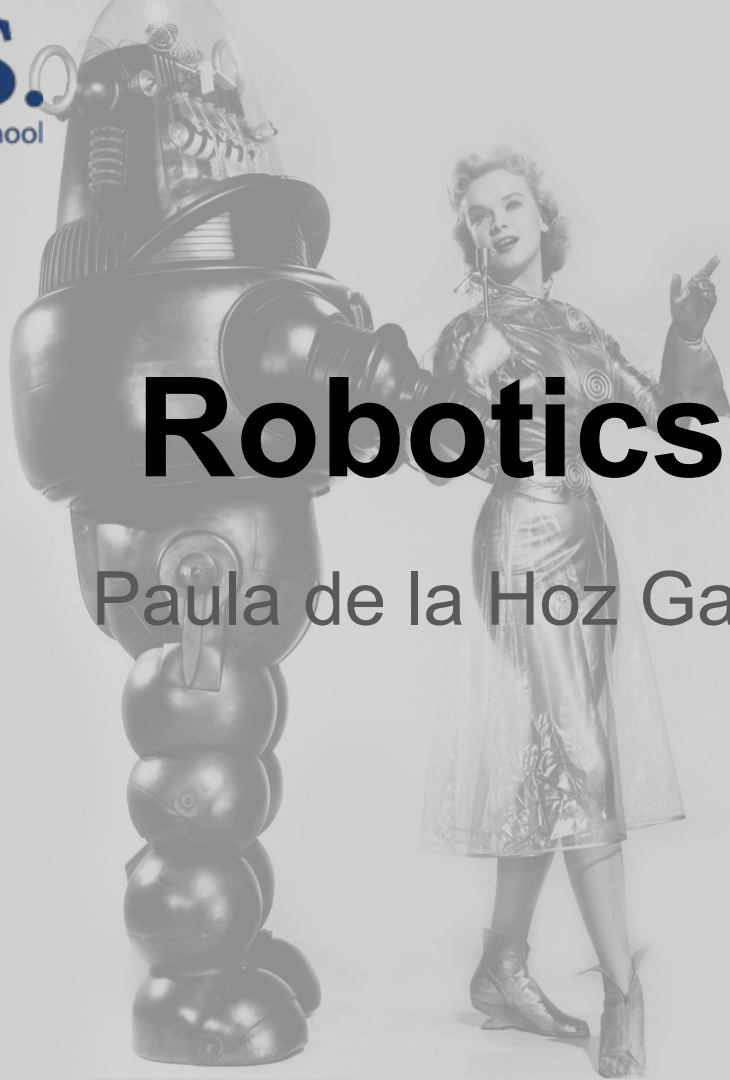


Robotics II

Paula de la Hoz Garrido





Content

- Personal **Introduction**
- Subject **Introduction**
- **Initial Test**
- **Scratch** programming
- Basic **Arduino** (Scratch 4 Arduino)
- **Brainstorming**, group project and workshop

変なホテル

Henna Hotel





SCRATCH PROGRAMMING

Massachusetts Institute of Technology

<https://scratch.mit.edu/>





Scratch Programming

First of all, **What's programming?**

Machines are *dumb*! They cannot think by themselves. They need you to tell them.





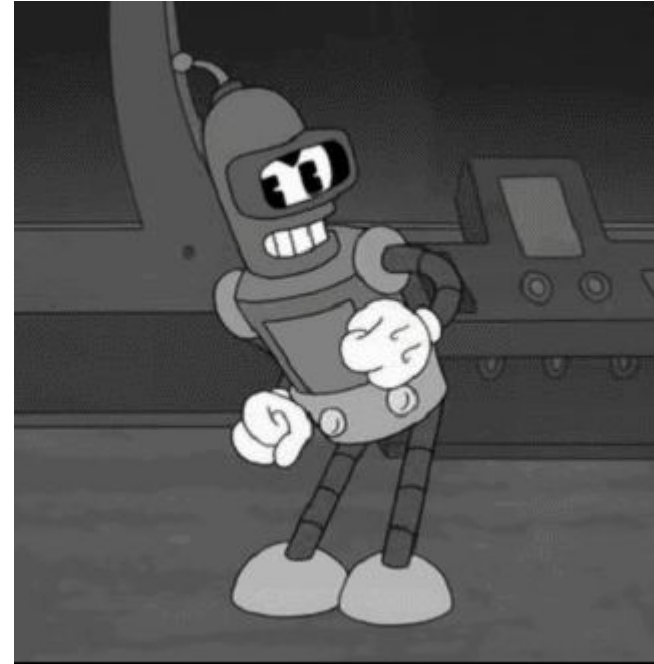
Scratch Programming

We need to have a clear idea of our goal, then design a path to reach it. It's not just a matter of computers, it's a *lifehack*.



Design a path for a robot if...

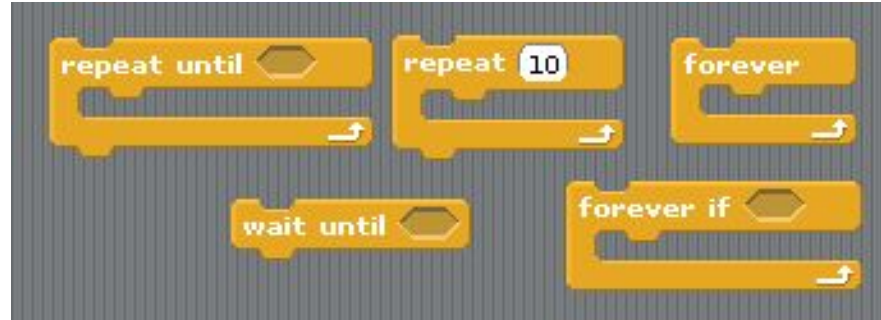
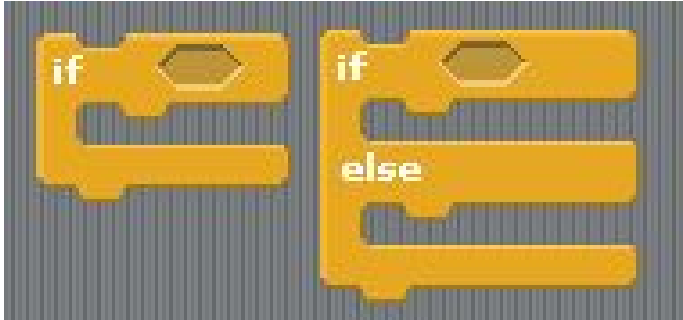
- a) Robot has **these orders**: WALK, STOP, WORK, TURN RIGHT/LEFT
- b) You want the Robot to do a **repetitive action**





Scratch Programming


With Scratch, and other programming languages we tell the computer what to do and how. The difficulty here, it's not actually learning the programming language but **how we design the program**.

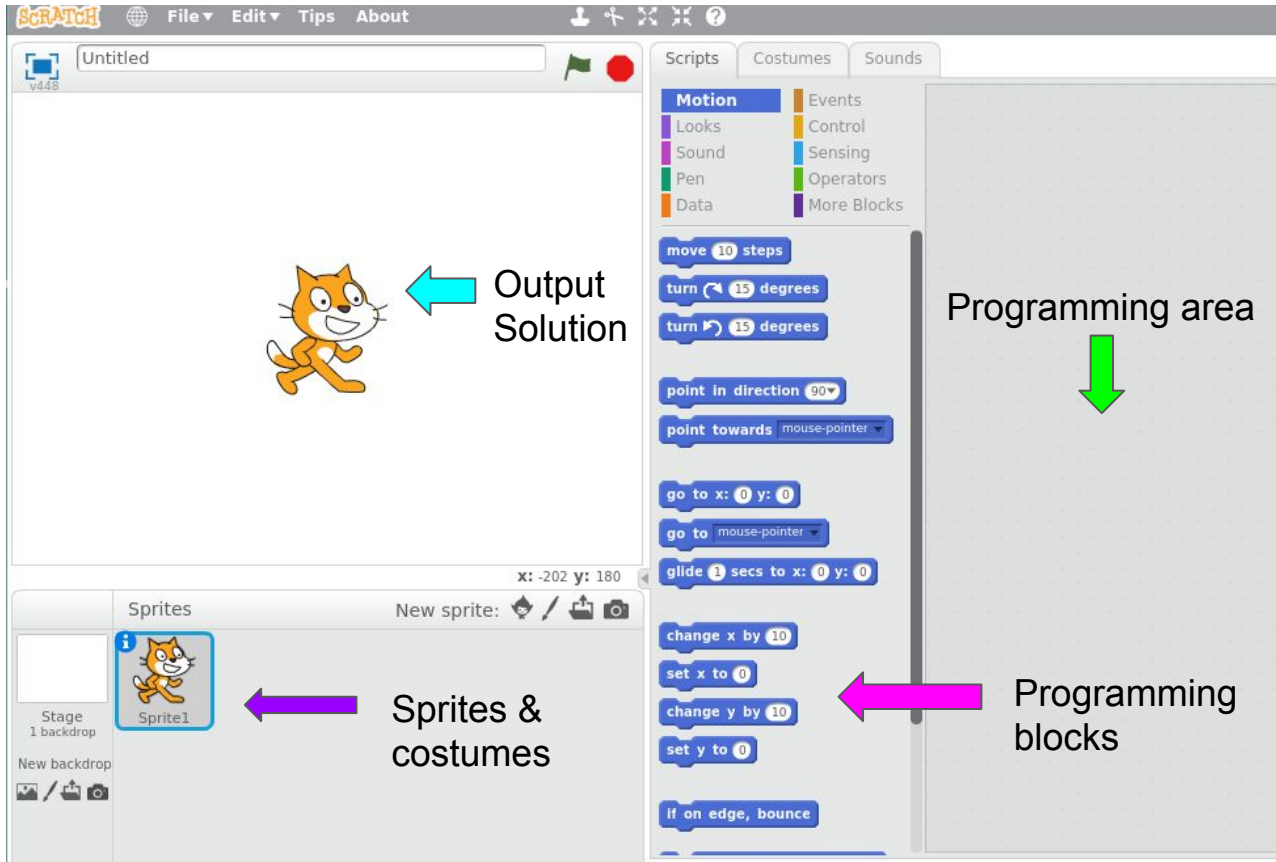




Scratch Programming

Tips:

- Use 
- For conditionals and loops go to Control
- For comparing values go to Operators
- For costumes and words go to Looks
- For keyboard sensing go to Sense
- Use "Forever..."
- Discover the rest trying easy programs!



The screenshot shows the Scratch interface with several annotations:

- Output Solution:** A blue arrow points from the text to the Scratch cat sprite on the stage.
- Programming area:** A green arrow points from the text to the Scripts and Blocks palette on the right.
- Sprites & costumes:** A purple arrow points from the text to the Sprites panel at the bottom left.
- Programming blocks:** A pink arrow points from the text to the list of blocks in the Scripts and Blocks palette.

The Scripts and Blocks palette contains the following categories and blocks:

- Motion:** move 10 steps, turn 15 degrees, turn 15 degrees, point in direction 90, point towards mouse-pointer, go to x: 0 y: 0, go to mouse-pointer, glide 1 secs to x: 0 y: 0, change x by 10, set x to 0, change y by 10, set y to 0, if on edge, bounce.
- Events:** when clicked.
- Control:** (empty)
- Sensing:** (empty)
- Operators:** (empty)
- More Blocks:** (empty)



Scratch Programming

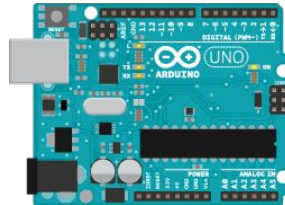
Let's **do some examples!**

- a) Use **if** conditional to make a character say different things
- b) Use **operators** in any of conditional
- c) Use one or more **variables** that you made on your own
- d) Try your own things!



Open Hardware

<https://www.arduino.cc/>





Arduino

¿What is arduino?

Open Hardware company, Boards with printed circuits and a microcontroller, it also has it own IDE, that works with **C**.

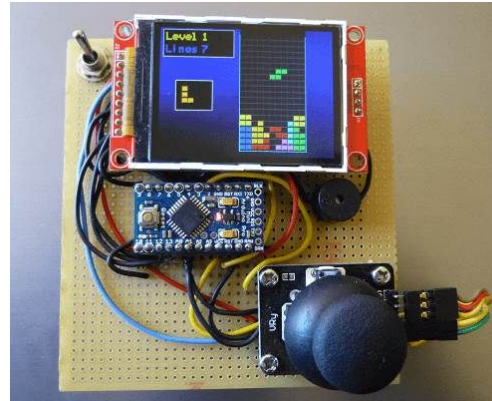




Arduino

What can we possibly make with Arduino? Let's share some ideas.

- Robots
- Interactive art
- Greenhouse controller
- Home devices
- etc

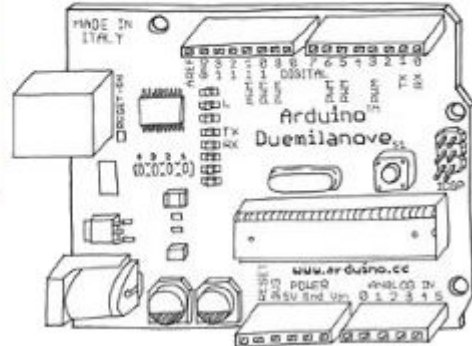




Arduino

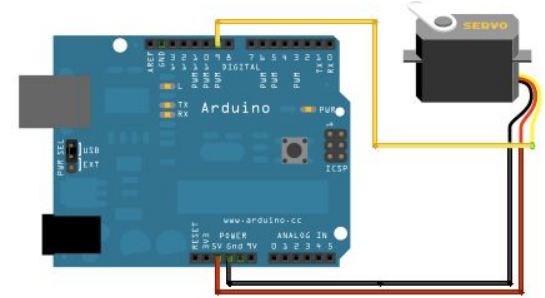
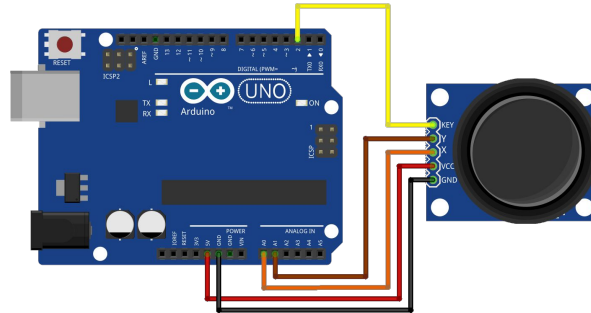
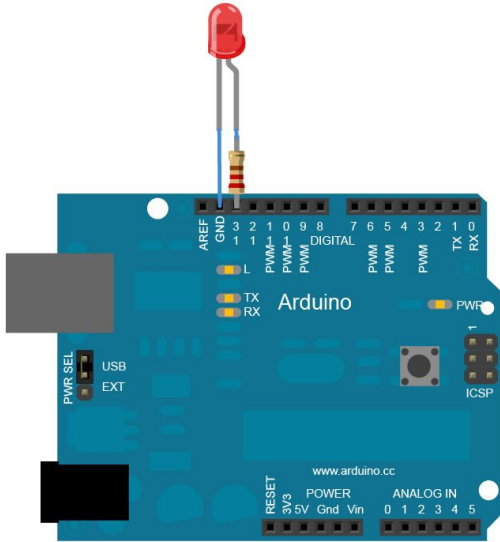
Let's program Arduino with **Scratch4Arduino**: <http://s4a.cat/>

- Same as normal Scratch, but has arduino variables
- In “**Motion**” we will find a lot of options related to the **Arduino Uno board**




COLLABORATIVE WORKSHOP

Let's create!



Brainstorming



 We will make groups and **think of ideas** with the components given. Follow the sheet!

additional content added in the class:

C, C++, Programming, projects (water sensor, servo motor, rainbow led)