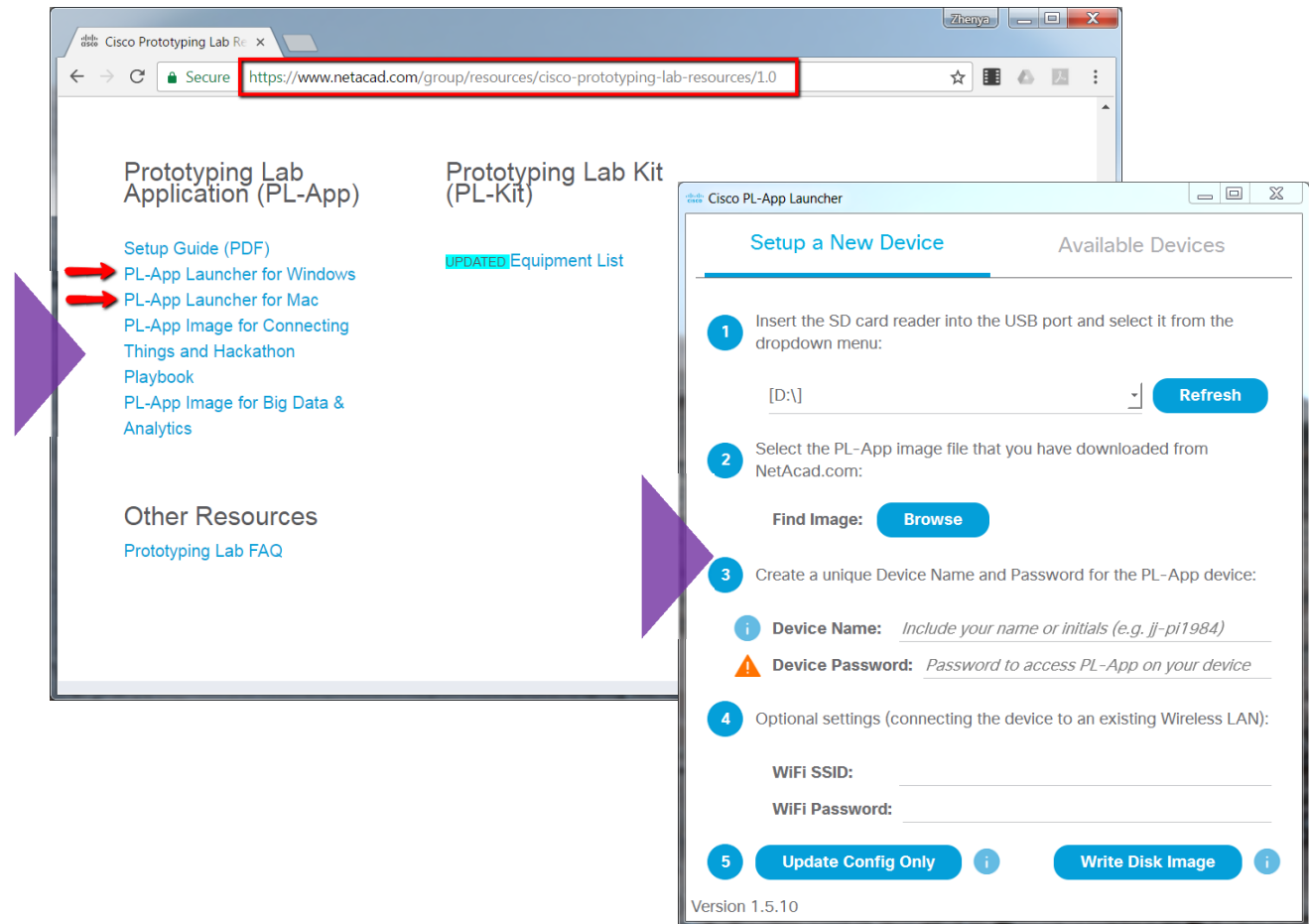


Step 1: Preparing the Platform



Download and install PL-App Launcher

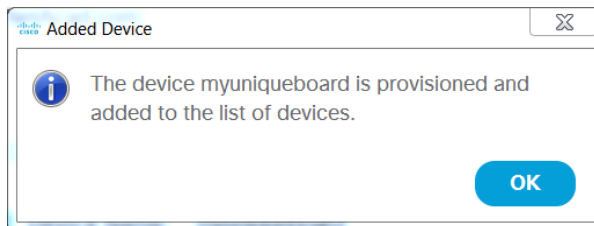
- Connect your laptop to the WiFi network
 - SSID: netacad
 - Password: workshop
- Go to NetAcad.com → Resources → Course Resources → IoT Fundamentals: Connecting Things → PL-App Launcher and Image →
- Download, install and launch PL-App Launcher



Configure PL-App

Your SD card is already flashed with PL-App image. You only need to configure it.

- Insert microSD card into your laptop using an appropriate adapter
- Select it from the dropdown menu 1
- Give your device a unique name and password 3
- Input WiFi SSID and password, if wireless network is used 4
- Click **Update Config Only** to update configuration without reimagining the SD card
- Configuration will be updated:



The screenshot shows the 'Cisco PL-App Launcher' window with the 'Setup a New Device' tab selected. The interface is divided into five numbered steps:

- Step 1:** 'Insert the SD card reader into the USB port and select it from the dropdown menu:' Below this is a dropdown menu showing '[D:\]' and a 'Refresh' button.
- Step 2:** 'Select the PL-App image file that you have downloaded from NetAcad.com:' Below this is a 'Find Image:' label and a 'Browse' button. A red box with the text 'no need to use image file' is overlaid on the right side of this step.
- Step 3:** 'Create a unique Device Name and Password for the PL-App device:' This step includes two fields: 'Device Name:' with the value 'myuniqueboard' and 'Device Password:' with masked characters. A warning icon is present next to the password field.
- Step 4:** 'Optional settings (connecting the device to an existing Wireless LAN):' This step includes two fields: 'WiFi SSID:' with the value 'netacad' and 'WiFi Password:' with masked characters. A box with the text 'workshop' is overlaid on the right side of this step.
- Step 5:** At the bottom, there are two buttons: 'Update Config Only' and 'Write Disk Image'. A red box with the text 'no need to write image' is overlaid on the right side of this step.

At the bottom of the window, it says 'Version 1.5.10'.

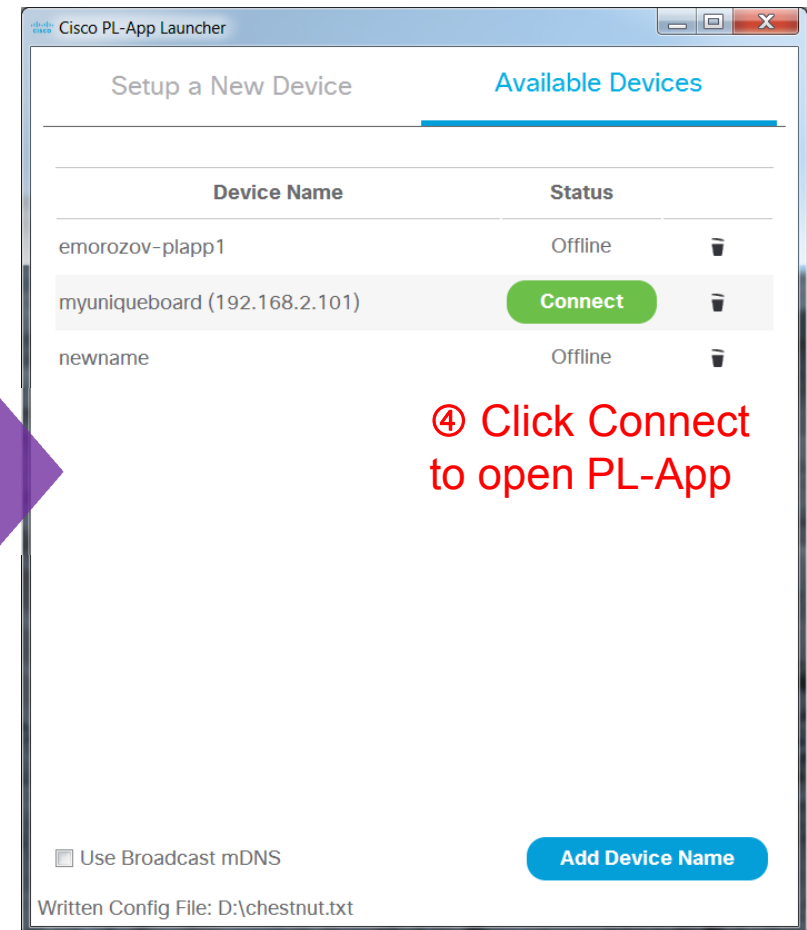
Connect and start your Raspberry Pi

- Safely remove SD card from your laptop


① Insert the MicroSD card

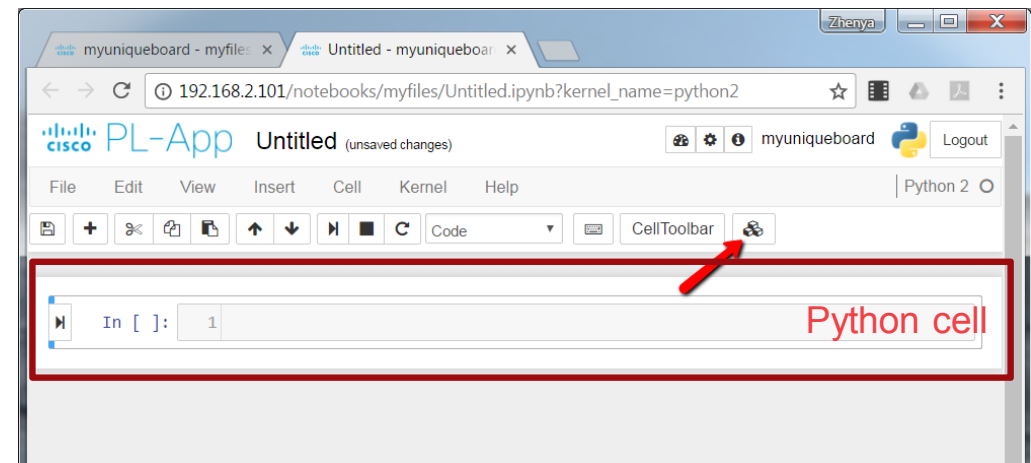
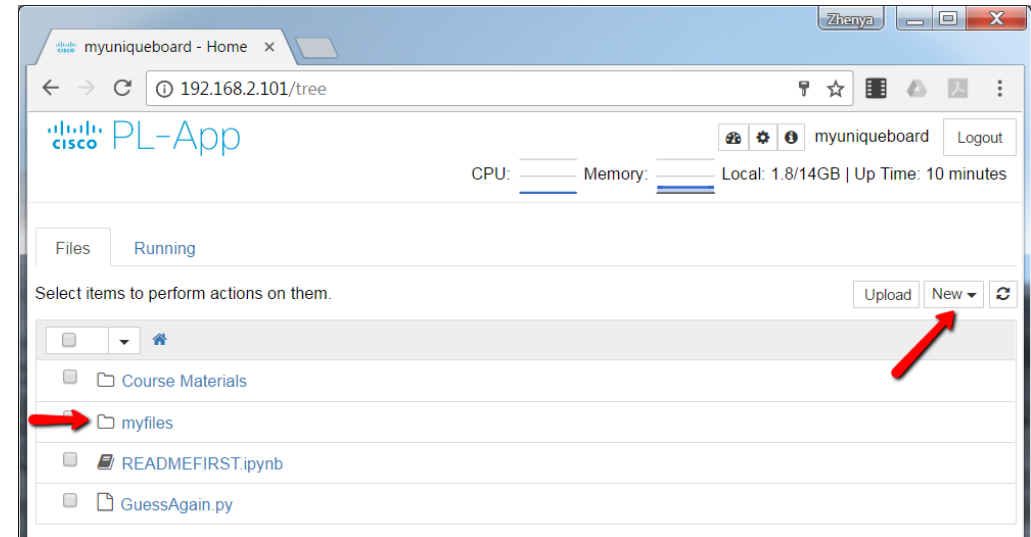
③ Power the RPi using MicroUSB cable

② Insert WiFi adapter or Ethernet cable




Create a project file

- Google Chrome is the best supported browser for PL-App at the moment
- Log into your board with the password you created
- Go to 'myfiles' folder
- Create a new notebook with Python 2
- A new notebook will open with a Python cell in it
- Click the small Blockly  icon to convert the cell into Blockly visual code
- We will use this cell to flash Firmata firmware into Arduino



Prepare your Arduino


In order to communicate with Raspberry Pi, Arduino should be flashed with a special firmware called Firmata

- Build the code to flash Arduino in the cell you have created
- Drag and snap Blockly instructions
- `flash Firmata to Arduino` instruction located under “Arduino” category
- The port should be `/dev/ttyACM0` or `/dev/ttyUSB0` depending on your hardware
- Connect Arduino to Raspberry Pi with USB cable
- Run the cell with  button



④ Run the cell

② Build the code to flash Arduino



① Grab instructions from here

③ Note a Python code is generated on the go



```
Welcome to PL-App
will flash Firmata now...
Flashing Standard Firmata to a USB-connected Arduino. Please wait...
Done flashing.

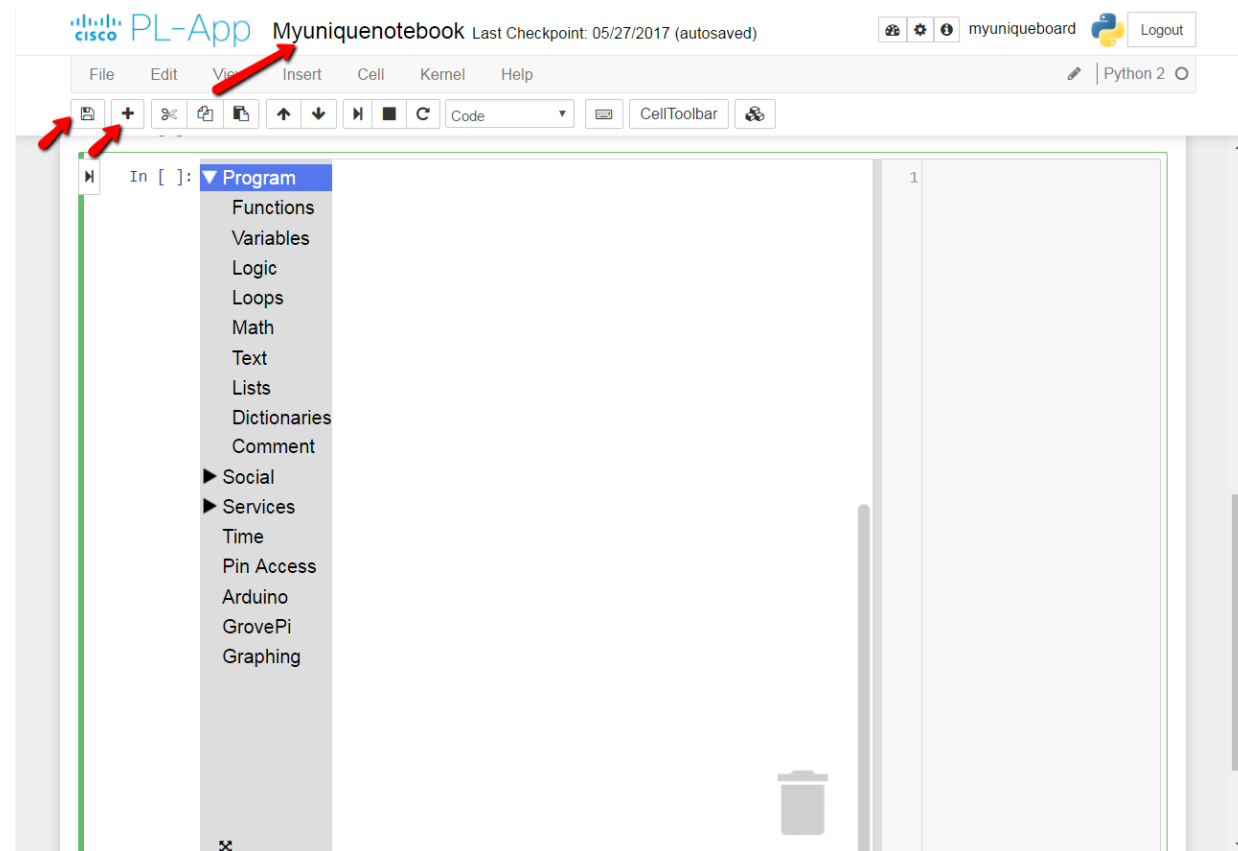
Out[2]: 0
```

Arduino is flashed

Get ready to build your project

Arduino has to be flashed only once. There is no need to flash it each time you run your project. We will use another cell to build your project.

- Click the  button to add new cell and make it Blockly cell 
- Rename your notebook to give it a unique name
- Save your notebook



Step 2: Creating a project



Project – Door monitoring

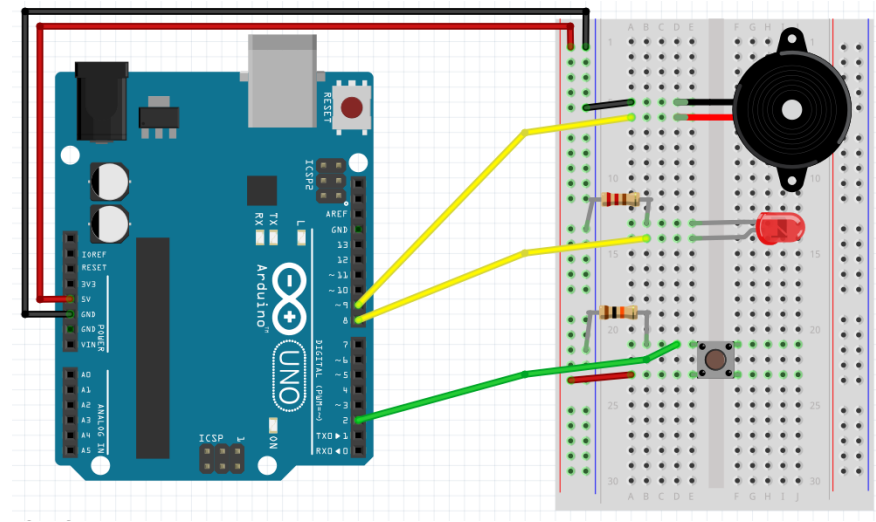
Monitor door using a simulation
push-button

While door is closed:

- nothing happens

When door is opened:

- Turn alarm light on
- Sound annoying buzzer alarm
- Send twitter notification



Project - Wiring

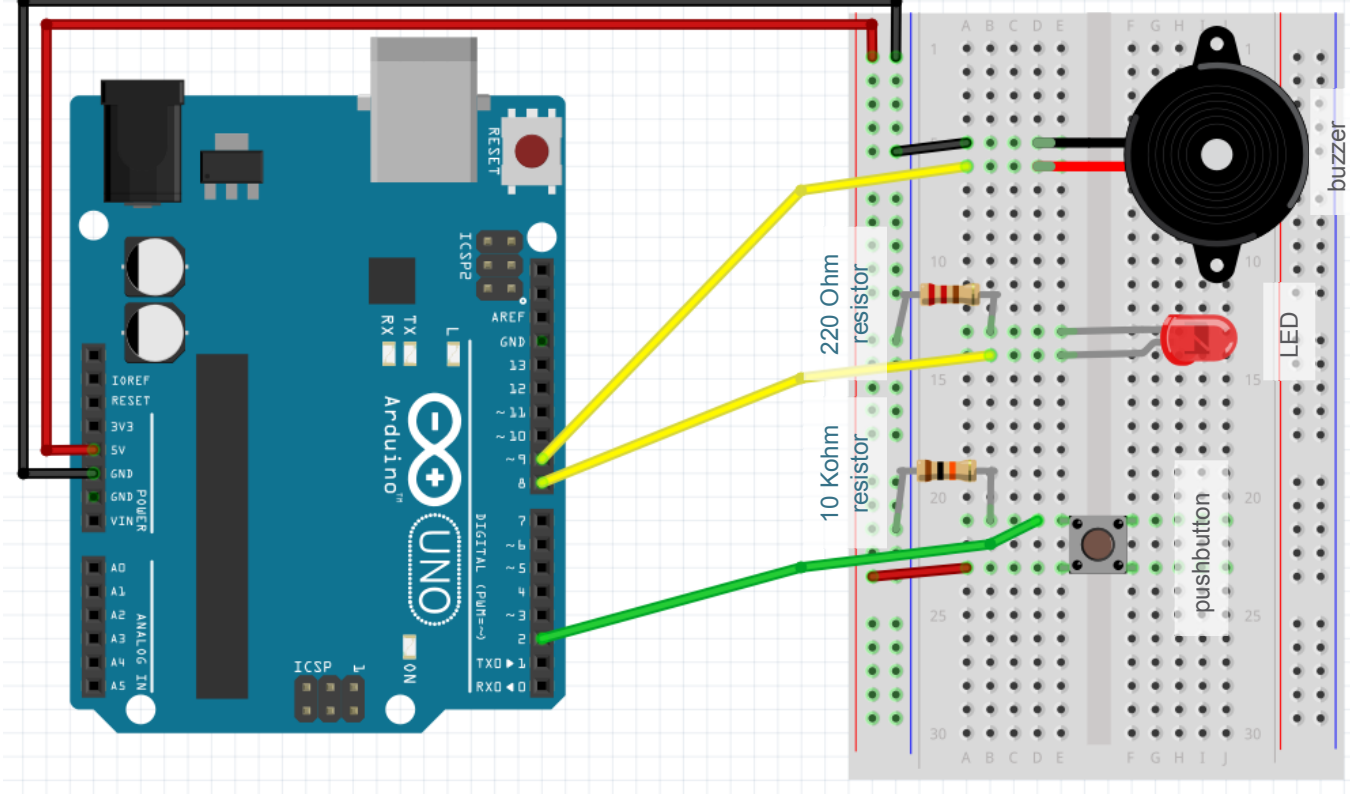
Wire color code:

RED – power 5V

BLACK – ground

GREEN – input

YELLOW - output



For resistor color coding,
refer to page 41 of Arduino
Projects Book

LED: short leg is ground

Project – Code

The code is organized into several sections:

- Initialization:** Starts with a 'print' block 'Welcome to PL-App'. It then connects to the Arduino on port '/dev/ttyACM0'. An 'analog read on pin' block is set to pin 0.
- Twitter Setup:** A 'Twitter setup' block contains four text fields for: Consumer key, Consumer secret, Access token, and Access token secret.
- Pin Configuration:** Three 'set Arduino pin' blocks configure pins 2, 8, and 9 to INPUT, OUTPUT, and PWM modes respectively.
- Alert Variable:** A 'set alert' block is set to 'false'. A 'print' block says 'Door secured'.
- Main Loop:** A 'repeat while' loop with the condition 'alert = false'. Inside the loop:
 - A 'sleep' block for 1 second.
 - An 'if' block checking 'digital read on pin 2'. If true, it executes a 'do' block containing:
 - 'set alert' to 'true'.
 - 'digital write to pin 8' with value 1.
 - 'analog write to pin 9' with value 20.
 - 'print' block: 'ALARM! Door opened!'.
 - 'twitterSend' block.

- Twitter Send Function:** A separate block 'to twitterSend' contains:
- 'Post on Twitter' block with 'Message' set to 'create text with'.
- The 'create text with' block has three inputs: 'Team # Secure door has been opened at:', 'seconds since start', and 'seconds'.
- A 'print' block: 'Alarm notification sent'.

Annotations and instructions:

- 'Arduino has to be initialized' points to the 'connect Arduino on port' block.
- 'Weird command (beta issue)' points to the 'analog read on pin' block.
- 'Connect to twitter account. You can follow it with @ioeprototyping' points to the Twitter setup fields.
- 'Initialize Arduino pins' points to the 'set Arduino pin' blocks.
- 'A variable used' points to the 'set alert' block.
- 'Put your team number instead of #, add your city in the tweet' points to the 'create text with' block in the 'twitterSend' function.

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

Clean up

Please follow these clean up steps after the workshop:

- Disassemble your device completely
- Carefully pack all equipment back to the box
- You can keep the paper instructions

