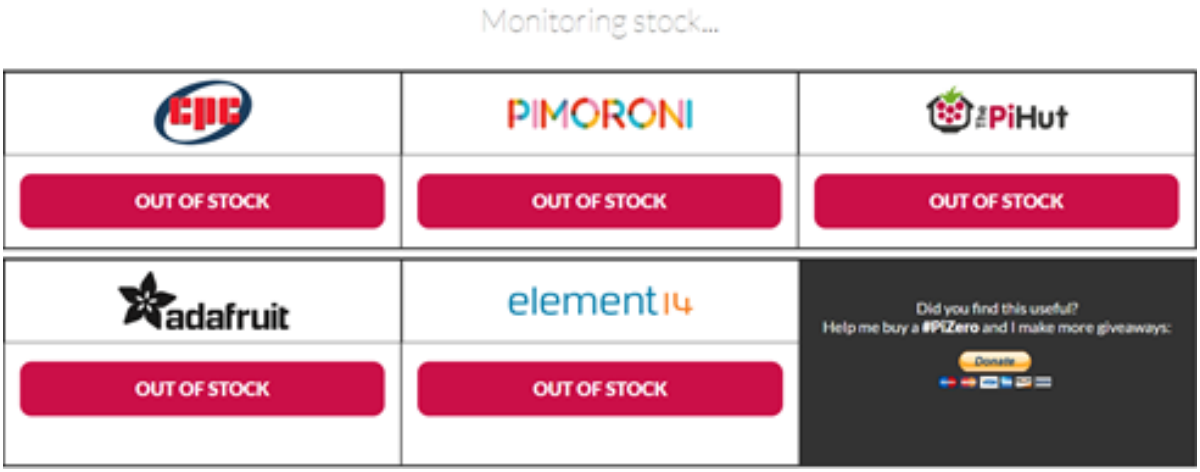
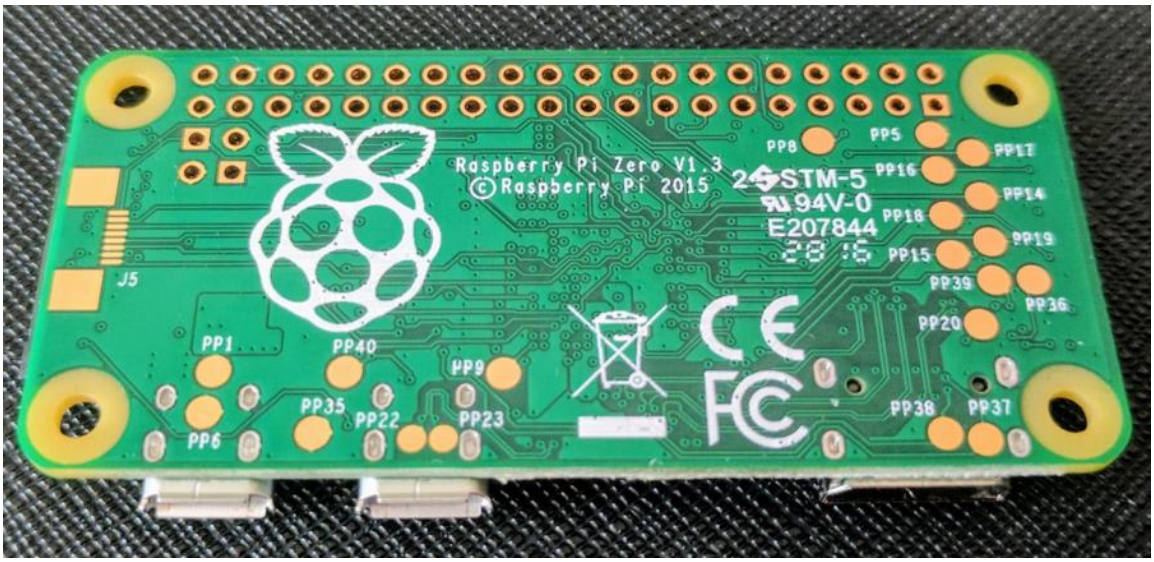
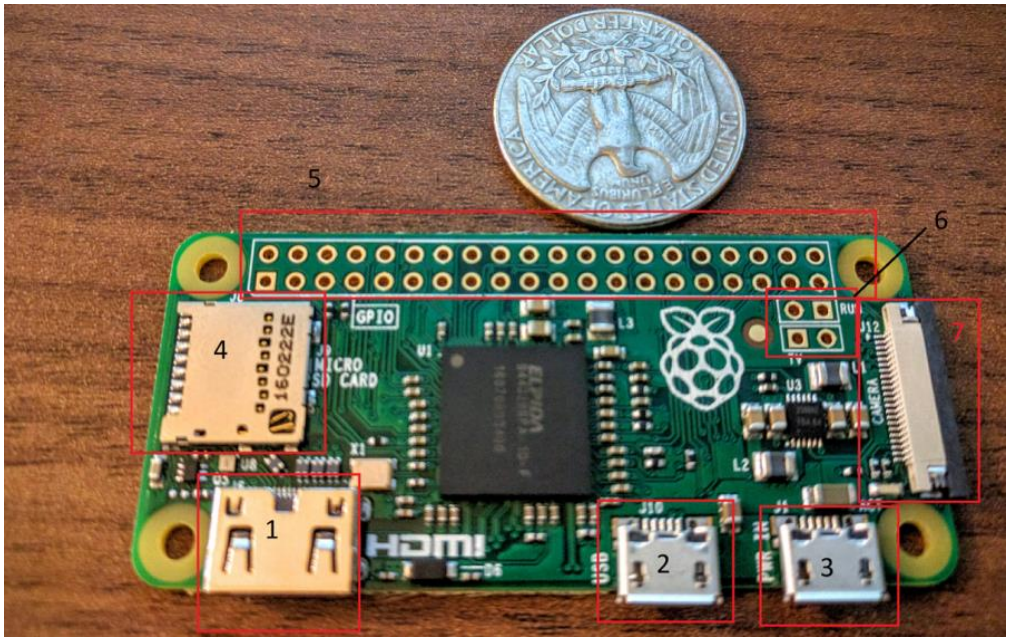
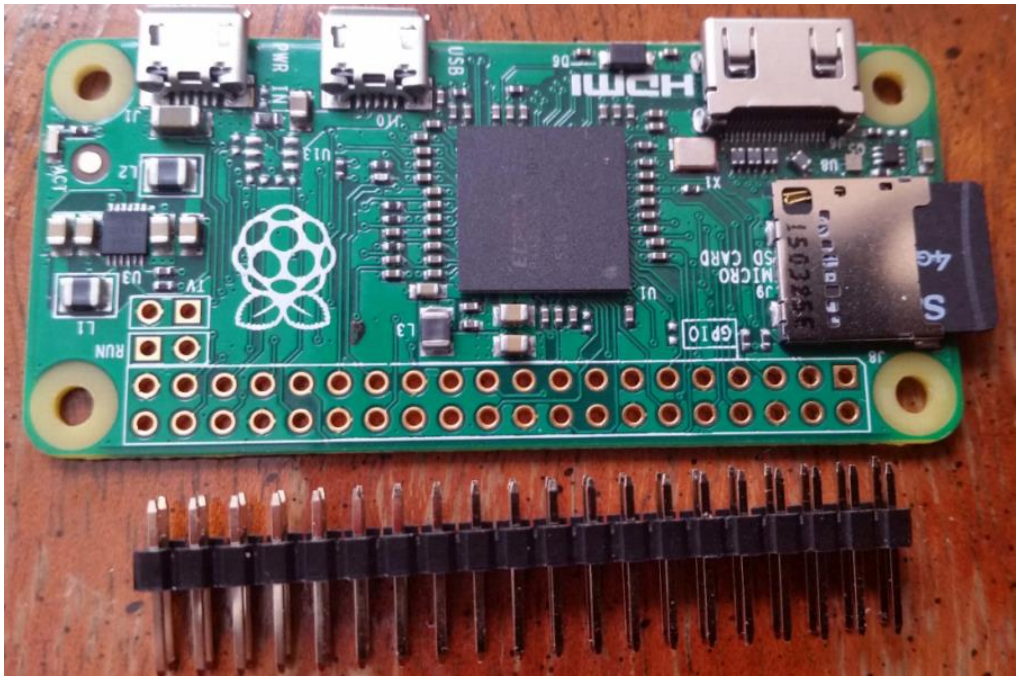
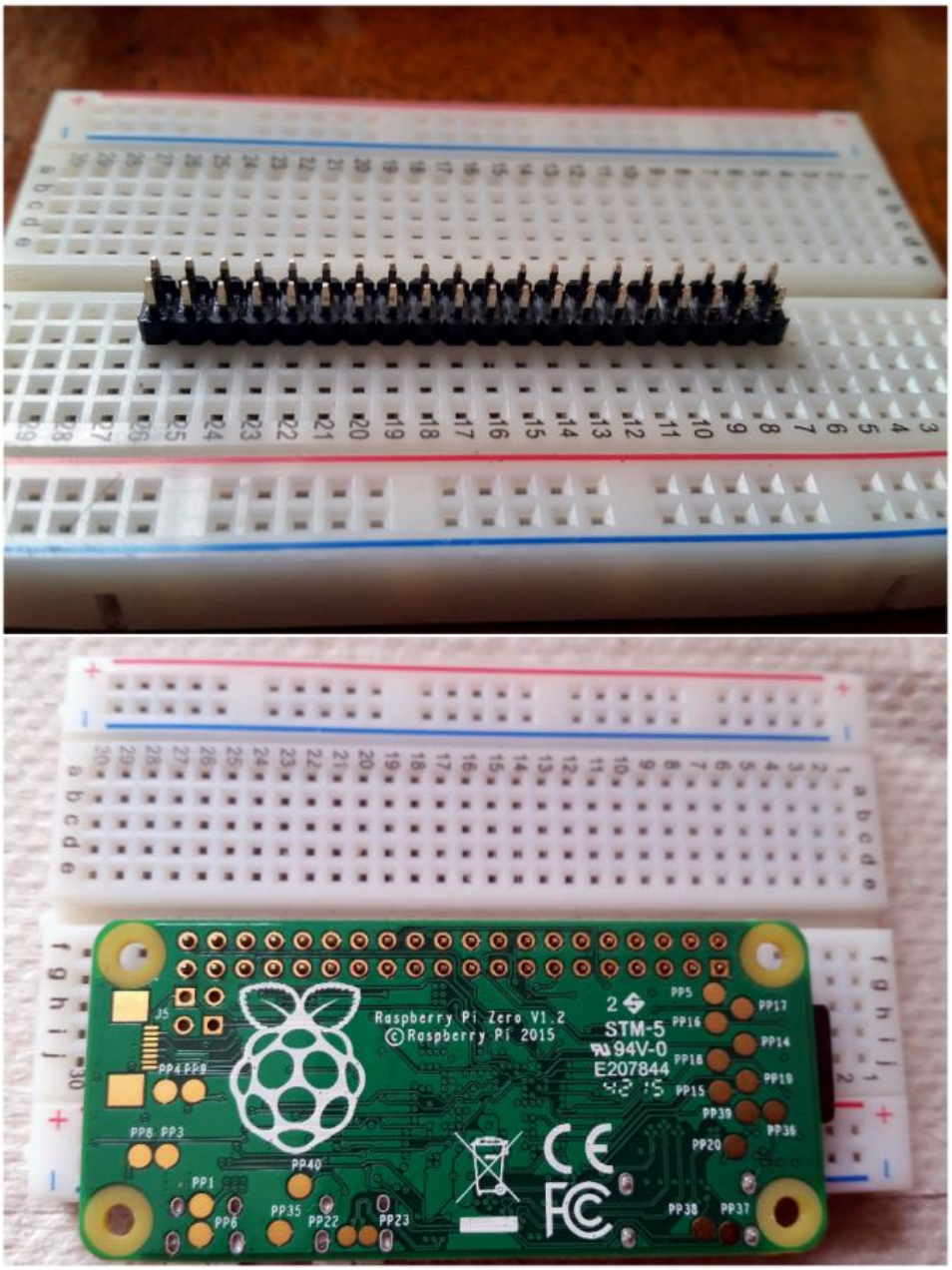
Chapter 1: Getting Started with Python and the Raspberry Pi Zero

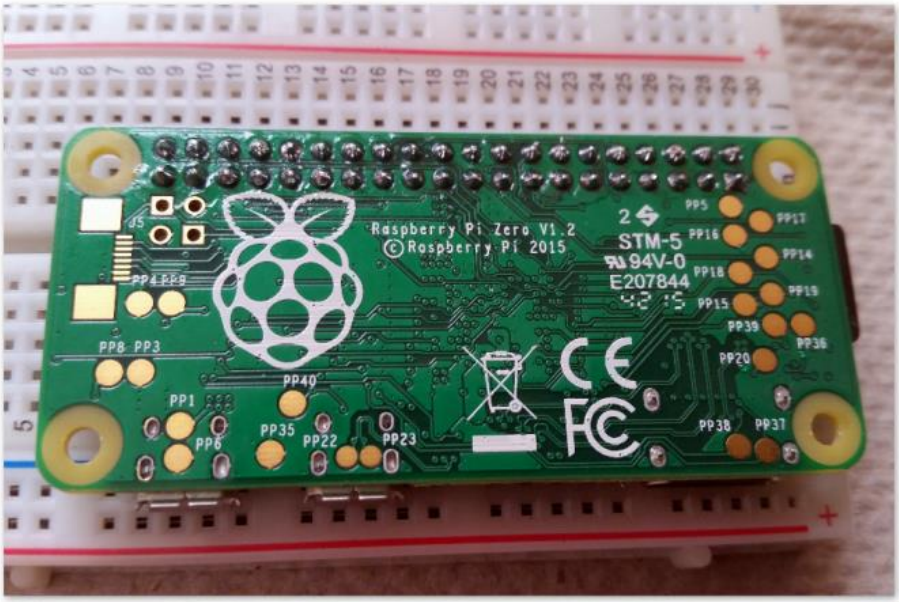





5
6
4
GPIO
MICRO SD CARD
7
CAMERA
1
HDMI
2
3


PWR IN
USB
HDMI
MICRO SD CARD
RUN
GPIO


Raspberry Pi Zero V1.2
©Raspberry Pi 2015
STM-5
94V-0
E207844
J5
PP1
PP3
PP4
PP5
PP6
PP8
PP9
PP14
PP15
PP16
PP17
PP18
PP19
PP20
PP22
PP23
PP35
PP36
PP37
PP38
PP39
PP40


Raspberry Pi Zero V1.2
©Raspberry Pi 2015
STM-5
94V-0
E207844
PP5
PP17
PP16
PP14
PP18
PP13
PP15
PP39
PP36
PP20
PP38
PP37
PP8 PP3
PP40
PP1
PP6
PP35
PP22
PP23


MICRO SD CARD
HDMI
USB
PWR IN
ACT


GPIO
SD CARD
HDMI

NOOBS

Beginners should start with NOOBS. You can purchase a pre-installed NOOBS SD card in the swag store, or download NOOBS below and follow the NOOBS setup guide in our help pages.

NOOBS is an easy operating system installer which contains Raspbian. It also provides a selection of alternative operating systems which are then downloaded from the internet and installed.

NOOBS Lite contains the same operating system installer without Raspbian pre-loaded. It provides the same operating system selection menu allowing Raspbian and other images to be downloaded and installed.

NOOBS

Offline and network install

Version: 1.9.0
Release date: 2016-03-18

Download Torrent | Download ZIP

SHA-1: 94f7ee8a067ac57c6d35523d99d1f0097f8dc5cc

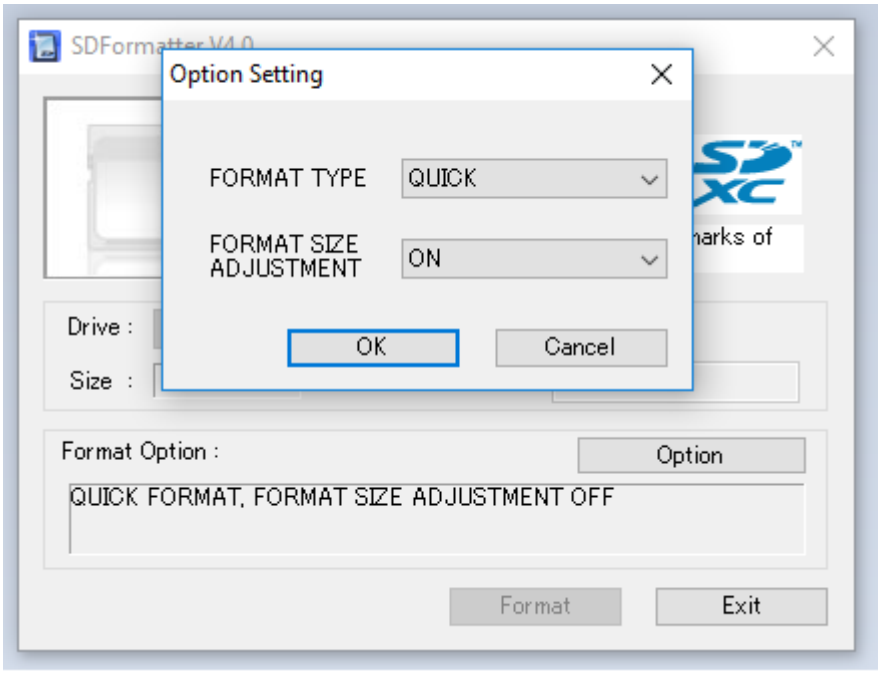
NOOBS LITE

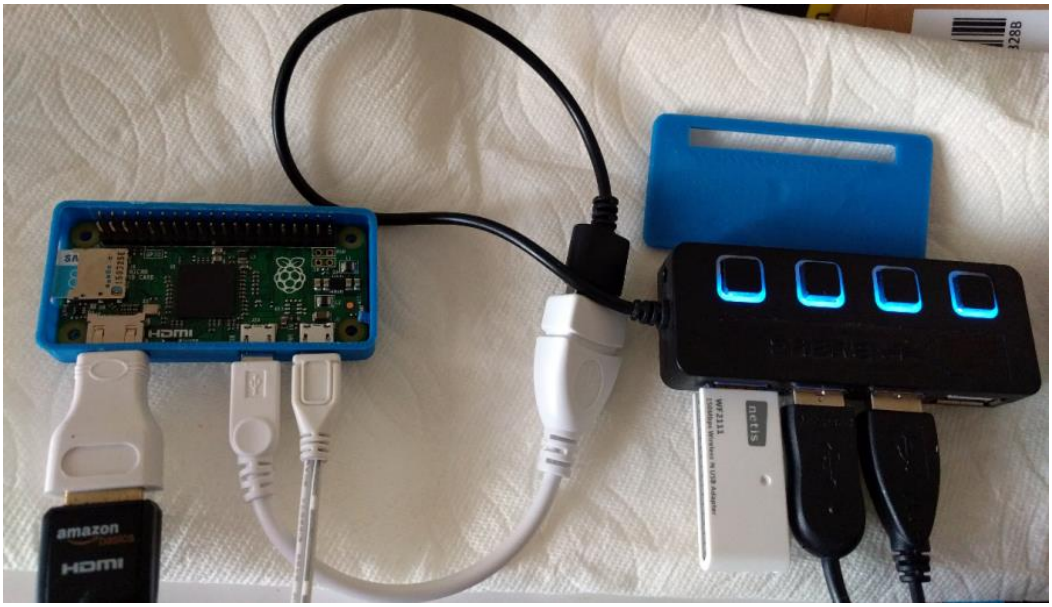
Network install only

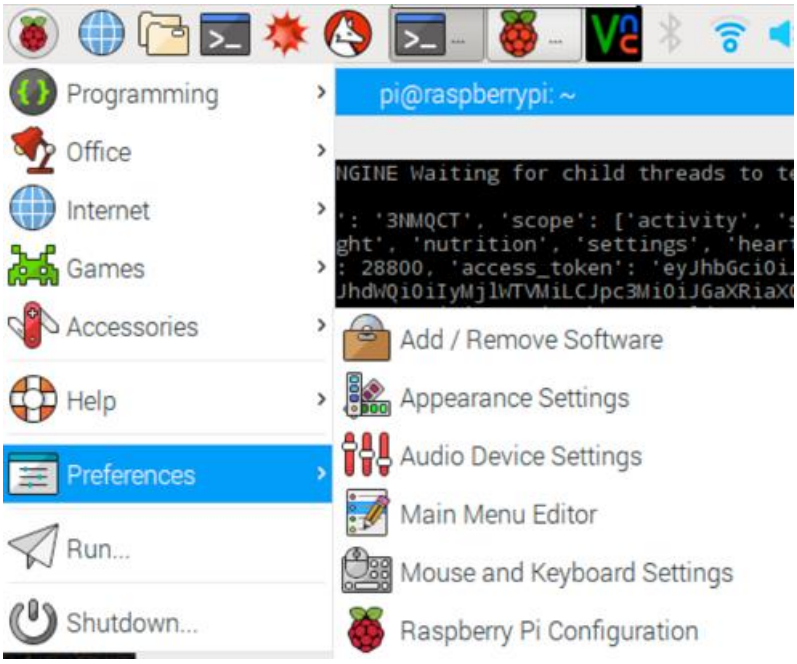
Version: 1.9
Release date: 2016-03-18

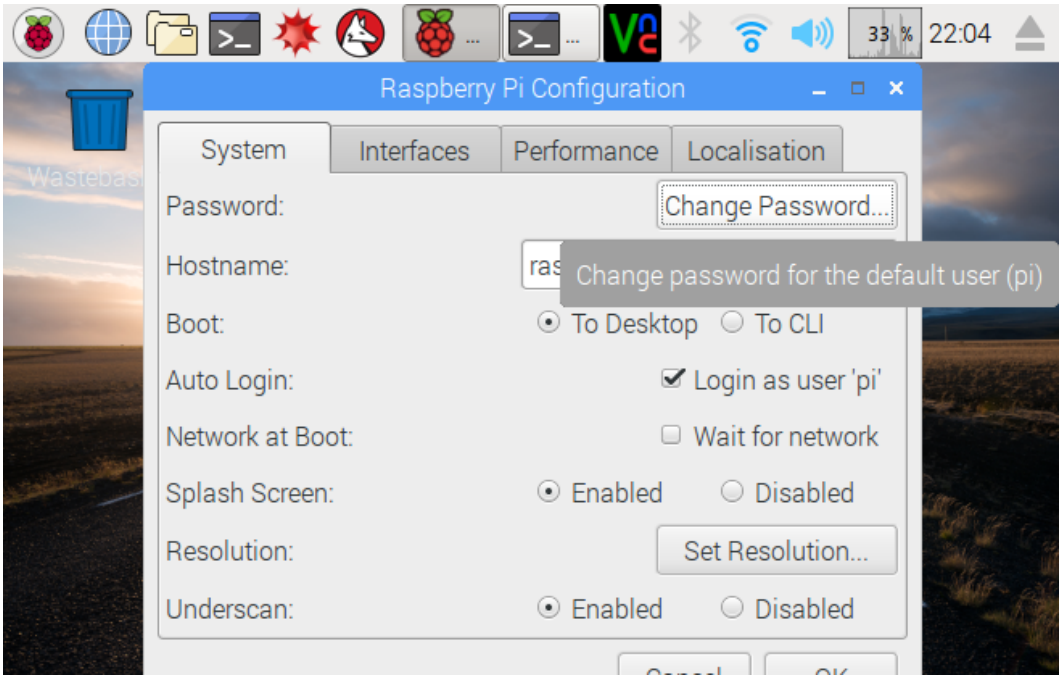
Download Torrent | Download ZIP

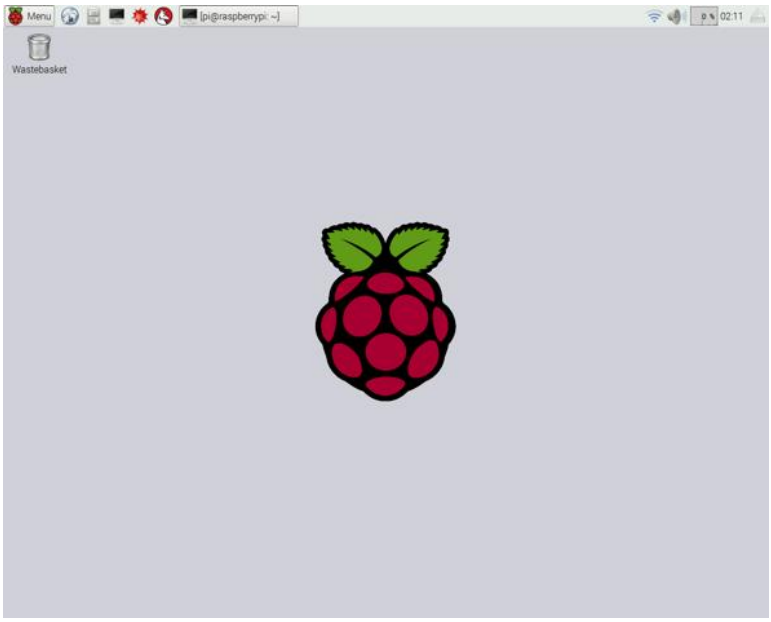
SHA-1: e97f7f1cdfe0d274134fdf58e0308e21c27d0b2d

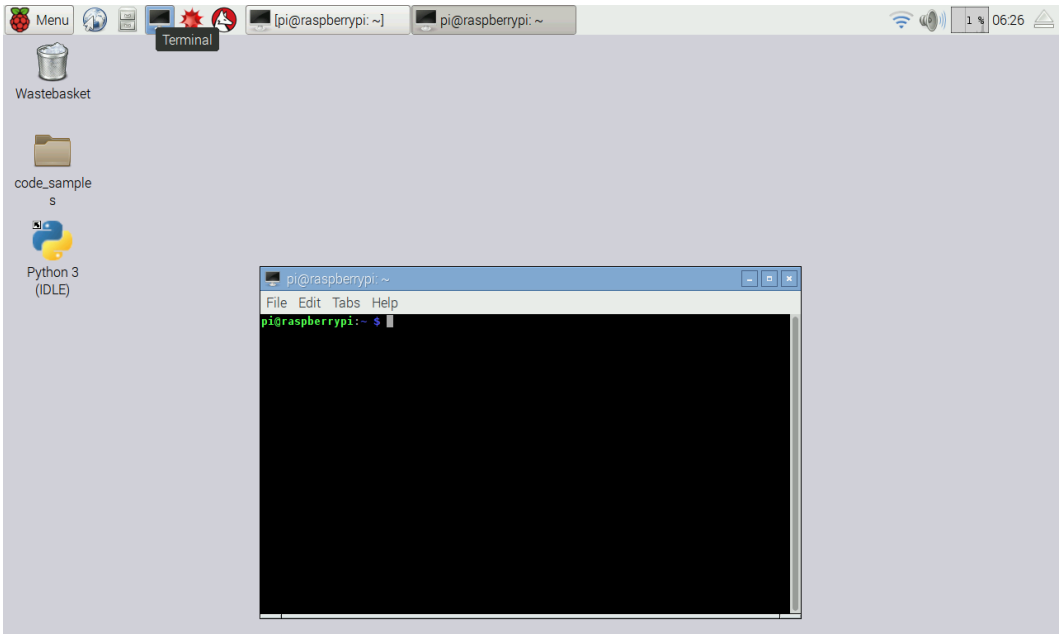

SDFormatter V4.0
Option Setting
FORMAT TYPE
QUICK
FORMAT SIZE ADJUSTMENT
ON
OK
Cancel
Drive :
Size :
Format Option :
Option
QUICK FORMAT, FORMAT SIZE ADJUSTMENT OFF
Format
Exit

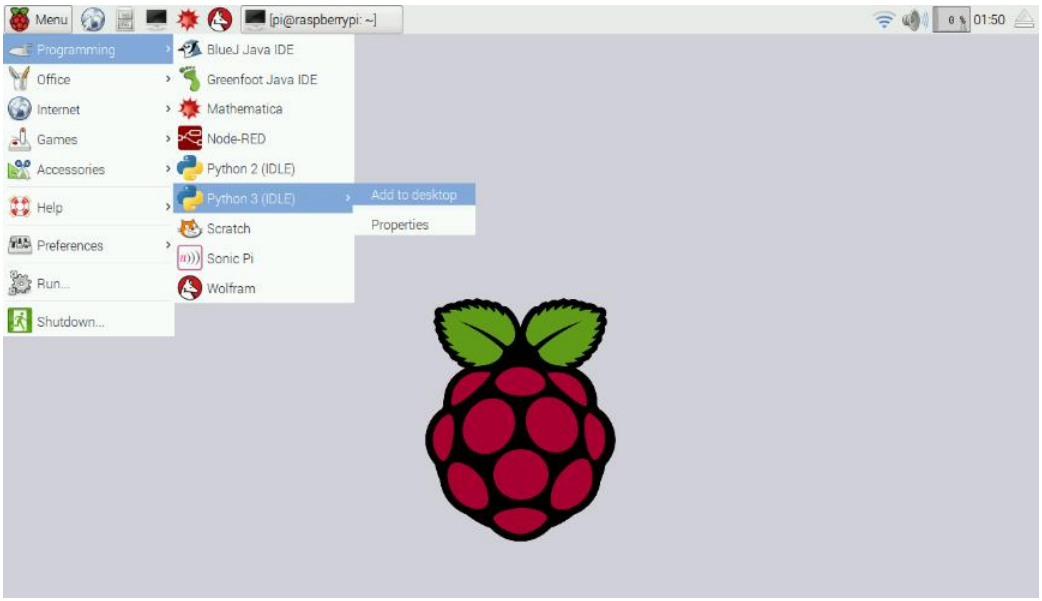

amazon
HDMI

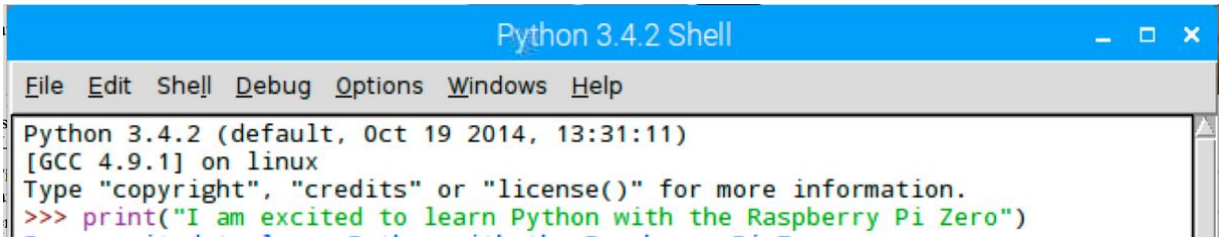

Programming
Office
Internet
Games
Accessories
Help
Preferences
Run...
Shutdown...
pi@raspberrypi: ~
Add / Remove Software
Appearance Settings
Audio Device Settings
Main Menu Editor
Mouse and Keyboard Settings
Raspberry Pi Configuration

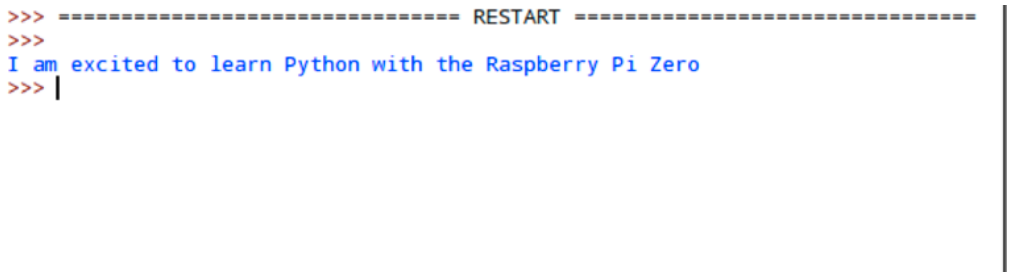

22:04
Raspberry Pi Configuration
System
Interfaces
Performance
Localisation
Password:
Change Password...
Hostname:
Change password for the default user (pi)
Boot:
To Desktop
To CLI
Auto Login:
Login as user 'pi'
Network at Boot:
Wait for network
Splash Screen:
Enabled
Disabled
Resolution:
Set Resolution...
Underscan:
Enabled
Disabled

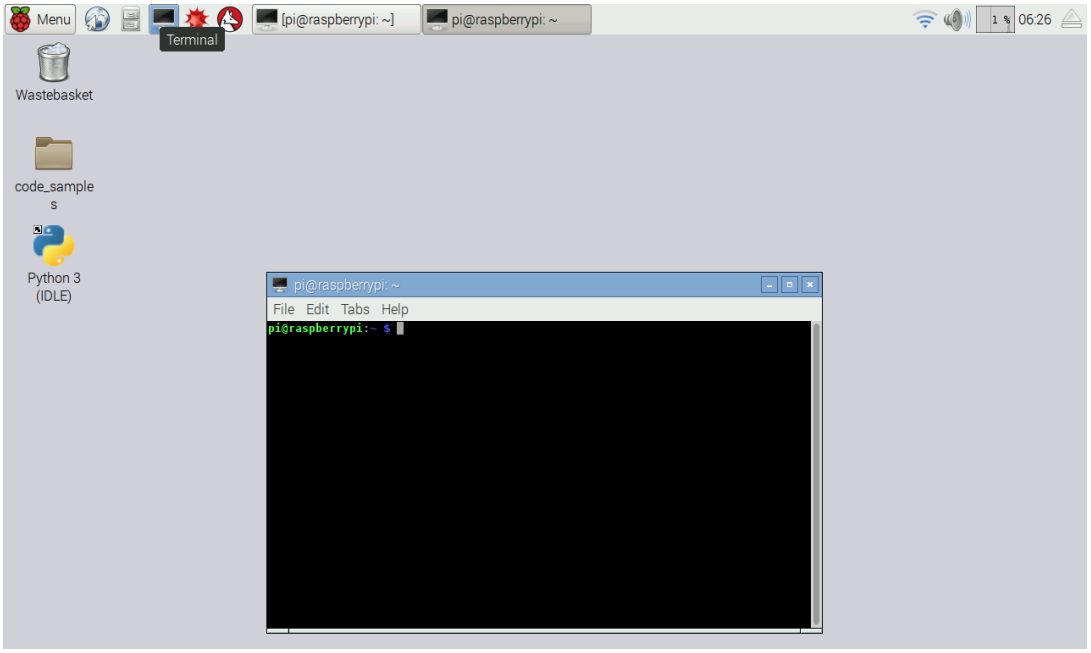

Menu
[pi@raspberrypi: ~]
02:11
Wastebasket

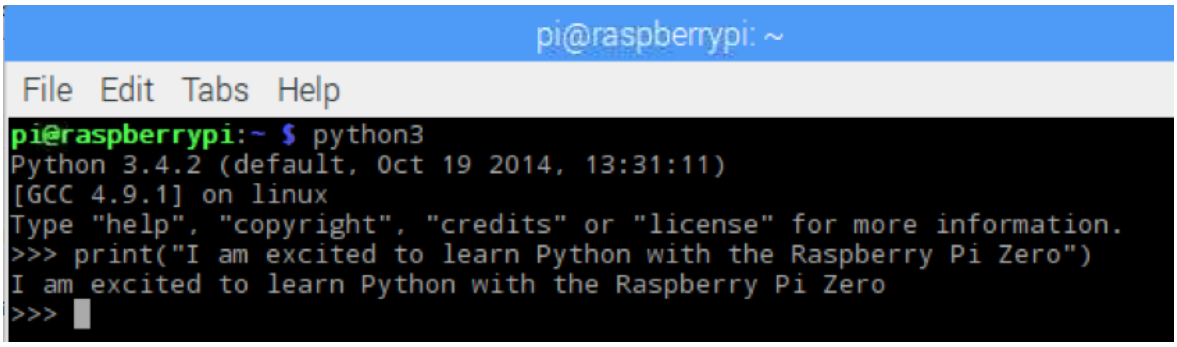

Menu
Terminal
[pi@raspberrypi: ~]
pi@raspberrypi: ~
06:26
Wastebasket
code_samples
Python 3 (IDLE)
pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $


Menu
[pi@raspberrypi: ~]
01:50
Programming
Office
Internet
Games
Accessories
Help
Preferences
Run...
Shutdown...
BlueJ Java IDE
Greenfoot Java IDE
Mathematica
Node-RED
Python 2 (IDLE)
Python 3 (IDLE)
Scratch
Sonic Pi
Wolfram
Add to desktop
Properties


Python 3.4.2 Shell
File Edit Shell Debug Options Windows Help
Python 3.4.2 (default, Oct 19 2014, 13:31:11)
[GCC 4.9.1] on linux
Type "copyright", "credits" or "license()" for more information.
>>> print("I am excited to learn Python with the Raspberry Pi Zero")

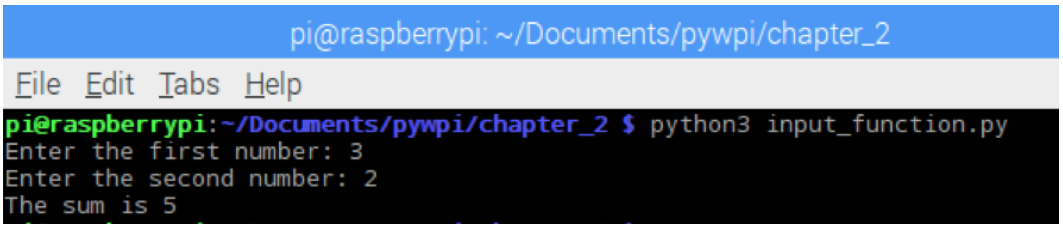

>>> ========== RESTART ==========
>>>
I am excited to learn Python with the Raspberry Pi Zero
>>>

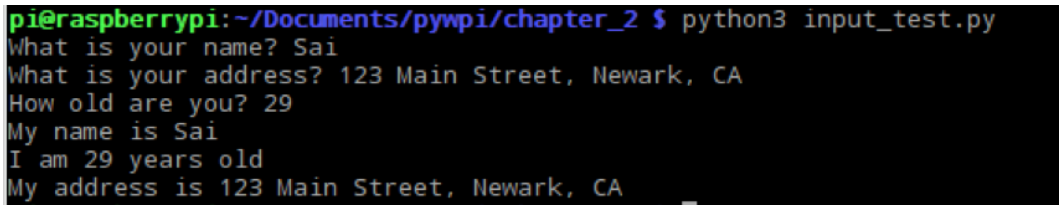

Menu
Terminal
[pi@raspberrypi: ~]
pi@raspberrypi: ~
06:26
Wastebasket
code_samples
Python 3 (IDLE)
pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $

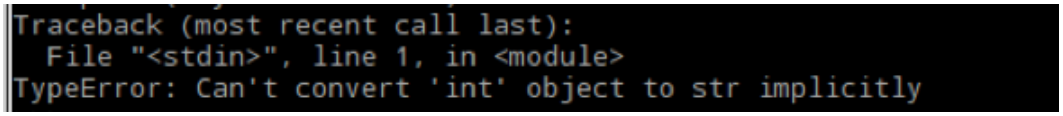

pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $ python3
Python 3.4.2 (default, Oct 19 2014, 13:31:11)
[GCC 4.9.1] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> print("I am excited to learn Python with the Raspberry Pi Zero")
I am excited to learn Python with the Raspberry Pi Zero
>>>

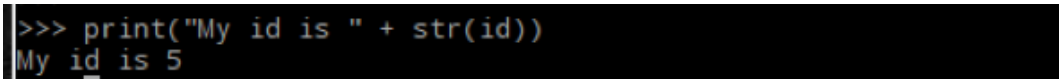
```
>>> help(print)
Help on built-in function print in module builtins:

print(...)
    print(value, ..., sep=' ', end='\n', file=sys.stdout, flush=False)

    Prints the values to a stream, or to sys.stdout by default.
    Optional keyword arguments:
    file:  a file-like object (stream); defaults to the current sys.stdout.
    sep:   string inserted between values, default a space.
    end:   string appended after the last value, default a newline.
    flush: whether to forcibly flush the stream.
```

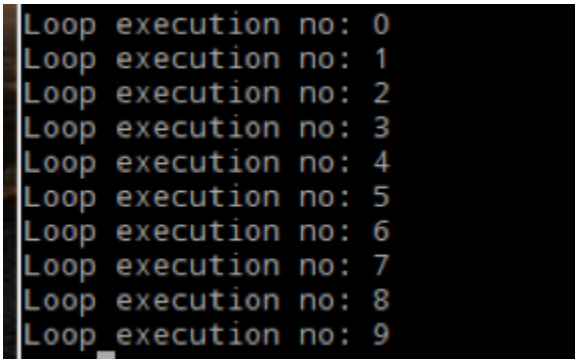
Chapter 2: Arithmetic Operations, Loops, and Blinky Lights

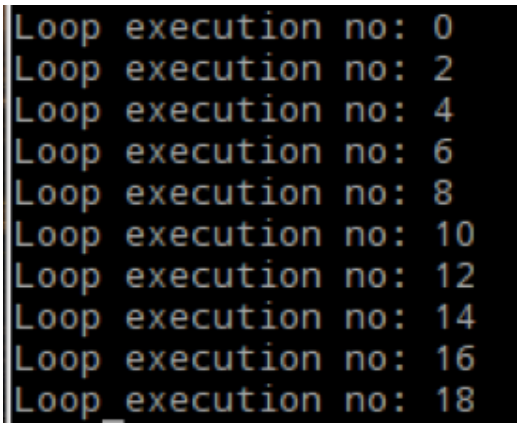


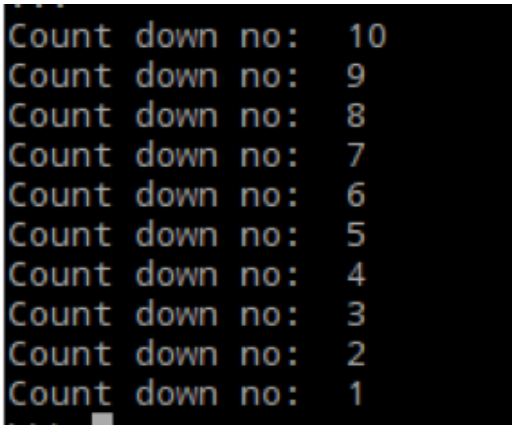






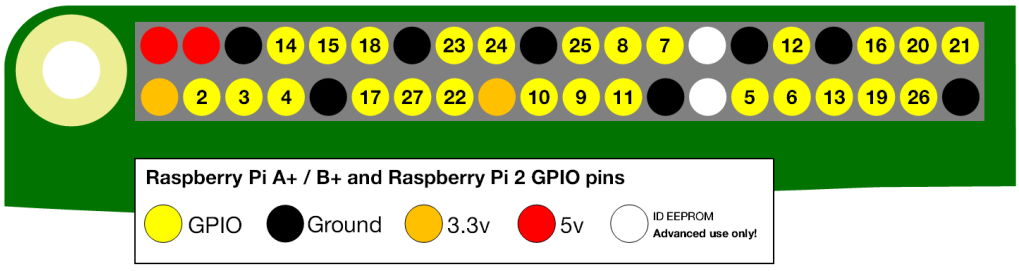

Loop execution no: 0
Loop execution no: 1
Loop execution no: 2
Loop execution no: 3
Loop execution no: 4
Loop execution no: 5
Loop execution no: 6
Loop execution no: 7
Loop execution no: 8
Loop execution no: 9

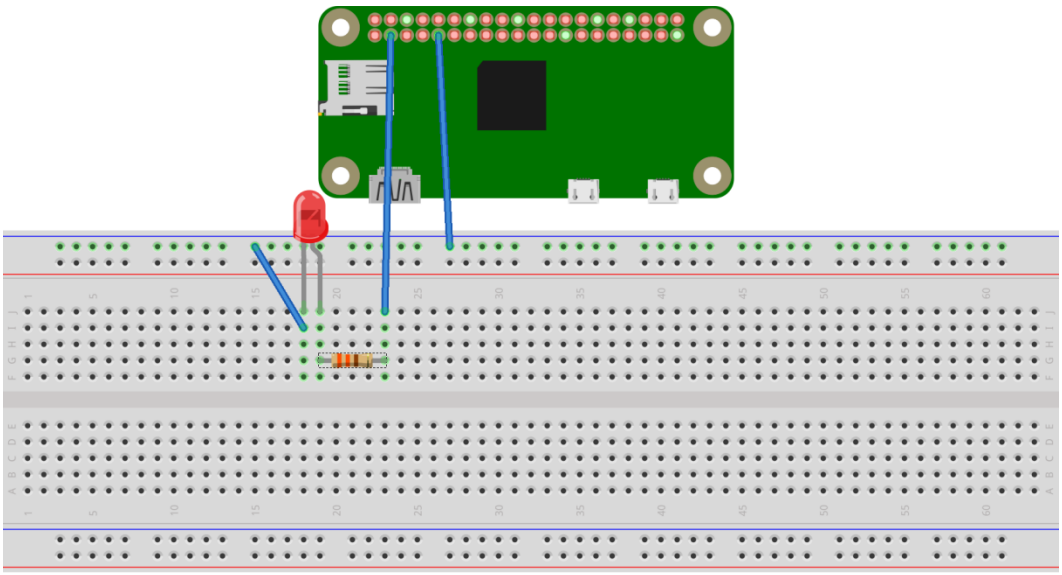

Loop execution no: 0
Loop execution no: 2
Loop execution no: 4
Loop execution no: 6
Loop execution no: 8
Loop execution no: 10
Loop execution no: 12
Loop execution no: 14
Loop execution no: 16
Loop execution no: 18


Count down no: 10
Count down no: 9
Count down no: 8
Count down no: 7
Count down no: 6
Count down no: 5
Count down no: 4
Count down no: 3
Count down no: 2
Count down no: 1

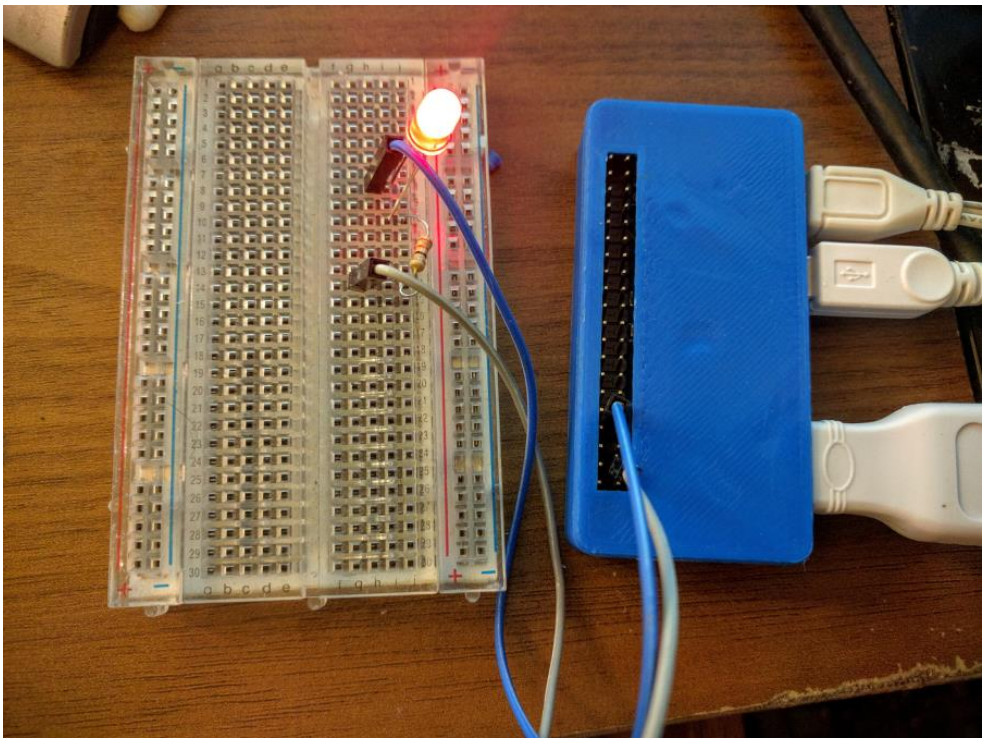
```
...
0 0
0 1
0 2
1 0
1 1
1 2
2 0
2 1
2 2
```

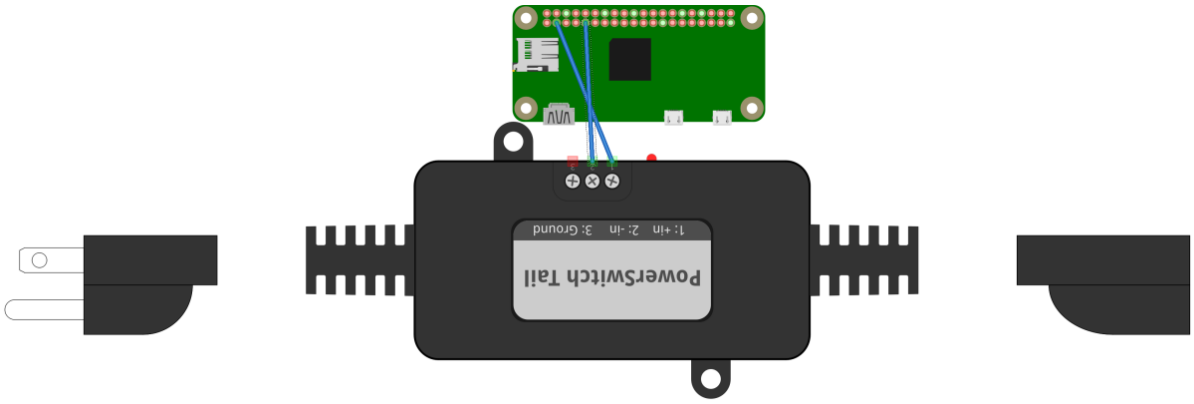
```
>>> for x in range(0, 10):
...     for y in range(0, 10):
...     print(x,y)
  File "<stdin>", line 3
    print(x,y)
        ^
IndentationError: expected an indented block
```



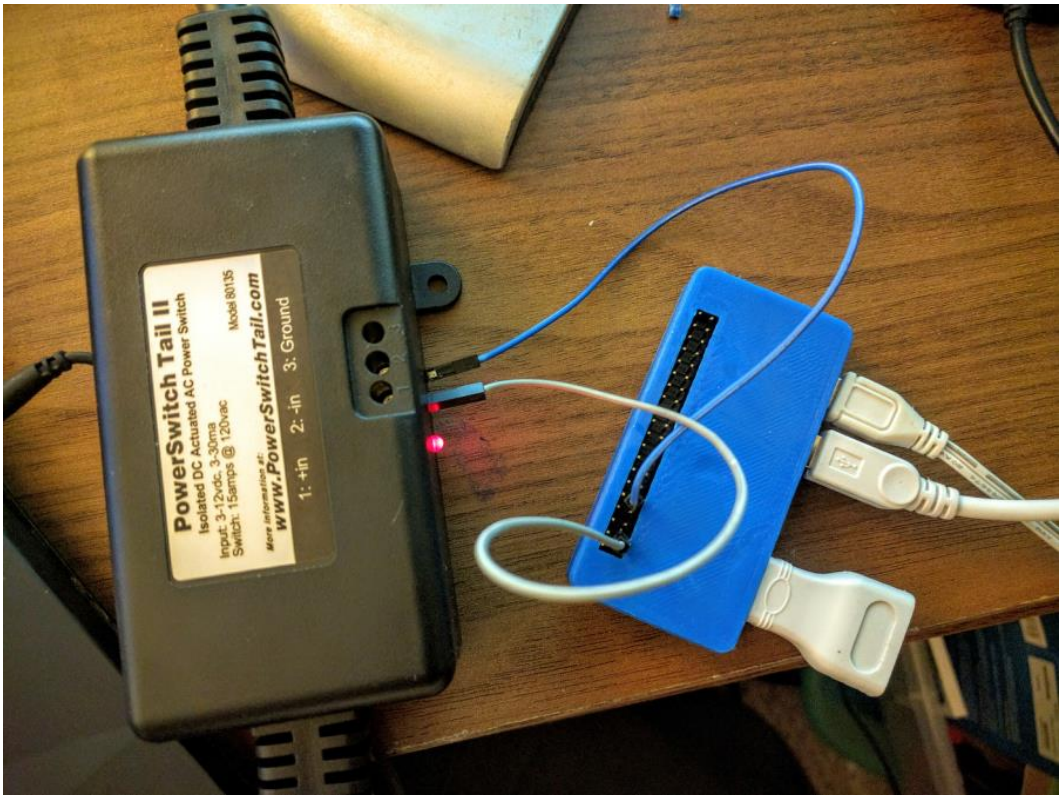


fritzing

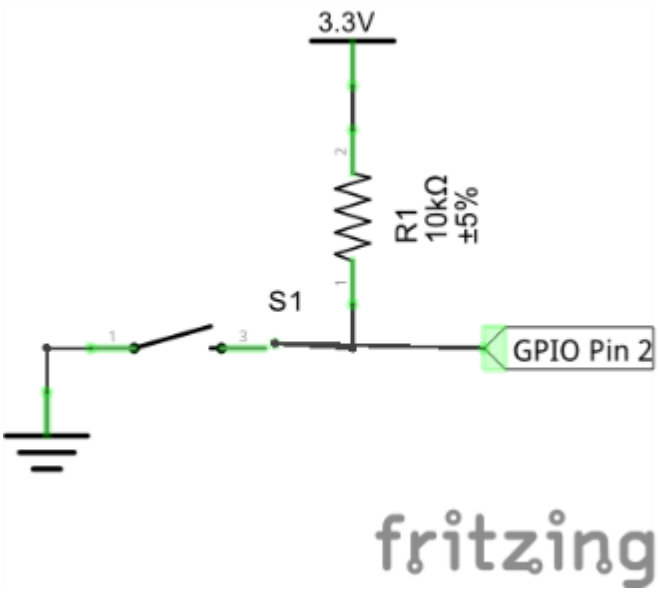


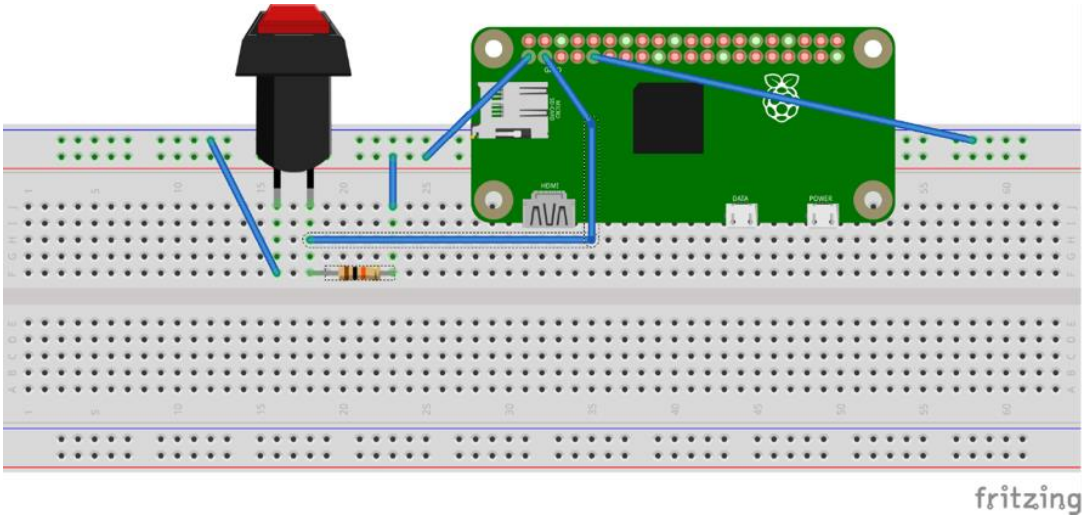

PowerSwitch Tail
1: +in 2: -in 3: Ground

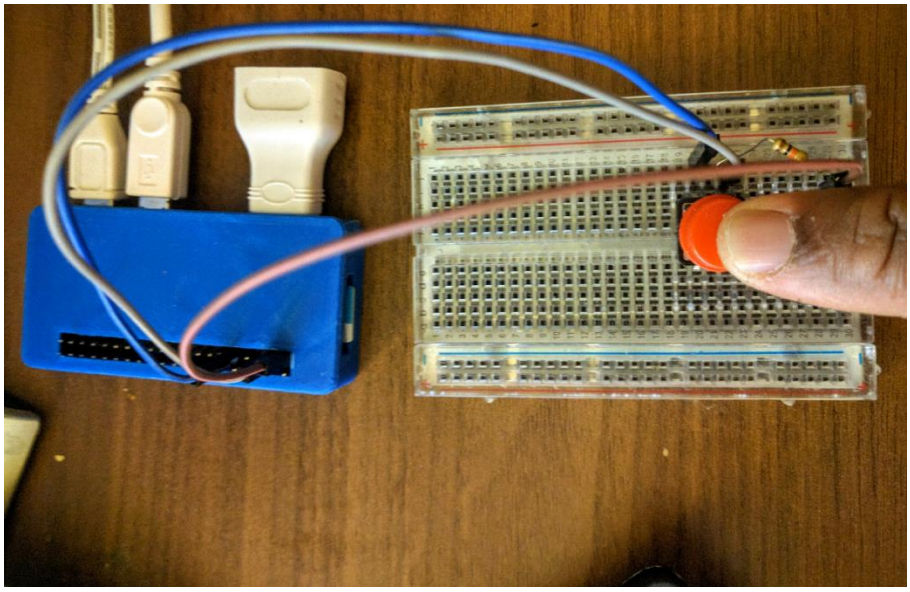
fritzing

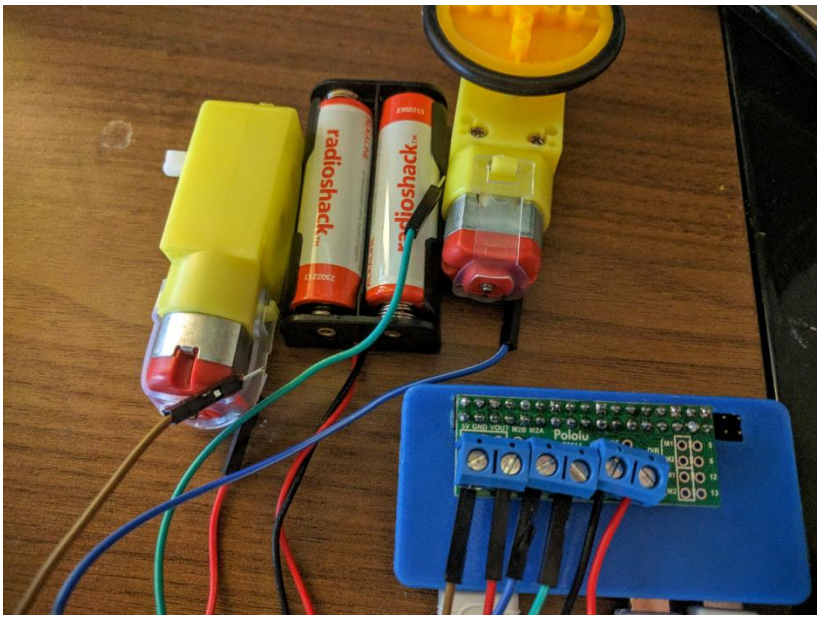

PowerSwitch Tail II
Isolated DC Actuated AC Power Switch
Model 80135
Input: 3-12vdc, 3-30ma
Switch: 15amps @ 120vac
More information at:
www.PowerSwitchTail.com
1: +in
2: -in
3: Ground

Chapter 3: Conditional Statements, Functions, and Lists

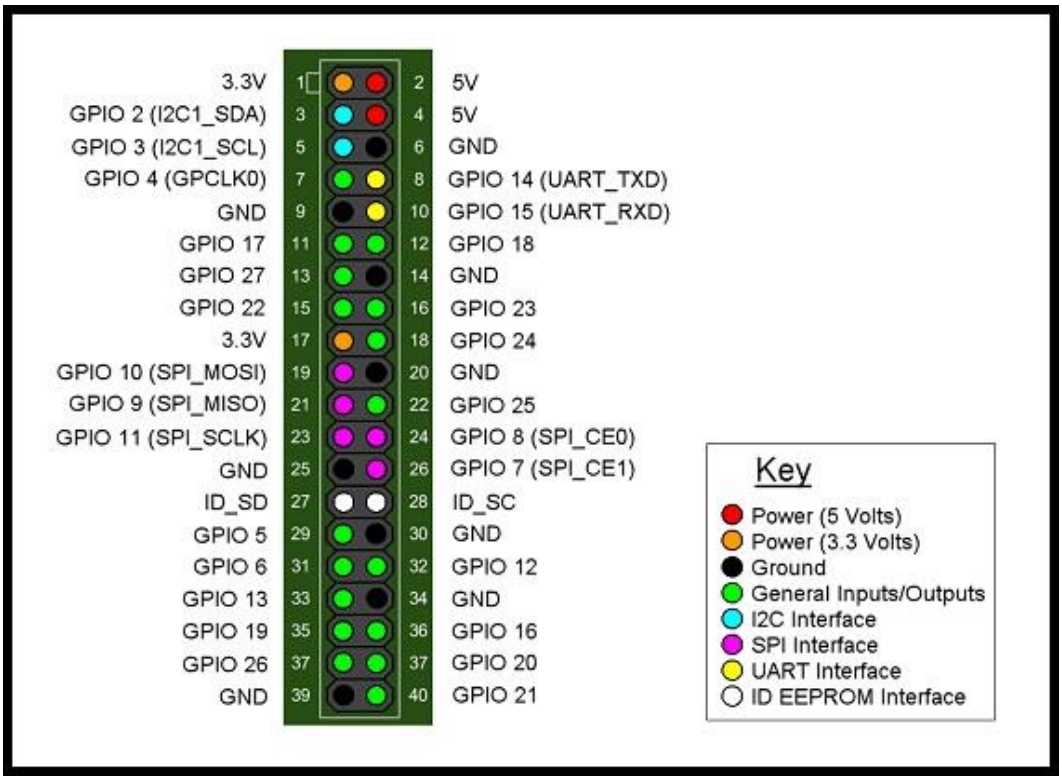


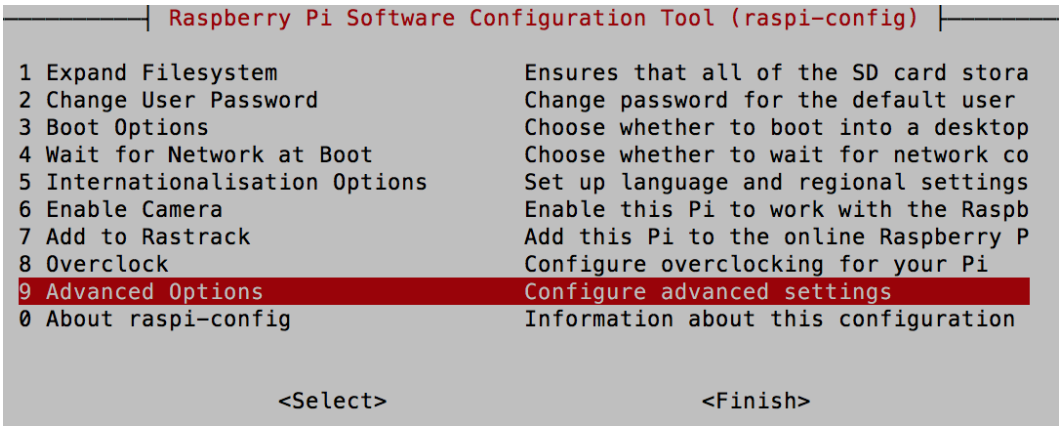


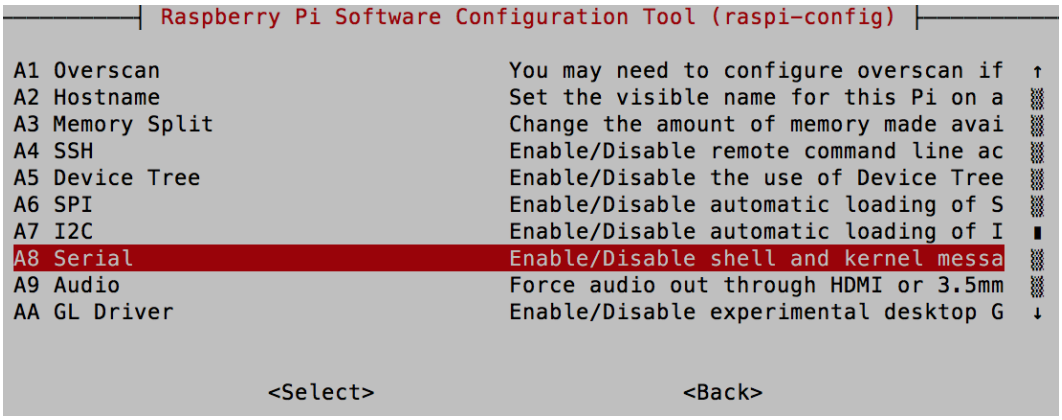


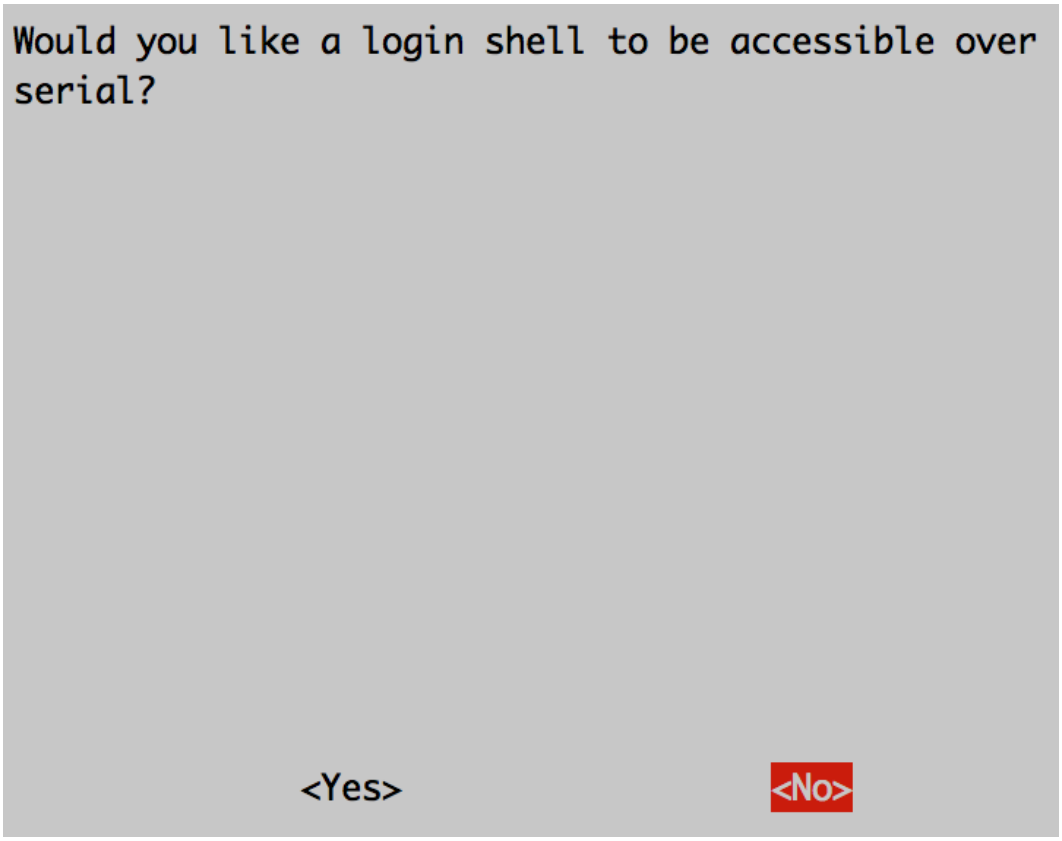

radioshack
radioshack
Pololu

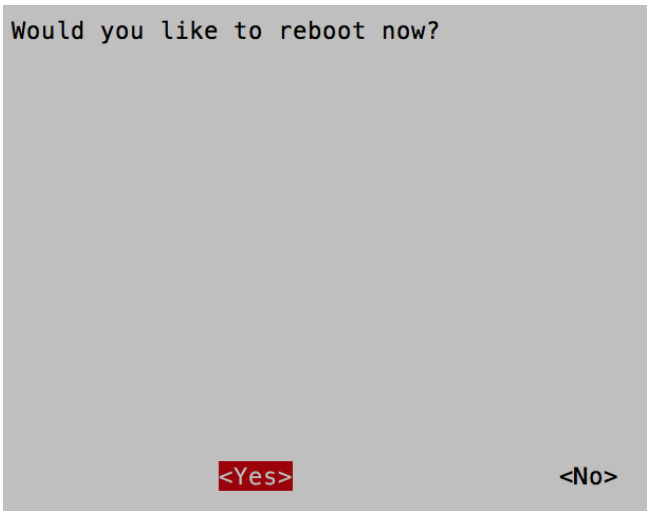
Chapter 4: Communication Interfaces

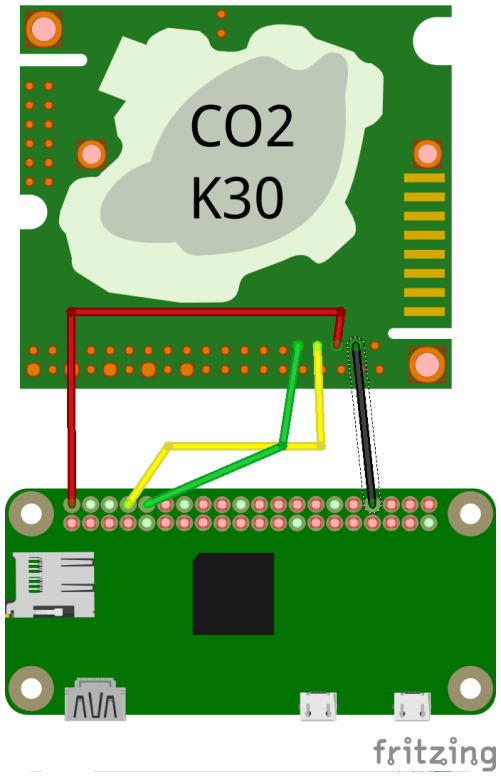





Raspberry Pi Software Configuration Tool (raspi-config)
A1 Overscan
You may need to configure overscan if
A2 Hostname
Set the visible name for this Pi on a
A3 Memory Split
Change the amount of memory made avai
A4 SSH
Enable/Disable remote command line ac
A5 Device Tree
Enable/Disable the use of Device Tree
A6 SPI
Enable/Disable automatic loading of S
A7 I2C
Enable/Disable automatic loading of I
A8 Serial
Enable/Disable shell and kernel messa
A9 Audio
Force audio out through HDMI or 3.5mm
AA GL Driver
Enable/Disable experimental desktop G
<Select>
<Back>


Would you like a login shell to be accessible over serial?
<Yes>
<No>


Would you like to reboot now?
<Yes>
<No>


CO2
K30
fritzing

Reading CO2

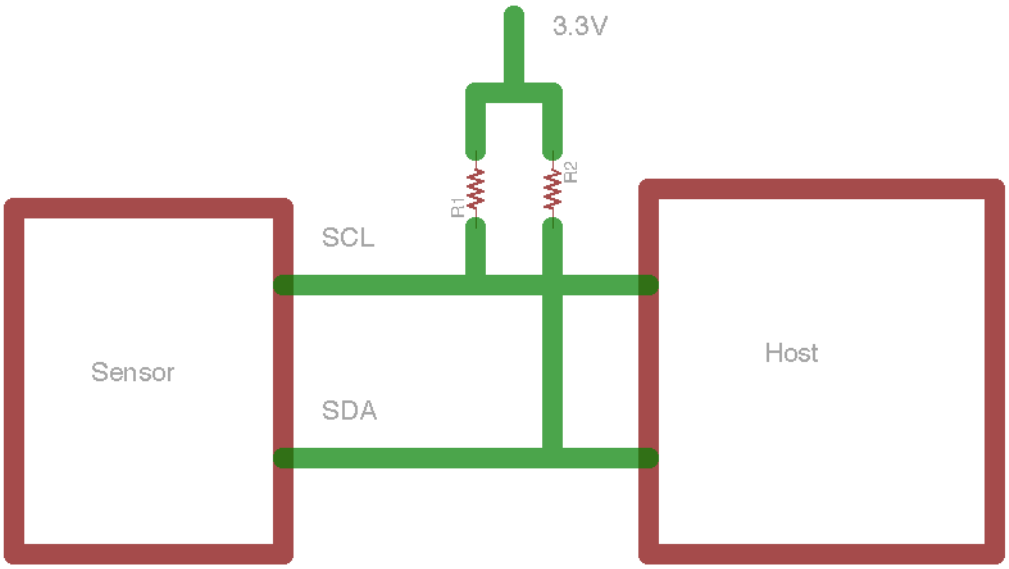
Request:

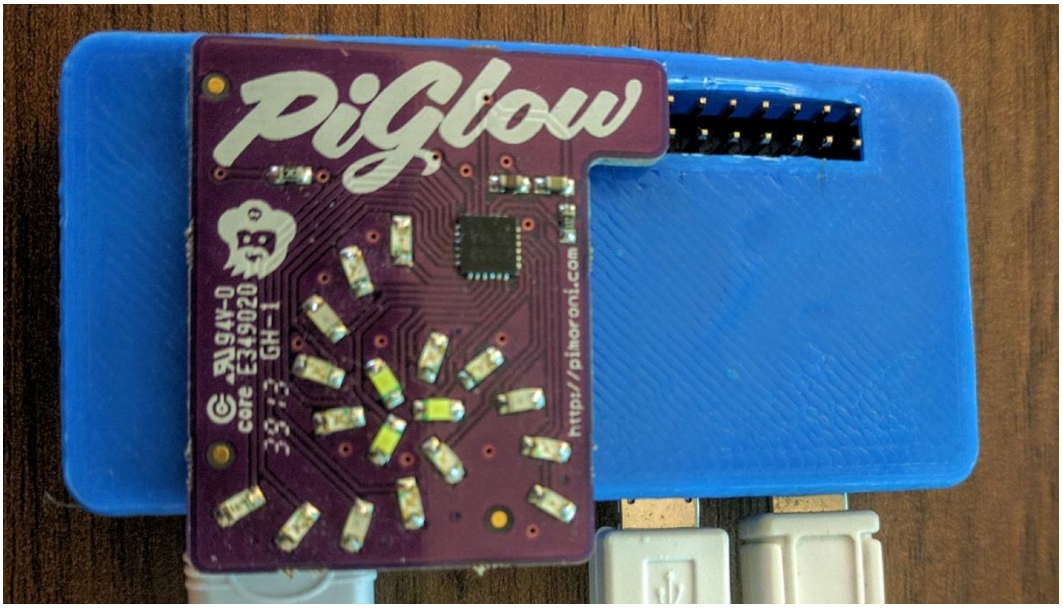
Description	Address 1byte	Command 1-byte	Address (see I2C guide) 2-bytes		N- Bytes to Read 1-byte	Checksum 2-bytes	
Example (reads CO2)	0xFE	0x44	0x00	0x08	0x02	0x9F	0x25

Command Bytes: 0x46- EEPROM Read, 0x44 – RAM Read

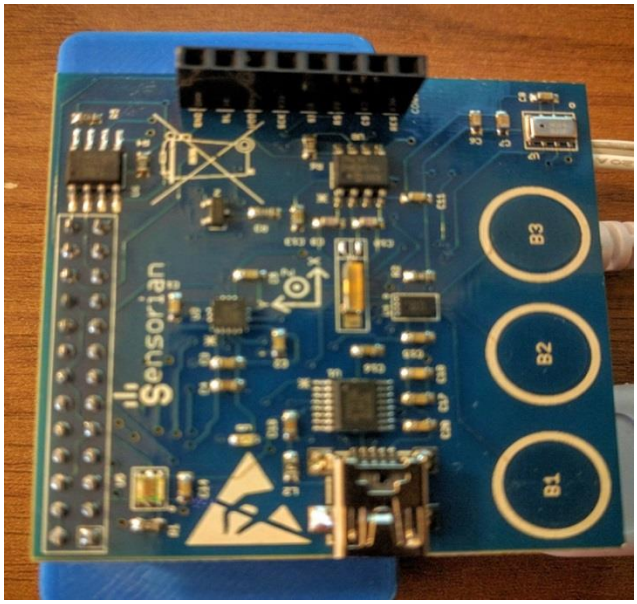
Response

Description	Address 1byte	Command 1-byte	Count 1-byte	N- Bytes Read n-bytes		Checksum 2-bytes	
Example (cont.)	0xFE	0x44	0x02	0x01	0x90		

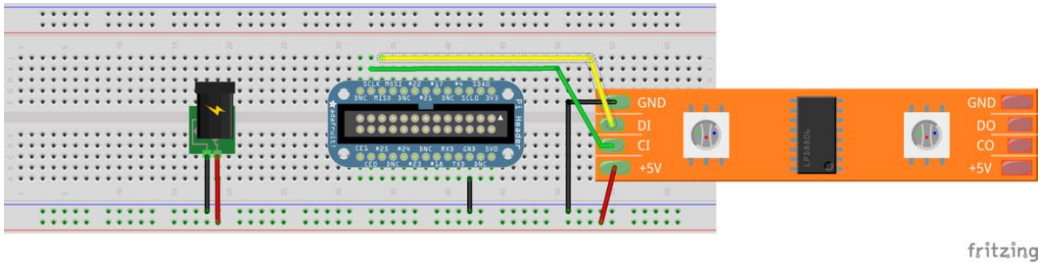



PiGlow
http://pimoroni.com

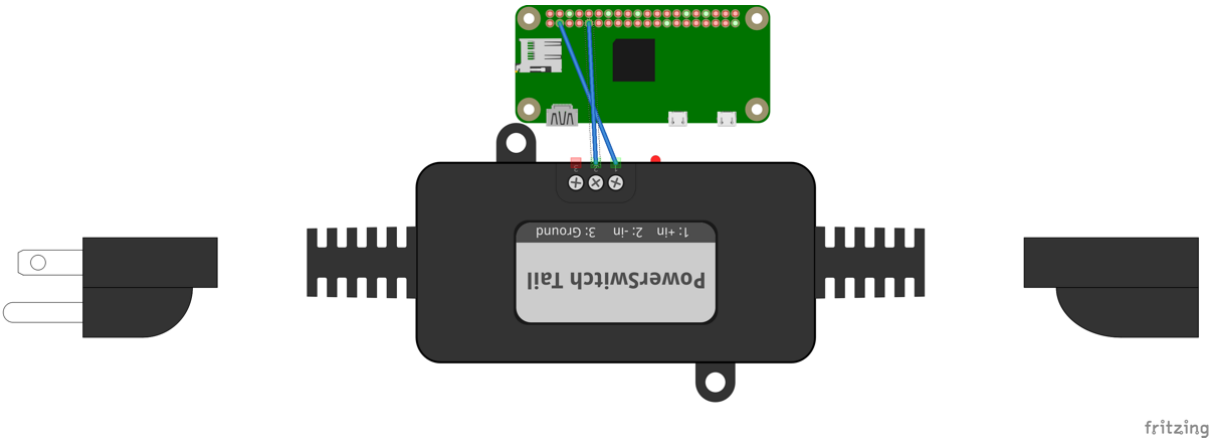

PiGlow



CH1/CH0	Sensor Lux Formula
0 ≤ CH1/CH0 ≤ 0.52	Sensor Lux = (0.0315 x CH0) – (0.0593 x CH0 x ((CH1/CH0)$^{1.4}$))
0.52 ≤ CH1/CH0 ≤ 0.65	Sensor Lux = (0.0229 x CH0) – (0.0291 x CH1)
0.65 ≤ CH1/CH0 ≤ 0.80	Sensor Lux = (0.0157 x CH0) – (0.0180 x CH1)
0.80 ≤ CH1/CH0 ≤ 1.30	Sensor Lux = (0.00338 x CH0) – (0.00260 x CH1)
CH1/CH0 ≥ 1.30	Sensor Lux = 0



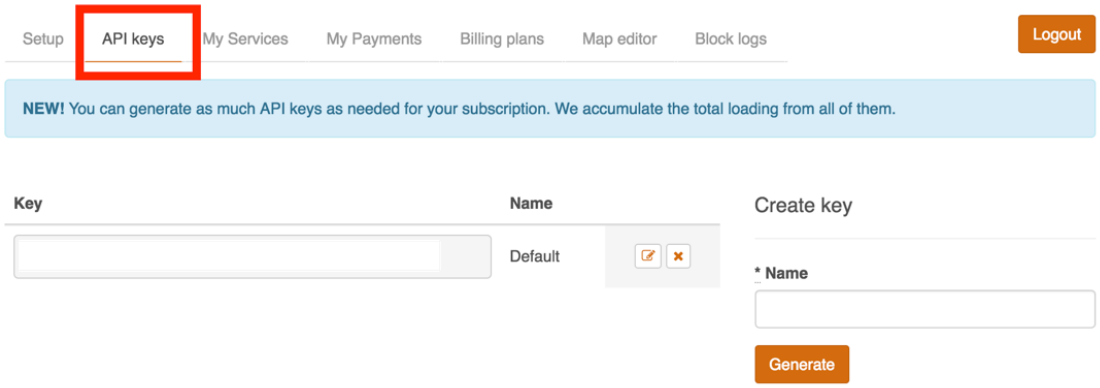
Chapter 5: Data Types and Object-Oriented Programming in Python

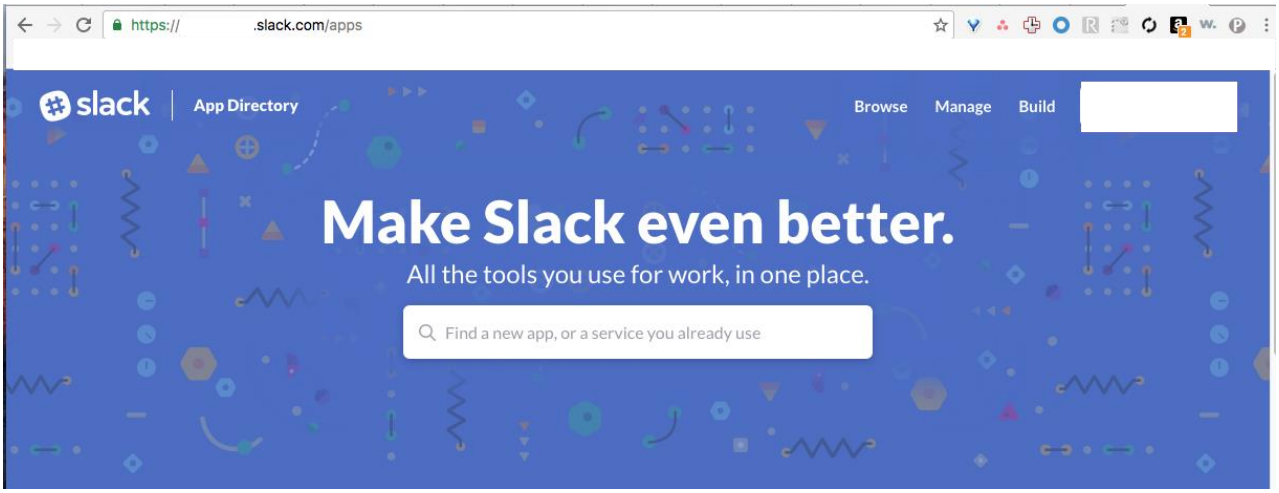


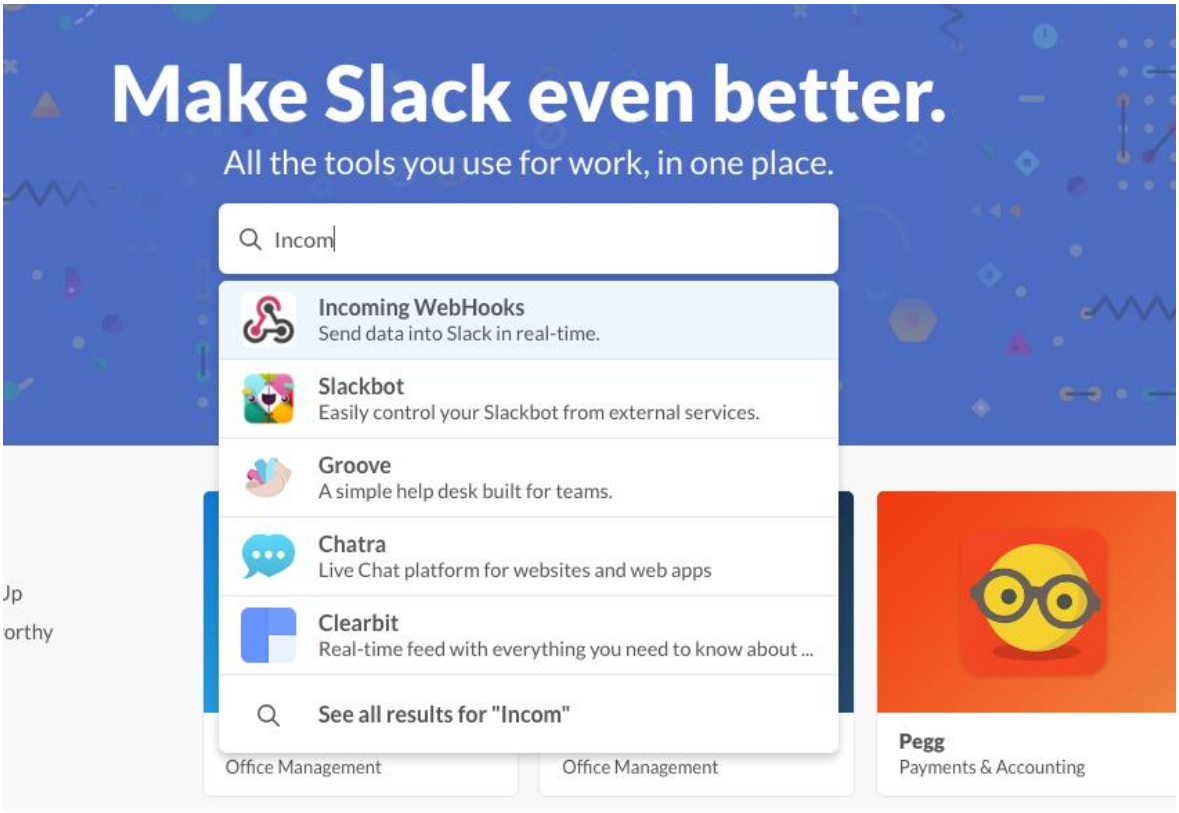
Chapter 6: File I/O and Python Utilities

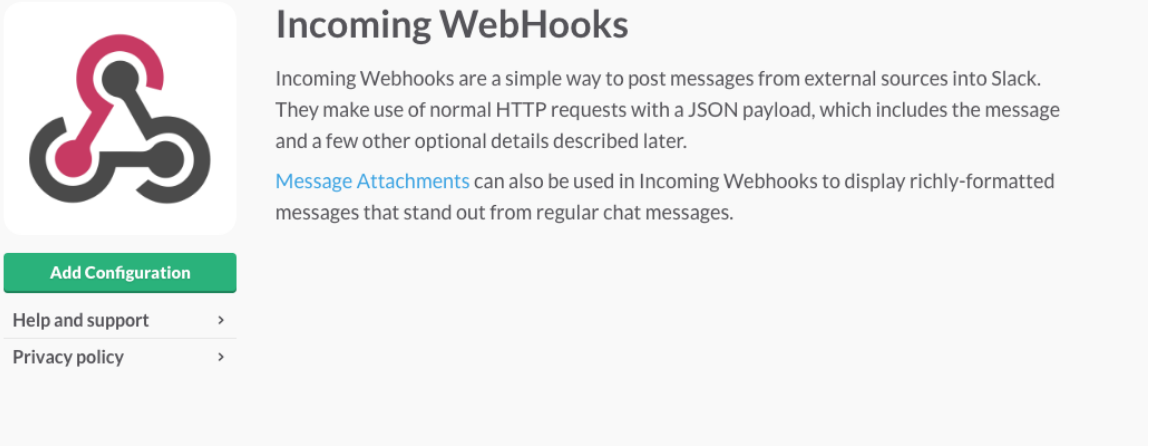
```
pi         822  0.0  1.1   6916  5000 pts/0    Ss   Jul10   0:02 -bash
root      1548  0.0  0.0      0     0 ?        S    Jul10   0:00 [kworker/u2:1]
pi        1815  0.1  1.9  12636  8804 pts/0    S+   Jul10   0:01 python3 light_scheduler.py
root      1817  0.0  1.1  12064  5280 ?        Ss   Jul10   0:00 sshd: pi [priv]
pi        1827  0.0  0.7  12064  3504 ?        S    Jul10   0:00 sshd: pi@pts/1
pi        1830  0.0  1.0   6320  4476 pts/1    Ss   Jul10   0:00 -bash
```

Chapter 7: Requests and Web Frameworks






Make Slack even better.
All the tools you use for work, in one place.
Incom
Incoming WebHooks
Send data into Slack in real-time.
Slackbot
Easily control your Slackbot from external services.
Groove
A simple help desk built for teams.
Chatra
Live Chat platform for websites and web apps
Clearbit
Real-time feed with everything you need to know about ...
See all results for "Incom"
Jp
orthy
Office Management
Office Management
Pegg
Payments & Accounting


Incoming WebHooks
Incoming Webhooks are a simple way to post messages from external sources into Slack. They make use of normal HTTP requests with a JSON payload, which includes the message and a few other optional details described later.
Message Attachments can also be used in Incoming Webhooks to display richly-formatted messages that stand out from regular chat messages.
Add Configuration
Help and support
Privacy policy

Post to Channel

Start by choosing a channel where your Incoming Webhook will post messages to.

Privately to (you)

or create a new channel

Add Incoming WebHooks integration

By creating an incoming webhook, you agree to the Slack API Terms of Service.

Webhook URL

`https://hooks.slack.com/services/`

Sending Messages

You have two options for sending data to the Webhook URL above:

- Send a JSON string as the `payload` parameter in a POST request
- Send a JSON string as the body of a POST request

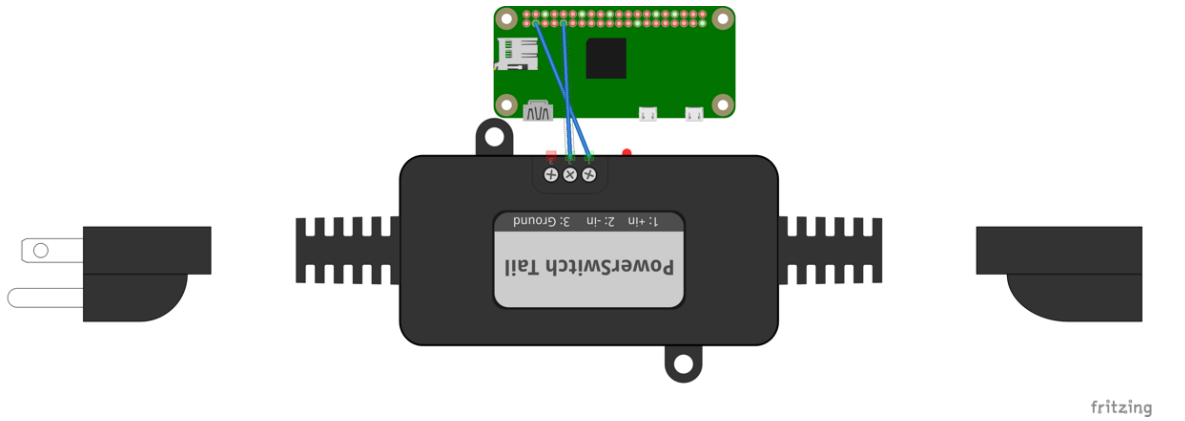
For a simple message, your JSON payload could contain a `text` property at minimum. This is the text that will be posted to the channel.
A simple example:

```
payload={"text": "This is a line of text in a channel.\nAnd this is
```

incoming-webhook BOT 11:29 AM

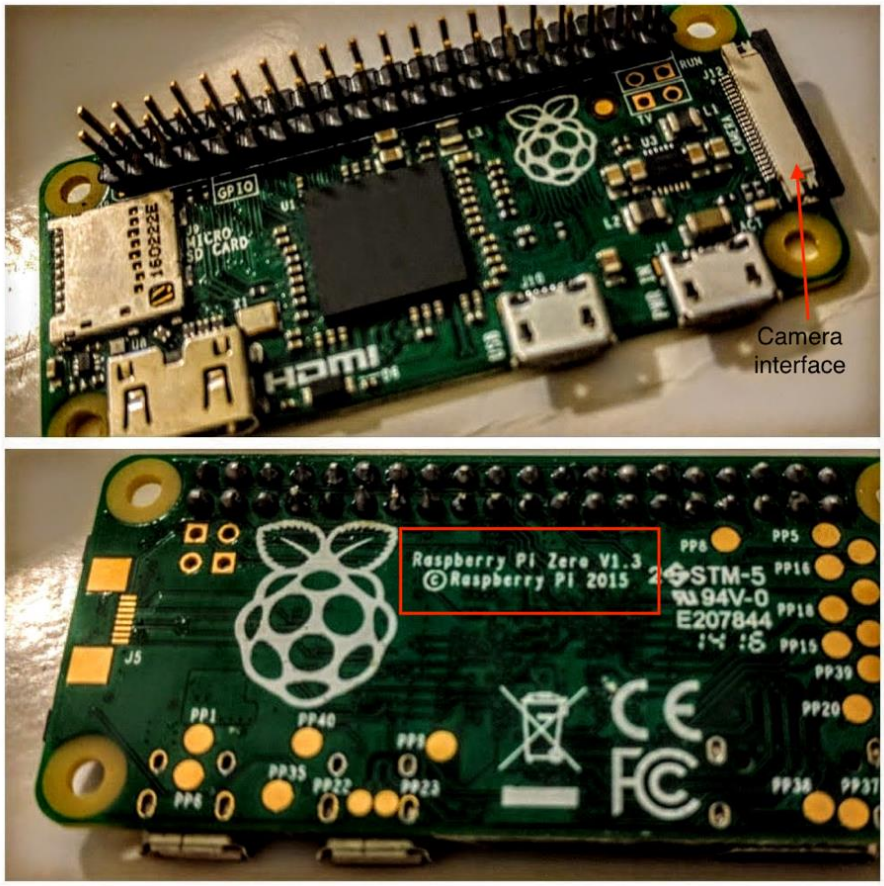
The cat door just opened!

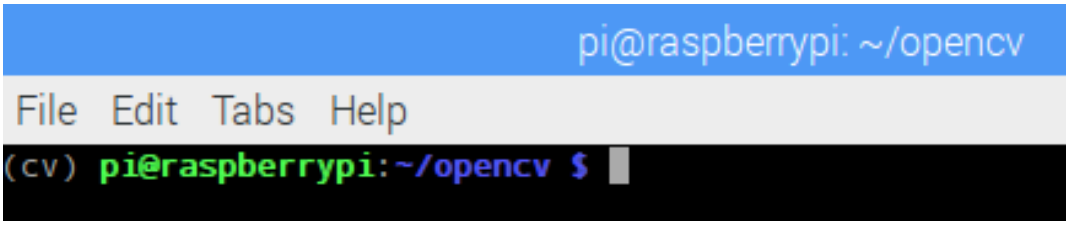

192.168.86.111:5000
Hello World!

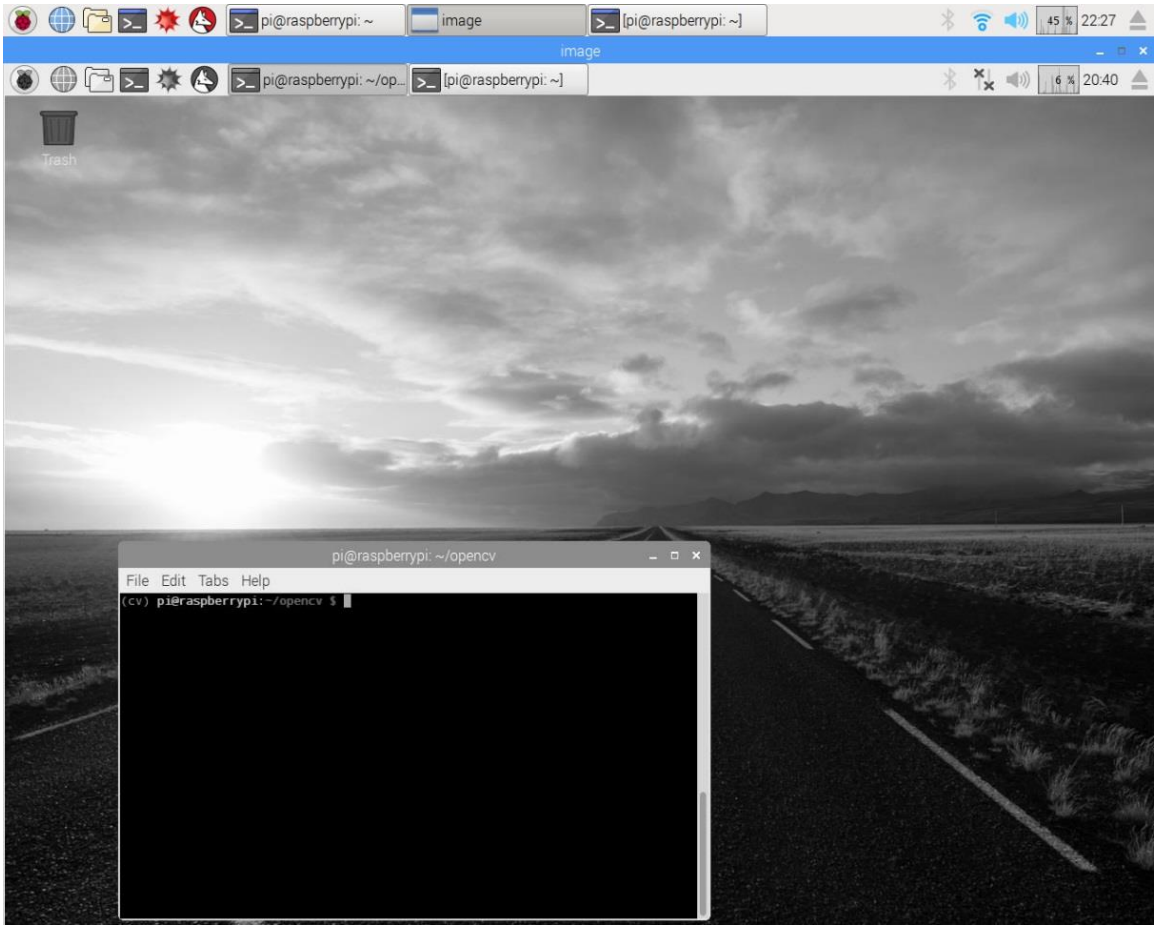

PowerSwitch Tail
1: +In
2: -In
3: Ground
fritzing

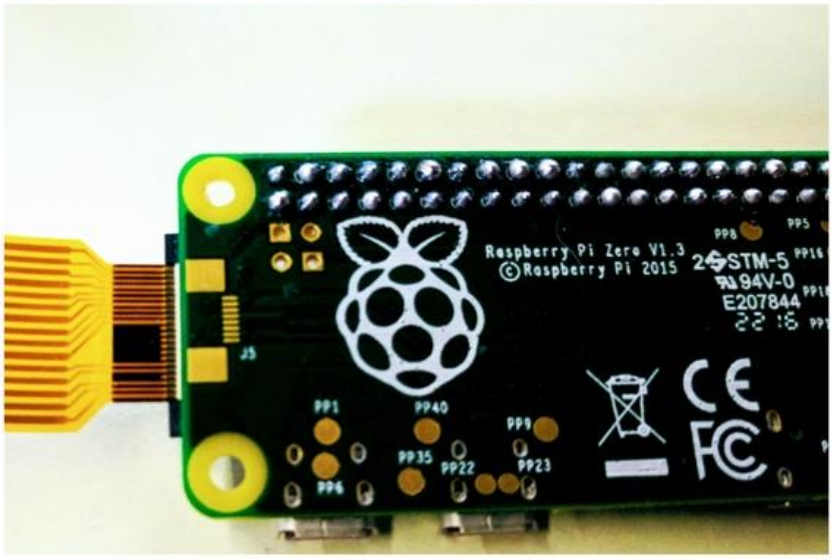

192.168.86.111:5000/lamp/off
Table lamp is now off

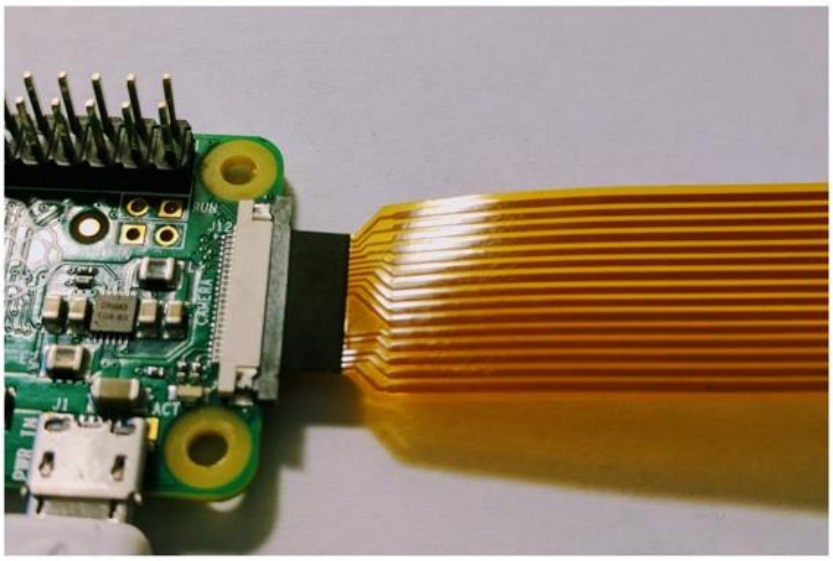
Chapter 8: Awesome Things You Could Develop Using Python

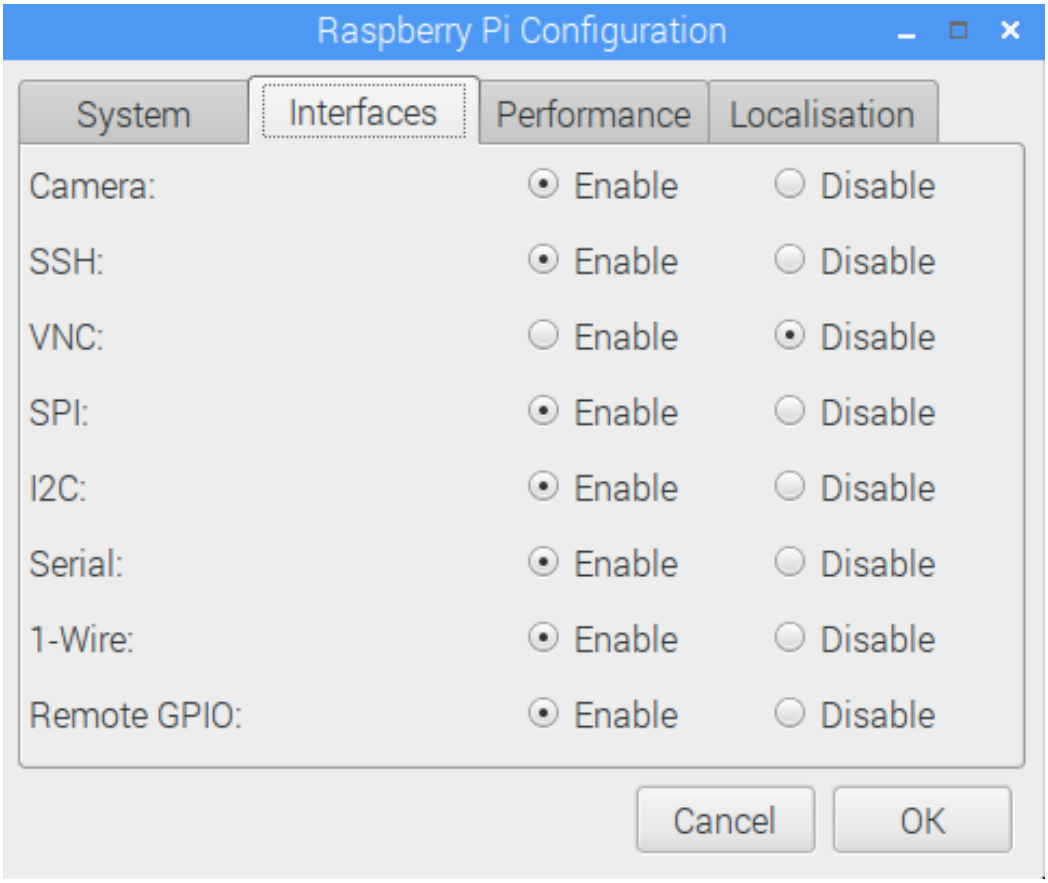


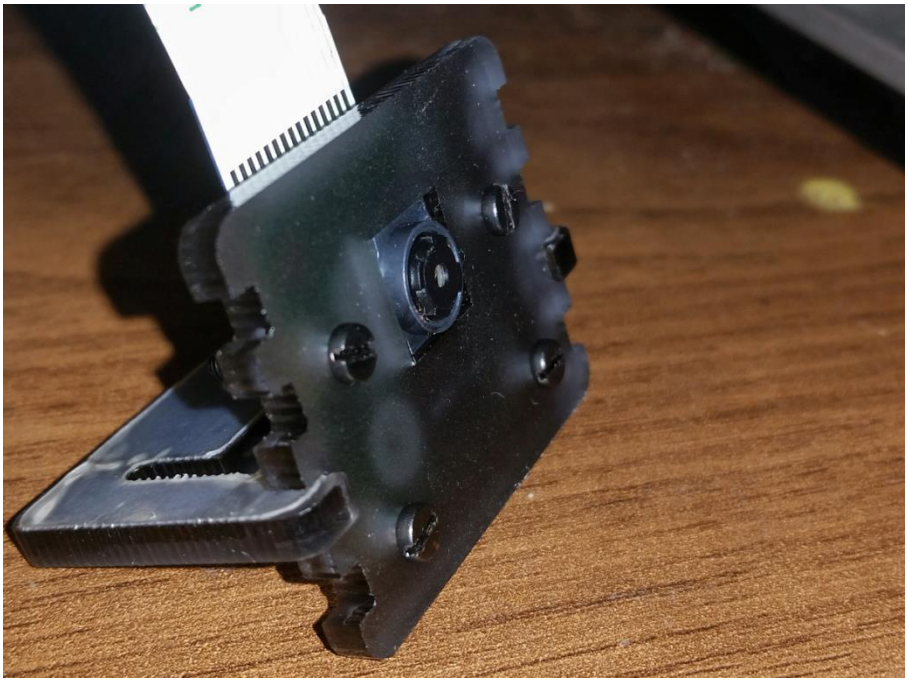


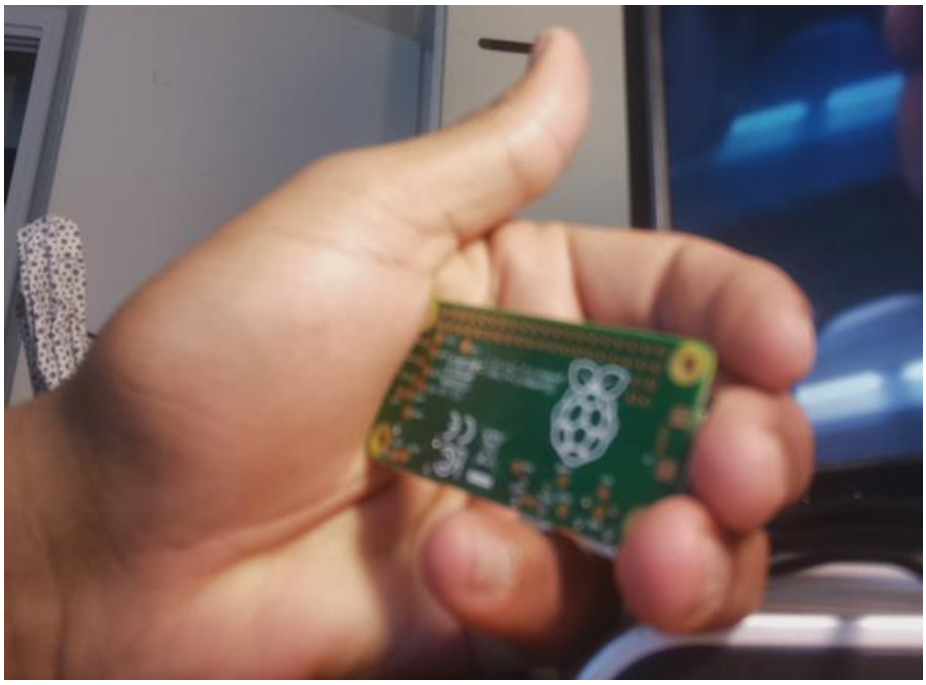

pi@raspberrypi: ~
image
[pi@raspberrypi: ~]
22:27
image
pi@raspberrypi: ~/op...
[pi@raspberrypi: ~]
20:40
Trash
pi@raspberrypi: ~/opencv
File Edit Tabs Help
(cv) pi@raspberrypi:~/opencv $

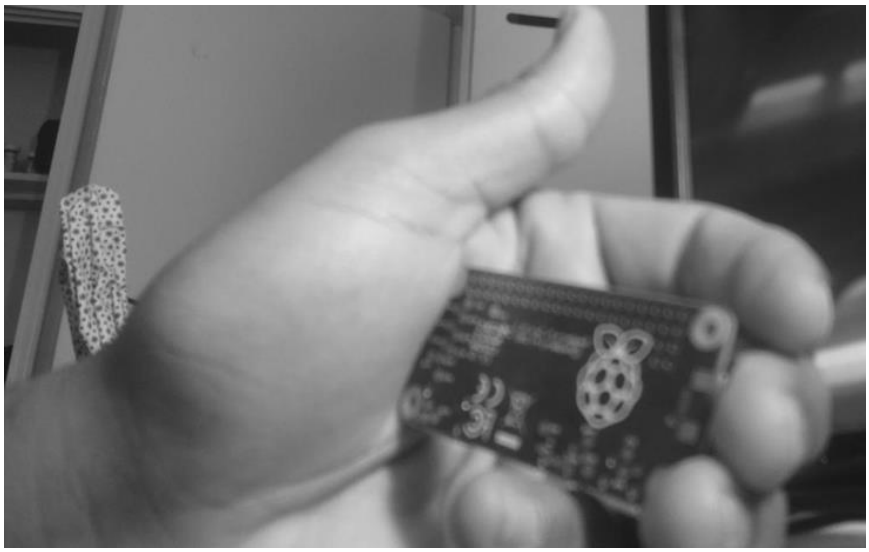

Raspberry Pi Zero V1.3
©Raspberry Pi 2015
STM-5
94V-0
E207844
J5
PP1
PP40
PP9
PP35
PP22
PP23
PP6


RUN
J12
CAMERA
J1
ACT


Raspberry Pi Configuration
System
Interfaces
Performance
Localisation
Camera: Enable Disable
SSH: Enable Disable
VNC: Enable Disable
SPI: Enable Disable
I2C: Enable Disable
Serial: Enable Disable
1-Wire: Enable Disable
Remote GPIO: Enable Disable
Cancel
OK







App ID

Server Access Token

Client Access Token

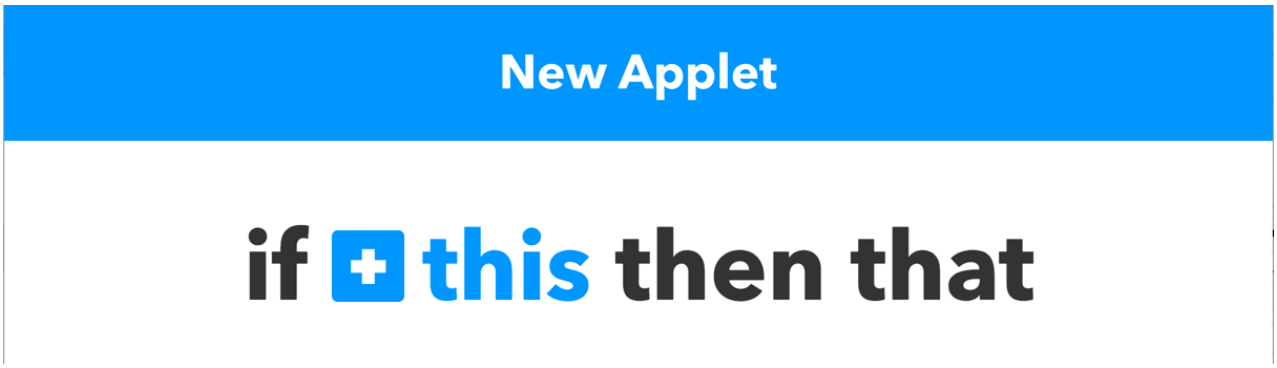
Allowed domains

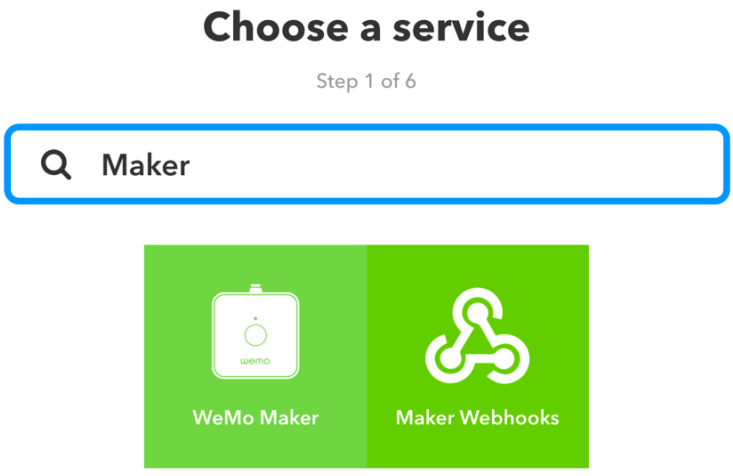
Add a new domain name to this app...

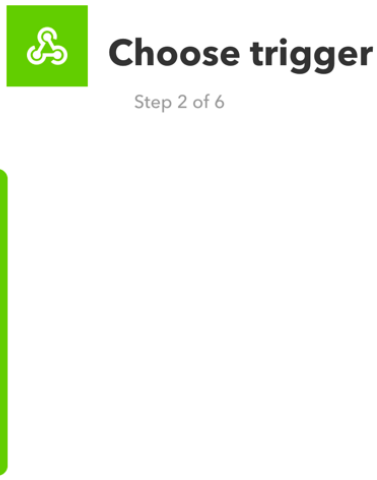
No items!

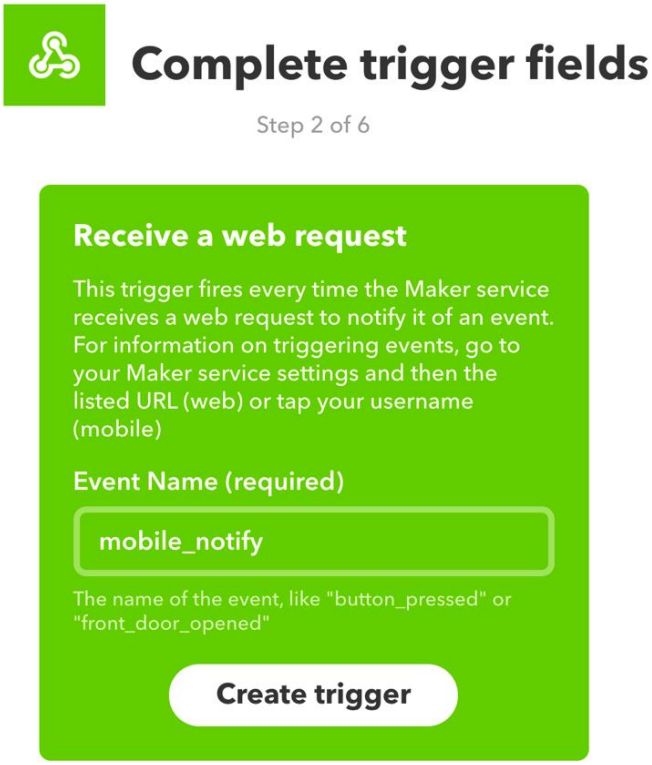
{"id":65,"stationName":"Townsend at 7th","availableDocks":7,"totalDocks"


IFTTT
Discover
Search
My Applets
18 Applets for the news
New Applet
Services
Settings
Sign out


New Applet
if this then that


Choose a service
Step 1 of 6
Maker
WeMo Maker
Maker Webhooks


Choose trigger
Step 2 of 6
Receive a web request
This trigger fires every time the Maker service receives a web request to notify it of an event. For information on triggering events, go to your Maker service settings and then the listed URL (web) or tap your username (mobile)


Complete trigger fields
Step 2 of 6
Receive a web request
This trigger fires every time the Maker service receives a web request to notify it of an event. For information on triggering events, go to your Maker service settings and then the listed URL (web) or tap your username (mobile)
Event Name (required)
mobile_notify
The name of the event, like "button_pressed" or "front_door_opened"
Create trigger

if then that

Choose action service

Step 3 of 6

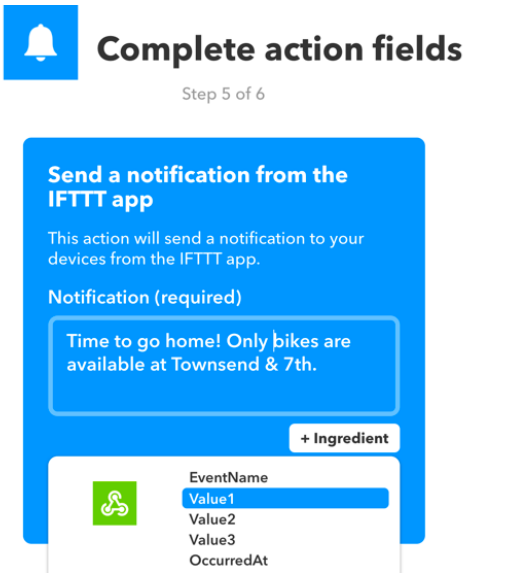
notifications

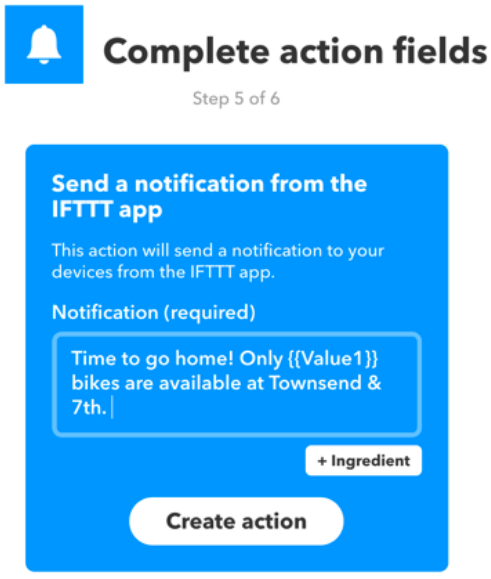
Choose action

Step 4 of 6

Send a notification from the IFTTT app

This action will send a notification to your devices from the IFTTT app.


Complete action fields
Step 5 of 6
Send a notification from the IFTTT app
This action will send a notification to your devices from the IFTTT app.
Notification (required)
Time to go home! Only bikes are available at Townsend & 7th.
+ Ingredient
EventName
Value1
Value2
Value3
OccurredAt


Complete action fields
Step 5 of 6
Send a notification from the IFTTT app
This action will send a notification to your devices from the IFTTT app.
Notification (required)
Time to go home! Only {{Value1}} bikes are available at Townsend & 7th.
+ Ingredient
Create action

Review and finish

Step 6 of 6

Finish

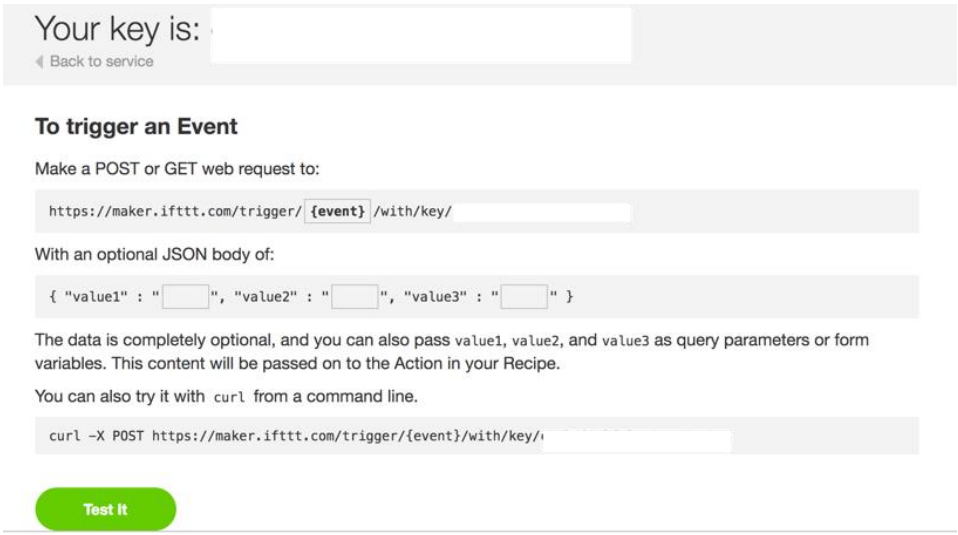
Account Info

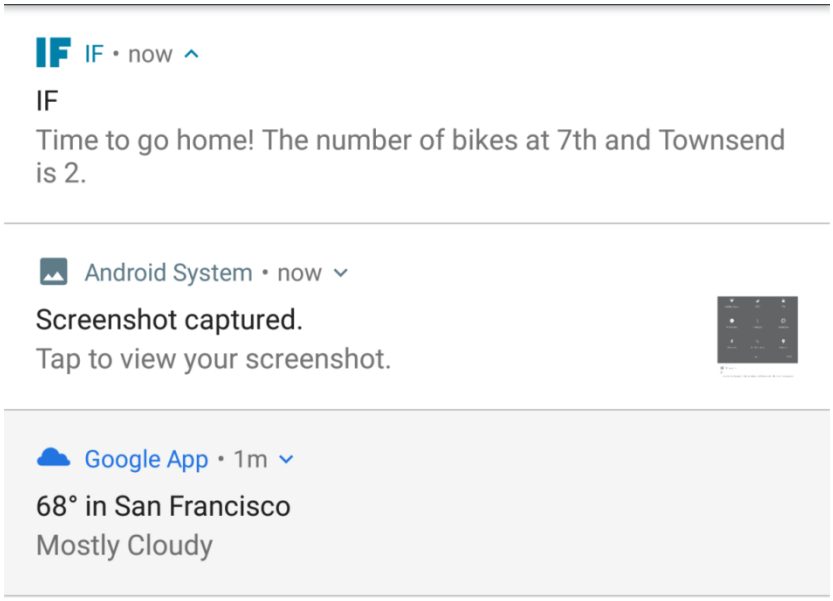
Connected as: _ Your key

URL: https://maker.ifttt.com/use/

Status: active

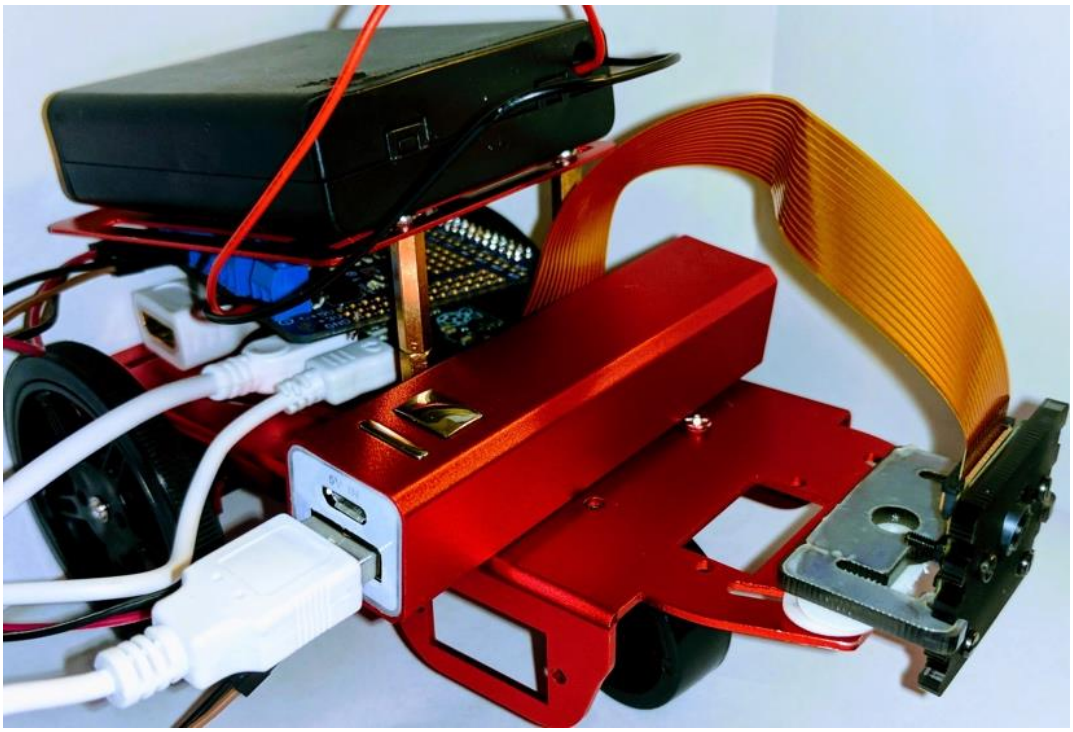
Edit connection

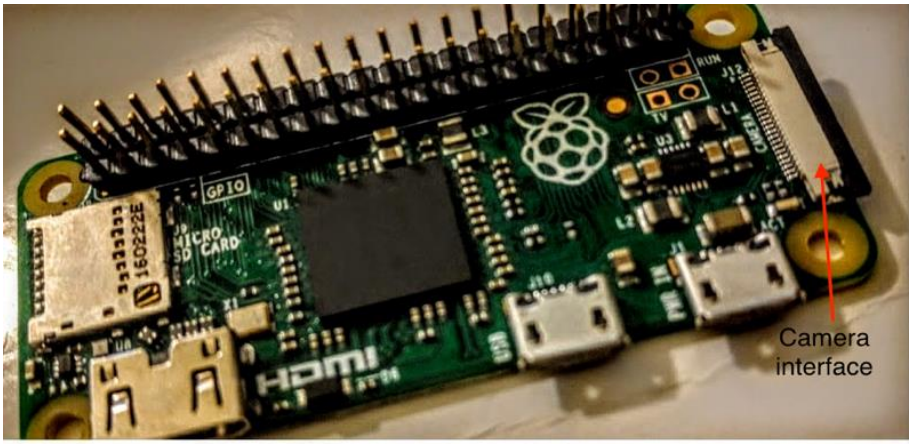


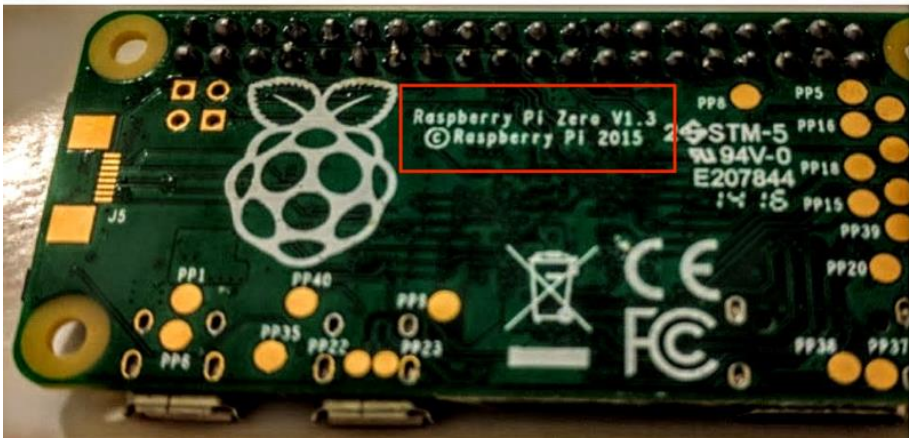


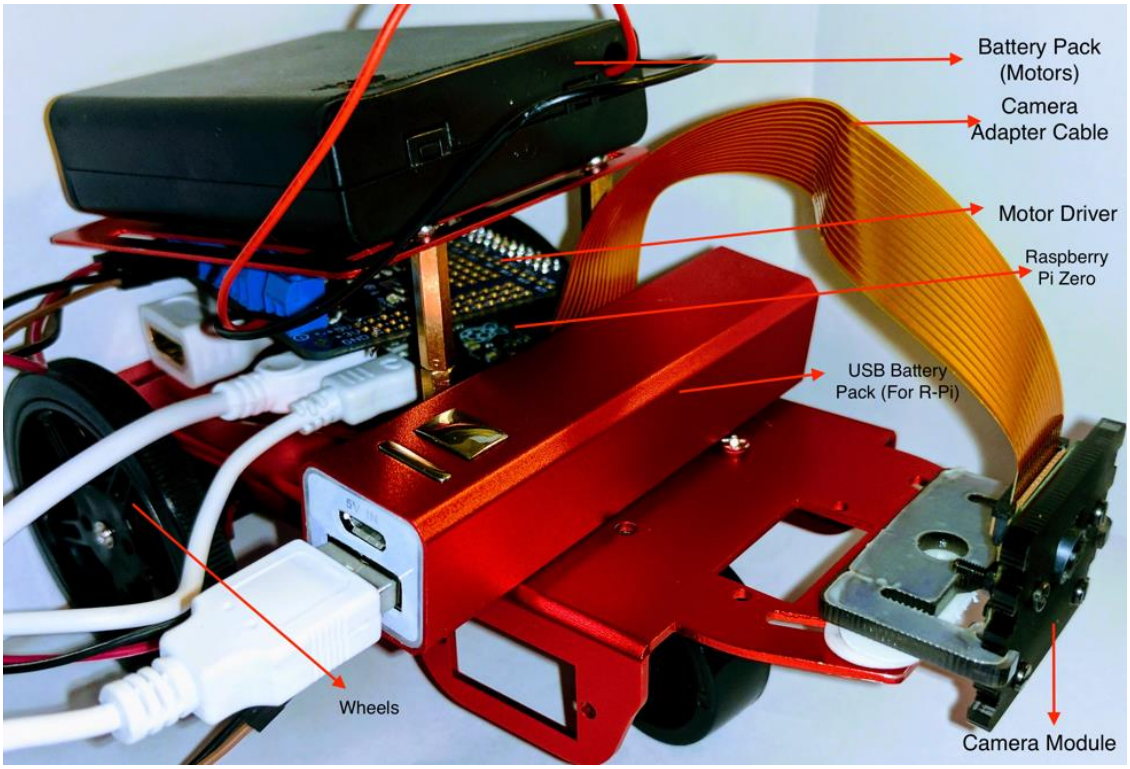

```
5  img = cv2.imread('/home/pi/Desktop/test_shot.jpg',cv2.IMREAD_GRAYSCALE)
6  cv2.imshow('image',img)
```

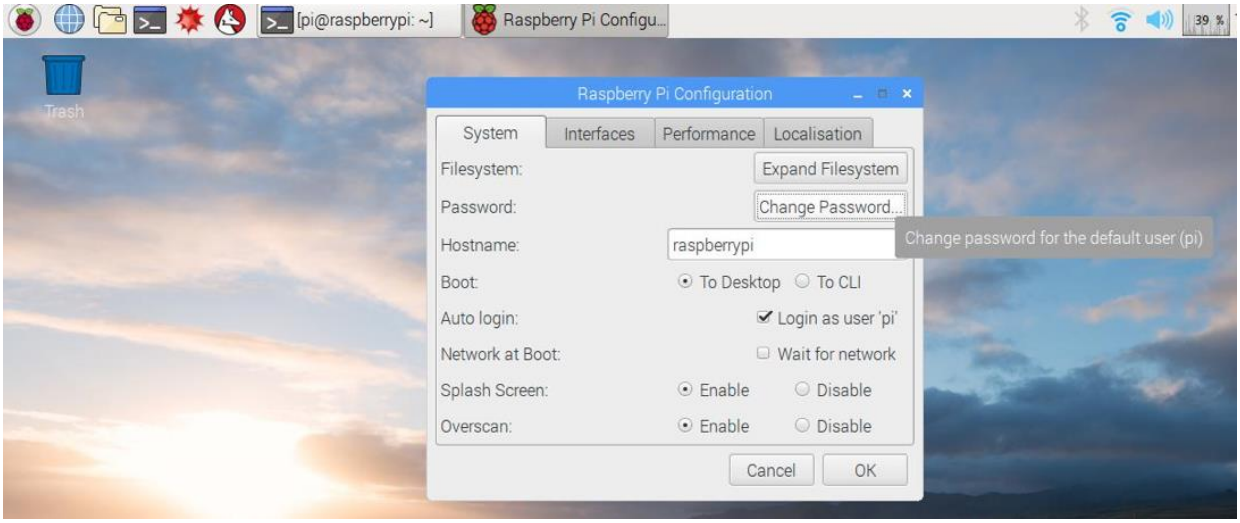
Chapter 9: Lets Build a Robot!

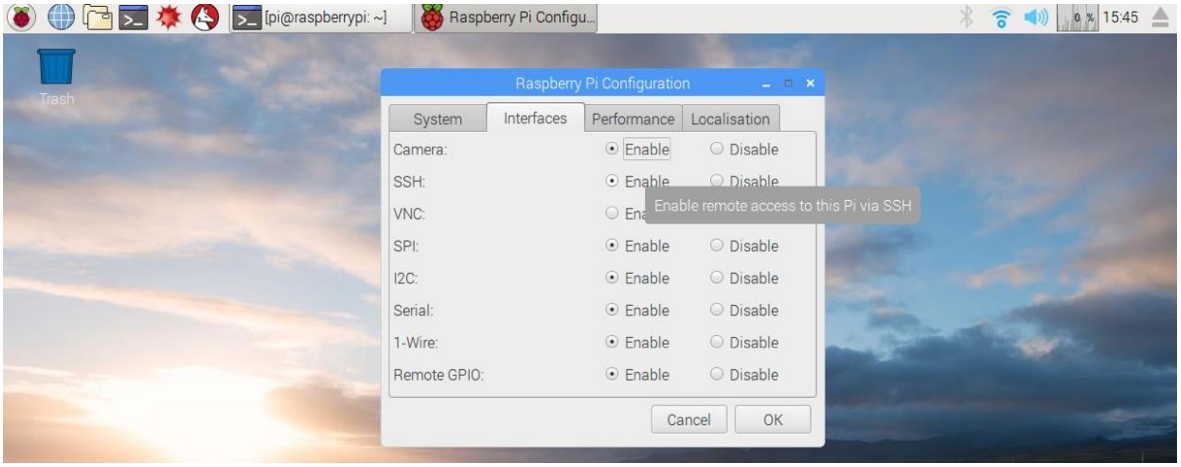


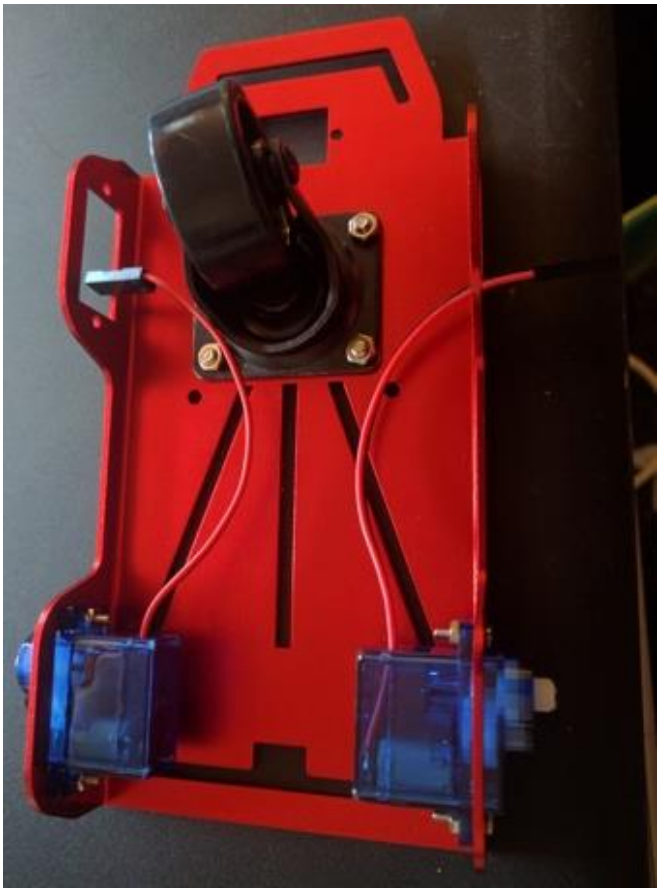

GPIO
MICRO SD CARD
HDMI
Camera interface

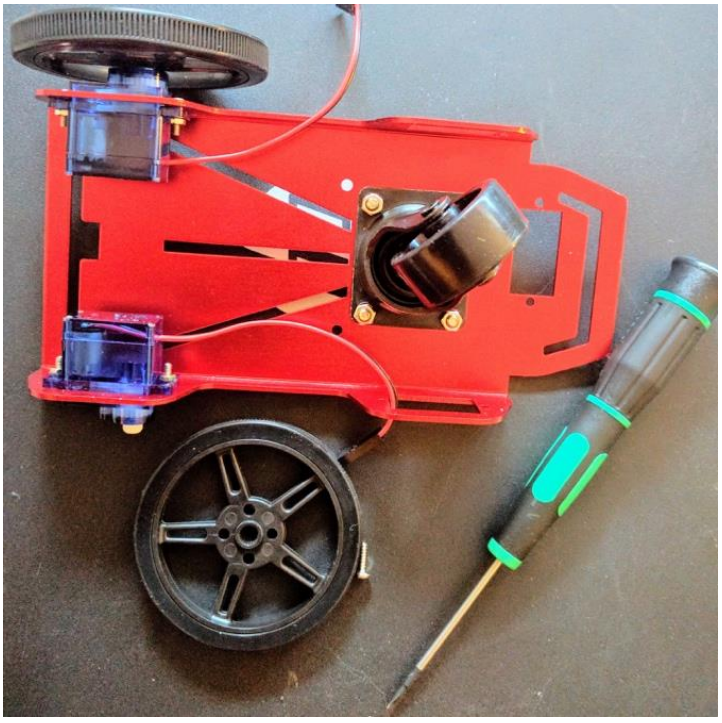

Raspberry Pi Zero V1.3
©Raspberry Pi 2015
STM-5
94V-0
E207844
J5
PP1
PP40
PP35
PP22
PP23
PP6
PP5
PP16
PP18
PP15
PP39
PP20
PP38
PP37

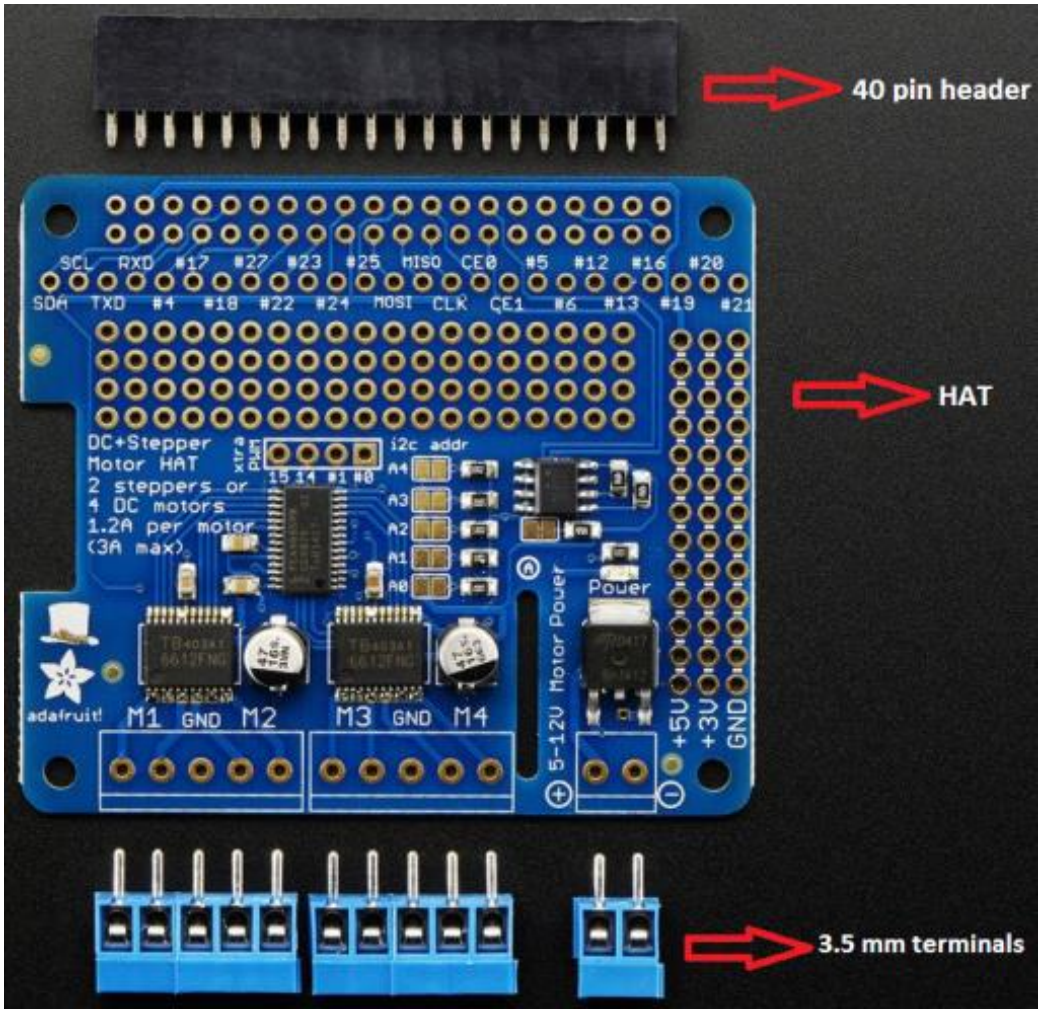

Battery Pack
(Motors)
Camera
Adapter Cable
Motor Driver
Raspberry
Pi Zero
USB Battery
Pack (For R-Pi)
Wheels
Camera Module

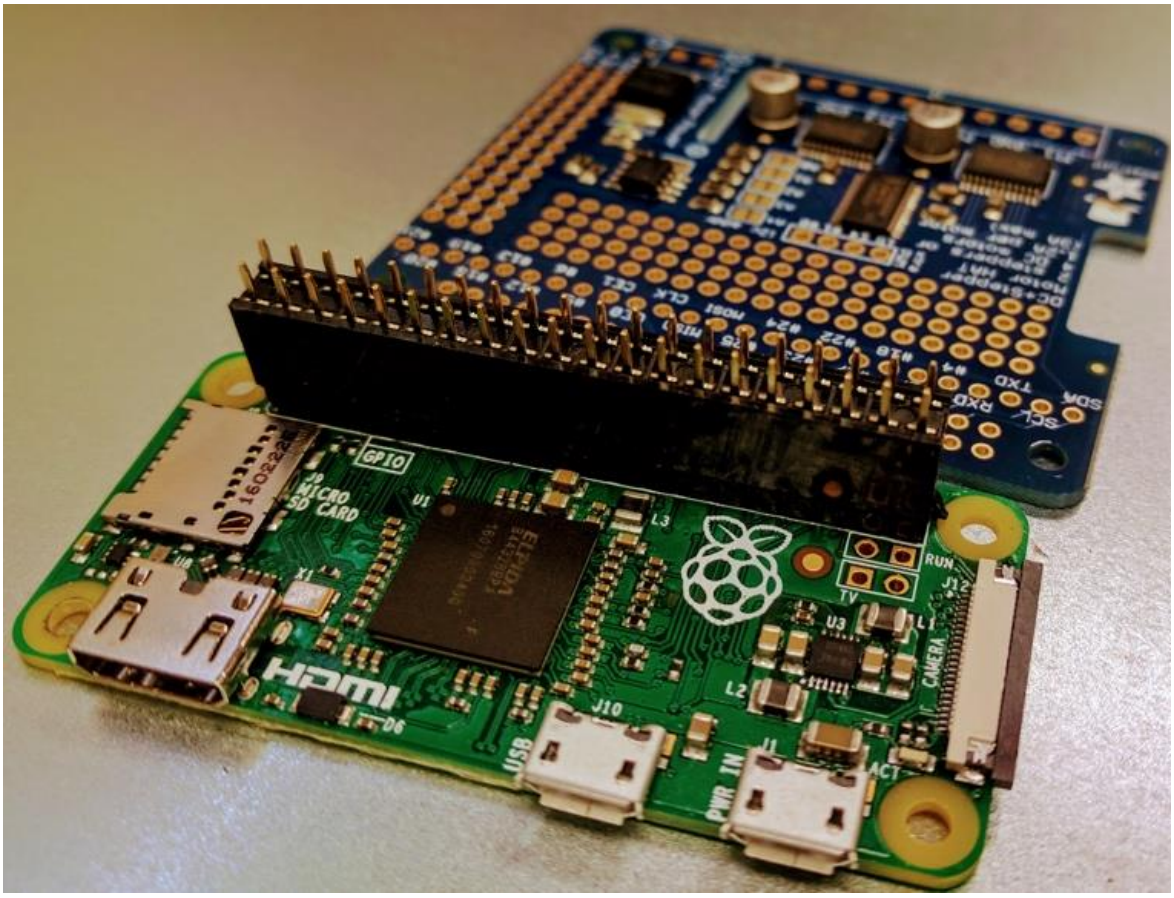

[pi@raspberrypi: ~]
Raspberry Pi Configu...
Trash
Raspberry Pi Configuration
System
Interfaces
Performance
Localisation
Filesystem:
Expand Filesystem
Password:
Change Password...
Hostname:
raspberrypi
Change password for the default user (pi)
Boot:
To Desktop
To CLI
Auto login:
Login as user 'pi'
Network at Boot:
Wait for network
Splash Screen:
Enable
Disable
Overscan:
Enable
Disable
Cancel
OK

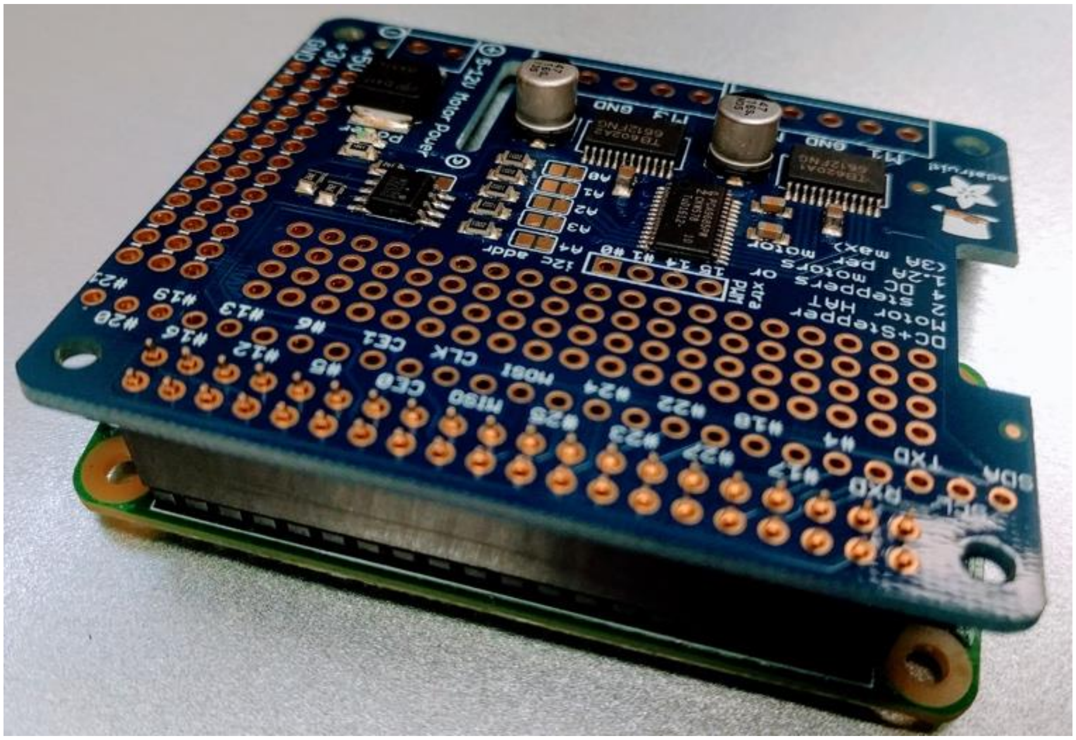

[pi@raspberrypi: ~]
Raspberry Pi Configu...
15:45
Trash
Raspberry Pi Configuration
System
Interfaces
Performance
Localisation
Camera:
SSH:
VNC:
SPI:
I2C:
Serial:
1-Wire:
Remote GPIO:
Enable
Disable
Enable remote access to this Pi via SSH
Cancel
OK

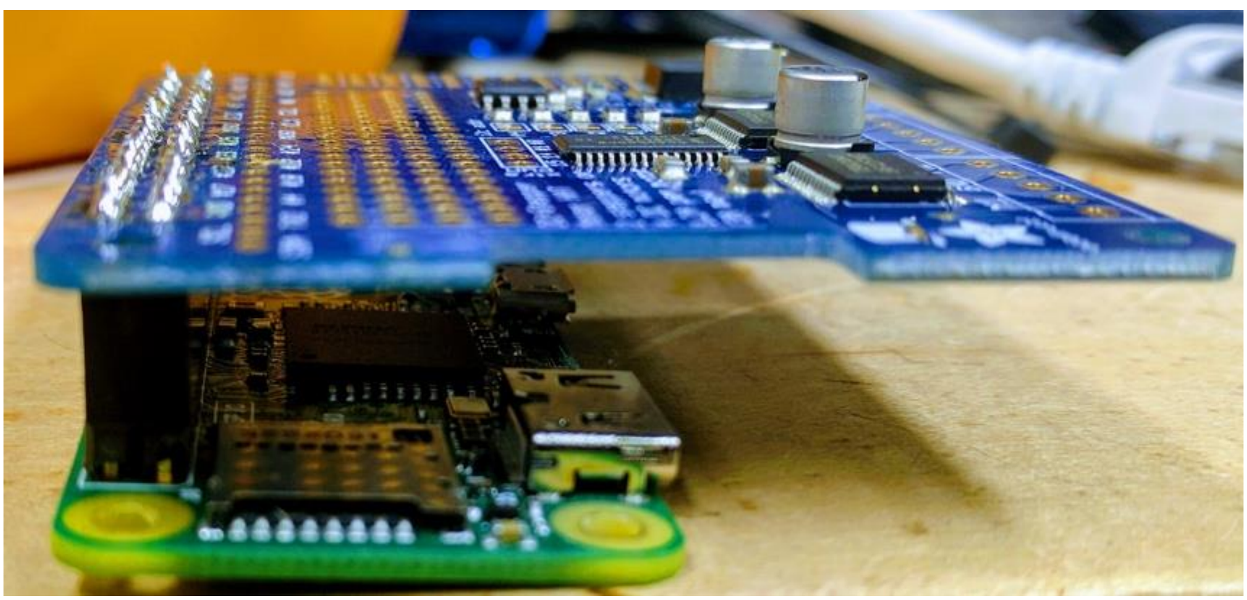


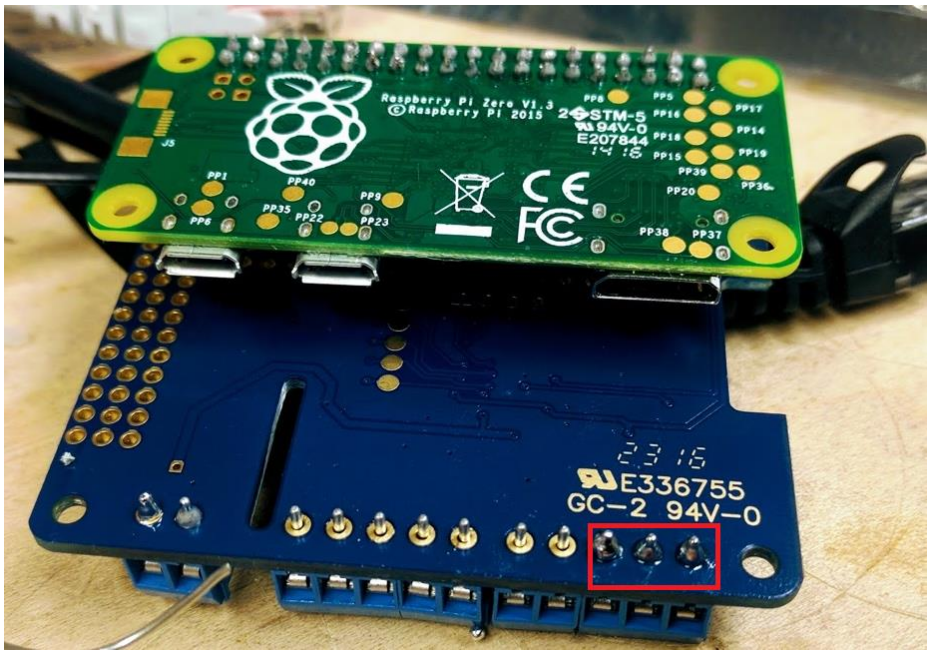


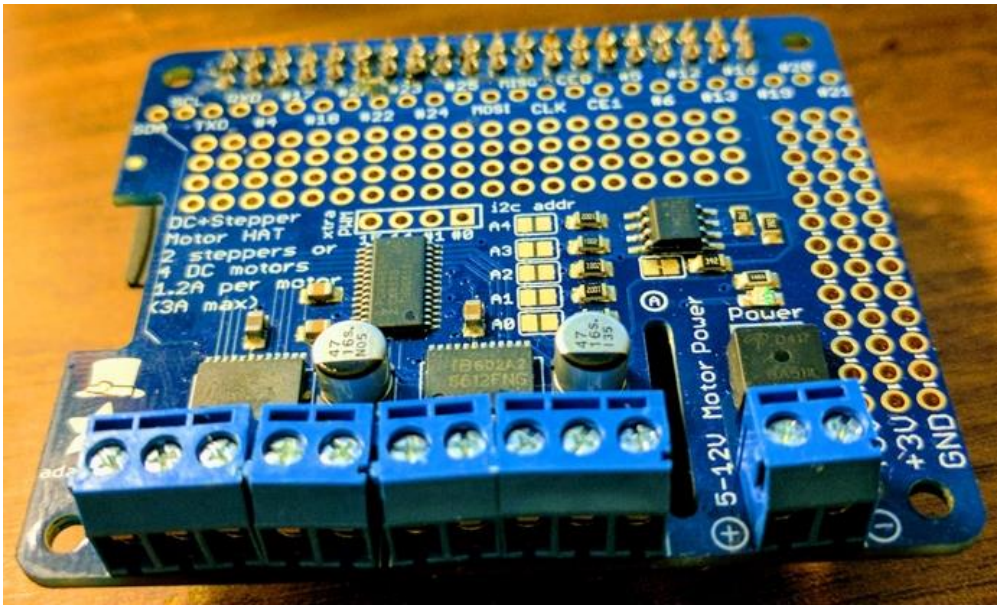

40 pin header
HAT
3.5 mm terminals
SCL RXD #17 #27 #23 #25 MISO CE0 #5 #12 #16 #20
SDA TXD #4 #18 #22 #24 MOSI CLK CE1 #6 #13 #19 #21
DC+Stepper
Motor HAT
2 steppers or
4 DC motors
1.2A per motor
(3A max)
xtra PWM
15 14 #1 #0
i2c addr
A4
A3
A2
A1
A0
Power
adafruit
M1 GND M2
M3 GND M4
5-12V Motor Power
+5V
+3V
GND

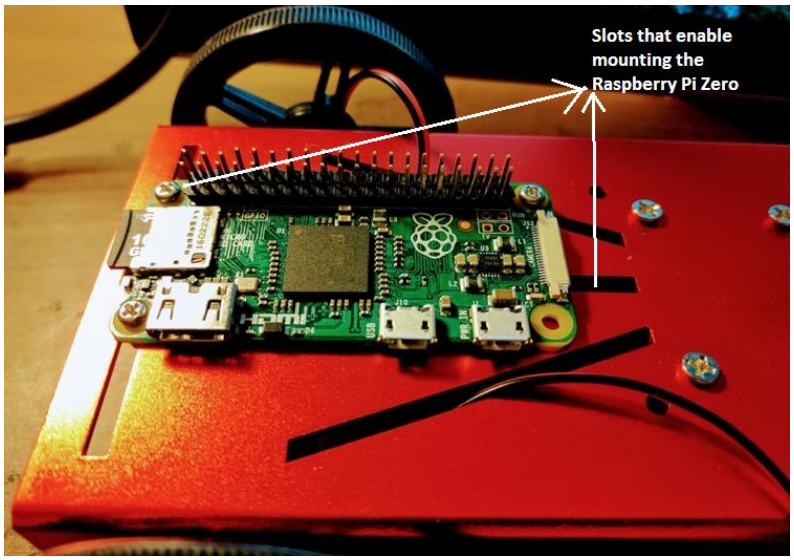

GPIO
MICRO SD CARD
HDMI
USB
PWR IN
CAMERA
RUN
TV
ACT
SCL
SDA
TXD
RXD

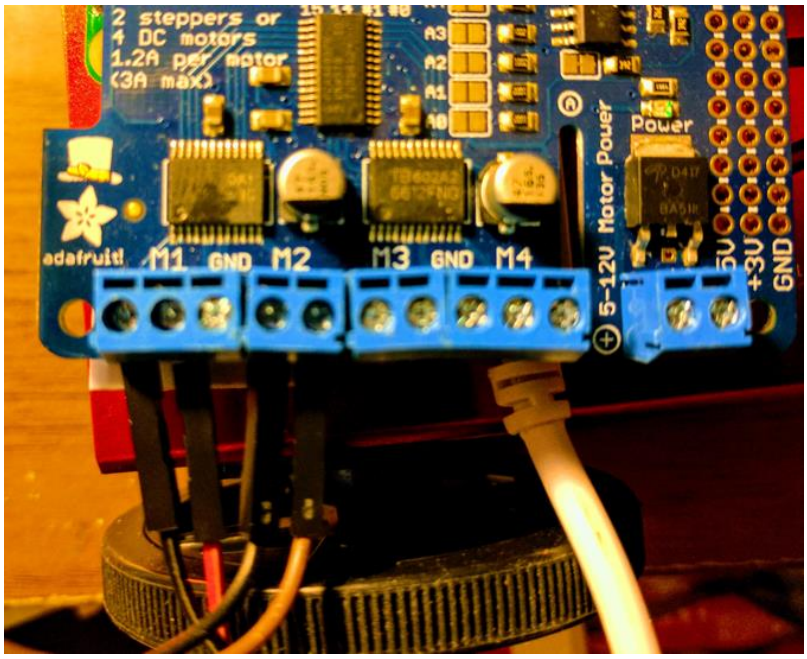

5-12V Motor Power
DC+Stepper
Motor HAT
GND
SDA
TXD
RXD
MOSI
MISO
CLK
CE0
CE1



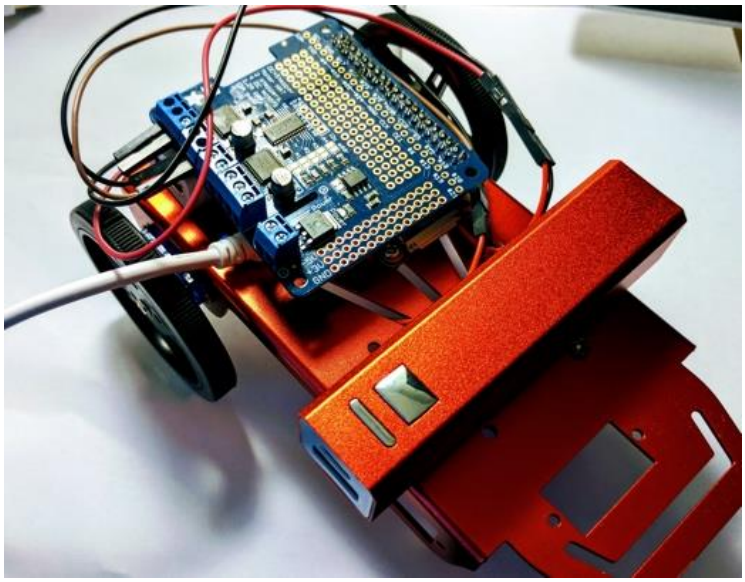

Raspberry Pi Zero V1.3
©Raspberry Pi 2015
E207844
E336755
GC-2 94V-0

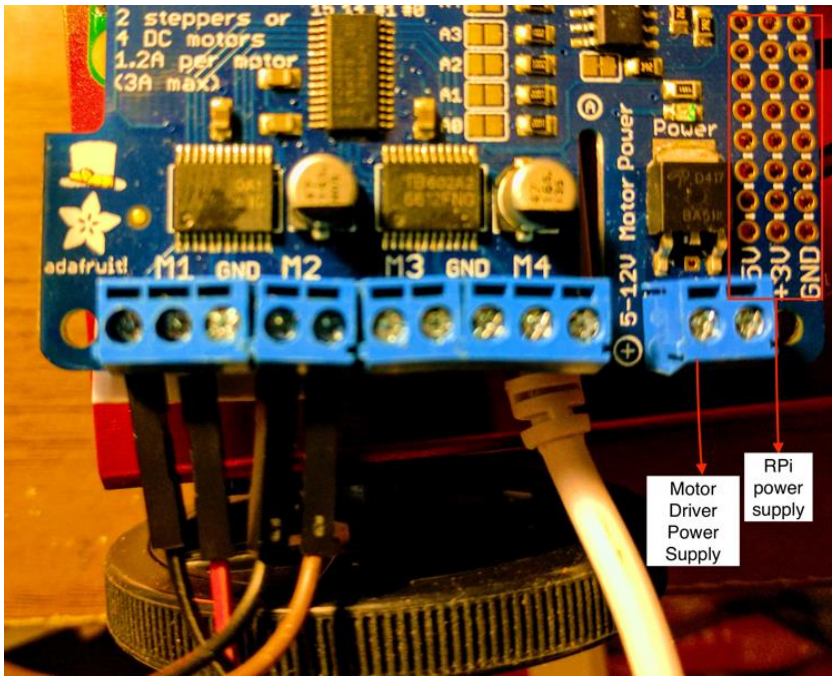

DC+Stepper
Motor HAT
2 steppers or
4 DC motors
1.2A per motor
(3A max)
i2c addr
Power
5-12V Motor Power
GND
+3V


Slots that enable
mounting the
Raspberry Pi Zero

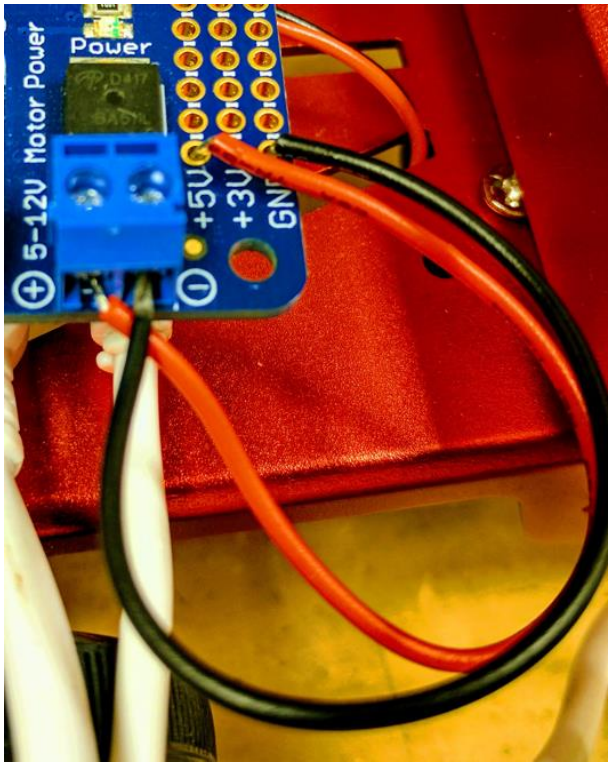

2 steppers or
4 DC motors
1.2A per motor
(3A max)
adafruit!
M1 GND M2 M3 GND M4
5-12V Motor Power
5V
+3V
GND

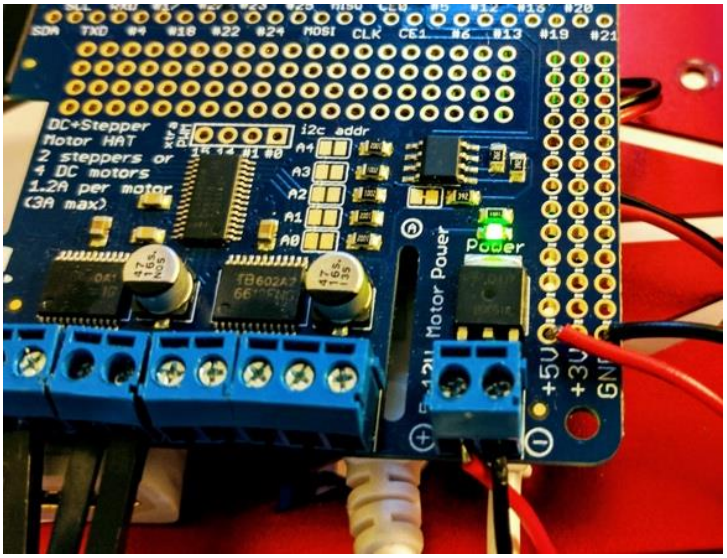
Battery capacity = Power consumption * Battery life time

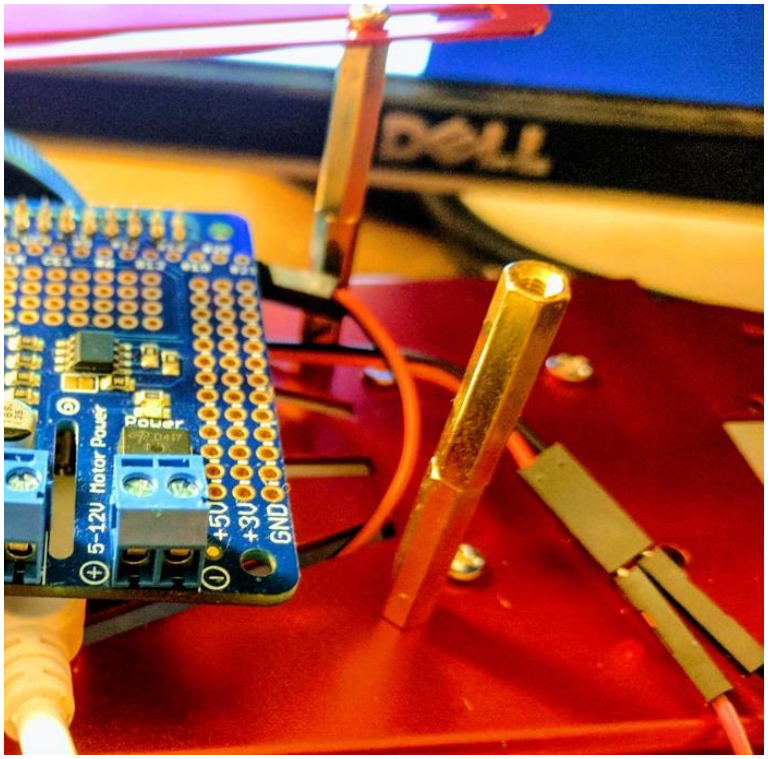


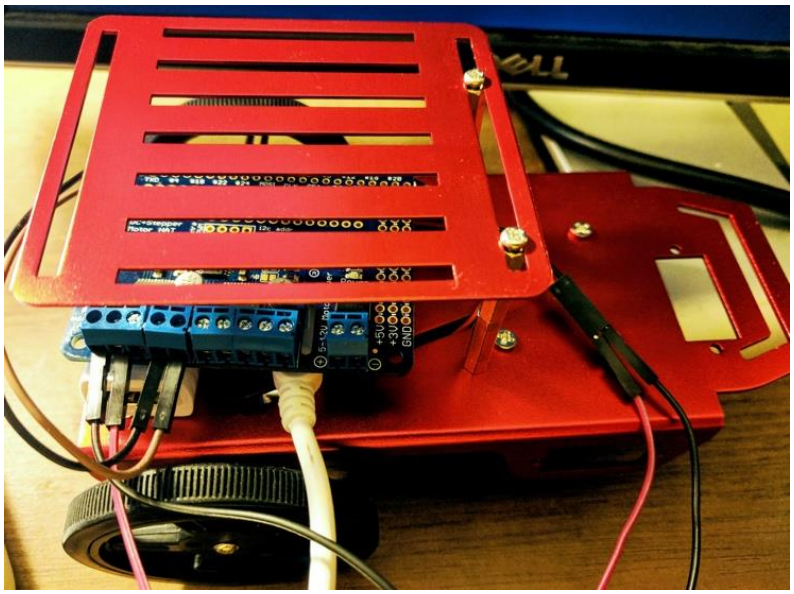

2 steppers or
4 DC motors
1.2A per motor
(3A max)
adafruit
M1 GND M2 M3 GND M4
5-12V Motor Power
5V +3V GND
Motor Driver Power Supply
RPi power supply


SCL RXD
SDA TXD
DC+Stepper
Motor HAT
2 steppers or
4 DC motors
1.2A per motor
(3A max)
i2c addr
5-12V Motor Power
+5V +3V GND

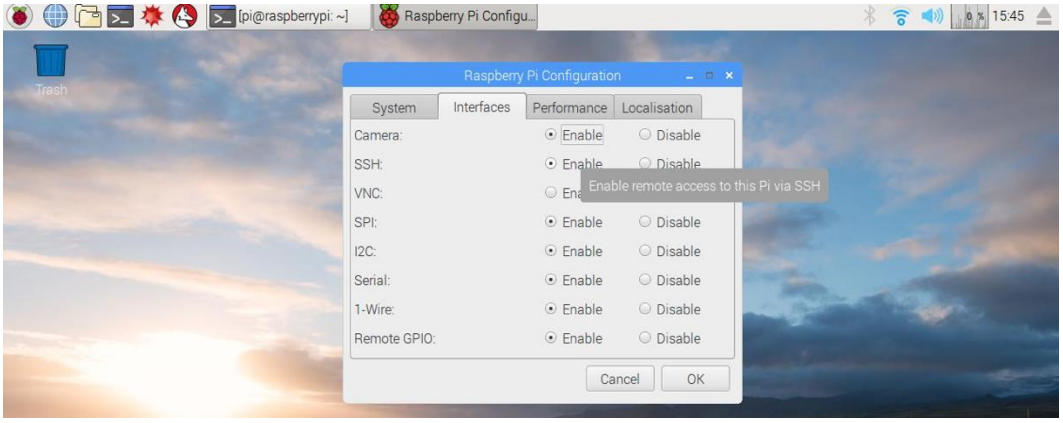

Power
5-12V Motor Power
+5V
+3V
GND

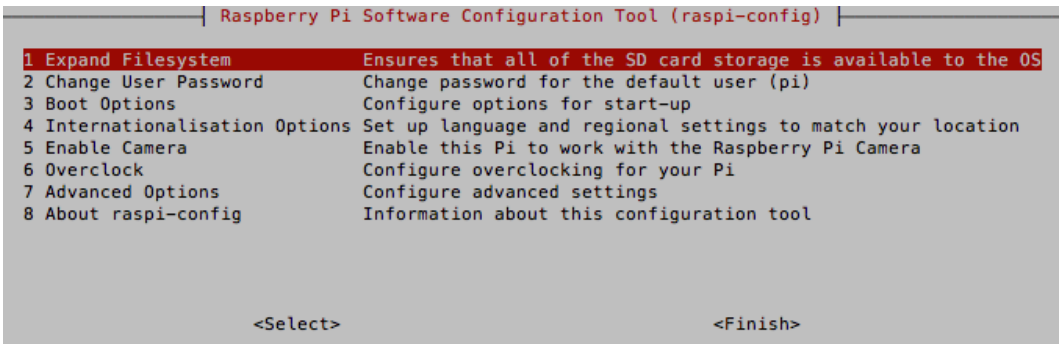

SDA
TXD
#4
#18
#22
#24
MOSI
CLK
CE1
#6
#13
#19
#21
DC+Stepper
Motor HAT
2 steppers or
4 DC motors
1.2A per motor
(3A max)
i2c addr
A4
A3
A2
A1
A0
Power
5-12V Motor Power
+5V
+3V
GND

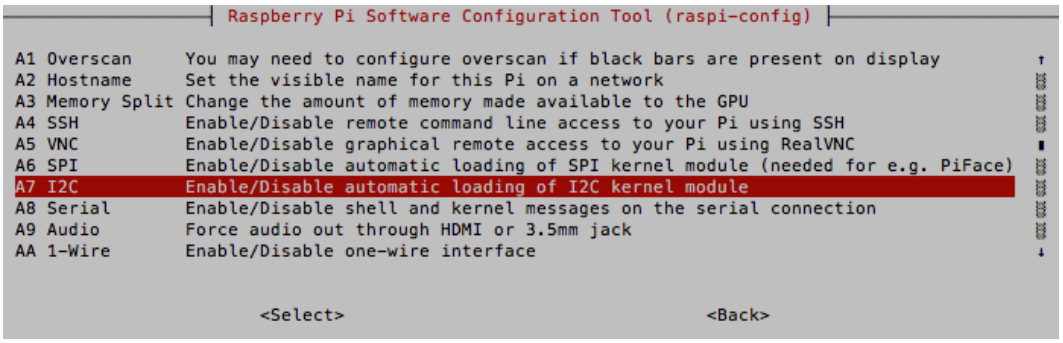

DELL
Power
5-12V Motor Power
+5V
+3V
GND

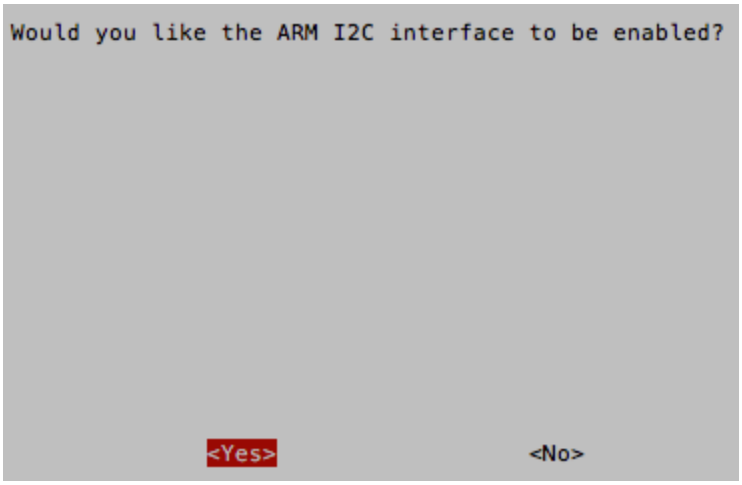

GND
+5V
+3.3V


GND

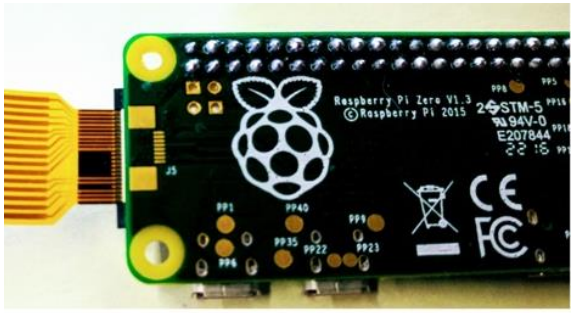

[pi@raspberrypi: ~]
Raspberry Pi Configu...
15:45
Trash
Raspberry Pi Configuration
System
Interfaces
Performance
Localisation
Camera: Enable Disable
SSH: Enable Disable
VNC: Ena
Enable remote access to this Pi via SSH
SPI: Enable Disable
I2C: Enable Disable
Serial: Enable Disable
1-Wire: Enable Disable
Remote GPIO: Enable Disable
Cancel
OK

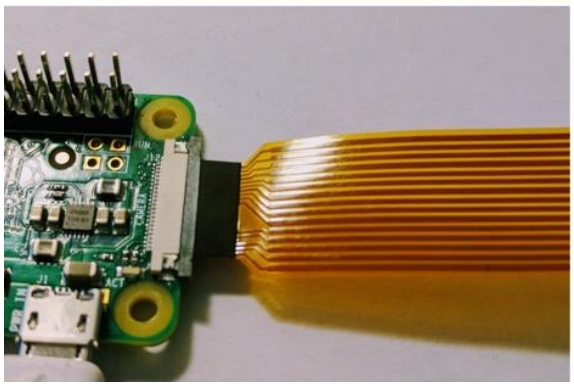

Raspberry Pi Software Configuration Tool (raspi-config)
1 Expand Filesystem Ensures that all of the SD card storage is available to the OS
2 Change User Password Change password for the default user (pi)
3 Boot Options Configure options for start-up
4 Internationalisation Options Set up language and regional settings to match your location
5 Enable Camera Enable this Pi to work with the Raspberry Pi Camera
6 Overclock Configure overclocking for your Pi
7 Advanced Options Configure advanced settings
8 About raspi-config Information about this configuration tool
<Select>
<Finish>

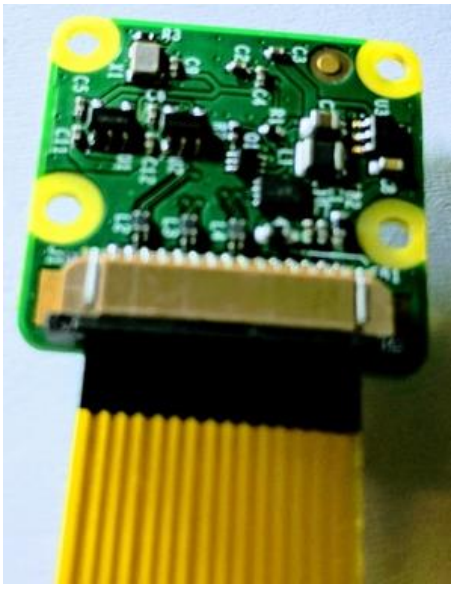

Raspberry Pi Software Configuration Tool (raspi-config)
A1 Overscan You may need to configure overscan if black bars are present on display
A2 Hostname Set the visible name for this Pi on a network
A3 Memory Split Change the amount of memory made available to the GPU
A4 SSH Enable/Disable remote command line access to your Pi using SSH
A5 VNC Enable/Disable graphical remote access to your Pi using RealVNC
A6 SPI Enable/Disable automatic loading of SPI kernel module (needed for e.g. PiFace)
A7 I2C Enable/Disable automatic loading of I2C kernel module
A8 Serial Enable/Disable shell and kernel messages on the serial connection
A9 Audio Force audio out through HDMI or 3.5mm jack
AA 1-Wire Enable/Disable one-wire interface
<Select>
<Back>

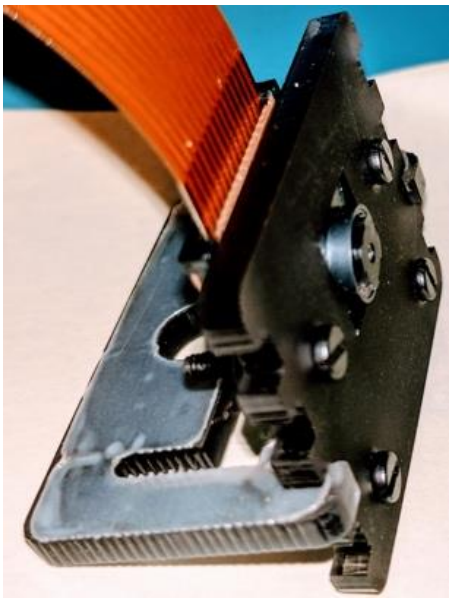

Would you like the ARM I2C interface to be enabled?
<Yes>
<No>

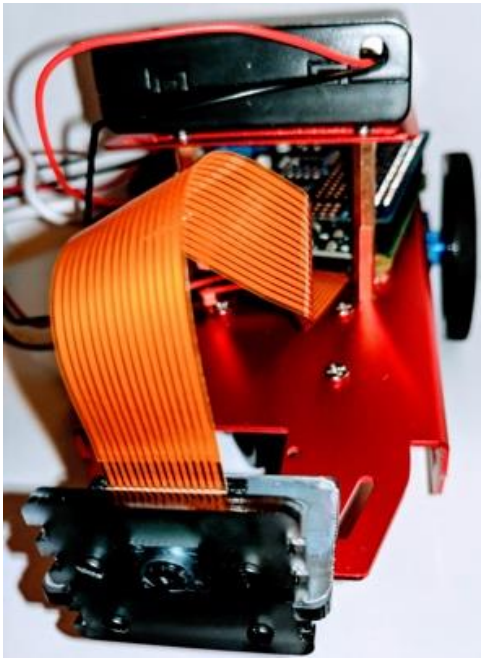

PWR IN
J1
ACT
L2
CAMERA
D3
TV
J12
RUN


Raspberry Pi Zero V1.3
©Raspberry Pi 2015
STM-5
94V-0
E207844

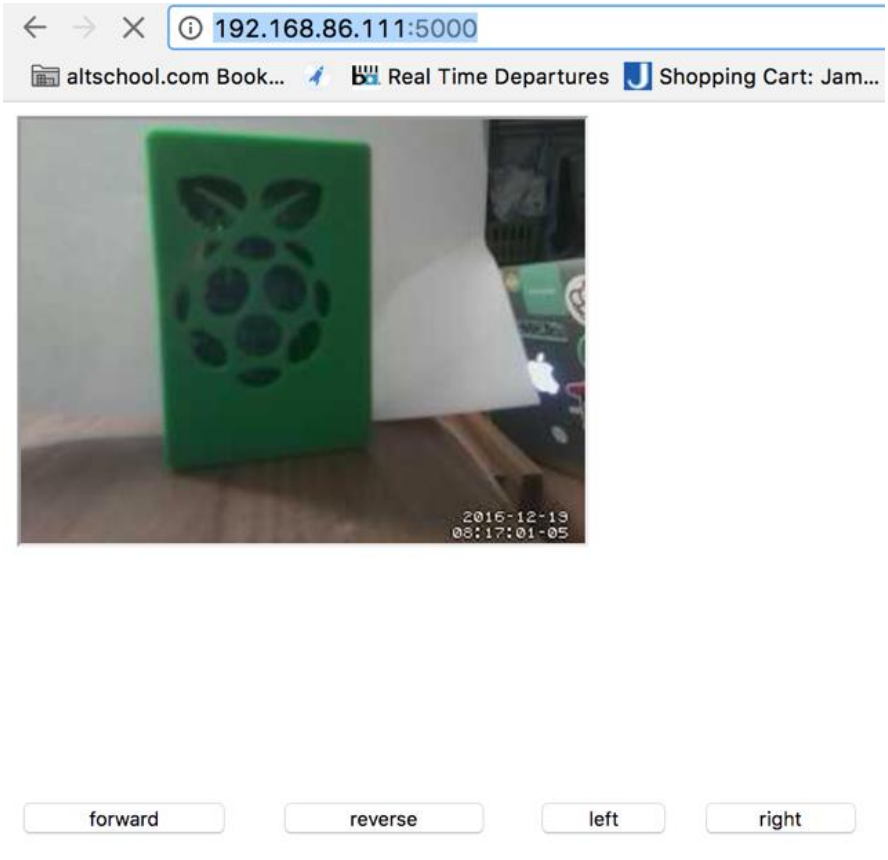






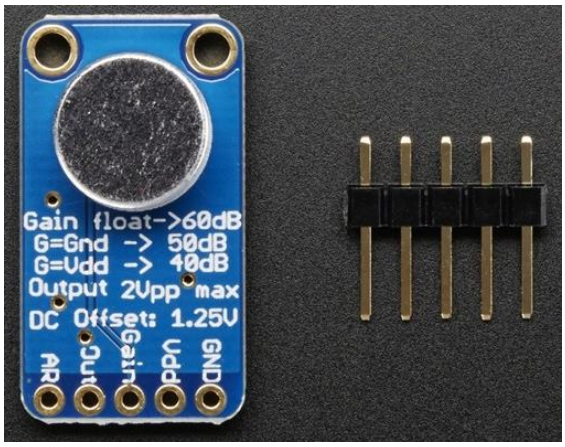


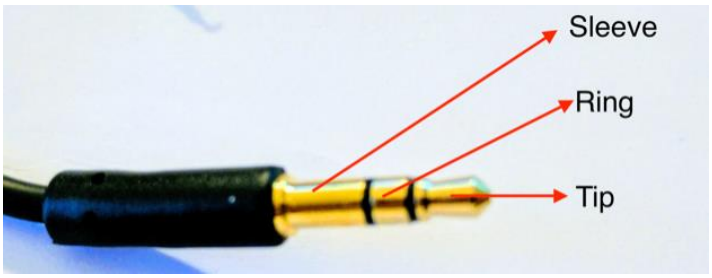
```
┤ Raspberry Pi Software Configuration Tool (raspi-config) ├

P1 Camera       Enable/Disable connection to the Raspberry Pi Camera
P2 SSH          Enable/Disable remote command line access to your Pi using SSH
P3 VNC          Enable/Disable graphical remote access to your Pi using RealVNC
P4 SPI          Enable/Disable automatic loading of SPI kernel module (needed for e.g. PiFace)
P5 I2C          Enable/Disable automatic loading of I2C kernel module
P6 Serial       Enable/Disable shell and kernel messages on the serial connection
P7 1-Wire       Enable/Disable one-wire interface
P8 Remote GPIO  Enable/Disable remote access to GPIO pins

                    <Select>                                <Back>
```

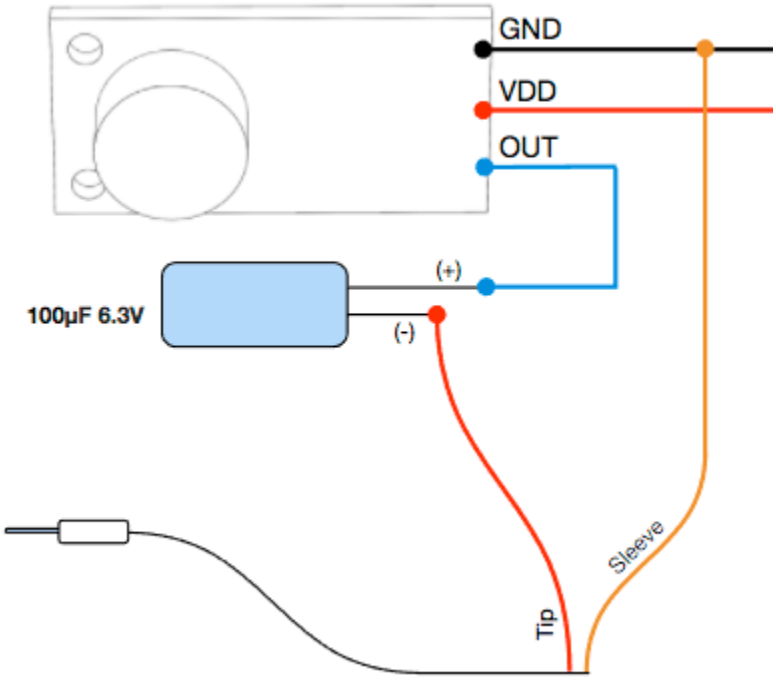

192.168.86.111:5000
altschool.com Book...
Real Time Departures
Shopping Cart: Jam...
2016-12-19
08:17:01-05
forward
reverse
left
right

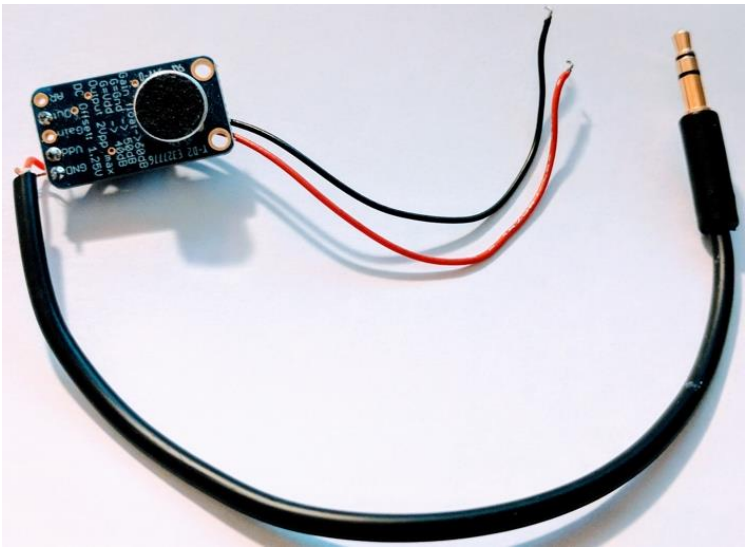
Chapter 10: Home Automation Using the Raspberry Pi Zero

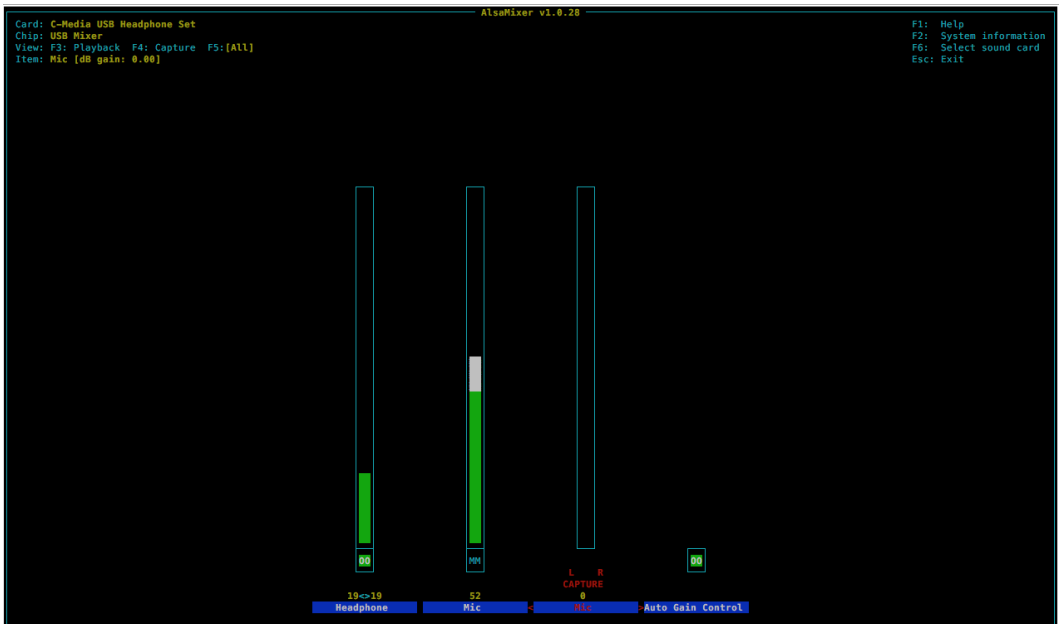
```
pi@raspberrypi:~ $ lsusb
Bus 001 Device 006: ID 093a:2510 Pixart Imaging, Inc. Optical Mouse
Bus 001 Device 005: ID 0d8c:000c C-Media Electronics, Inc. Audio Adapter
Bus 001 Device 004: ID 045e:00dd Microsoft Corp. Comfort Curve Keyboard 2000 V1.0
Bus 001 Device 003: ID 0bda:8176 Realtek Semiconductor Corp. RTL8188CUS 802.11n WLAN Adapter
Bus 001 Device 002: ID 1a40:0101 Terminus Technology Inc. 4-Port HUB
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

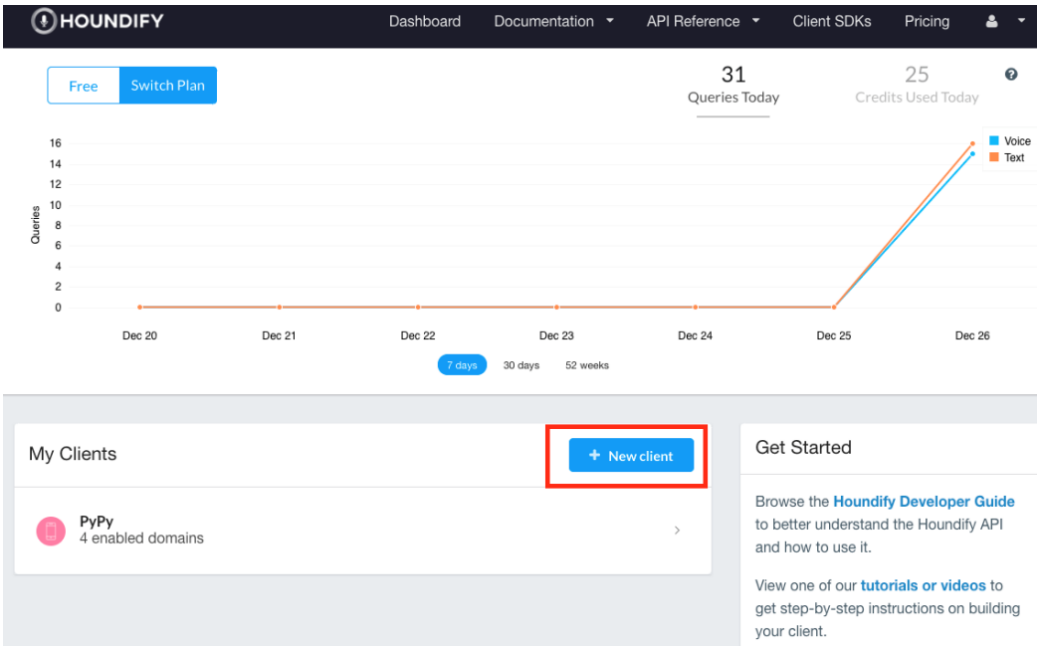





GND
VDD
OUT
(+)
100µF 6.3V
(-)
Tip
Sleeve




AlsaMixer v1.0.28
Card: C-Media USB Headphone Set
Chip: USB Mixer
View: F3: Playback F4: Capture F5:[All]
Item: Mic [dB gain: 0.00]
F1: Help
F2: System information
F6: Select sound card
Esc: Exit
00
MM
00
L R
CAPTURE
19<>19
52
0
Headphone
Mic
Mic
Auto Gain Control


HOUNDIFY
Dashboard
Documentation
API Reference
Client SDKs
Pricing
Free
Switch Plan
31
Queries Today
25
Credits Used Today
Voice
Text
Queries
16
14
12
10
8
6
4
2
0
Dec 20
Dec 21
Dec 22
Dec 23
Dec 24
Dec 25
Dec 26
7 days
30 days
52 weeks
My Clients
+ New client
PyPy
4 enabled domains
Get Started
Browse the Houndify Developer Guide to better understand the Houndify API and how to use it.
View one of our tutorials or videos to get step-by-step instructions on building your client.

Add Client Details

Name

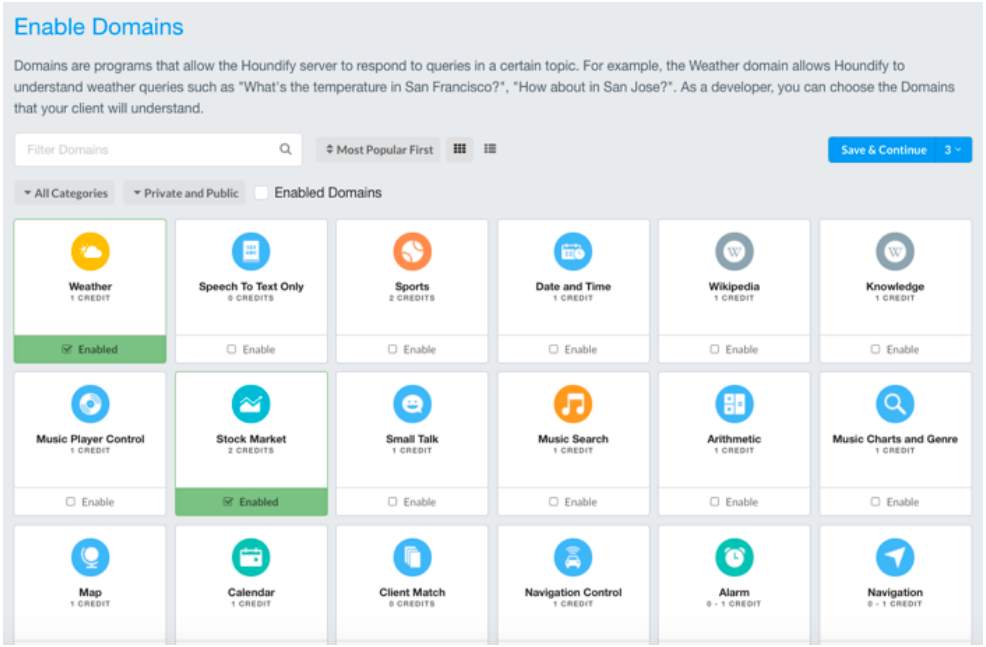
My new app

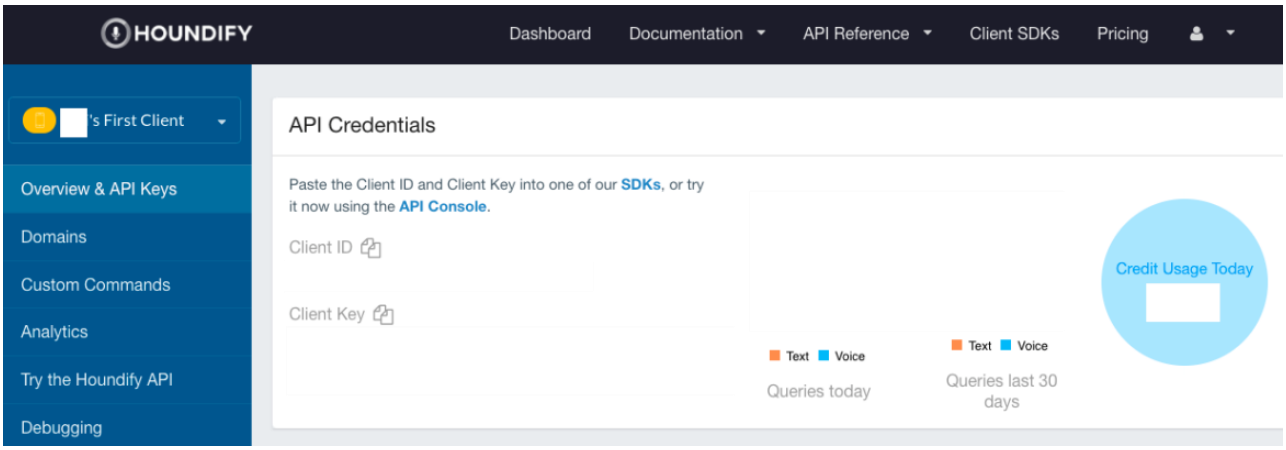
Platform

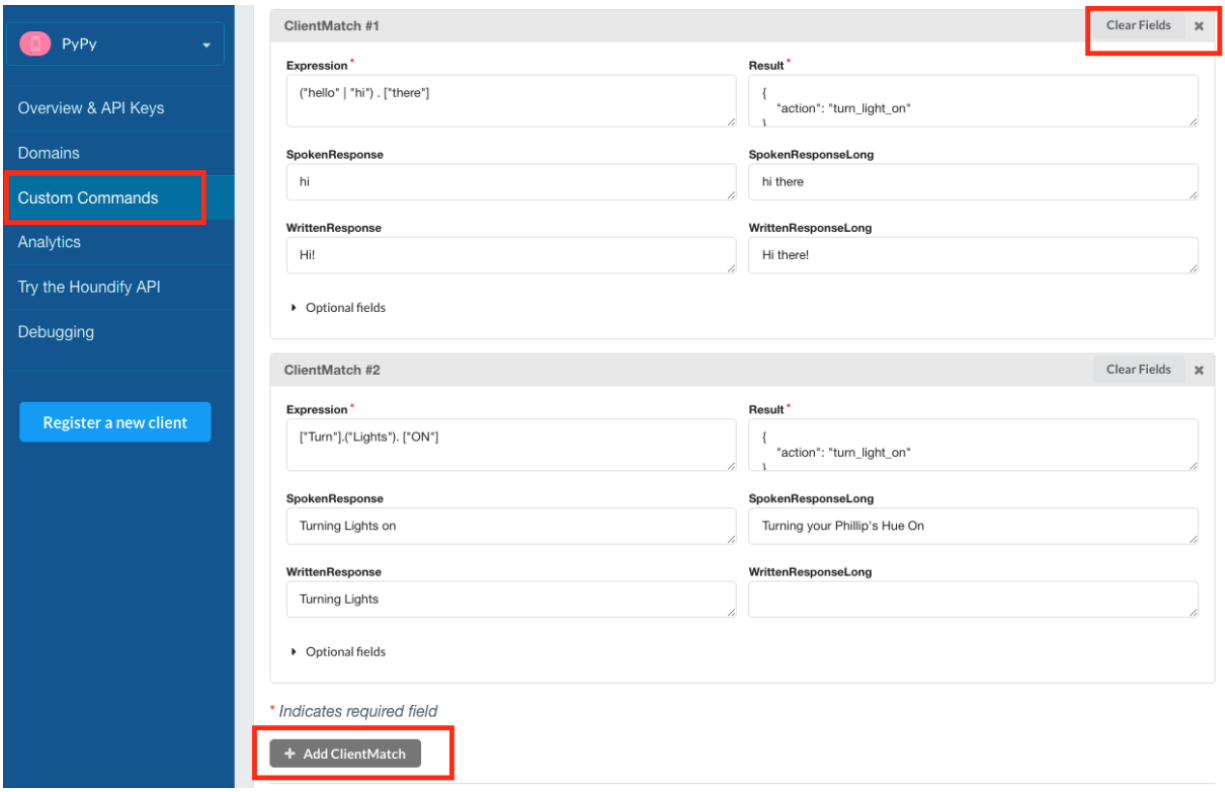
What platform does this application run on? If more than one platform, choose the primary one.

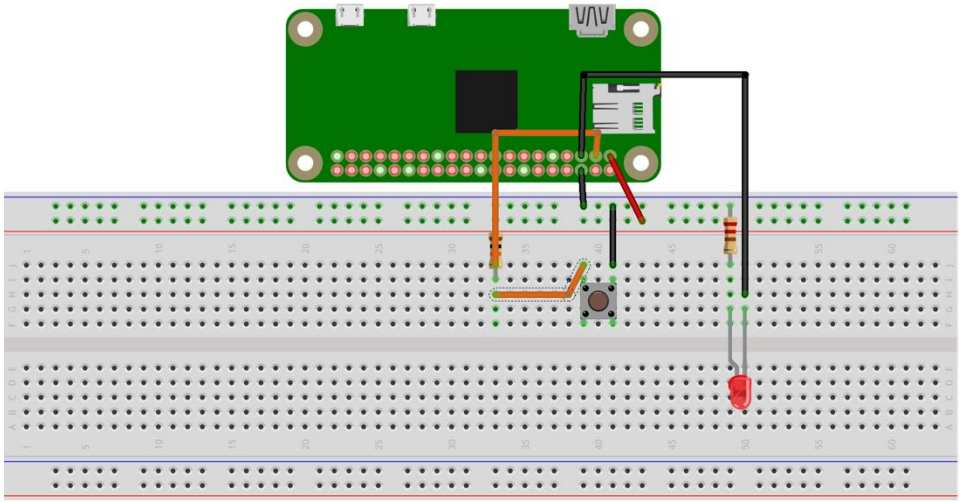
Choose a platform

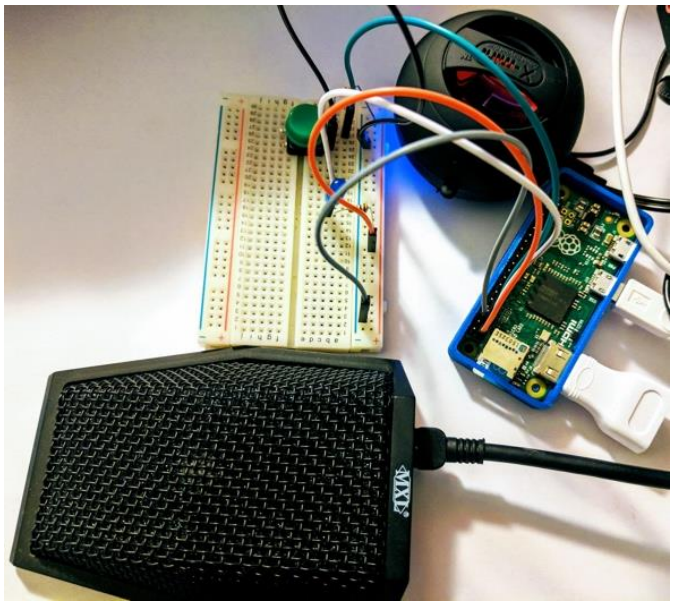
- Appliances
- Automobile Application
- Desktop Application
- Game Console
- Home Automation
- IVR

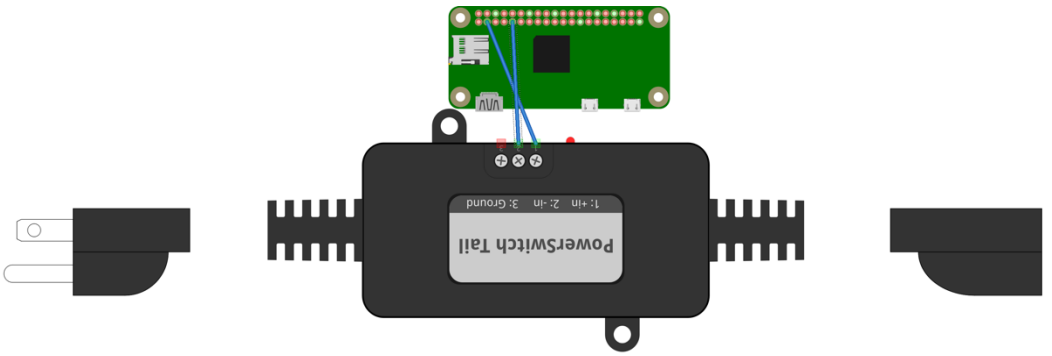



HOUNDIFY
Dashboard
Documentation
API Reference
Client SDKs
Pricing
's First Client
Overview & API Keys
Domains
Custom Commands
Analytics
Try the Houndify API
Debugging
API Credentials
Paste the Client ID and Client Key into one of our SDKs, or try it now using the API Console.
Client ID
Client Key
Text
Voice
Queries today
Text
Voice
Queries last 30 days
Credit Usage Today


PyPy
Overview & API Keys
Domains
Custom Commands
Analytics
Try the Houndify API
Debugging
Register a new client
ClientMatch #1
Clear Fields
Expression *
("hello" | "hi") . ["there"]
Result *
{
"action": "turn_light_on"
}
SpokenResponse
hi
SpokenResponseLong
hi there
WrittenResponse
Hi!
WrittenResponseLong
Hi there!
Optional fields
ClientMatch #2
Clear Fields
Expression *
["Turn"].("Lights"). ["ON"]
Result *
{
"action": "turn_light_on"
}
SpokenResponse
Turning Lights on
SpokenResponseLong
Turning your Phillip's Hue On
WrittenResponse
Turning Lights
WrittenResponseLong
Optional fields
* Indicates required field
+ Add ClientMatch

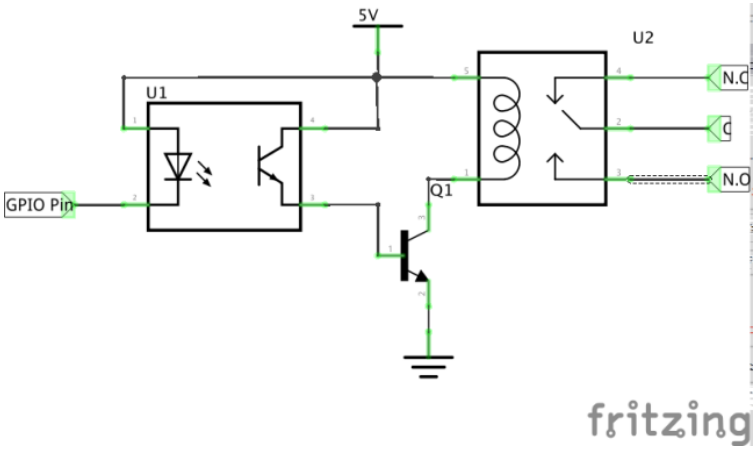

fritzing

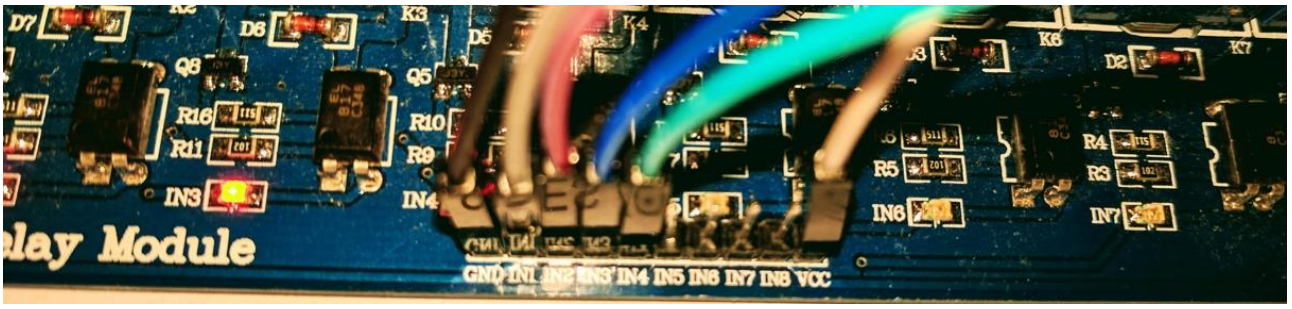



PowerSwitch Tail
1: +In 2: -In 3: Ground
fritzing


8 Relay Module
GND IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8 VCC
GND VCC JD-VCC

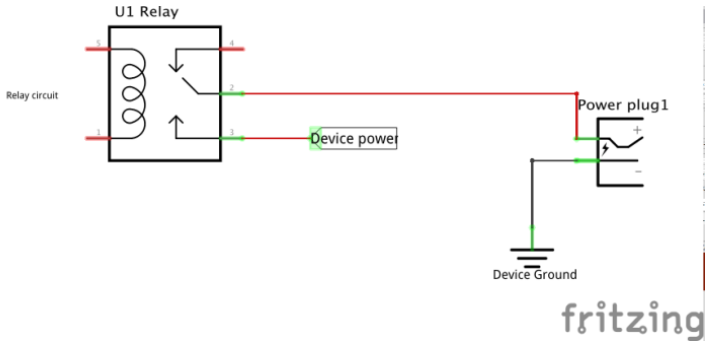

normally ON
switch active
normally OFF
power
OFF
RESET
DIGITAL LOGGERS.COM


5V
U2
U1
N.C
N.O
GPIO Pin
Q1
fritzing


D7
D6
K3
D5
K4
K6
D2
K7
Q8
Q5
R16
R11
R10
R9
R5
R4
R3
IN3
IN4
IN6
IN7
lay Module
GND IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8 VCC


Relay
SRD-05VDC-SL-C
Flywheel
Diode
D8
K1
Q7
Transistor
R15
R14
IN1
IN2
Optocoupler
8


SONGLE
SRD-05VDC-SL-C
N.O.
C
N.C.



Motor On Off
Tank Light 1 On Off
Tank Light 2 On Off
Submersible Pump On Off

Submersible Pump On Off

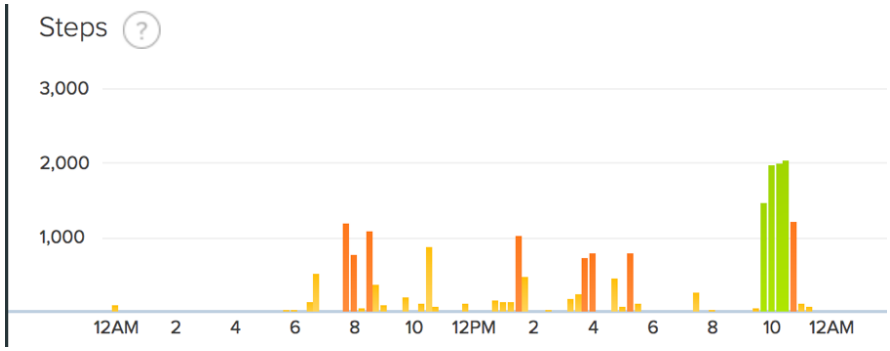
Energize

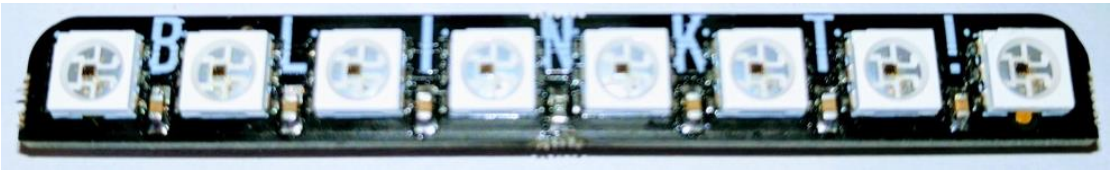
192.168.86.111:5000
altschool.com Book... Real Time Departures Shop

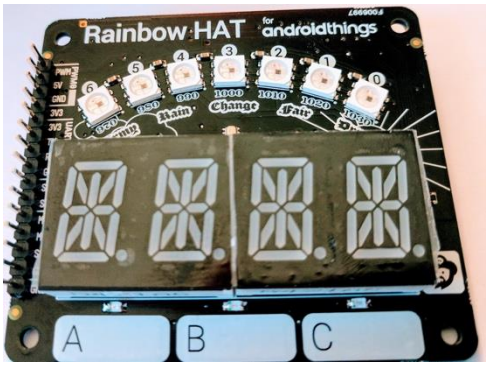
Motor On Off
Tank Light 1 On Off
Tank Light 2 On Off
Submersible Pump On Off

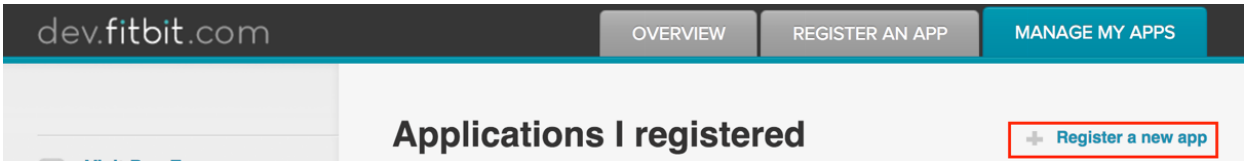
Energize

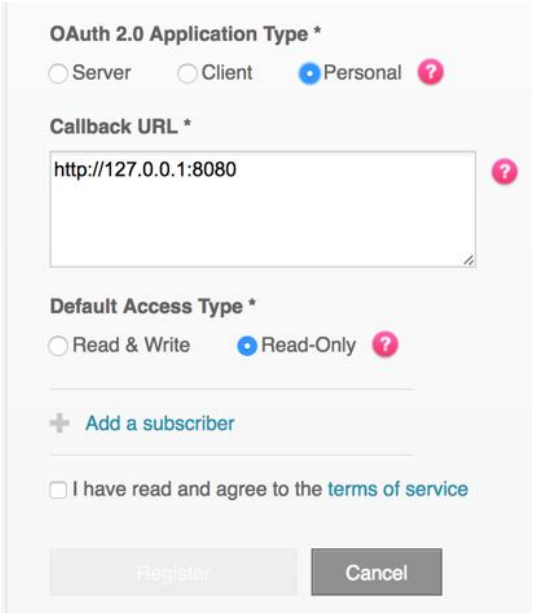

8 Relay Module
SRD-05VDC-SL-C
SONGLE

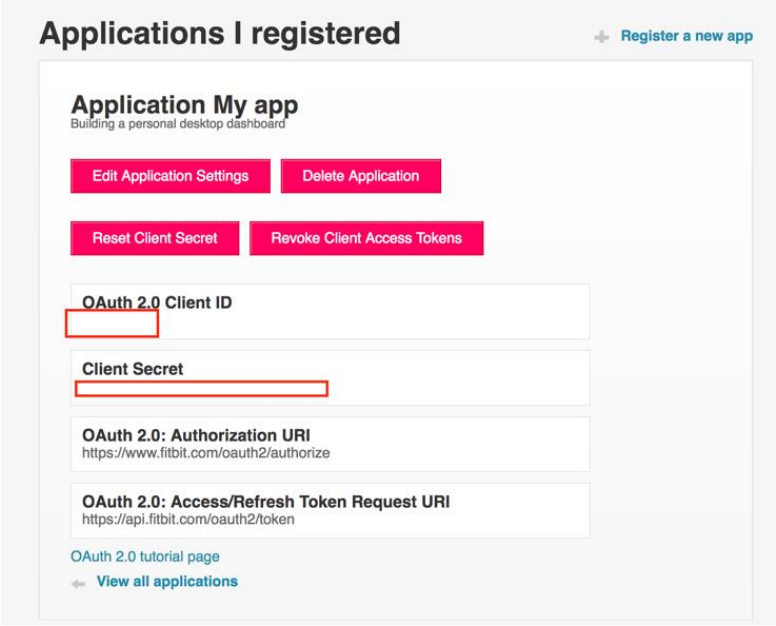

Steps
3,000
2,000
1,000
12AM
2
4
6
8
10
12PM
2
4
6
8
10
12AM

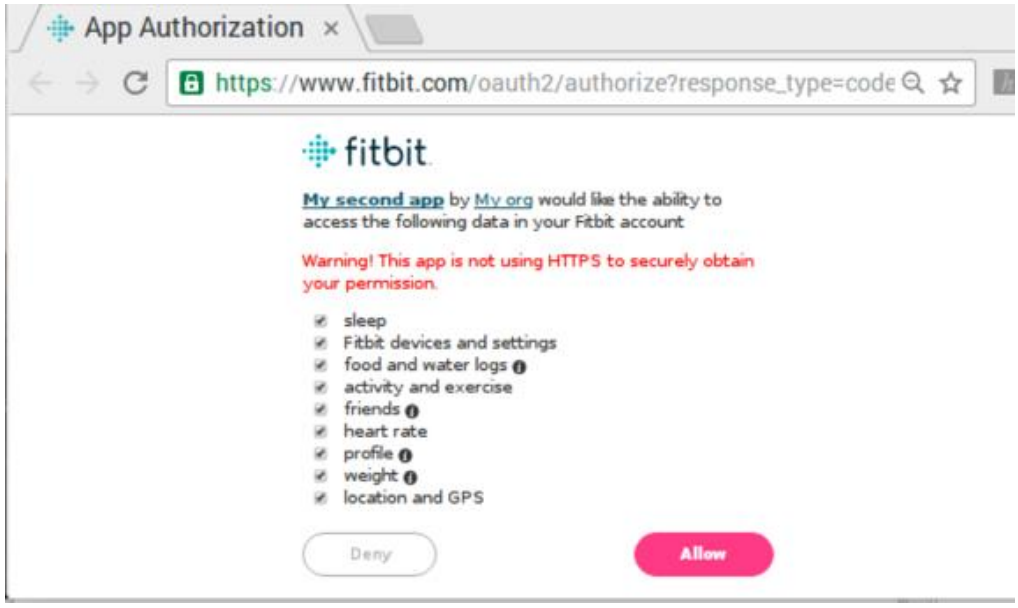

BLINKT!


Rainbow HAT
for androidthings
A
B
C


dev.fitbit.com
OVERVIEW
REGISTER AN APP
MANAGE MY APPS
Applications I registered
Register a new app


OAuth 2.0 Application Type *
Server
Client
Personal
Callback URL *
http://127.0.0.1:8080
Default Access Type *
Read & Write
Read-Only
Add a subscriber
I have read and agree to the terms of service
Register
Cancel

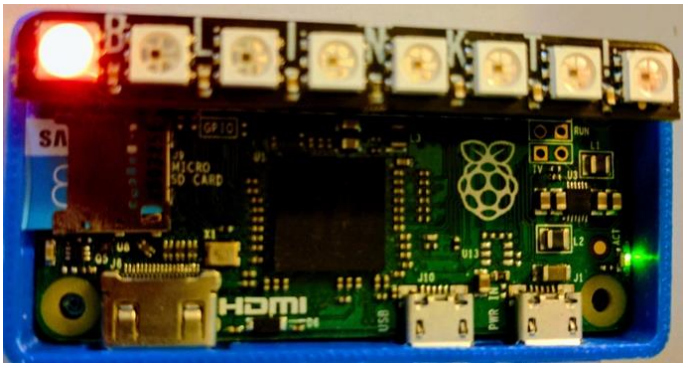

Applications I registered
Register a new app
Application My app
Building a personal desktop dashboard
Edit Application Settings
Delete Application
Reset Client Secret
Revoke Client Access Tokens
OAuth 2.0 Client ID
Client Secret
OAuth 2.0: Authorization URI
https://www.fitbit.com/oauth2/authorize
OAuth 2.0: Access/Refresh Token Request URI
https://api.fitbit.com/oauth2/token
OAuth 2.0 tutorial page
View all applications

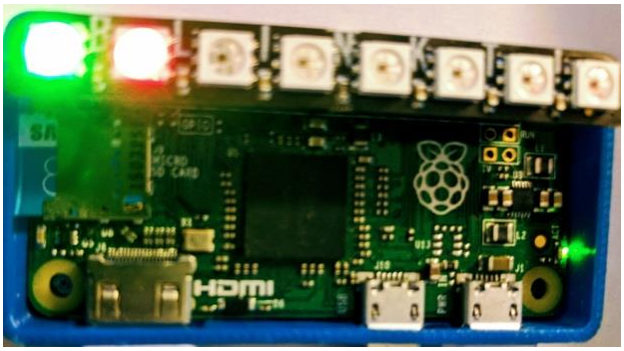

App Authorization
https://www.fitbit.com/oauth2/authorize?response_type=code
fitbit
My second app by My org would like the ability to access the following data in your Fitbit account
Warning! This app is not using HTTPS to securely obtain your permission.
sleep
Fitbit devices and settings
food and water logs
activity and exercise
friends
heart rate
profile
weight
location and GPS
Deny
Allow

You are now authorized to access the Fitbit API!

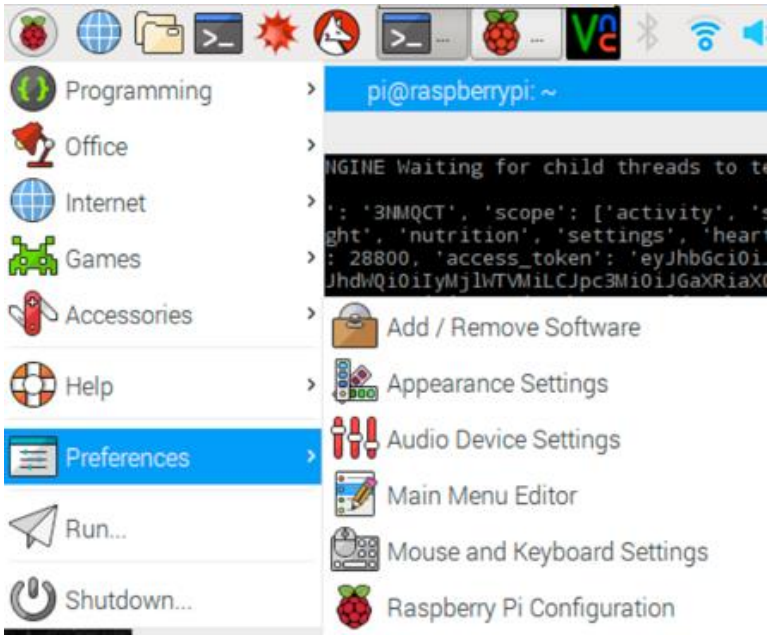
You can close this window

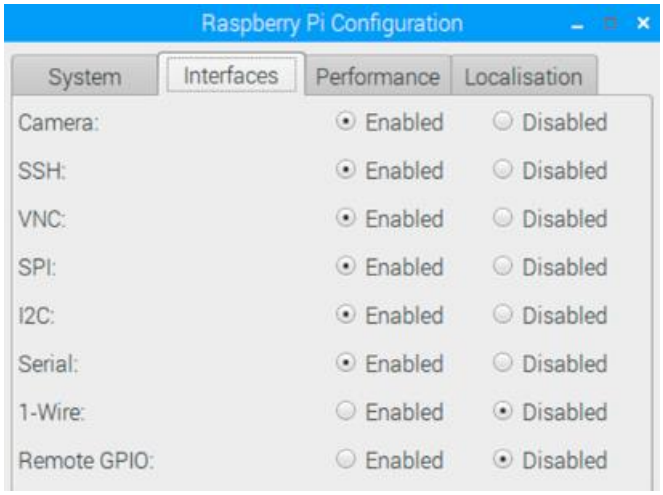
```
ACCESS_TOKEN = [redacted]
jg3NFIiLCJpc3Mi[redacted]
Jyc29jIHJzZXQgc[redacted]
xNDgzMzY1Mzk3LC[redacted]
c3fGwL74xivU
REFRESH_TOKEN = [redacted]
4d73e2d5532
pi@raspberrypi:~ $
```

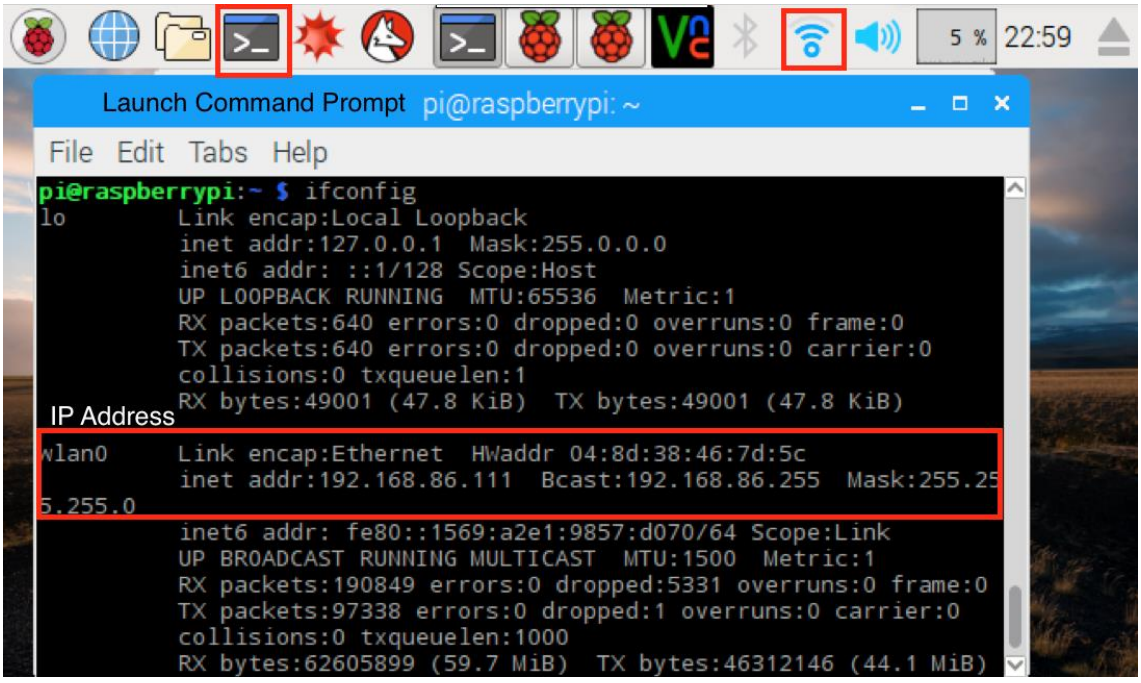


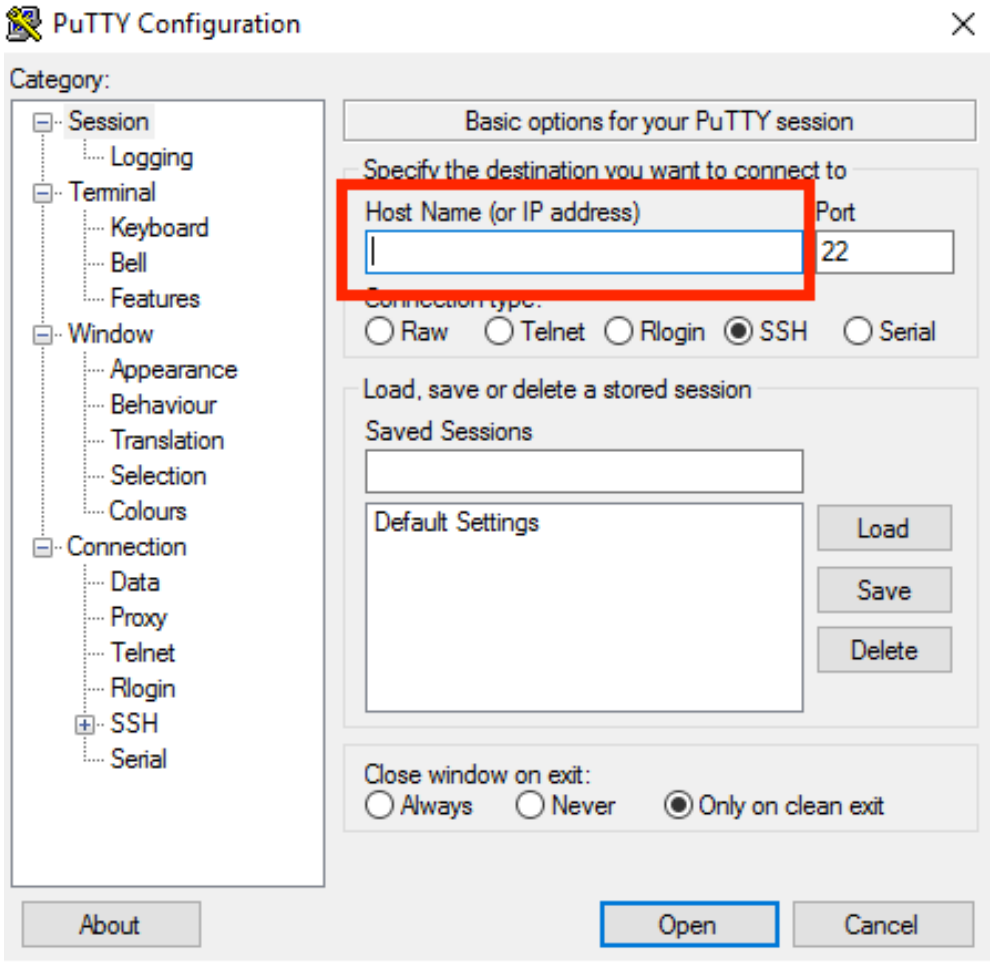


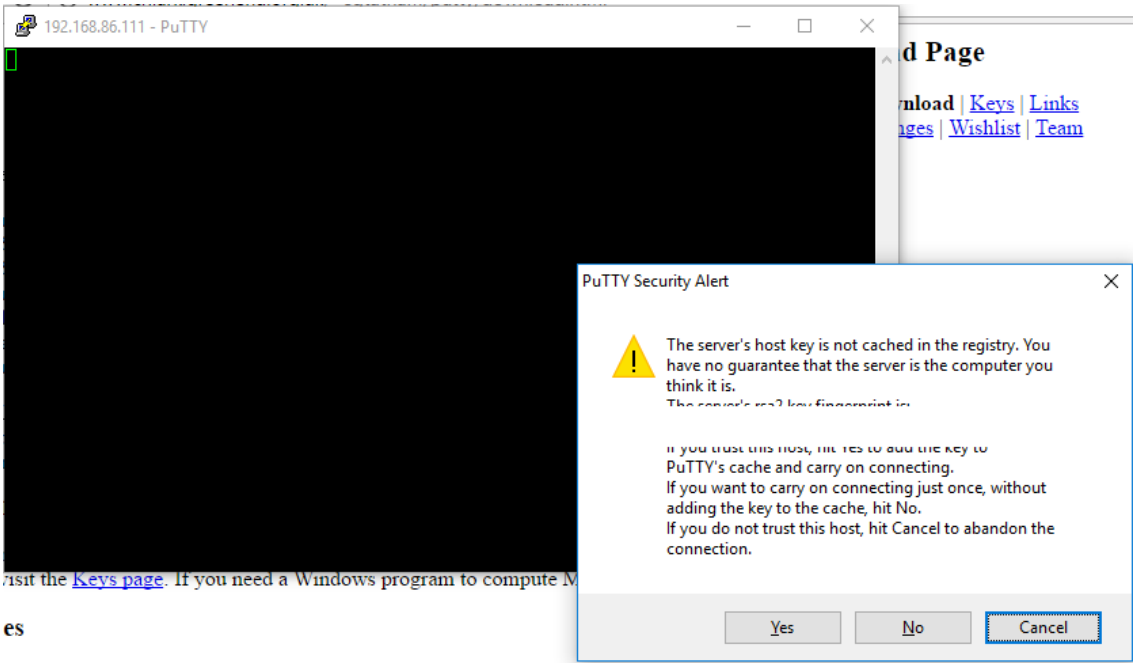
Chapter 11: Tips and Tricks

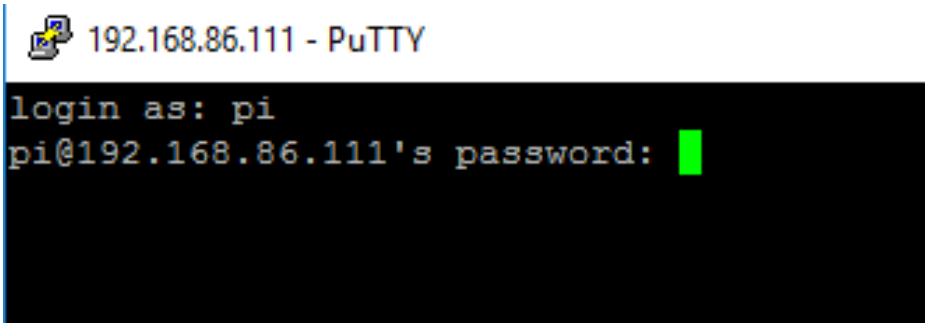




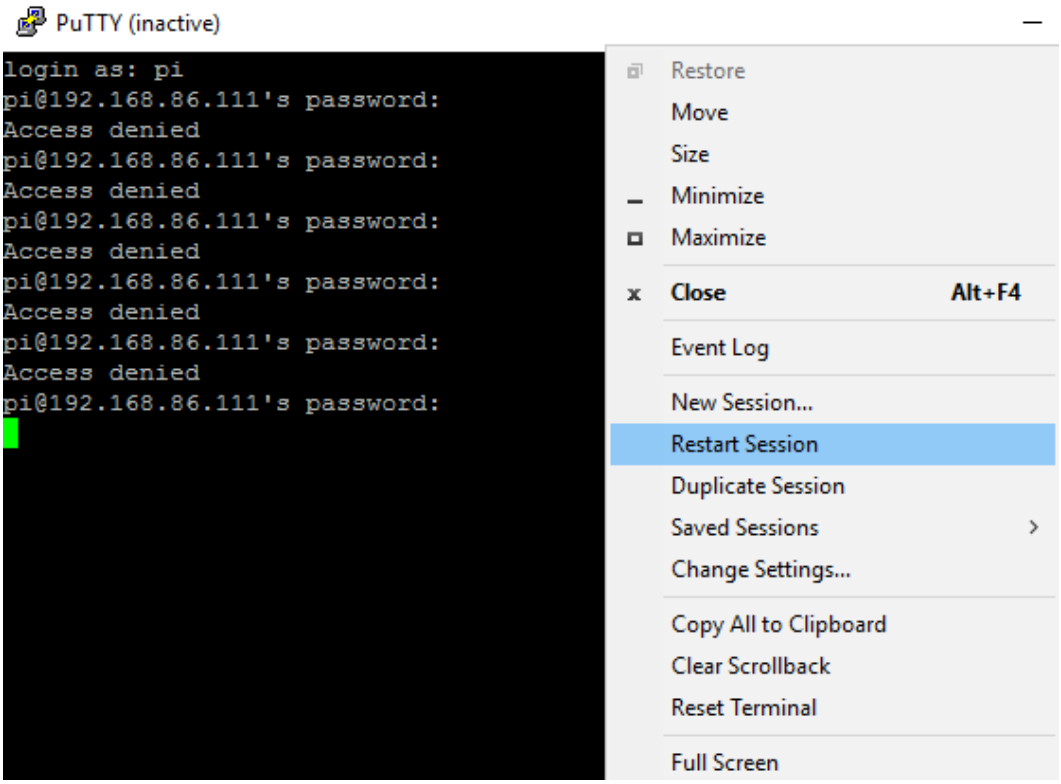

Launch Command Prompt pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $ ifconfig
lo Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
inet6 addr: ::1/128 Scope:Host
UP LOOPBACK RUNNING MTU:65536 Metric:1
RX packets:640 errors:0 dropped:0 overruns:0 frame:0
TX packets:640 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1
RX bytes:49001 (47.8 KiB) TX bytes:49001 (47.8 KiB)
IP Address
wlan0 Link encap:Ethernet HWaddr 04:8d:38:46:7d:5c
inet addr:192.168.86.111 Bcast:192.168.86.255 Mask:255.25
5.255.0
inet6 addr: fe80::1569:a2e1:9857:d070/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:190849 errors:0 dropped:5331 overruns:0 frame:0
TX packets:97338 errors:0 dropped:1 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:62605899 (59.7 MiB) TX bytes:46312146 (44.1 MiB)
5 %
22:59

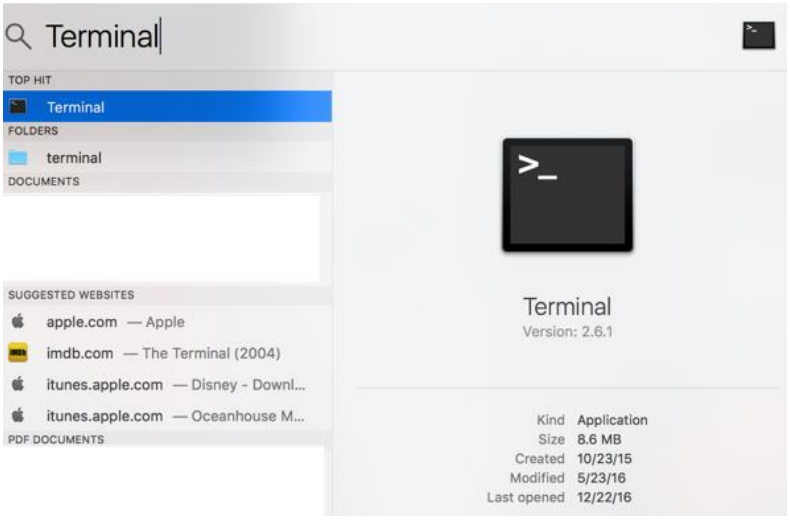

PuTTY Configuration
Category:
Session
Logging
Terminal
Keyboard
Bell
Features
Window
Appearance
Behaviour
Translation
Selection
Colours
Connection
Data
Proxy
Telnet
Rlogin
SSH
Serial
Basic options for your PuTTY session
Specify the destination you want to connect to
Host Name (or IP address)
Port
22
Raw
Telnet
Rlogin
SSH
Serial
Load, save or delete a stored session
Saved Sessions
Default Settings
Load
Save
Delete
Close window on exit:
Always
Never
Only on clean exit
About
Open
Cancel


192.168.86.111 - PuTTY
d Page
nload | Keys | Links
ages | Wishlist | Team
PuTTY Security Alert
The server's host key is not cached in the registry. You have no guarantee that the server is the computer you think it is.
PuTTY's cache and carry on connecting.
If you want to carry on connecting just once, without adding the key to the cache, hit No.
If you do not trust this host, hit Cancel to abandon the connection.
Yes
No
Cancel
isit the Keys page. If you need a Windows program to compute M
es


192.168.86.111 - PuTTY
login as: pi
pi@192.168.86.111's password:

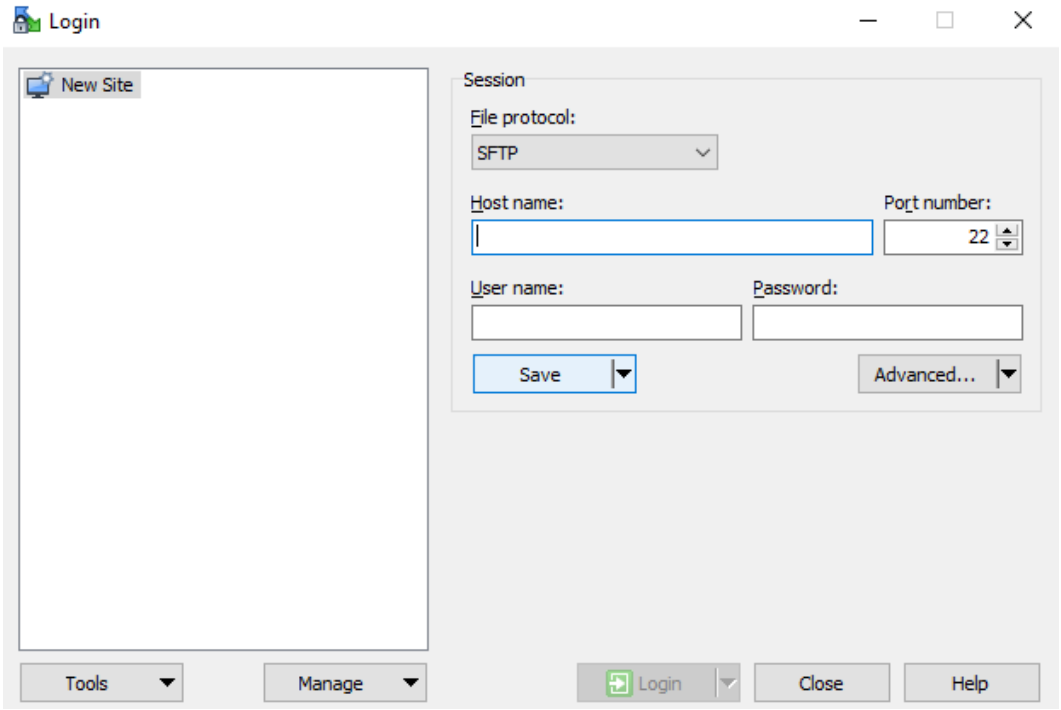
```
login as: pi
pi@192.168.86.111's password:

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Jan  2 15:07:29 2017 from sais-mbp-29277.lan
pi@raspberrypi:~ $ ls
342718__gadzooks__ting-bounce.wav  gather_keys_oauth2.py       Public
audio_test.py                      houndify_python3_sdk_0.5.0  python_games
beep.wav                           Music                       query.wav
Desktop                            oldconffiles                speech.sh
Documents                          Pictures                    Templates
Downloads                          Pimoroni                    Videos
pi@raspberrypi:~ $
```

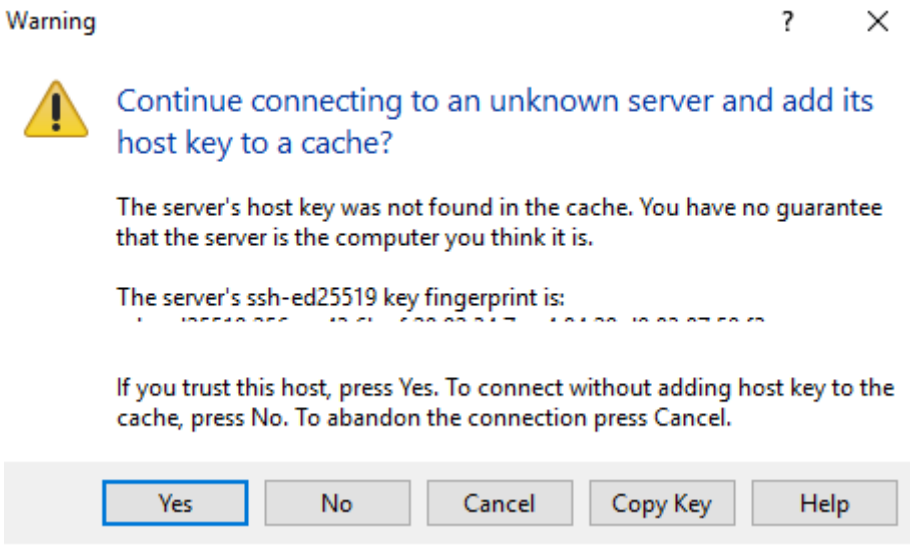


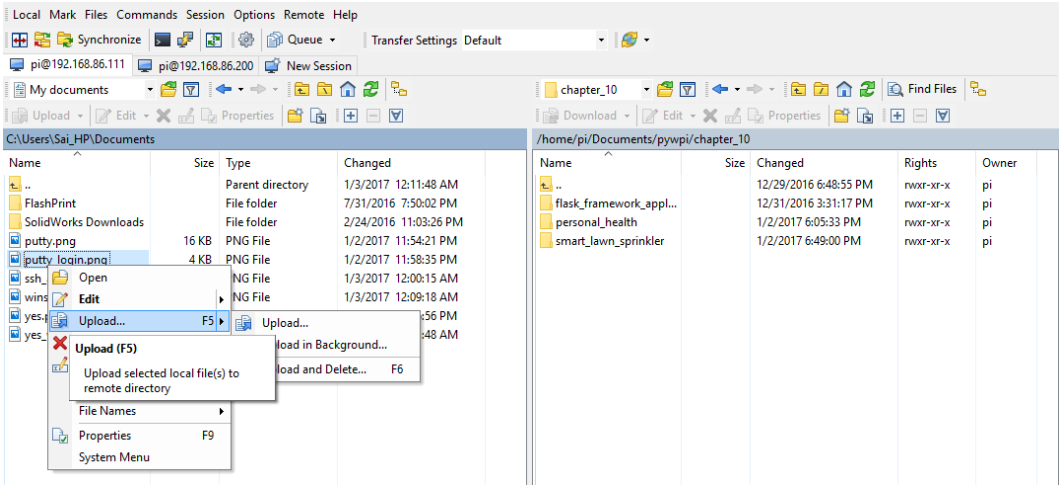


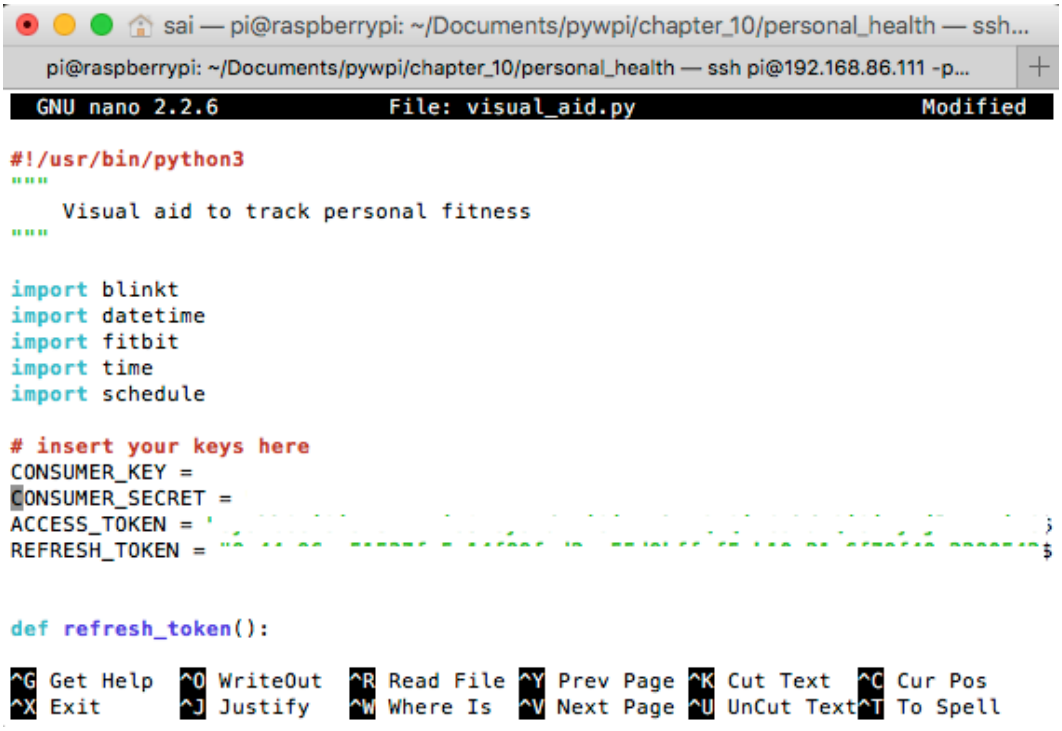

```
Last login: Mon Jan  2 17:42:39 on ttys011
Sais-MBP-29277:~ sai$ ssh pi@192.168.86.111 -p 22
pi@192.168.86.111's password:

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Jan  2 23:58:44 2017 from desktop-7nhn6dm.lan
pi@raspberrypi:~ $
```

```
sai@sai-VirtualBox: ~
sai@sai-VirtualBox:~$ ssh pi@192.168.86.111 -p 22
The authenticity of host '192.168.86.111 (192.168.86.111)' can't be established.
ECDS
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.86.111' (ECDSA) to the list of known hosts.
pi@192.168.86.111's password:
```


Login
New Site
Session
File protocol:
SFTP
Host name:
Port number:
22
User name:
Password:
Save
Advanced...
Tools
Manage
Login
Close
Help


Warning
Continue connecting to an unknown server and add its host key to a cache?
The server's host key was not found in the cache. You have no guarantee that the server is the computer you think it is.
The server's ssh-ed25519 key fingerprint is:
If you trust this host, press Yes. To connect without adding host key to the cache, press No. To abandon the connection press Cancel.
Yes
No
Cancel
Copy Key
Help


Local Mark Files Commands Session Options Remote Help
Synchronize
Queue
Transfer Settings Default
pi@192.168.86.111
pi@192.168.86.200
New Session
My documents
chapter_10
Find Files
Upload
Edit
Properties
Download
C:\Users\Sai_HP\Documents
/home/pi/Documents/pywpi/chapter_10
Name
Size
Type
Changed
Rights
Owner
Parent directory
FlashPrint
SolidWorks Downloads
putty.png
putty_login.png
flask_framework_appl...
personal_health
smart_lawn_sprinkler
Open
Edit
Upload... F5
Upload (F5)
Upload selected local file(s) to remote directory
File Names
Properties F9
System Menu
Upload...
Upload and Delete... F6


sai — pi@raspberrypi: ~/Documents/pywpi/chapter_10/personal_health — ssh...
pi@raspberrypi: ~/Documents/pywpi/chapter_10/personal_health — ssh pi@192.168.86.111 -p...
GNU nano 2.2.6 File: visual_aid.py Modified
#!/usr/bin/python3
"""
Visual aid to track personal fitness
"""
import blinkt
import datetime
import fitbit
import time
import schedule
# insert your keys here
CONSUMER_KEY =
CONSUMER_SECRET =
ACCESS_TOKEN =
REFRESH_TOKEN =
def refresh_token():
^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell

```
def refresh_token():
Save modified buffer (ANSWERING "No" WILL DESTROY CHANGES) ?
 Y Yes
 N No           ^C Cancel
```

```
File Name to Write: visual_aid.py
^G Get Help      M-D DOS Format      M-A Append      M-B Backup File
^C Cancel        M-M Mac Format      M-P Prepend
```

C:\Users\Sai_HP\Documents\setup.py - Notepad++

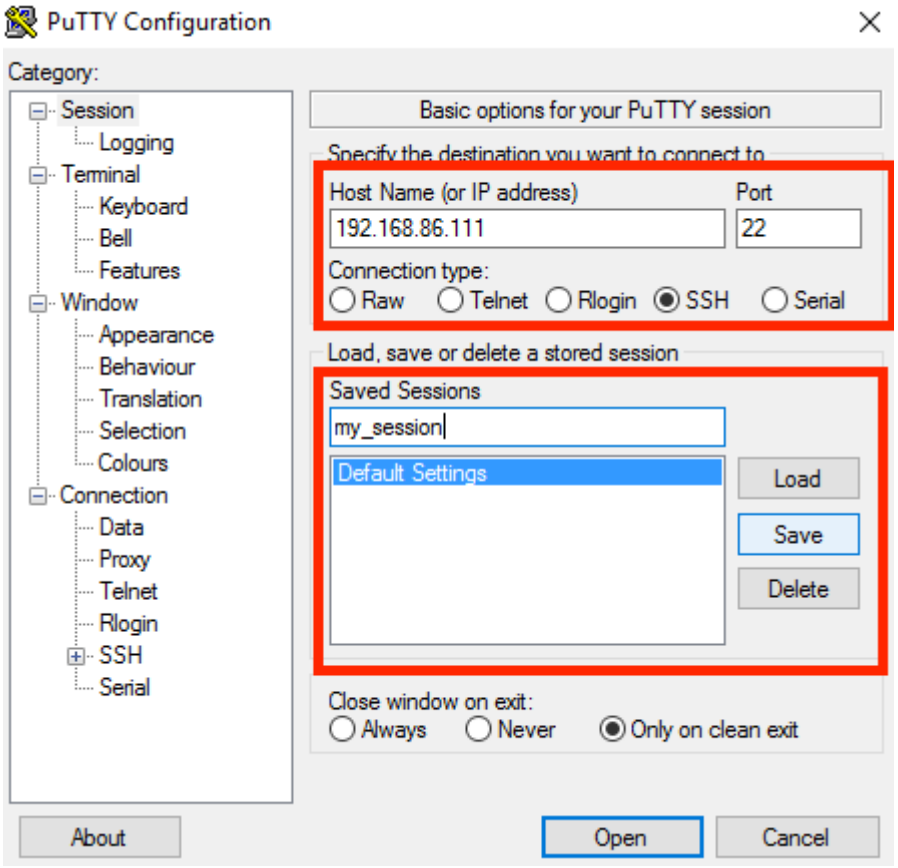
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

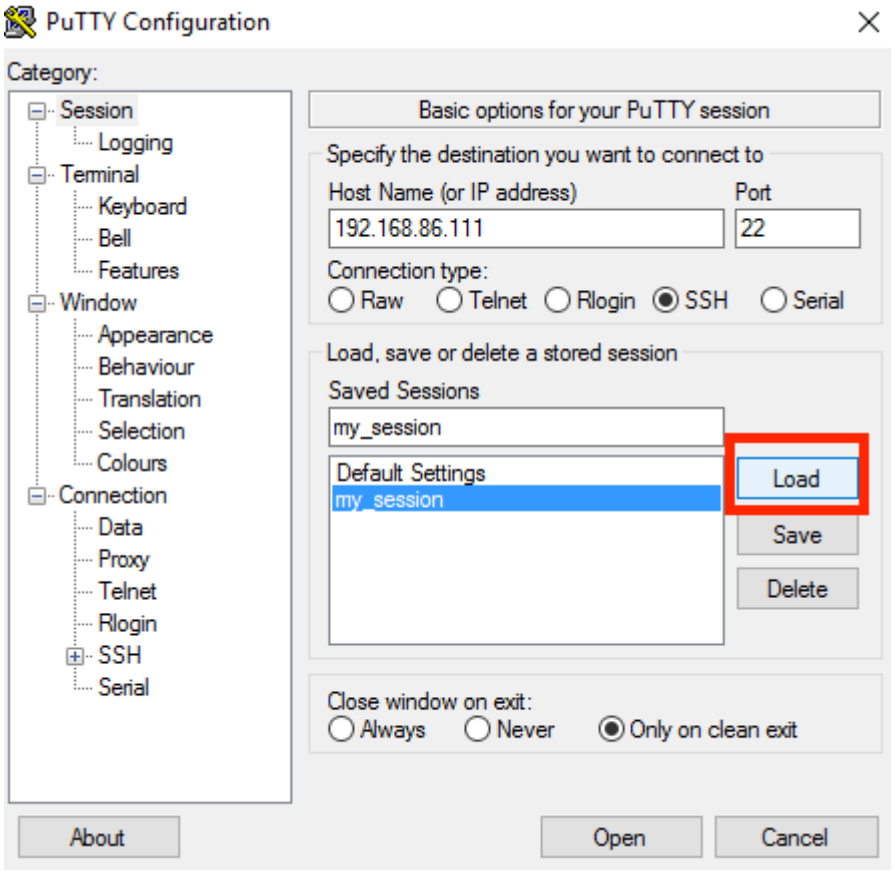
change.log | setup.py

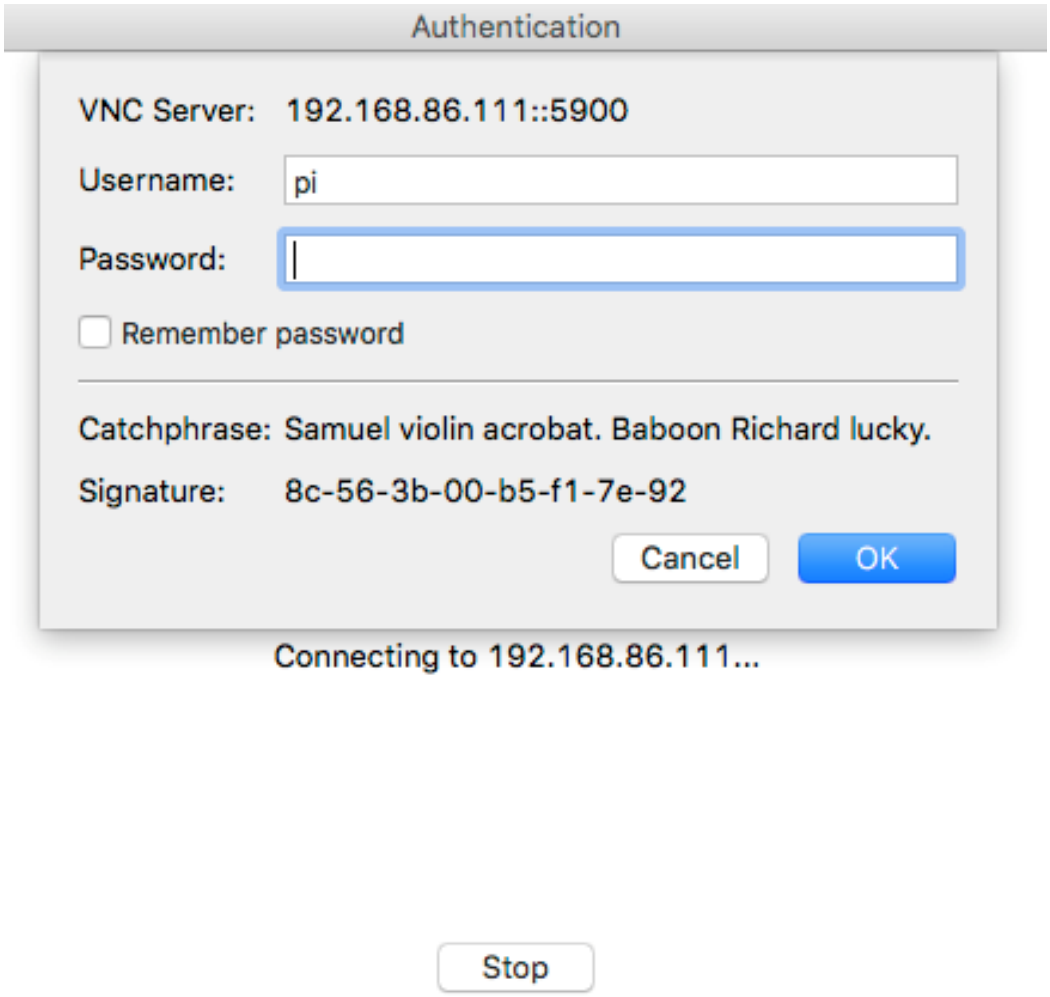
```
#!/usr/bin/env python

import glob
import os
import os.path
import sys

if sys.version_info < (3, 2, 0):
    sys.stderr.write("ERROR: You need Python 3.2 or later to use mypy.\n")
    exit(1)

from distutils.core import setup
from distutils.command.build_py import build_py
from mypy.version import base_version
from mypy import git

git.verify_git_integrity_or_abort(".")

version = base_version
description = 'Optional static typing for Python'
long_description = '''
Mypy -- Optional Static Typing for Python
=========================================

Add type annotations to your Python programs, and use mypy to type
check them.  Mypy is essentially a Python linter on steroids, and it
can catch many programming errors by analyzing your program, without
actually having to run it.  Mypy has a powerful type system with
features such as type inference, gradual typing, generics and union
types.
'''.lstrip()


def find_data_files(base, globs):
    """Find all interesting data files, for setup(data_files=)
```

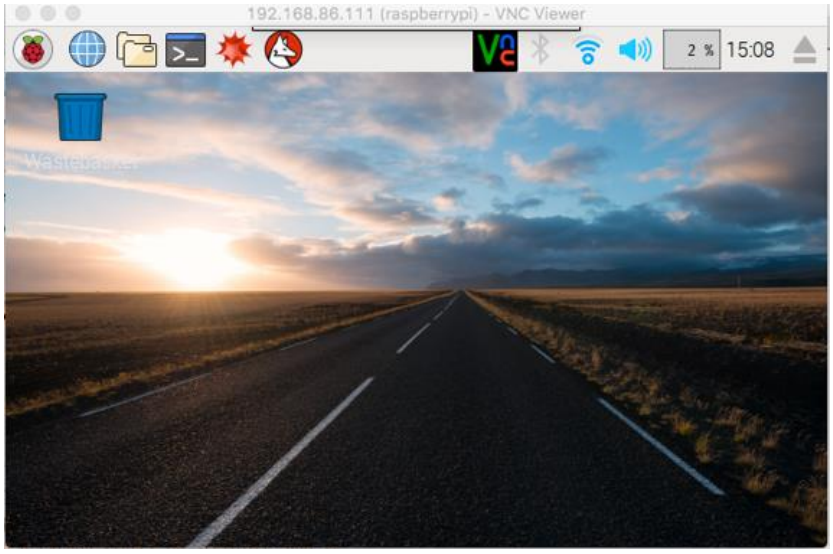
lawn_sprinkler.py

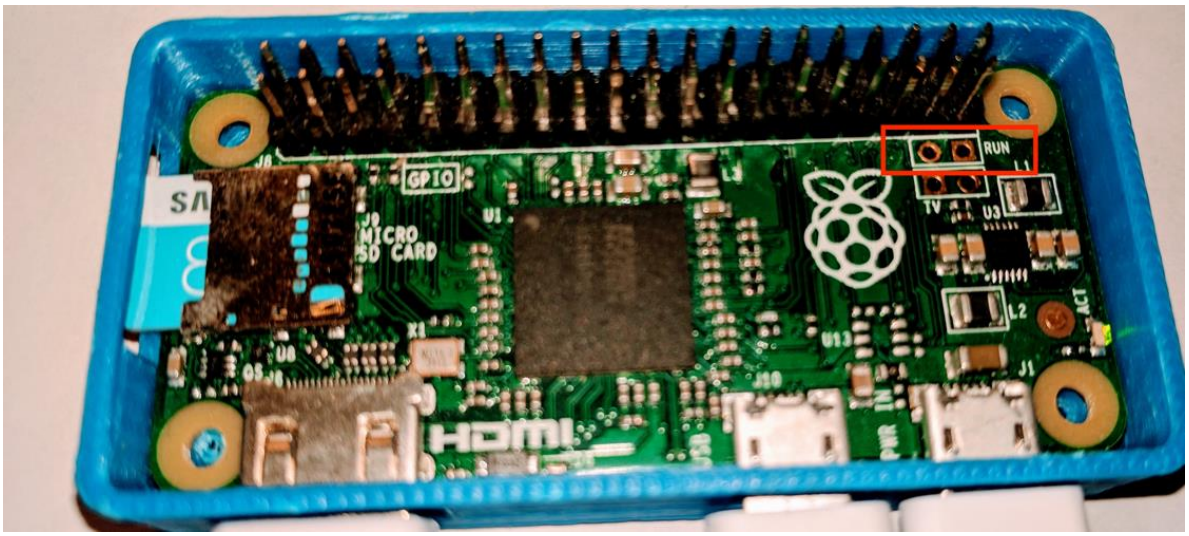
```python
#!/usr/bin/python3
"""
    Smart Water Sprinkler Example
"""

import requests
import schedule
import time

URL = ("https://api.darksky.net/forecast/key"
"/37.8267,-122.4233?exclude=currently,minutely,hourly")

def check_weather():
    try:
        response = requests.get(URL)
    except Exception as error:
        print(error)
    else:
        if response.status_code == 200:
            data = response.json()
            if data["daily"]["data"][1]["icon"] == "rain":
                return True
            else:
                return False

def turn_on_sprinkler():
    if not check_weather():
        # turn on sprinkler
        print("Turning on sprinkler")
        time.sleep(600)
        # turn off sprinkler
        print("Turning off sprinkler")
    else:
        print("Ignoring the sprinker for today")

def turn_off_sprinkler():
    pass

if __name__ == "__main__":
    schedule.every().day.at("18:50").do(turn_on_sprinkler)

    while True:
        schedule.run_pending()
        time.sleep(1)
```

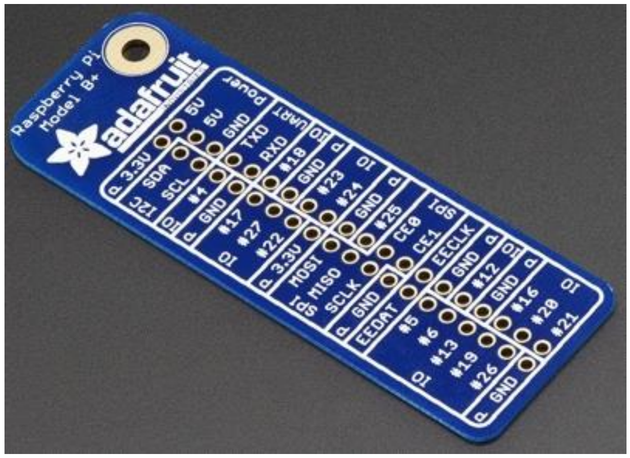

PuTTY Configuration
Category:
Session
Logging
Terminal
Keyboard
Bell
Features
Window
Appearance
Behaviour
Translation
Selection
Colours
Connection
Data
Proxy
Telnet
Rlogin
SSH
Serial
Basic options for your PuTTY session
Specify the destination you want to connect to
Host Name (or IP address)
Port
192.168.86.111
22
Connection type:
Raw
Telnet
Rlogin
SSH
Serial
Load, save or delete a stored session
Saved Sessions
my_session
Default Settings
Load
Save
Delete
Close window on exit:
Always
Never
Only on clean exit
About
Open
Cancel

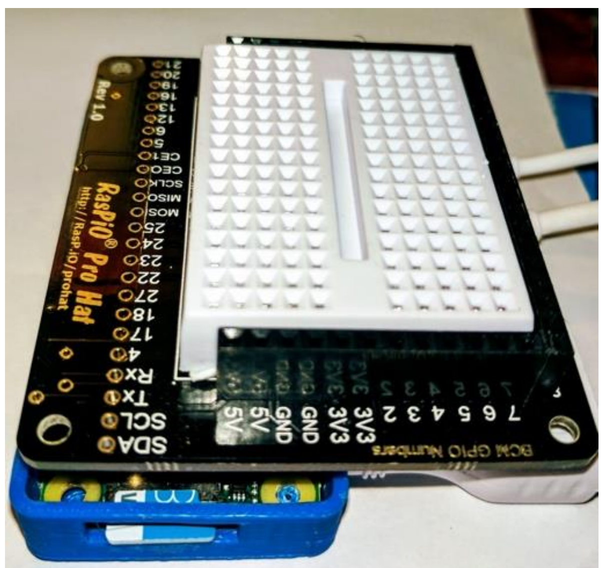

PuTTY Configuration
Category:
Session
Logging
Terminal
Keyboard
Bell
Features
Window
Appearance
Behaviour
Translation
Selection
Colours
Connection
Data
Proxy
Telnet
Rlogin
SSH
Serial
Basic options for your PuTTY session
Specify the destination you want to connect to
Host Name (or IP address)
Port
192.168.86.111
22
Connection type:
Raw
Telnet
Rlogin
SSH
Serial
Load, save or delete a stored session
Saved Sessions
my_session
Default Settings
my_session
Load
Save
Delete
Close window on exit:
Always
Never
Only on clean exit
About
Open
Cancel


Authentication
VNC Server: 192.168.86.111::5900
Username: pi
Password:
Remember password
Catchphrase: Samuel violin acrobat. Baboon Richard lucky.
Signature: 8c-56-3b-00-b5-f1-7e-92
Cancel
OK
Connecting to 192.168.86.111...
Stop


192.168.86.111 (raspberrypi) - VNC Viewer
2 %
15:08


RUN
GPIO
MICRO
SD CARD
HDMI


Raspberry Pi
Model B+
adafruit


RasPiO® Pro Hat
http://RasP.iO/prohat
Rev 1.0
BCM GPIO Numbers
SDA
SCL
Tx
Rx
5V
5V
GND
GND
3V3
3V3