Pythonist (https://soumilshah1995.blogspot.com/)

I earned a Bachelor of Science in Electronic Engineering and a double master's in Electrical and Computer Engineering. I have extensive expertise in developing scalable YouTube channel where I teach people about Data Science, Machine learning, Elastic search, and AWS. I work as data collection and processing Team Lead at Jobtarget and creating microservices and scalable arc

Tuesday, April 30, 2019

Server and Client Send Actual Sensor Data over Network using Raspberr

Server and Client Send Actual Sensor Data over Network using Raspberry Pi

objective

In this Experiment we shall learn to create our own server and client with raspberyy pi uisng python Socket Programming.

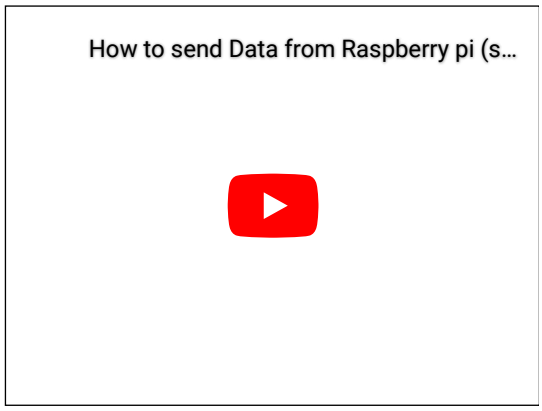
Our Tagrget is to create a server. the server would be Running 24x7 on Raspberry pi and server is always listening for request from client When a client request serve Temperature and Humidty over Network using Socket Programming

Video Tutorial can be found below link

In [17]:

```
from IPython.display import YouTubeVideo
YouTubeVideo('QihjI84Z2tQ')
```

Out[17]:



Getting Started with Raspberry pi

In [21]:

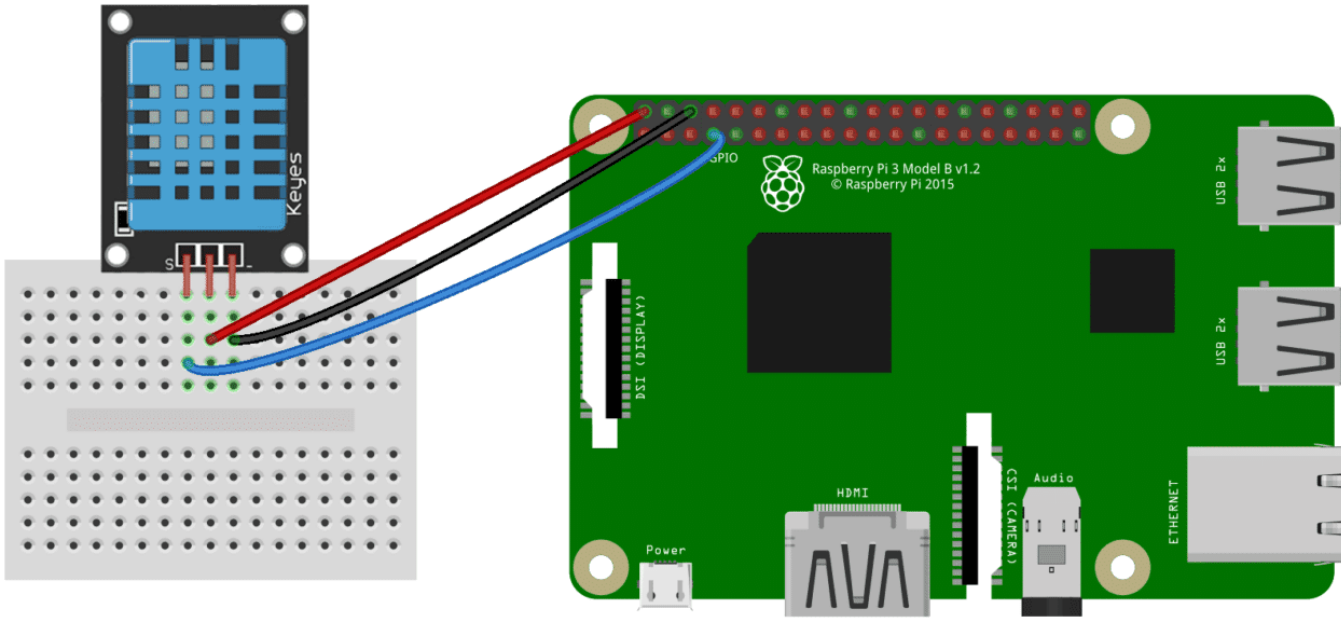
```
from IPython.display import YouTubeVideo
YouTubeVideo('qL2ClHYEuog')
```

Out[21]:

Connection Diagram

In [14]:

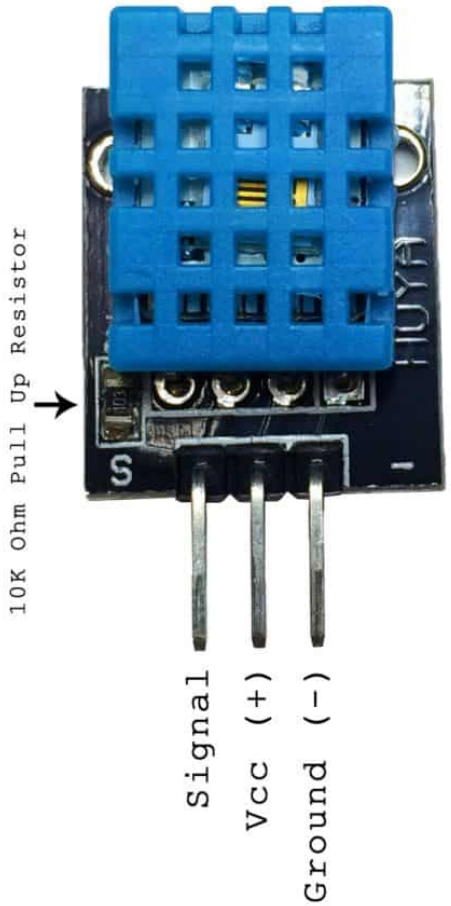
```
%%html
<img src="http://www.circuitbasics.com/wp-content/uploads/2015/12/How-to-Setup-the-DHT11-on-the-Raspberry-Pi-Three-pin-DHT11-Wiring-D
dth=600, height=300>
```

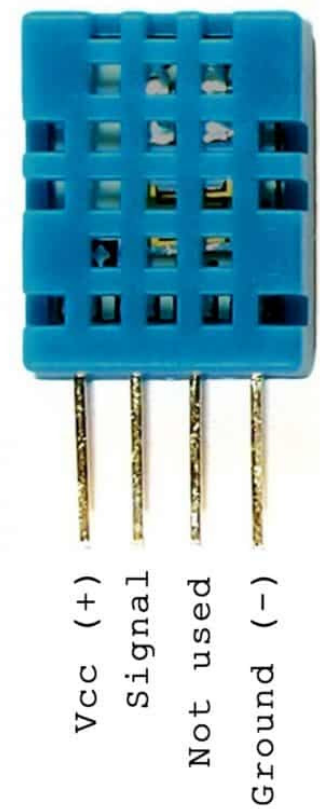


DHT Pinout

In [15]:

```
%%html
<img src="http://www.circuitbasics.com/wp-content/uploads/2015/12/DHT11-Pinout-for-three-pin-and-four-pin-types-2.jpg" ,] width=600, h
```





Step 1: Create Server

Define the Library

In [2]:

```
import socket
import numpy as np
import encodings
```

Define the HOST and PORT

In [ ]:

```
HOST = '127.0.0.1'  # Standard loopback interface address (localhost)
PORT = 65432        # Port to listen on (non-privileged ports are > 1023)
```

For the Experiment we shall send Dummy Data and then once we know the concept we can send actual Sensor value over the socket programming.

Define the function which will send dummy data when client sends request

In [ ]:

```
def random_data():

    x1 = np.random.randint(0, 55, None)          # Dummy temperature
    y1 = np.random.randint(0, 45, None)          # Dummy humidigy
    my_sensor = "{},{}".format(x1,y1)
    return my_sensor                             # return data seperated by comma
```

Define the actual server when client sends string Data it shall send Data

In [ ]:

```
def my_server():

    with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as s:
        print("Server Started waiting for client to connect ")
        s.bind((HOST, PORT))
        s.listen(5)
        conn, addr = s.accept()

        with conn:
            print('Connected by', addr)
            while True:

                data = conn.recv(1024).decode('utf-8')

                if str(data) == "Data":

                    print("Ok Sending data ")

                    my_data = random_data()

                    x_encoded_data = my_data.encode('utf-8')

                    conn.sendall(x_encoded_data)

                elif  str(data) == "Quit":
                    print("shutting down server ")
                    break


                if not data:
                    break
                else:
                    pass
```

In [ ]:

```
if __name__ == '__main__':
    while 1:
        my_server()
```

Explanation

when client sends Data as a string server will send sensor data over the network

Entire Code for Server

In [ ]:

```
import socket
import numpy as np
import encodings

HOST = '127.0.0.1'  # Standard loopback interface address (localhost)
PORT = 65432        # Port to listen on (non-privileged ports are > 1023)


def random_data():

    x1 = np.random.randint(0, 55, None)         # Dummy temperature
    y1 = np.random.randint(0, 45, None)         # Dummy humidigy
    my_sensor = "{},{}".format(x1,y1)
    return my_sensor                            # return data seperated by comma



def my_server():

    with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as s:
        print("Server Started waiting for client to connect ")
        s.bind((HOST, PORT))
        s.listen(5)
        conn, addr = s.accept()

        with conn:
            print('Connected by', addr)
            while True:

                data = conn.recv(1024).decode('utf-8')

                if str(data) == "Data":

                    print("Ok Sending data ")

                    my_data = random_data()

                    x_encoded_data = my_data.encode('utf-8')

                    conn.sendall(x_encoded_data)

                elif  str(data) == "Quit":
                    print("shutting down server ")
                    break


                if not data:
                    break
                else:
                    pass


if __name__ == '__main__':
    while 1:
        my_server()
```

Step 2: Write the Code for Client

Import library

In [ ]:

```
import socket
import threading
import time
```

Define the HOST and PORT

In [ ]:

```
HOST = '192.168.0.111'  # The server's hostname or IP address
PORT = 65432        # The port used by the server
```

we need to process the Data that server sends us lets us define a function for that

In [ ]:

```
def process_data_from_server(x):
    x1, y1 = x.split(",")
    return x1,y1
```

Write the Client Code

In [ ]:

```
def my_client():
    threading.Timer(11, my_client).start()

    with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as s:
        s.connect((HOST, PORT))

        my = input("Enter command ")

        #my = "Data"

        my_inp = my.encode('utf-8')

        s.sendall(my_inp)

        data = s.recv(1024).decode('utf-8')

        x_temperature,y_humidity = process_data_from_server(data)

        print("Temperature {}".format(x_temperature))
        print("Humidity {}".format(y_humidity))

        s.close()
        time.sleep(5)
```

In [ ]:

```
if __name__ == "__main__":
    while 1:
        my_client()
```

Entire Client Code

In [ ]:

```
import socket
import threading
import time


HOST = '192.168.0.111'  # The server's hostname or IP address
PORT = 65432        # The port used by the server


def process_data_from_server(x):
    x1, y1 = x.split(",")
    return x1,y1


def my_client():
    threading.Timer(11, my_client).start()

    with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as s:
        s.connect((HOST, PORT))

        my = input("Enter command ")

        #my = "Data"

        my_inp = my.encode('utf-8')

        s.sendall(my_inp)

        data = s.recv(1024).decode('utf-8')

        x_temperature,y_humidity = process_data_from_server(data)

        print("Temperature {}".format(x_temperature))
        print("Humidity {}".format(y_humidity))

        s.close()
        time.sleep(5)


if __name__ == "__main__":
    while 1:
        my_client()
```

Great Job try the Code and lets send Actual Sensor Data over Network

Server Code which will run on Raspberry pi

In [ ]:

```
import socket
import numpy as np
import encodings
import Adafruit_DHT


HOST = '192.168.1.4'  # Standard loopback interface address (localhost)
PORT = 65432        # Port to listen on (non-privileged ports are > 1023)


def random_data():
    pin = 4
    sensor = Adafruit_DHT.DHT22
    humidity, temperature = Adafruit_DHT.read_retry(sensor, pin)

    if humidity is not None and temperature is not None:
        print('Temp={0:0.1f}*C  Humidity={1:0.1f}%'.format(temperature, humidity))
        print("data was written on database T{} H{}".format(temperature,humidity))
        data = '{},{}'.format(temperature,humidity)
        return data




def my_server():

    with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as s:
        print("Server Started waiting for client to connect ")
        s.bind((HOST, PORT))
        s.listen(5)
        conn, addr = s.accept()

        with conn:
            print('Connected by', addr)
            while True:

                data = conn.recv(1024).decode('utf-8')

                if str(data) == "Data":

                    print("Ok Sending data ")

                    my_data = random_data()

                    x_encoded_data = my_data.encode('utf-8')

                    conn.sendall(x_encoded_data)

                elif  str(data) == "Quit":
                    print("shutting down server ")
                    break


                if not data:
                    break
                else:
                    pass


if __name__ == '__main__':
    while 1:
        my_server()
```

Client Code will be same as Above.

at April 30, 2019 (2019-04-30T12:30:00-07:00) (https://soumilshah1995.blogspot.com/2019/04/server-and-client-send-actual-sensor.html)

9 comments:

Hamza Sajjad (https://www.blogger.com/profile/16149653585870501625) January 15, 2020 at 10:25 AM (https://soumilshah1995.blogspot.com/2019/04/server-and-clien sensor.html?showComment=1579112733737#c3259540453281406266)

You have done amazing work, i will be thankful if you explain these lines
if __name__ == '__main__':
while 1:
my_server()

RegardsL Humza