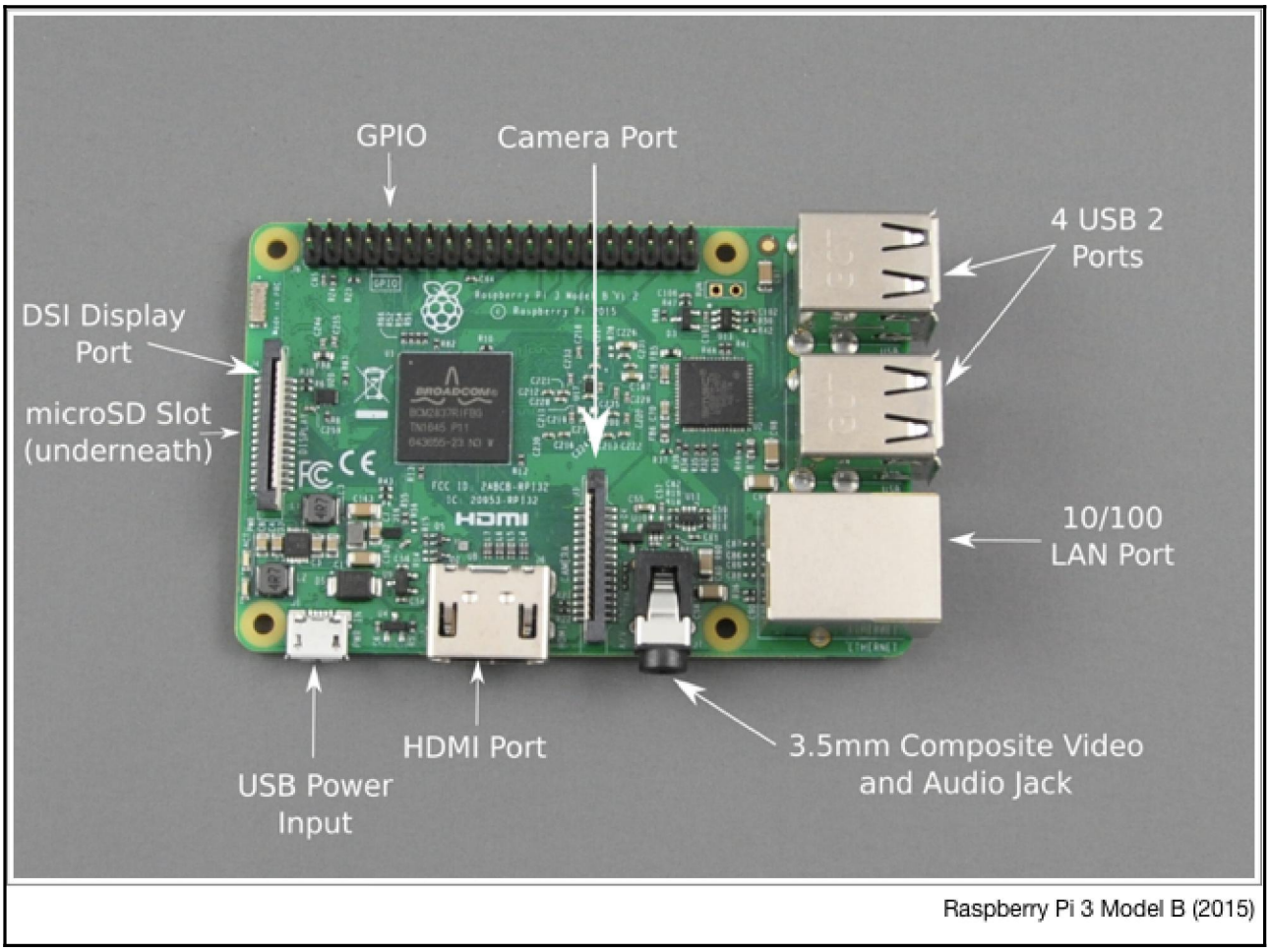
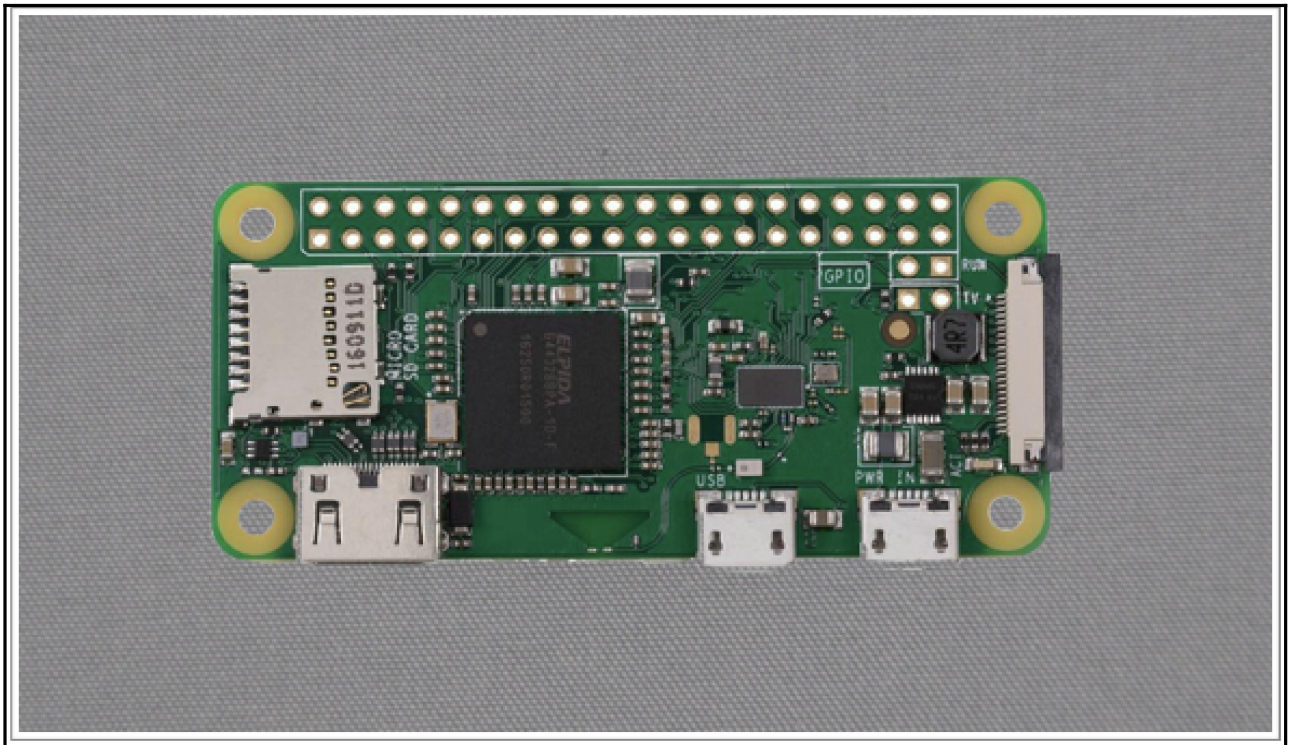
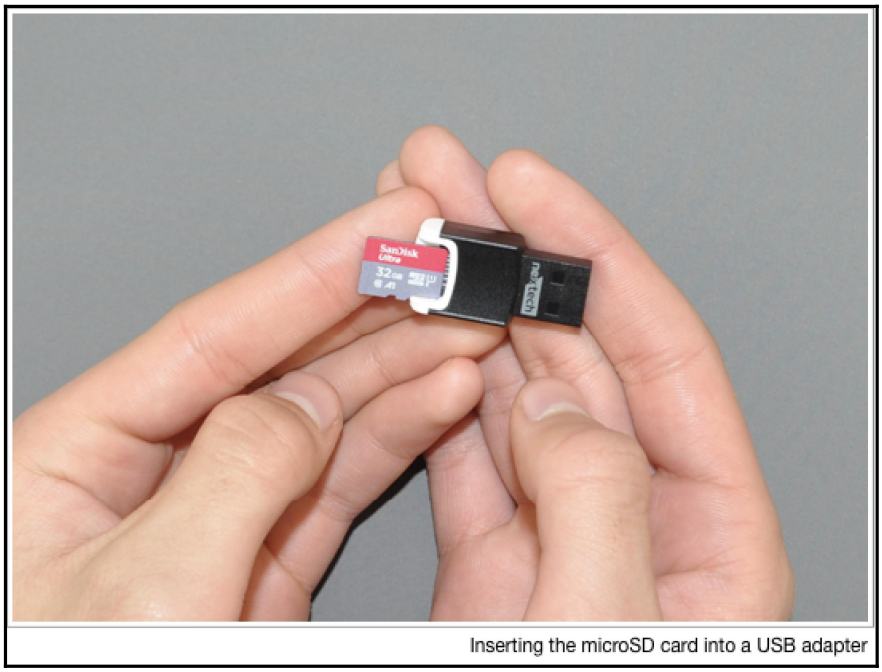
Chapter 01: Installing Raspbian on the Raspberry Pi



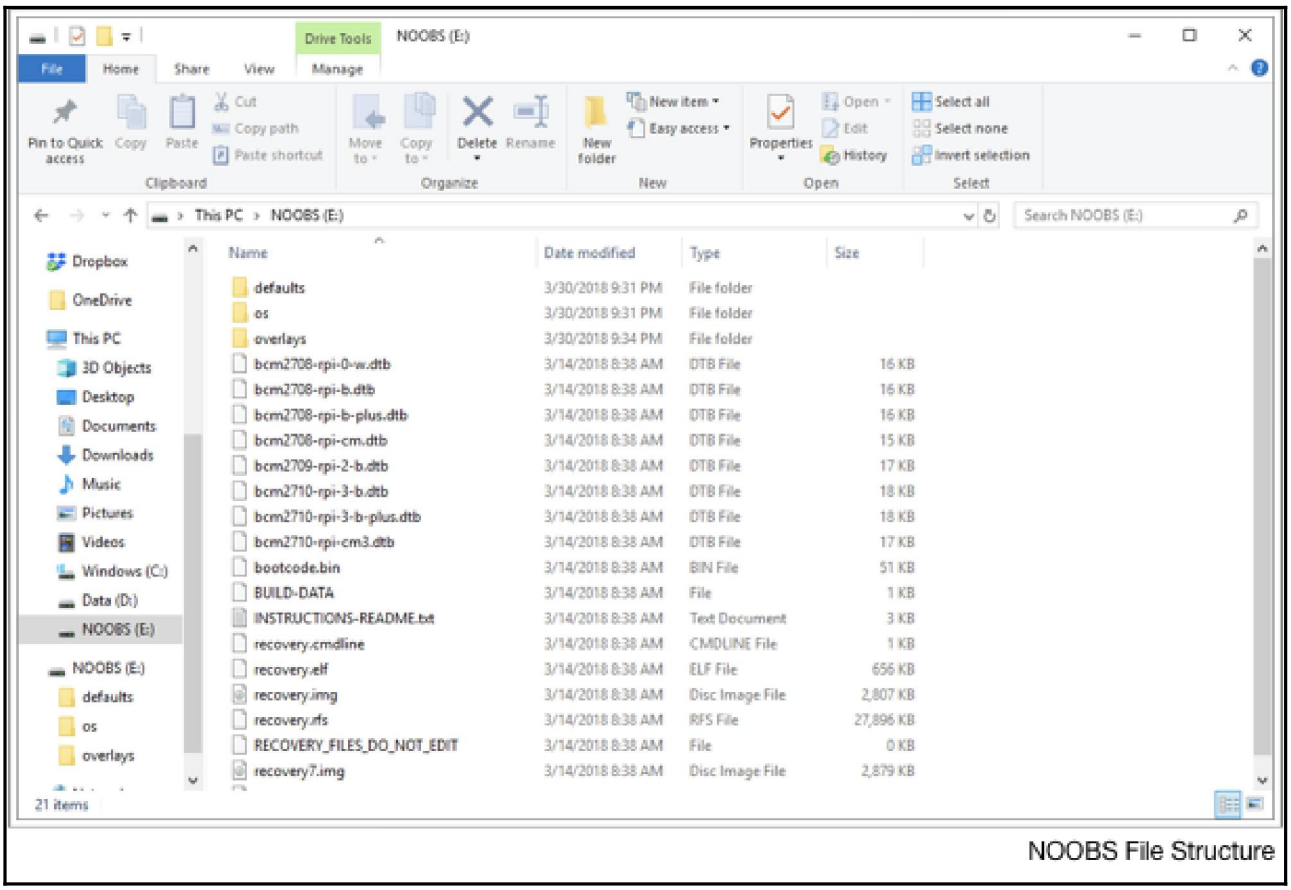
Raspberry Pi 3 Model B (2015)



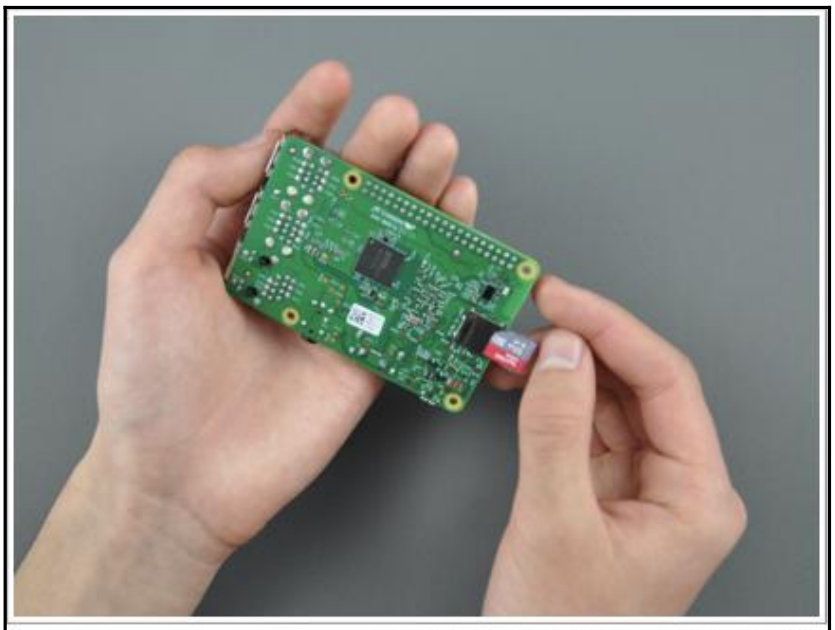
Raspberry Pi Zero W



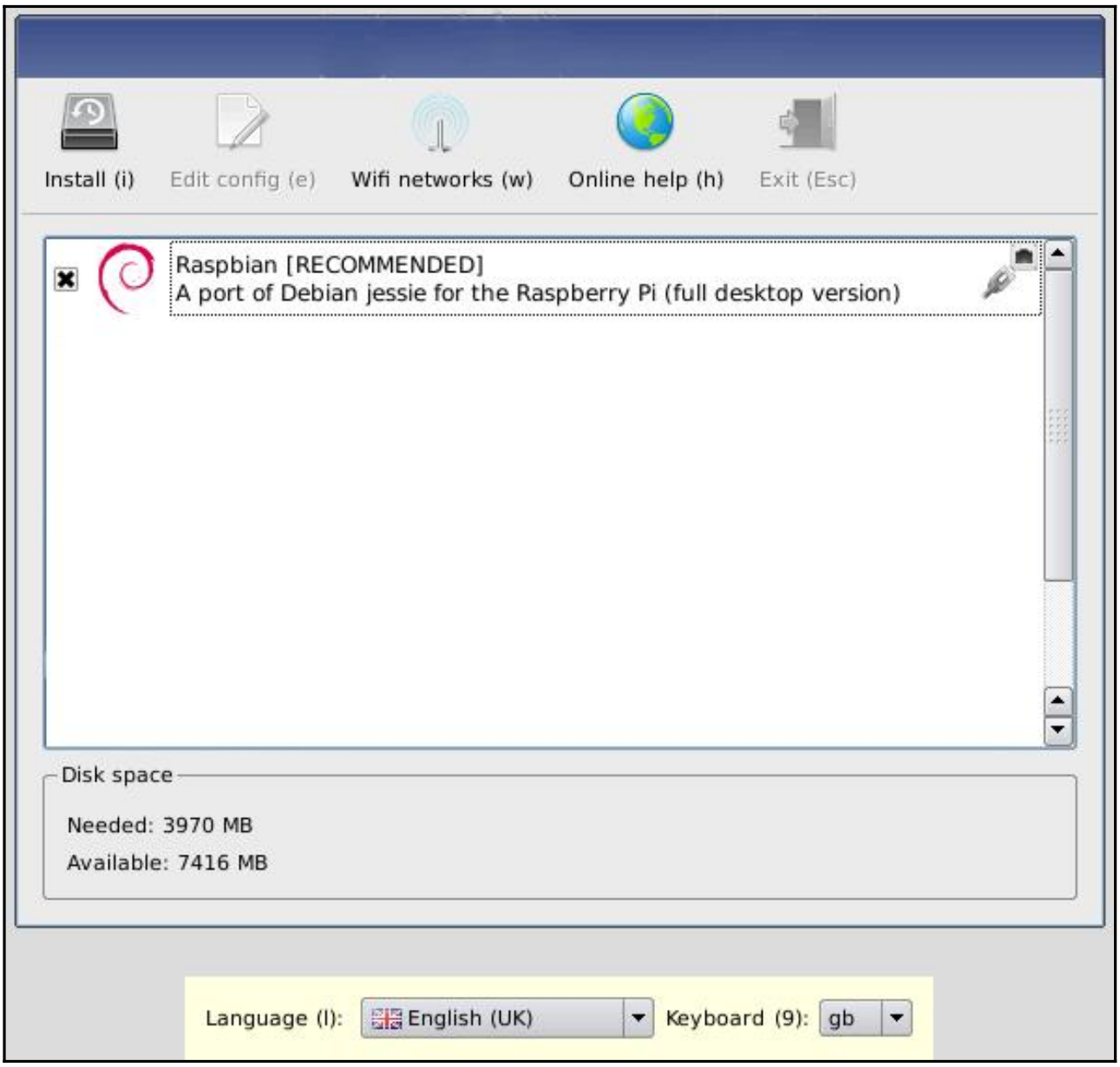
Inserting the microSD card into a USB adapter

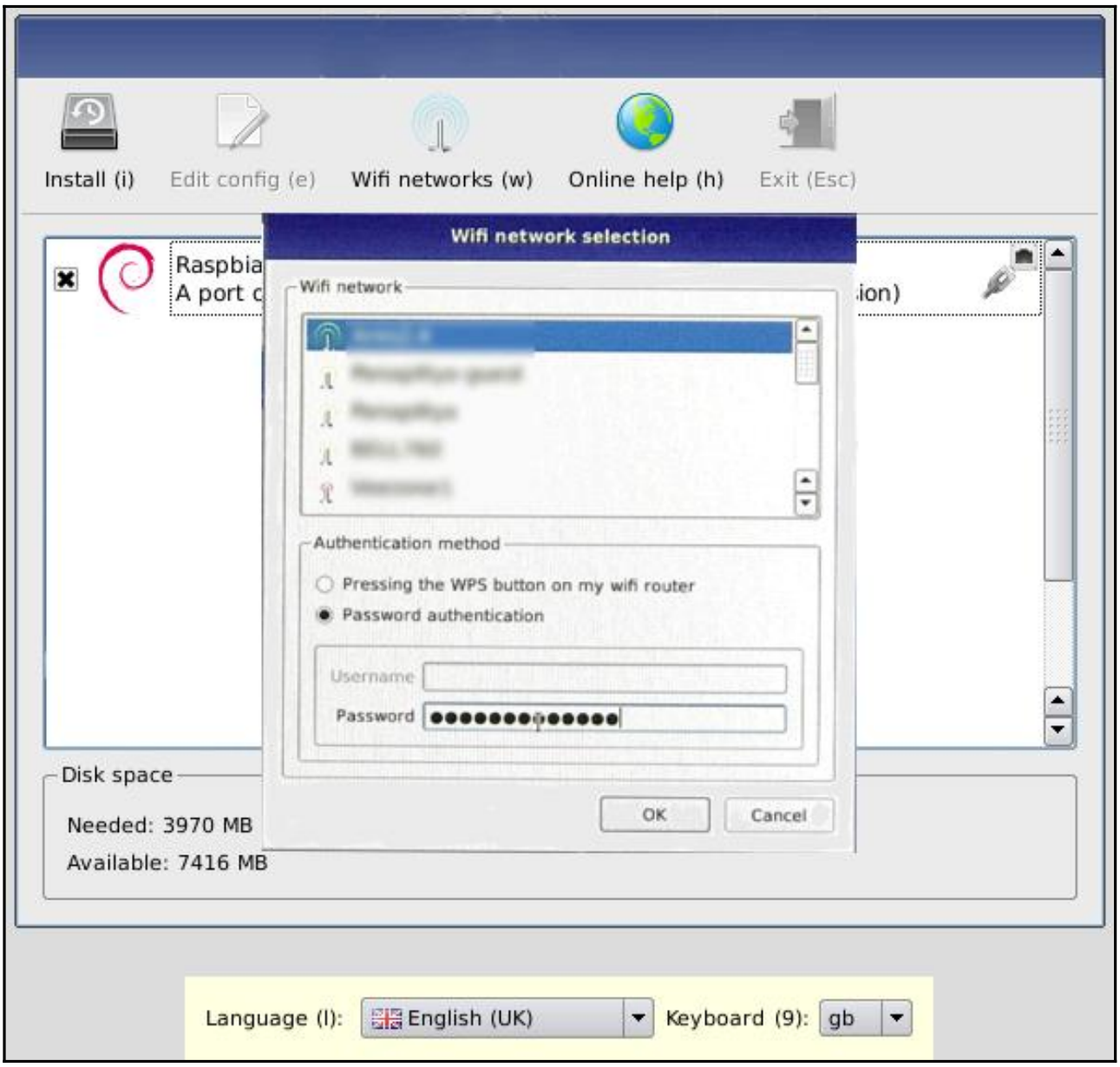


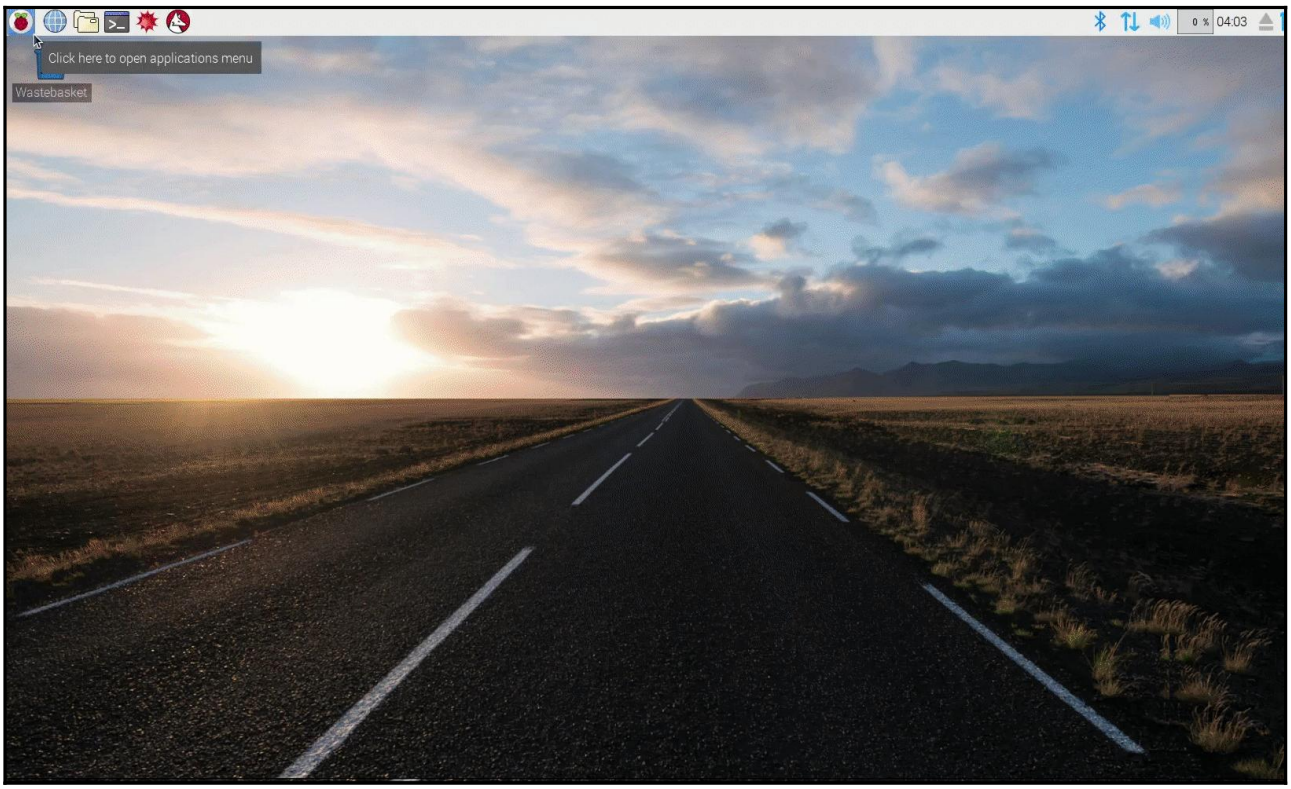
NOOBS File Structure

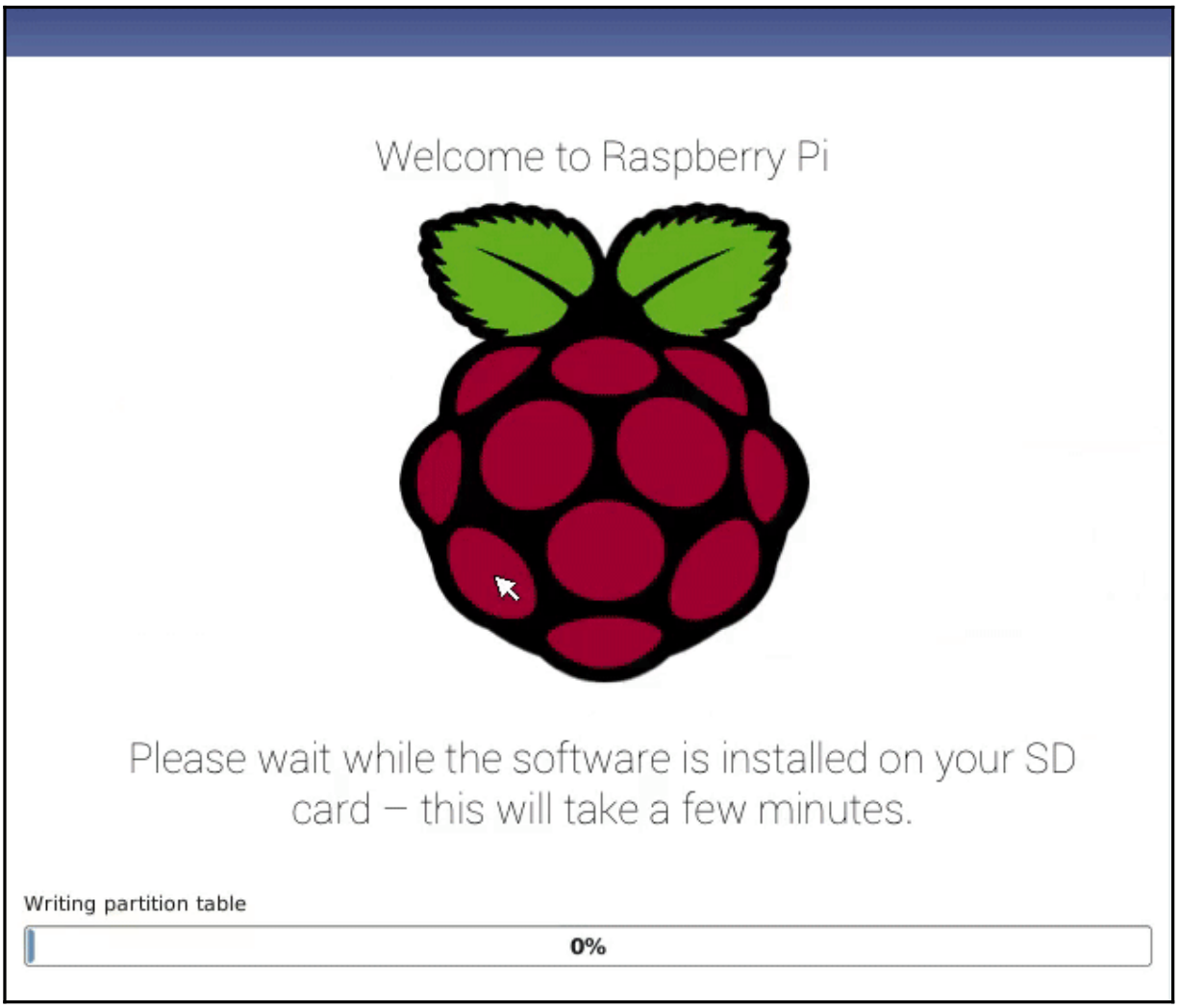


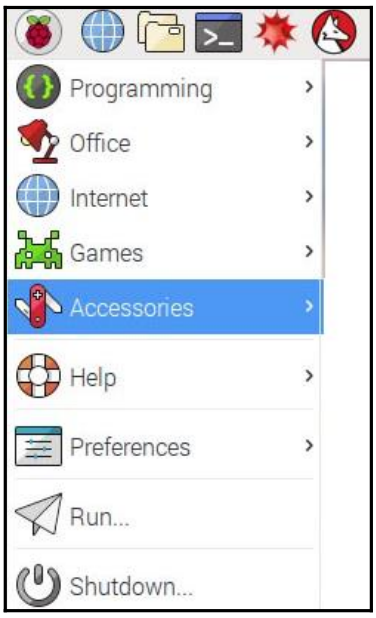
Inserting the microSD into the Raspberry Pi

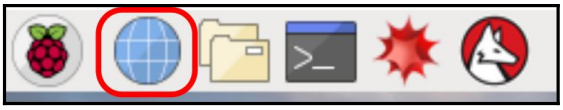

Install (i)
Edit config (e)
Wifi networks (w)
Online help (h)
Exit (Esc)
Raspbian [RECOMMENDED]
A port of Debian jessie for the Raspberry Pi (full desktop version)
Disk space
Needed: 3970 MB
Available: 7416 MB
Language (l):
English (UK)
Keyboard (9):
gb

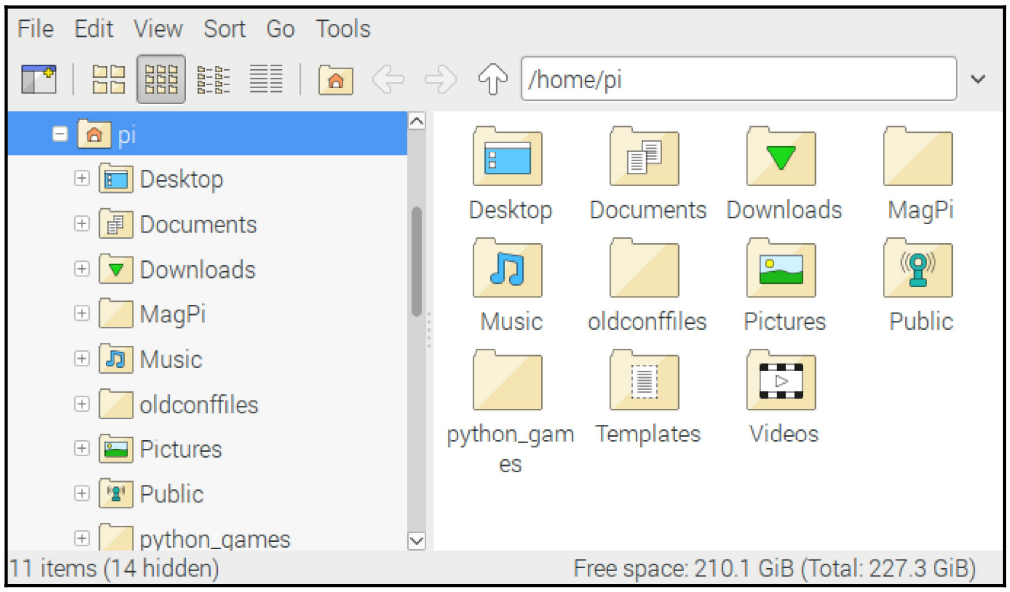

Install (i)
Edit config (e)
Wifi networks (w)
Online help (h)
Exit (Esc)
Wifi network selection
Wifi network
Authentication method
Pressing the WPS button on my wifi router
Password authentication
Username
Password
OK
Cancel
Disk space
Needed: 3970 MB
Available: 7416 MB
Language (l):
English (UK)
Keyboard (9):
gb

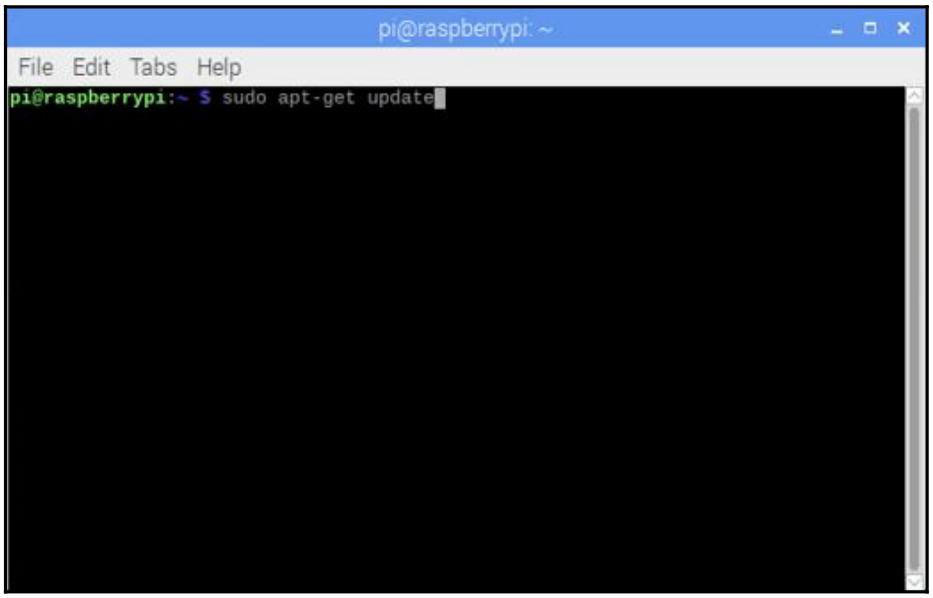

Click here to open applications menu
Wastebasket
0 %
04:03

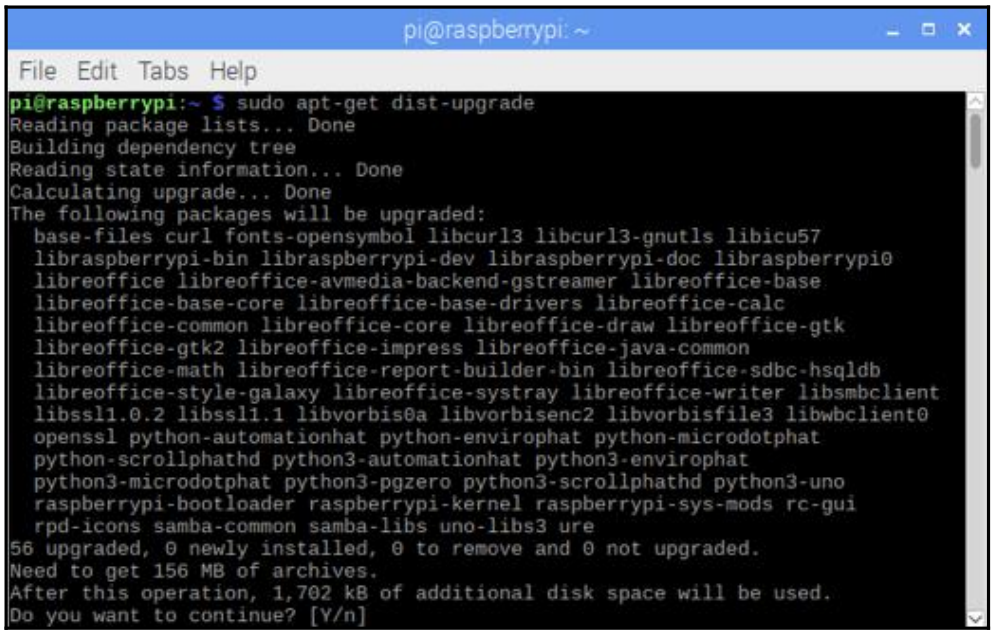

Welcome to Raspberry Pi
Please wait while the software is installed on your SD card – this will take a few minutes.
Writing partition table
0%

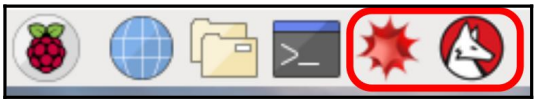

Programming
Office
Internet
Games
Accessories
Help
Preferences
Run...
Shutdown...

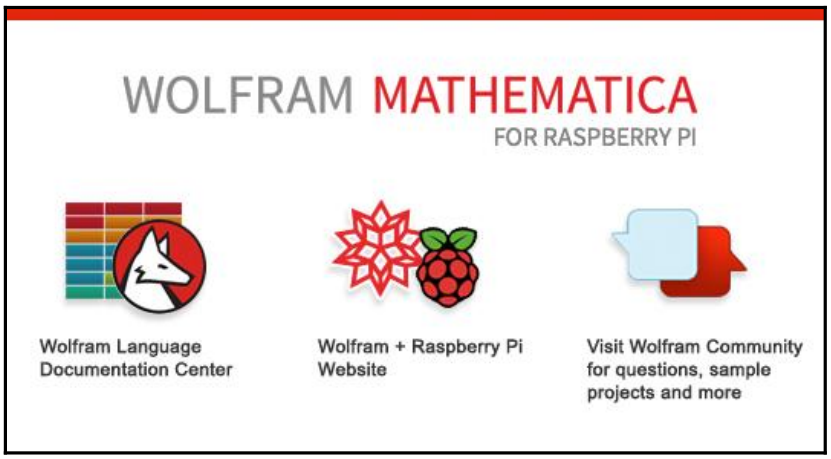



File Edit View Sort Go Tools
/home/pi
pi
Desktop
Documents
Downloads
MagPi
Music
oldconffiles
Pictures
Public
python_games
Templates
Videos
11 items (14 hidden)
Free space: 210.1 GiB (Total: 227.3 GiB)

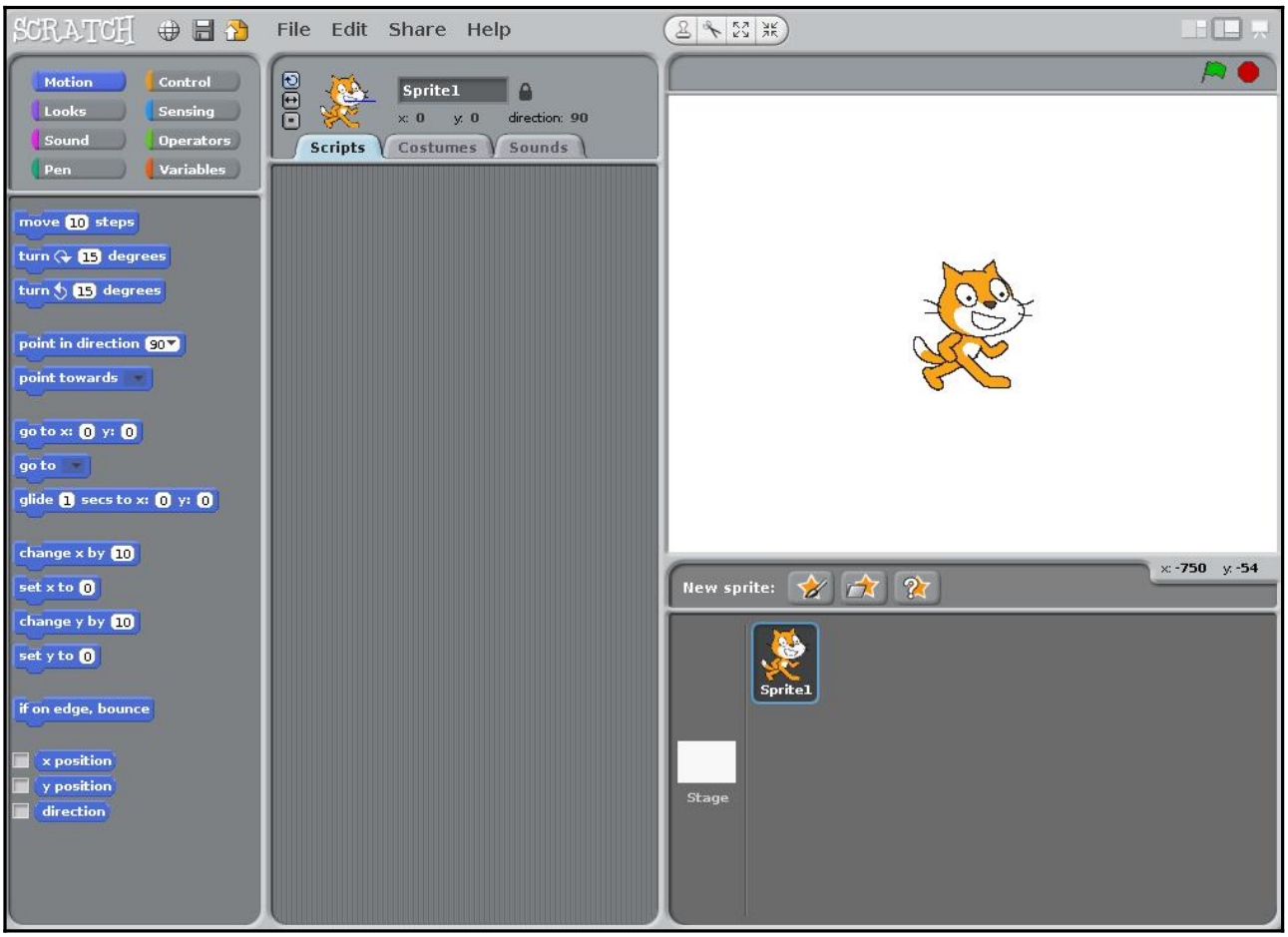

pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $ sudo apt-get update

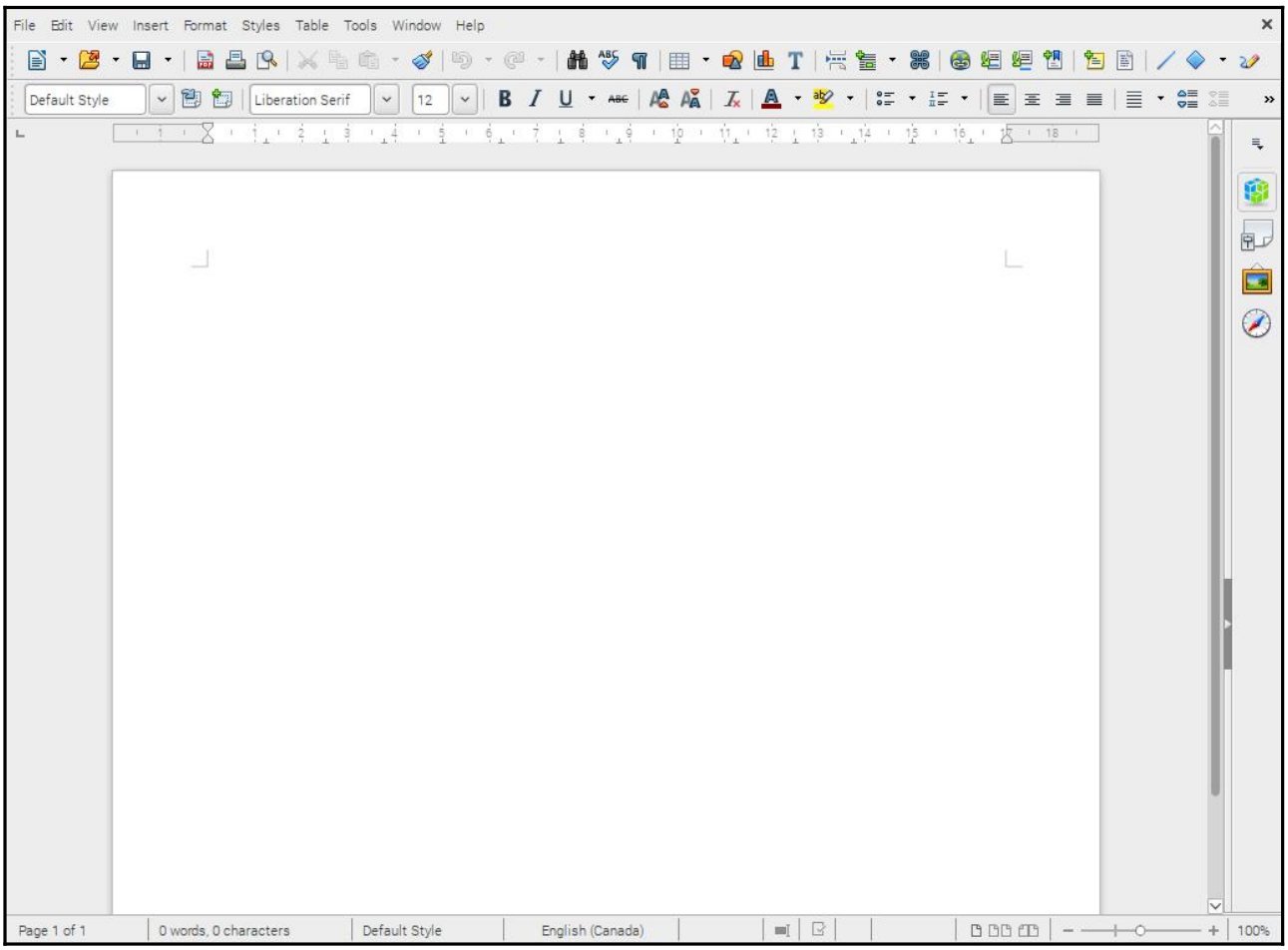

pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $ sudo apt-get dist-upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following packages will be upgraded:
base-files curl fonts-opensymbol libcurl3 libcurl3-gnutls libicu57
libraspberrypi-bin libraspberrypi-dev libraspberrypi-doc libraspberrypi0
libreoffice libreoffice-avmedia-backend-gstreamer libreoffice-base
libreoffice-base-core libreoffice-base-drivers libreoffice-calc
libreoffice-common libreoffice-core libreoffice-draw libreoffice-gtk
libreoffice-gtk2 libreoffice-impress libreoffice-java-common
libreoffice-math libreoffice-report-builder-bin libreoffice-sdbc-hsqldb
libreoffice-style-galaxy libreoffice-systray libreoffice-writer libsmbclient
libssl1.0.2 libssl1.1 libvorbis0a libvorbisenc2 libvorbisfile3 libwbclient0
openssl python-automationhat python-envirophat python-microdotphat
python-scrollphathd python3-automationhat python3-envirophat
python3-microdotphat python3-pgzero python3-scrollphathd python3-uno
raspberrypi-bootloader raspberrypi-kernel raspberrypi-sys-mods rc-gui
rpd-icons samba-common samba-libs uno-libs3 ure
56 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 156 MB of archives.
After this operation, 1,702 kB of additional disk space will be used.
Do you want to continue? [Y/n]



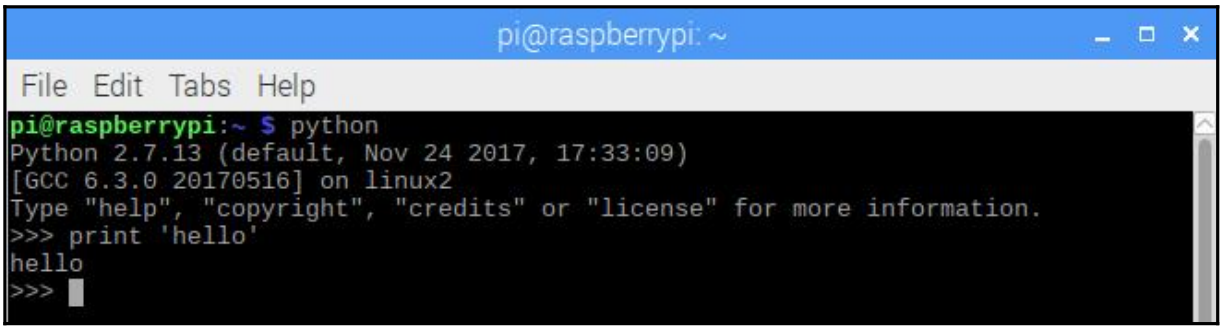

WOLFRAM MATHEMATICA
FOR RASPBERRY PI
Wolfram Language Documentation Center
Wolfram + Raspberry Pi Website
Visit Wolfram Community for questions, sample projects and more

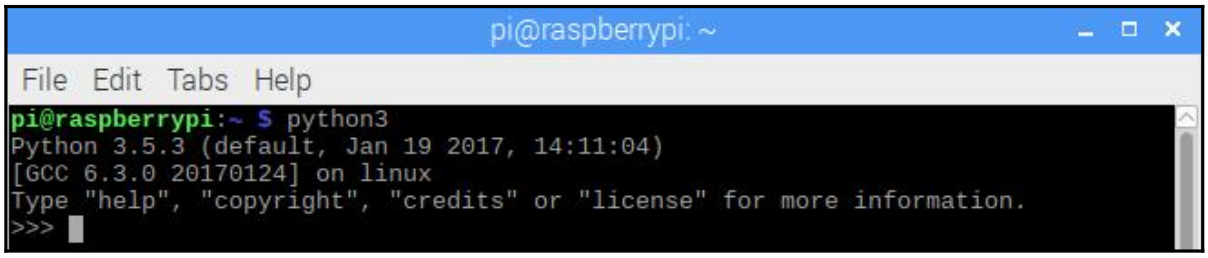

Run
Stop
Rec
Save
Load
Size
Size
Scope
Welcome to
Log
=> Initialised SuperCollider Audio
=> Initialised MIDI subsystems
=> Hello, it's lovely to see
Cues
Buffer 0
Buffer 1
Buffer 2
Buffer 3
Buffer 4
Buffer 5
Help
1 Welcome to Sonic Pi
1.1 Live Coding
1.2 Exploring the Interface
1.3 Learning through Play
2 Synths
2.1 Your First Beeps
Tutorial
Examples
Synths
Fx
Samples
Lang
Sonic Pi v3.0.1 on Raspberry Pi

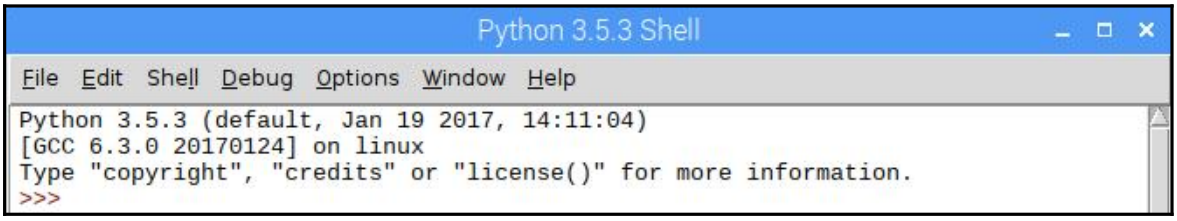

SCRATCH
File Edit Share Help
Motion
Control
Looks
Sensing
Sound
Operators
Pen
Variables
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: 0 y: 0
go to
glide 1 secs to x: 0 y: 0
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
x position
y position
direction
Sprite1
x: 0 y: 0 direction: 90
Scripts
Costumes
Sounds
New sprite:
x: -750 y: -54
Sprite1
Stage

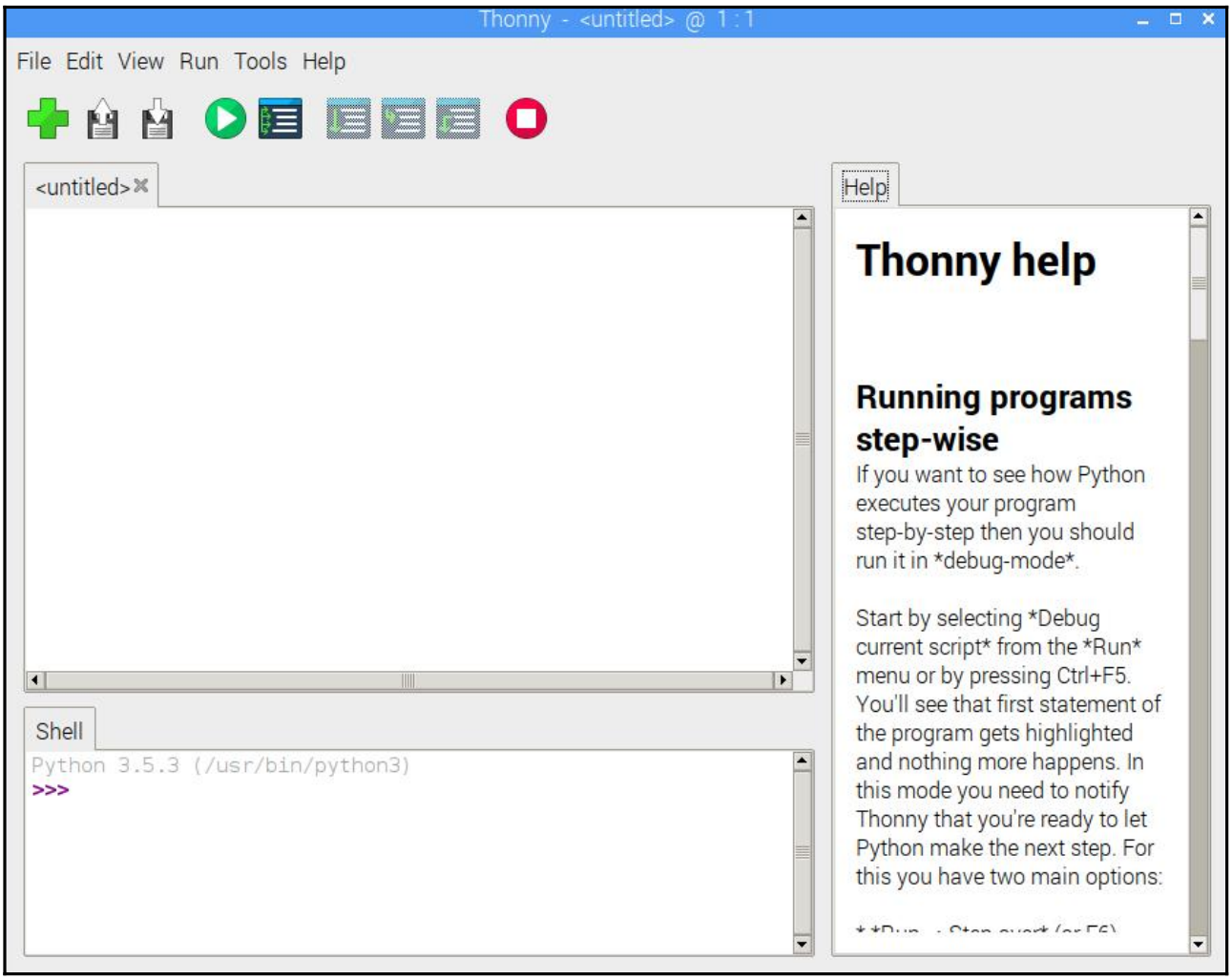

File Edit View Insert Format Styles Table Tools Window Help
Default Style
Liberation Serif
12
Page 1 of 1
0 words, 0 characters
Default Style
English (Canada)
100%

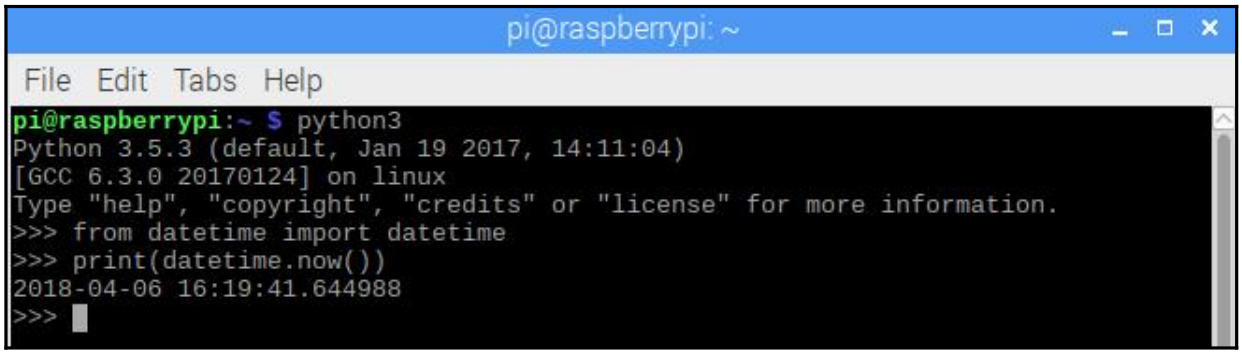
Chapter 02: Writing Python Programs Using the Raspberry Pi

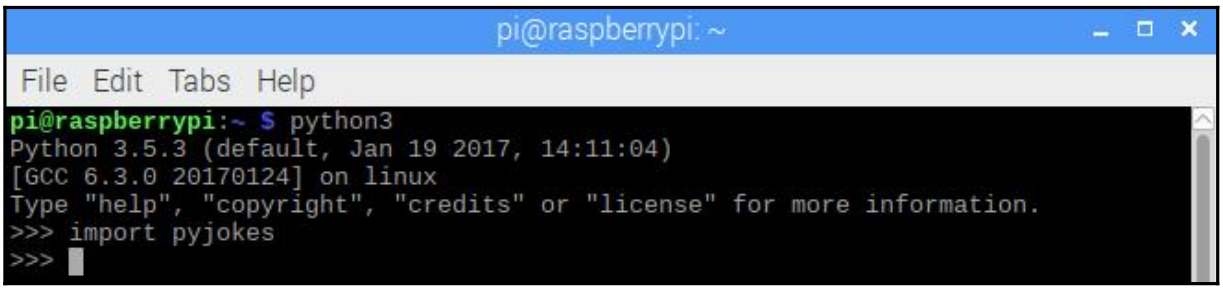


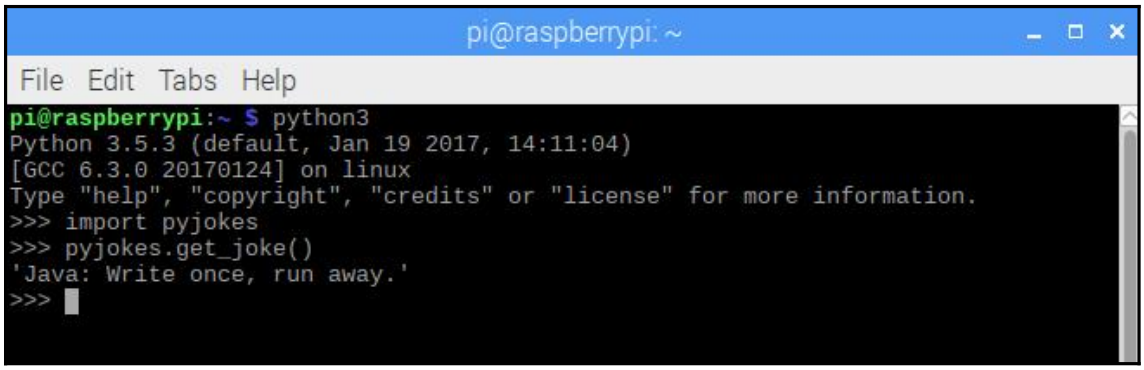


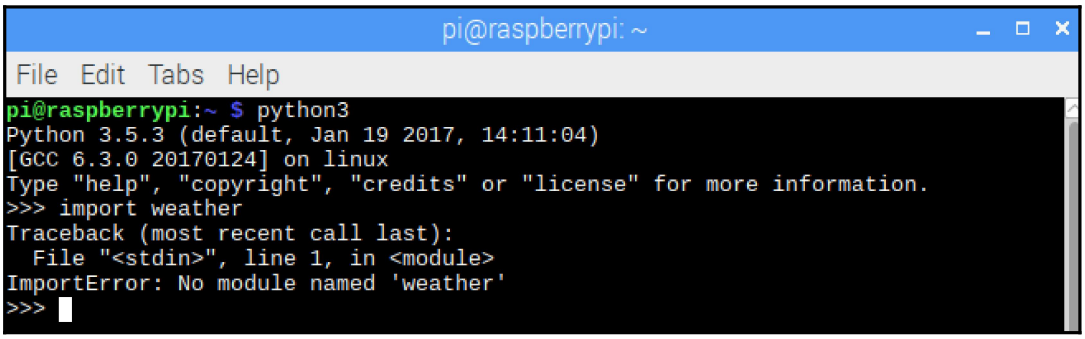


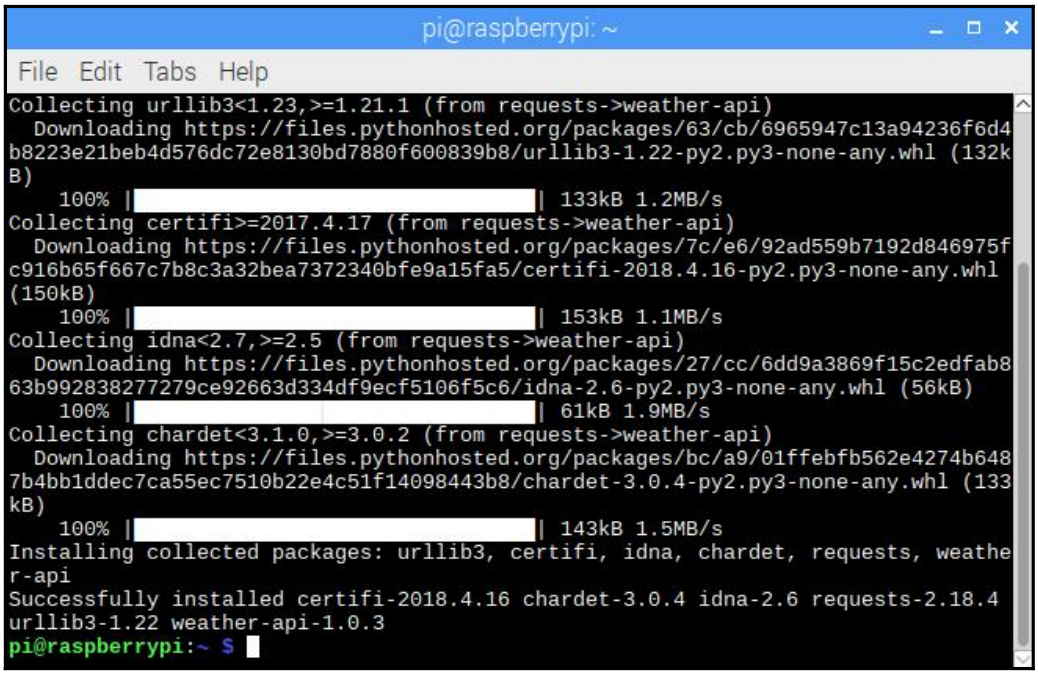

Thonny - <untitled> @ 1 : 1
File Edit View Run Tools Help
<untitled>
Help
Thonny help
Running programs step-wise
If you want to see how Python executes your program step-by-step then you should run it in *debug-mode*.
Start by selecting *Debug current script* from the *Run* menu or by pressing Ctrl+F5. You'll see that first statement of the program gets highlighted and nothing more happens. In this mode you need to notify Thonny that you're ready to let Python make the next step. For this you have two main options:
Shell
Python 3.5.3 (/usr/bin/python3)
>>>

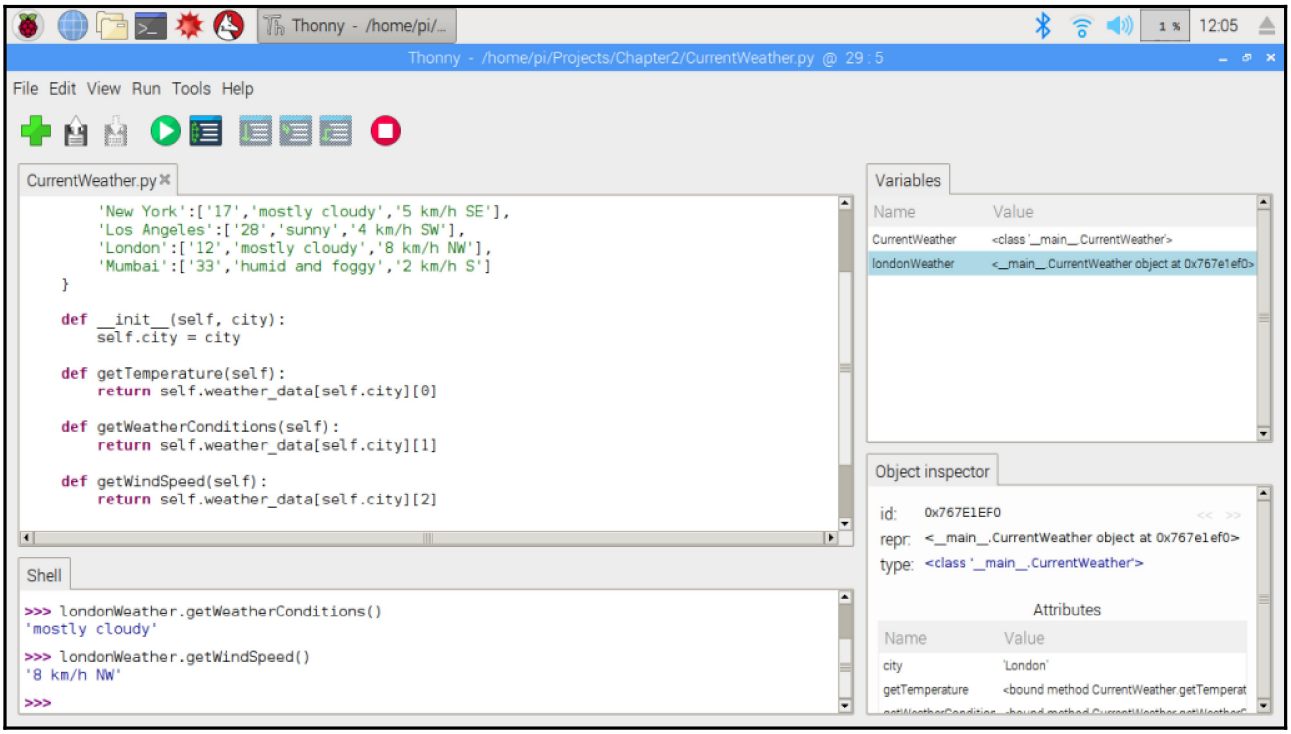

pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $ python3
Python 3.5.3 (default, Jan 19 2017, 14:11:04)
[GCC 6.3.0 20170124] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> from datetime import datetime
>>> print(datetime.now())
2018-04-06 16:19:41.644988
>>>


pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $ python3
Python 3.5.3 (default, Jan 19 2017, 14:11:04)
[GCC 6.3.0 20170124] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import pyjokes
>>>

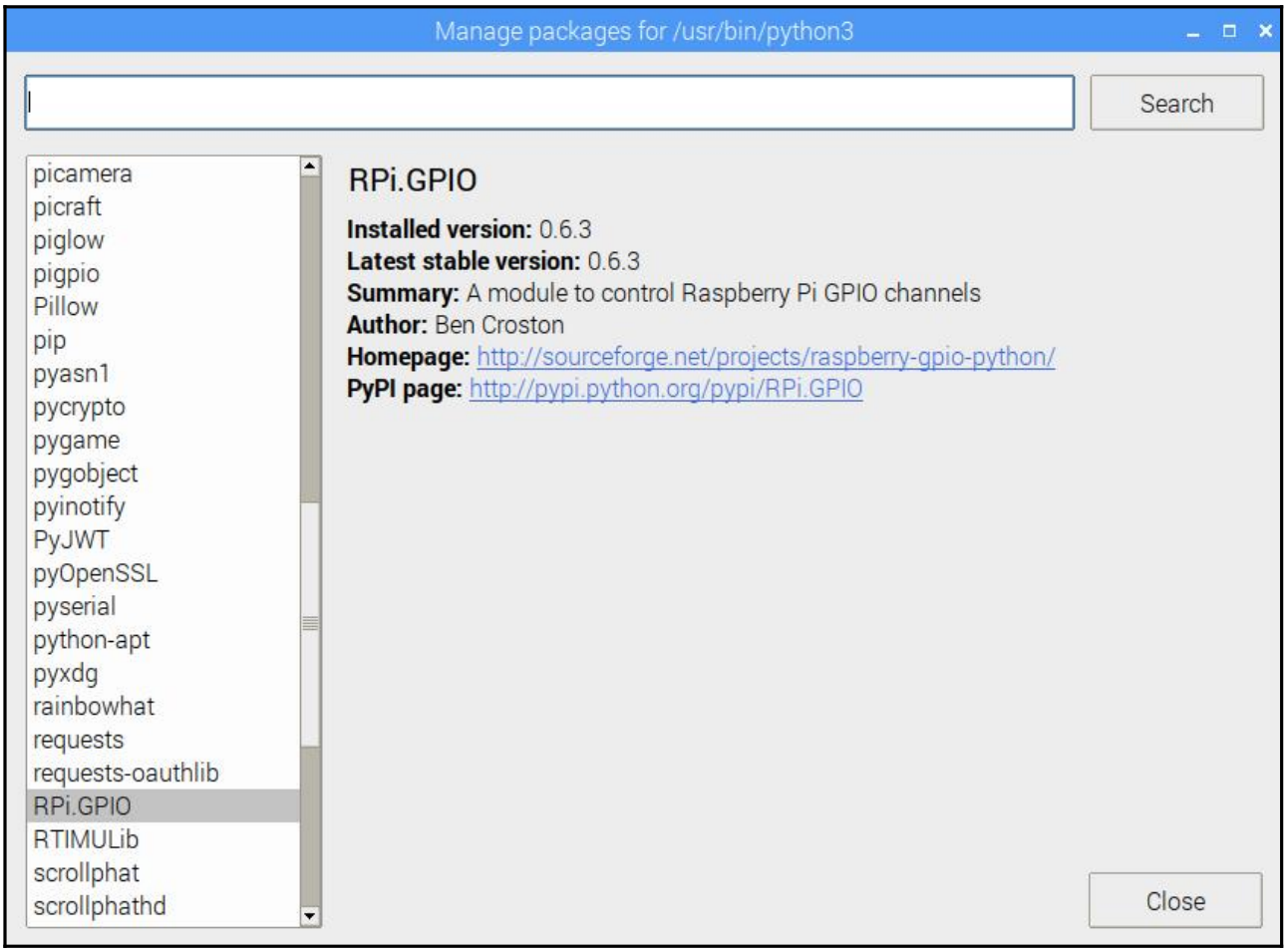

pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $ python3
Python 3.5.3 (default, Jan 19 2017, 14:11:04)
[GCC 6.3.0 20170124] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import pyjokes
>>> pyjokes.get_joke()
'Java: Write once, run away.'
>>>

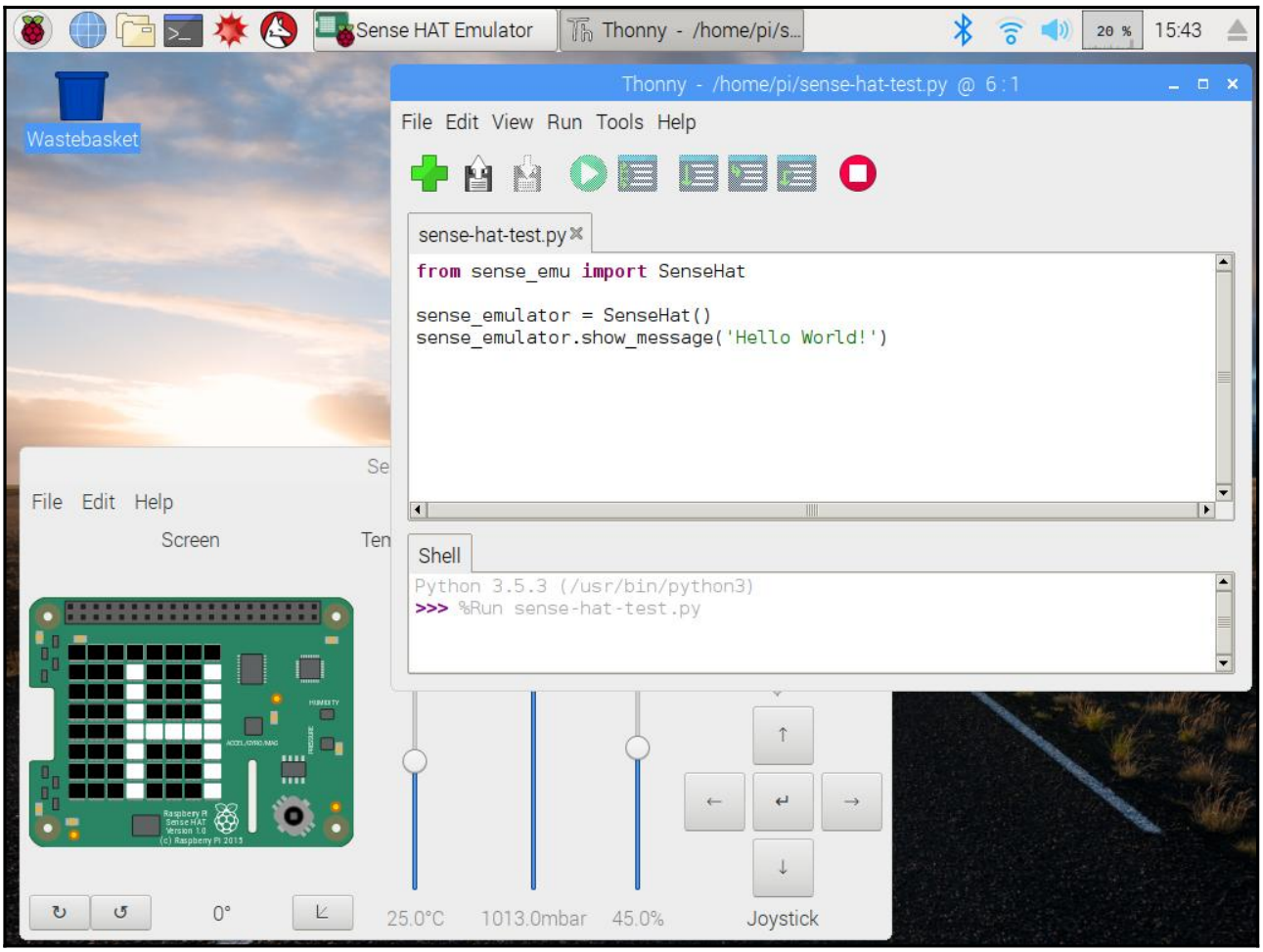

pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $ python3
Python 3.5.3 (default, Jan 19 2017, 14:11:04)
[GCC 6.3.0 20170124] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import weather
Traceback (most recent call last):
File "<stdin>", line 1, in <module>
ImportError: No module named 'weather'
>>>

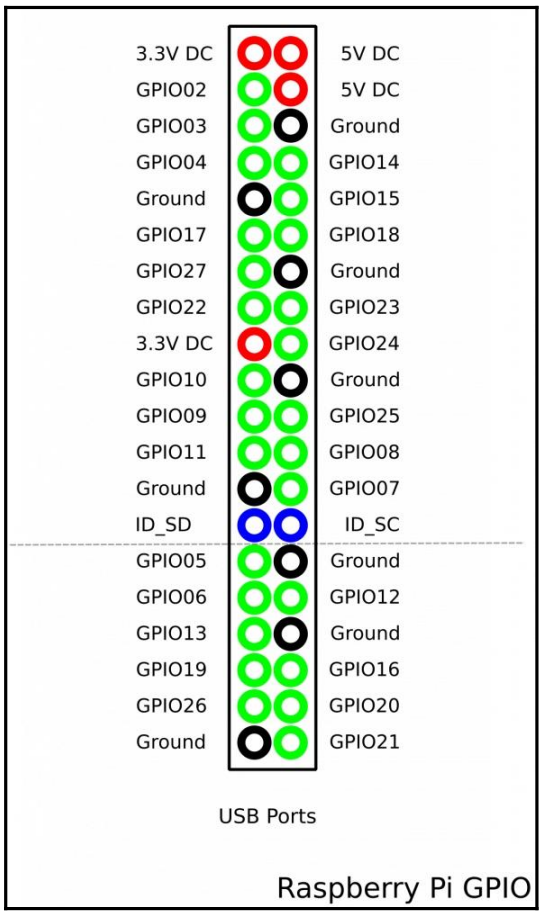

pi@raspberrypi: ~
File Edit Tabs Help
Collecting urllib3<1.23,>=1.21.1 (from requests->weather-api)
Downloading https://files.pythonhosted.org/packages/63/cb/6965947c13a94236f6d4b8223e21beb4d576dc72e8130bd7880f600839b8/urllib3-1.22-py2.py3-none-any.whl (132kB)
100% | 133kB 1.2MB/s
Collecting certifi>=2017.4.17 (from requests->weather-api)
Downloading https://files.pythonhosted.org/packages/7c/e6/92ad559b7192d846975fc916b65f667c7b8c3a32bea7372340bfe9a15fa5/certifi-2018.4.16-py2.py3-none-any.whl (150kB)
100% | 153kB 1.1MB/s
Collecting idna<2.7,>=2.5 (from requests->weather-api)
Downloading https://files.pythonhosted.org/packages/27/cc/6dd9a3869f15c2edfab863b992838277279ce92663d334df9ecf5106f5c6/idna-2.6-py2.py3-none-any.whl (56kB)
100% | 61kB 1.9MB/s
Collecting chardet<3.1.0,>=3.0.2 (from requests->weather-api)
Downloading https://files.pythonhosted.org/packages/bc/a9/01ffebfb562e4274b6487b4bb1ddec7ca55ec7510b22e4c51f14098443b8/chardet-3.0.4-py2.py3-none-any.whl (133kB)
100% | 143kB 1.5MB/s
Installing collected packages: urllib3, certifi, idna, chardet, requests, weather-api
Successfully installed certifi-2018.4.16 chardet-3.0.4 idna-2.6 requests-2.18.4 urllib3-1.22 weather-api-1.0.3
pi@raspberrypi:~ $

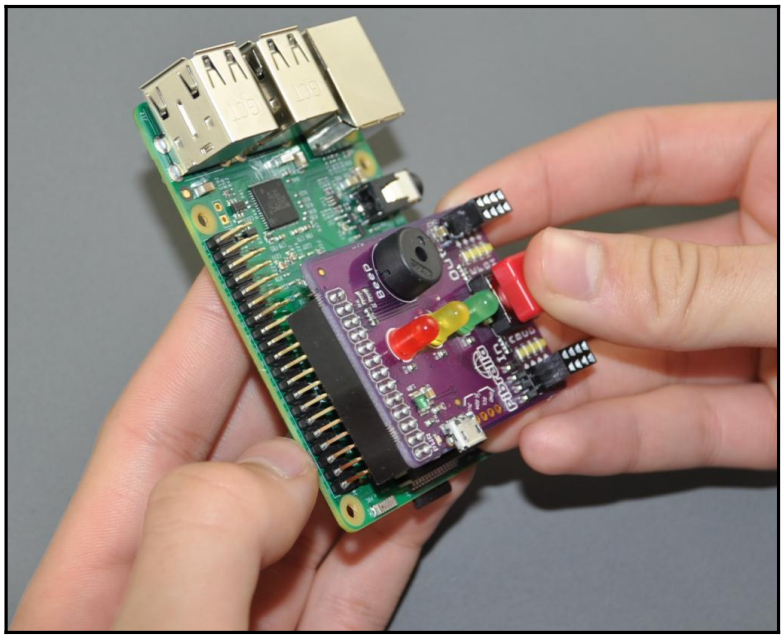

Thonny - /home/pi/...
12:05
Thonny - /home/pi/Projects/Chapter2/CurrentWeather.py @ 29 : 5
File Edit View Run Tools Help
CurrentWeather.py
'New York':['17','mostly cloudy','5 km/h SE'],
'Los Angeles':['28','sunny','4 km/h SW'],
'London':['12','mostly cloudy','8 km/h NW'],
'Mumbai':['33','humid and foggy','2 km/h S']
}
def __init__(self, city):
self.city = city
def getTemperature(self):
return self.weather_data[self.city][0]
def getWeatherConditions(self):
return self.weather_data[self.city][1]
def getWindSpeed(self):
return self.weather_data[self.city][2]
Variables
Name Value
CurrentWeather <class '__main__.CurrentWeather'>
londonWeather <__main__.CurrentWeather object at 0x767e1ef0>
Object inspector
id: 0x767E1EF0
repr: <__main__.CurrentWeather object at 0x767e1ef0>
type: <class '__main__.CurrentWeather'>
Attributes
Name Value
city 'London'
getTemperature <bound method CurrentWeather.getTemperat
Shell
>>> londonWeather.getWeatherConditions()
'mostly cloudy'
>>> londonWeather.getWindSpeed()
'8 km/h NW'
>>>

Chapter 03: Using the GPIO to connect to the Outside World

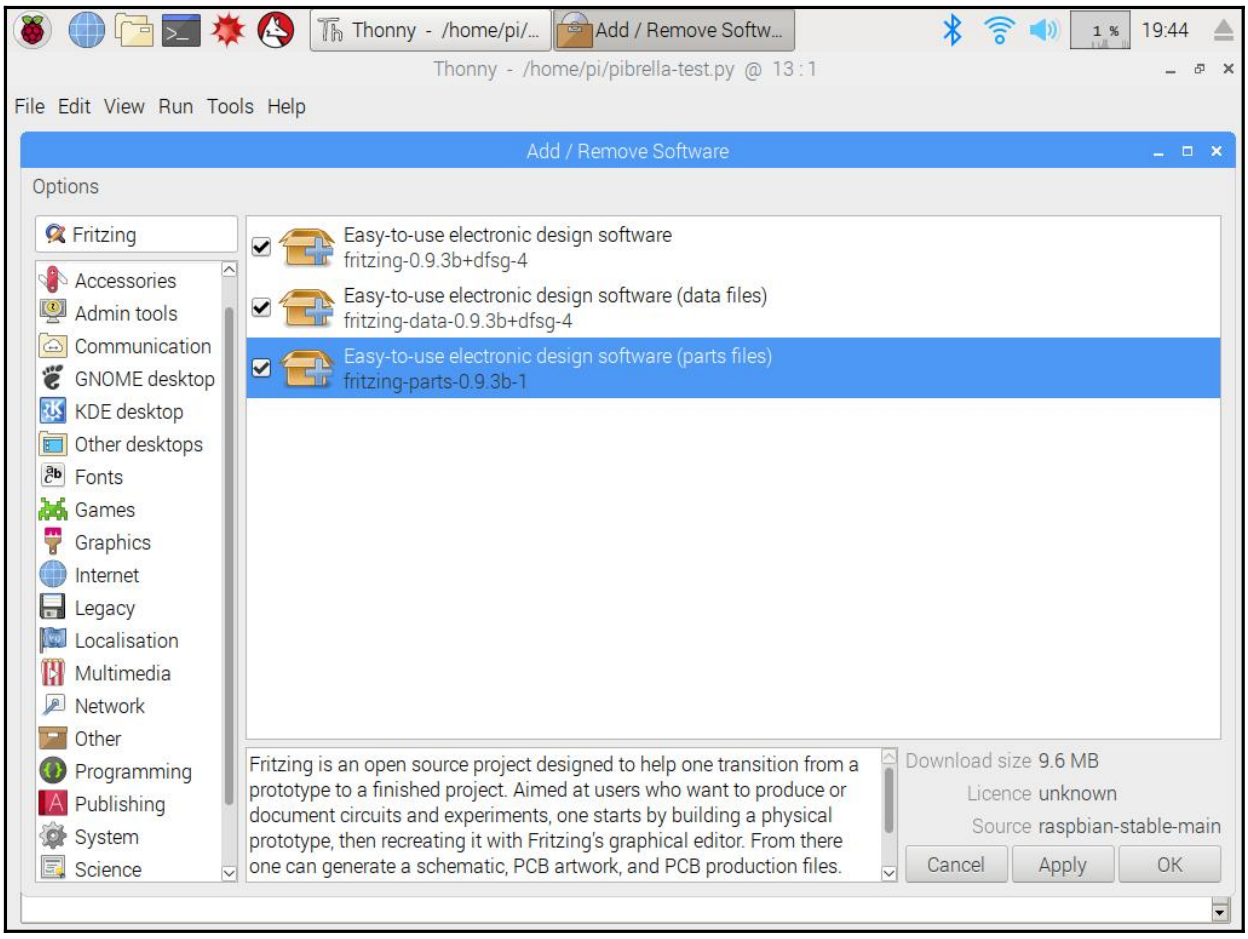


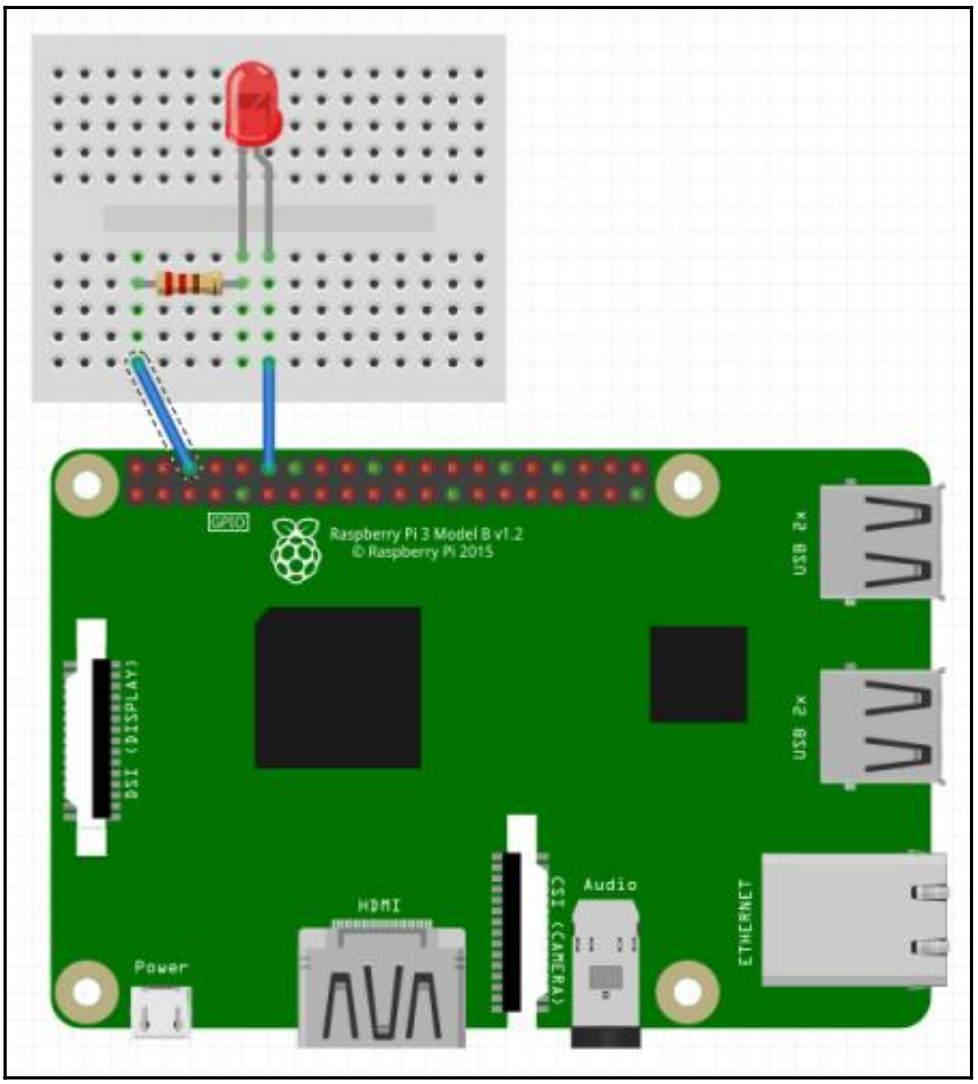

Sense HAT Emulator
Thonny - /home/pi/s...
20 %
15:43
Wastebasket
Thonny - /home/pi/sense-hat-test.py @ 6 : 1
File Edit View Run Tools Help
sense-hat-test.py
from sense_emu import SenseHat
sense_emulator = SenseHat()
sense_emulator.show_message('Hello World!')
Shell
Python 3.5.3 (/usr/bin/python3)
>>> %Run sense-hat-test.py
File Edit Help
Screen
0°
25.0°C
1013.0mbar
45.0%
Joystick

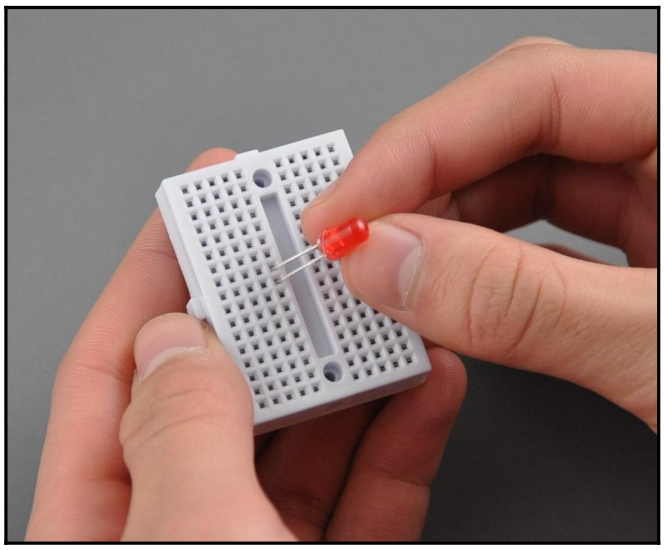

3.3V DC
5V DC
GPIO02
5V DC
GPIO03
Ground
GPIO04
GPIO14
Ground
GPIO15
GPIO17
GPIO18
GPIO27
Ground
GPIO22
GPIO23
3.3V DC
GPIO24
GPIO10
Ground
GPIO09
GPIO25
GPIO11
GPIO08
Ground
GPIO07
ID_SD
ID_SC
GPIO05
Ground
GPIO06
GPIO12
GPIO13
Ground
GPIO19
GPIO16
GPIO26
GPIO20
Ground
GPIO21
USB Ports
Raspberry Pi GPIO

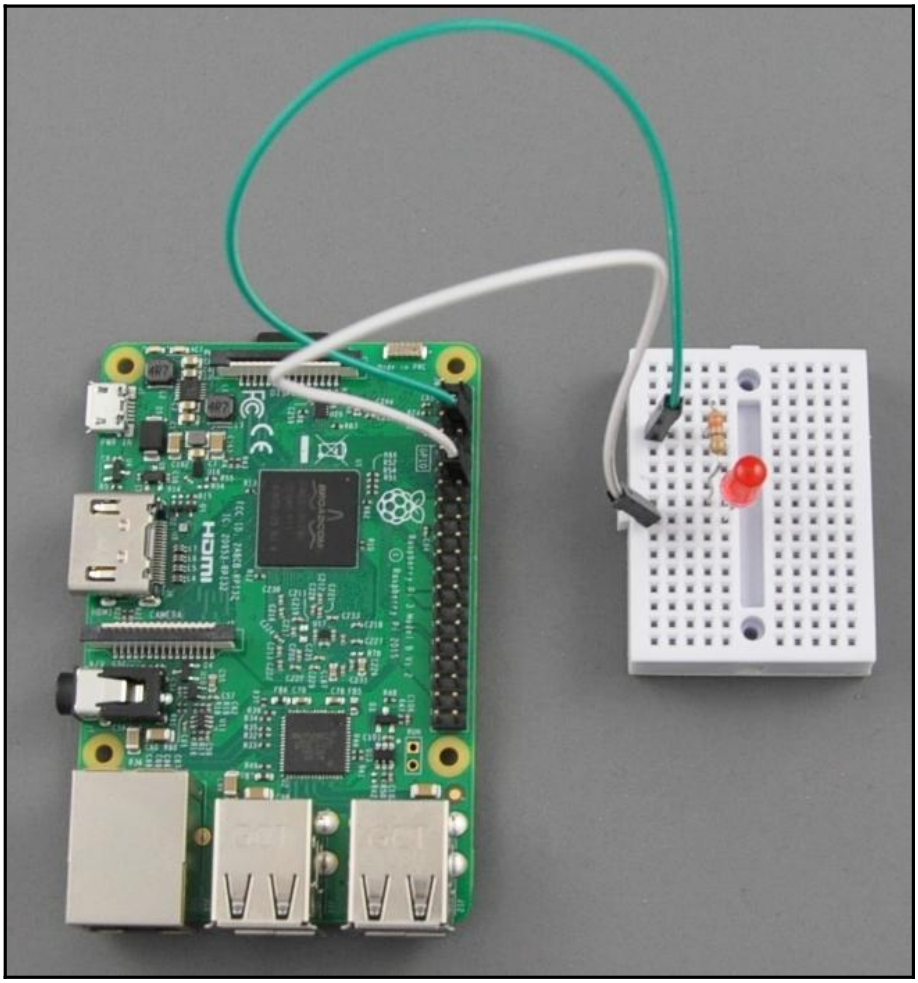



```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ sudo pip3 install pibrella
Collecting pibrella
  Downloading https://www.piwheels.org/simple/pibrella/Pibrella-1.4.0-py3-none-a
ny.whl
Requirement already satisfied: RPi.GPIO in /usr/lib/python3/dist-packages (from
pibrella)
Installing collected packages: pibrella
Successfully installed pibrella-1.4.0
pi@raspberrypi:~ $
```

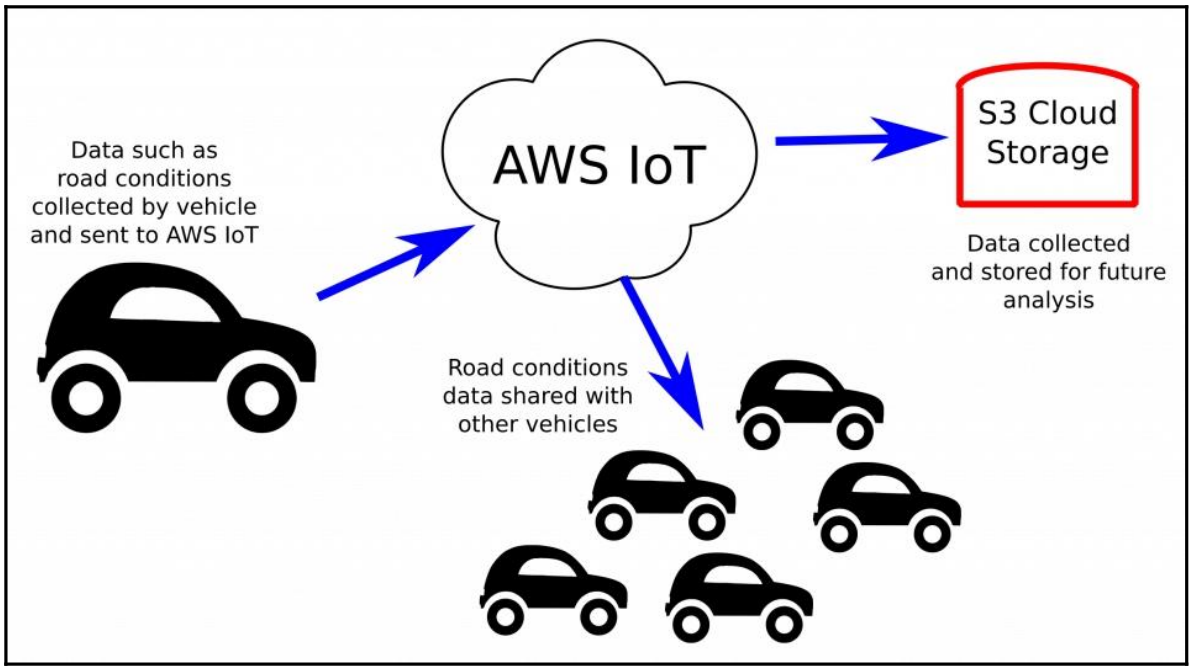

Thonny - /home/pi/...
Add / Remove Softw...
19:44
Thonny - /home/pi/pibrella-test.py @ 13 : 1
File Edit View Run Tools Help
Add / Remove Software
Options
Fritzing
Accessories
Admin tools
Communication
GNOME desktop
KDE desktop
Other desktops
Fonts
Games
Graphics
Internet
Legacy
Localisation
Multimedia
Network
Other
Programming
Publishing
System
Science
Easy-to-use electronic design software
fritzing-0.9.3b+dfsg-4
Easy-to-use electronic design software (data files)
fritzing-data-0.9.3b+dfsg-4
Easy-to-use electronic design software (parts files)
fritzing-parts-0.9.3b-1
Fritzing is an open source project designed to help one transition from a prototype to a finished project. Aimed at users who want to produce or document circuits and experiments, one starts by building a physical prototype, then recreating it with Fritzing's graphical editor. From there one can generate a schematic, PCB artwork, and PCB production files.
Download size 9.6 MB
Licence unknown
Source raspbian-stable-main
Cancel
Apply
OK

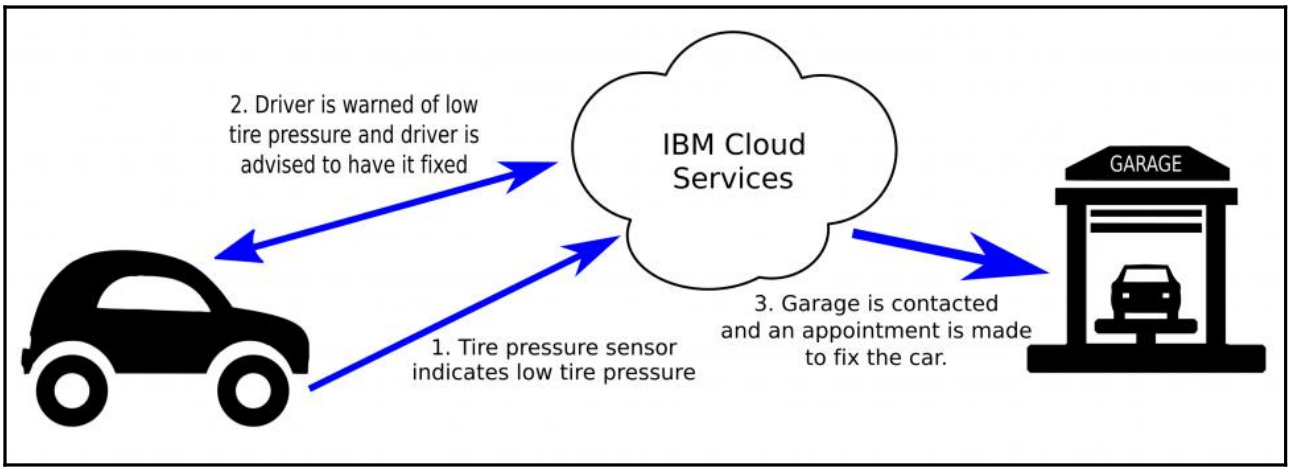

GPIO
Raspberry Pi 3 Model B v1.2
© Raspberry Pi 2015
USB 2x
USB 2x
DSI (DISPLAY)
HDMI
CSI (CAMERA)
Audio
ETHERNET
Power

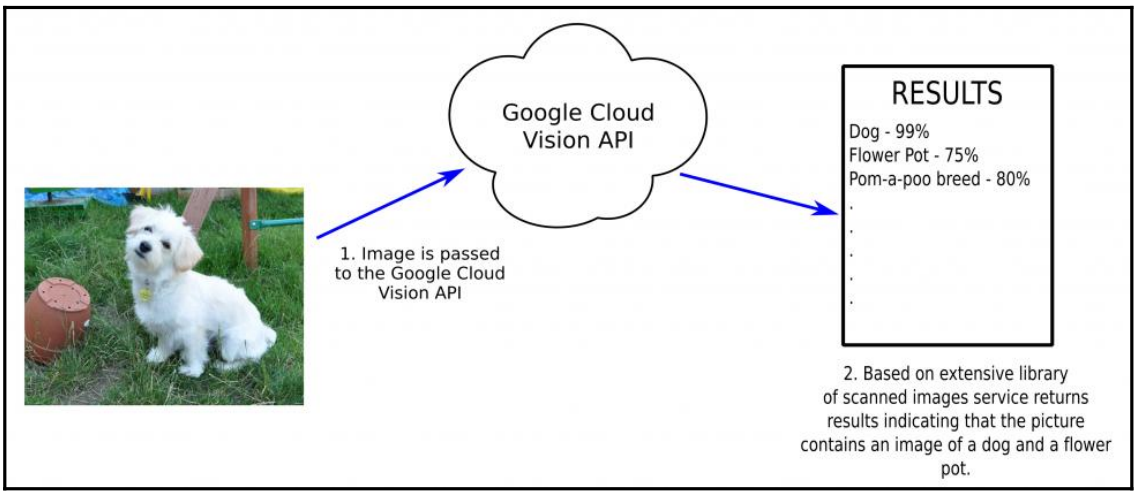


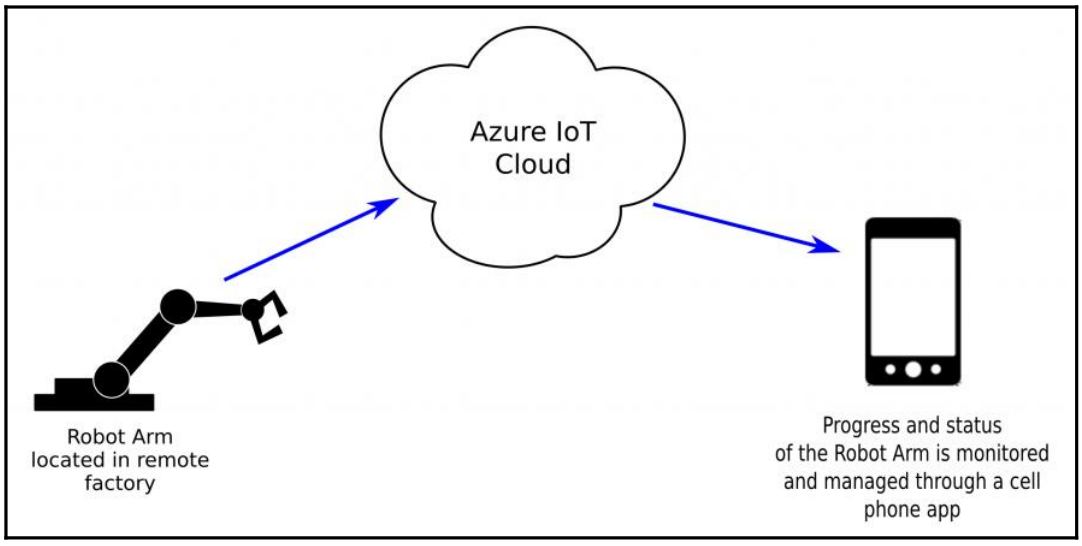


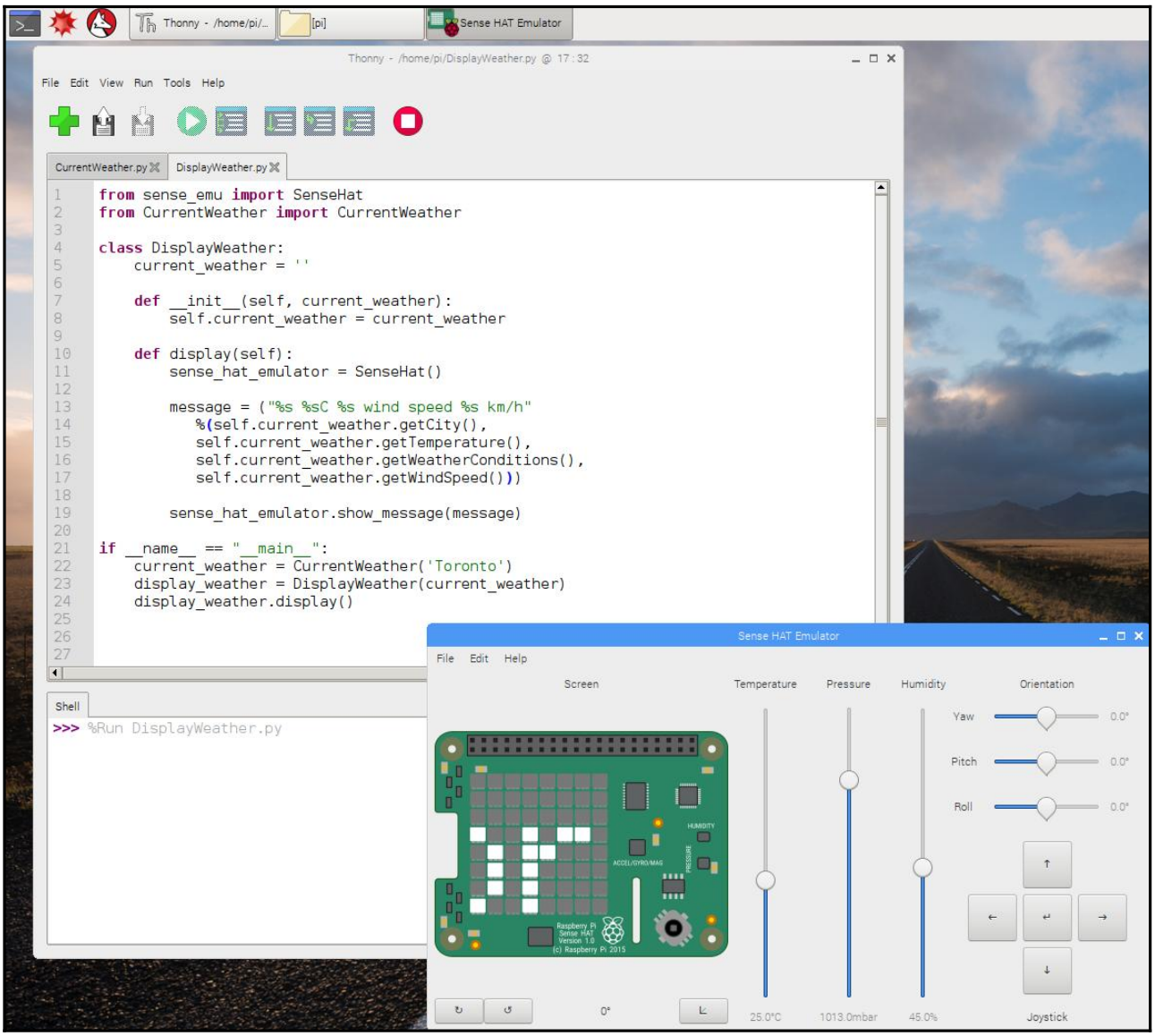
Chapter 04: Subscribing to Web Services



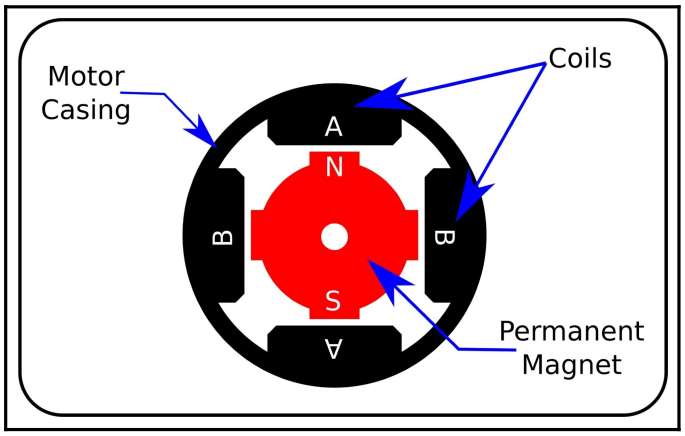


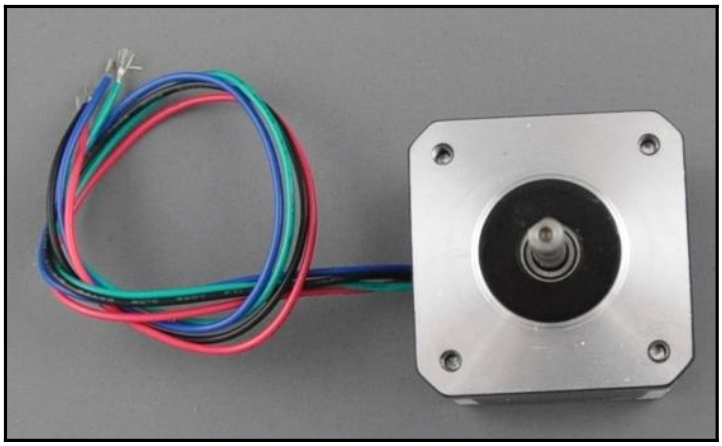

Google Cloud
Vision API
RESULTS
Dog - 99%
Flower Pot - 75%
Pom-a-poo breed - 80%
1. Image is passed
to the Google Cloud
Vision API
2. Based on extensive library
of scanned images service returns
results indicating that the picture
contains an image of a dog and a flower
pot.

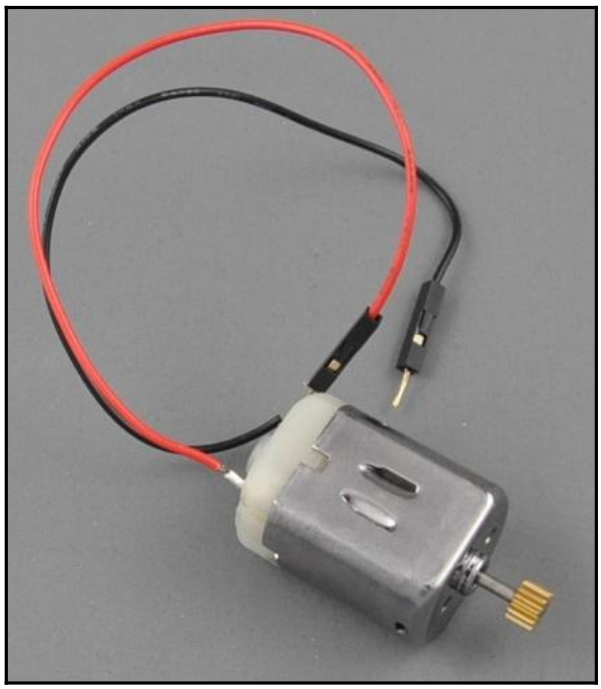

Azure IoT
Cloud
Robot Arm
located in remote
factory
Progress and status
of the Robot Arm is monitored
and managed through a cell
phone app

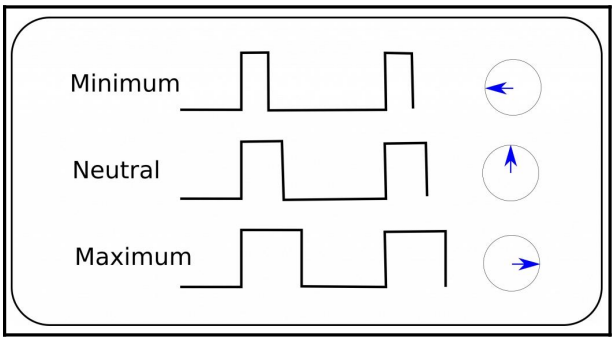

Thonny - /home/pi/...
[pi]
Sense HAT Emulator
Thonny - /home/pi/DisplayWeather.py @ 17 : 32
File Edit View Run Tools Help
CurrentWeather.py
DisplayWeather.py
from sense_emu import SenseHat
from CurrentWeather import CurrentWeather
class DisplayWeather:
current_weather = ''
def __init__(self, current_weather):
self.current_weather = current_weather
def display(self):
sense_hat_emulator = SenseHat()
message = ("%s %sC %s wind speed %s km/h"
%(self.current_weather.getCity(),
self.current_weather.getTemperature(),
self.current_weather.getWeatherConditions(),
self.current_weather.getWindSpeed()))
sense_hat_emulator.show_message(message)
if __name__ == "__main__":
current_weather = CurrentWeather('Toronto')
display_weather = DisplayWeather(current_weather)
display_weather.display()
Shell
>>> %Run DisplayWeather.py
Sense HAT Emulator
File Edit Help
Screen
Temperature
Pressure
Humidity
Orientation
Yaw
Pitch
Roll
0.0°
25.0°C
1013.0mbar
45.0%
Joystick

Chapter 05: Controlling a Servo with Python

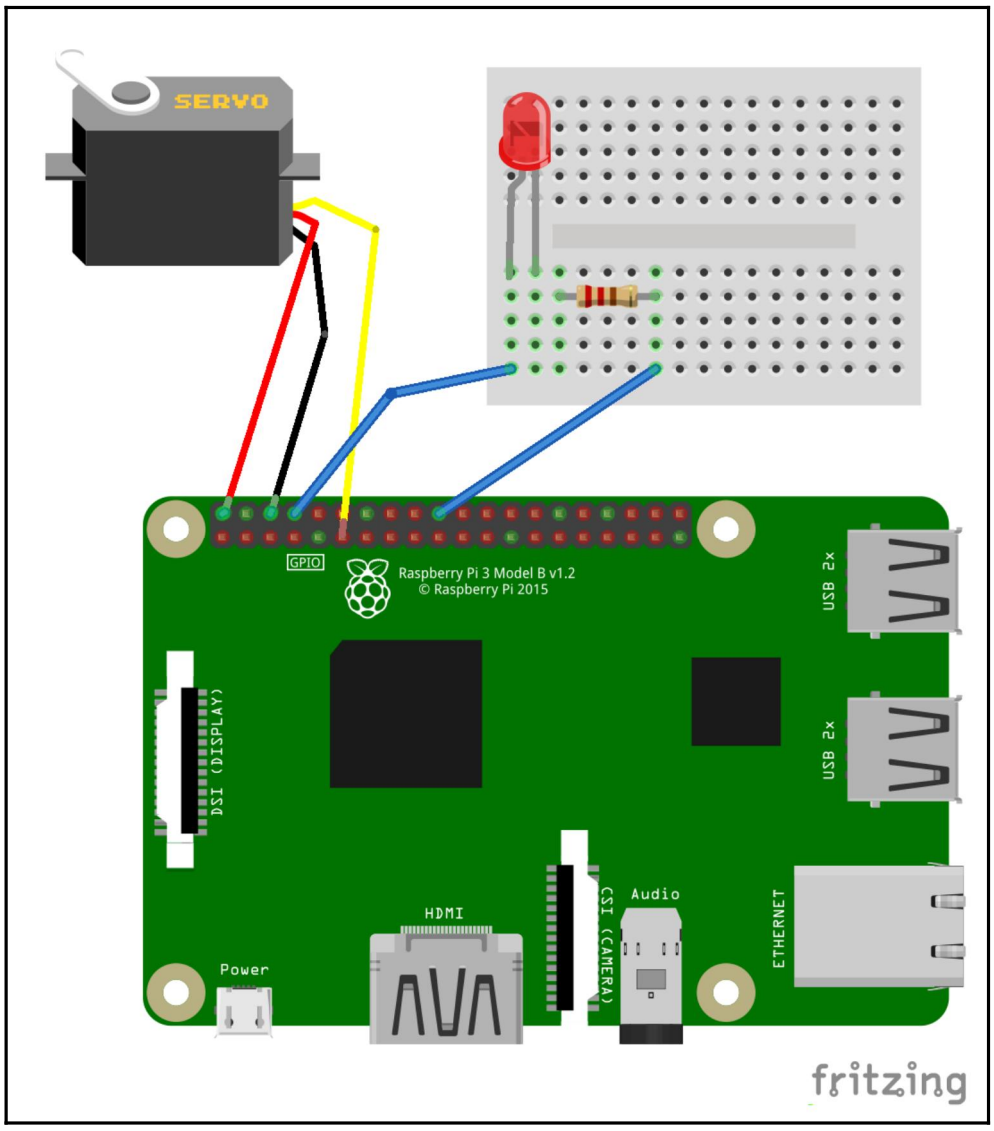


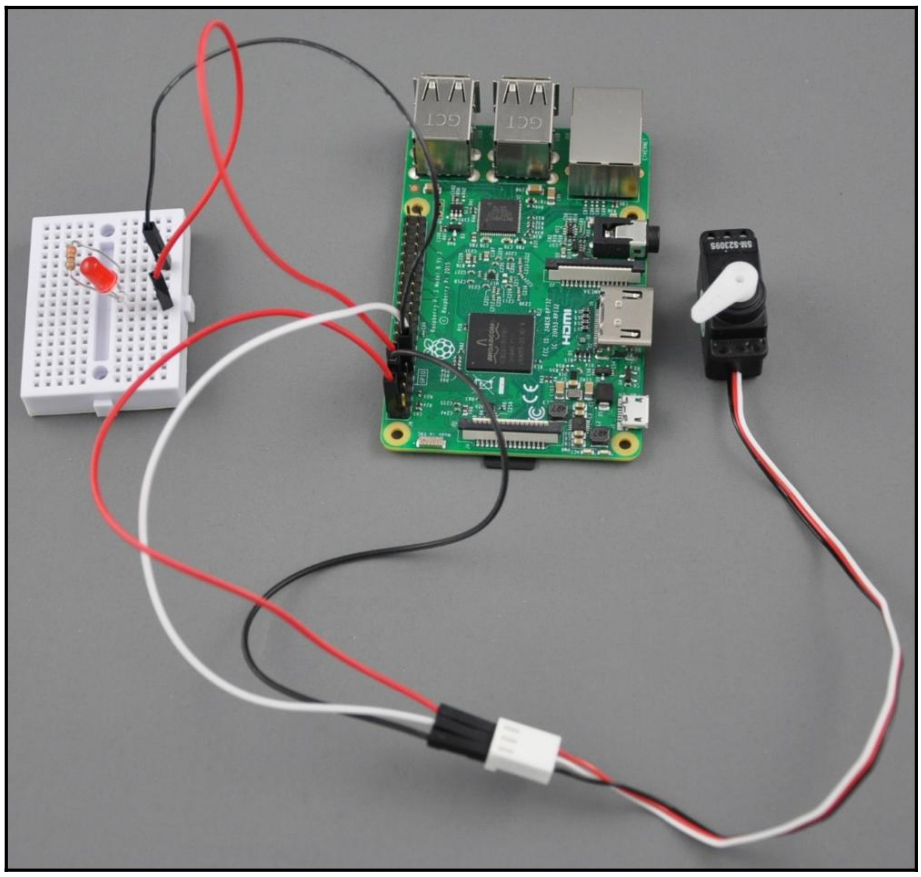


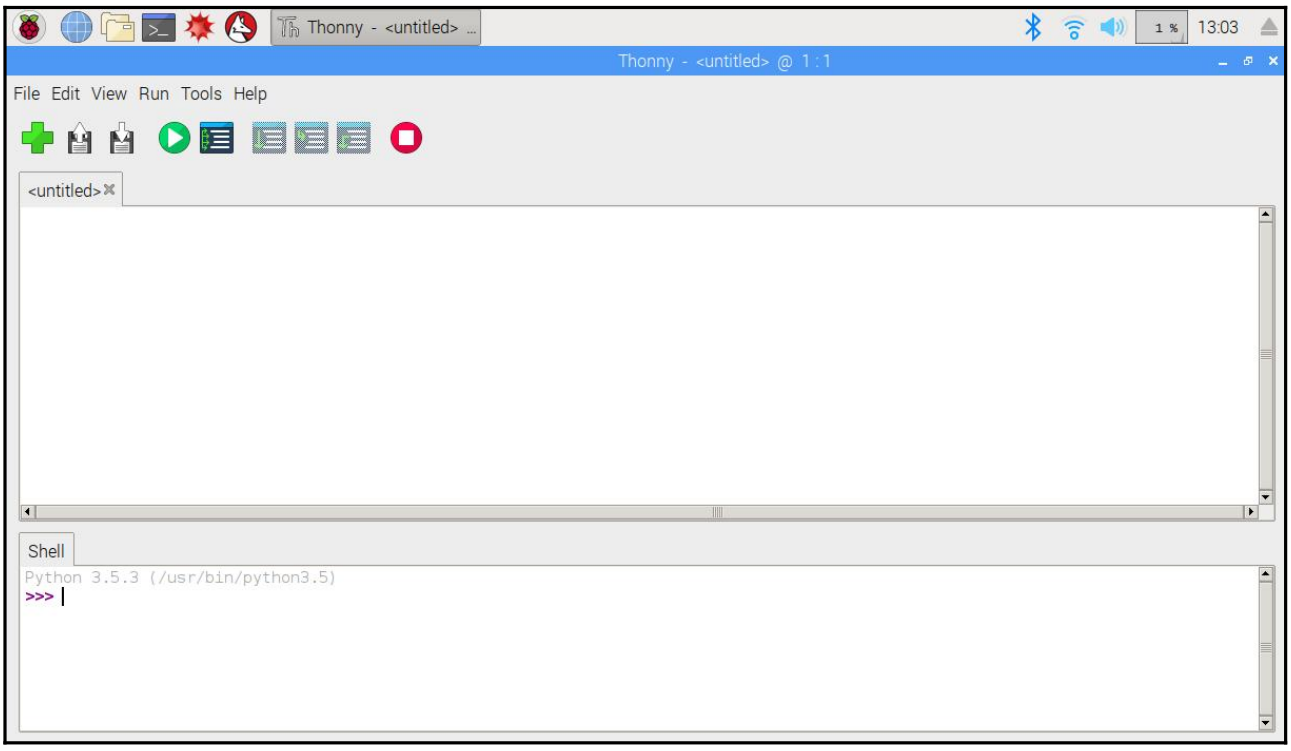




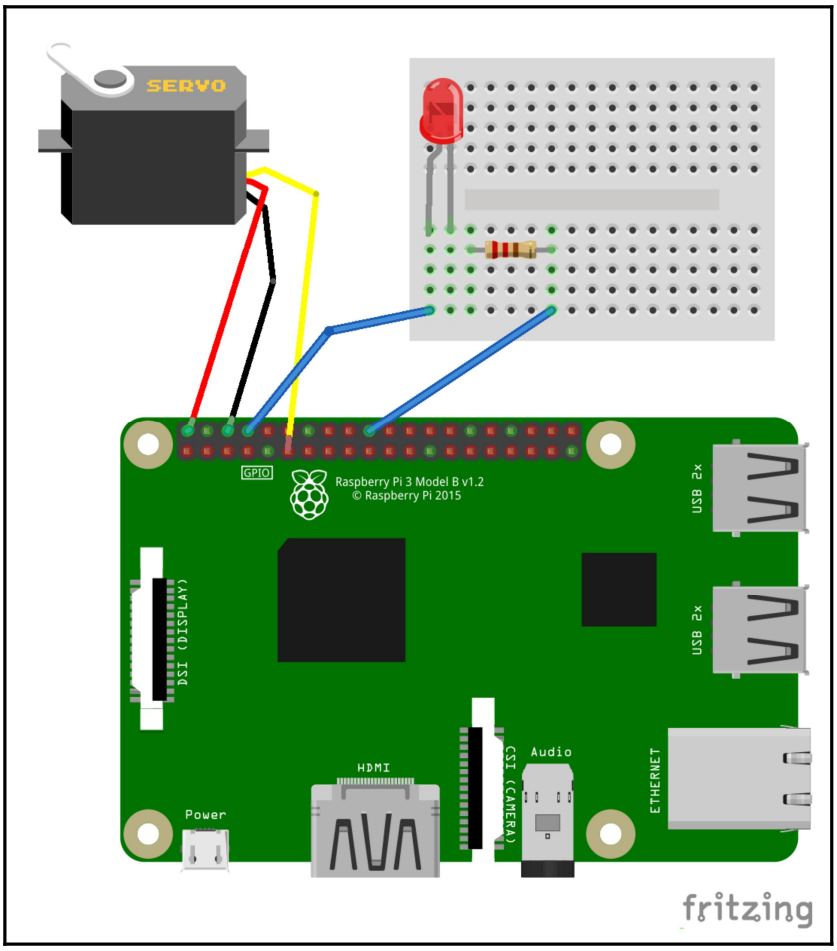
Power / Positive (+)	Signal / Data	Ground (-)
Red	Yellow	Black
Red	White	Black
Red	Orange	Black
Red	Orange	Brown
Red	Blue	Black

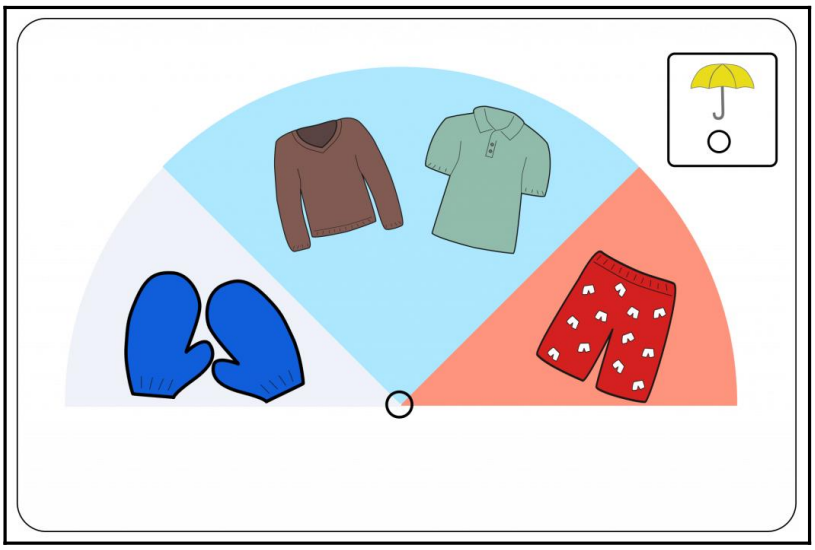

SERVO
GPIO
Raspberry Pi 3 Model B v1.2
© Raspberry Pi 2015
USB 2x
USB 2x
DSI (DISPLAY)
HDMI
CSI (CAMERA)
Audio
ETHERNET
Power
fritzing

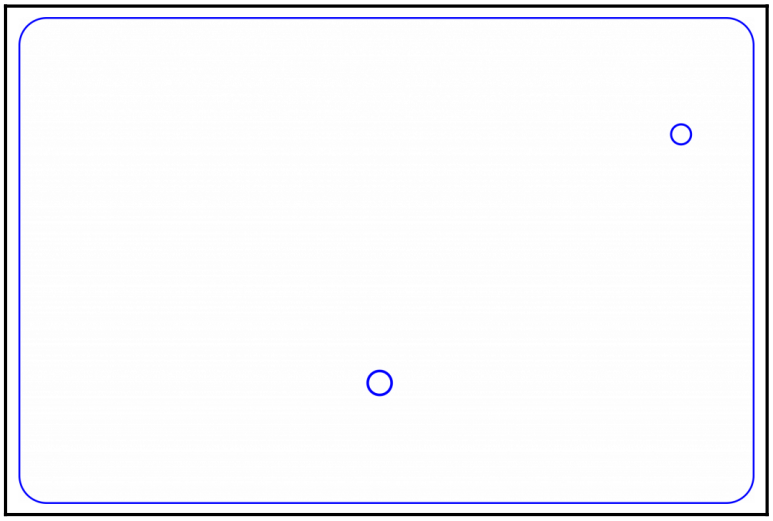


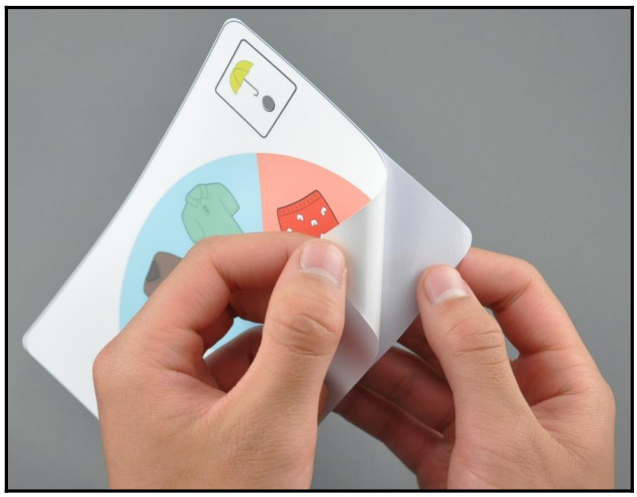

Thonny - <untitled> ...
1 %
13:03
Thonny - <untitled> @ 1 : 1
File Edit View Run Tools Help
<untitled>
Shell
Python 3.5.3 (/usr/bin/python3.5)
>>>

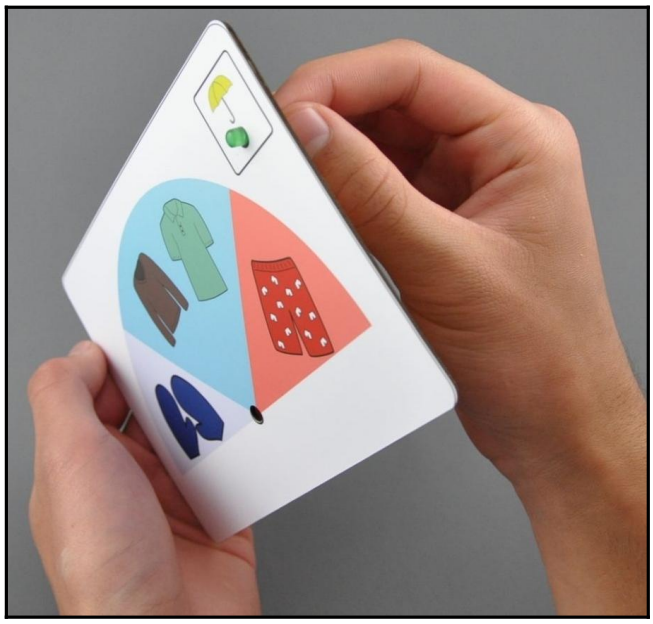
Chapter 06: Working with the Servo Control Code to Control an Analog Device

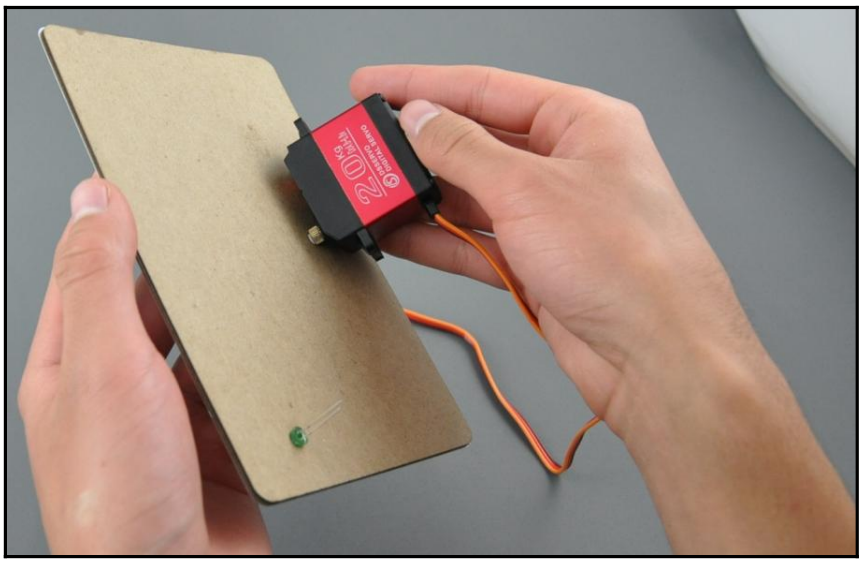


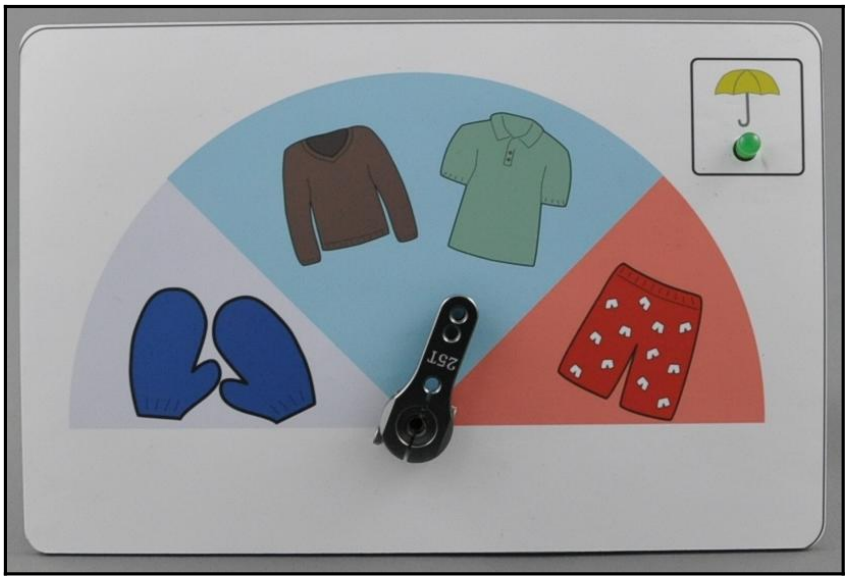




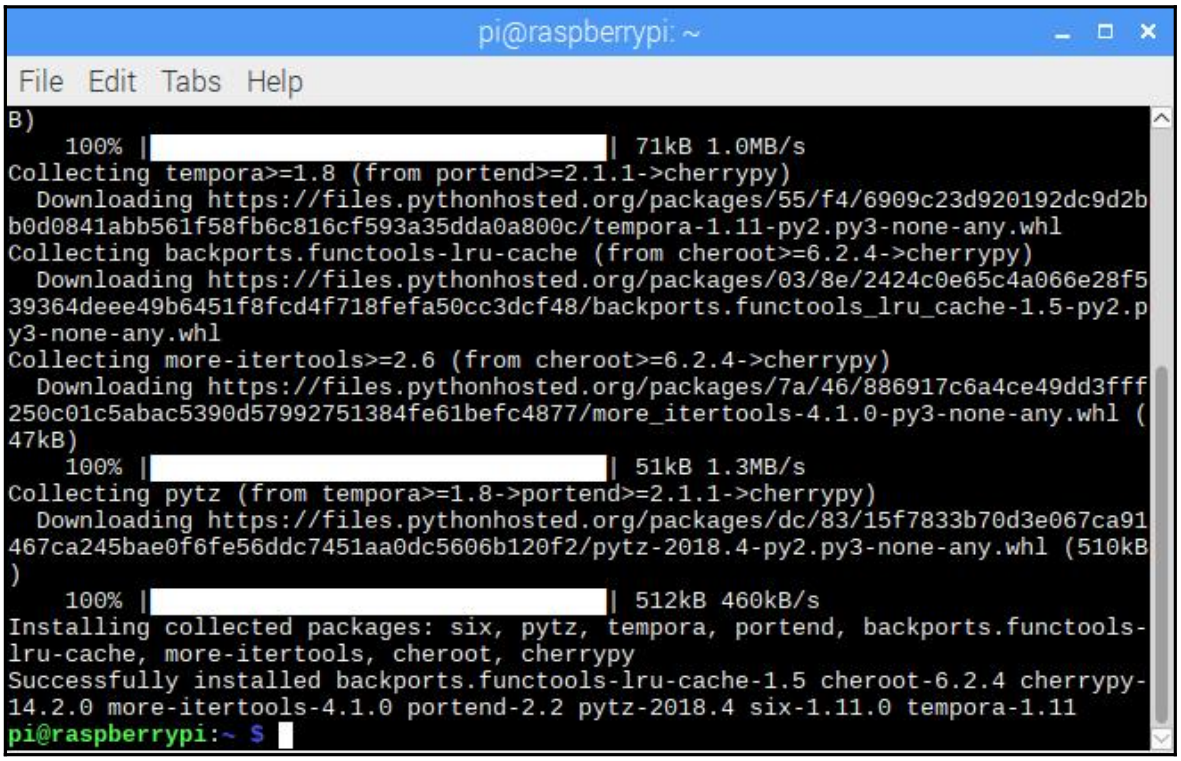


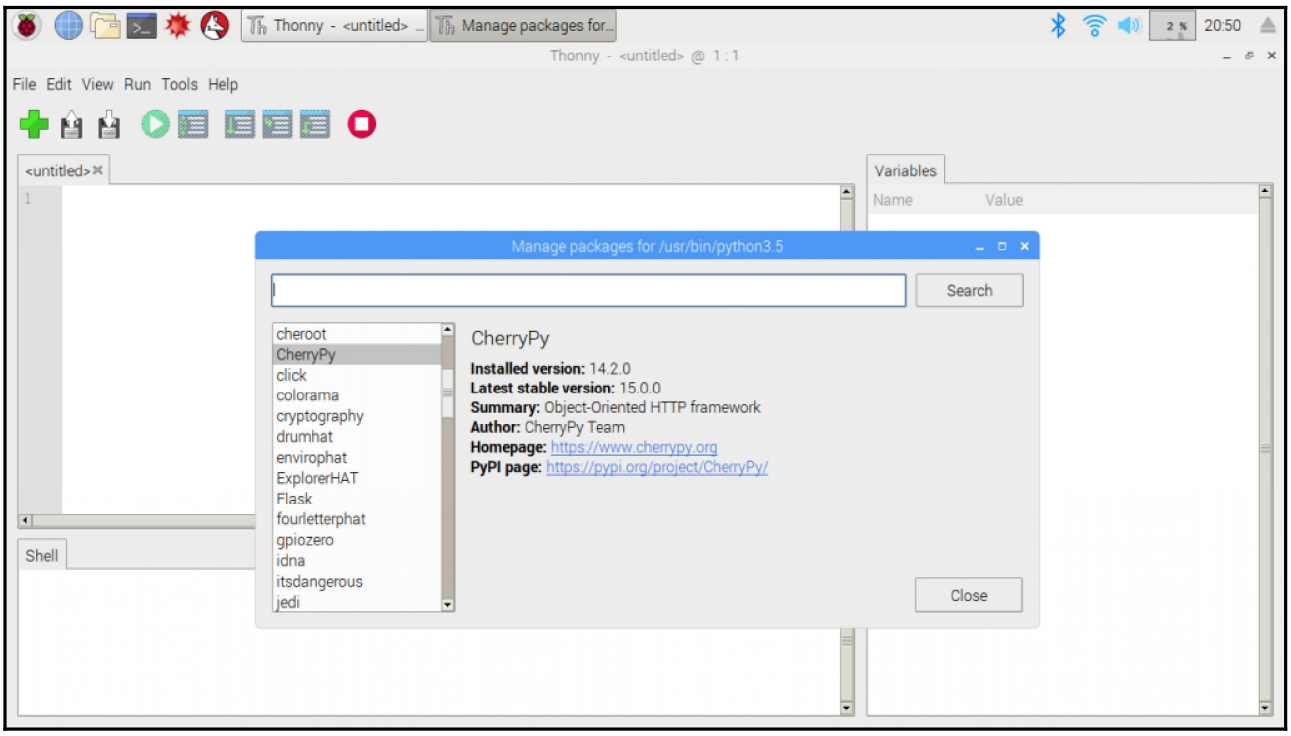


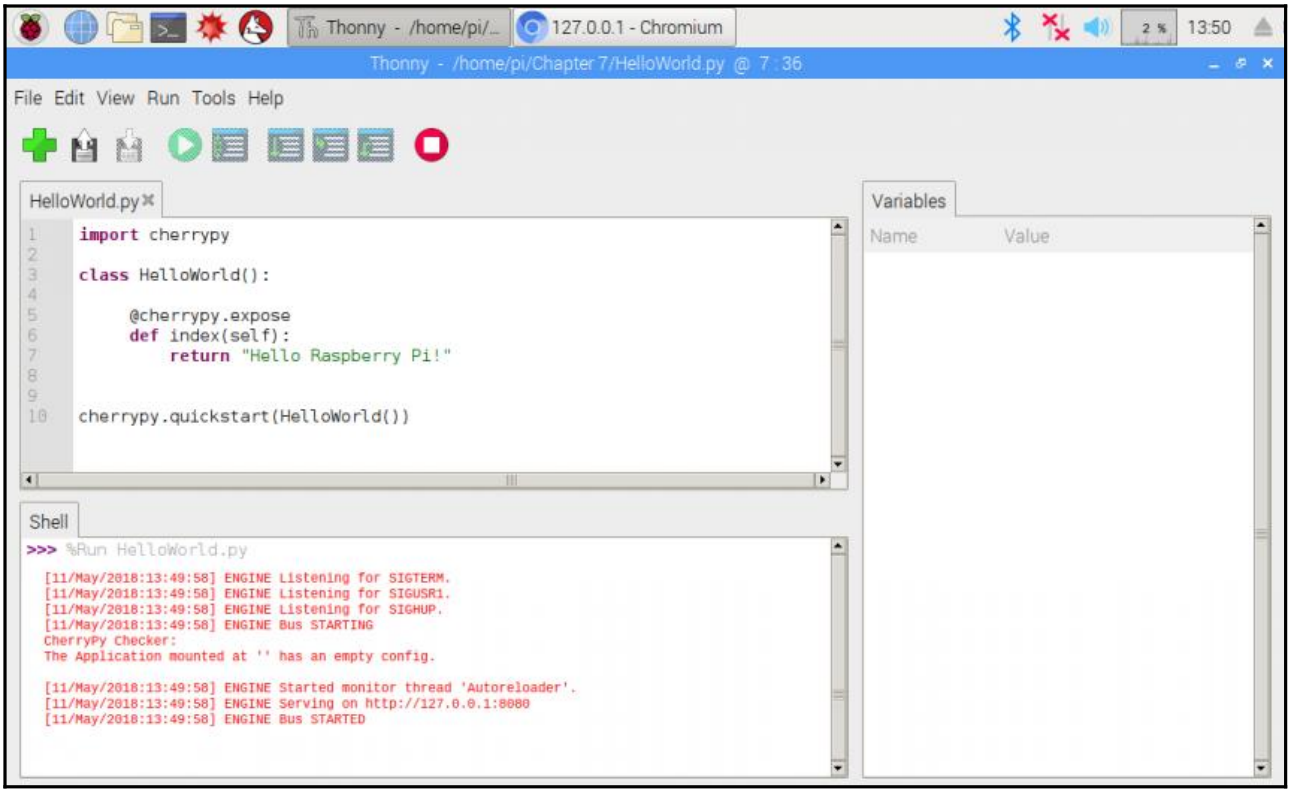


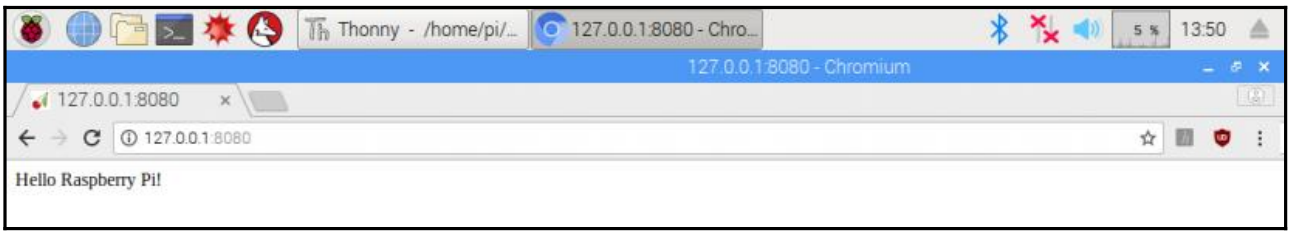

25T

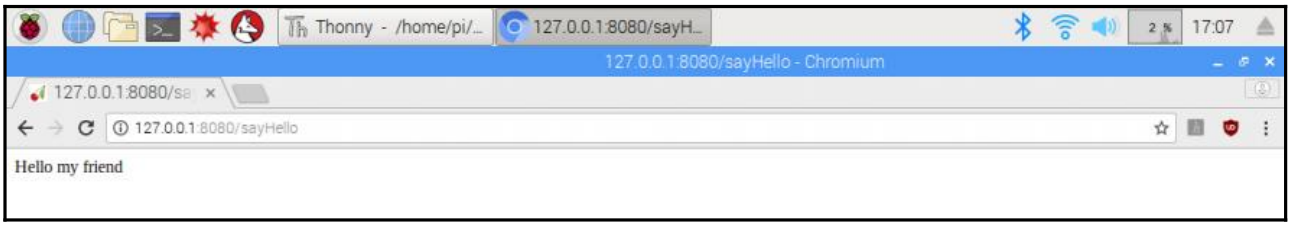
Chapter 07: Setting up a Raspberry Pi Web Server



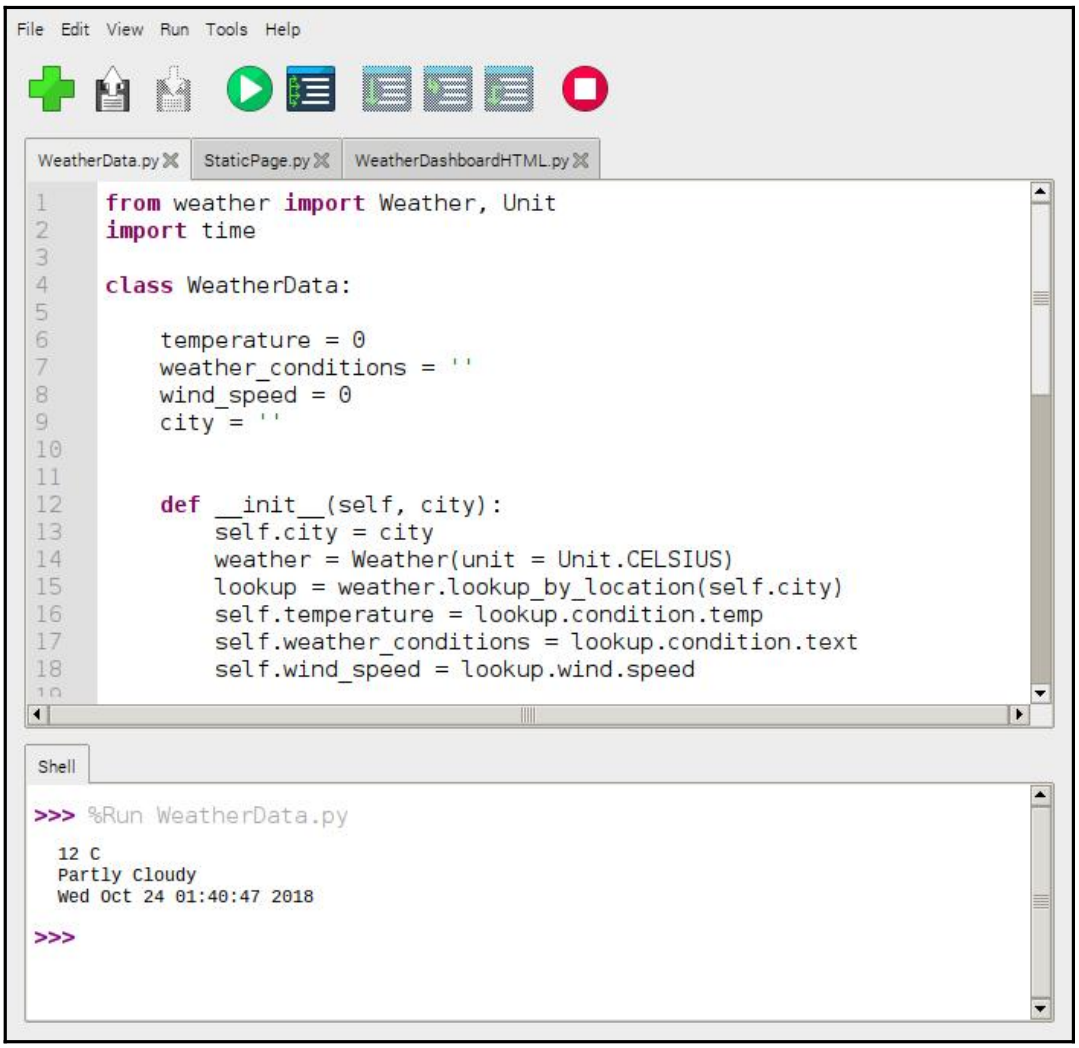

Thonny - <untitled> ...
Manage packages for...
20:50
Thonny - <untitled> @ 1 : 1
File Edit View Run Tools Help
<untitled>
Variables
Name Value
Manage packages for /usr/bin/python3.5
Search
cheroot
CherryPy
click
colorama
cryptography
drumhat
envirophat
ExplorerHAT
Flask
fourletterphat
gpiozero
idna
itsdangerous
jedi
CherryPy
Installed version: 14.2.0
Latest stable version: 15.0.0
Summary: Object-Oriented HTTP framework
Author: CherryPy Team
Homepage: https://www.cherrypy.org
PyPI page: https://pypi.org/project/CherryPy/
Close
Shell

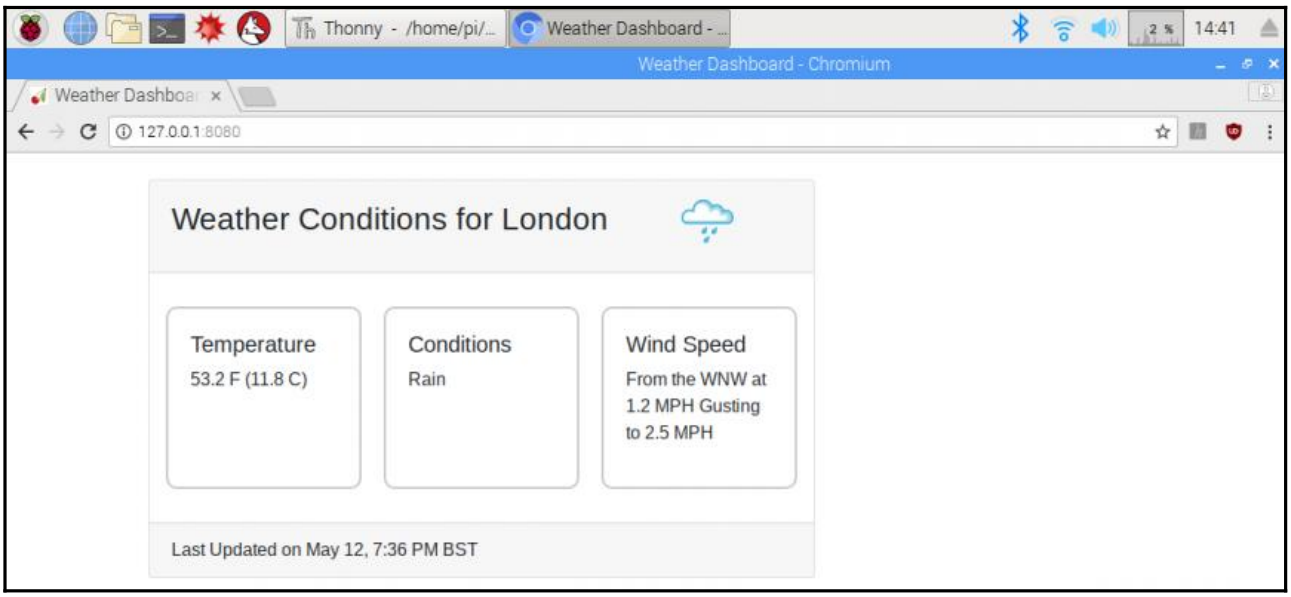

Thonny - /home/pi/...
127.0.0.1 - Chromium
13:50
Thonny - /home/pi/Chapter 7/HelloWorld.py @ 7 : 36
File Edit View Run Tools Help
HelloWorld.py
import cherrypy
class HelloWorld():
@cherrypy.expose
def index(self):
return "Hello Raspberry Pi!"
cherrypy.quickstart(HelloWorld())
Variables
Name Value
Shell
>>> %Run HelloWorld.py
[11/May/2018:13:49:58] ENGINE Listening for SIGTERM.
[11/May/2018:13:49:58] ENGINE Listening for SIGUSR1.
[11/May/2018:13:49:58] ENGINE Listening for SIGHUP.
[11/May/2018:13:49:58] ENGINE Bus STARTING
CherryPy Checker:
The Application mounted at '' has an empty config.
[11/May/2018:13:49:58] ENGINE Started monitor thread 'Autoreloader'.
[11/May/2018:13:49:58] ENGINE Serving on http://127.0.0.1:8080
[11/May/2018:13:49:58] ENGINE Bus STARTED


Thonny - /home/pi/...
127.0.0.1:8080 - Chro...
13:50
127.0.0.1:8080 - Chromium
127.0.0.1:8080
127.0.0.1:8080
Hello Raspberry Pi!

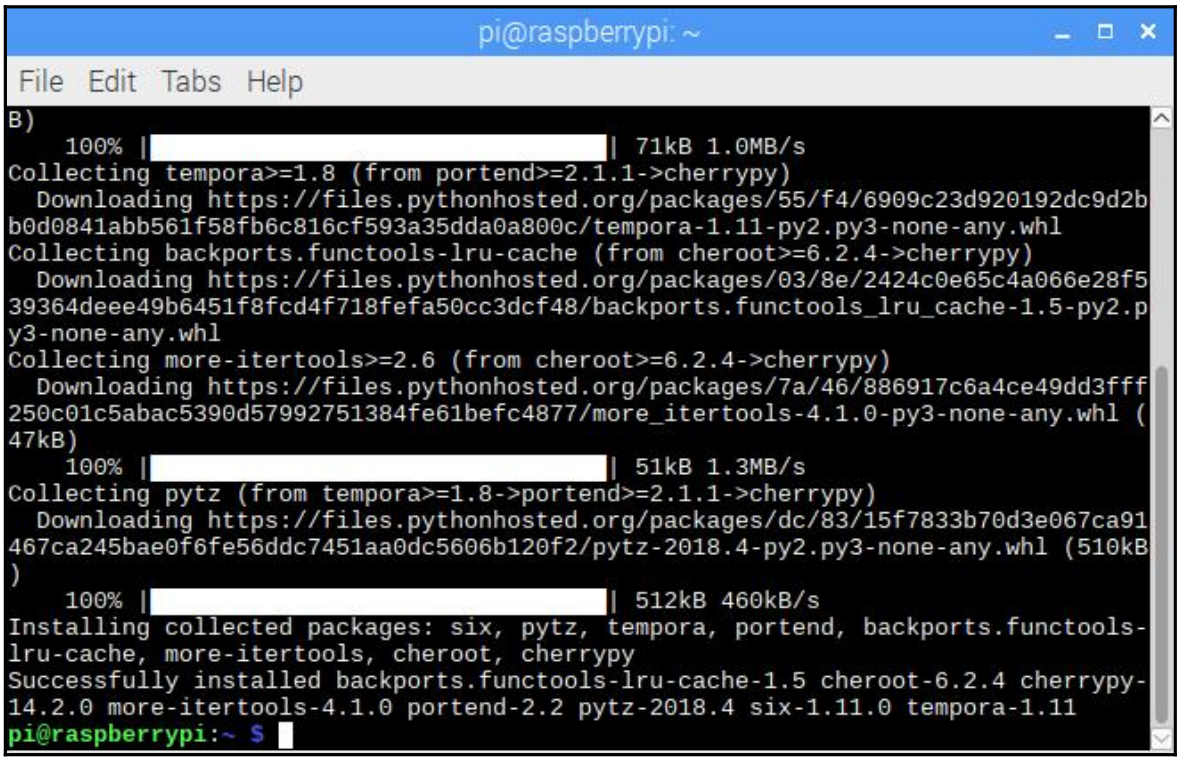

Thonny - /home/pi/...
127.0.0.1:8080/sayH...
17:07
127.0.0.1:8080/sayHello - Chromium
127.0.0.1:8080/sa
127.0.0.1:8080/sayHello
Hello my friend

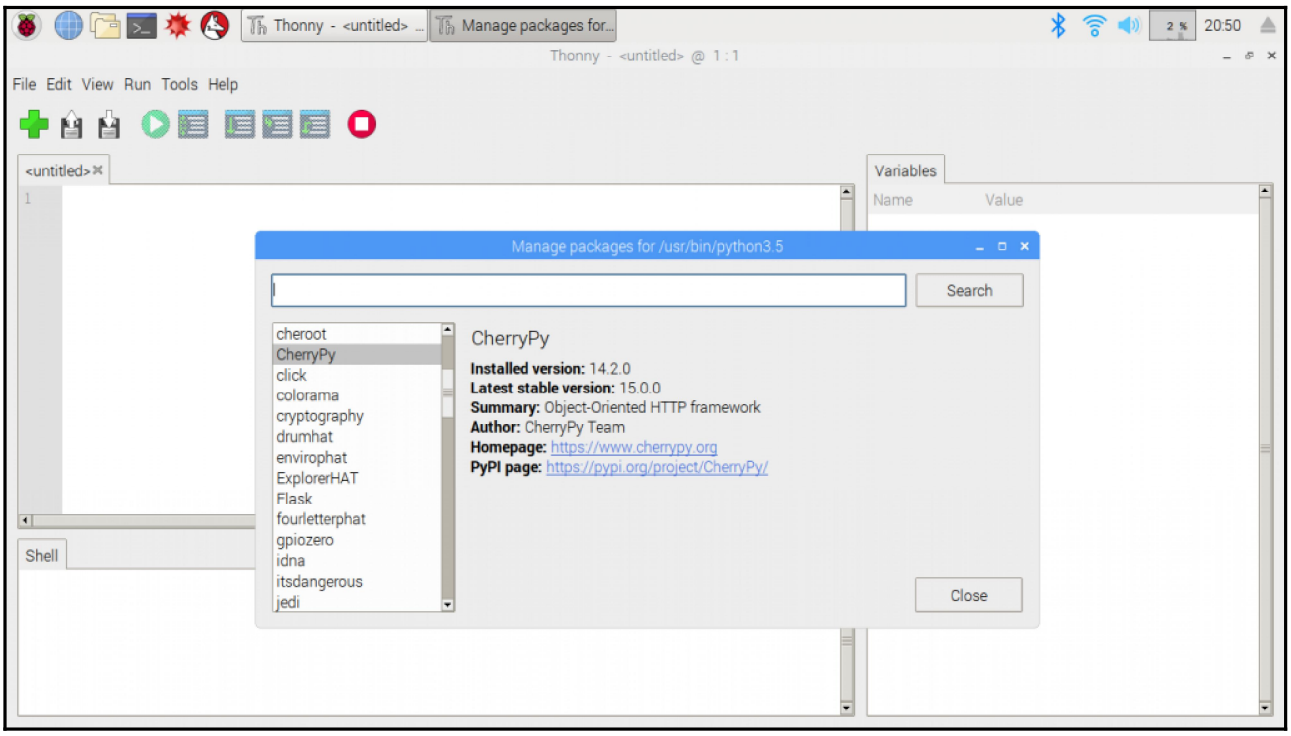

127.0.0.1:8080
127.0.0.1:8080
This is a static HTML page.

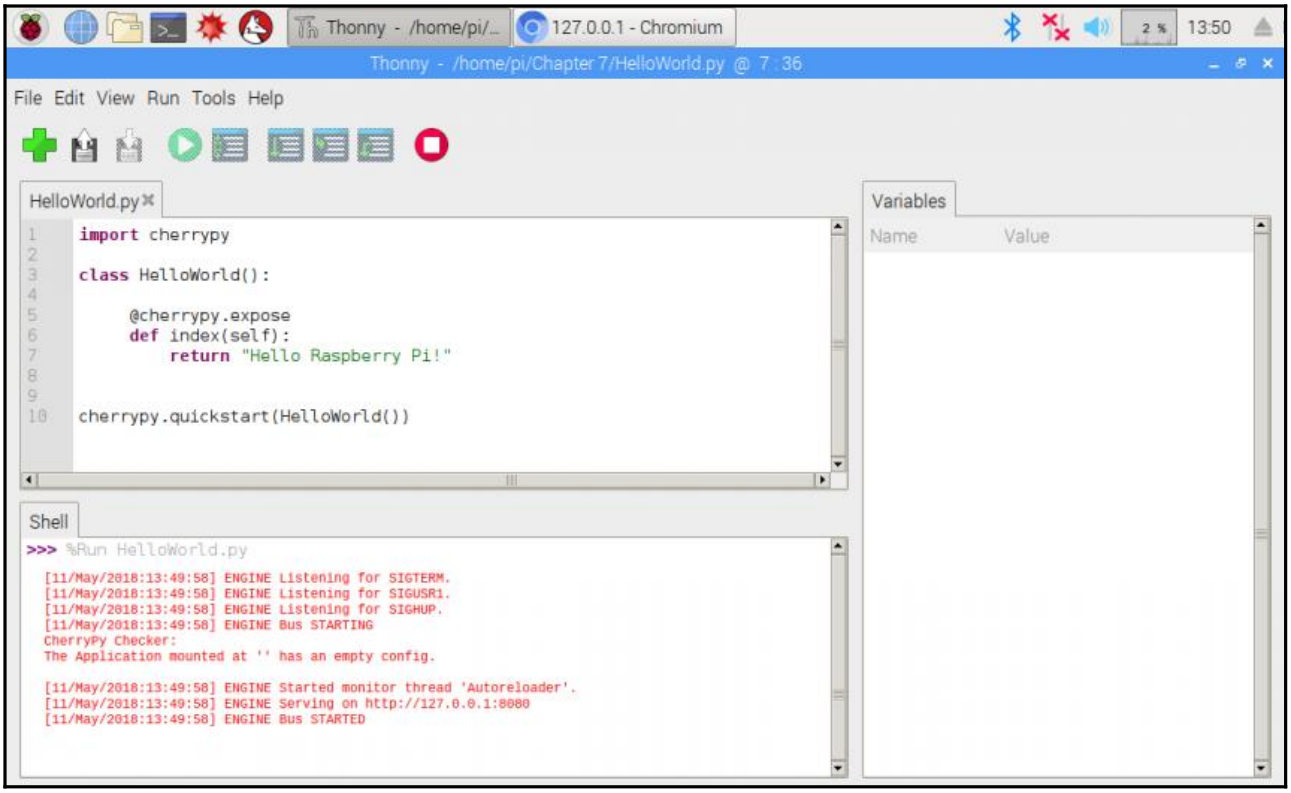

File Edit View Run Tools Help
WeatherData.py
StaticPage.py
WeatherDashboardHTML.py
1 from weather import Weather, Unit
2 import time
3
4 class WeatherData:
5
6 temperature = 0
7 weather_conditions = ''
8 wind_speed = 0
9 city = ''
10
11
12 def __init__(self, city):
13 self.city = city
14 weather = Weather(unit = Unit.CELSIUS)
15 lookup = weather.lookup_by_location(self.city)
16 self.temperature = lookup.condition.temp
17 self.weather_conditions = lookup.condition.text
18 self.wind_speed = lookup.wind.speed
Shell
>>> %Run WeatherData.py
12 C
Partly Cloudy
Wed Oct 24 01:40:47 2018
>>>

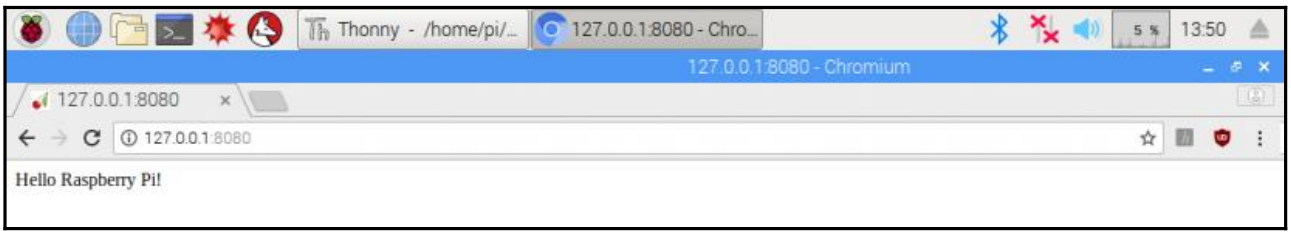

Thonny - /home/pi/...
Weather Dashboard - ...
14:41
Weather Dashboard - Chromium
Weather Dashboar
127.0.0.1:8080
Weather Conditions for London
Temperature
53.2 F (11.8 C)
Conditions
Rain
Wind Speed
From the WNW at 1.2 MPH Gusting to 2.5 MPH
Last Updated on May 12, 7:36 PM BST

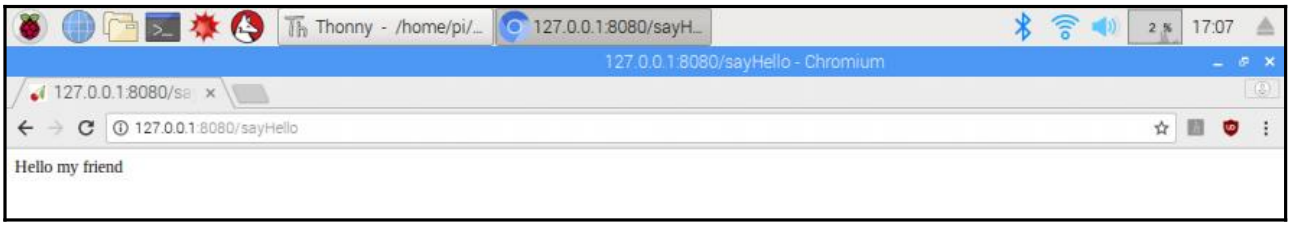
Chapter 08: Reading Raspberry Pi GPIO Sensor Data Using Python



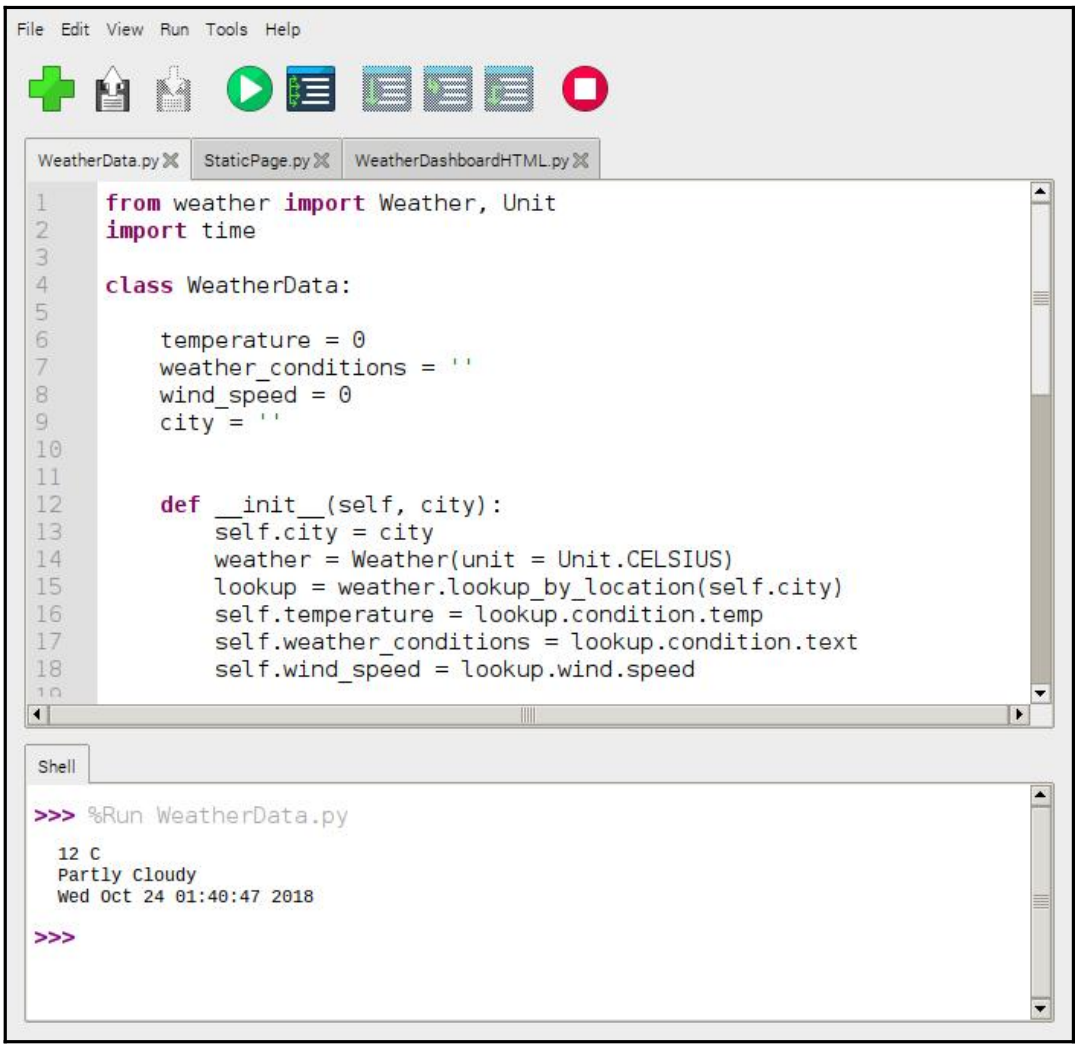

Thonny - <untitled> ...
Manage packages for...
20:50
Thonny - <untitled> @ 1 : 1
File Edit View Run Tools Help
<untitled>
Variables
Name Value
Manage packages for /usr/bin/python3.5
Search
cheroot
CherryPy
click
colorama
cryptography
drumhat
envirophat
ExplorerHAT
Flask
fourletterphat
gpiozero
idna
itsdangerous
jedi
CherryPy
Installed version: 14.2.0
Latest stable version: 15.0.0
Summary: Object-Oriented HTTP framework
Author: CherryPy Team
Homepage: https://www.cherrypy.org
PyPI page: https://pypi.org/project/CherryPy/
Close
Shell

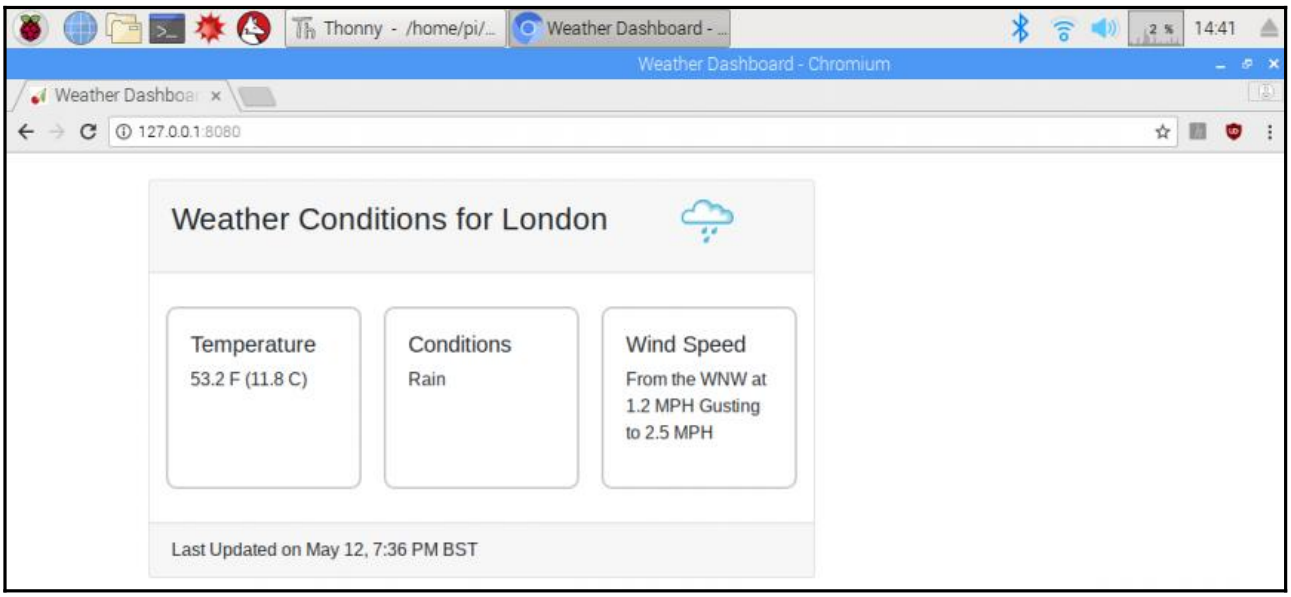

Thonny - /home/pi/...
127.0.0.1 - Chromium
13:50
Thonny - /home/pi/Chapter 7/HelloWorld.py @ 7 : 36
File Edit View Run Tools Help
HelloWorld.py
import cherrypy
class HelloWorld():
@cherrypy.expose
def index(self):
return "Hello Raspberry Pi!"
cherrypy.quickstart(HelloWorld())
Variables
Name Value
Shell
>>> %Run HelloWorld.py
[11/May/2018:13:49:58] ENGINE Listening for SIGTERM.
[11/May/2018:13:49:58] ENGINE Listening for SIGUSR1.
[11/May/2018:13:49:58] ENGINE Listening for SIGHUP.
[11/May/2018:13:49:58] ENGINE Bus STARTING
CherryPy Checker:
The Application mounted at '' has an empty config.
[11/May/2018:13:49:58] ENGINE Started monitor thread 'Autoreloader'.
[11/May/2018:13:49:58] ENGINE Serving on http://127.0.0.1:8080
[11/May/2018:13:49:58] ENGINE Bus STARTED


Thonny - /home/pi/...
127.0.0.1:8080 - Chro...
13:50
127.0.0.1:8080 - Chromium
127.0.0.1:8080
127.0.0.1:8080
Hello Raspberry Pi!

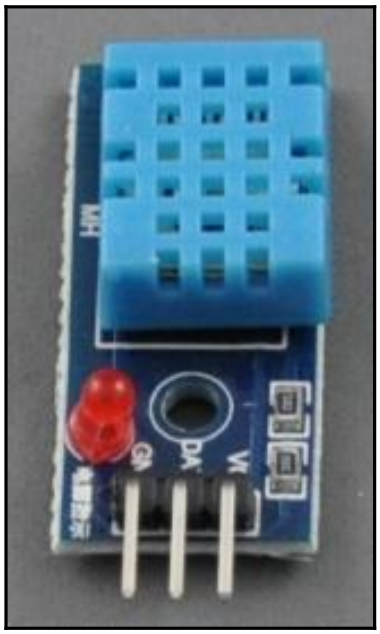

Thonny - /home/pi/...
127.0.0.1:8080/sayH...
17:07
127.0.0.1:8080/sayHello - Chromium
127.0.0.1:8080/sa
127.0.0.1:8080/sayHello
Hello my friend


127.0.0.1:8080
127.0.0.1:8080
This is a static HTML page.

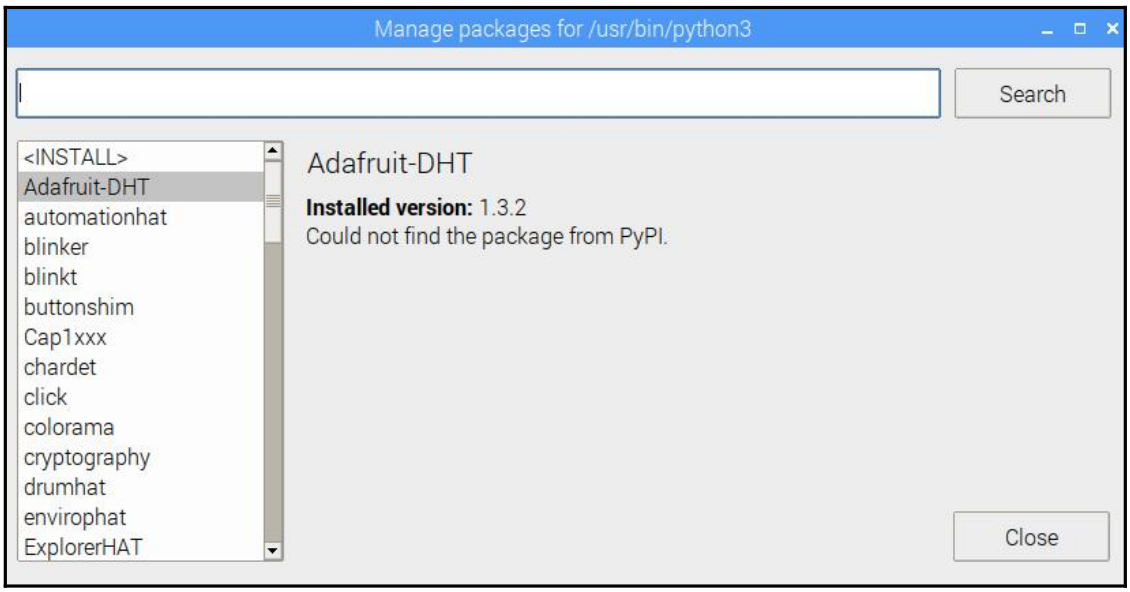

File Edit View Run Tools Help
WeatherData.py
StaticPage.py
WeatherDashboardHTML.py
from weather import Weather, Unit
import time
class WeatherData:
temperature = 0
weather_conditions = ''
wind_speed = 0
city = ''
def __init__(self, city):
self.city = city
weather = Weather(unit = Unit.CELSIUS)
lookup = weather.lookup_by_location(self.city)
self.temperature = lookup.condition.temp
self.weather_conditions = lookup.condition.text
self.wind_speed = lookup.wind.speed
Shell
>>> %Run WeatherData.py
12 C
Partly Cloudy
Wed Oct 24 01:40:47 2018
>>>

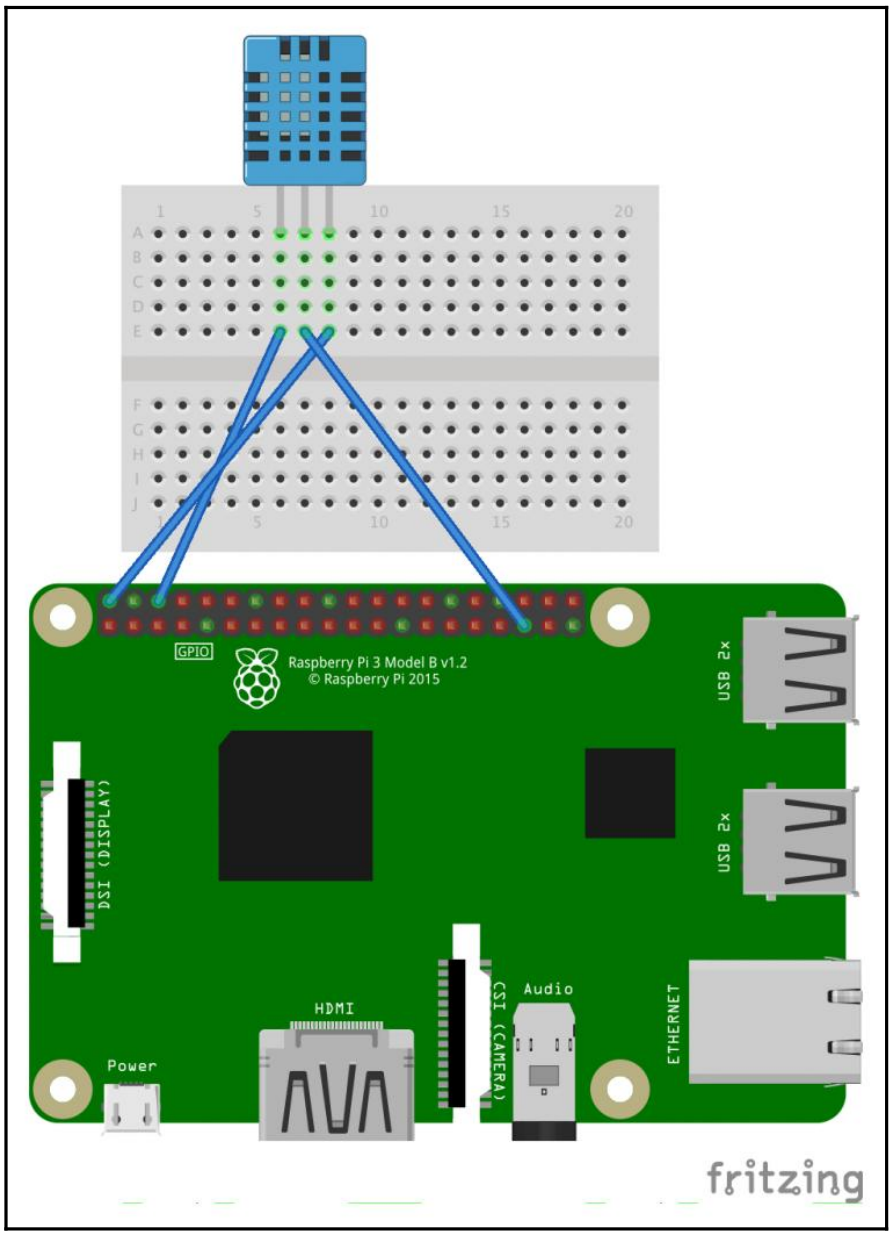

Thonny - /home/pi/...
Weather Dashboard - ...
14:41
Weather Dashboard - Chromium
Weather Dashboar
127.0.0.1:8080
Weather Conditions for London
Temperature
53.2 F (11.8 C)
Conditions
Rain
Wind Speed
From the WNW at 1.2 MPH Gusting to 2.5 MPH
Last Updated on May 12, 7:36 PM BST

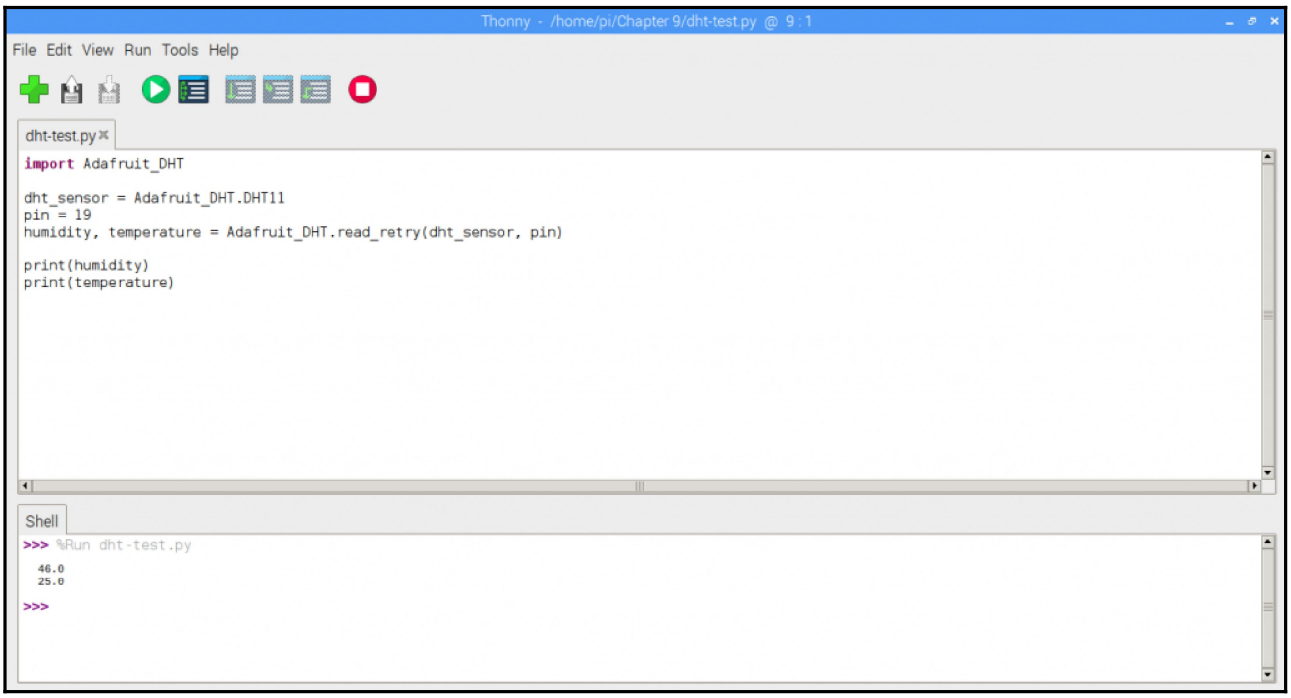
Chapter 09: Building a Home Security Dashboard

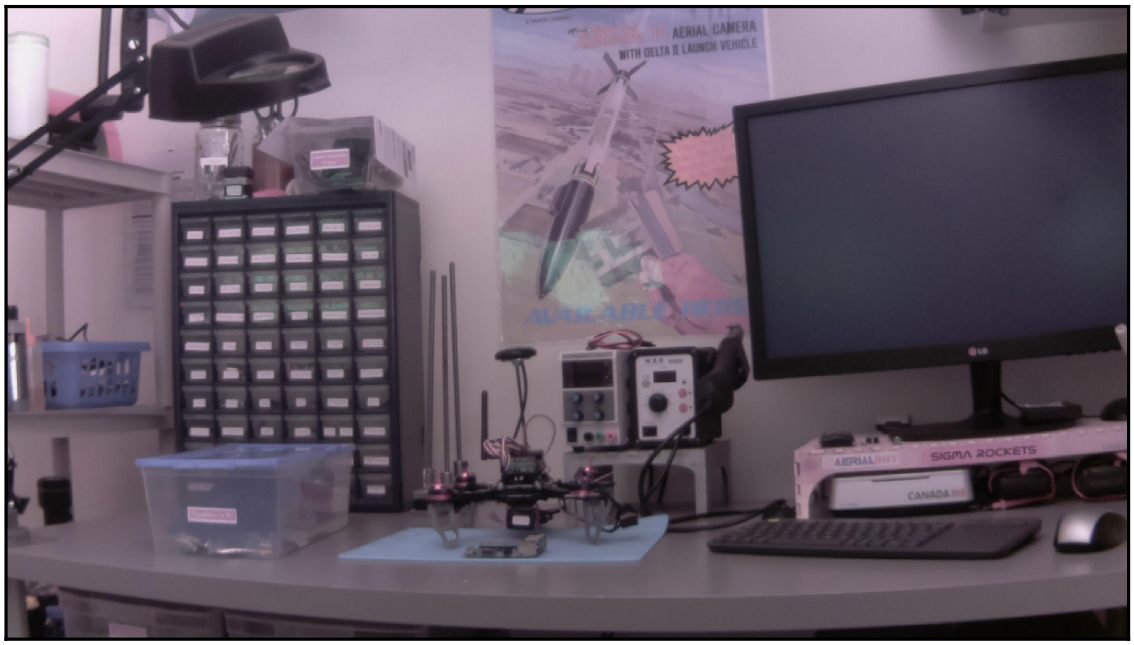


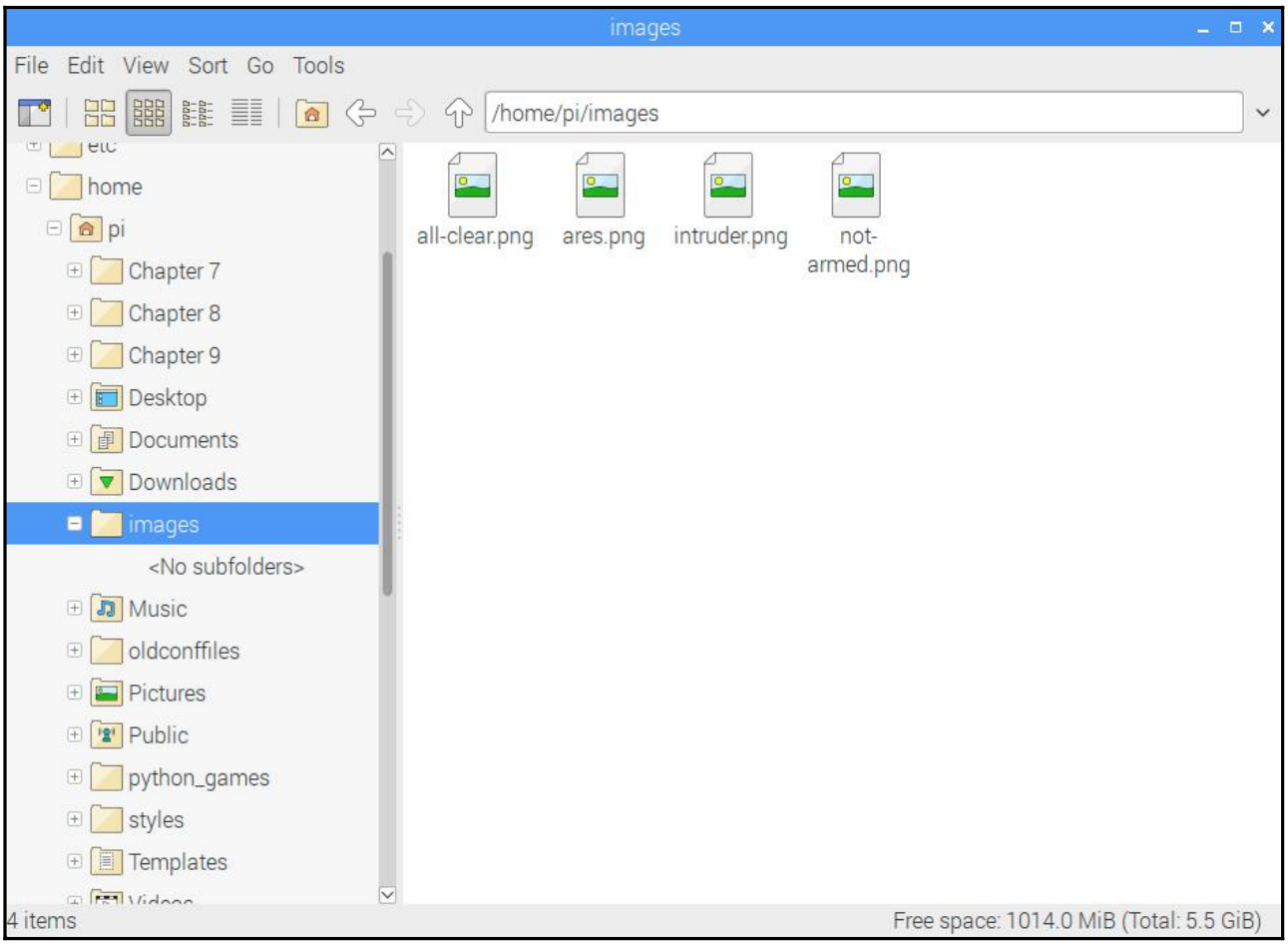
```
pi@raspberrypi: ~/Adafruit_Python_DHT
File  Edit  Tabs  Help
pi@raspberrypi:~ $ cd Adafruit_Python_DHT/
pi@raspberrypi:~/Adafruit_Python_DHT $ ls
Adafruit_DHT          build  examples     ez_setup.pyc  README.md  source
Adafruit_DHT.egg-info  dist   ez_setup.py  LICENSE       setup.py
pi@raspberrypi:~/Adafruit_Python_DHT $ sudo python3 setup.py install
running install
running bdist_egg
running egg_info
writing dependency_links to Adafruit_DHT.egg-info/dependency_links.txt
writing top-level names to Adafruit_DHT.egg-info/top_level.txt
writing Adafruit_DHT.egg-info/PKG-INFO
reading manifest file 'Adafruit_DHT.egg-info/SOURCES.txt'
writing manifest file 'Adafruit_DHT.egg-info/SOURCES.txt'
installing library code to build/bdist.linux-armv7l/egg
running install_lib
running build_py
creating build/lib.linux-armv7l-3.5
creating build/lib.linux-armv7l-3.5/Adafruit_DHT
copying Adafruit_DHT/common.py -> build/lib.linux-armv7l-3.5/Adafruit_DHT
copying Adafruit_DHT/Beaglebone_Black.py -> build/lib.linux-armv7l-3.5/Adafruit_
DHT
copying Adafruit_DHT/platform_detect.py -> build/lib.linux-armv7l-3.5/Adafruit_D
HT
copying Adafruit_DHT/Test.py -> build/lib.linux-armv7l-3.5/Adafruit_DHT
```

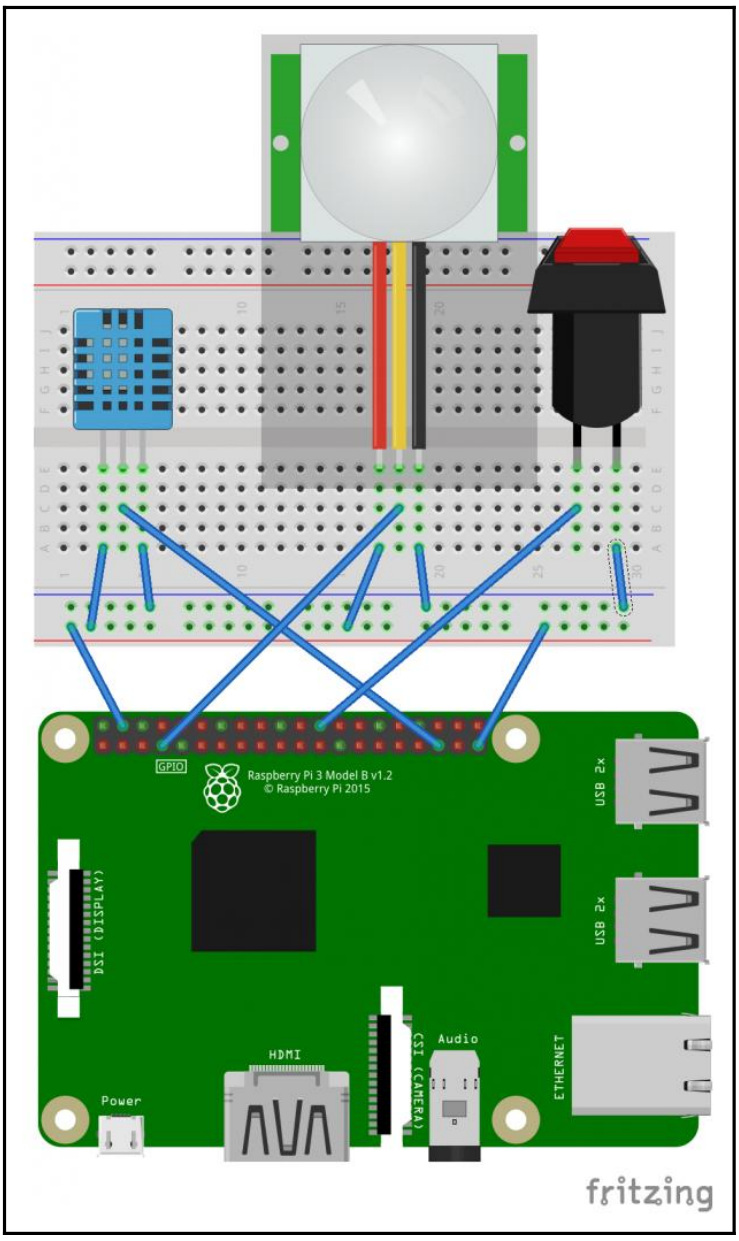

Manage packages for /usr/bin/python3
Search
<INSTALL>
Adafruit-DHT
automationhat
blinker
blinkt
buttonshim
Cap1xxx
chardet
click
colorama
cryptography
drumhat
envirophat
ExplorerHAT
Adafruit-DHT
Installed version: 1.3.2
Could not find the package from PyPI.
Close

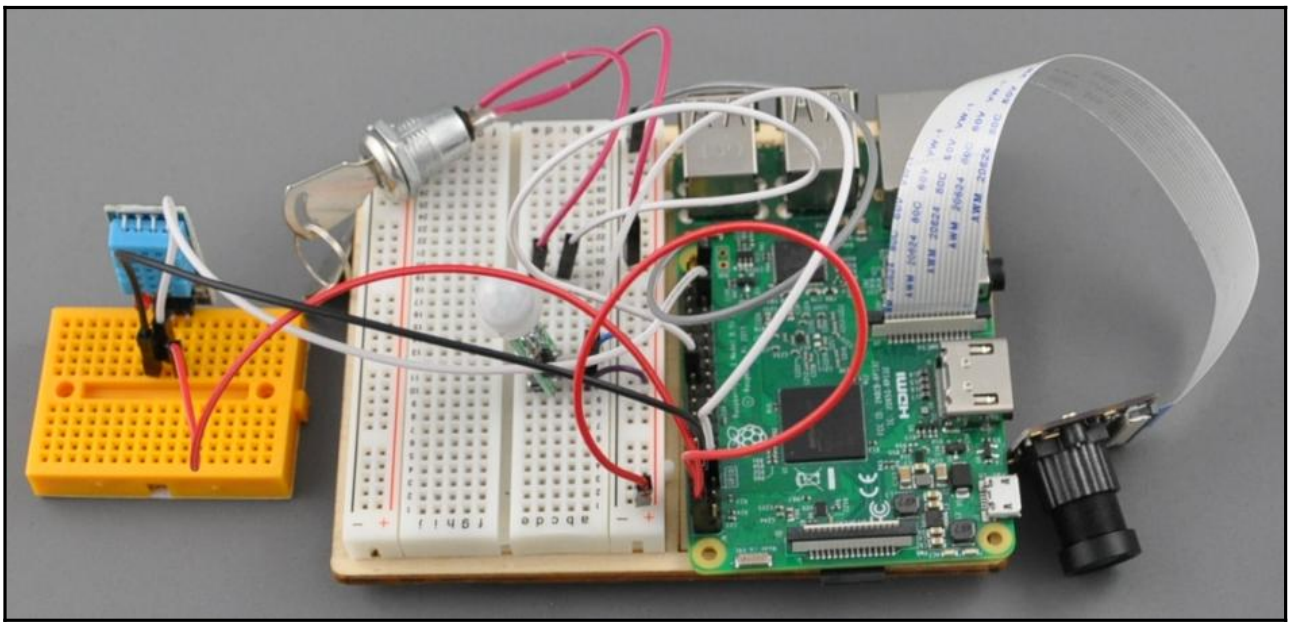

GPIO
Raspberry Pi 3 Model B v1.2
© Raspberry Pi 2015
USB 2x
USB 2x
DSI (DISPLAY)
HDMI
CSI (CAMERA)
Audio
ETHERNET
Power
fritzing


Thonny - /home/pi/Chapter 9/dht-test.py @ 9 : 1
File Edit View Run Tools Help
dht-test.py
import Adafruit_DHT
dht_sensor = Adafruit_DHT.DHT11
pin = 19
humidity, temperature = Adafruit_DHT.read_retry(dht_sensor, pin)
print(humidity)
print(temperature)
Shell
>>> %Run dht-test.py
46.0
25.0
>>>


AERIAL CAMERA
WITH DELTA II LAUNCH VEHICLE
SIGMA ROCKETS

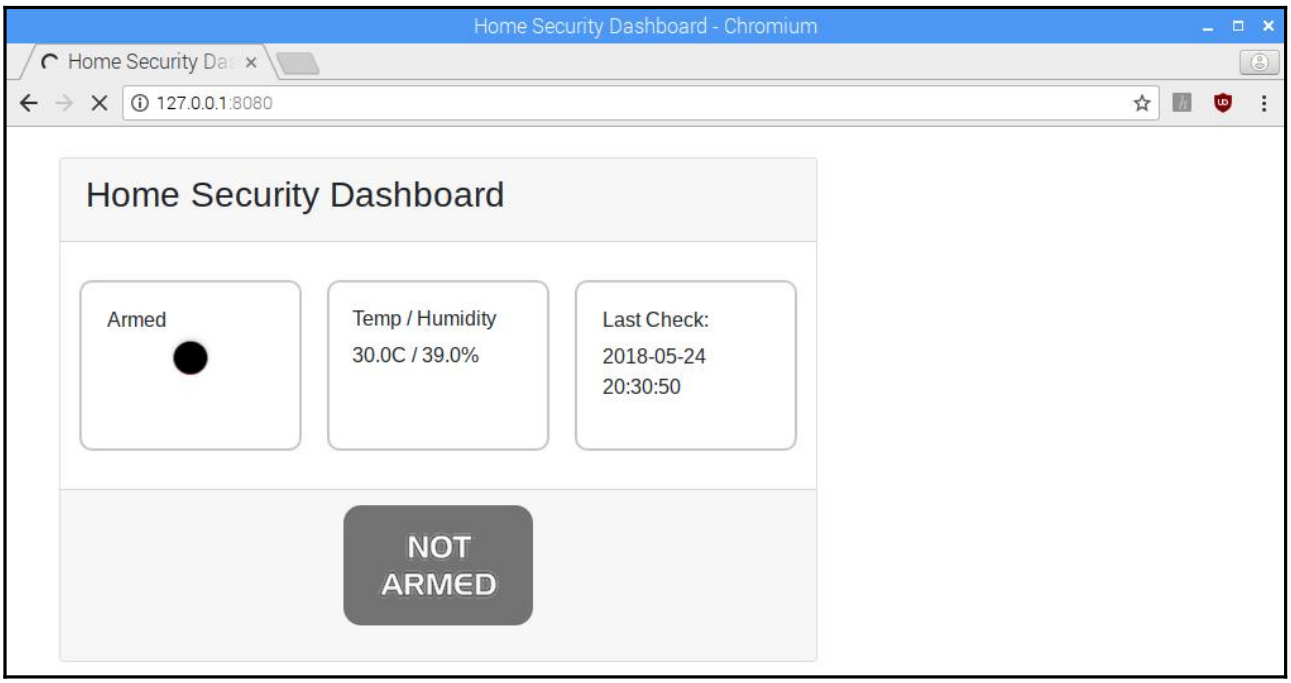

images
File Edit View Sort Go Tools
/home/pi/images
home
pi
Chapter 7
Chapter 8
Chapter 9
Desktop
Documents
Downloads
images
<No subfolders>
Music
oldconffiles
Pictures
Public
python_games
styles
Templates
all-clear.png
ares.png
intruder.png
not-armed.png
4 items
Free space: 1014.0 MiB (Total: 5.5 GiB)

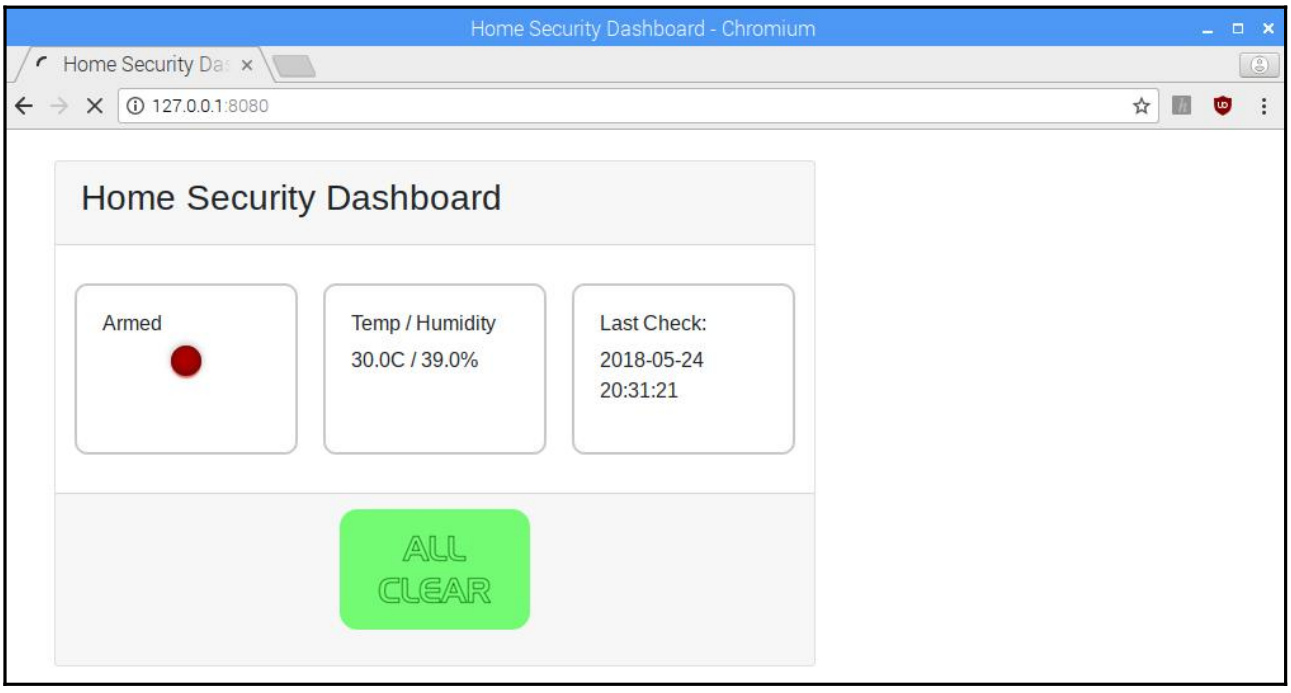

GPIO
Raspberry Pi 3 Model B v1.2
© Raspberry Pi 2015
USB 2x
USB 2x
DSI (DISPLAY)
HDMI
CSI (CAMERA)
Audio
ETHERNET
Power
fritzing

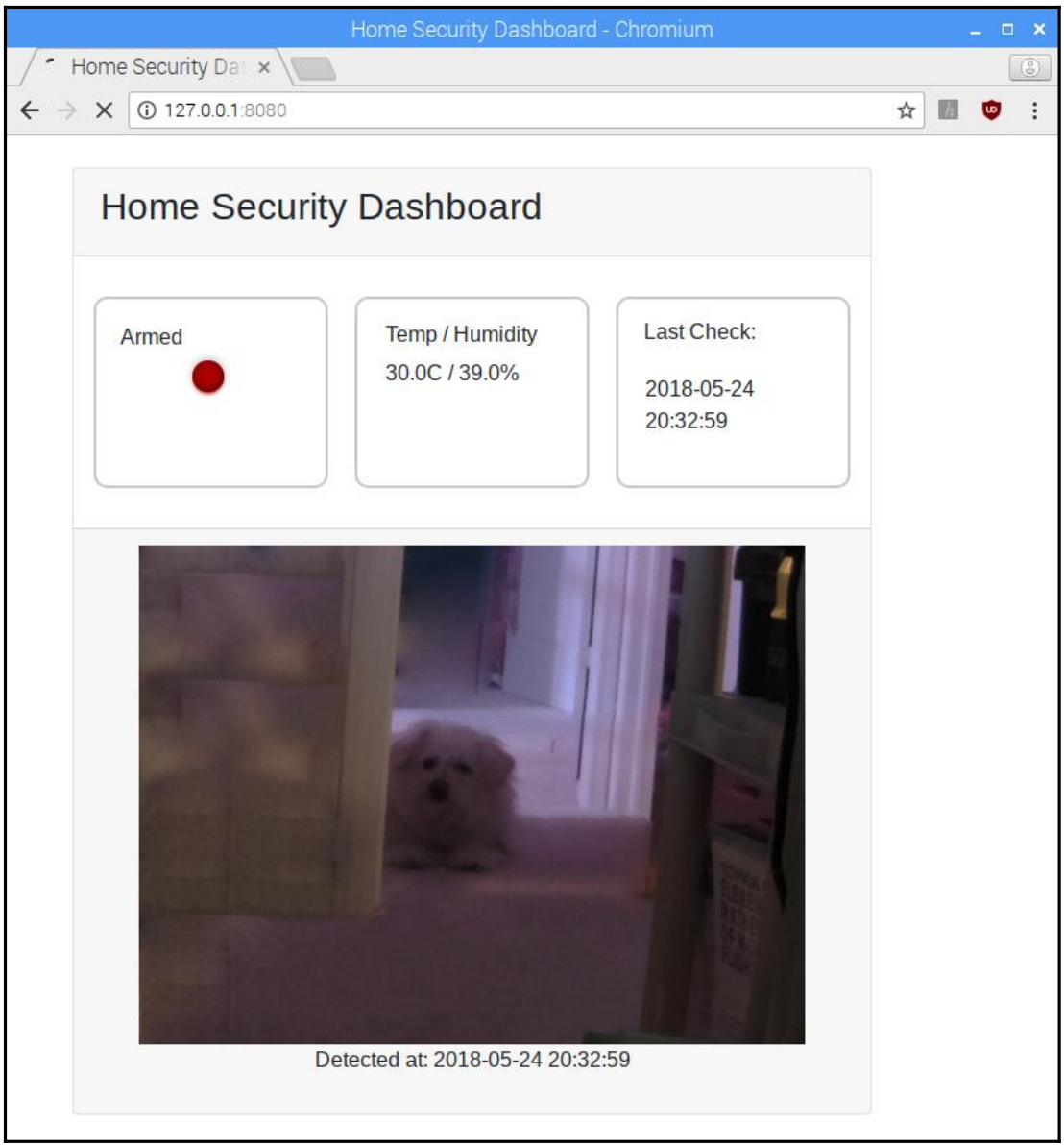


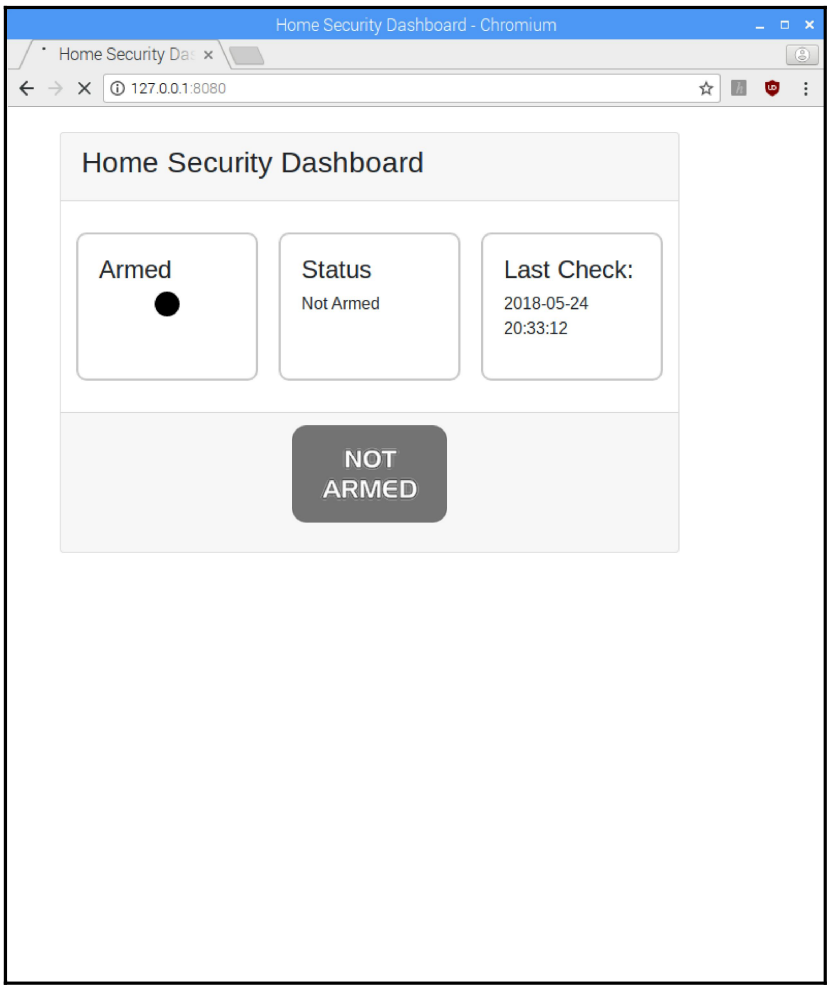

NOT
ARMED

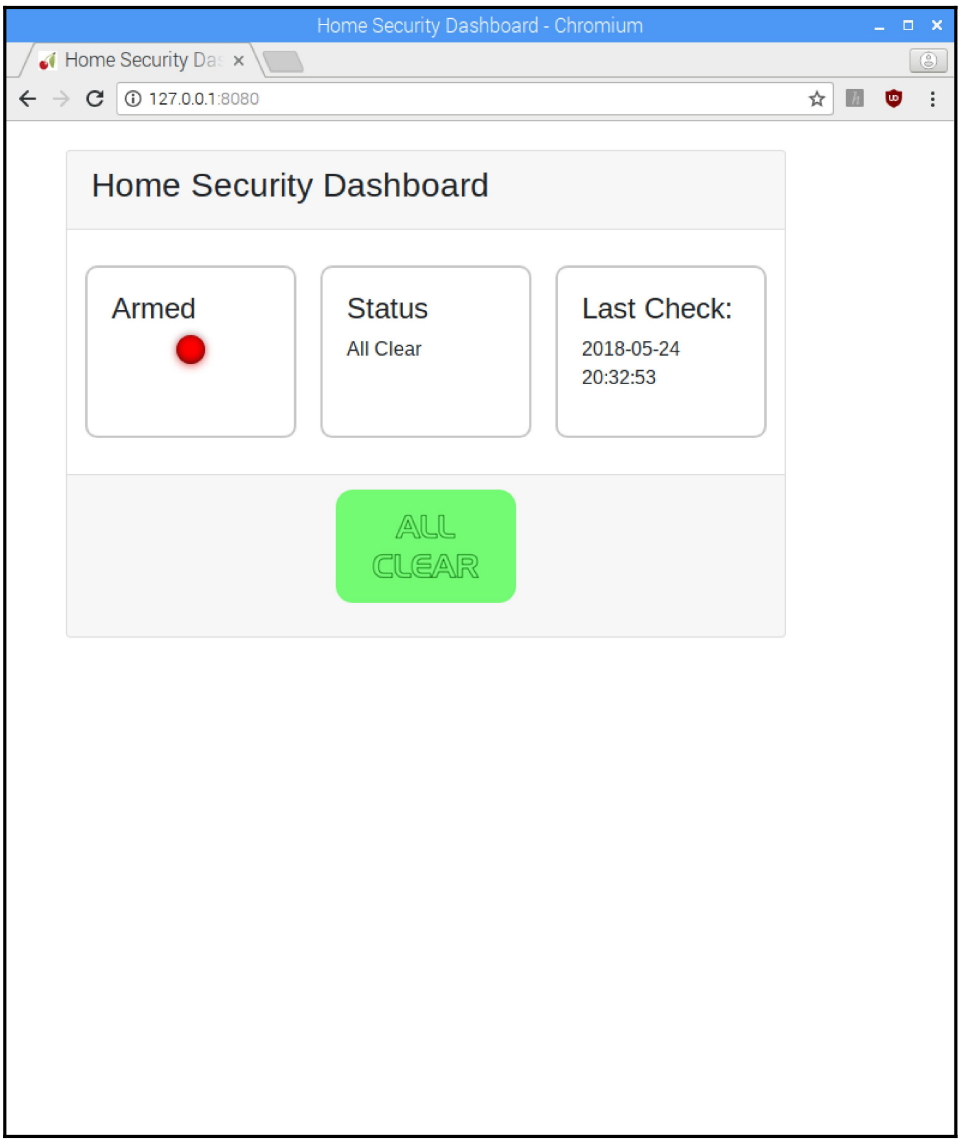

ALL
CLEAR

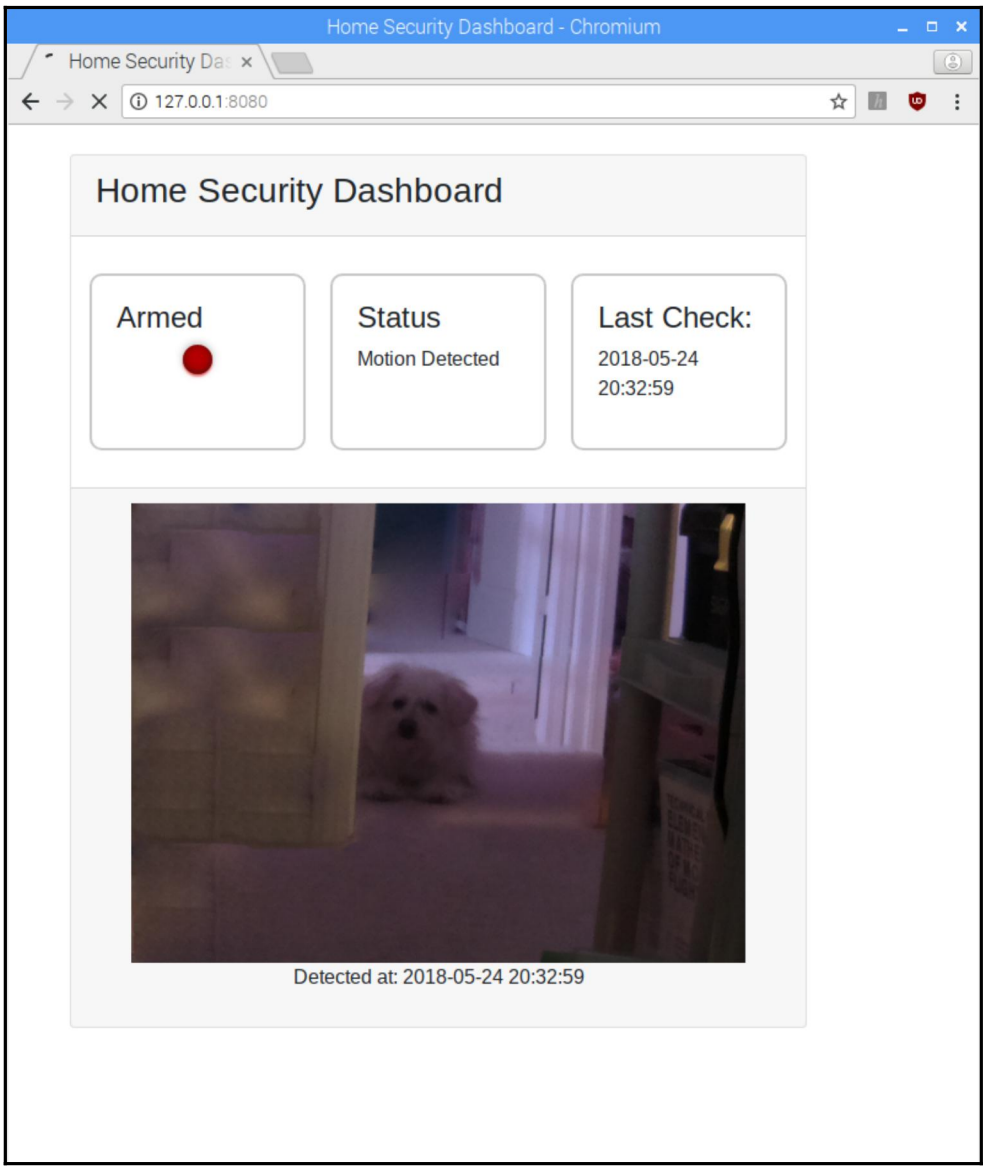

Home Security Dashboard - Chromium
Home Security Da
127.0.0.1:8080
Home Security Dashboard
Armed
Temp / Humidity
30.0C / 39.0%
Last Check:
2018-05-24
20:30:50
NOT ARMED


Home Security Dashboard - Chromium
Home Security Da
127.0.0.1:8080
Home Security Dashboard
Armed
Temp / Humidity
30.0C / 39.0%
Last Check:
2018-05-24
20:31:21
ALL CLEAR

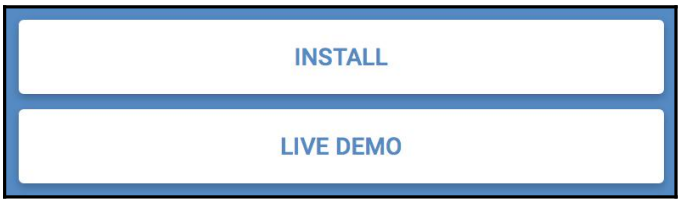

Home Security Dashboard - Chromium
Home Security Da
127.0.0.1:8080
Home Security Dashboard
Armed
Temp / Humidity
30.0C / 39.0%
Last Check:
2018-05-24
20:32:59
Detected at: 2018-05-24 20:32:59

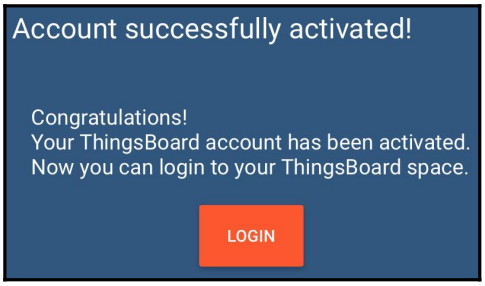

Home Security Dashboard - Chromium
Home Security Da
127.0.0.1:8080
Home Security Dashboard
Armed
Status
Not Armed
Last Check:
2018-05-24
20:33:12
NOT ARMED

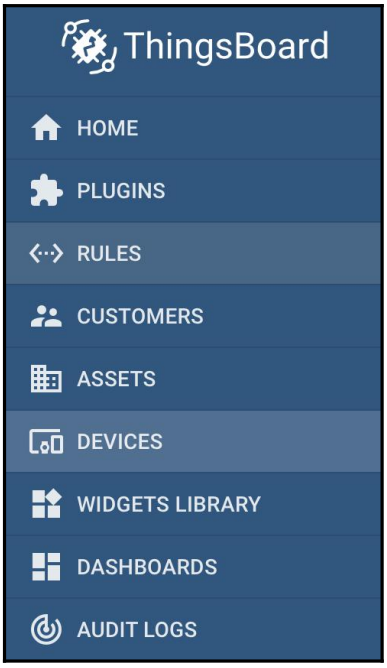

Home Security Dashboard - Chromium
Home Security Da
127.0.0.1:8080
Home Security Dashboard
Armed
Status
All Clear
Last Check:
2018-05-24
20:32:53
ALL
CLEAR

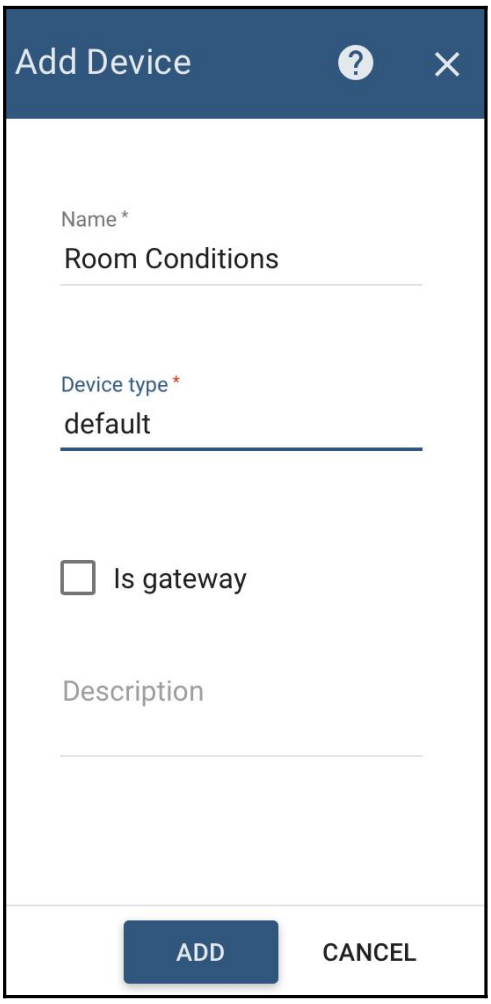

Home Security Dashboard - Chromium
Home Security Das
127.0.0.1:8080
Home Security Dashboard
Armed
Status
Motion Detected
Last Check:
2018-05-24
20:32:59
Detected at: 2018-05-24 20:32:59

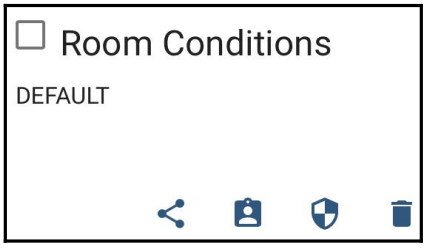
Chapter 10: Publishing to Web Services



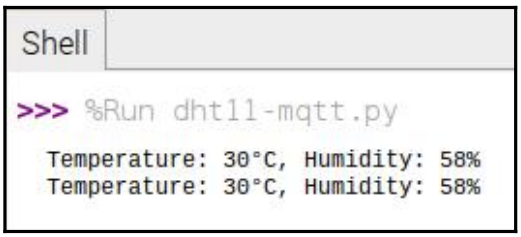


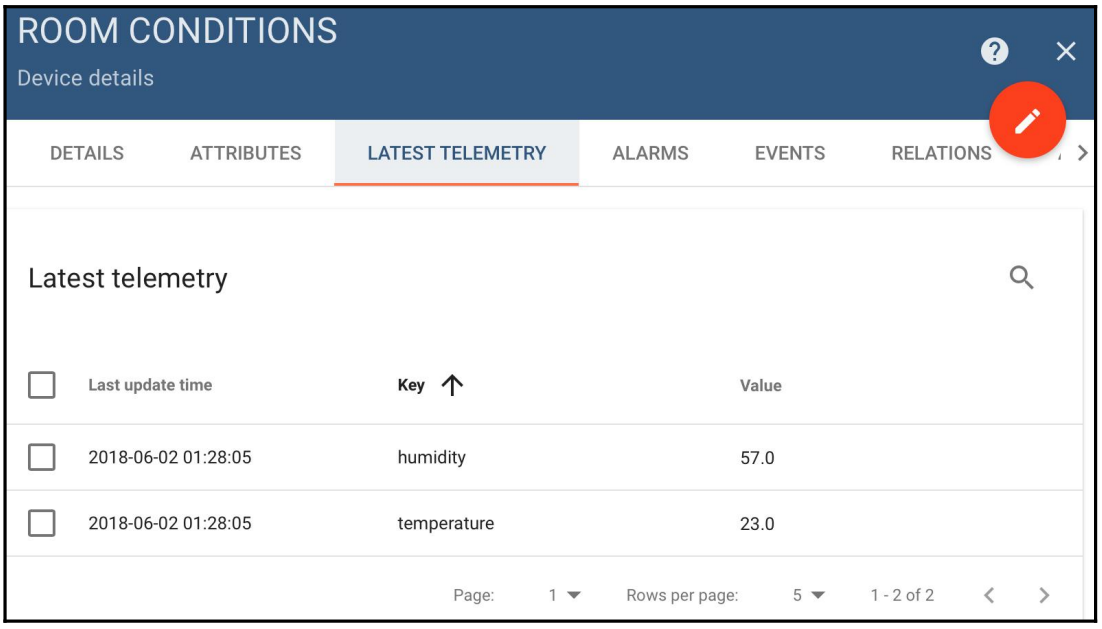


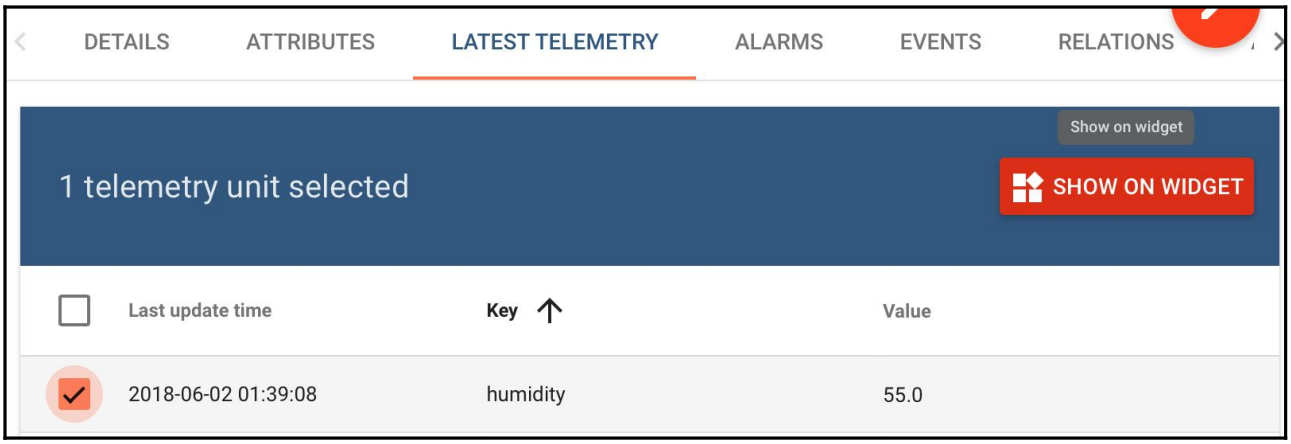

Add Device
Name *
Room Conditions
Device type *
default
Is gateway
Description
ADD
CANCEL

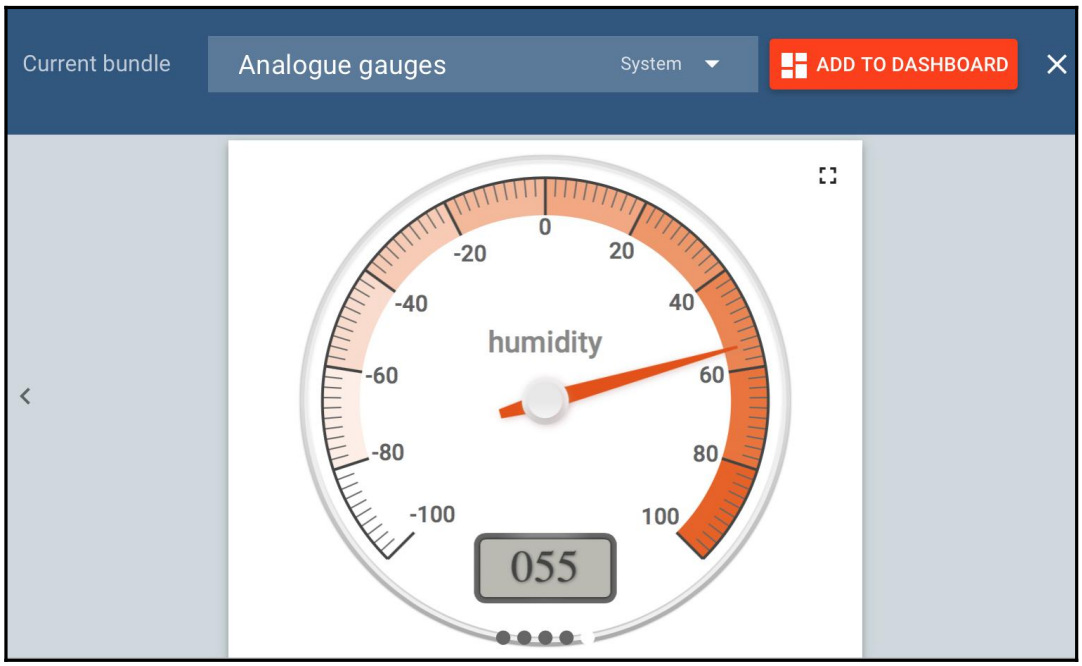

Room Conditions
DEFAULT

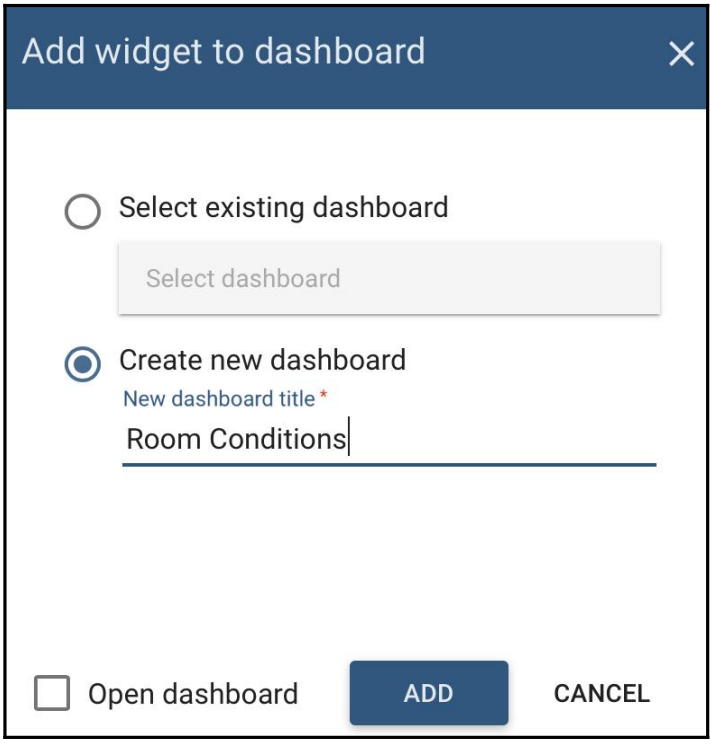

COPY ACCESS TOKEN

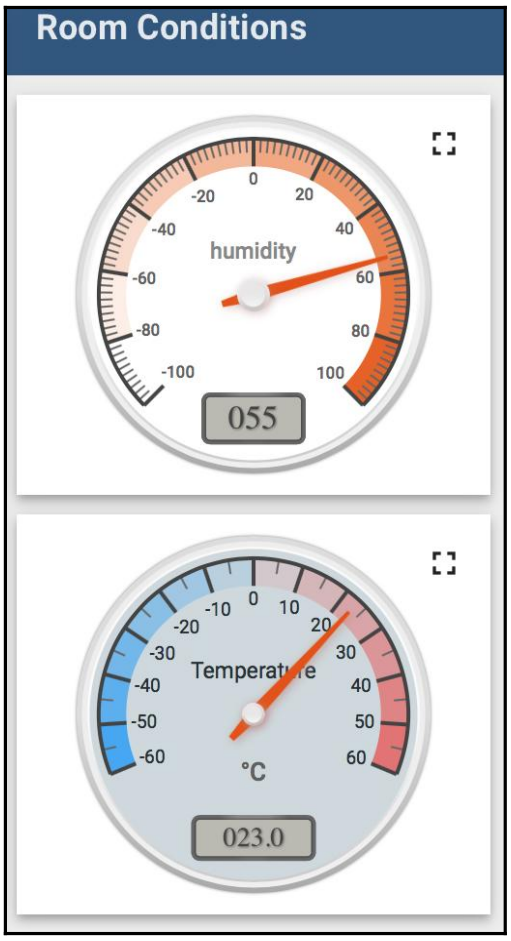

Shell
>>> %Run dht11-mqtt.py
Temperature: 30°C, Humidity: 58%
Temperature: 30°C, Humidity: 58%


ROOM CONDITIONS
Device details
DETAILS
ATTRIBUTES
LATEST TELEMETRY
ALARMS
EVENTS
RELATIONS
Latest telemetry
Last update time
Key
Value
2018-06-02 01:28:05
humidity
57.0
2018-06-02 01:28:05
temperature
23.0
Page: 1
Rows per page: 5
1 - 2 of 2


DETAILS
ATTRIBUTES
LATEST TELEMETRY
ALARMS
EVENTS
RELATIONS
1 telemetry unit selected
Show on widget
SHOW ON WIDGET
Last update time
Key
Value
2018-06-02 01:39:08
humidity
55.0


Current bundle
Analogue gauges
System
ADD TO DASHBOARD
0
-20
20
-40
40
humidity
-60
60
-80
80
-100
100
055

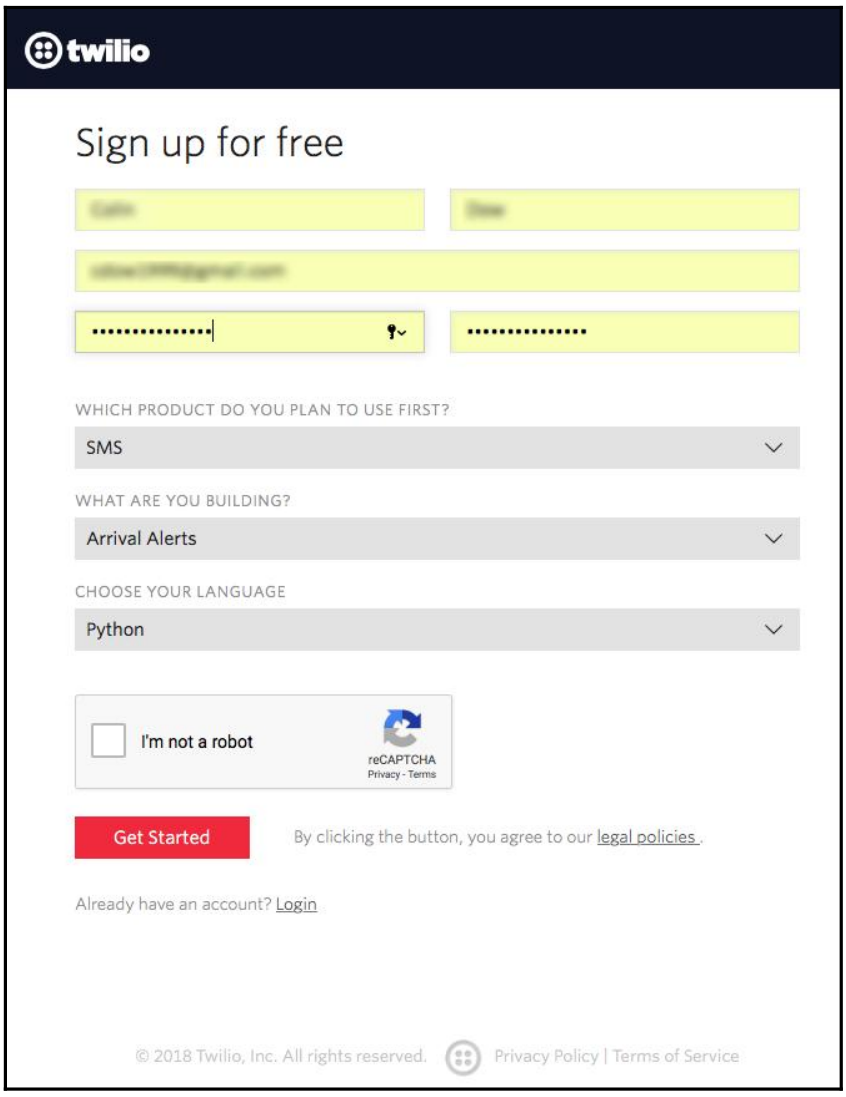

Add widget to dashboard
Select existing dashboard
Select dashboard
Create new dashboard
New dashboard title *
Room Conditions
Open dashboard
ADD
CANCEL

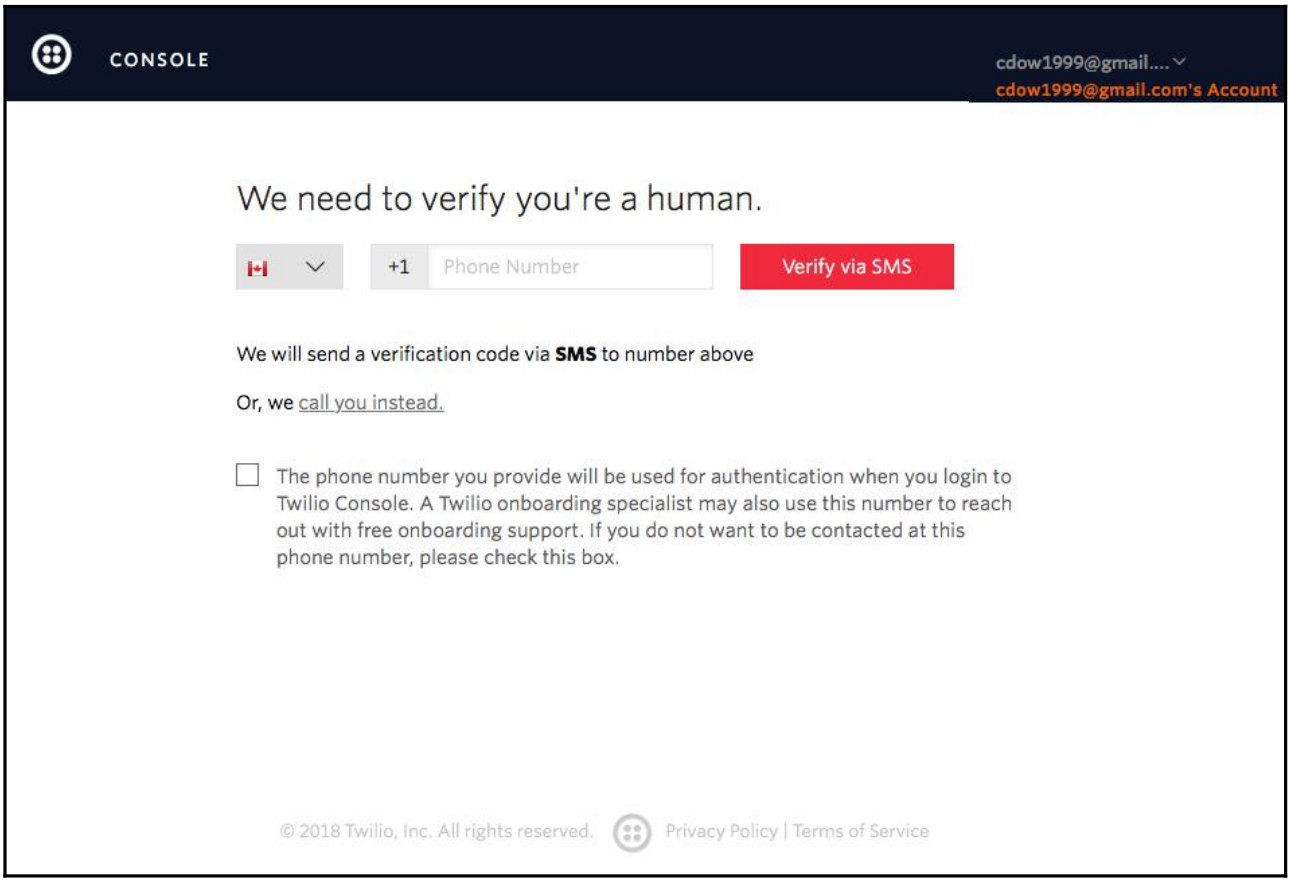

Room Conditions
humidity
0
-20
20
-40
40
-60
60
-80
80
-100
100
055
-10
10
-30
30
Temperature
-50
50
°C
023.0

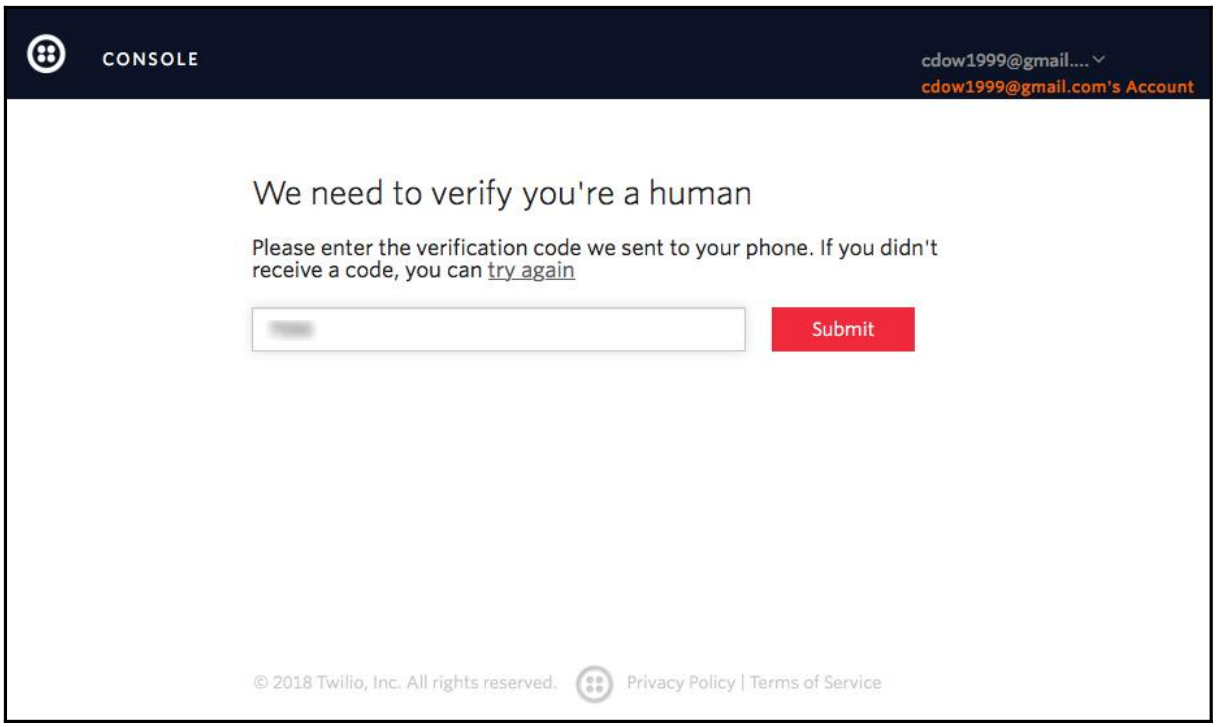

DASHBOARDS

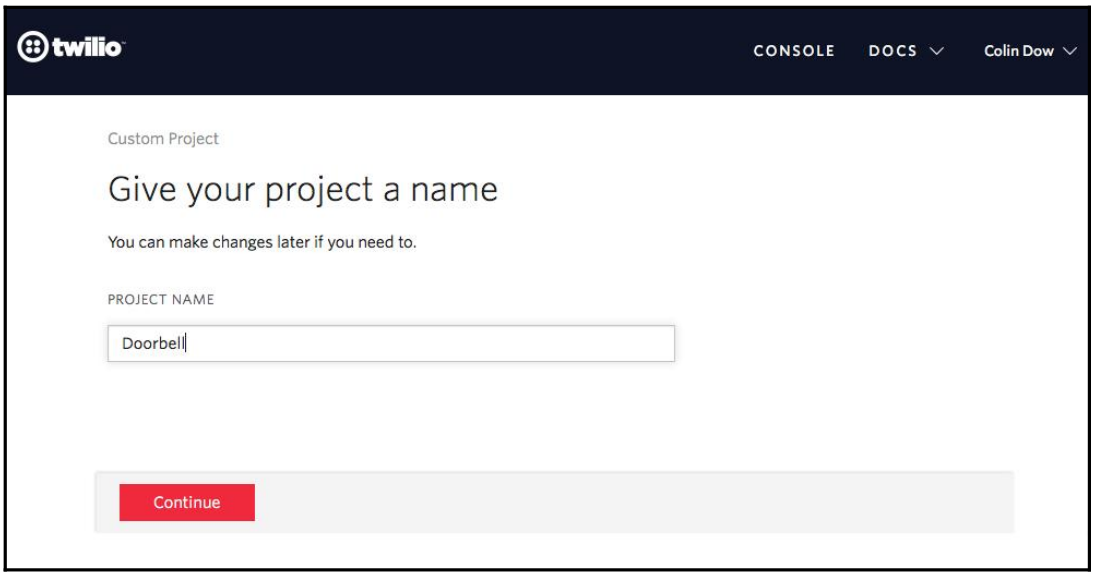

Room Conditions
Make dashboard public

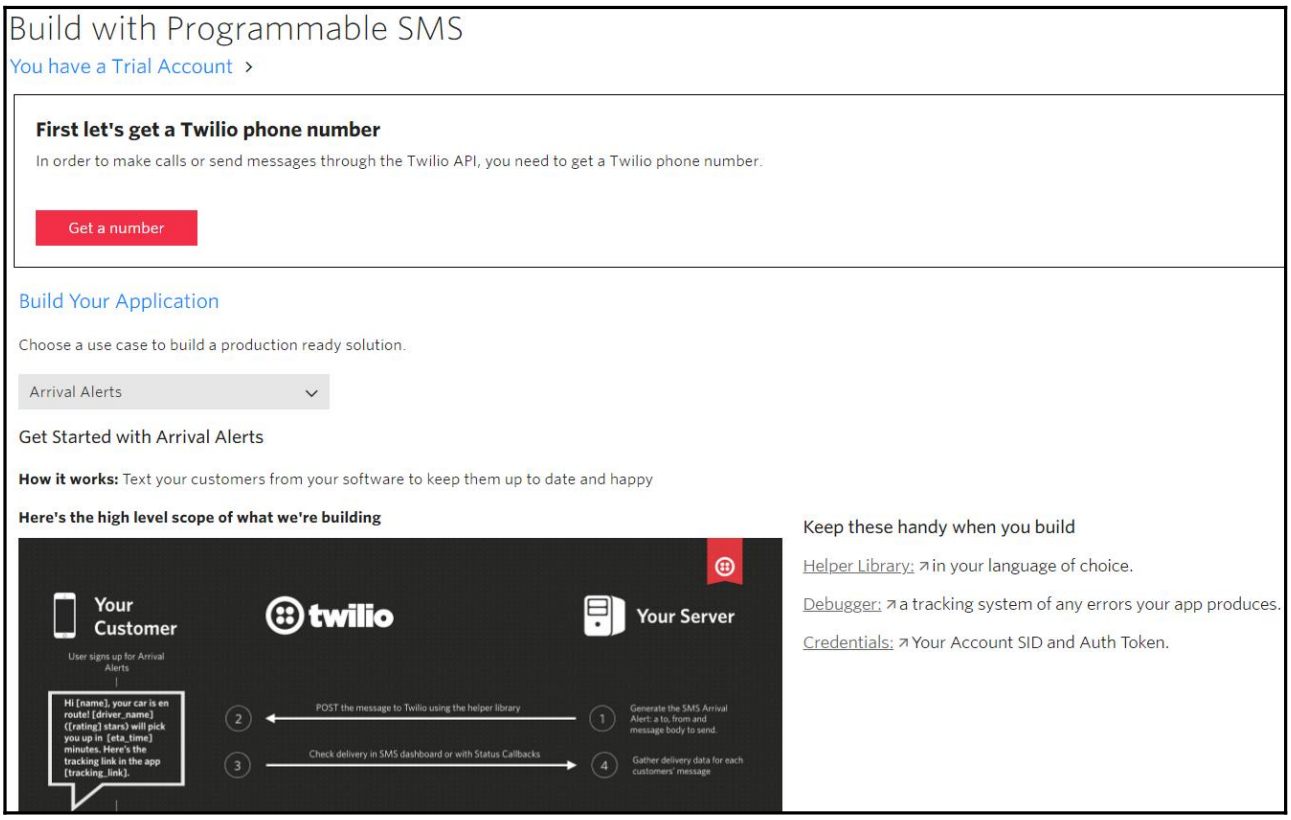

Dashboard is now public
Your dashboard **Room Conditions** is now public and accessible via next public link:
https://demo.thingsboard.io/dashboards/a552cf00-6629-11e8-bee0-c3b186e30863?publicId=674b91
Note: Do not forget to make related devices public in order to access their data.
OK


twilio
Sign up for free
WHICH PRODUCT DO YOU PLAN TO USE FIRST?
SMS
WHAT ARE YOU BUILDING?
Arrival Alerts
CHOOSE YOUR LANGUAGE
Python
I'm not a robot
reCAPTCHA
Privacy - Terms
Get Started
By clicking the button, you agree to our legal policies .
Already have an account? Login
© 2018 Twilio, Inc. All rights reserved.
Privacy Policy | Terms of Service

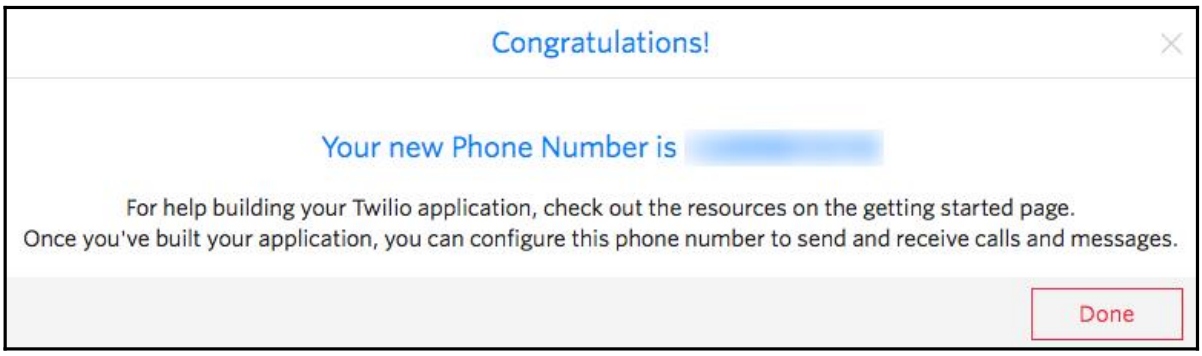

CONSOLE
cdow1999@gmail....
cdow1999@gmail.com's Account
We need to verify you're a human.
+1
Phone Number
Verify via SMS
We will send a verification code via SMS to number above
Or, we call you instead.
The phone number you provide will be used for authentication when you login to Twilio Console. A Twilio onboarding specialist may also use this number to reach out with free onboarding support. If you do not want to be contacted at this phone number, please check this box.
© 2018 Twilio, Inc. All rights reserved.
Privacy Policy | Terms of Service

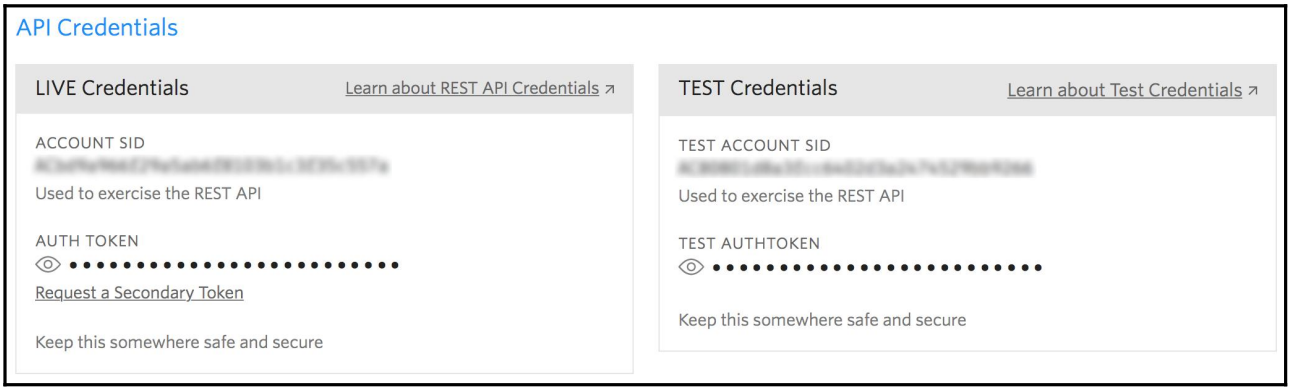

CONSOLE
cdow1999@gmail....
cdow1999@gmail.com's Account
We need to verify you're a human
Please enter the verification code we sent to your phone. If you didn't receive a code, you can try again
Submit
© 2018 Twilio, Inc. All rights reserved.
Privacy Policy | Terms of Service

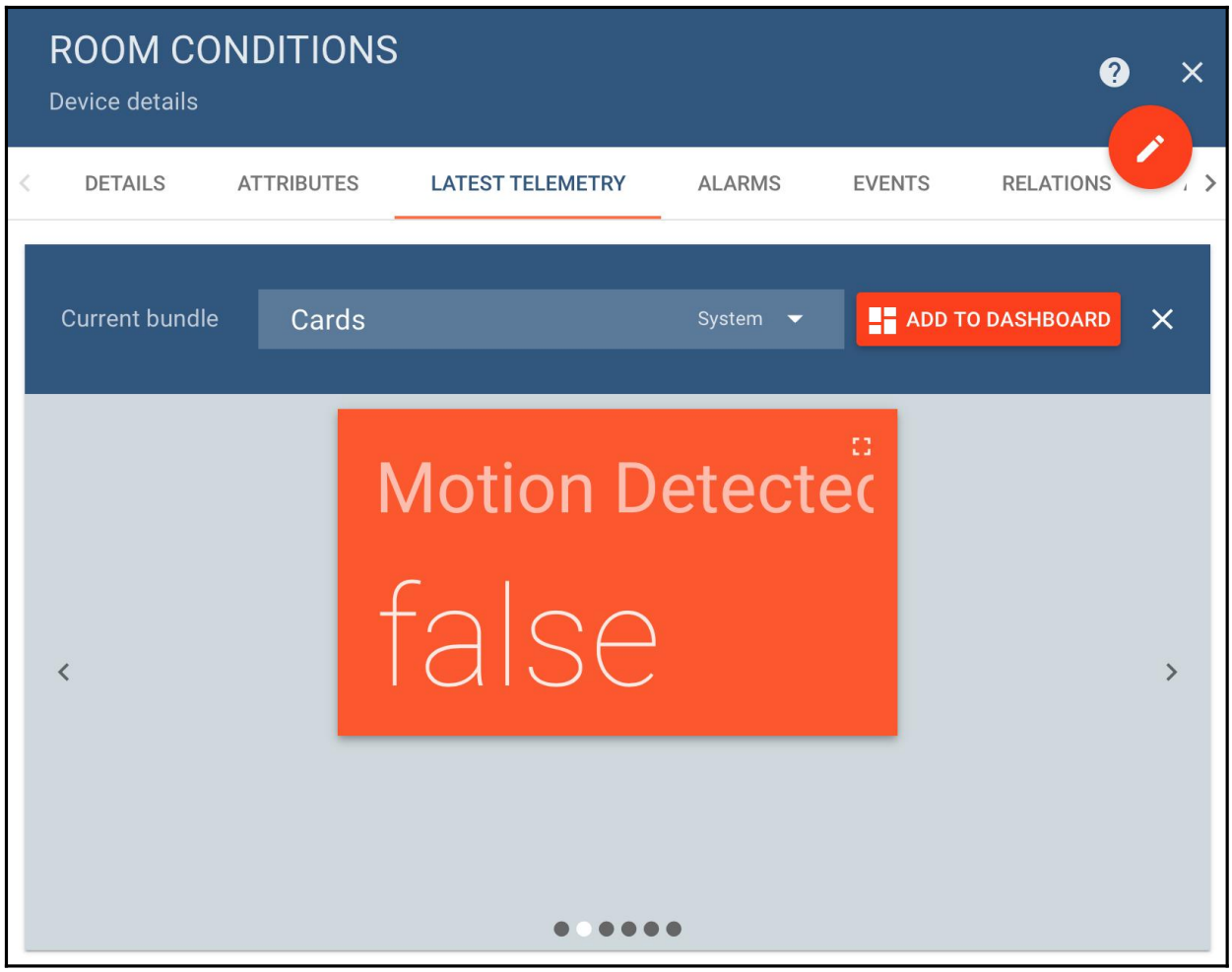

twilio
CONSOLE
DOCS
Colin Dow
Custom Project
Give your project a name
You can make changes later if you need to.
PROJECT NAME
Doorbell
Continue

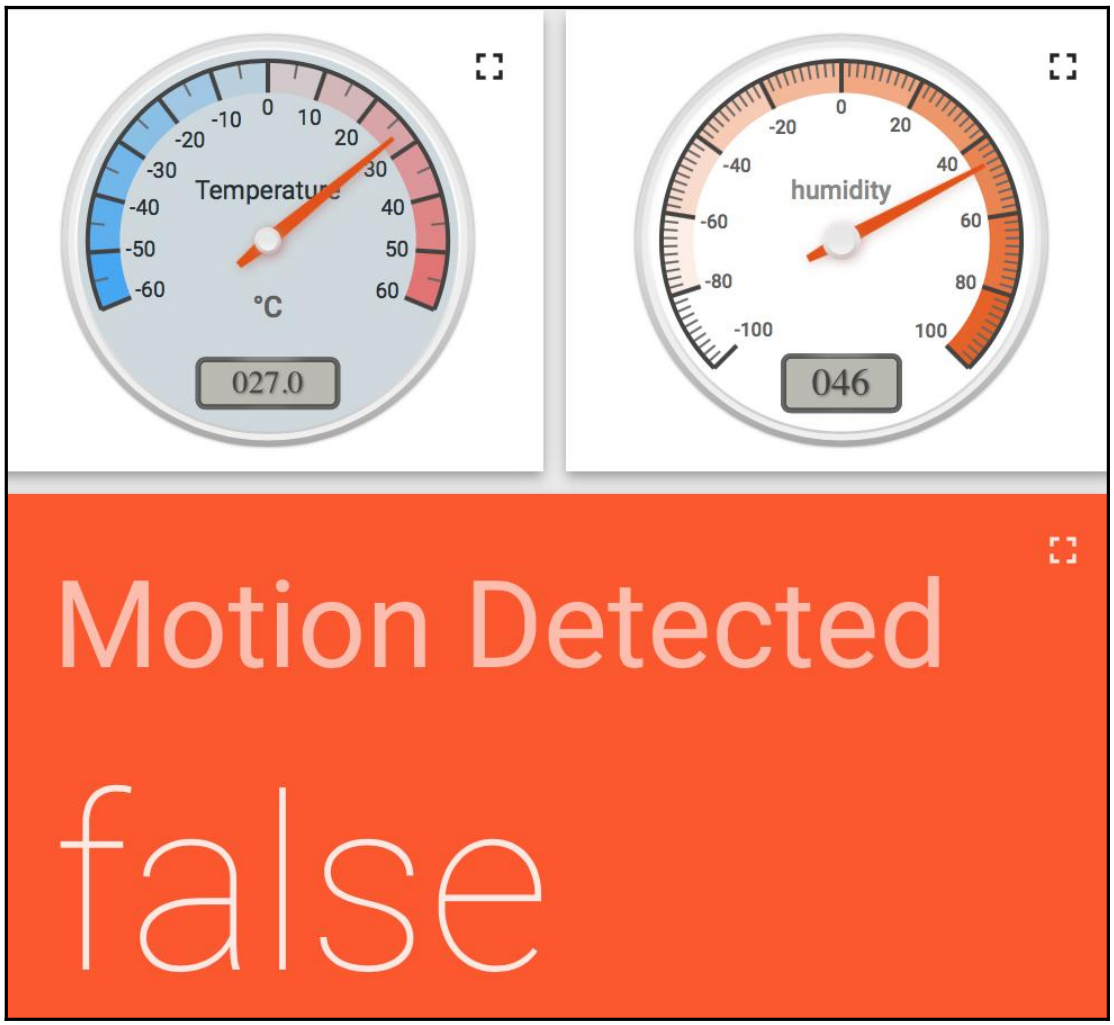

Build with Programmable SMS
You have a Trial Account ›
First let's get a Twilio phone number
In order to make calls or send messages through the Twilio API, you need to get a Twilio phone number.
Get a number
Build Your Application
Choose a use case to build a production ready solution.
Arrival Alerts
Get Started with Arrival Alerts
How it works: Text your customers from your software to keep them up to date and happy
Here's the high level scope of what we're building
Your Customer
twilio
Your Server
User signs up for Arrival Alerts
Hi [name], your car is en route! [driver_name] ([rating] stars) will pick you up in [eta_time] minutes. Here's the tracking link in the app [tracking_link].
2
POST the message to Twilio using the helper library
1
Generate the SMS Arrival Alert: a to, from and message body to send.
3
Check delivery in SMS dashboard or with Status Callbacks
4
Gather delivery data for each customers' message
Keep these handy when you build
Helper Library: ↗ in your language of choice.
Debugger: ↗ a tracking system of any errors your app produces.
Credentials: ↗ Your Account SID and Auth Token.


Your first Twilio Phone Number
Don't like this one? Search for a different number
This Canada phone number has the following capabilities:
Voice: This number can receive incoming calls and make outgoing calls.
SMS: This number can send and receive text messages to and from mobile numbers.
MMS: This number can send and receive multi media messages to and from mobile numbers.
Cancel
Choose this Number

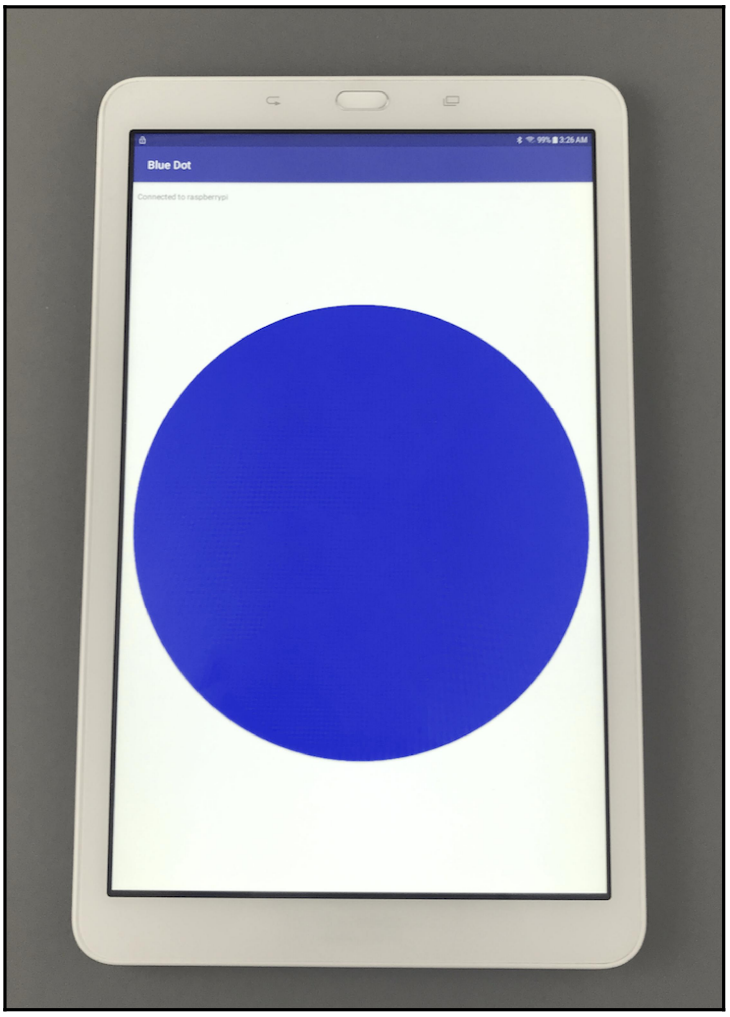

Congratulations!
Your new Phone Number is
For help building your Twilio application, check out the resources on the getting started page.
Once you've built your application, you can configure this phone number to send and receive calls and messages.
Done

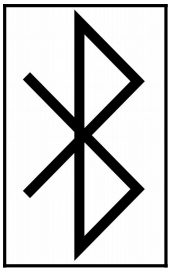

API Credentials
LIVE Credentials
Learn about REST API Credentials
ACCOUNT SID
Used to exercise the REST API
AUTH TOKEN
Request a Secondary Token
Keep this somewhere safe and secure
TEST Credentials
Learn about Test Credentials
TEST ACCOUNT SID
Used to exercise the REST API
TEST AUTHTOKEN
Keep this somewhere safe and secure

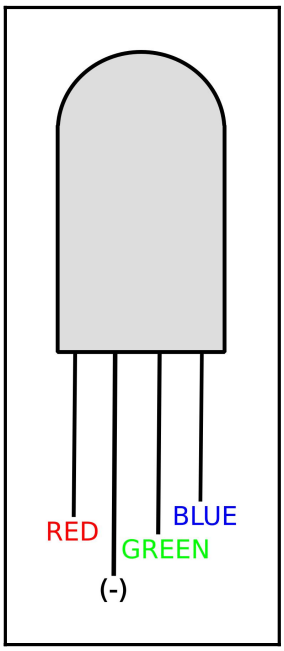

ROOM CONDITIONS
Device details
DETAILS
ATTRIBUTES
LATEST TELEMETRY
ALARMS
EVENTS
RELATIONS
Current bundle
Cards
System
ADD TO DASHBOARD
Motion Detecte
false

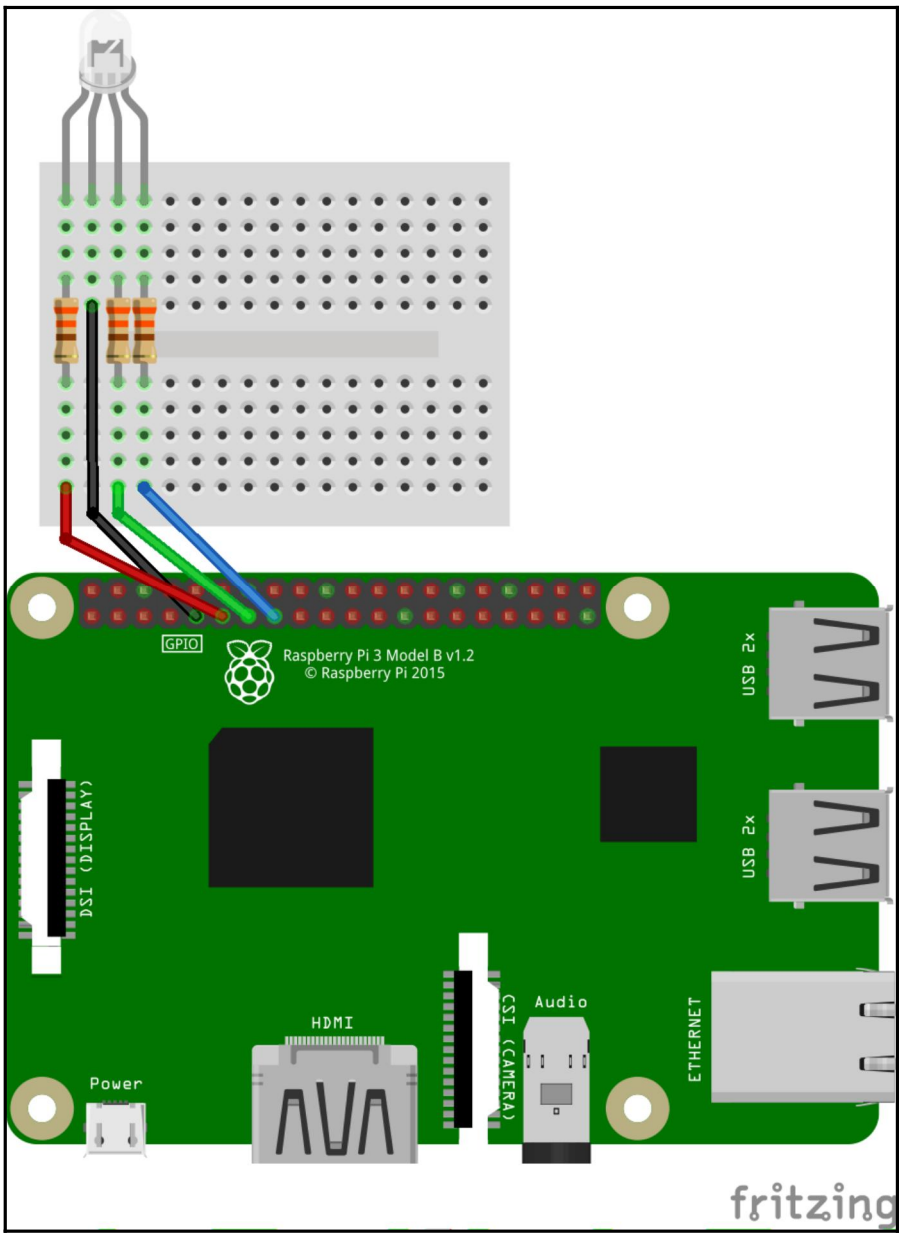

Temperature
°C
027.0
humidity
046
Motion Detected
false

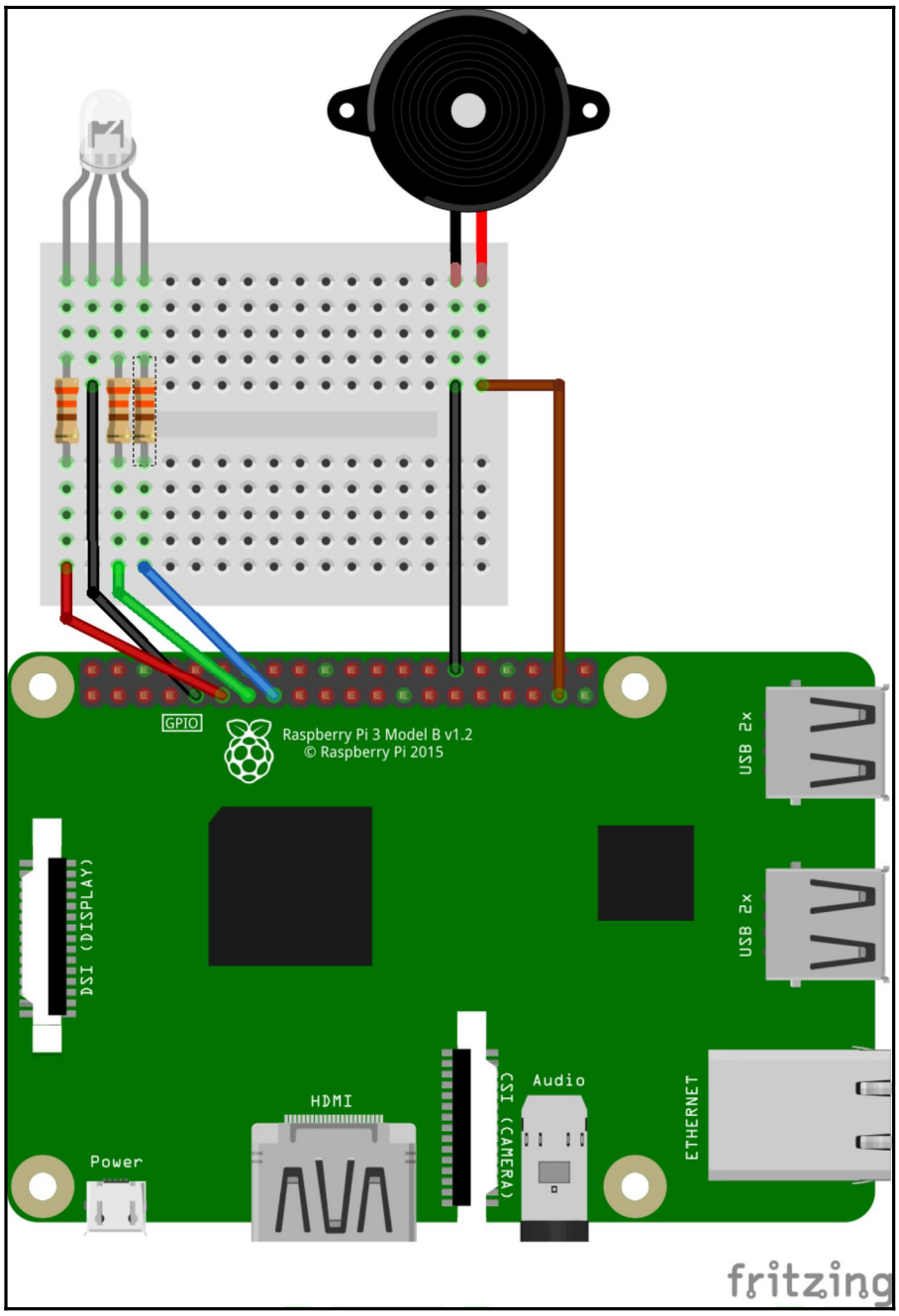
Chapter 11: Creating a Doorbell Button Using Bluetooth



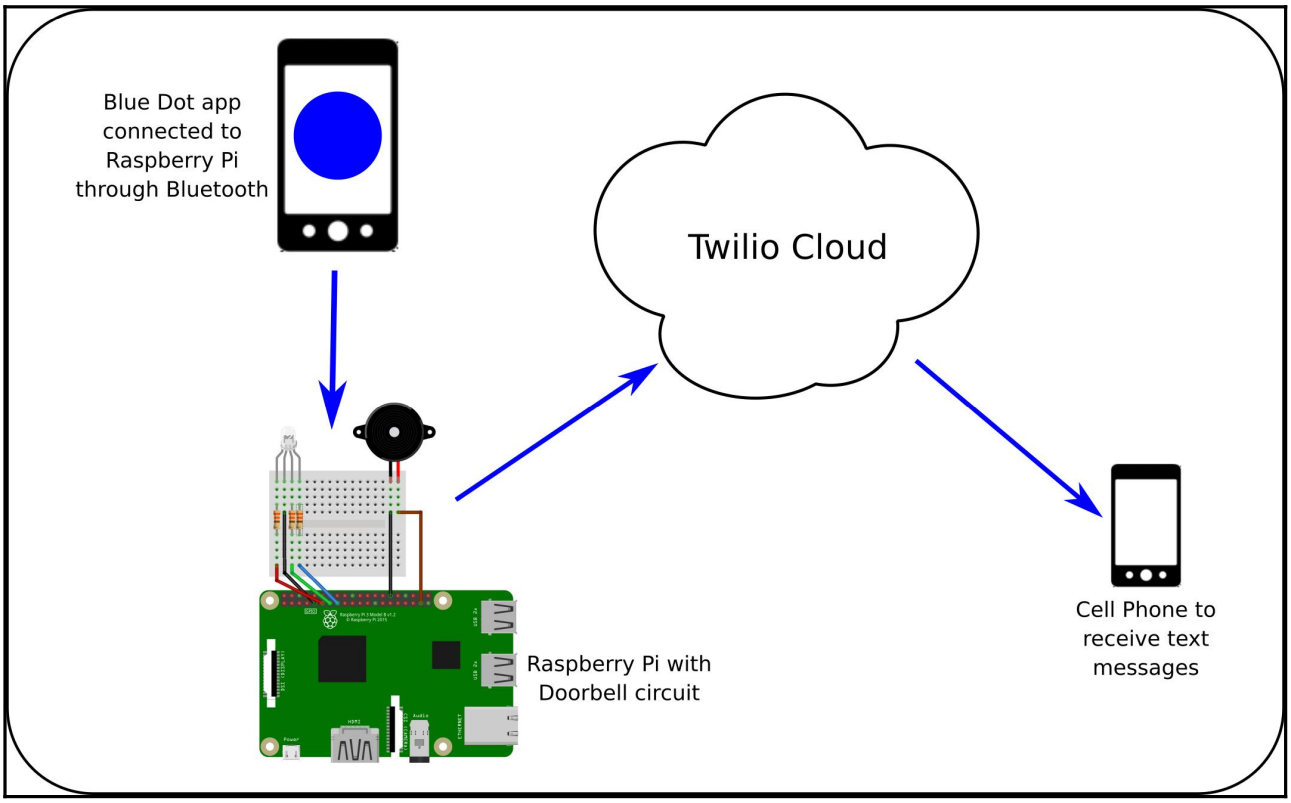



RED
(-)
GREEN
BLUE


GPIO
Raspberry Pi 3 Model B v1.2
© Raspberry Pi 2015
USB 2x
USB 2x
DSI (DISPLAY)
HDMI
CSI (CAMERA)
Audio
ETHERNET
Power
fritzing


GPIO
Raspberry Pi 3 Model B v1.2
© Raspberry Pi 2015
USB 2x
USB 2x
DSI (DISPLAY)
HDMI
CSI (CAMERA)
Audio
ETHERNET
Power
fritzing

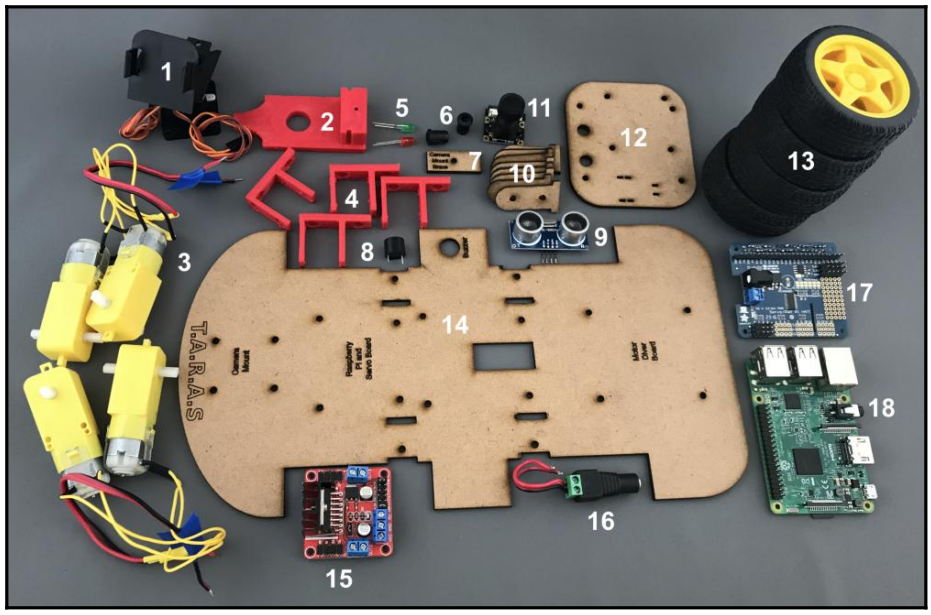
Chapter 12: Enhancing our IoT Doorbell

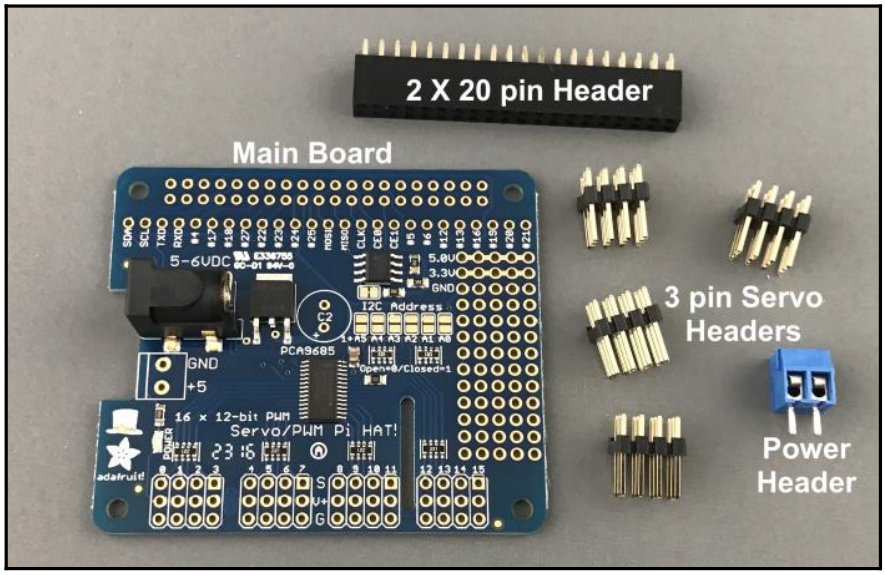


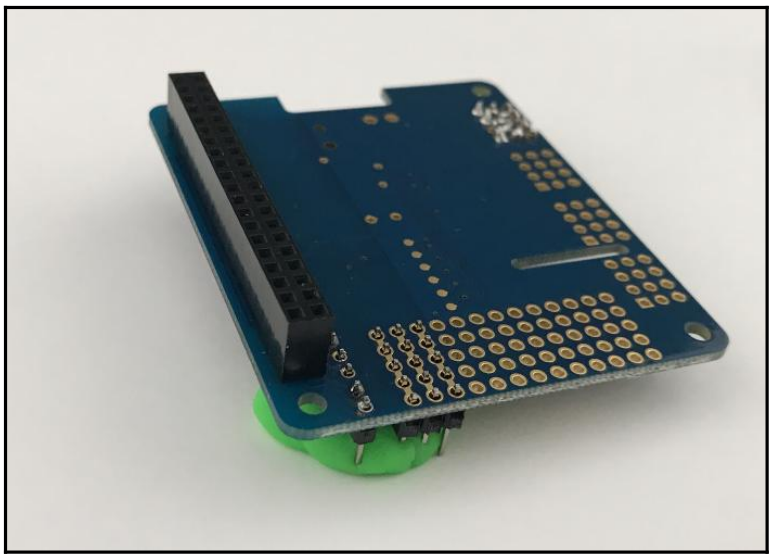

Rogers Wi-Fi
3:07 PM
100%
Text Message
Today 11:26 AM
Sent from your Twilio trial account - There is someone at the door
Text Message

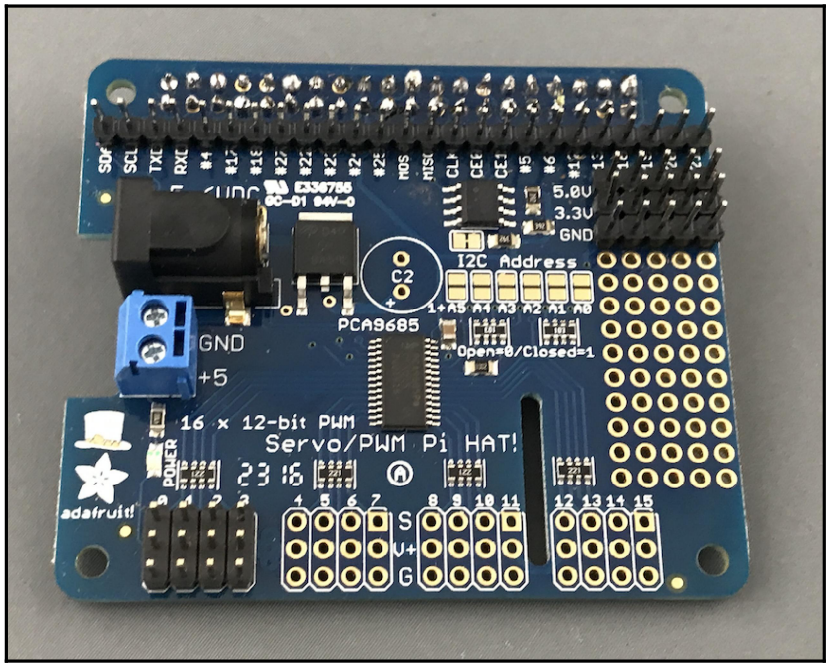

Rogers Wi-Fi
3:07 PM
100%
Today 2:40 PM
Sent from your Twilio trial account - Josephine is at the door!
Text Message

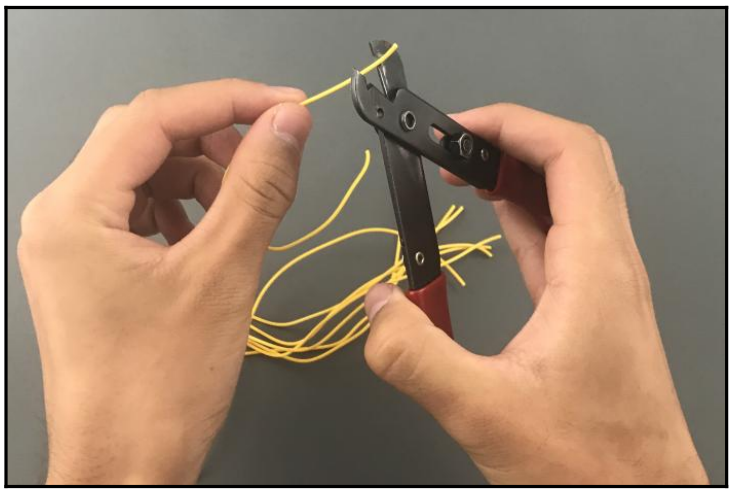
Chapter 13: Introducing the Raspberry Pi Robot Car

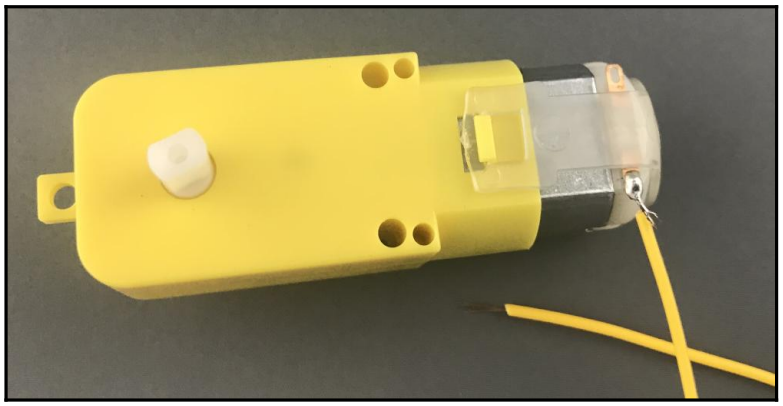


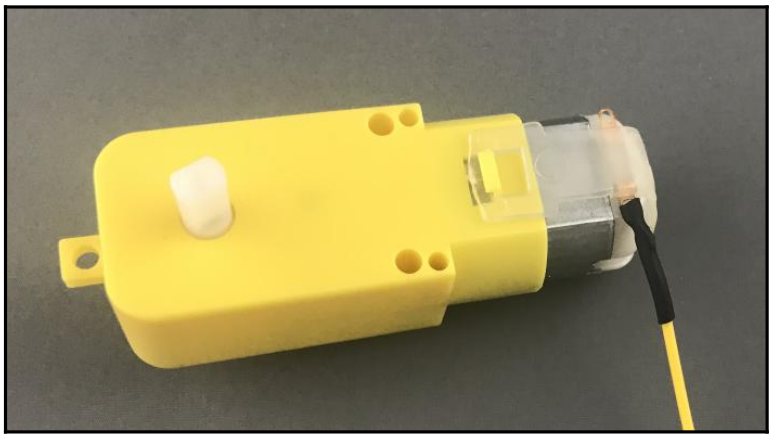


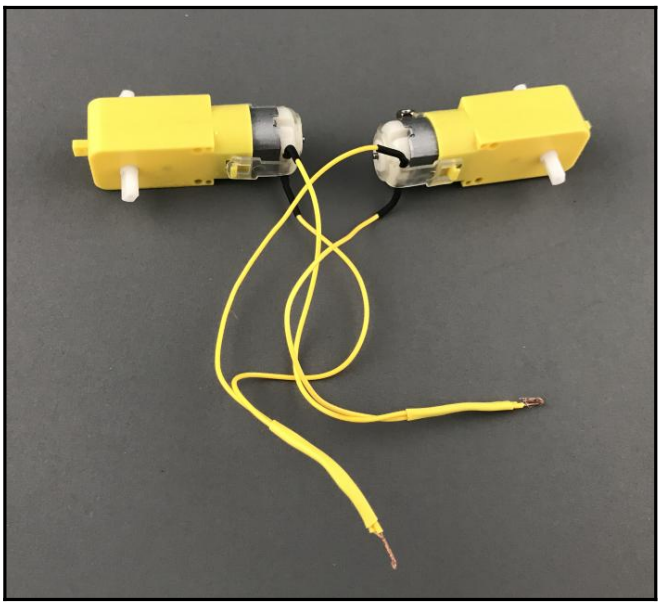


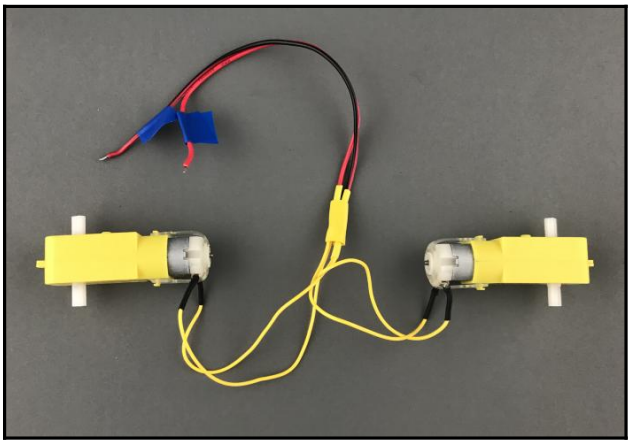

5.0V
3.3V
GND
I2C Address
PCA9685
GND
+5
16 x 12-bit PWM
Servo/PWM Pi HAT!
adafruit!

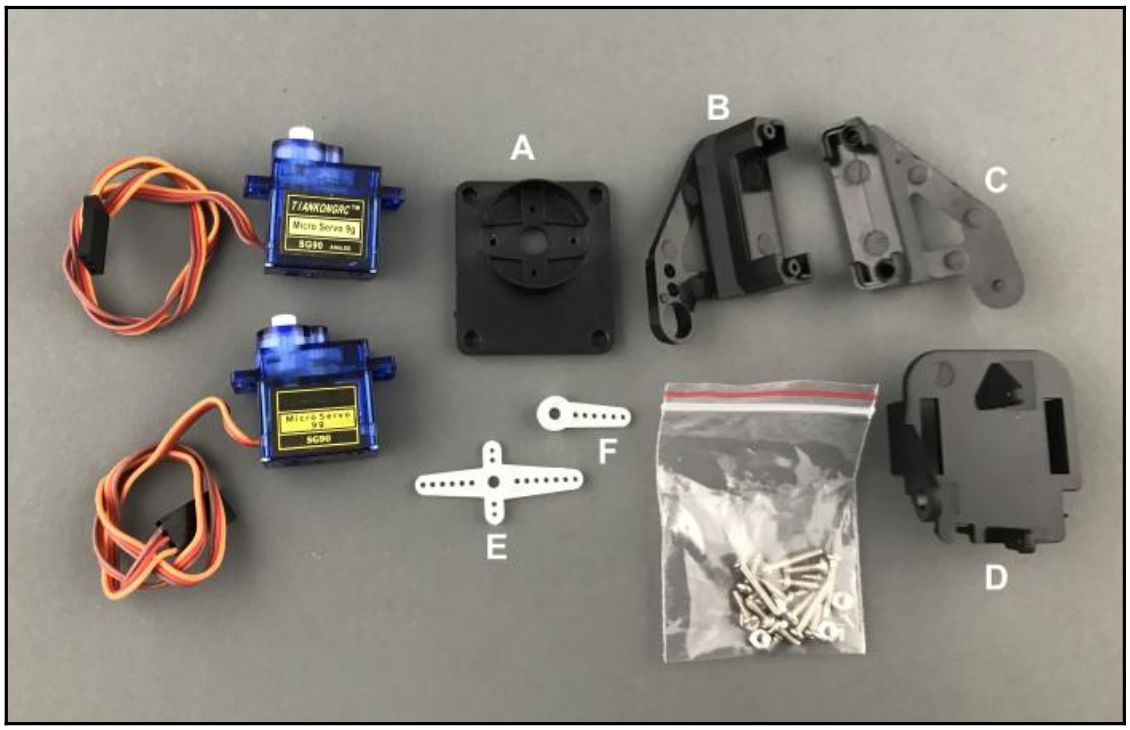


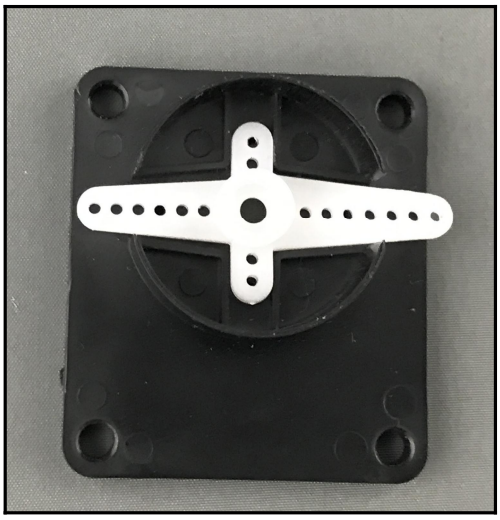


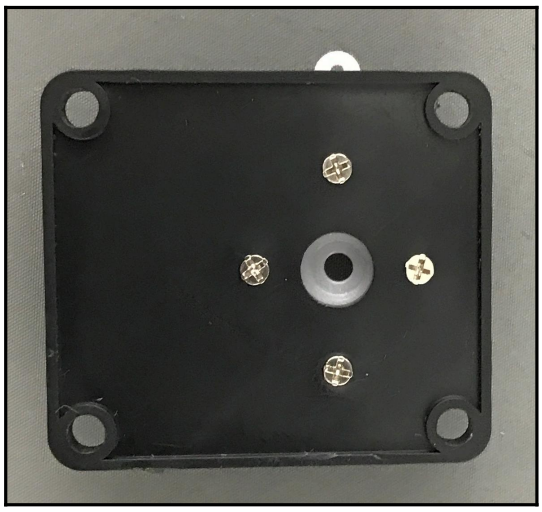


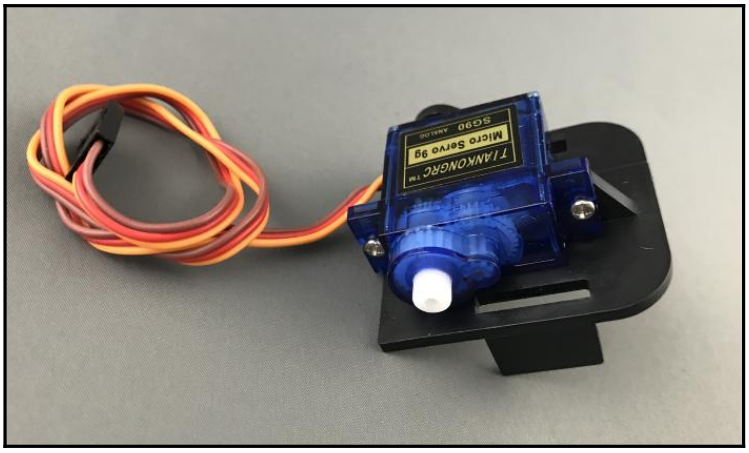


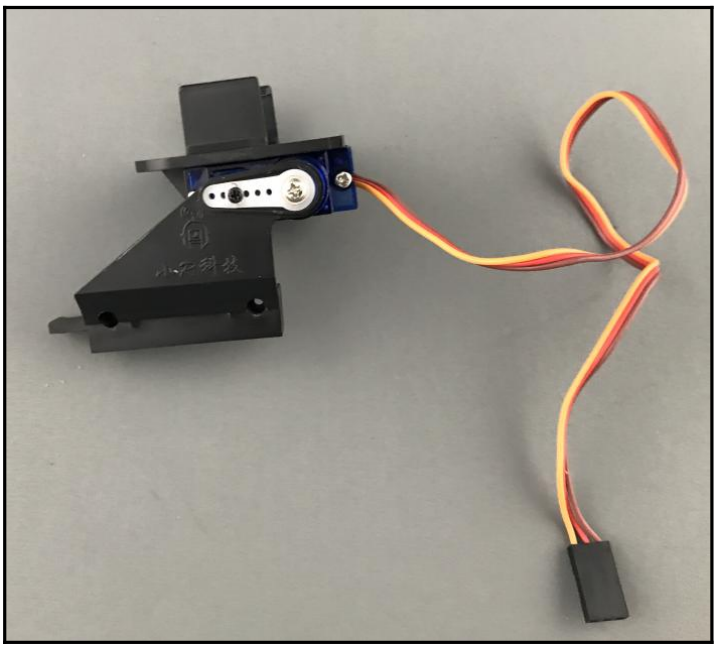


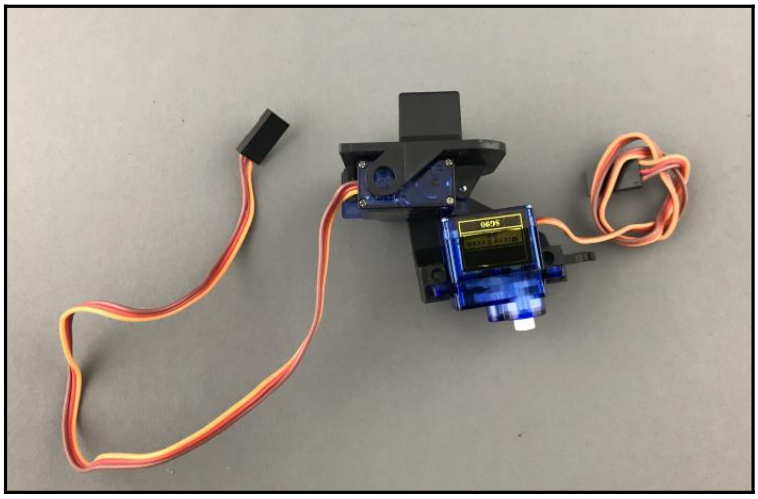

A
B
C
D
E
F
TIANKONGRC
Micro Servo 9g
SG90

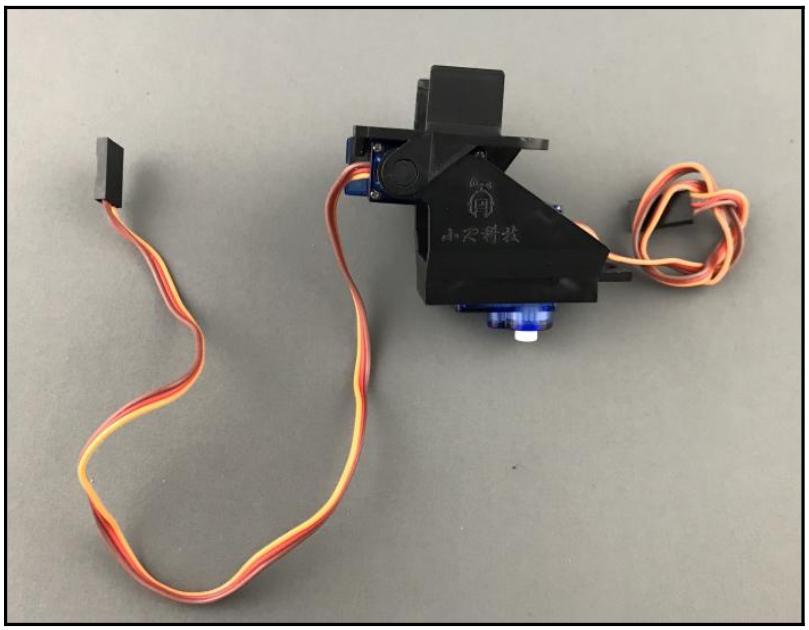


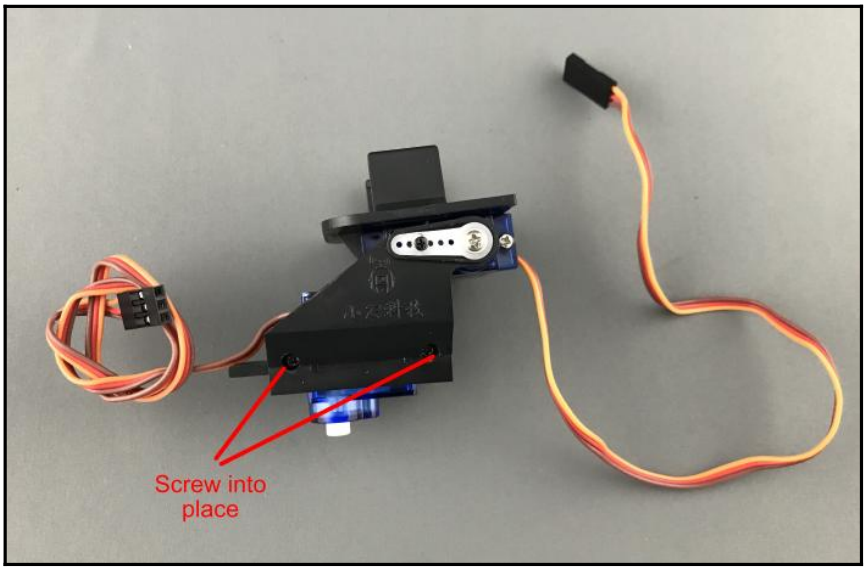


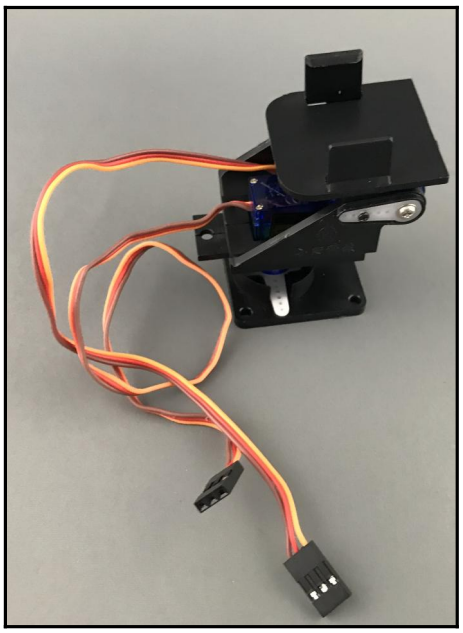

TIANKONGRC TM
Micro Servo 9g
SG90

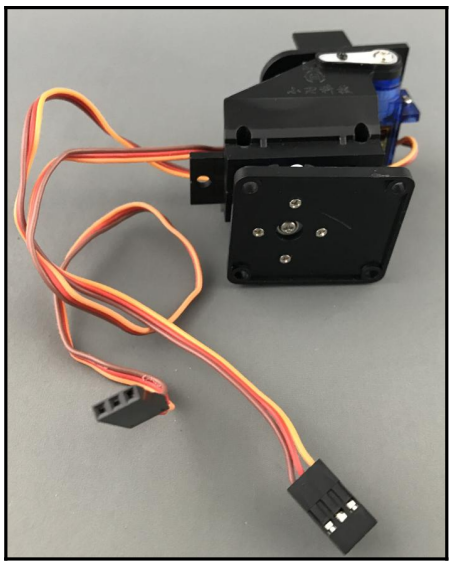


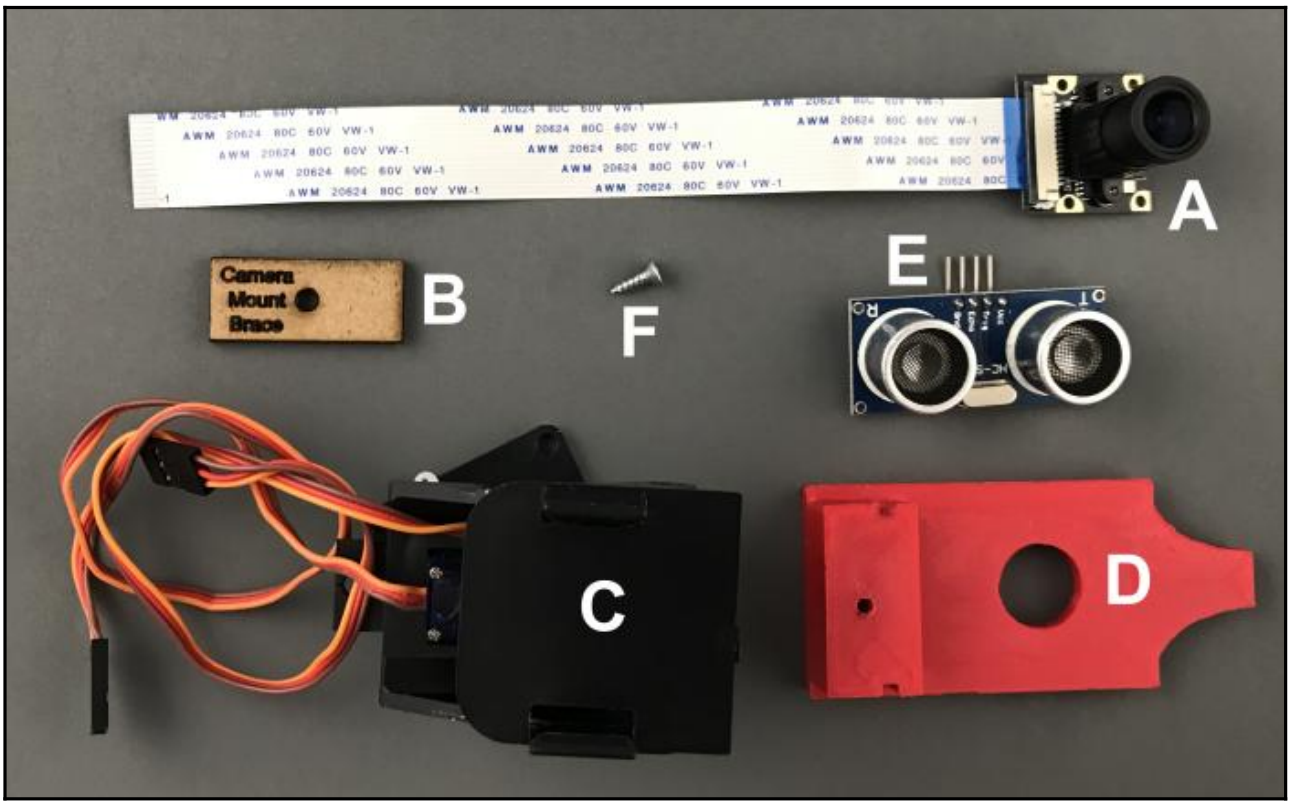


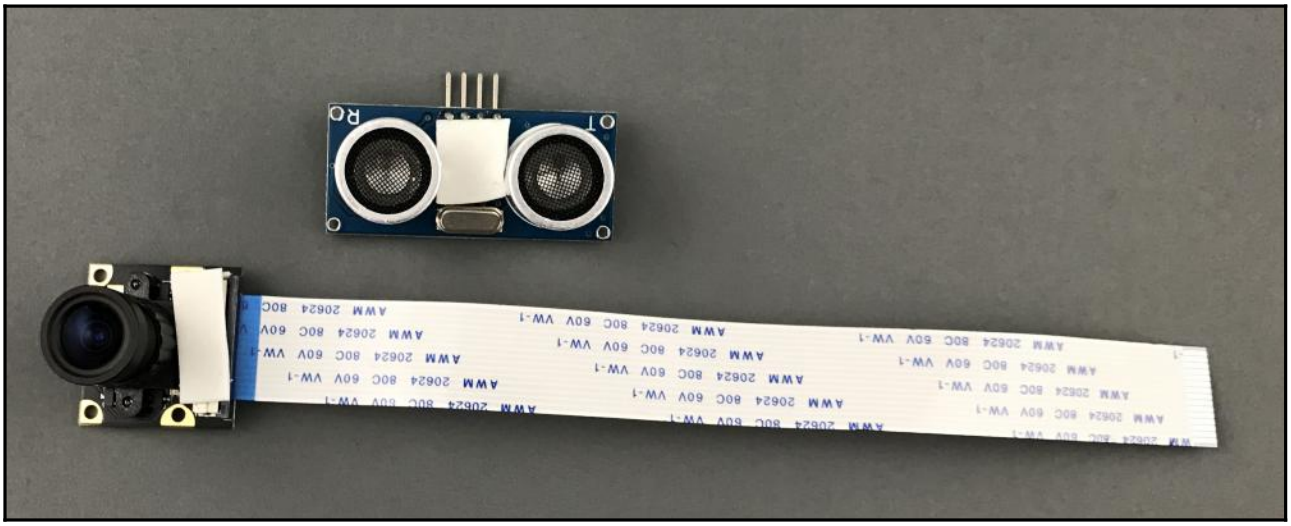


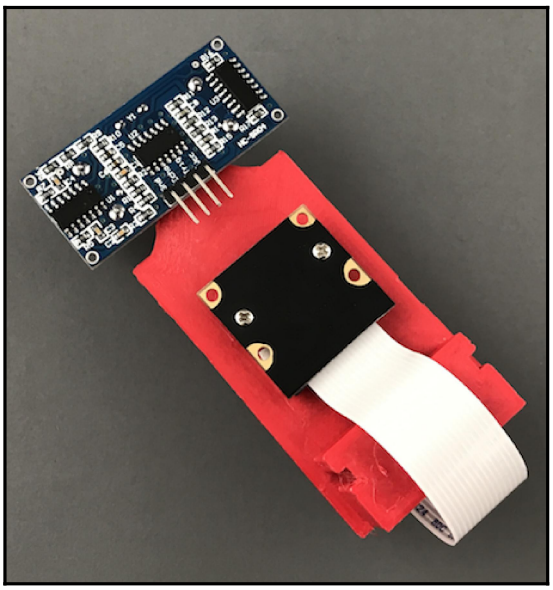

Screw into
place

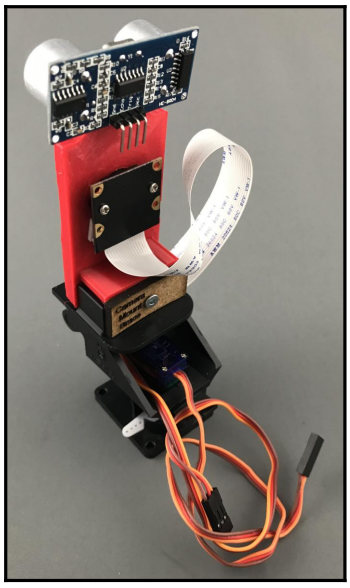


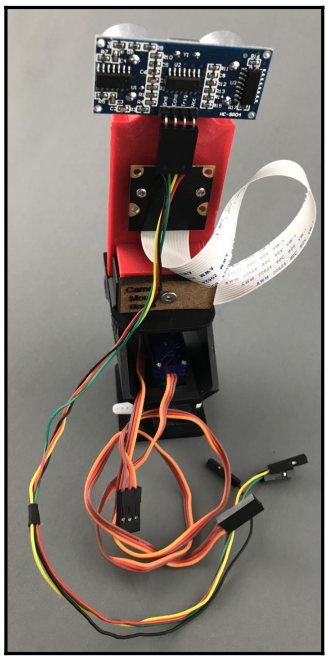


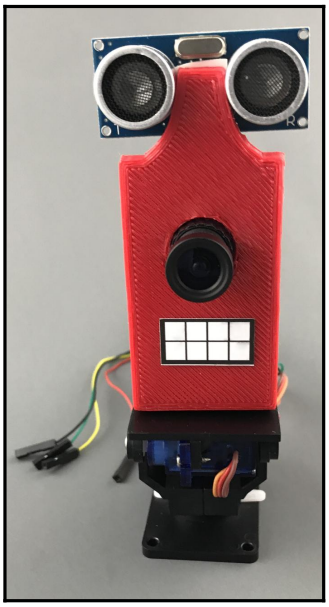

A
Camera
Mount
Brace
B
F
E
C
D

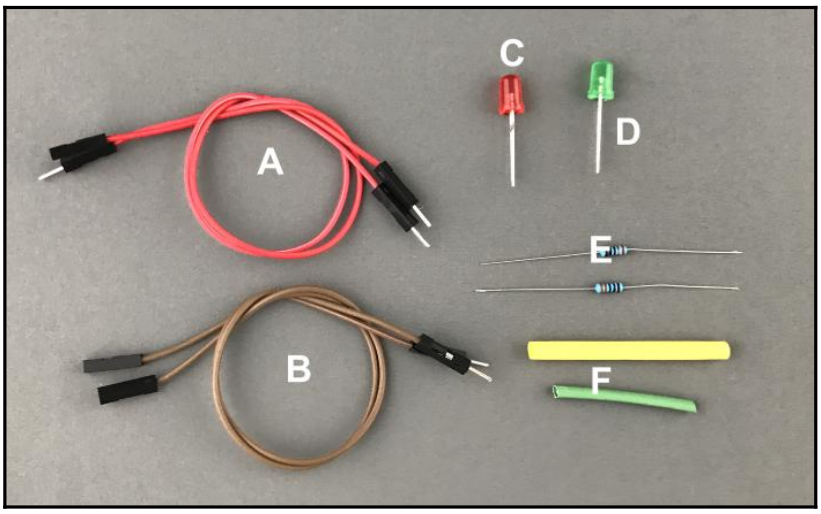


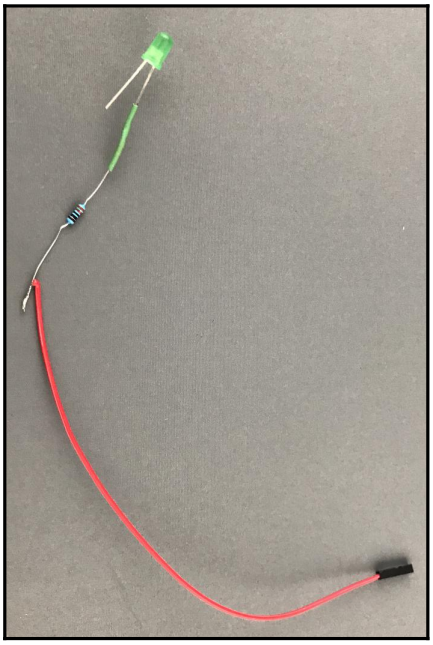


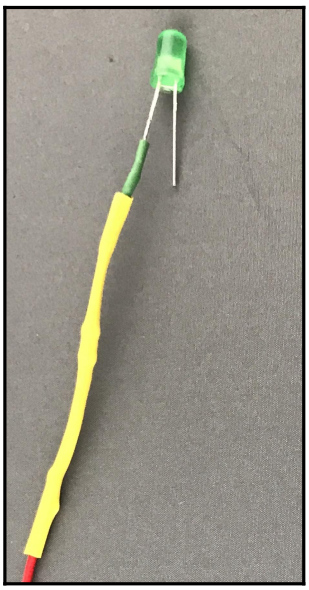


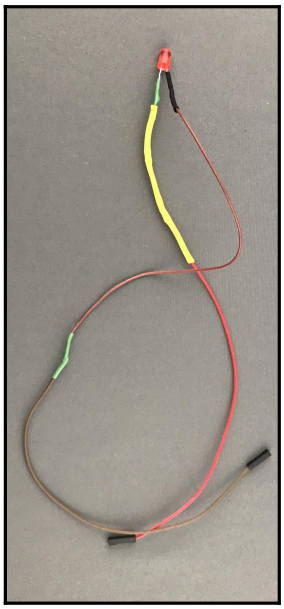


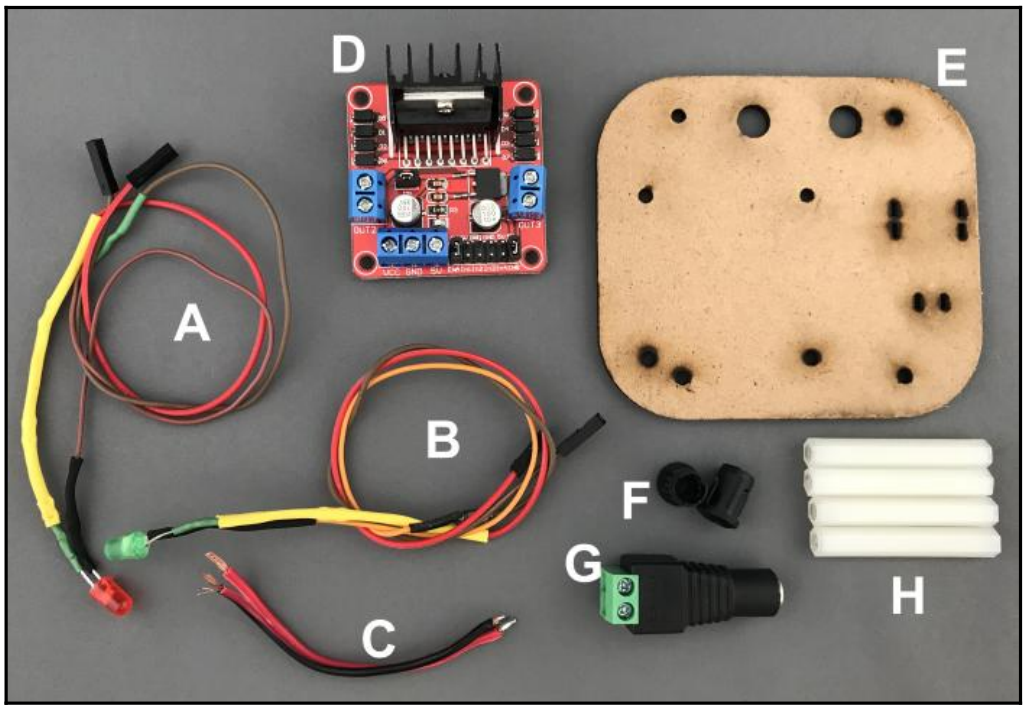


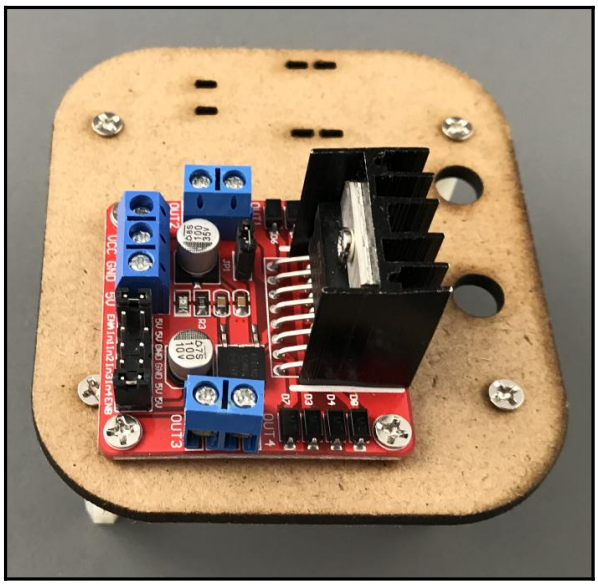

C
D
A
E
B
F

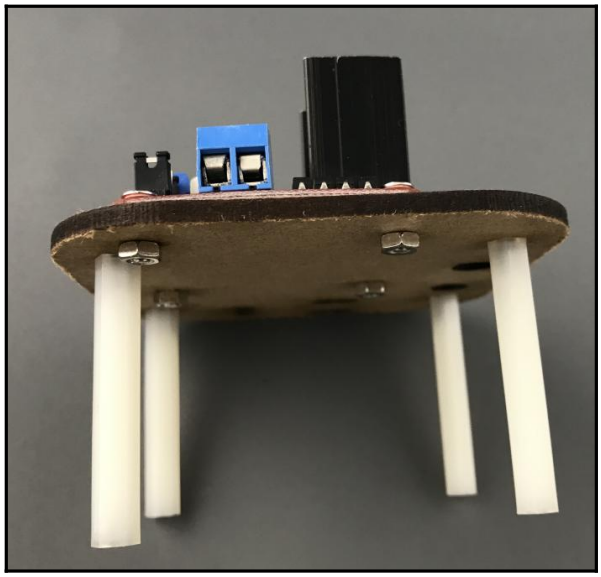


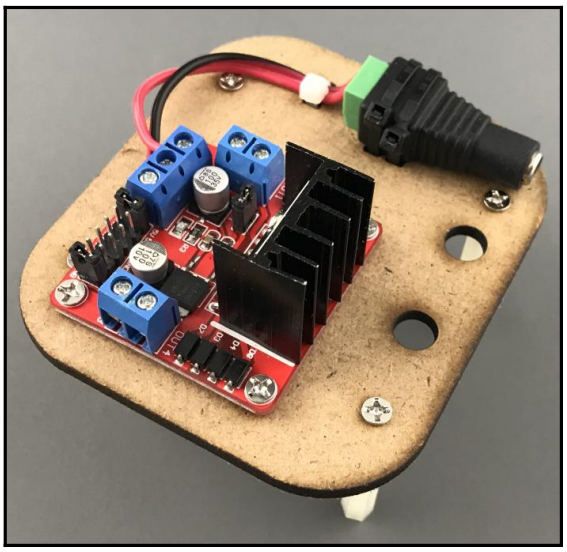


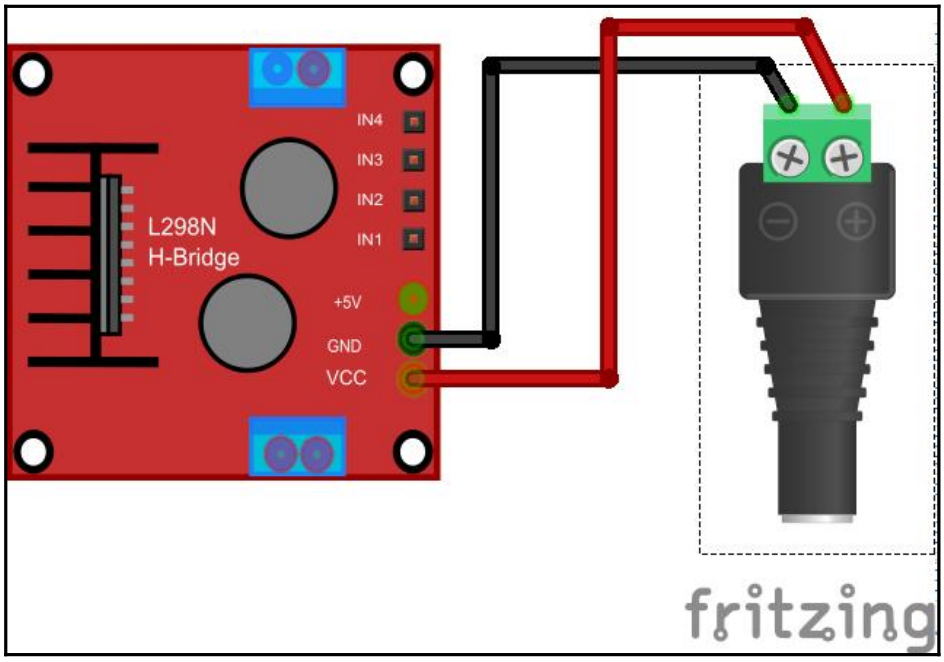


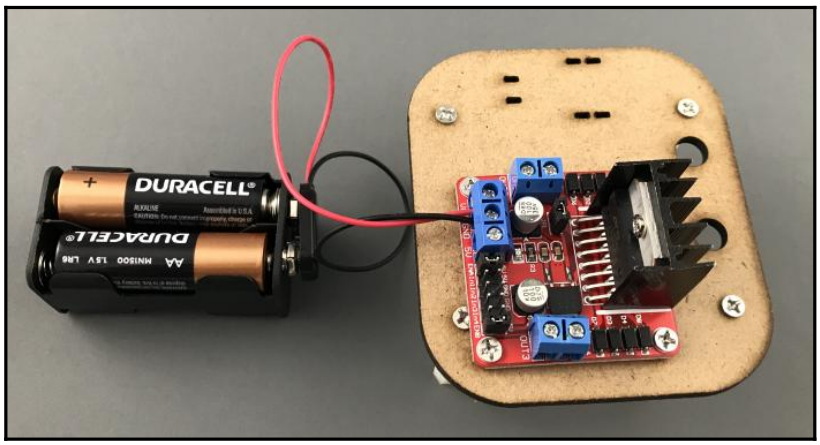

D
E
A
B
F
G
H
C

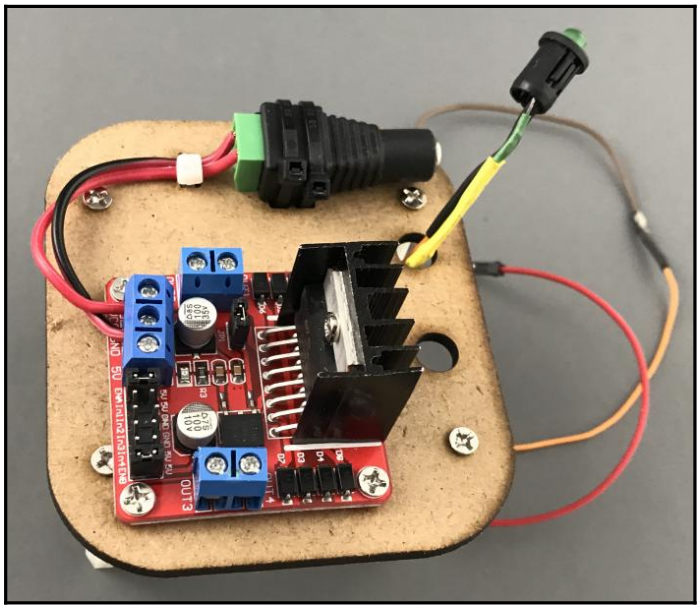

OUT2
OUT1
OUT3
OUT4

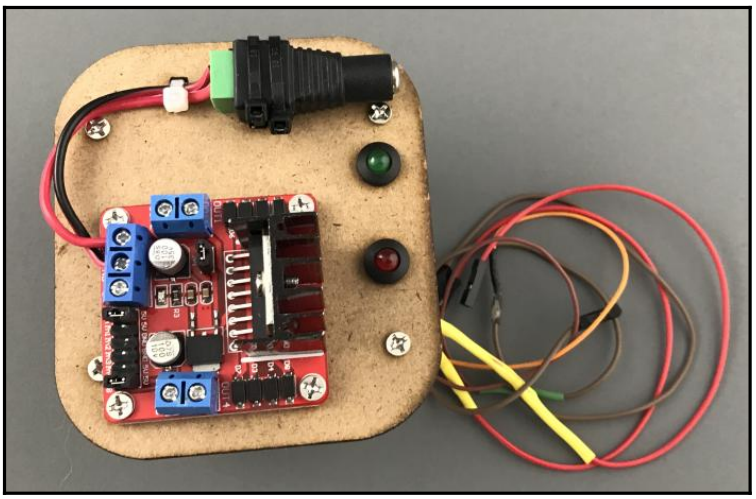


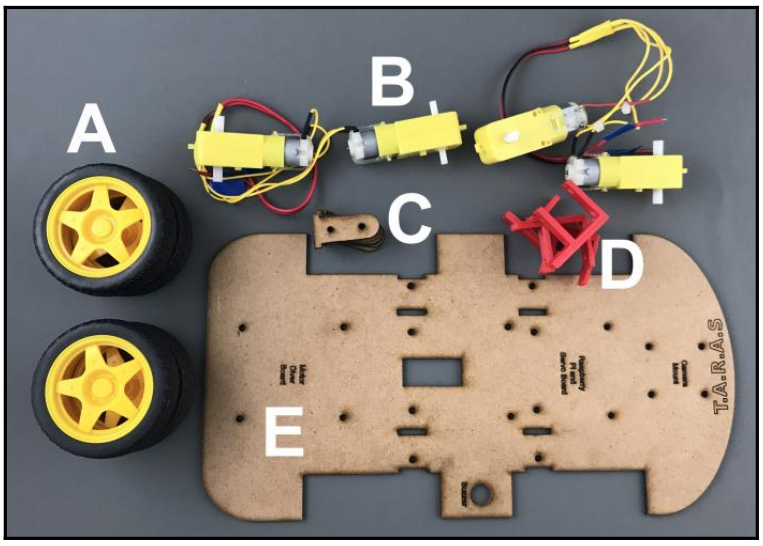


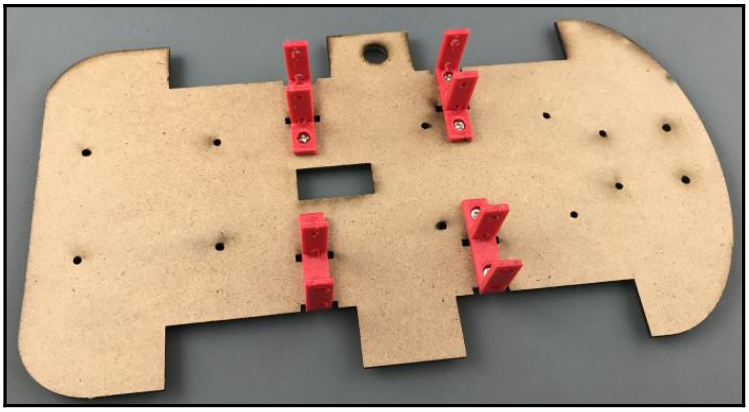

IN4
IN3
IN2
IN1
L298N
H-Bridge
+5V
GND
VCC
fritzing

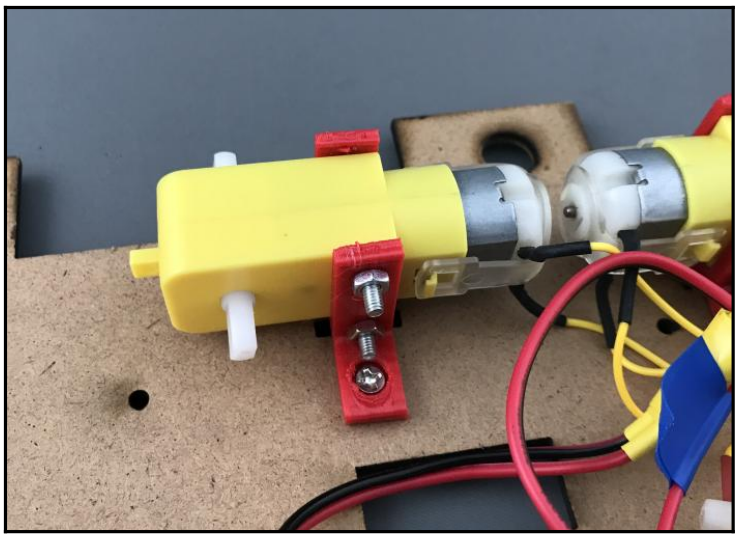

DURACELL

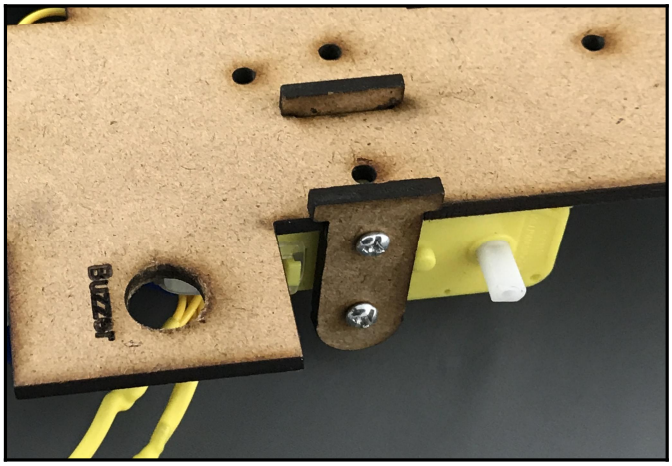


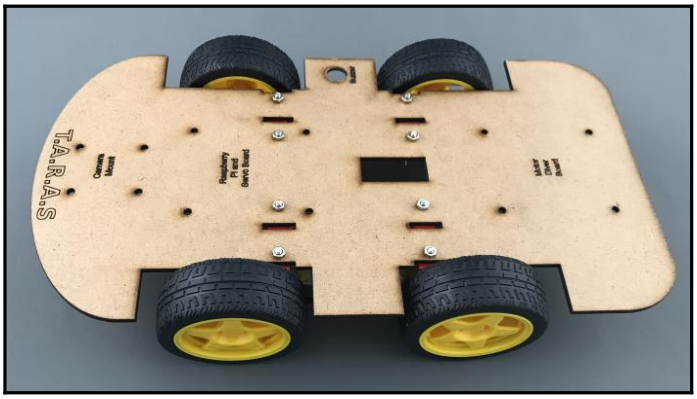


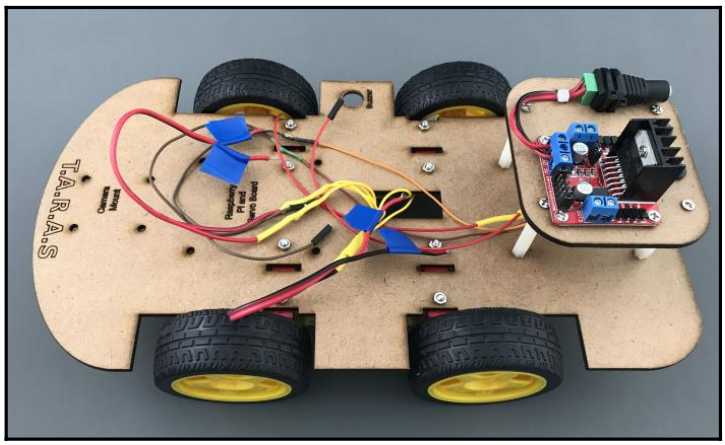

A
B
C
D
E
T.A.R.A.S

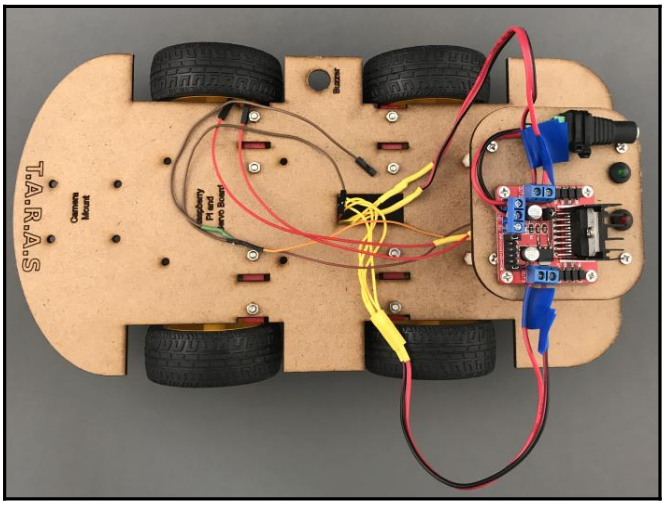


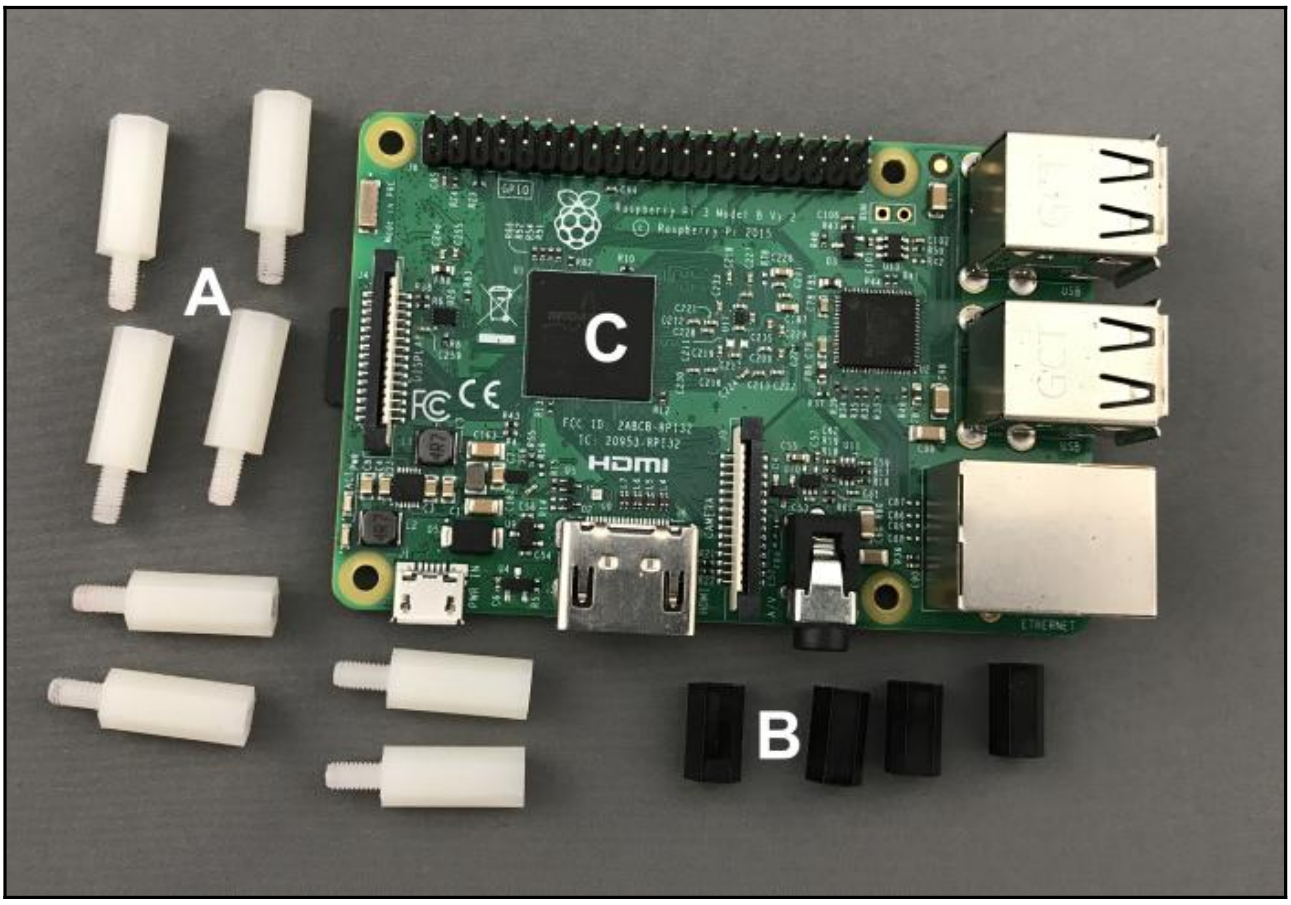


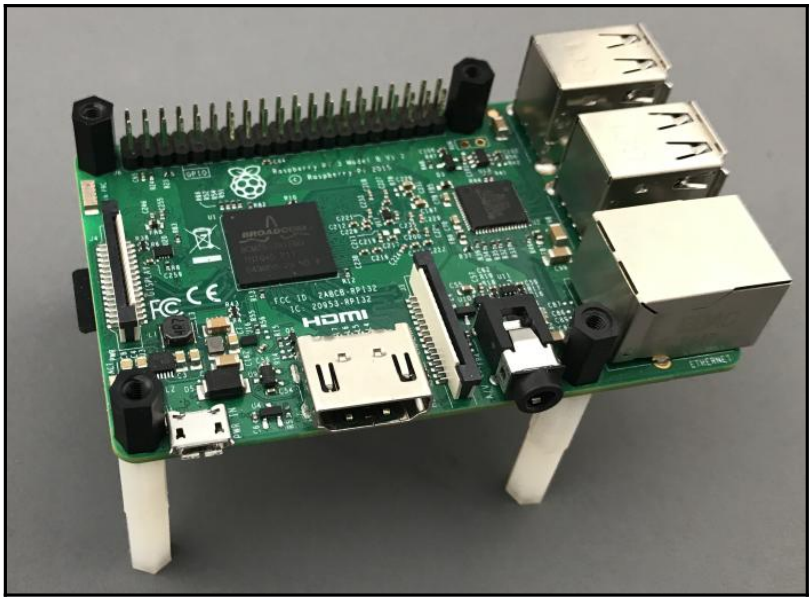

Buzzer

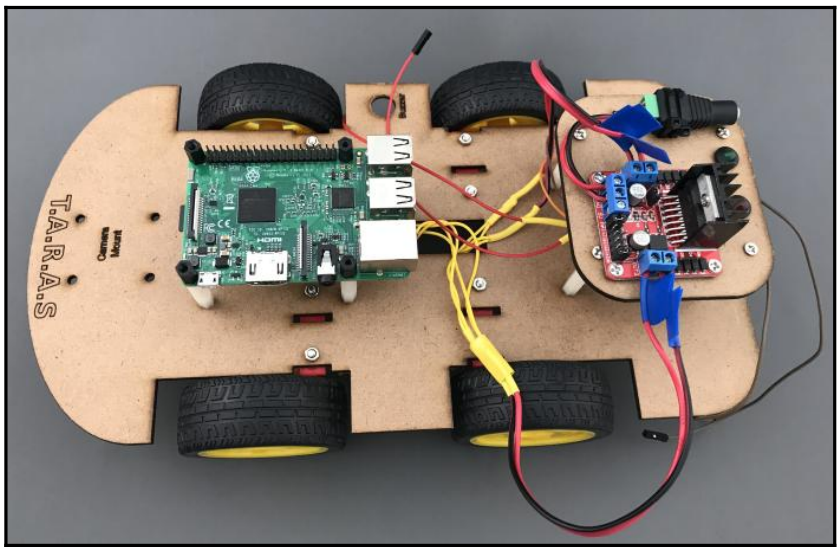

T.A.R.A.S

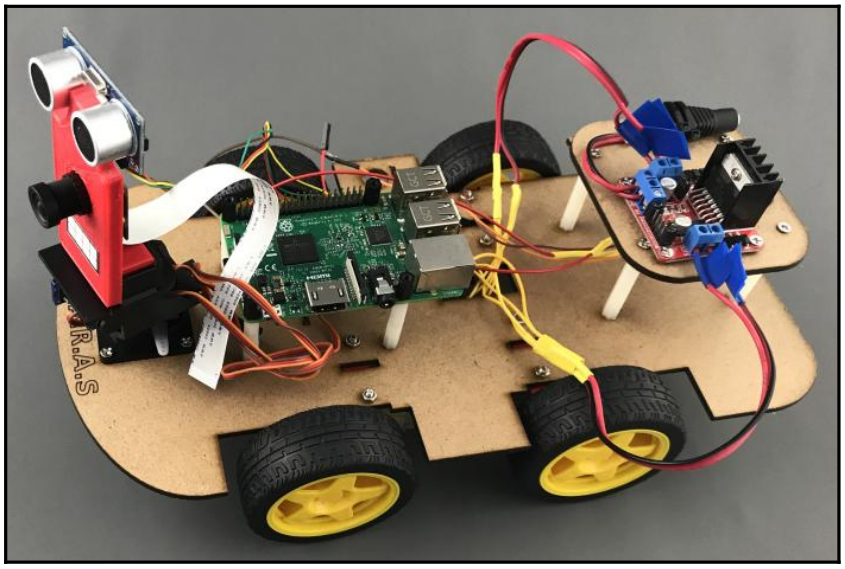

T.A.R.A.S
Camera Mount
Raspberry Pi and Servo Board

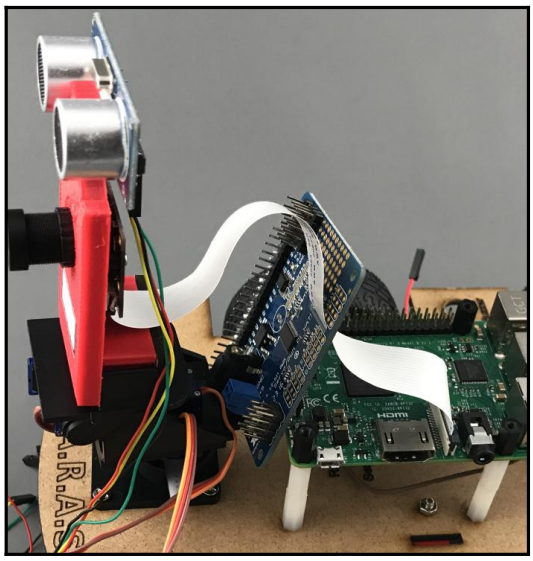

T.A.R.A.S
Camera Mount
Raspberry Pi and Servo Board
Buzzer

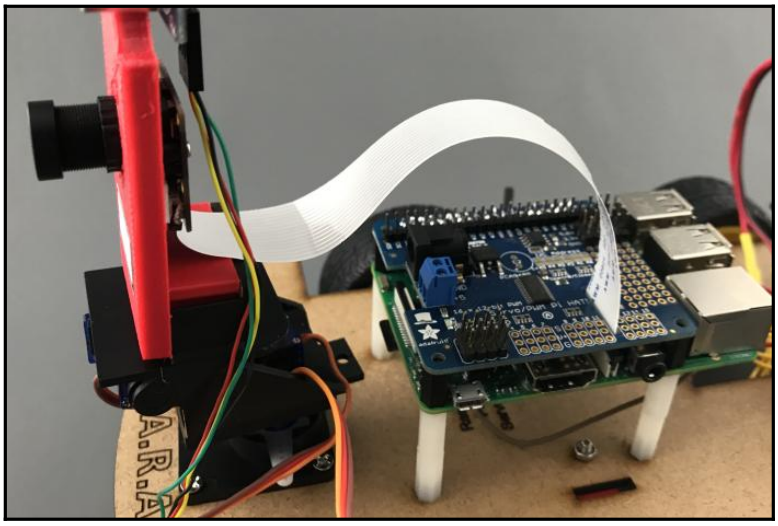

A
C
B

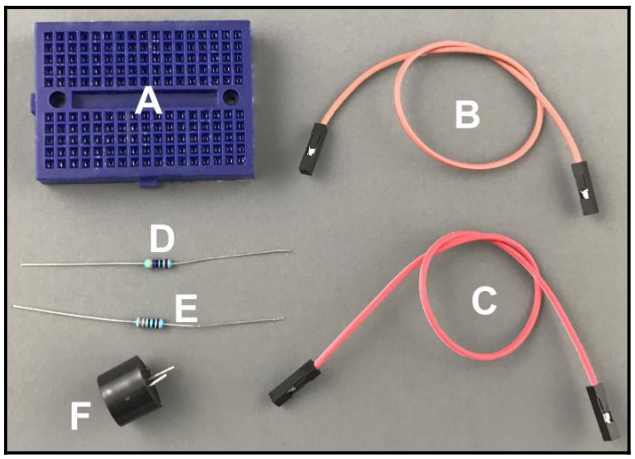


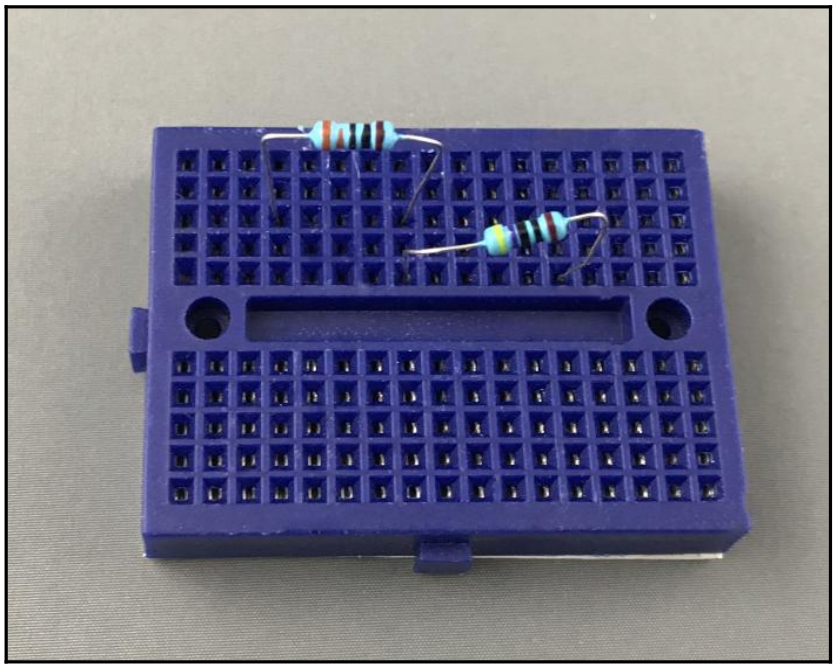

T.A.R.A.S
Camera
Mount

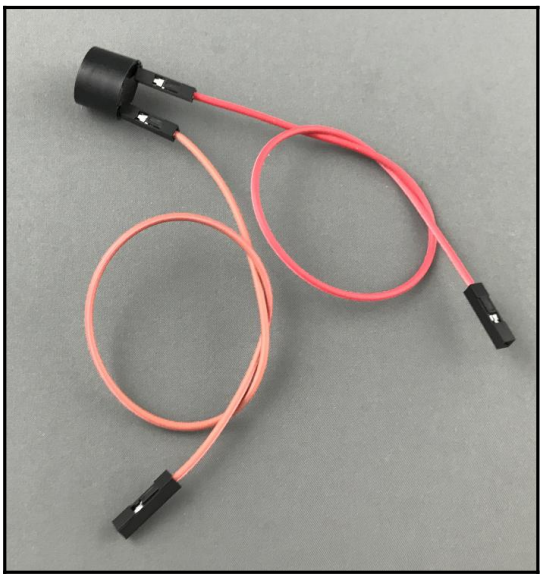

T.A.R.A.S

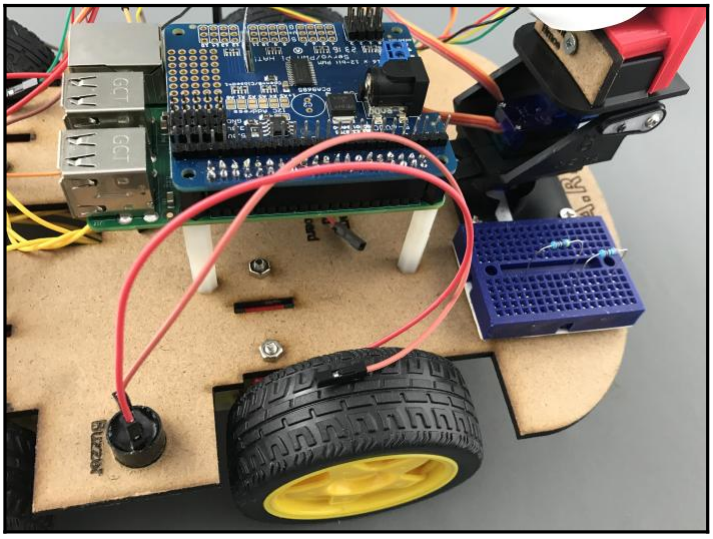


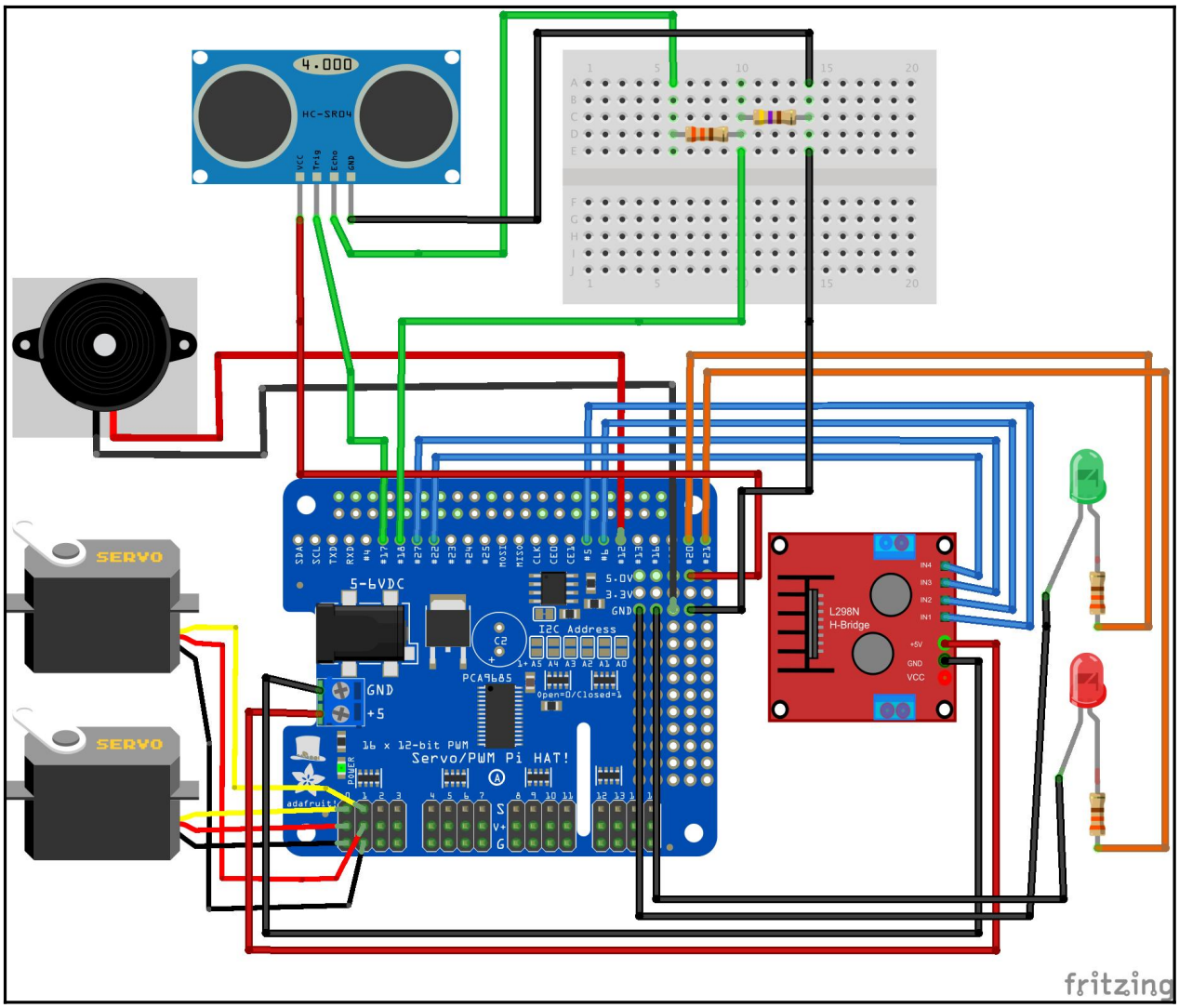



A
B
D
E
C
F

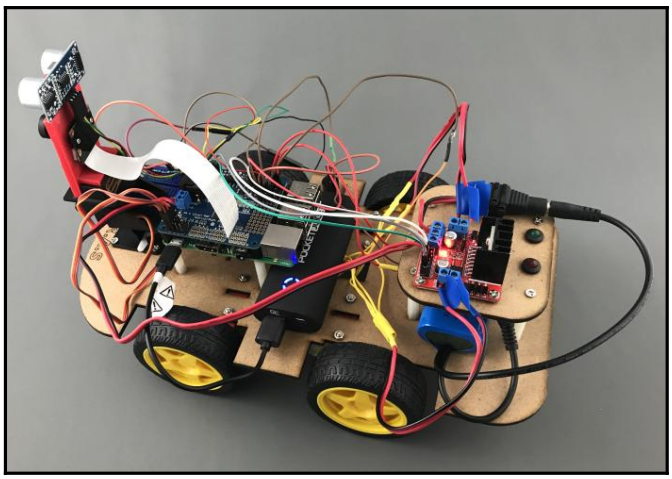


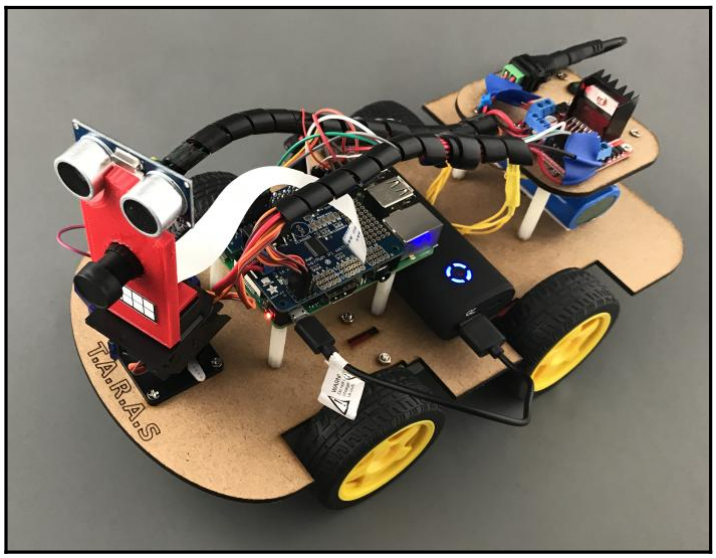


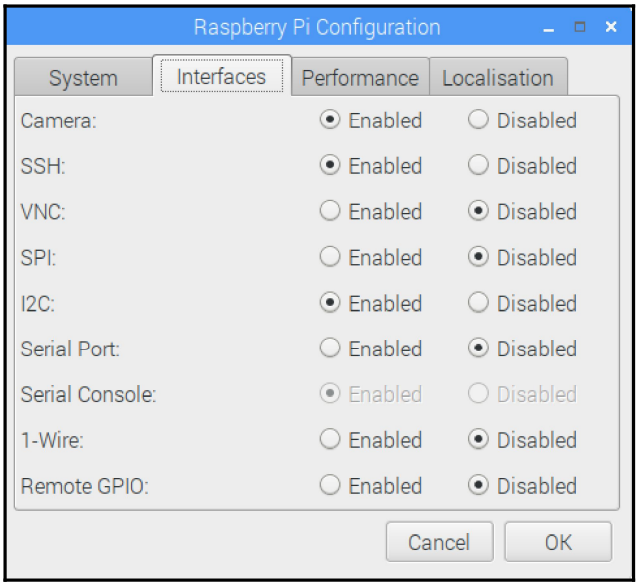


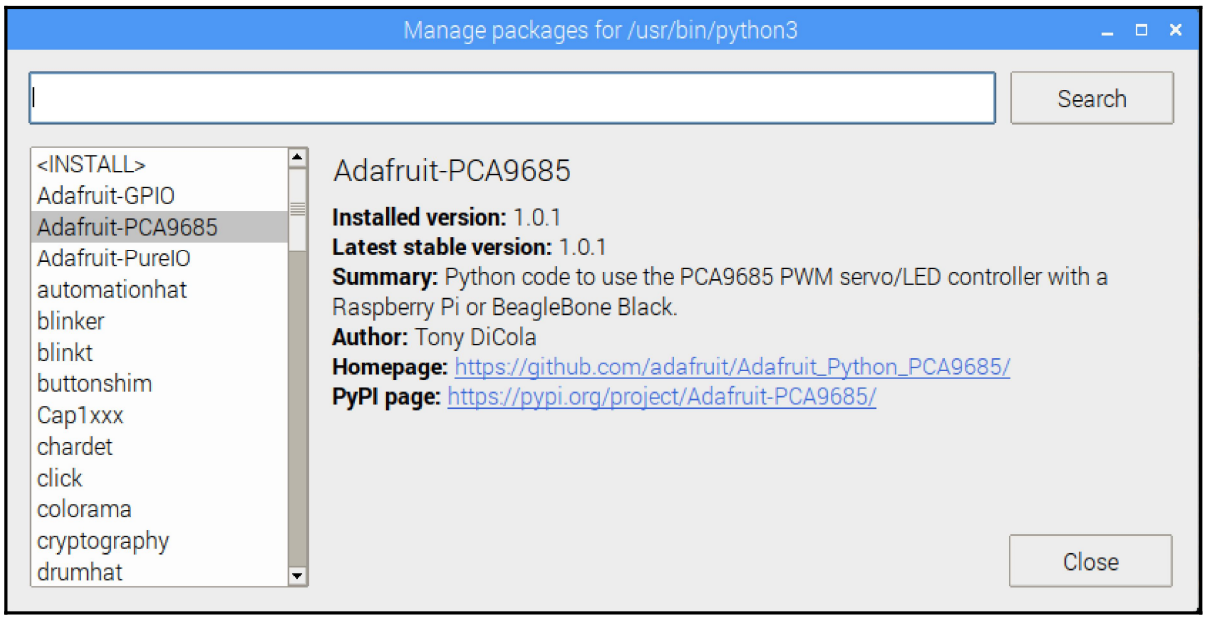

4.000
HC-SR04
VCC
Trig
Echo
GND
SERVO
SERVO
5-6VDC
GND
+5
5.0V
3.3V
GND
I2C Address
PCA9685
Open=0/Closed=1
16 x 12-bit PWM
Servo/PWM Pi HAT!
adafruit
L298N
H-Bridge
IN4
IN3
IN2
IN1
+5V
GND
VCC
fritzing


POCKETJUICE
Xiao-R Technology Co.,Ltd
www.wifi-robots.com
7.4V-2200mAh

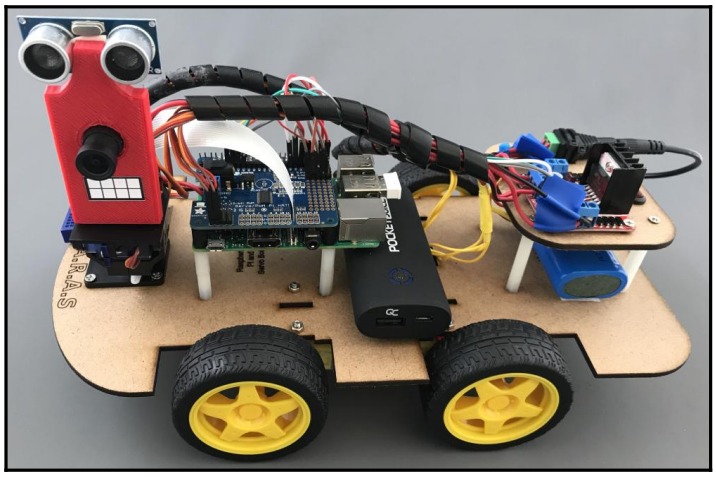


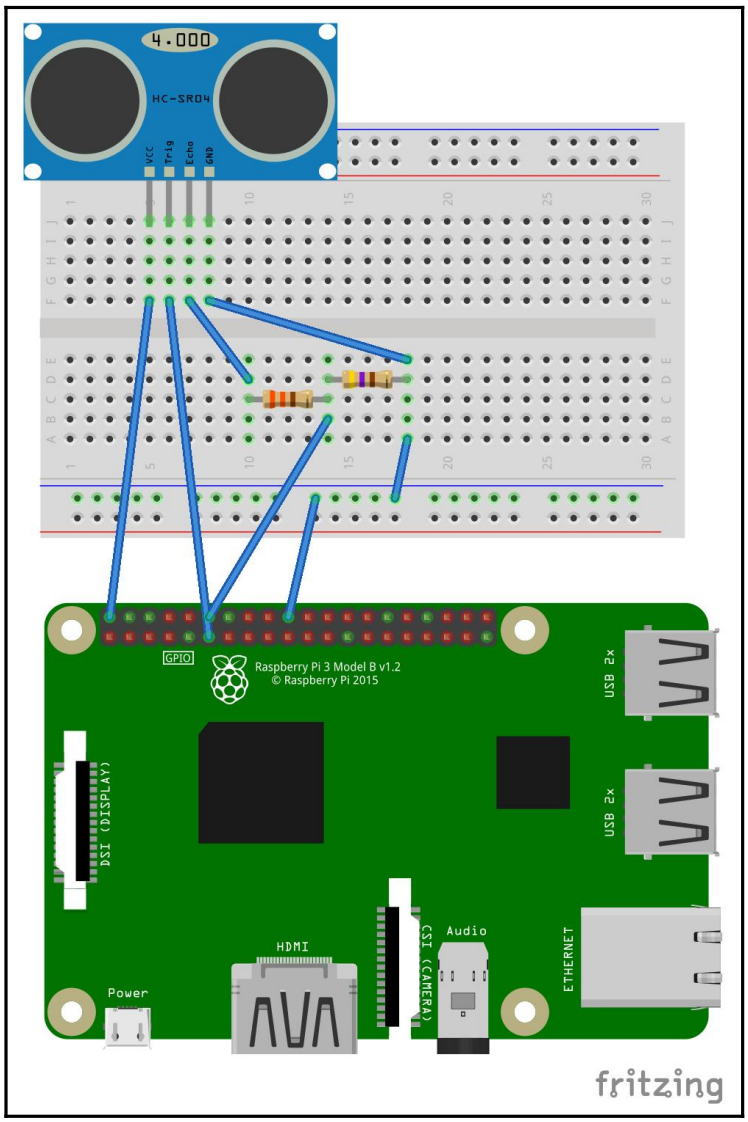

TARAS

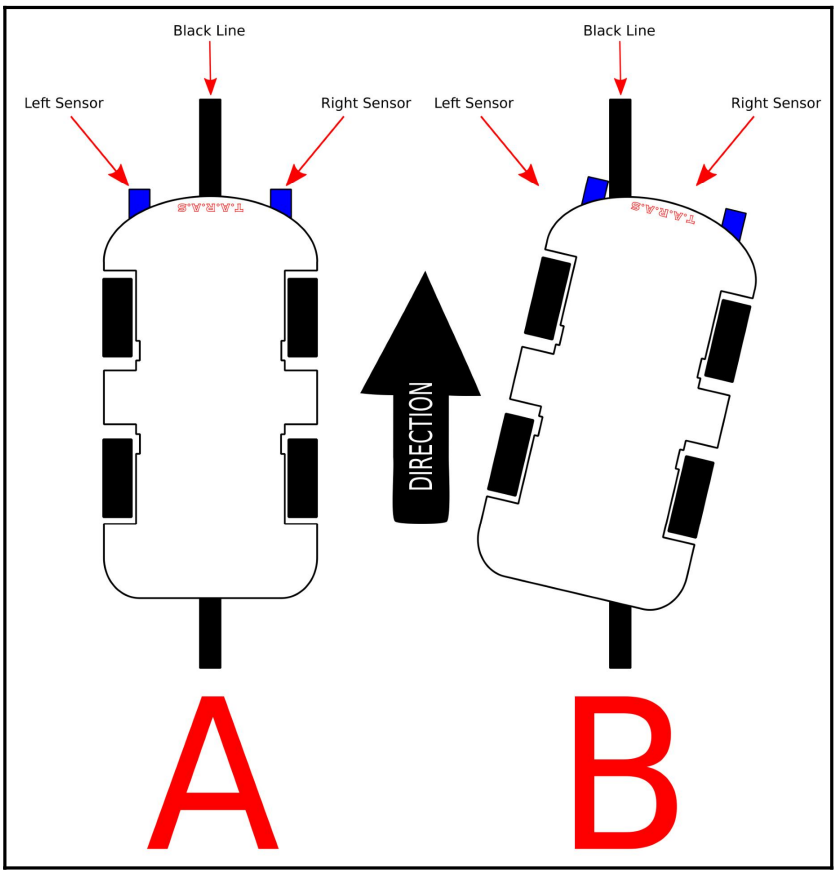

Raspberry Pi Configuration
System
Interfaces
Performance
Localisation
Camera: Enabled Disabled
SSH: Enabled Disabled
VNC: Enabled Disabled
SPI: Enabled Disabled
I2C: Enabled Disabled
Serial Port: Enabled Disabled
Serial Console: Enabled Disabled
1-Wire: Enabled Disabled
Remote GPIO: Enabled Disabled
Cancel
OK

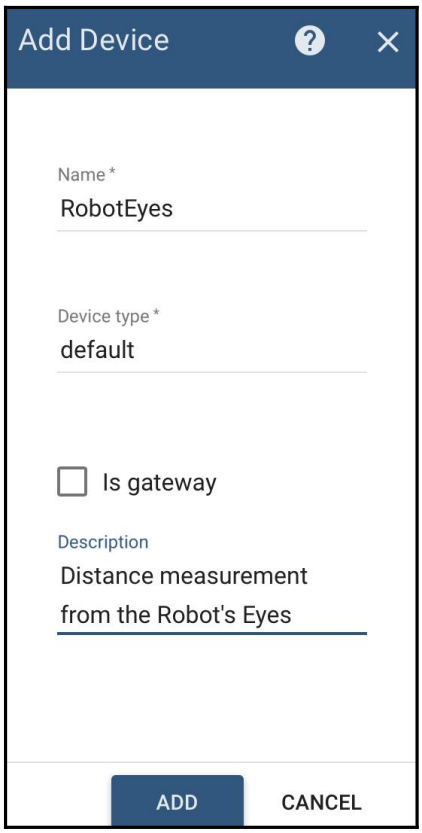

Manage packages for /usr/bin/python3
Search
<INSTALL>
Adafruit-GPIO
Adafruit-PCA9685
Adafruit-PureIO
automationhat
blinker
blinkt
buttonshim
Cap1xxx
chardet
click
colorama
cryptography
drumhat
Adafruit-PCA9685
Installed version: 1.0.1
Latest stable version: 1.0.1
Summary: Python code to use the PCA9685 PWM servo/LED controller with a Raspberry Pi or BeagleBone Black.
Author: Tony DiCola
Homepage: https://github.com/adafruit/Adafruit_Python_PCA9685/
PyPI page: https://pypi.org/project/Adafruit-PCA9685/
Close

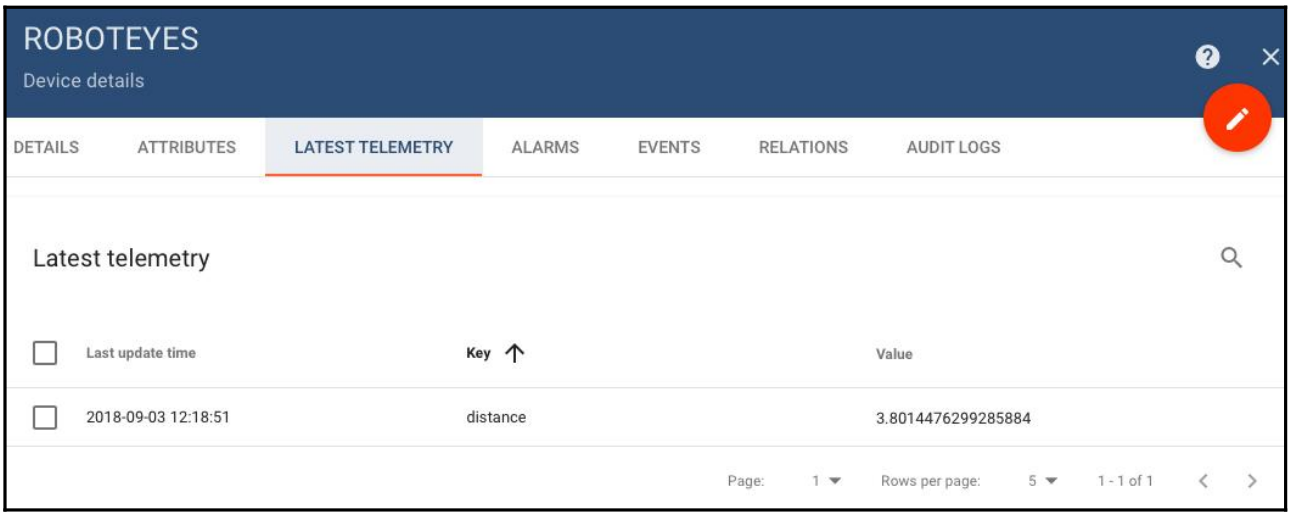
Chapter 15: Connecting Sensory Inputs from the Robot Car to the Web




4.000
HC-SR04
Vcc
Trig
Echo
GND
GPIO
Raspberry Pi 3 Model B v1.2
© Raspberry Pi 2015
USB 2x
USB 2x
DSI (DISPLAY)
HDMI
CSI (CAMERA)
Audio
ETHERNET
Power
fritzing

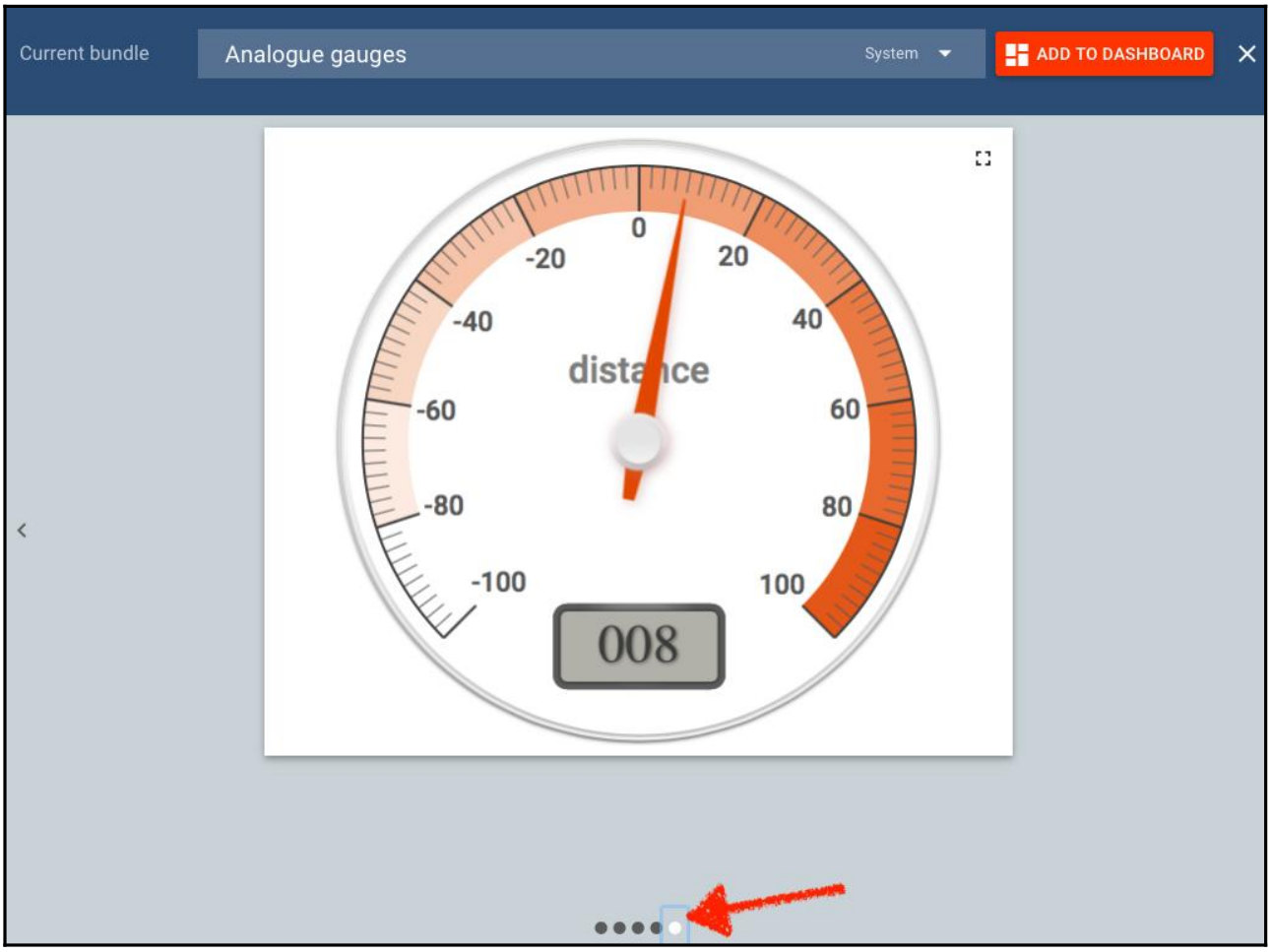

Black Line
Left Sensor
Right Sensor
DIRECTION
Black Line
Left Sensor
Right Sensor
A
B

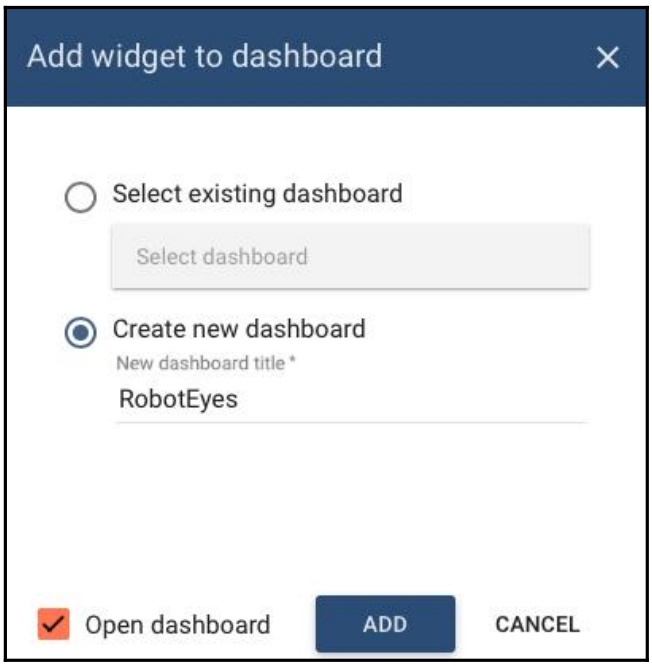

Add Device
Name *
RobotEyes
Device type *
default
Is gateway
Description
Distance measurement
from the Robot's Eyes
ADD
CANCEL


ROBOTEYES
Device details
DETAILS
ATTRIBUTES
LATEST TELEMETRY
ALARMS
EVENTS
RELATIONS
AUDIT LOGS
Latest telemetry
Last update time
Key
Value
2018-09-03 12:18:51
distance
3.8014476299285884
Page: 1
Rows per page: 5
1 - 1 of 1


1 telemetry unit selected
SHOW ON WIDGET
Last update time
Key
Value
2018-09-03 12:25:37
distance
7.5926653146743766
Page:
1
Rows per page:
5
1 - 1 of 1

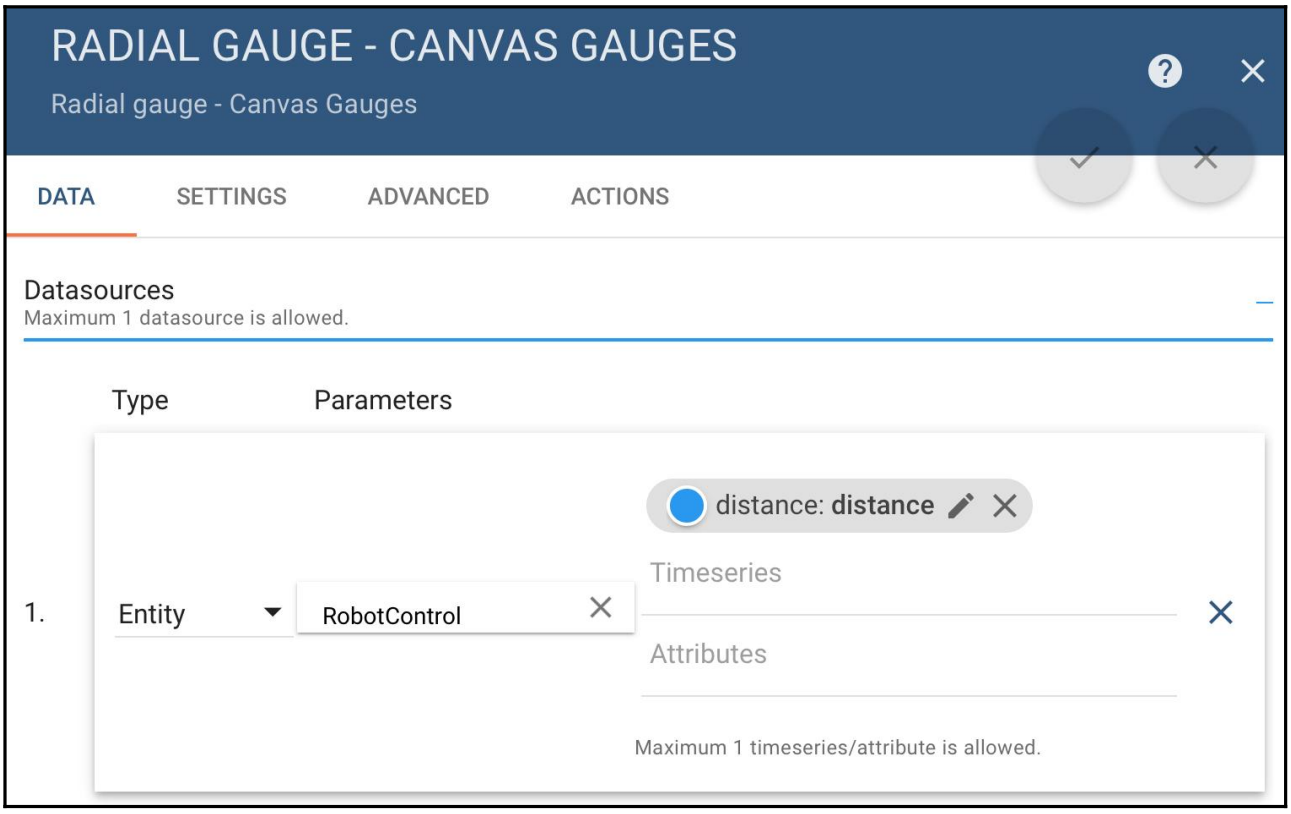

Current bundle
Analogue gauges
System
ADD TO DASHBOARD

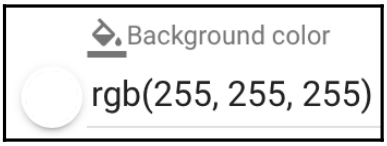

Current bundle
Analogue gauges
System
ADD TO DASHBOARD
0
-20
20
-40
40
distance
-60
60
-80
80
-100
100
008

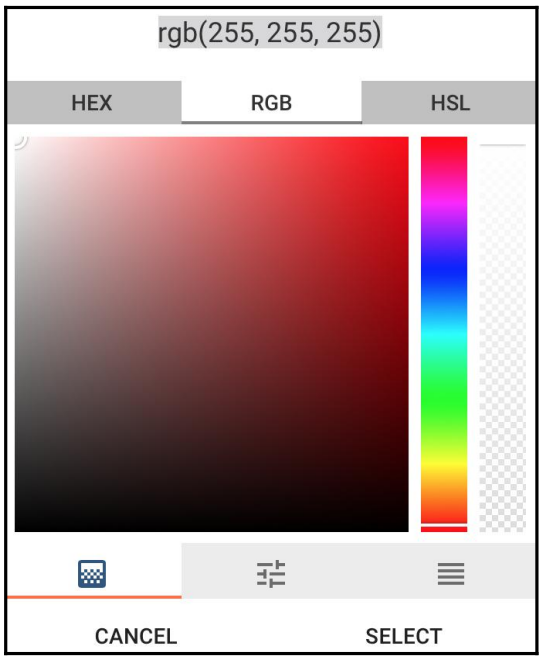

Add widget to dashboard
Select existing dashboard
Select dashboard
Create new dashboard
New dashboard title *
RobotEyes
Open dashboard
ADD
CANCEL


0
-20
20
-40
40
distance
-60
60
-80
80
-100
100
006

Chapter 16: Controlling the Robot Car with Web Service Calls






rgb(255, 255, 255)
HEX
RGB
HSL
CANCEL
SELECT


RobotEyes
0
-20
20
-40
40
distance
-60
60
-80
80
-100
100
007.2

ROBOTEYES

Radial gauge - Canvas Gauges

DATA SETTINGS ADVANCED ACTIONS

Start ticks angle

45

Ticks angle

270

Needle circle size

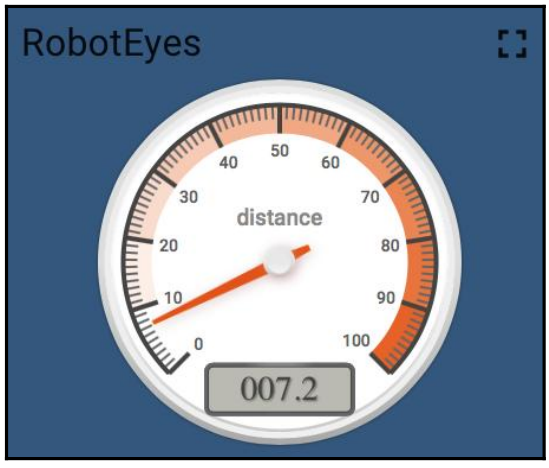
10

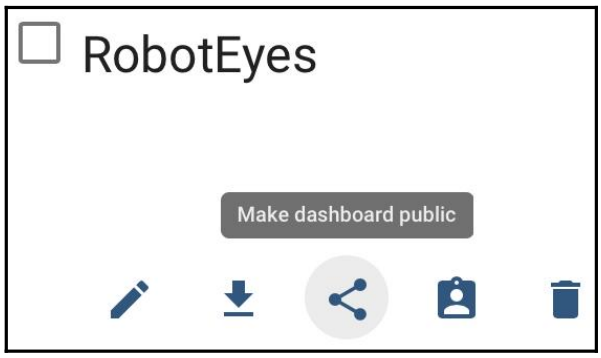
Minimum value

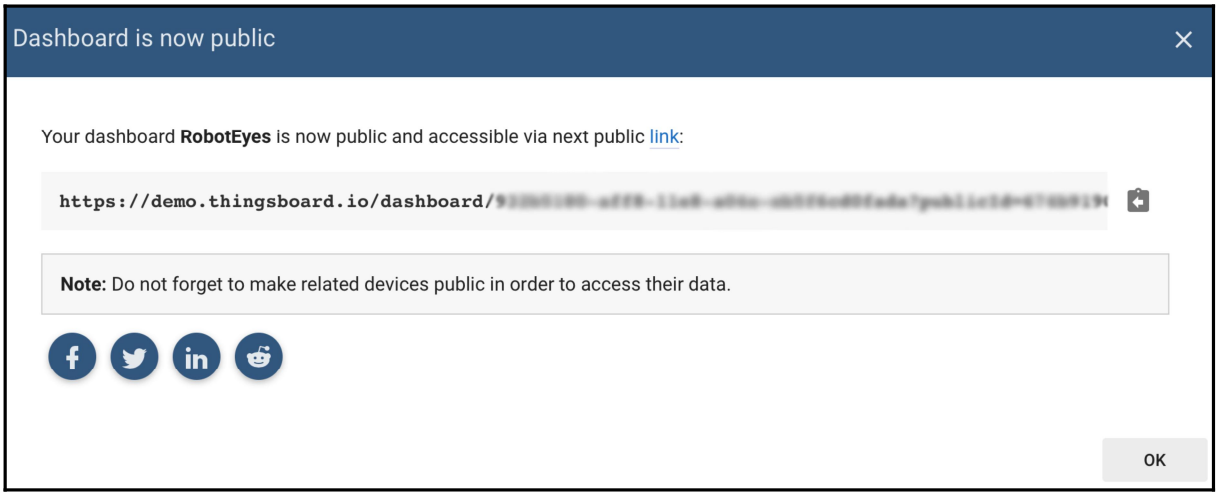
0

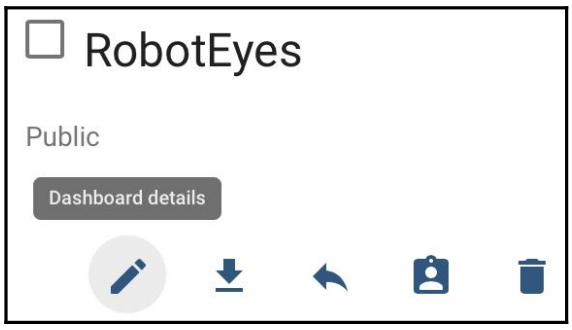
Maximum value

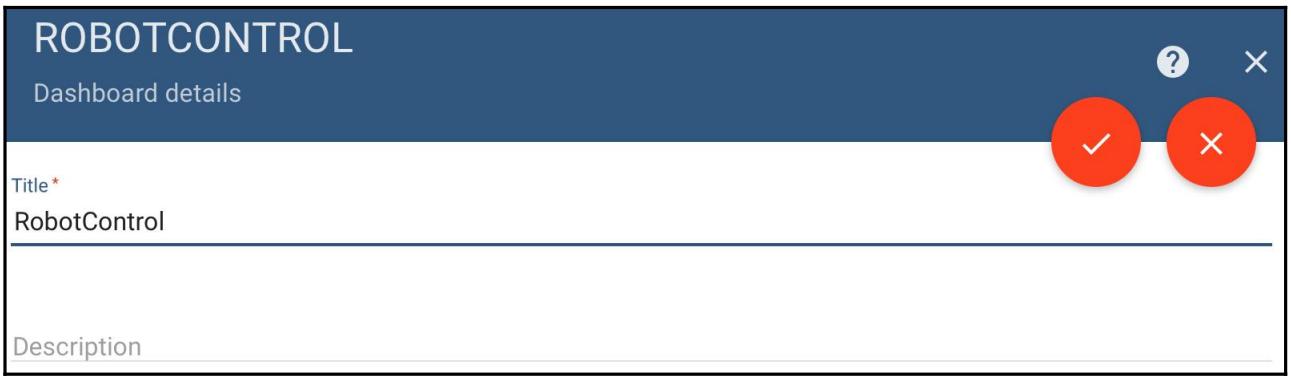
100



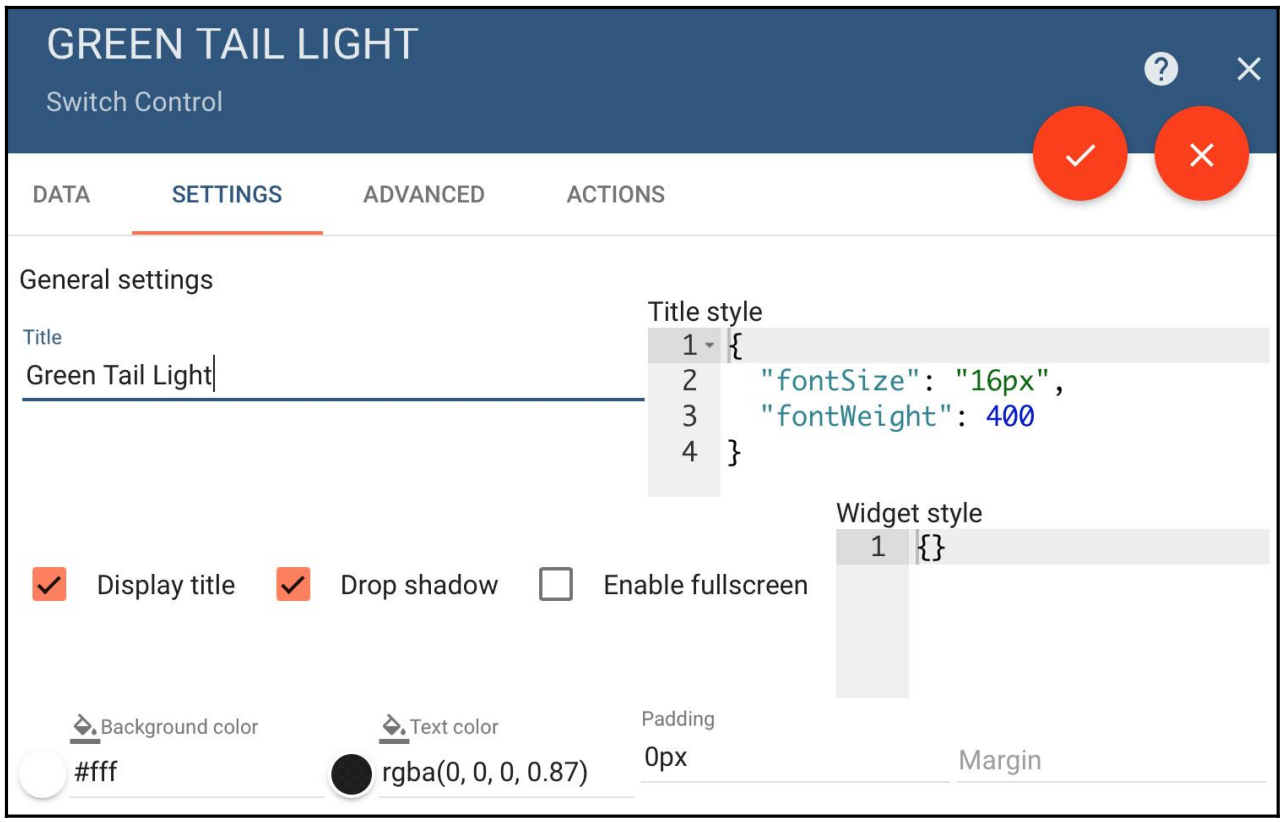

RobotEyes
Make dashboard public

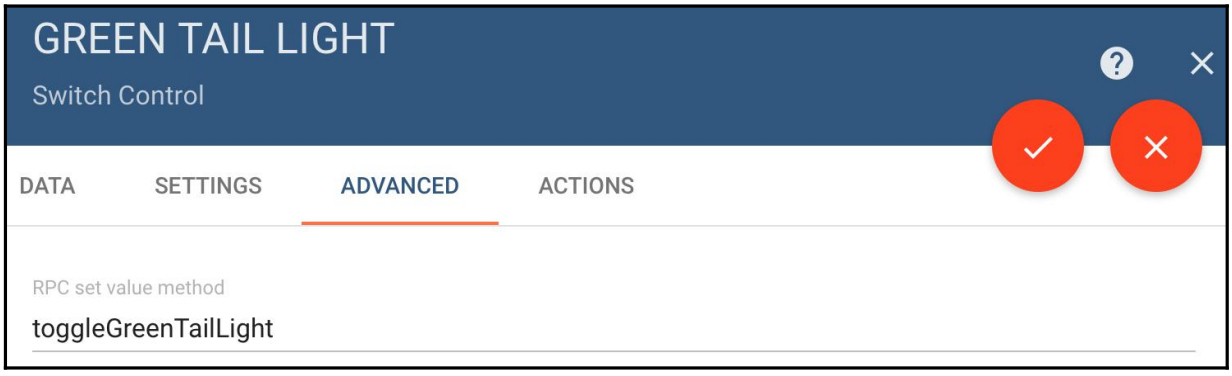

Dashboard is now public
Your dashboard RobotEyes is now public and accessible via next public link:
https://demo.thingsboard.io/dashboard/
Note: Do not forget to make related devices public in order to access their data.
OK


RobotEyes
Public
Dashboard details

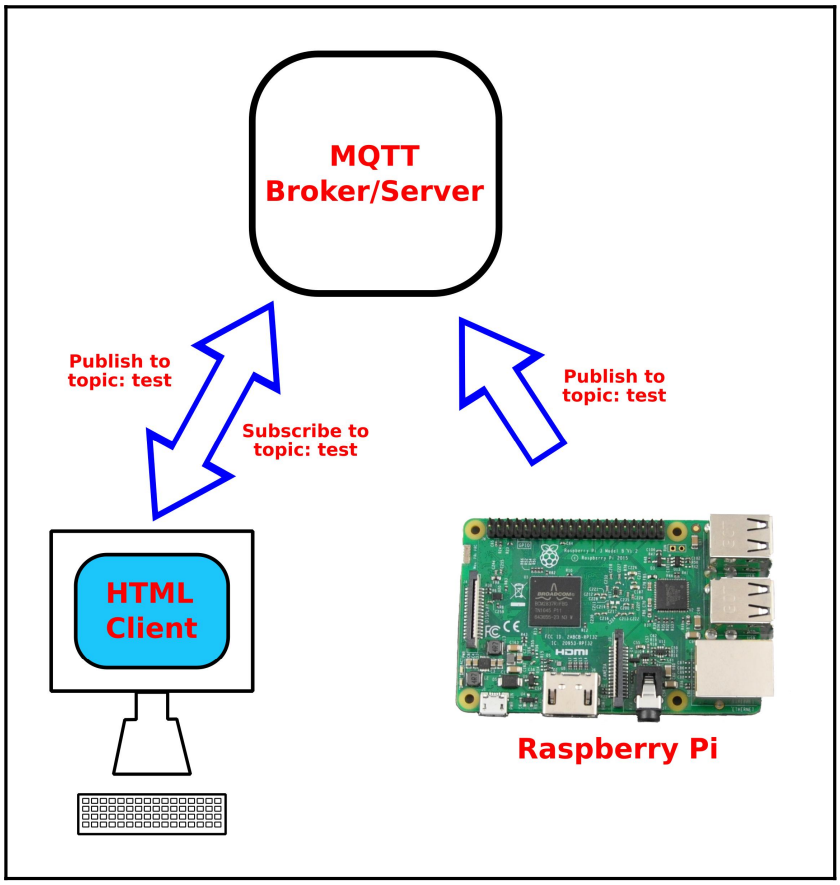

ROBOTCONTROL
Dashboard details
Title *
RobotControl
Description

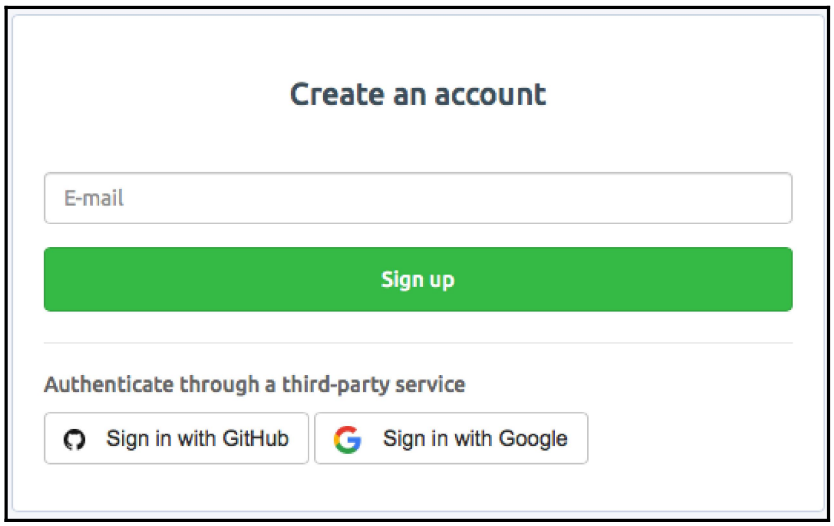

SELECT WIDGET
Current bundle
Control widgets
System
CONTROL WIDGET
Target device is not set!
Led indicator
Target device is not set!
Round switch
I
0
Target device is not set!
Switch control
OFF

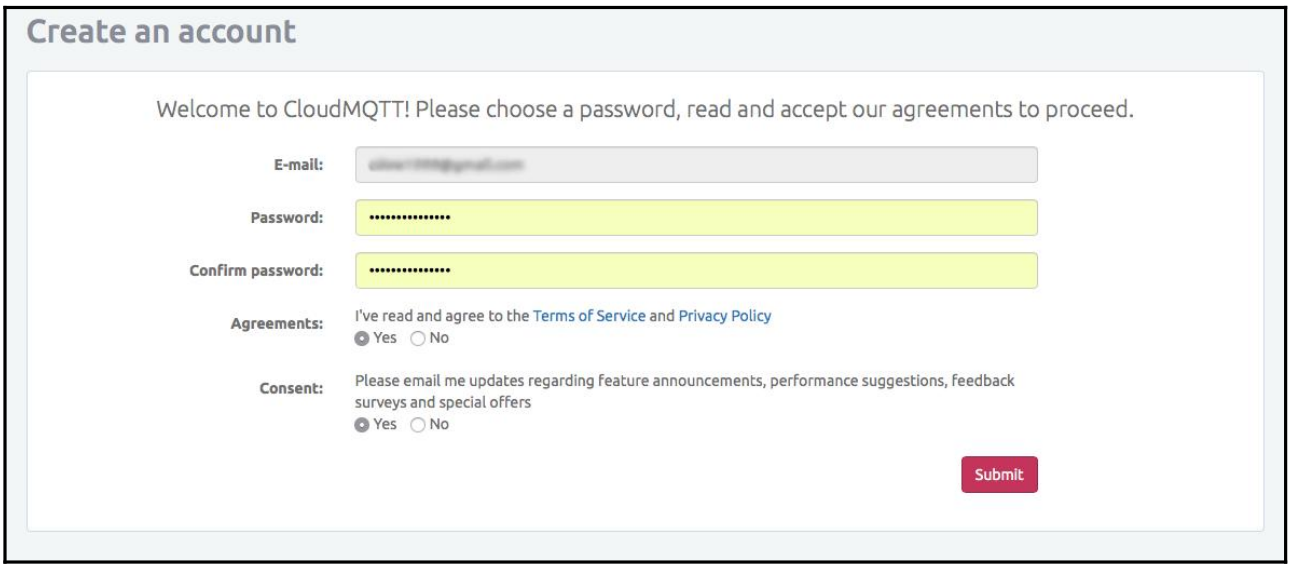

GREEN TAIL LIGHT
Switch Control
DATA
SETTINGS
ADVANCED
ACTIONS
General settings
Title
Green Tail Light
Title style
{
"fontSize": "16px",
"fontWeight": 400
}
Widget style
{}
Display title
Drop shadow
Enable fullscreen
Background color
#fff
Text color
rgba(0, 0, 0, 0.87)
Padding
0px
Margin

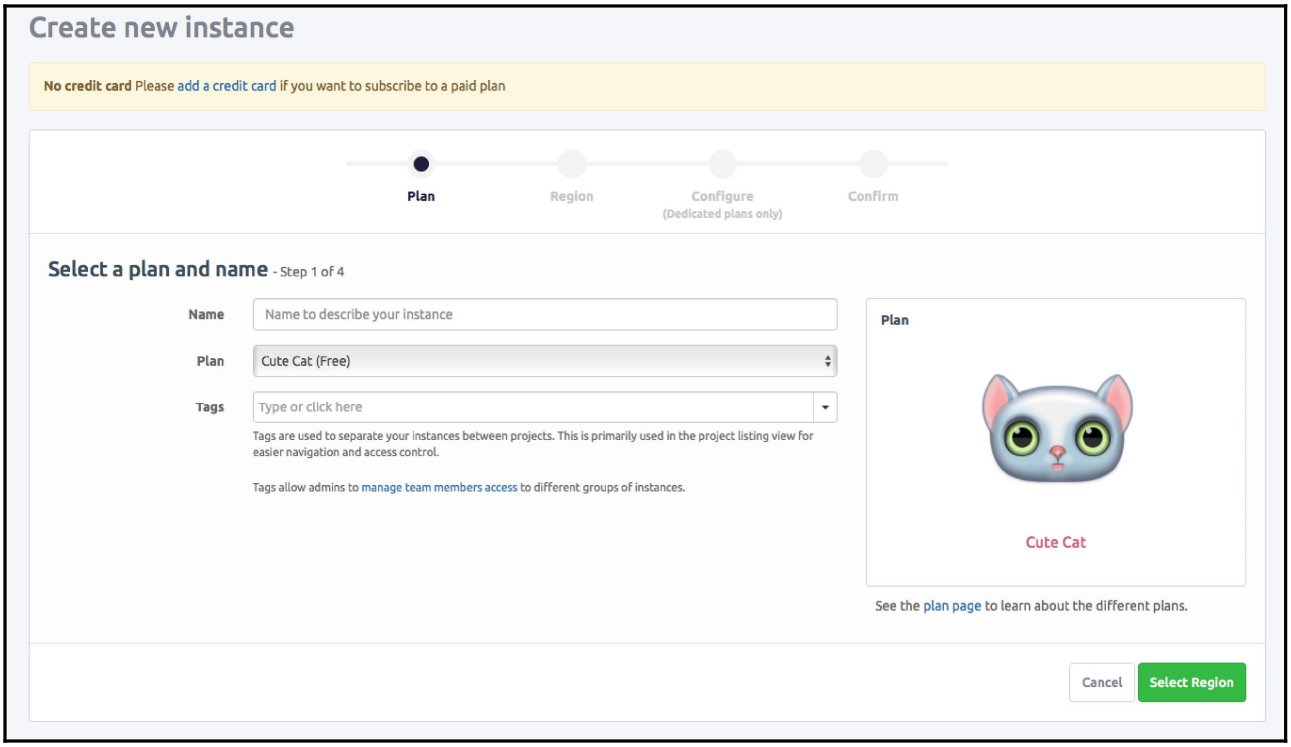

GREEN TAIL LIGHT
Switch Control
DATA
SETTINGS
ADVANCED
ACTIONS
RPC set value method
toggleGreenTailLight

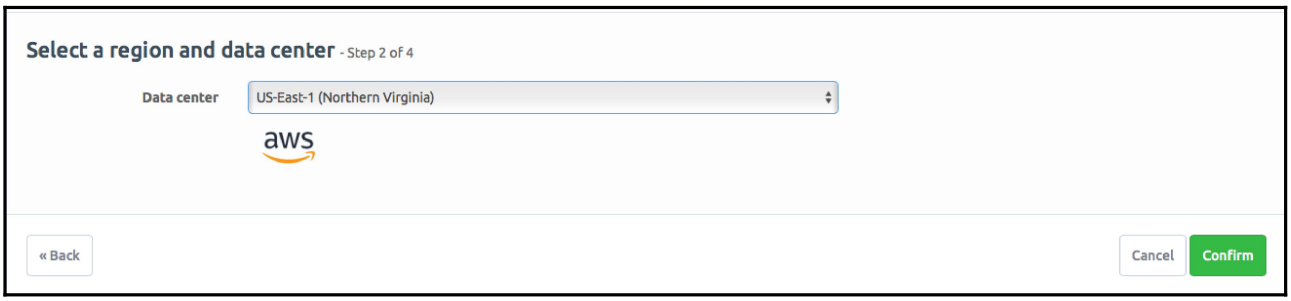
Chapter 17: Building the JavaScript Client

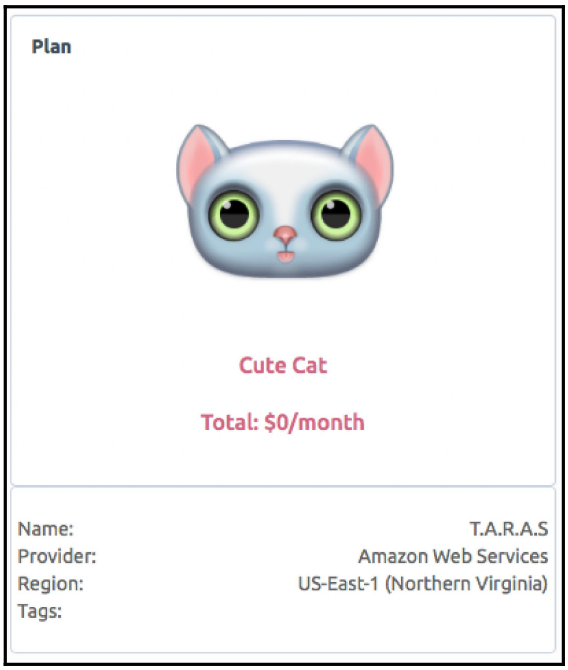





Create an account
Welcome to CloudMQTT! Please choose a password, read and accept our agreements to proceed.
E-mail:
Password:
Confirm password:
Agreements:
I've read and agree to the Terms of Service and Privacy Policy
Yes No
Consent:
Please email me updates regarding feature announcements, performance suggestions, feedback surveys and special offers
Yes No
Submit


Create new instance
No credit card Please add a credit card if you want to subscribe to a paid plan
Plan
Region
Configure
(Dedicated plans only)
Confirm
Select a plan and name - Step 1 of 4
Name
Name to describe your instance
Plan
Cute Cat (Free)
Tags
Type or click here
Tags are used to separate your instances between projects. This is primarily used in the project listing view for easier navigation and access control.
Tags allow admins to manage team members access to different groups of instances.
Plan
Cute Cat
See the plan page to learn about the different plans.
Cancel
Select Region

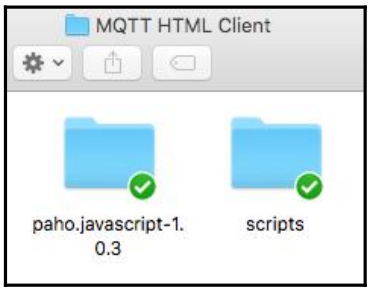

Select a region and data center - Step 2 of 4
Data center
US-East-1 (Northern Virginia)
aws
« Back
Cancel
Confirm

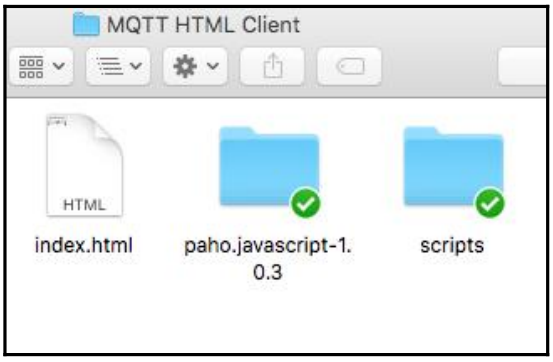

Plan
Cute Cat
Total: $0/month
Name:
T.A.R.A.S
Provider:
Amazon Web Services
Region:
US-East-1 (Northern Virginia)
Tags:


T.A.R.A.S.
Cat
Amazon Web Services US-East-1 (Northern Virginia)
Edit

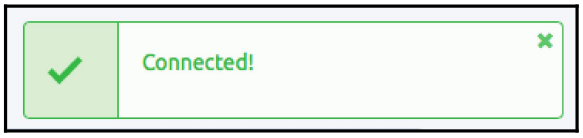
Instance info

Server	m15.cloudmqtt.com
User	ychzdsuq Restart
Password	t00uz5DWCsQ_ Rotate
Port	18086
SSL Port	28086
Websockets Port (TLS only)	38086
Connection limit	5



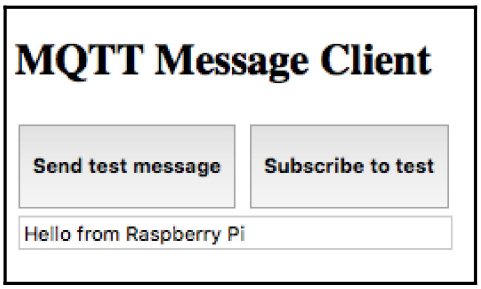



MQTT Message Client
Send test Message
Subscribe to test
Waiting for MQTT message

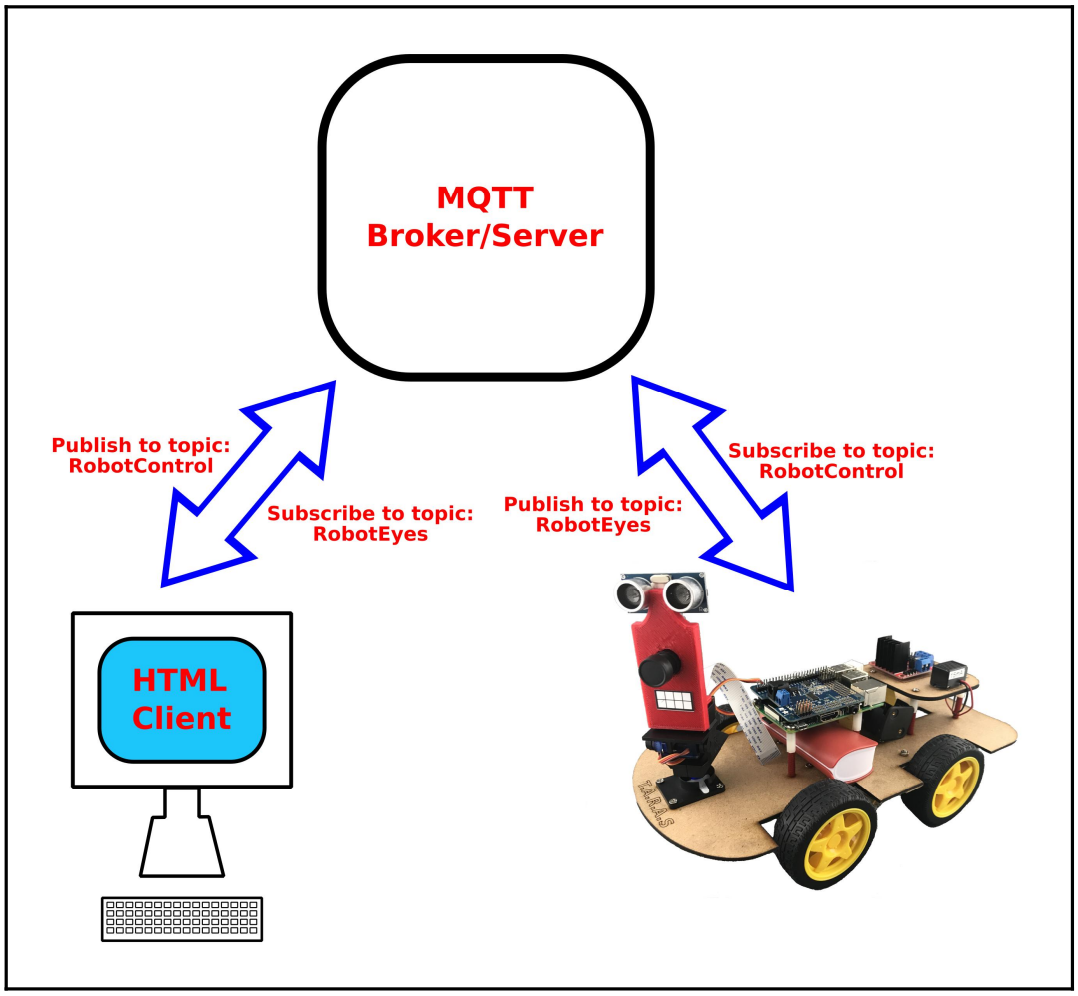

Connected!

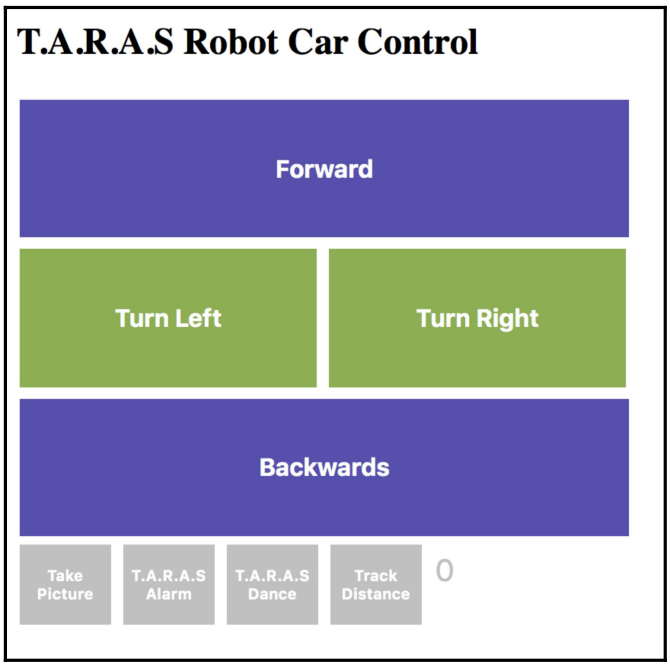

Received messages
Topic
Message
test
Hello from JavaScript client

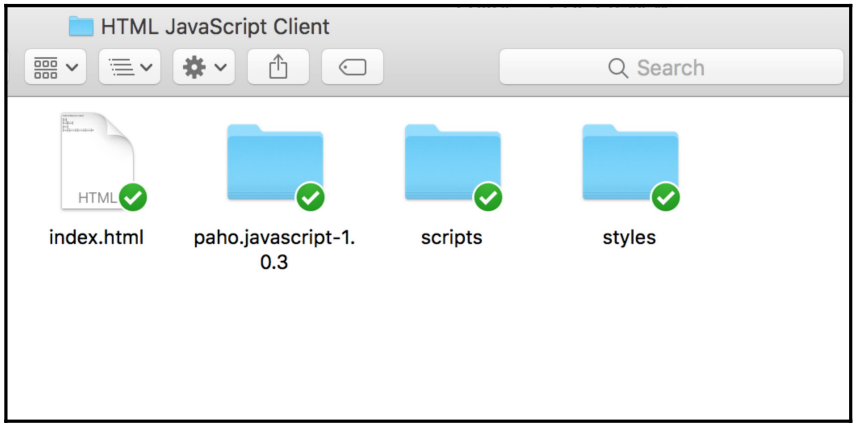

Received messages
Topic
Message
test
Hello from Raspberry Pi

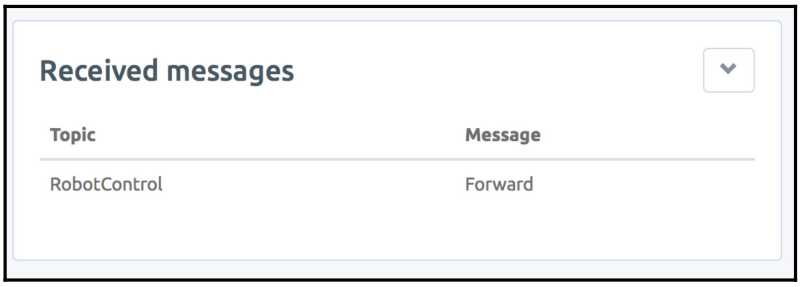

MQTT Message Client
Send test message
Subscribe to test
Hello from Raspberry Pi

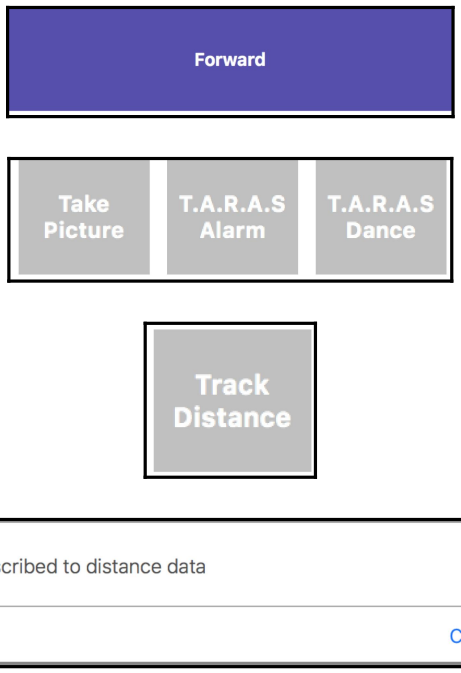
Chapter 18: Putting it All Together

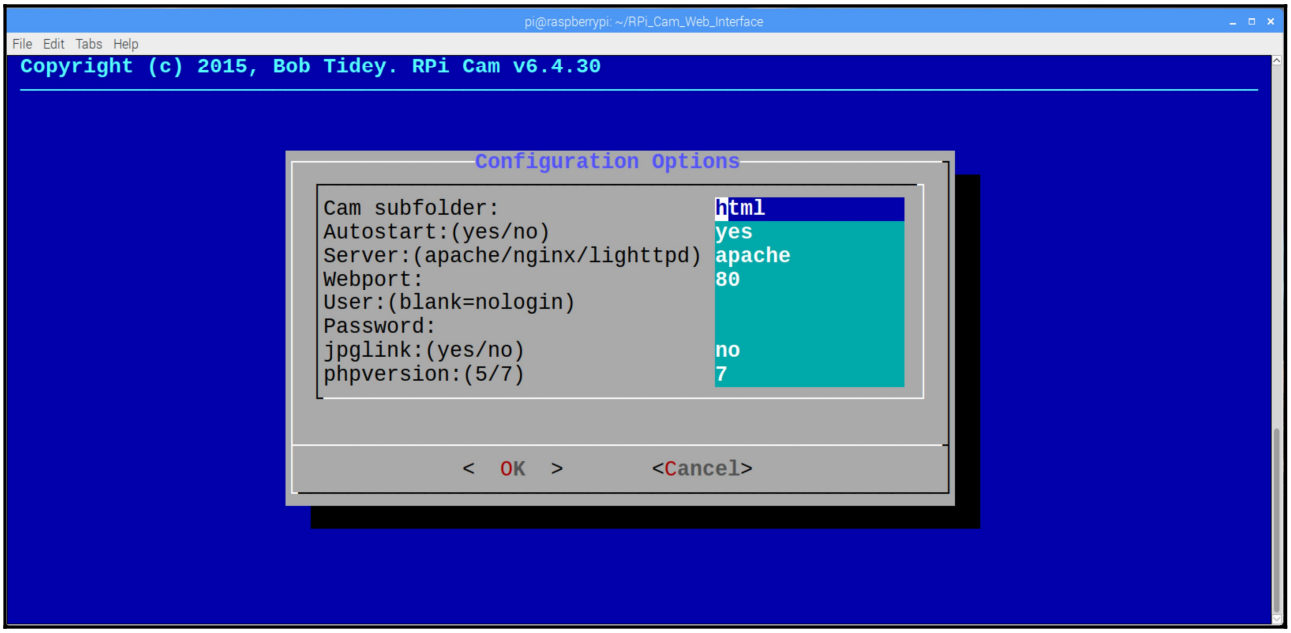


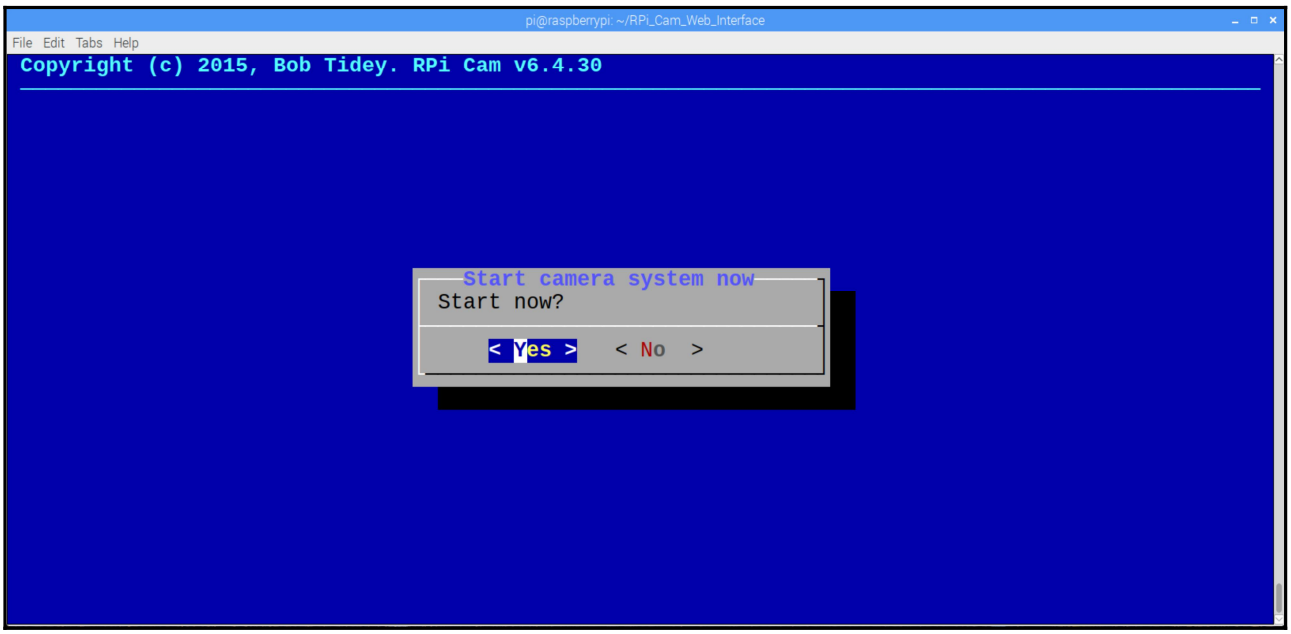

T.A.R.A.S Robot Car Control
Forward
Turn Left
Turn Right
Backwards
Take Picture
T.A.R.A.S Alarm
T.A.R.A.S Dance
Track Distance
0

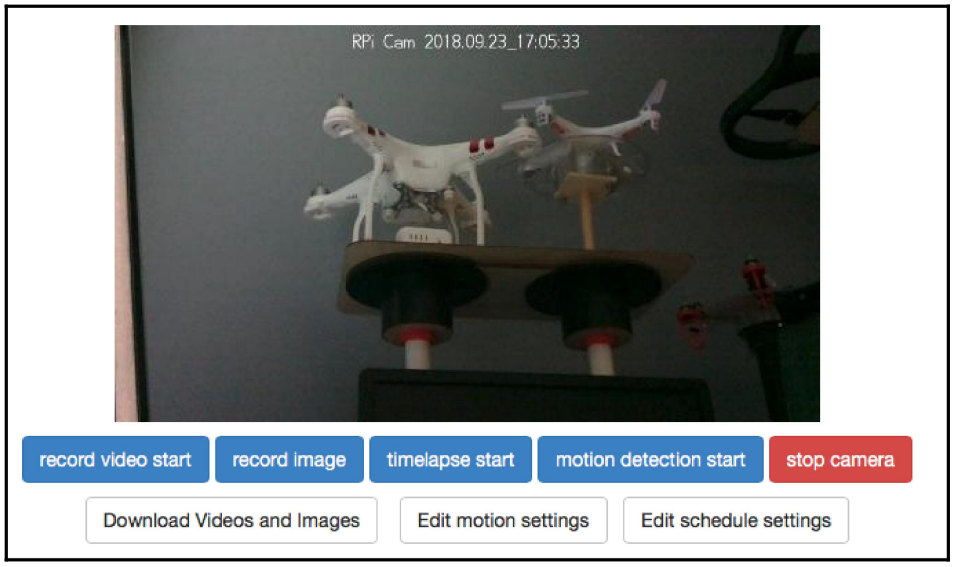

HTML JavaScript Client
Search
HTML
index.html
paho.javascript-1.0.3
scripts
styles

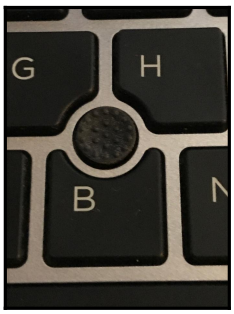

Received messages
Topic
Message
RobotControl
Forward


Forward
Take Picture
T.A.R.A.S Alarm
T.A.R.A.S Dance
Track Distance
Subscribed to distance data
Close


pi@raspberrypi: ~/RPi_Cam_Web_Interface
File Edit Tabs Help
Copyright (c) 2015, Bob Tidey. RPi Cam v6.4.30
Configuration Options
Cam subfolder: html
Autostart:(yes/no) yes
Server:(apache/nginx/lighttpd) apache
Webport: 80
User:(blank=nologin)
Password:
jpglink:(yes/no) no
phpversion:(5/7) 7
< OK >
<Cancel>


pi@raspberrypi: ~/RPi_Cam_Web_Interface
File Edit Tabs Help
Copyright (c) 2015, Bob Tidey. RPi Cam v6.4.30
Start camera system now
Start now?
< Yes >
< No >


RPi Cam 2018.09.23_17:05:33
record video start
record image
timelapse start
motion detection start
stop camera
Download Videos and Images
Edit motion settings
Edit schedule settings



End of graphics bundle