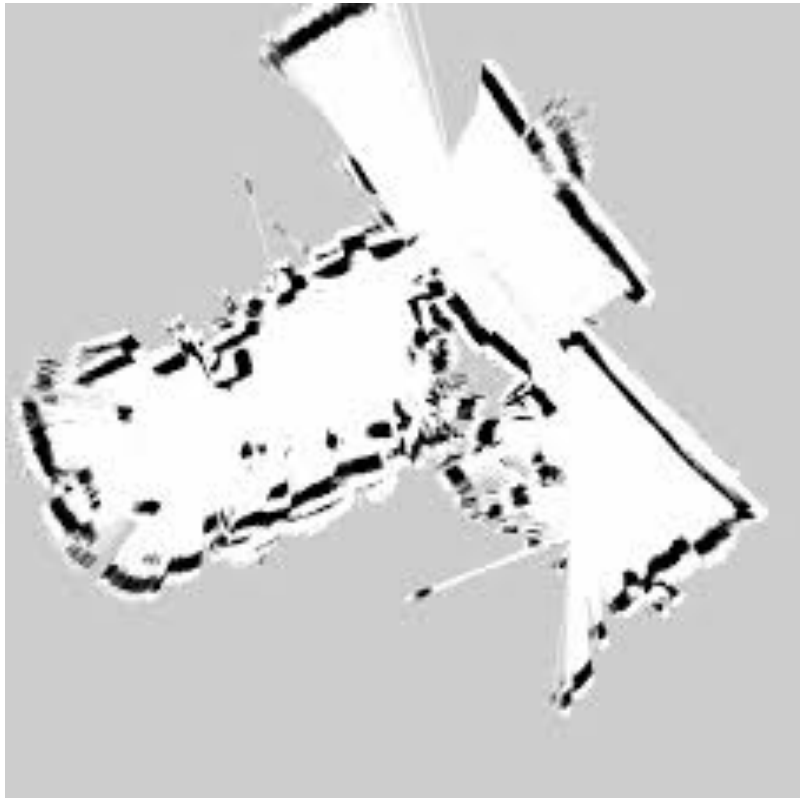
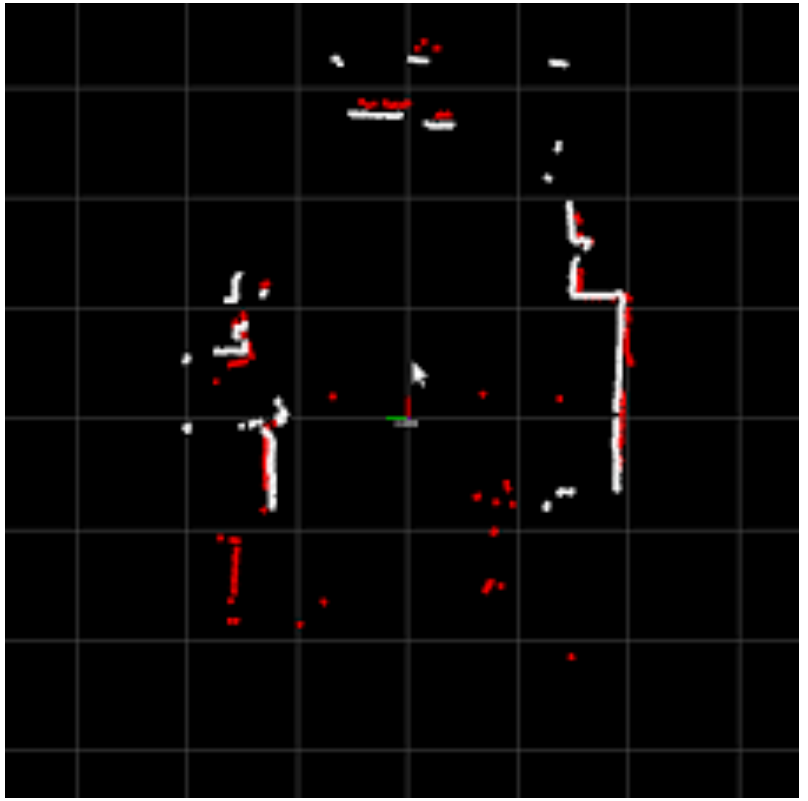
Mobile Robot Lab: NEATO





Installing Wifi Drivers

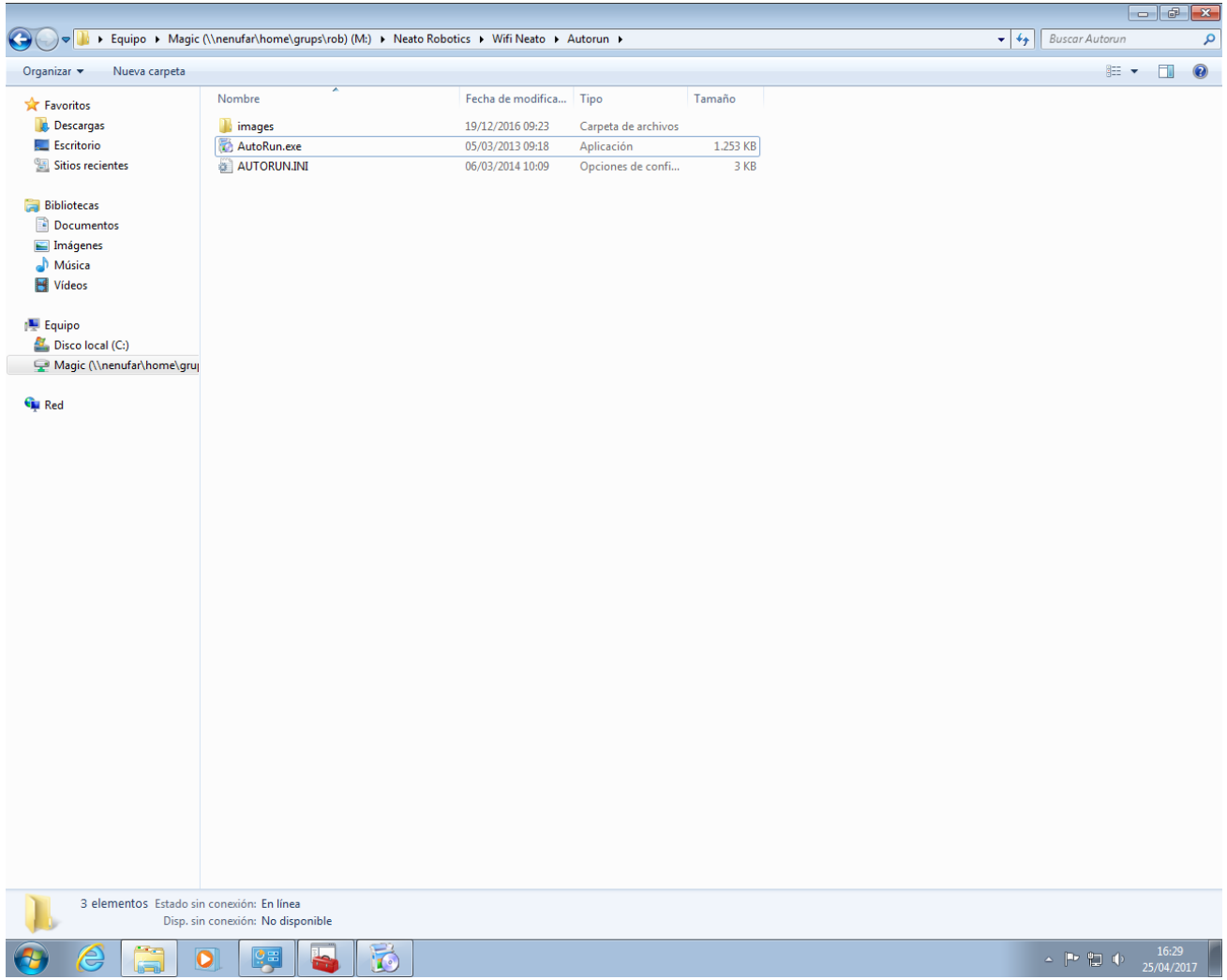
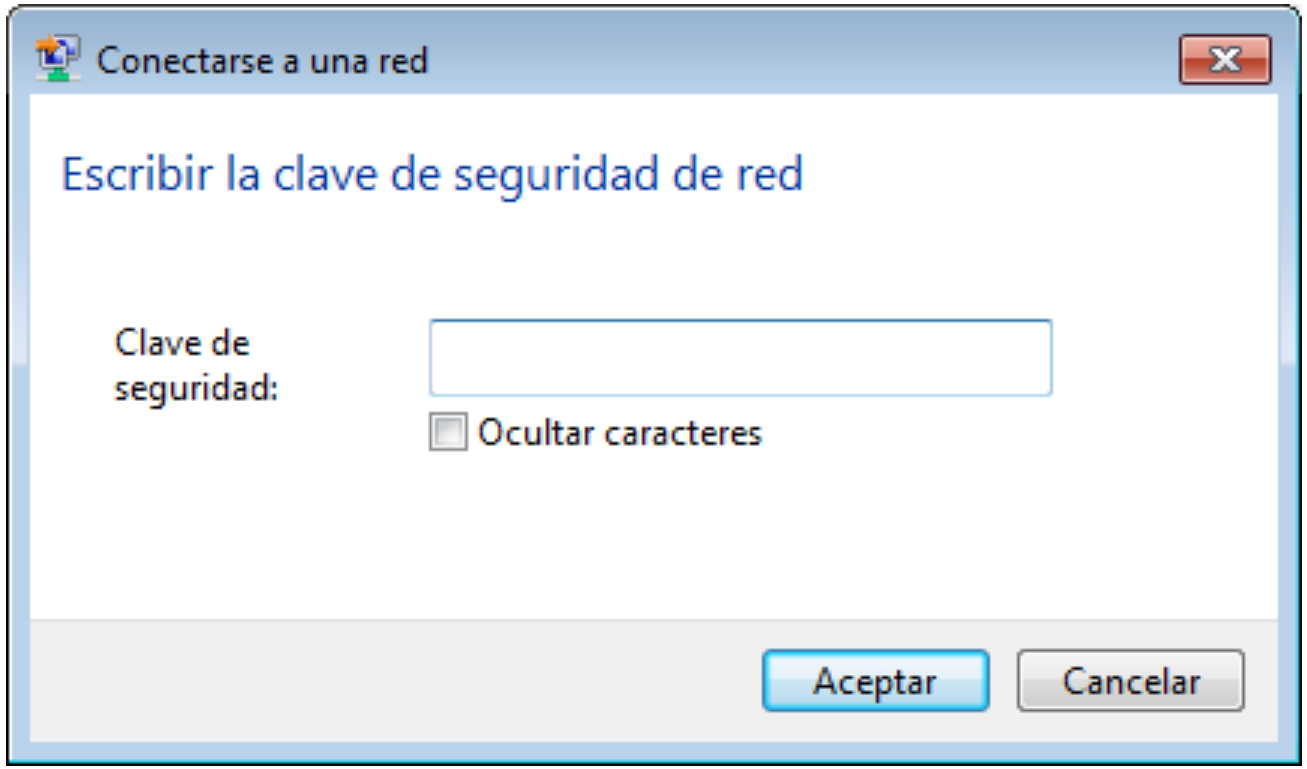


Figure 1 Go to Magic; M:\Neato Robotics\Wifi Neato\Autorun

Conecting to Neato=RaspberryPi

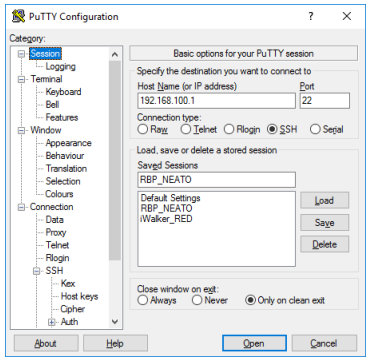


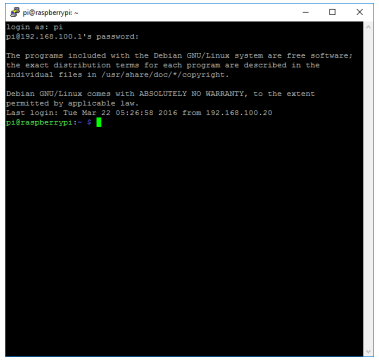
Select the SSID Wifi:
NEATO_{ A B C D E F K }

Password: neato2016

Enviroment

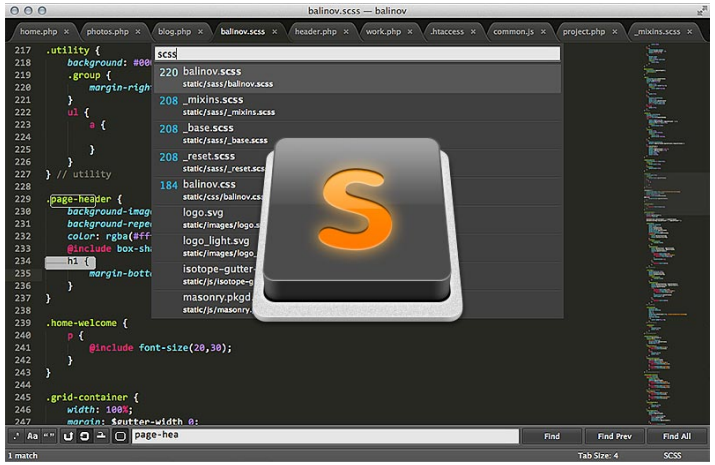
Putty → connect remotely to RPI and execute



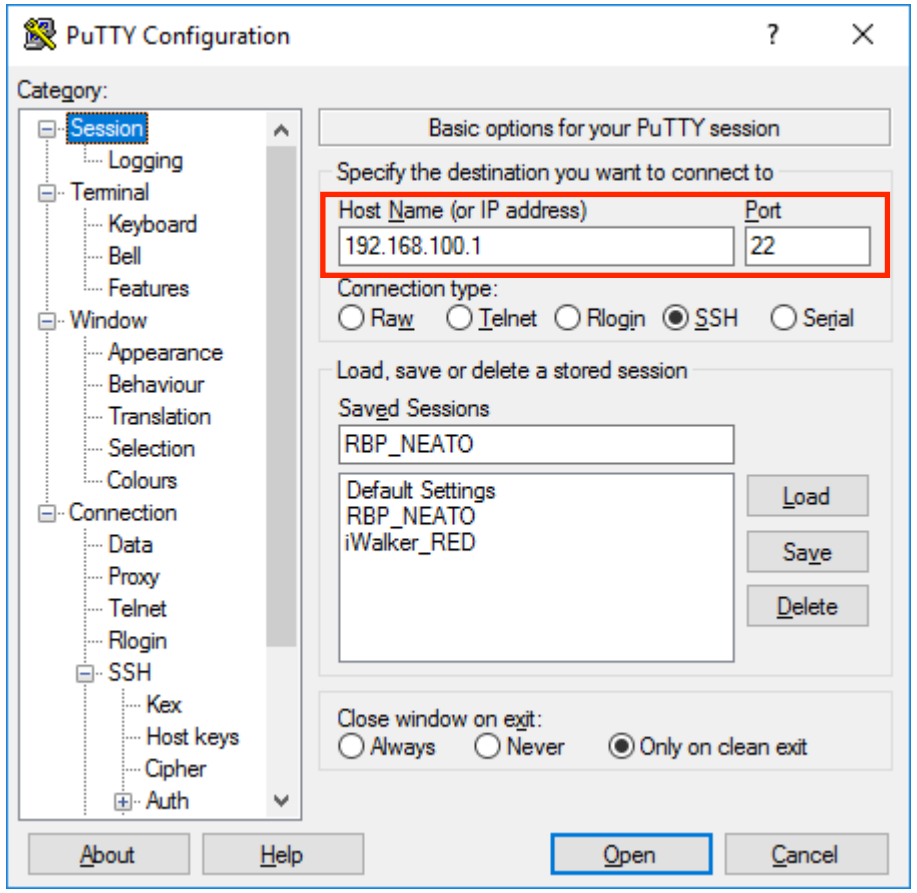


FileZilla → To transfers files to the RPI

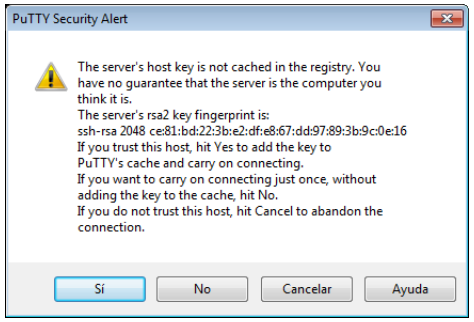
Sublime Text → For editing



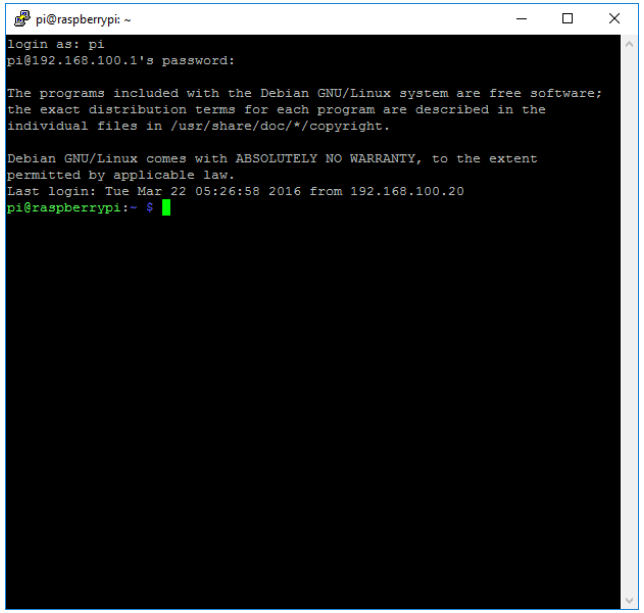
Config Putty (user: pi / pass: raspberry)

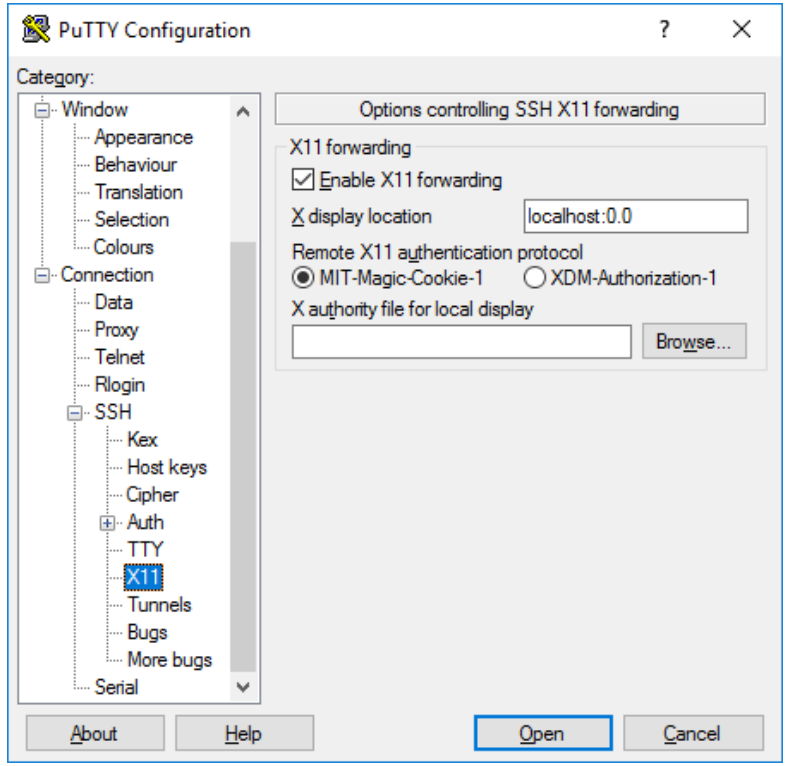


IP: 192.168.100.1
Port: 22



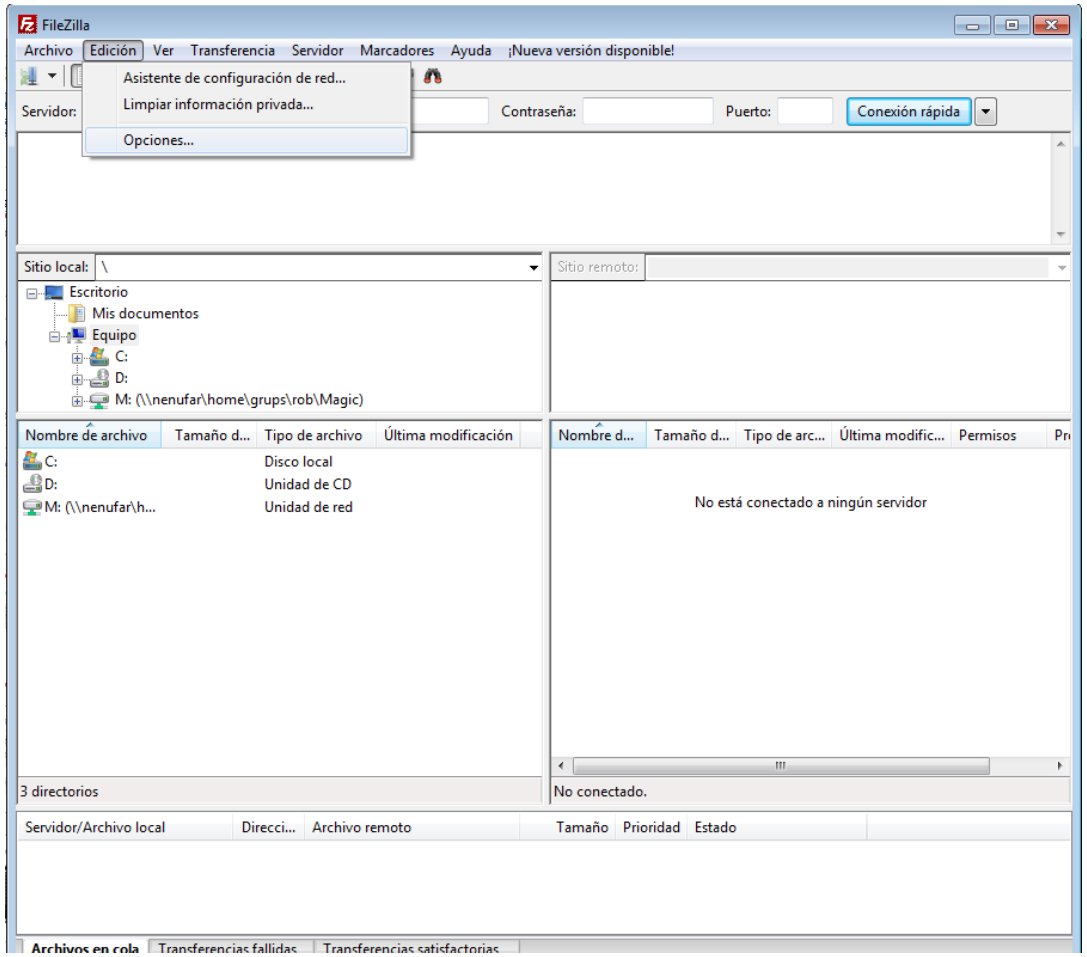
Answer: YES

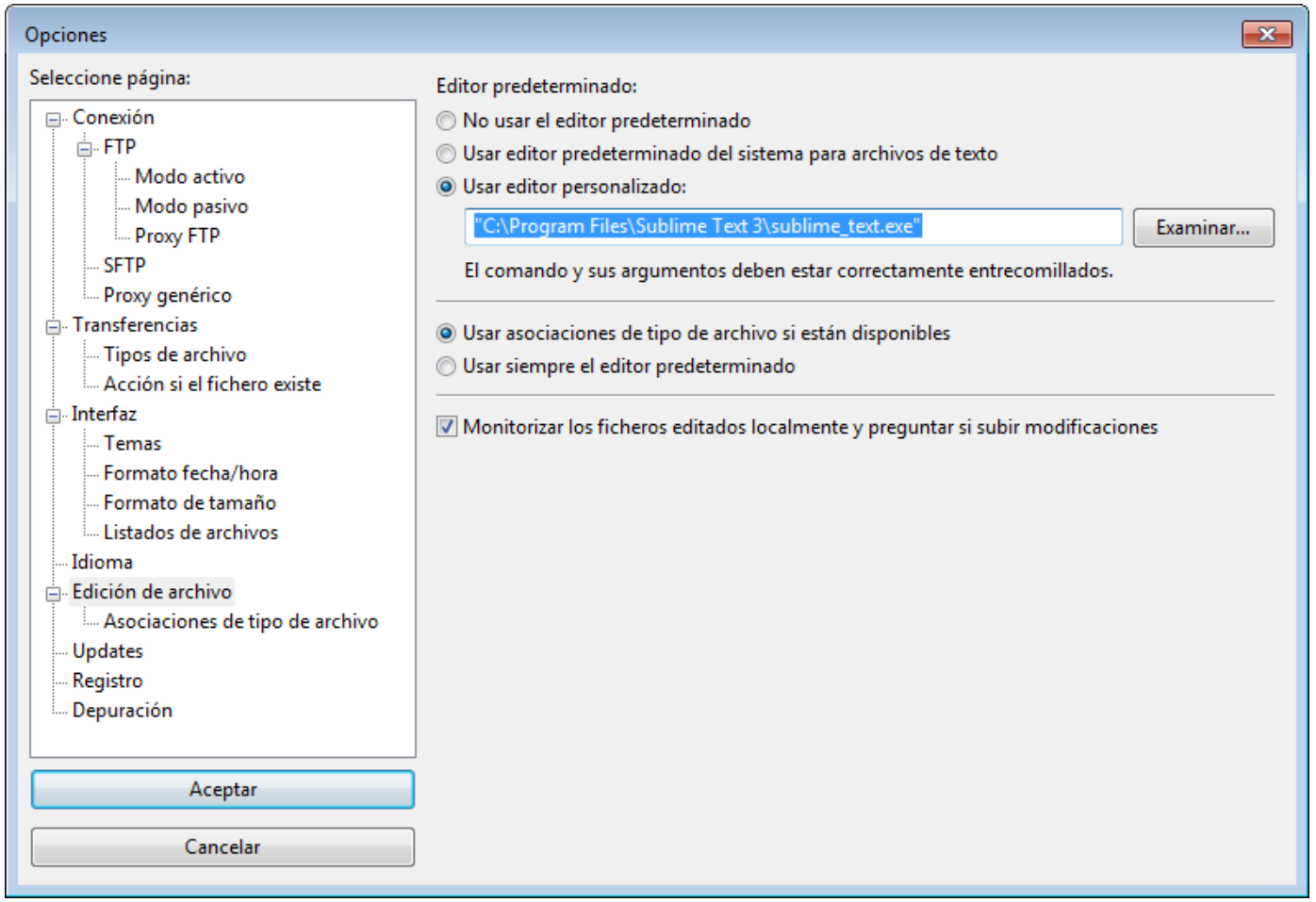




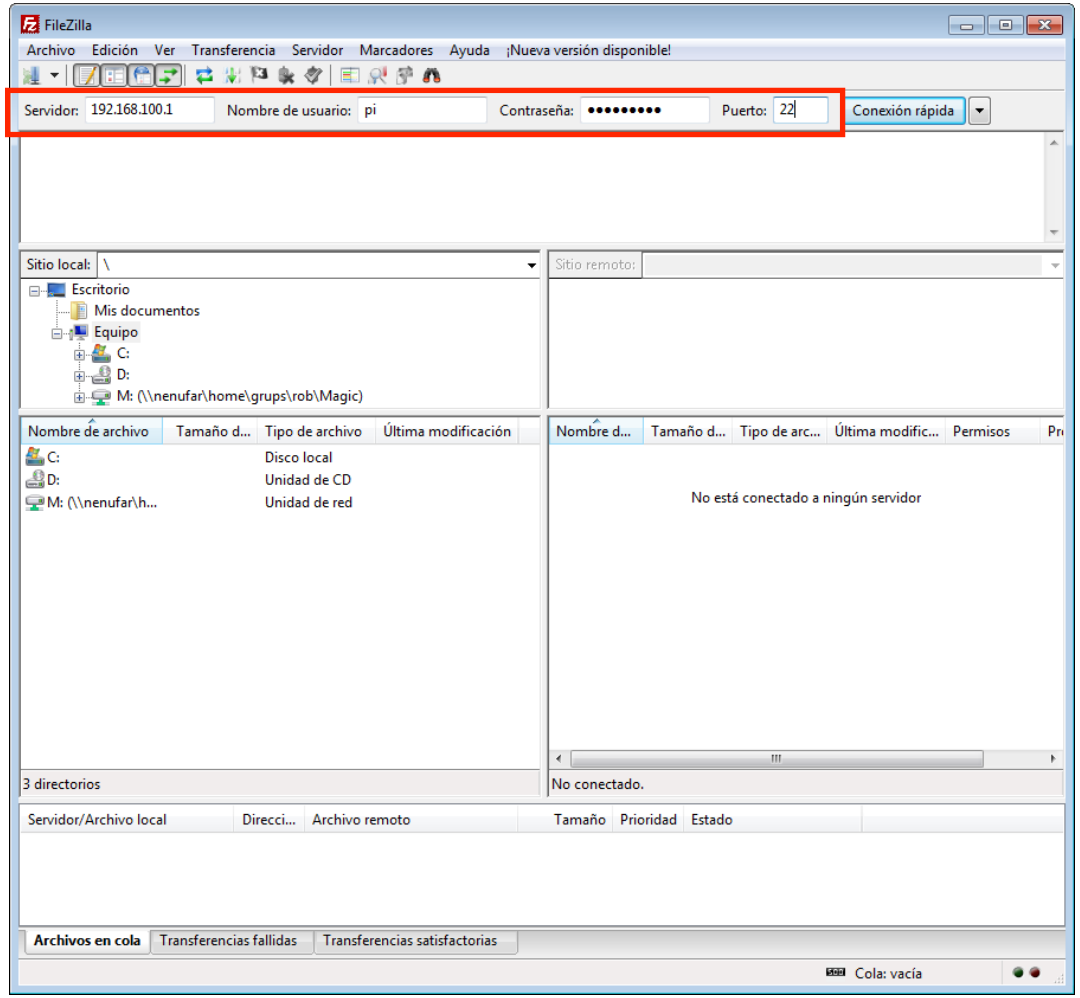
Login as: pi
Psw: raspberry

Configuring Filezilla



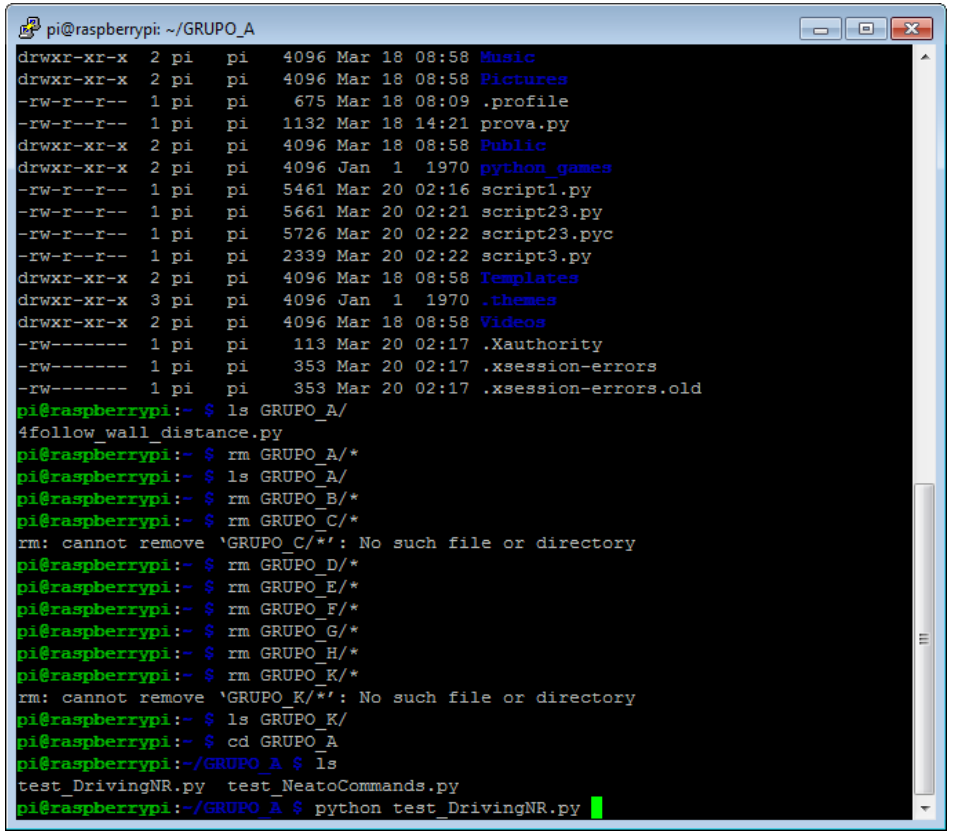


Connecting Filezilla to Raspberry



IP: 192.168.100.1 / usr: pi / psw: raspberry / Port: 22

Executing: test_DrivingNR.py and test_NeatoCommands.py



Python test_DrivingNR.py
Python test_NeatoCommands.py

How Neato ‘firmware’ interpret: set_motor command

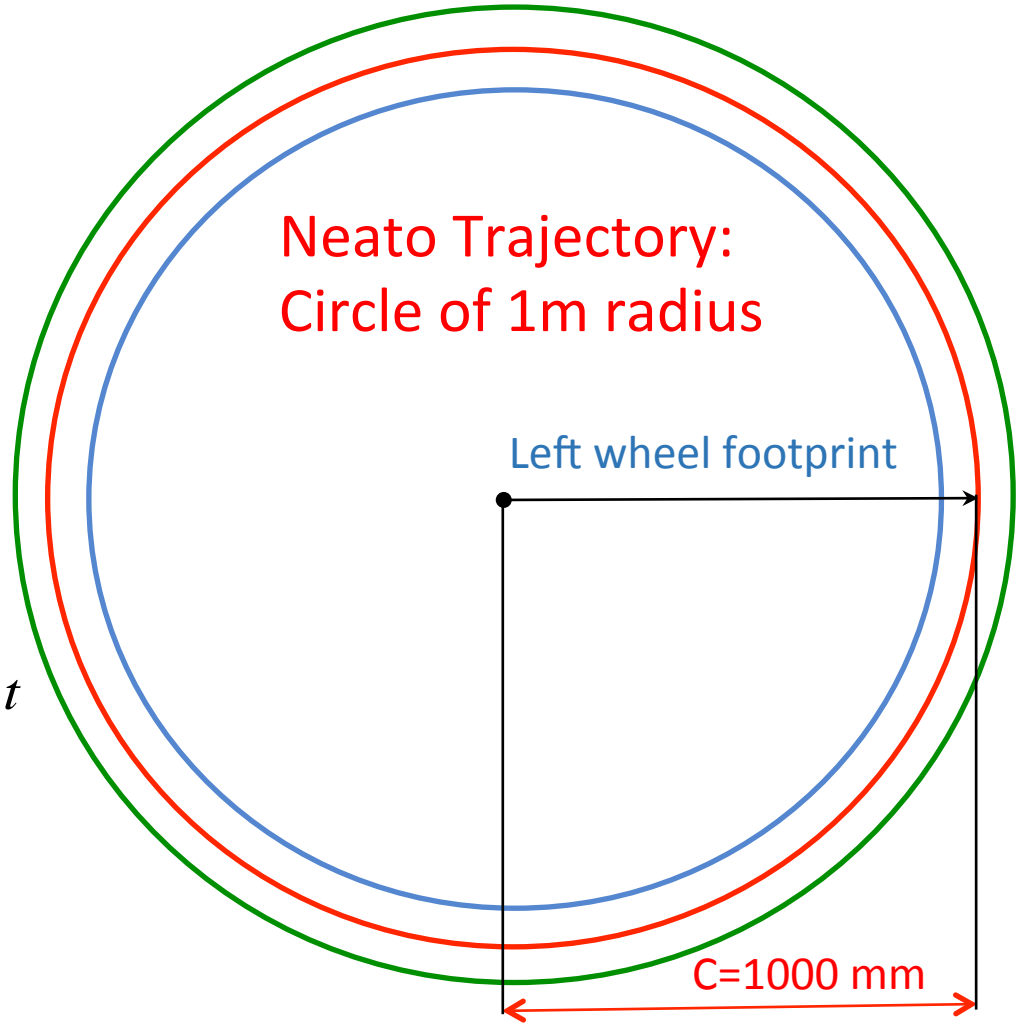
Command: SetMotor

Description: Sets the specified motor to run in a direction at a requested speed. (TestMode Only)
Usage: SetMotor [LWheelDist <LWheelDist_value>] [RWheelDist <RWheelDist_value>] [Speed <Speed_value>] [Accel <Accel_value>] [RPM <RPM_value>] [Brush] [VacuumOn] [VacuumOff] [VacuumSpeed <VacuumSpeed_value>] [RWheelDisable] [LWheelDisable] [BrushDisable] [RWheelEnable] [LWheelEnable] [BrushEnable]
Options:

Flag	Description
LWheelDist	Distance in millimeters to drive Left wheel. (Pos = forward, neg = backward)
RWheelDist	Distance in millimeters to drive Right wheel. (Pos = forward, neg = backward)
Speed	Speed in millimeters/second. (Required only for wheel movements)
Accel	Acceleration in millimeters/second. (Used only for wheel movements. Defaults to ‘Speed’.)
RPM	Next argument is the RPM of the motor. Not used for wheels, but applied to all other motors specified in the command line.
Brush	Brush motor forward (Mutually exclusive with wheels and vacuum.)

How Neato ‘firmware’ interpret: set_motor command

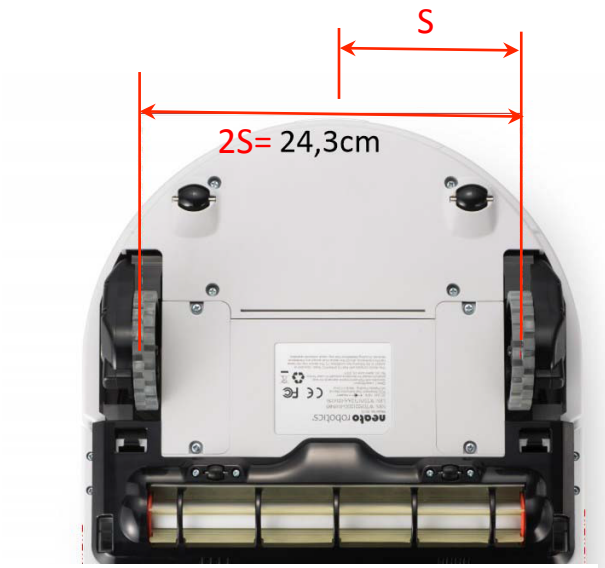
Understanding
test_DrivingNR.py



$$R = 2\pi\left(1000 + \frac{243}{2}\right) = 7047mm$$

$$L = 2\pi\left(1000 + \frac{243}{2}\right) = 5520mm$$

Right wheel footprint



Inverse Kinematics

$$\begin{bmatrix} \dot{R} \\ \dot{L} \end{bmatrix} t = \underbrace{\begin{bmatrix} 1 & S \\ 1 & -S \end{bmatrix}}_{Jacobian} \begin{bmatrix} v_C \\ \dot{\theta} \end{bmatrix} t$$

$$\begin{bmatrix} R \\ L \end{bmatrix} = \begin{bmatrix} 1 & S \\ 1 & -S \end{bmatrix} \begin{bmatrix} C \\ \theta \end{bmatrix}$$

```
distancia_R = (((speed * pow(-1, direccion) ) + (S * tita_dot)) * tiempo) * pow(-1, direccion)
distancia_L = (((speed * pow(-1, direccion) ) + (-S * tita_dot)) * tiempo) * pow(-1, direccion)

comando = 'SetMotor LWheelDist ' + str(distancia_L) + ' RWheelDist ' + str(distancia_R) + ' Speed ' + str(speed * pow(-1, direccion))
envia(ser,comando, 0.2)
```