Practicals°5: Internet of Things

1. IoT – internet of things

The Internet of things (or IoT) is the internetworking of physical devices, vehicles, buildings, and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data.

In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society." The IoT allows objects to be sensed or controlled remotely across existing network infrastructure.

2. Arduino

Arduino (**http://www.arduino.cc**) is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, - and turn it into an output - activating a motor, turning on an LED, etc. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. Thanks to its simple and accessible user experience, Arduino has been used in thousands of different projects and applications. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Teachers and students use it to build low cost scientific instruments. Arduino is a key tool to learn new things.

There are many other microcontrollers and microcontroller platforms available for physical computing. All of these tools take the messy details of microcontroller programming and wrap it up in an easy-to-use package. Arduino also simplifies the process of working with microcontrollers, but it offers some advantage for teachers, students, and interested amateurs over other systems.

Getting started? Visit this webpage: **https://www.arduino.cc/en/Guide/HomePage**

2. Proposal (4 hours)

Rethinking the House: The Internet of Things has arrived. Your mission is to build and code a prototype (hardware <u>and</u> software useful and <u>secure</u> for home automation!

You'll have to provide any sketch, prototype and discuss about security provided by your solution. You can work by group (around 2/3) and present your work at the end of the lab.

This is some ideas to deal with hardware:

- Make some fake hotspot using nodeMCU device (**http://www.nodemcu.com**)
- Manipulate a fake keyboard able to download malware through the internet with a teensy device (**https://www.pjrc.com/teensy**)
- Generate "real randomized" password using disgispark board (**http://digistump.com**)

Links

- https://samy.pl/
- http://www.instructables.com/id/NodeMCU-IoT-Project-DHT11/
- https://www.hackster.io/nodemcu/projects