SNP –Tech Wednesday - Class #4 – 2018May30

Controlling a LEGO mindstorm using python

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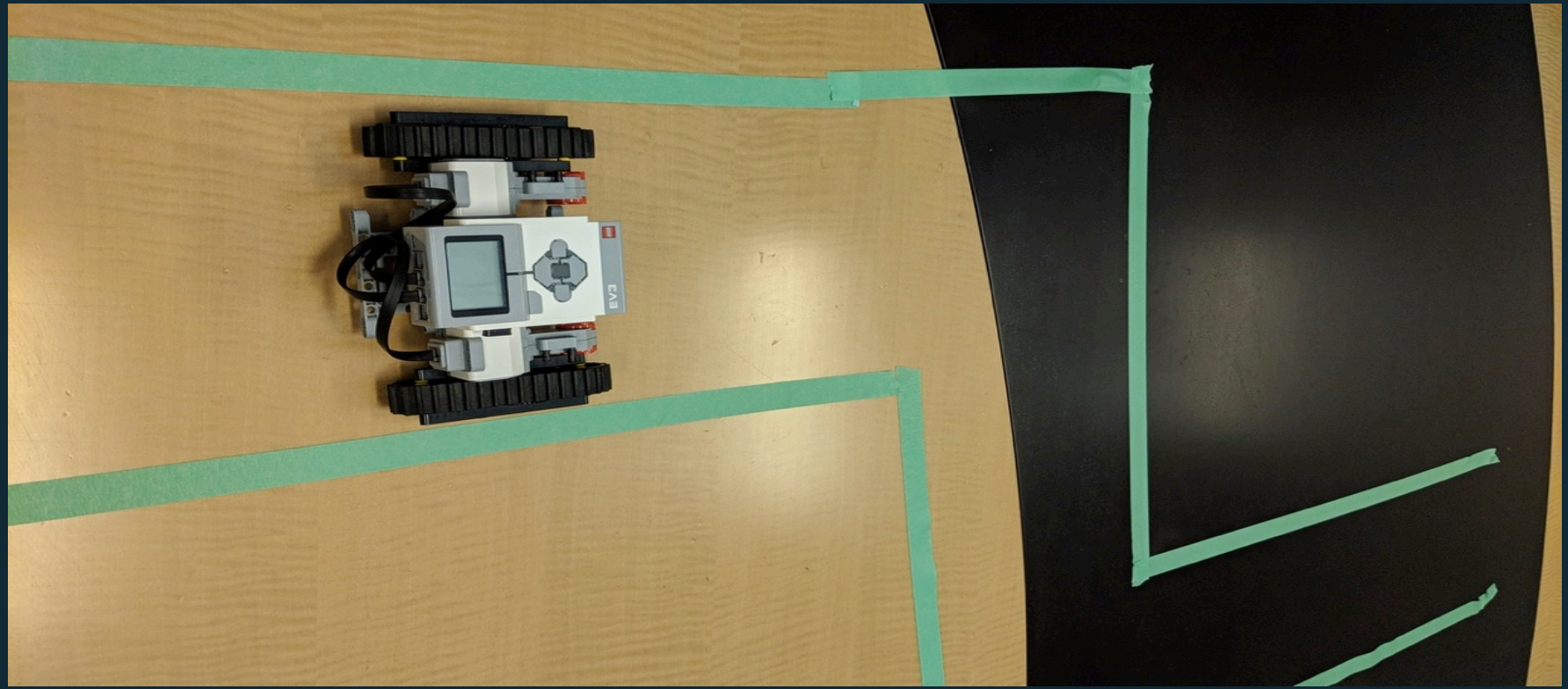
IBM SPEED

Think. Create. Win.

https://en.wikipedia.org/wiki/Six_Nations_Polytechnic

Goal – Control a Lego Robot/Rover via python code



Step 1

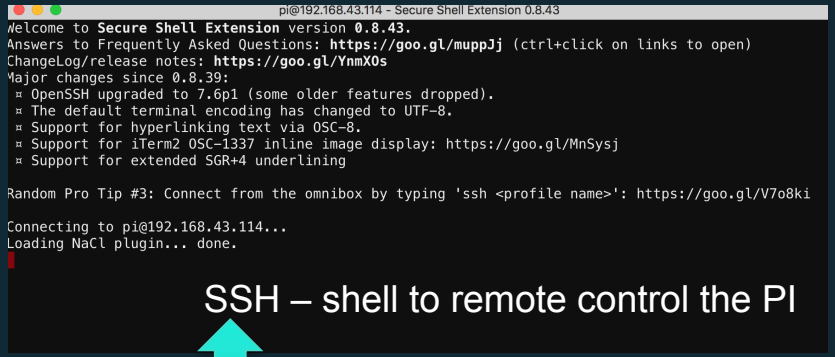
- Build a simple Mindstorm Rover
- Keep is simple
- Look at the example one
- Keep to 20-30 Min

Teachers Task

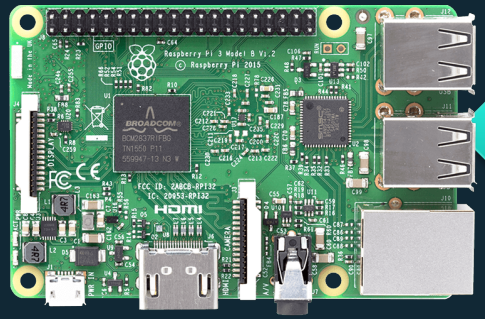
- Connect Pis
- Update Pis
- Write down PI IP-address
- Pair with Mindstorms once the rovers a build
- Write down Mindstorm MAC address

A little bit of Hacking

Overview of the Setup



SSH – shell to remote control the PI

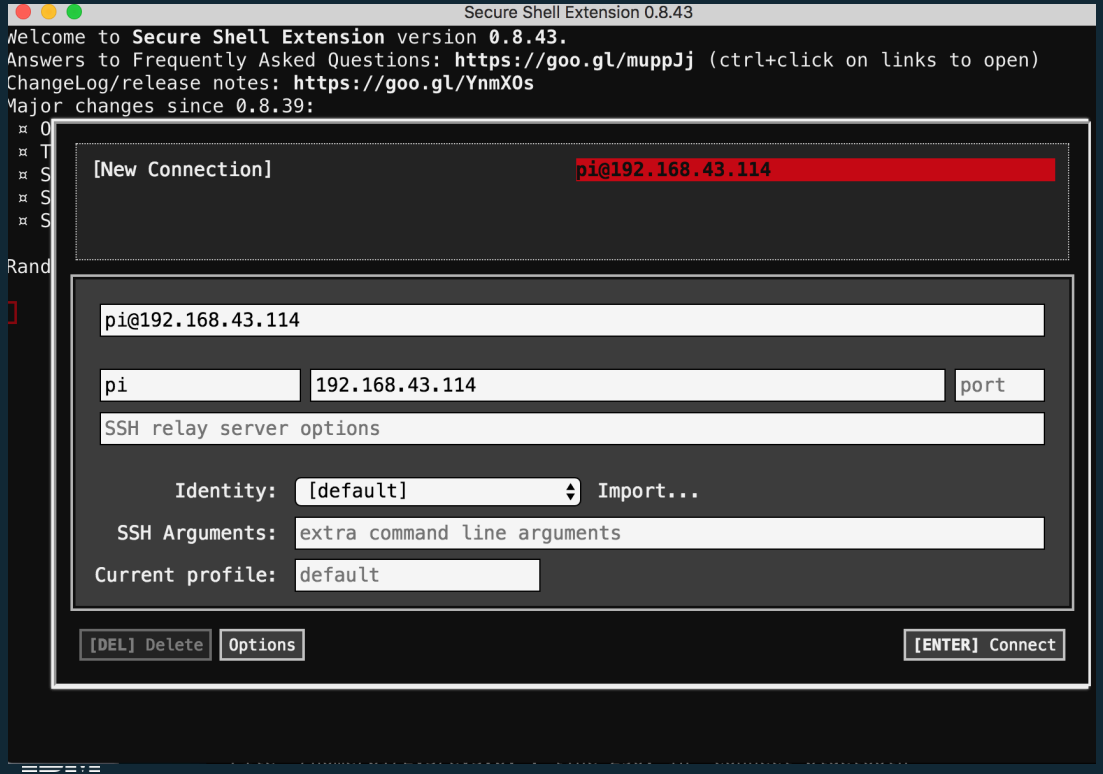


Bluetooth

Raspberry PI controlling the Robot

mindstorm

Install the SSH – secure shell on your desktop / chrome extension
Launch and connect to the PI with the IP address of the Raspberry PI



Use “**pi**” as the username
And “**raspberry**”
as the password

Some important Unix commands

Note: Everything is case sensitive

ls - list the directory content
cd - change the directory
cp - copy a program like cp from to
pwd - show where you are in the directory
nano - code editor
python3 - is the programing language and also the command to execute our code

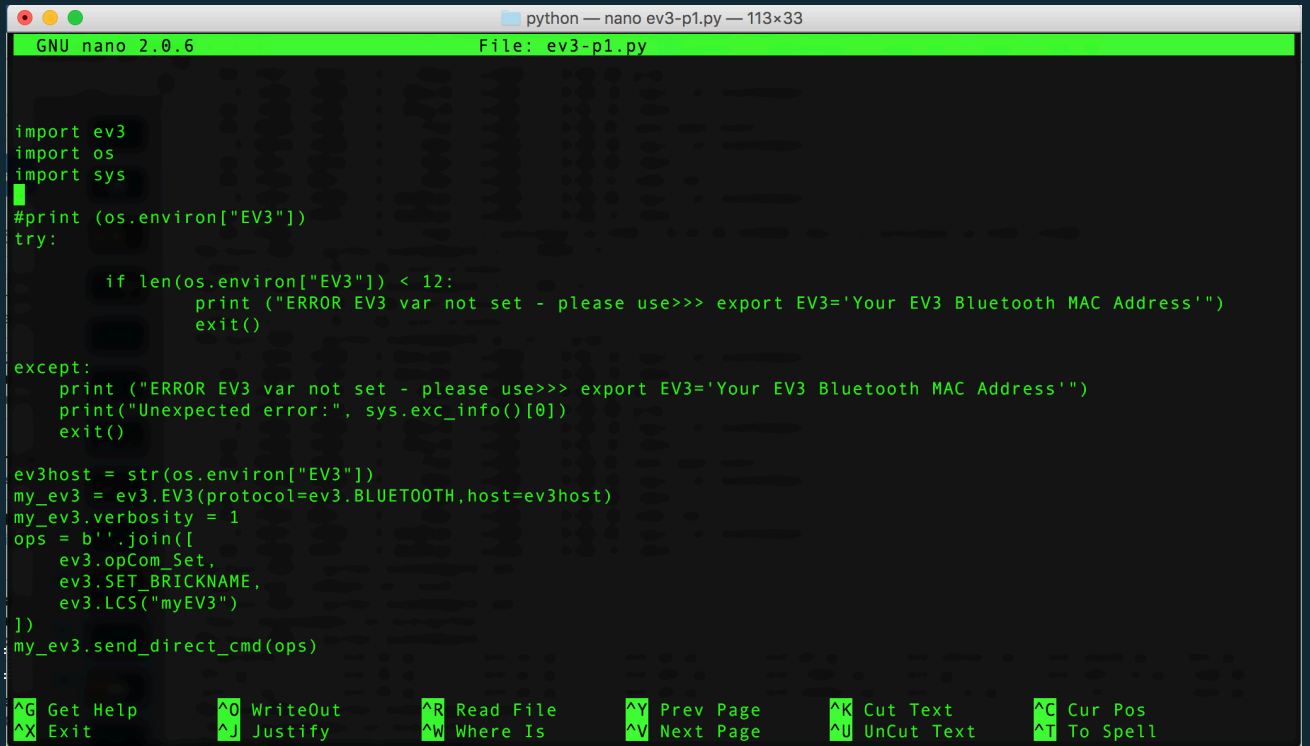
Our code is the directory EV3 – use cd EV3 to get to the directory
The code ends with *.py

Unix editor - nano

nano is a small editor to edit the programs

like: nano ev3-1.py

Node. Control + X will let use exit and save the progam after you changed something

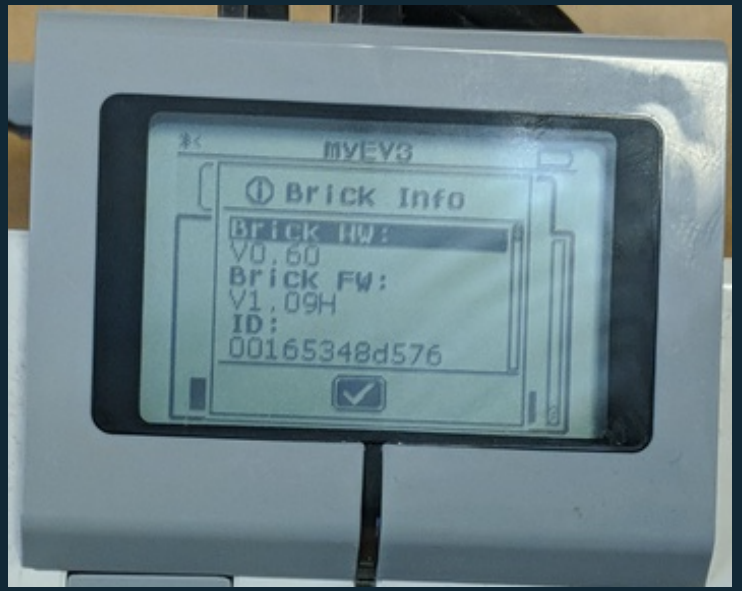


Set the MAC address of the EV3

We need to set the MAC address of the EV3 in the shell

The MAC Address you can find in the EV3 under
the system menu -> Brick info ->ID

Note: you have do add “:” for the address
Address /ID translates into
00:16:53:48:d5:76



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Set the MAC address in the shell

export EV3='00:16:53:48:d5:76'

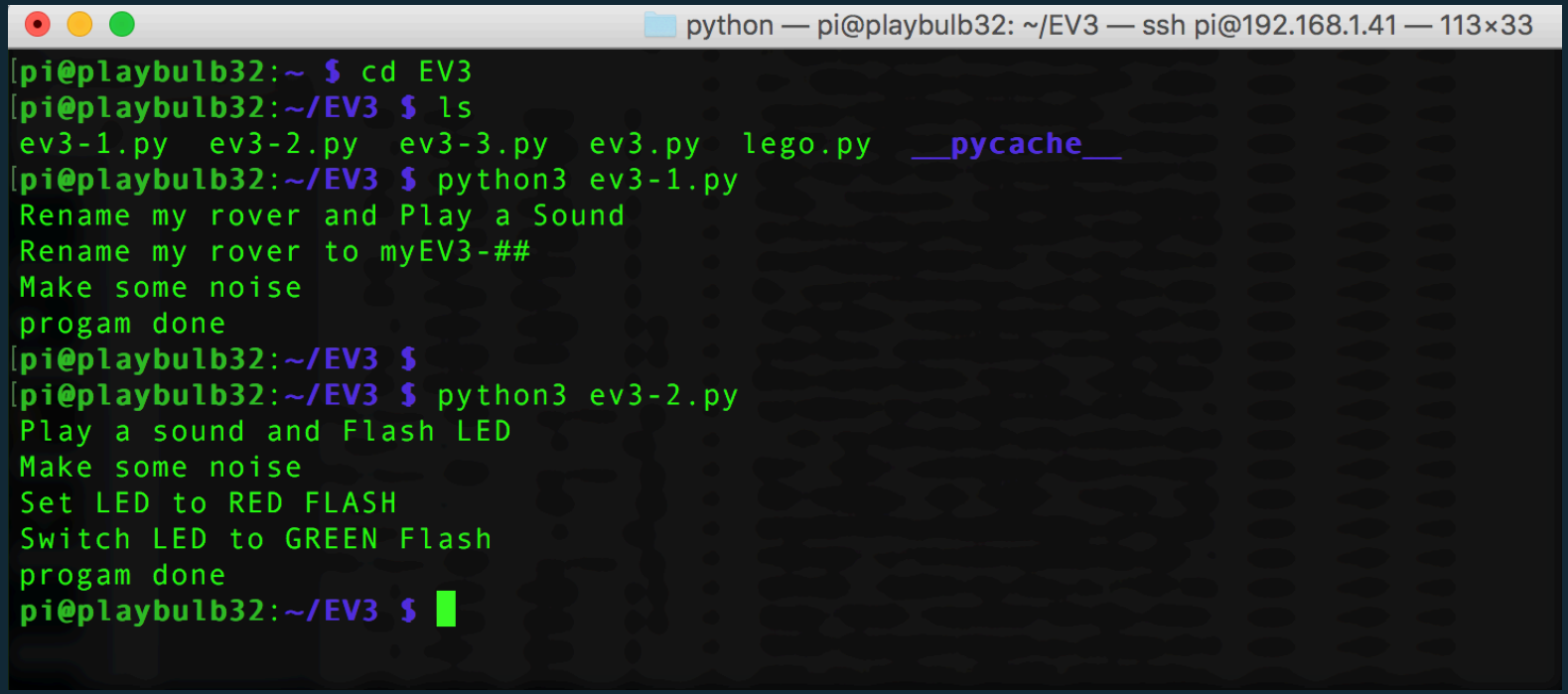
Execute code

Run you 1st python3 program
Change to the EV3 directory – cd EV3
Execute the program
python3 ev3-1.py

Look at the code via nano and change it change the EV3 name to myEV(YourGroupNumber) like myEV-32

ev3-1.py = Change the name of your rover
ev3-2.py = Play a sound and switch on the LED
ev3-3.py = Driving program

Executing the 1st python program



Execute - driving program

The driving program will give you the basic commands
Examples:

```
print ("moving forward")
lego.move(20,0)     # slow forward
lego.time.sleep(5)  #Program sleeps 5 seconds
print ("turn and move right”)
lego.move(20,-100)
```

Note:
mode (speed, angle)
– speed of the rover +number forward – numbers backward – max speed is 50
– angle turns the rover +number left – numbers right   -/ +100 | -/+ 200 turn is circles
sleep waits but keep the rover going
print prints text

Execution on the driving program

Start coding a path for the rover

- Take a look at the ev3-3.py program
- Familiarize yourself with the speed/move command
- We will create a path for the rover which you have to follow using the example code

Reference

Base install
https://github.com/markusvankempen/snp-pi-installation

Presentation

Code:
https://github.com/markusvankempen/snp-2018/tree/master/2018-04-LegoMindstorm1

Video: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