Cisco Networking Academy
Mind Wide Open

IoT Prototyping Workshop

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Technical Manager CEE-RCIS

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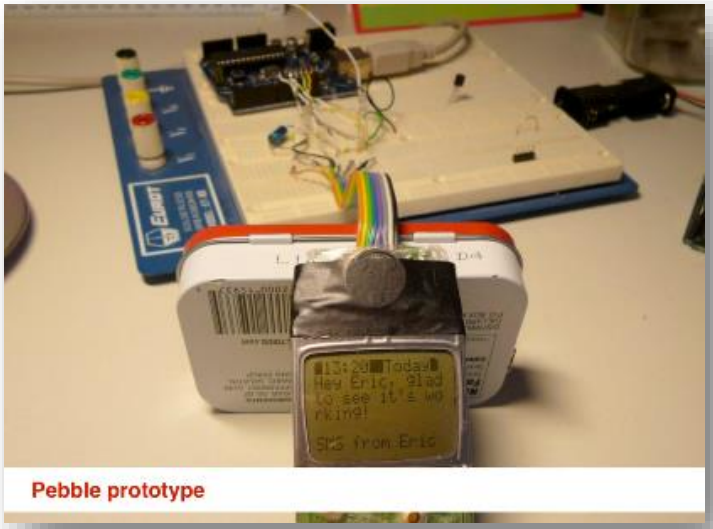
Eric Migicovsky is 26 years old and has a vision: creating Pebble!

What is Pebble: *"It is a smart watch, something that connects to your phone and brings some of the functionality of your phone to your wrist"*



With his team he created a prototype with pieces of Old Nokia Phone and and some open hardware.

On April, 2012 he was looking for 100.000$ to realize his idea.

Six VC and Investors put him down.

So he created this video

Pebble Raises $3 Million+ in Four Days, What Kickstarter Means for Entrepreneurs

Pebble: E-Paper Watch for iPhone and Android

by Pebble Technology

Funded! This project successfully raised its funding goal on May 19, 2012.

68,929
backers

$10,266,845
pledged of $100,000 goal

0
seconds to go

Project by
Pebble Technology
Palo Alto, CA
Contact me

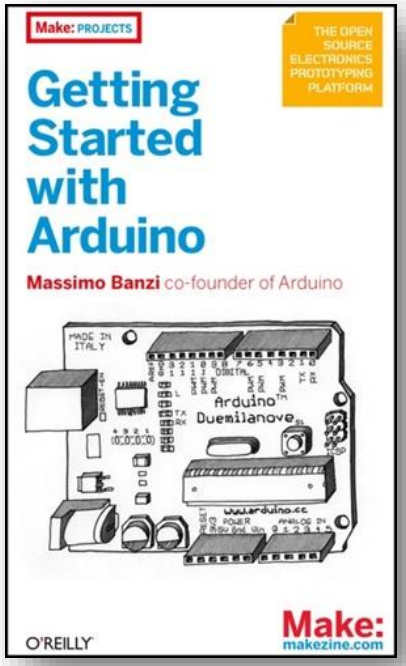
First created · 28 backed

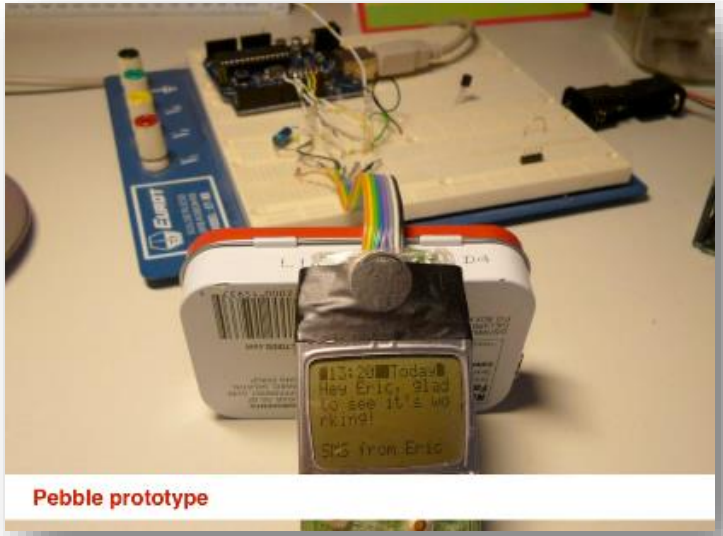
Eric Migicovsky 720 friends

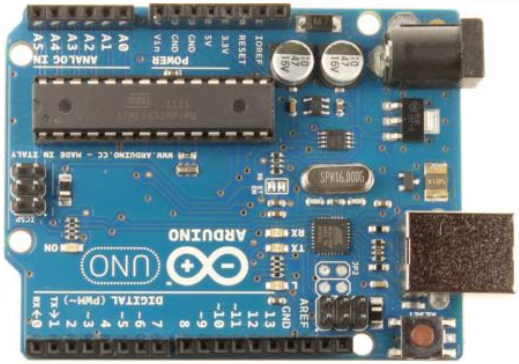
Website: getpebble.com

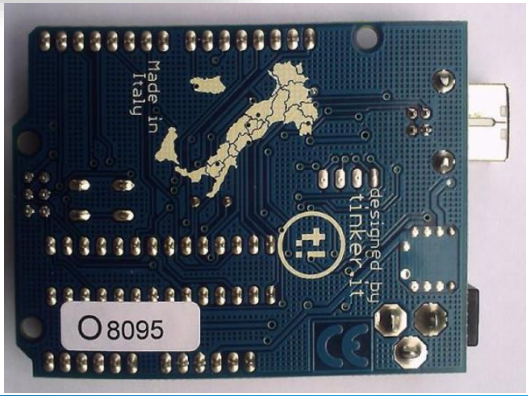
Arduino

The prototype of Pebble was done using an Open Hardware project named “Arduino”

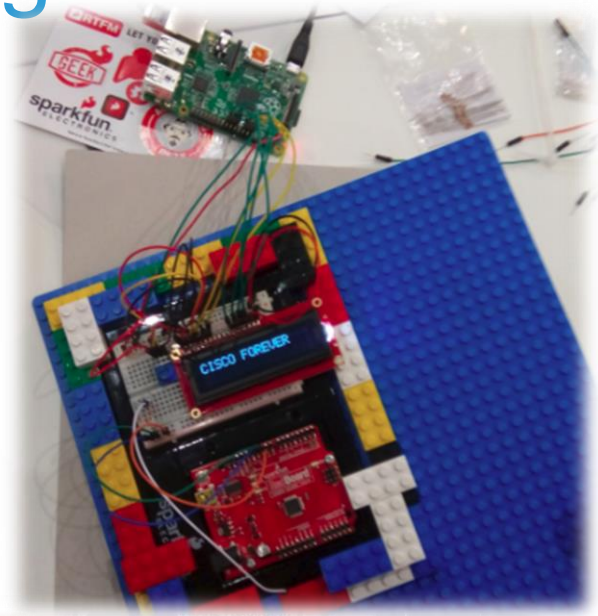






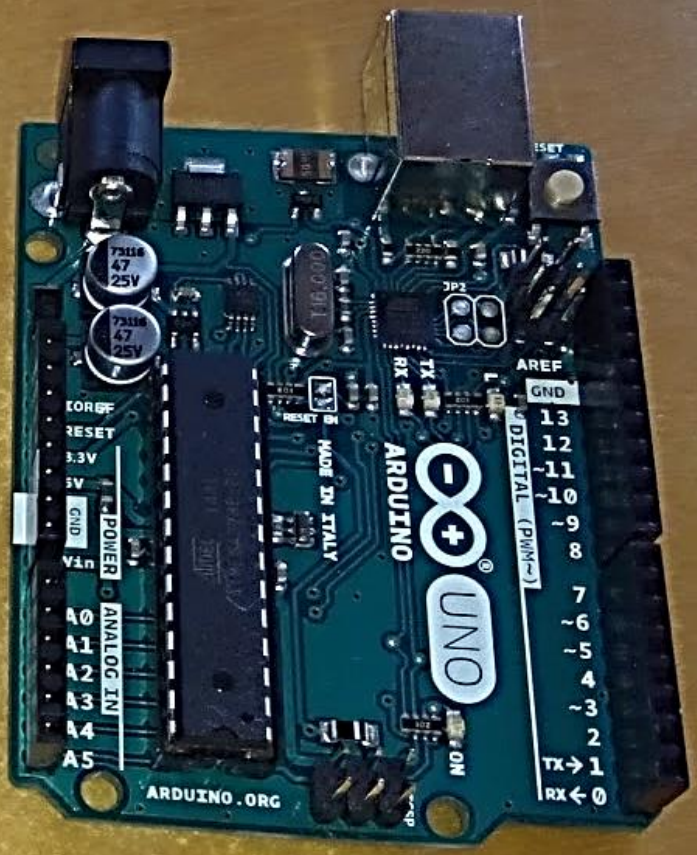


What will be your smart thing?

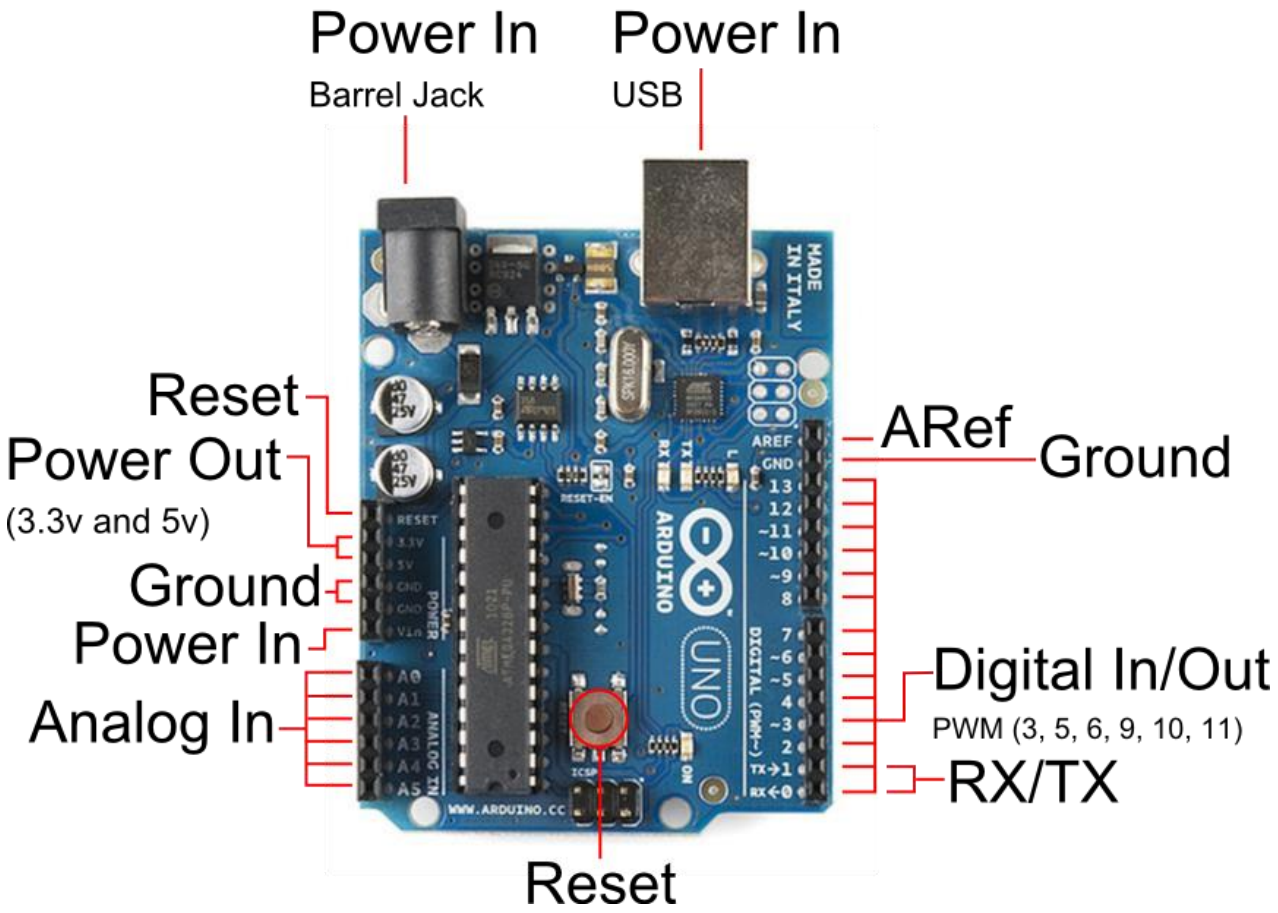


Prototyping

Arduino


ARDUINO
UNO
ARDUINO.ORG
MADE IN ITALY
POWER
ANALOG IN
DIGITAL (PWM~)
AREF
GND
RESET
TX
RX
ON

Arduino pins



Arduino Options

- Arduino Original 20 EUR+VAT
- Arduino clones from $5
- Arduino Starter Kit 80 EUR+VAT

Breadboard


a b c d e
f g h i j
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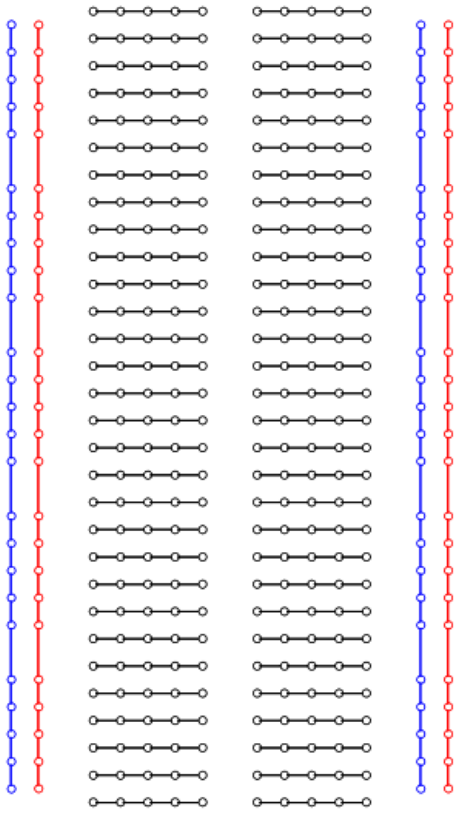
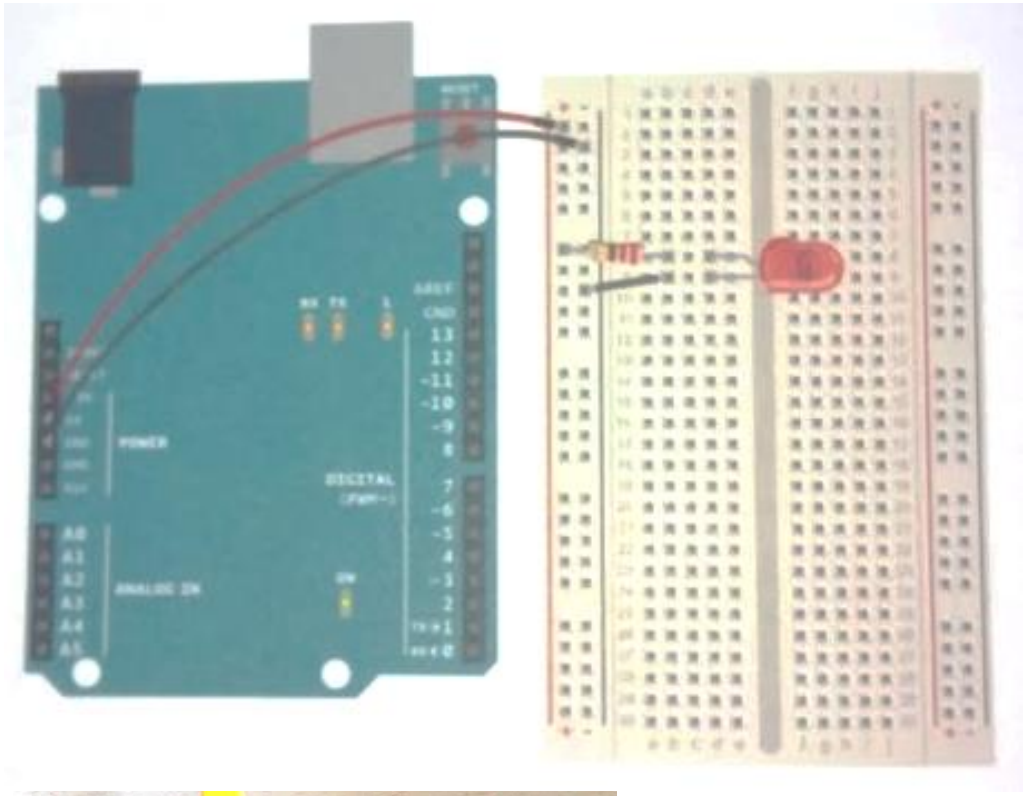
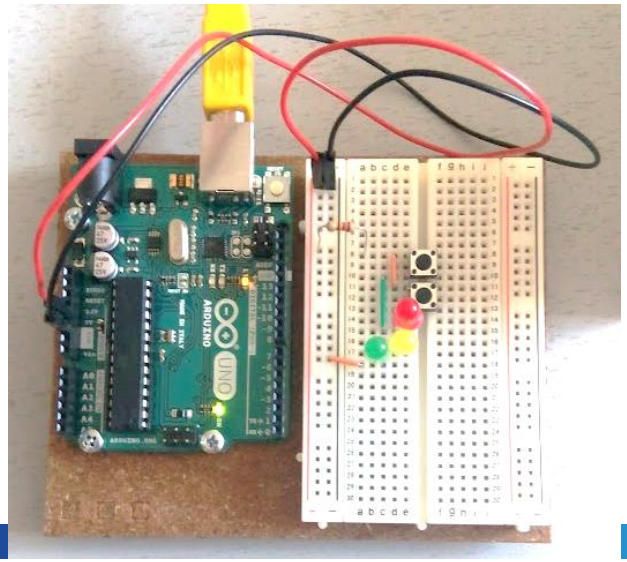
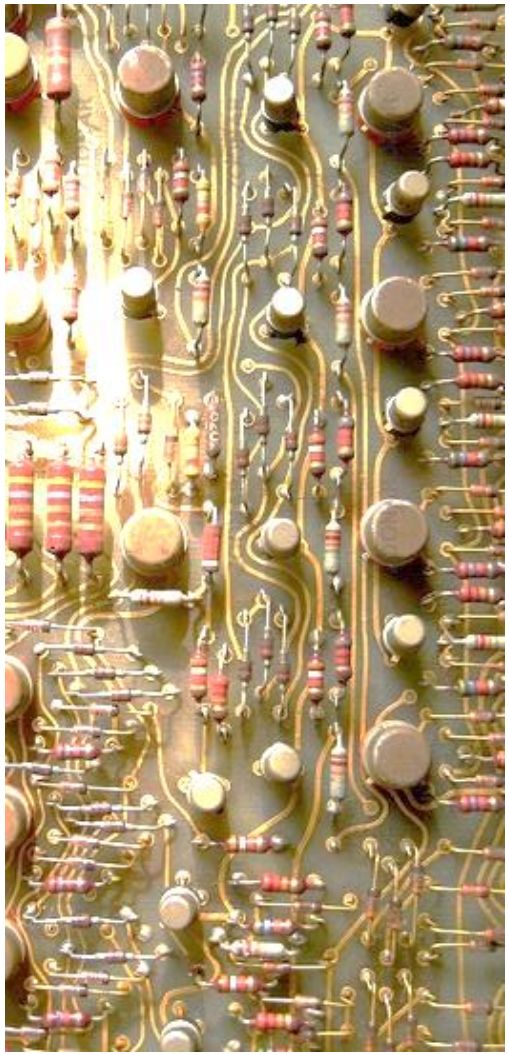
Breadboard



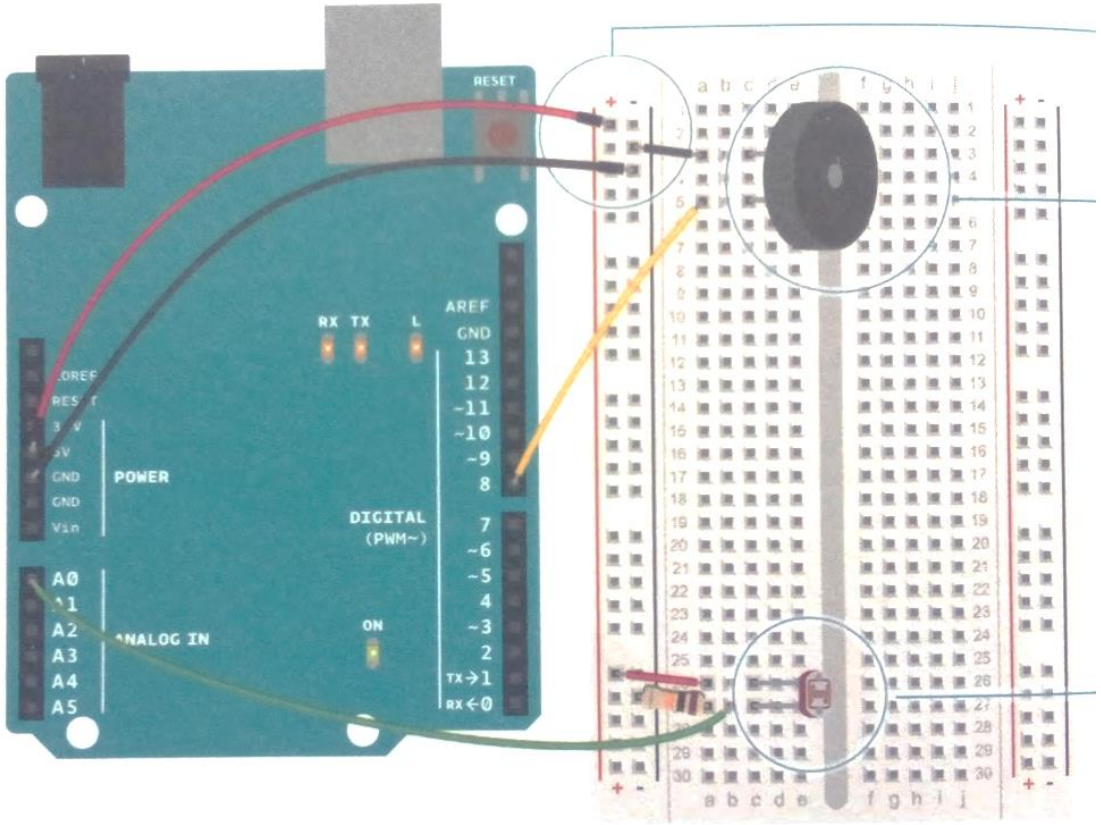




Amateur Electronics 2.0

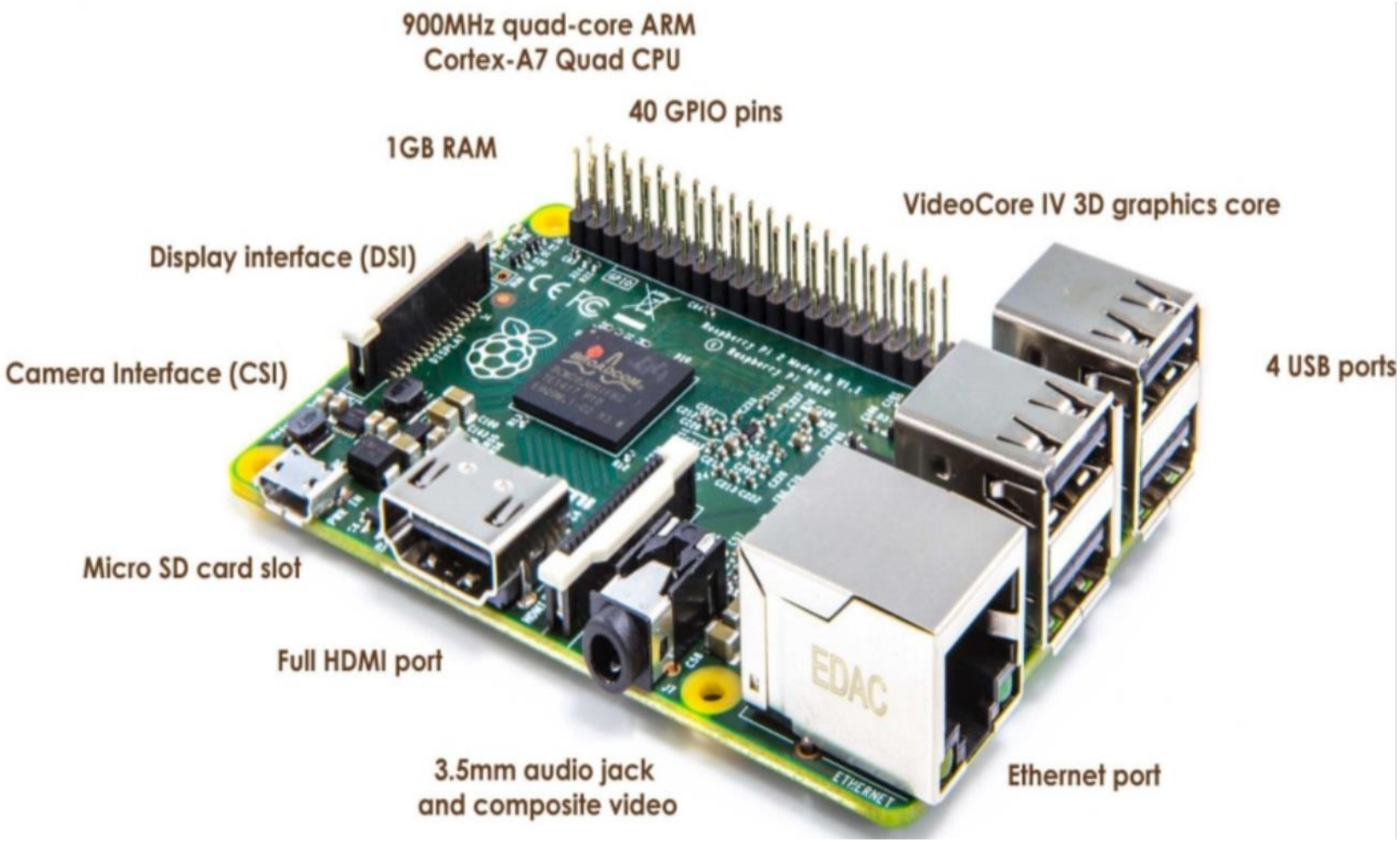


Hardwired vs Software-controlled

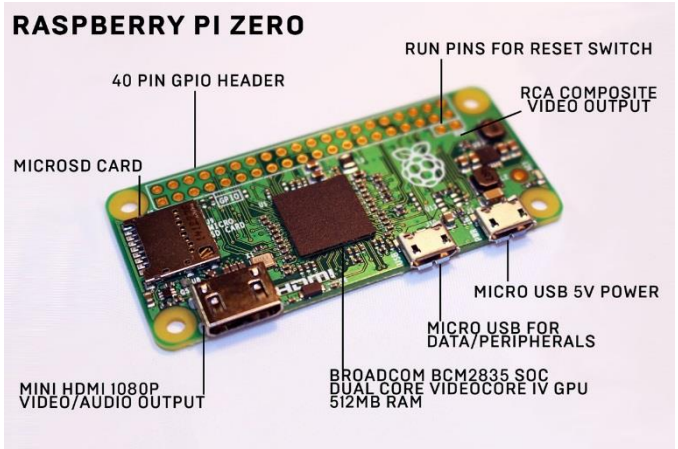


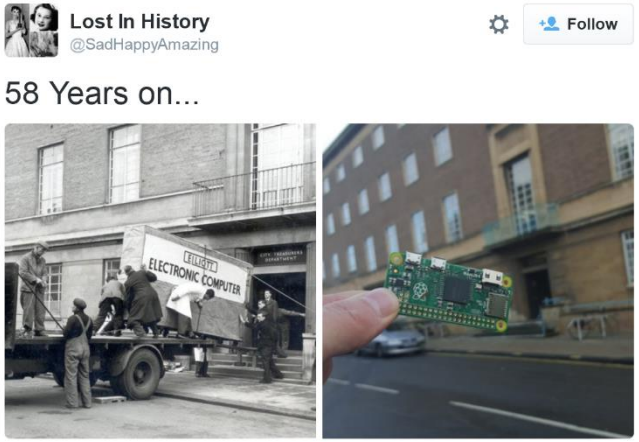
Raspberry Pi

Raspberry Pi 2 Model B



Raspberry Pi Zero - $5 computer





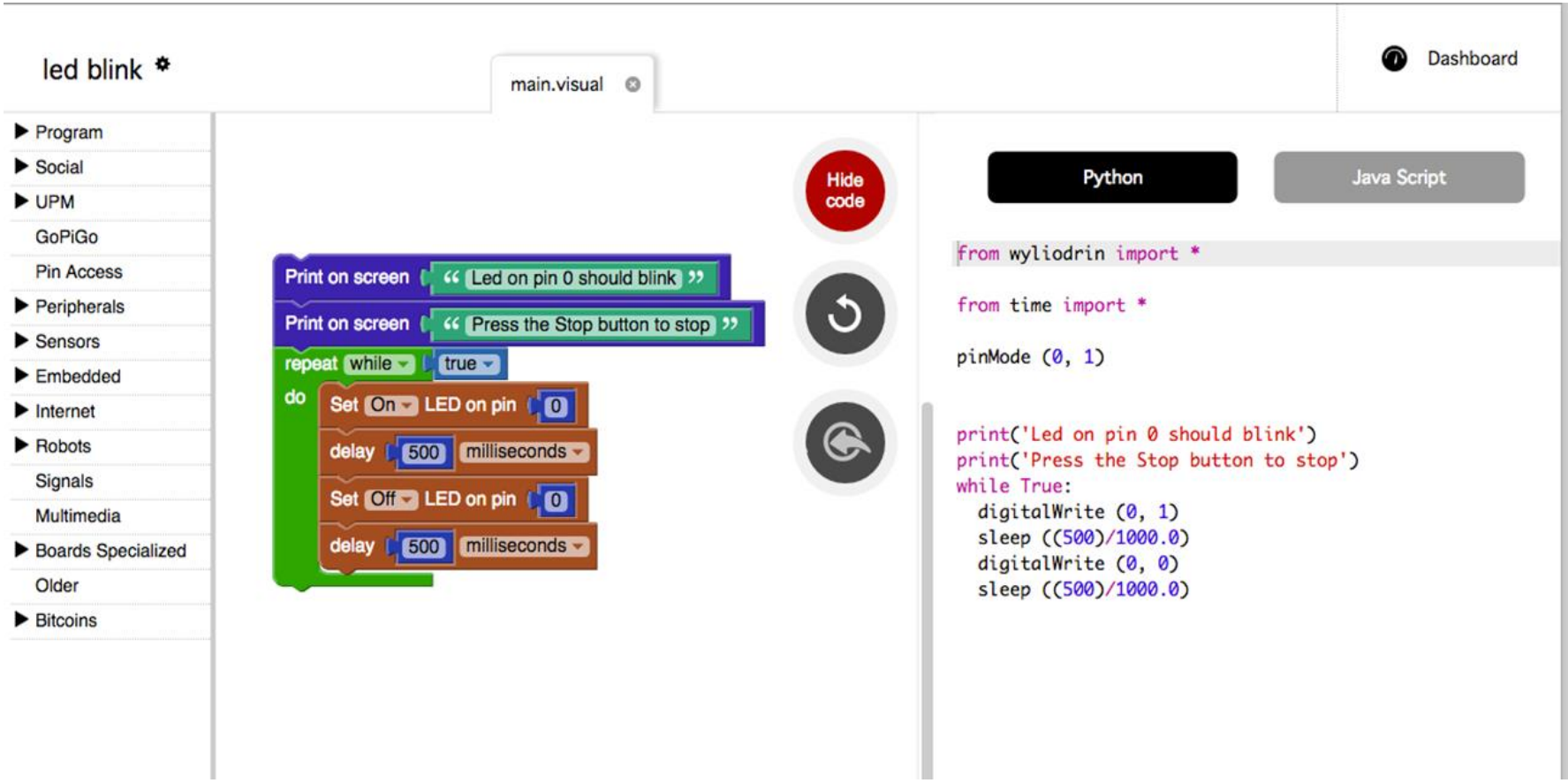
Prototyping Cloud

image+config

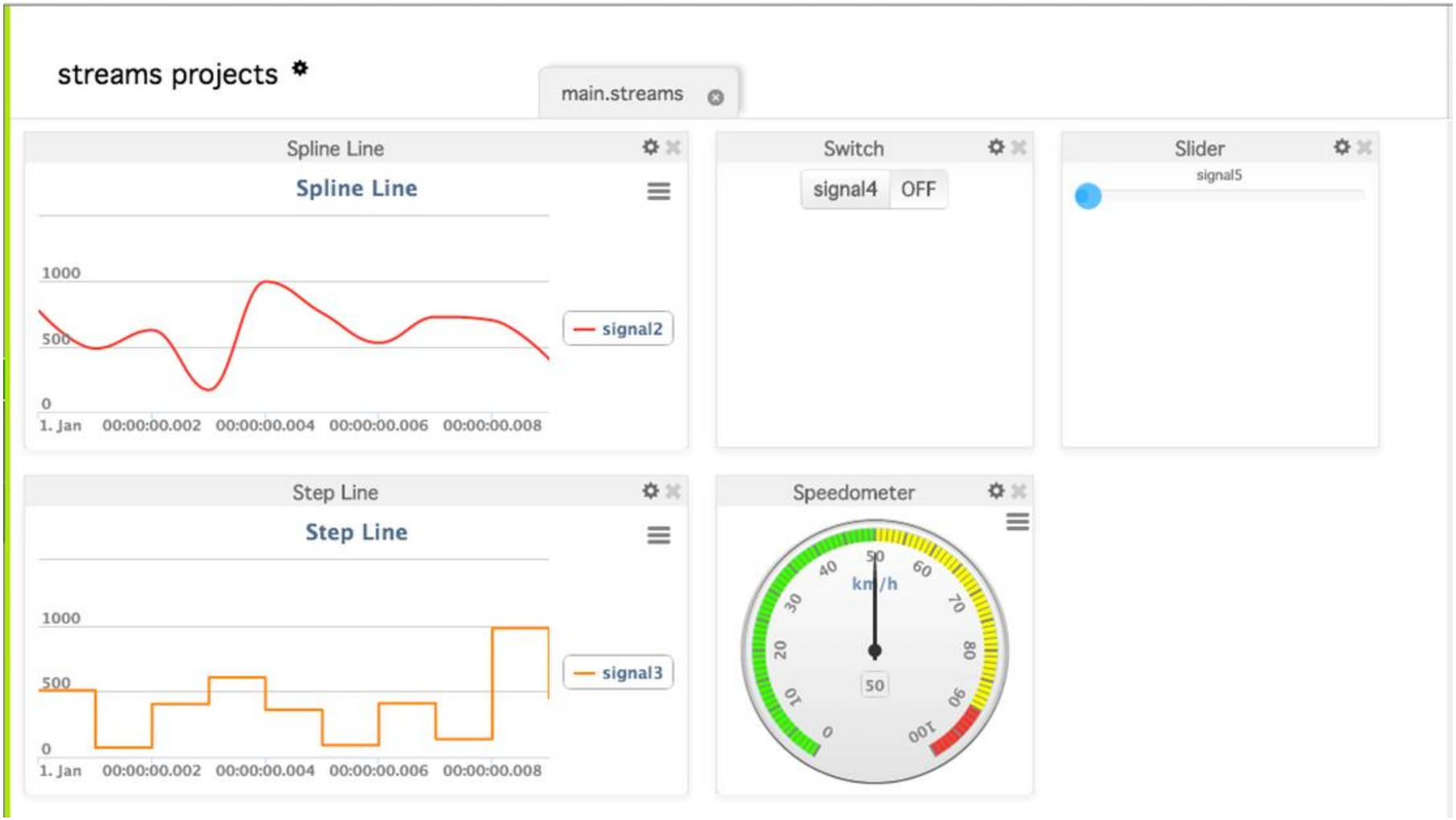
Web:
programming,
visualization, data
analytics, M2M, etc.

REST API
XMPP

Visual Programming



Graphs: Input from Sensors



Step1:
Bringing it online

Log in to demo account

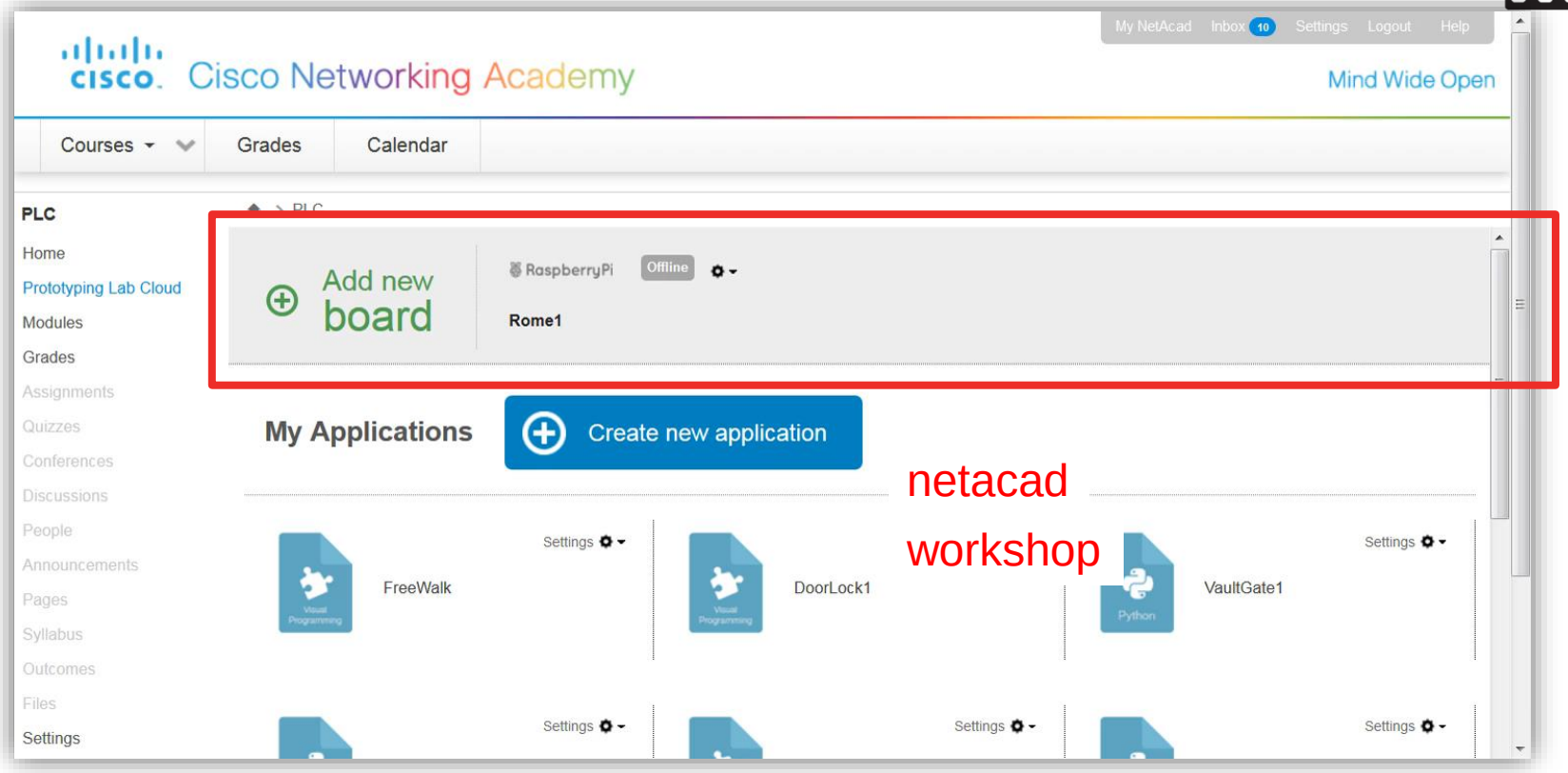
- http://www.netacad.com
- Use demo username and password with your team number
- Go to the course
- Click “Prototyping Lab Cloud”

netacad

workshop

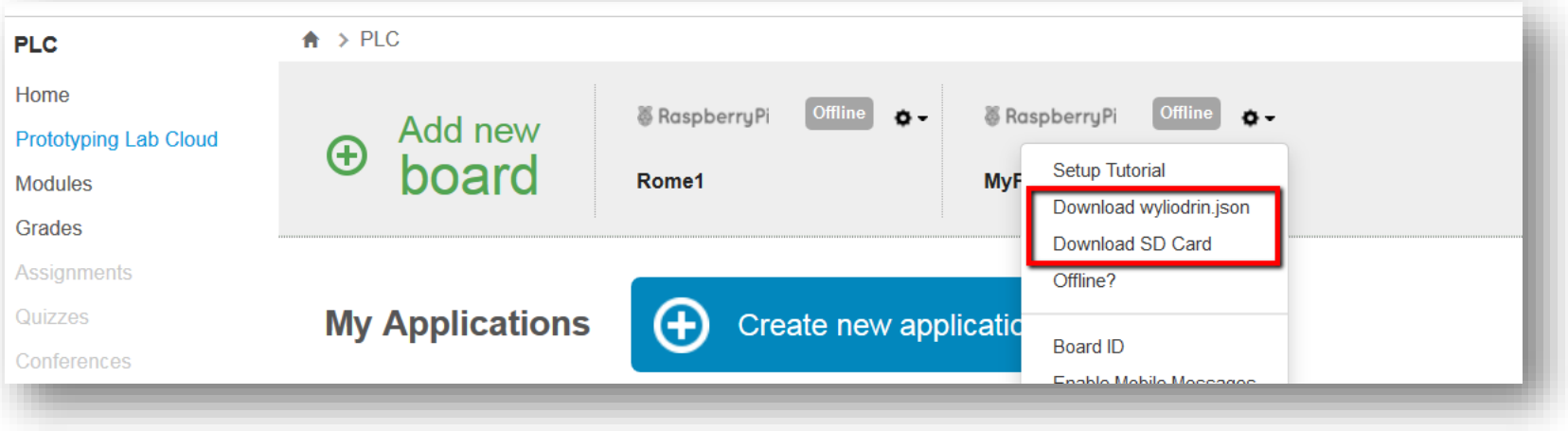
NetAcad Username	NetAcad Password
team01	Proto1746
team02	Proto1746
team03	Proto1746
team04	Proto1746
team05	Proto1746
team06	Proto1746
team07	Proto1746
team08	Proto1746
team09	Proto1746
team10	Proto1746
team11	Proto1746
team12	Proto1746
team13	Proto1746
team14	Proto1746
team15	Proto1746

Add new device



- Before adding yours, you may remove all existing boards and projects by clicking ⚙ then “Remove”

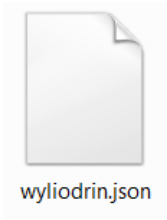
Downloading image and config

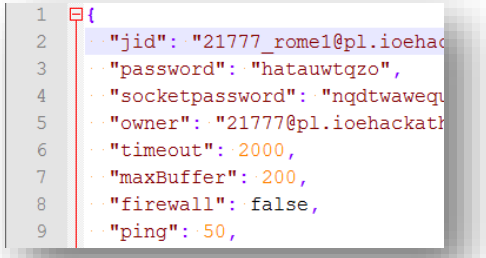


1. Flash OS image to SD card
   - Image download size: 1.4 GB
   - Image write time: 10-15 min

(already done to save time)

1. Download and copy the configuration file (wyliodrin.json) to your microSD card

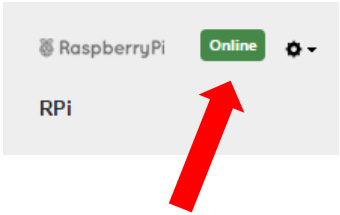




Connecting and starting your RPi

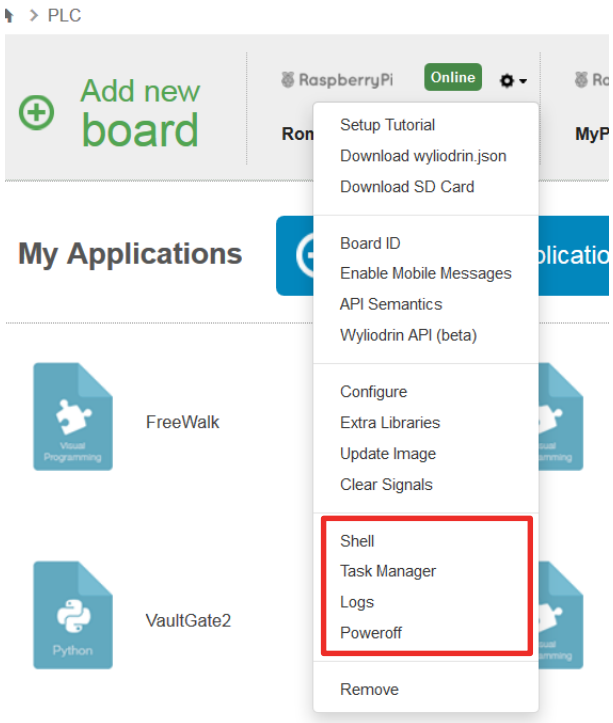
1 Insert the MicroSD card

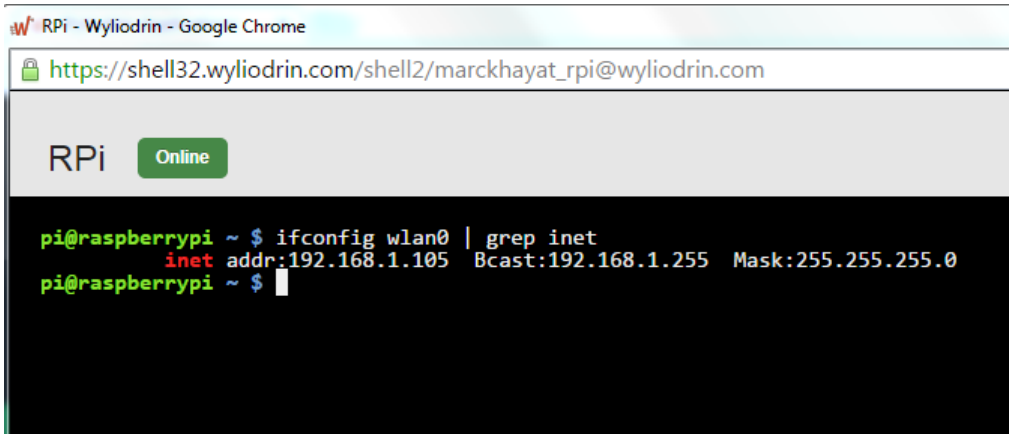
2 Power the RPi using MicroUSB cable



3 After 2 minutes device should show Online on Cloud

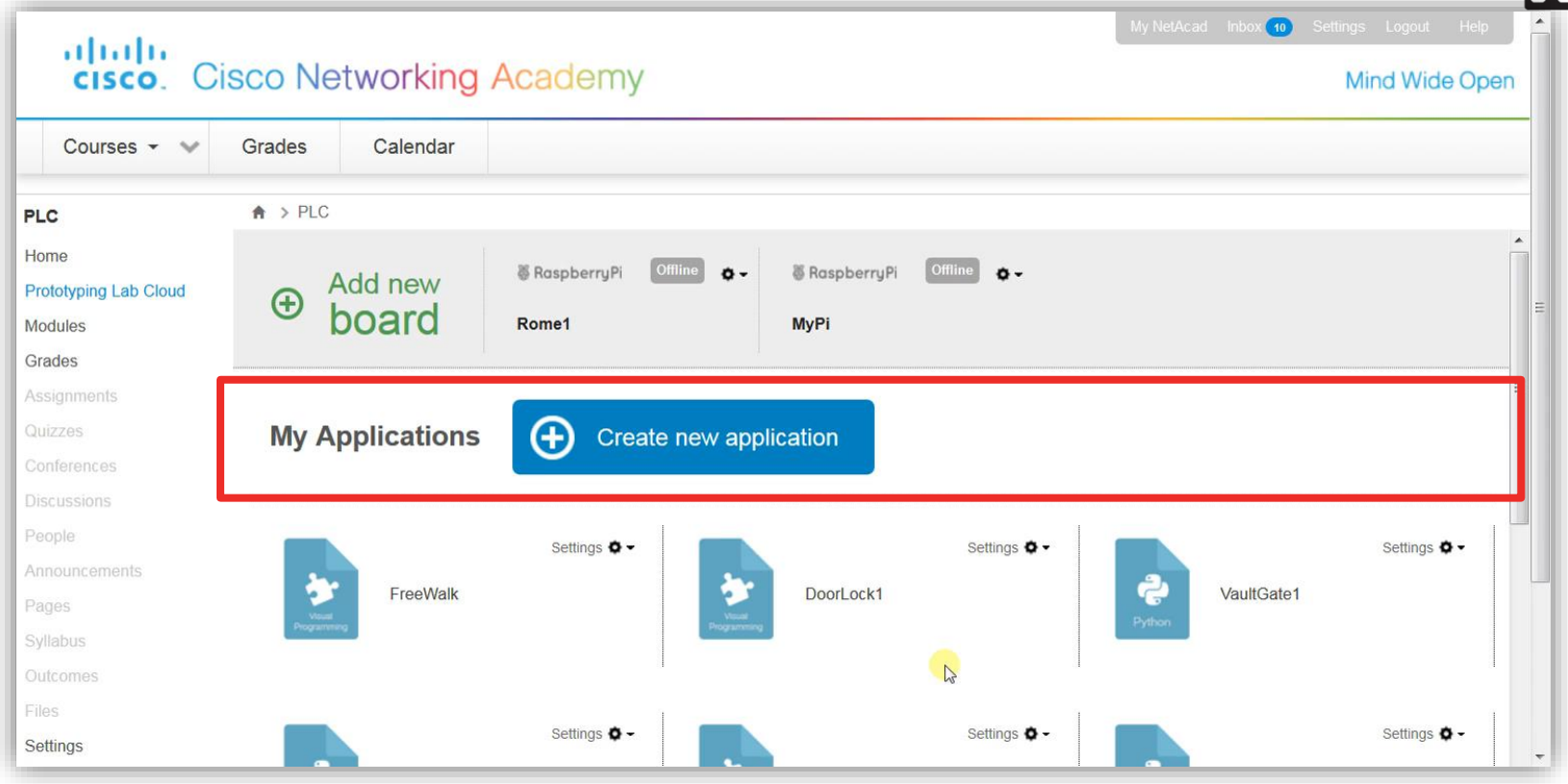
Connect to shell (optional)



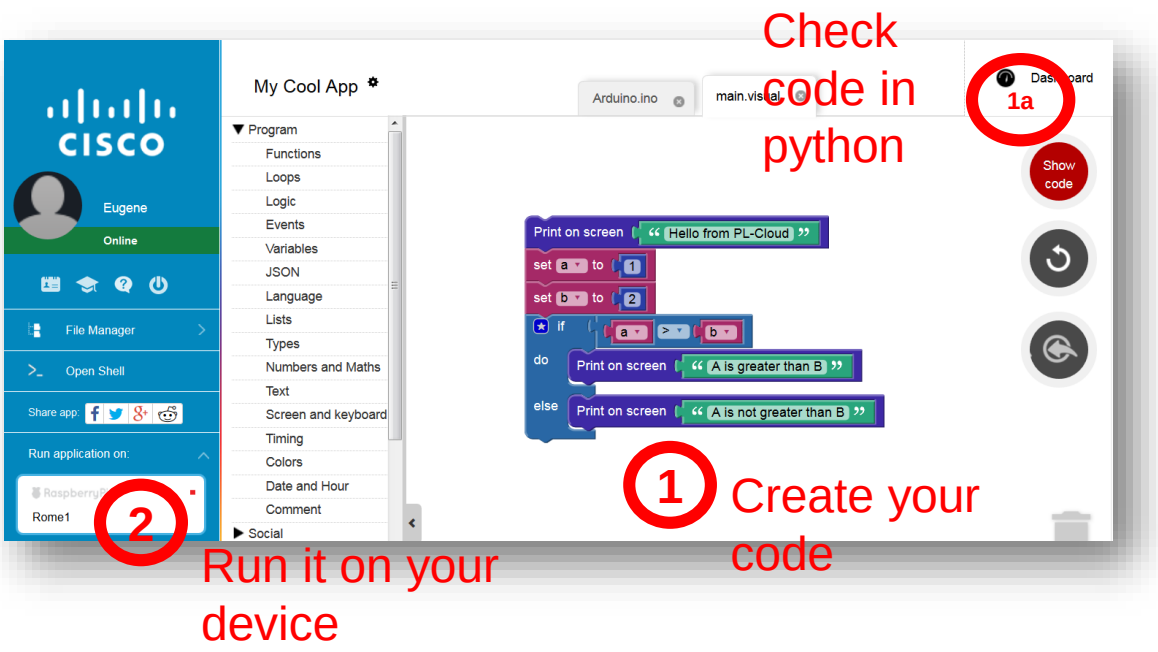


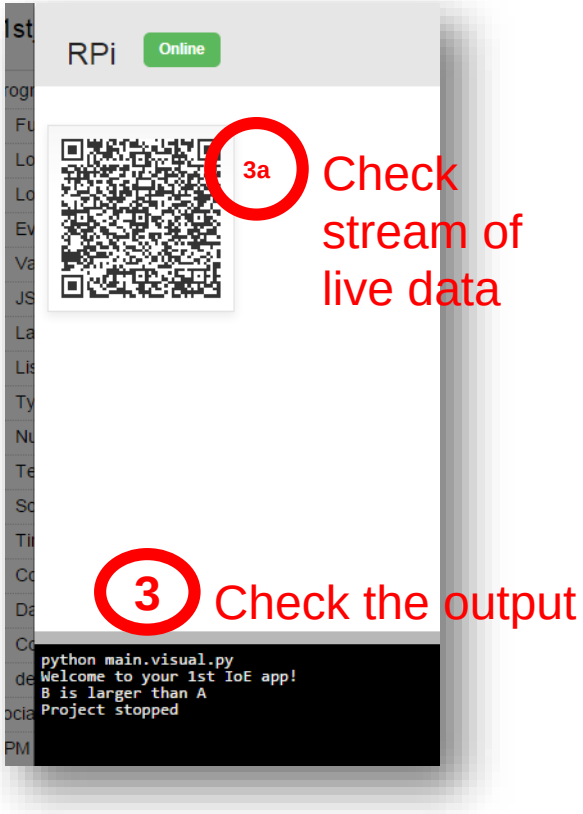
- This step is optional, it's just to verify you can access your board's CLI from the cloud.

Add new project



How to run your app





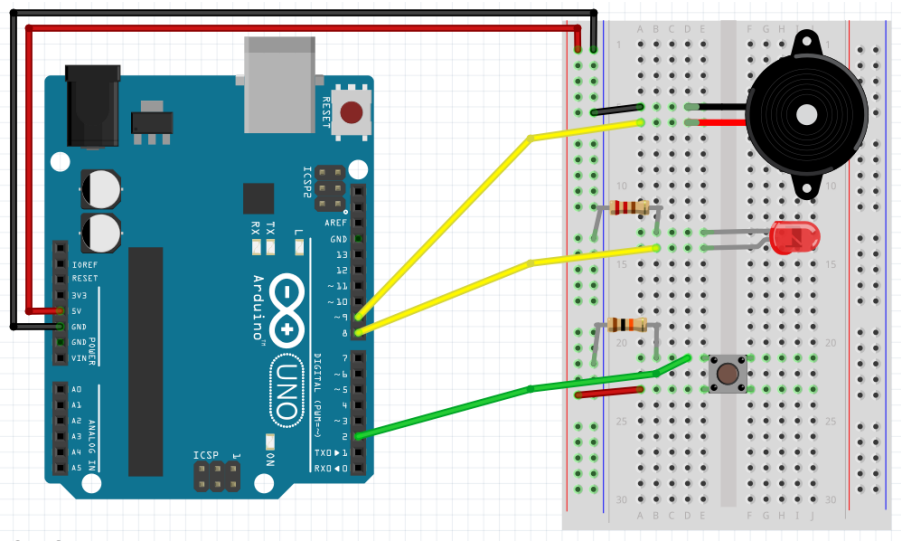
- You need to flash the Arduino only the first time you launch your application

Step 2: Creating a project

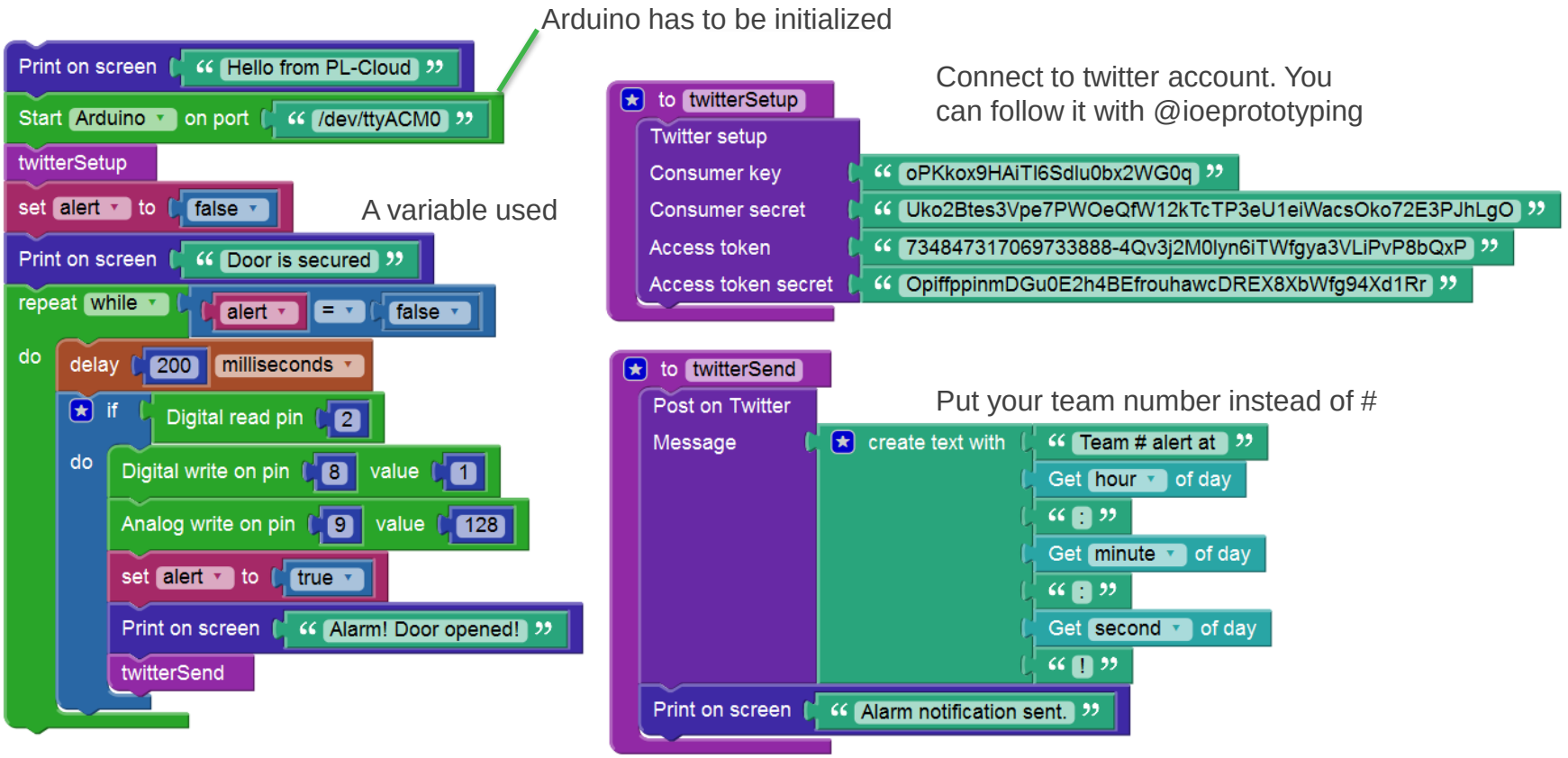
Select Project A or Project B

Project A – Door monitoring

- Monitor door using a simulation push-button
- If door is closed: nothing happens
- If door is opened:
  - Turn alarm light on
  - Sound annoying buzzer alarm
  - Send twitter notification



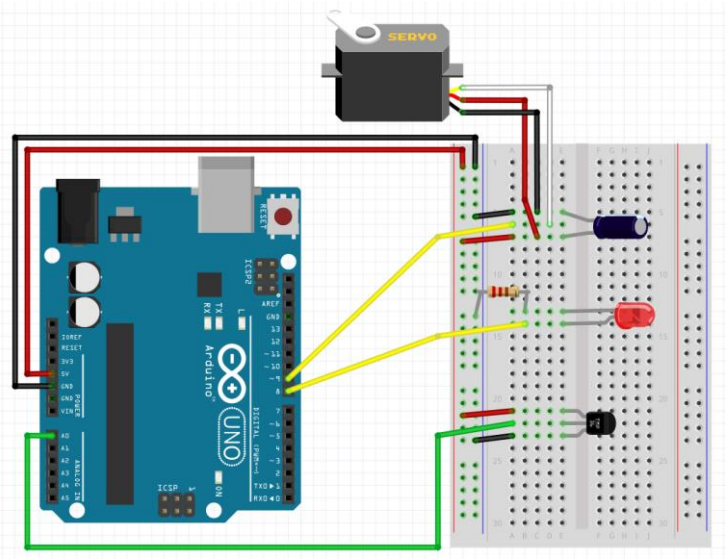
Project A – Code



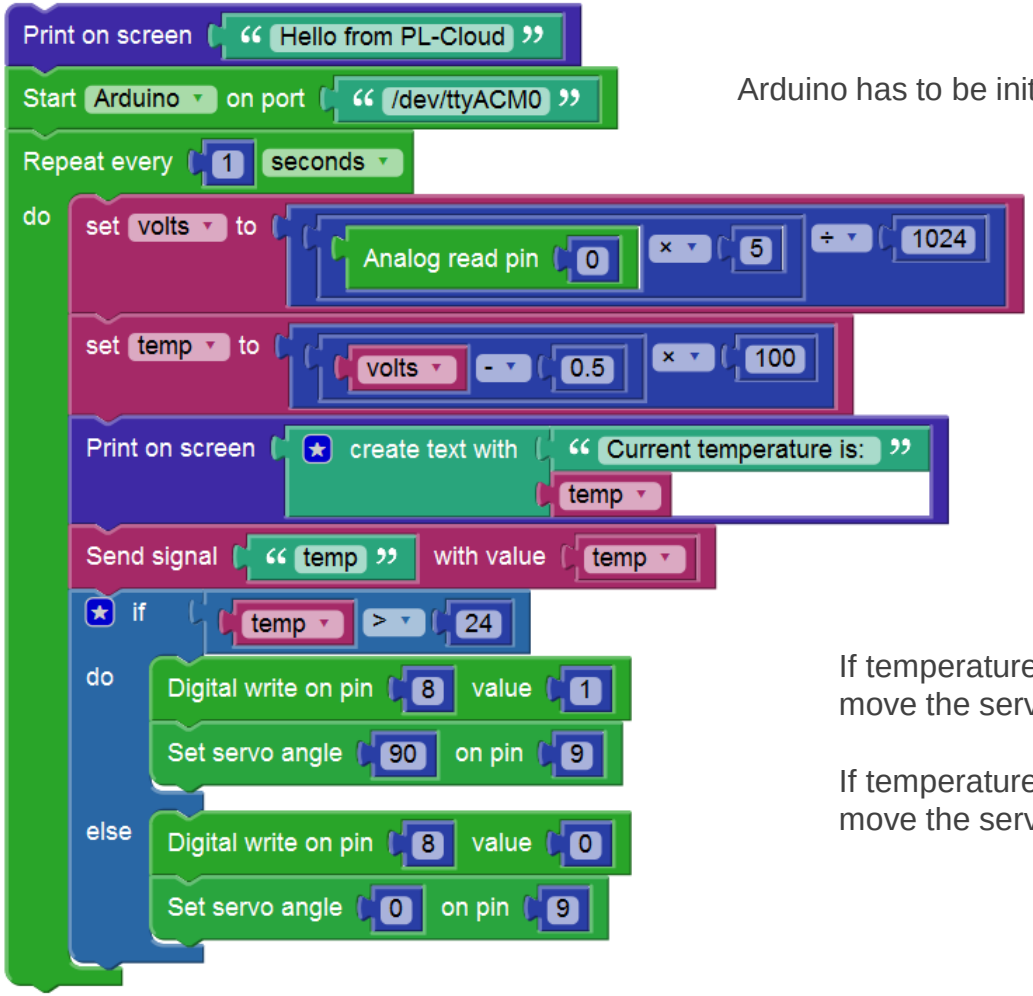
- Try to build your project without twitter notifications and verify it is working. You can add twitter feature then.

Project B – Smart Greenhouse

- Monitor temperature using sensor
- If temperature is below 24 ° C:
  - LED is green
- If temperature goes above 24 ° C:
  - Turn LED red
  - Articulate servo to open air vent
- Let the farmer monitor temperature online and with mobile phone



Project B – Code



Arduino has to be initialized

Sensor reading to ° C:
Voltage at pin in Volts
= (reading from pin) * (5/1024)
Centigrade temperature
= [(voltage in V) – 0.5] * 100

If temperature is too high, turn on the light, move the servo 90 degrees

If temperature is normal, turn off the light, move the servo to initial position

Let’s go!

Danke.

Cisco Networking Academy

Mind Wide Open

Cloud Prototyping Platform

- Publicly available
- Free account:
  - 1 board
  - 3 application
- www.wyliodrin.com