

# [ INTERNET OF THINGS ]

## Practical-9

**-:AIM:-**

**Raspberry pi basic Programming with Sensors.**

Submitted By: Dharmay Sureja

Enrollment No:17012011056

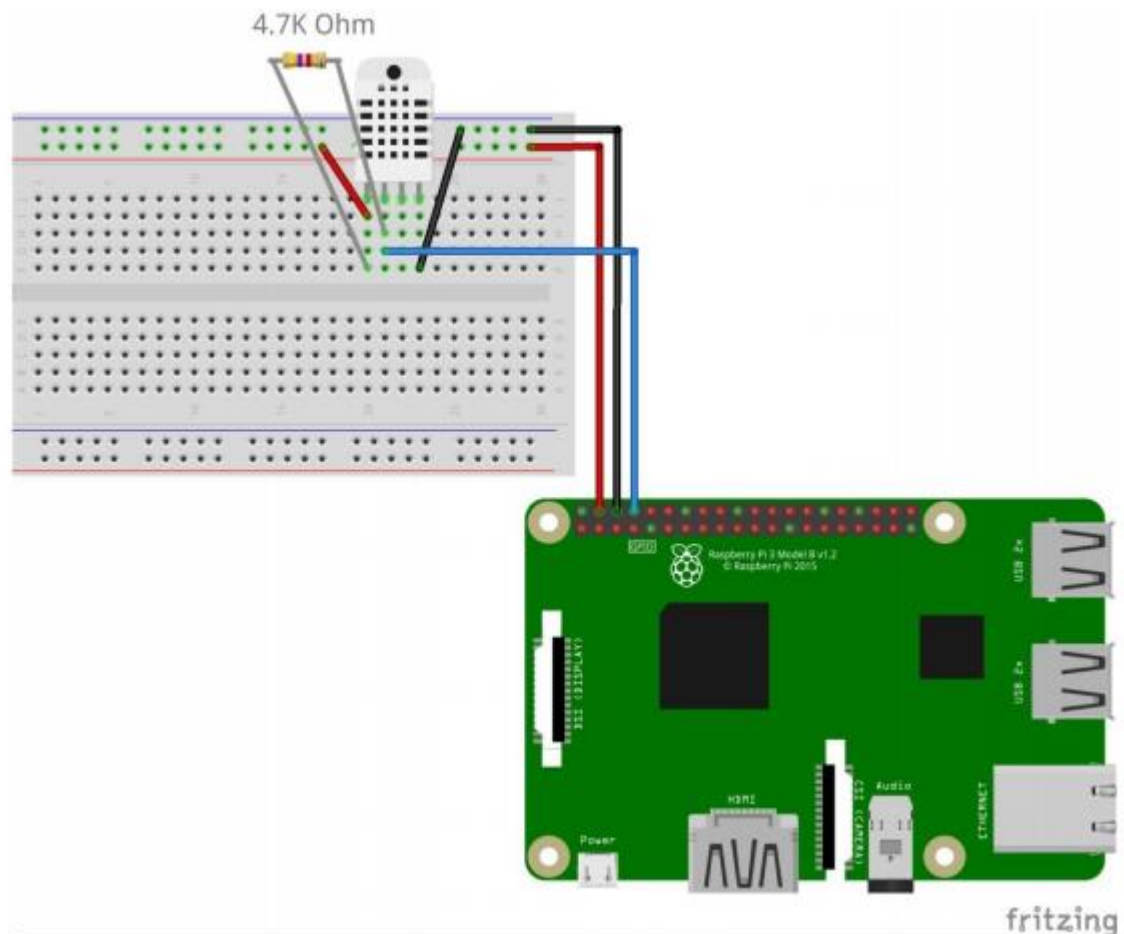
## AIM:- Raspbian pi basic programming with Sensors.

### Experiments

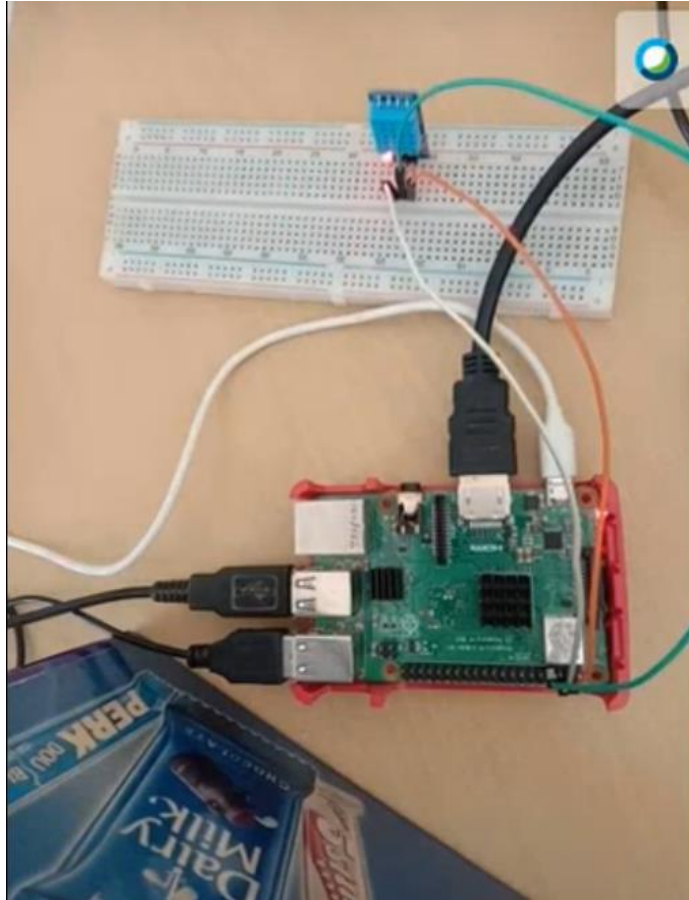
#### 1. Display room Temperature

**Components used :** Breadboard , LED , 4.7K Ohm Resistor , Raspberry pi , USB Cable  
SD Card & Adapter , Jumper Wire , Temperature Sensor

**Circuit:**



## Practical-9



```
*Python 3.4.2 Shell*
File Edit Shell Debug Options Windows Help

>>> ===== RESTART =====
>>>
Temp=26.00*C Humidity=44.00%
Temp=26.00*C Humidity=45.00%
Temp=27.00*C Humidity=43.00%
Temp=27.00*C Humidity=43.00%
Temp=27.00*C Humidity=43.00%
Temp=26.00*C Humidity=44.00%
Temp=26.00*C Humidity=44.00%
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Temp=26.00*C Humidity=39.00%
Temp=27.00*C Humidity=43.00%
Temp=27.00*C Humidity=47.00%
Temp=27.00*C Humidity=45.00%
Temp=27.00*C Humidity=47.00%
Temp=27.00*C Humidity=48.00%
Temp=28.00*C Humidity=56.00%
Temp=27.00*C Humidity=53.00%
Temp=27.00*C Humidity=52.00%
Temp=27.00*C Humidity=51.00%
Temp=27.00*C Humidity=51.00%
```

Code : Adafruit\_DHT.py

```
import sys
import Adafruit_DHT
sensor_args = { '11' : Adafruit_DHT.DHT11,
                '22' : Adafruit_DHT.DHT22,
                '2302' : Adafruit_DHT.DHT2302
              }
if len(sys.argv) == 3 and sys.argv[1] in sensor_args:
    sensor = sensor_args[sys.argv[1]]
    pin = sys.argv[2]
else:
    print("Usage : sudo ./Adafruit_DHT.py [11|22|2302] <GPIO pin number> ")
    print("Example : sudo ./Adafruit_DHT.py 2302 4 - Read From AM2302 Connected
to GPIO pin #4")
    sys.exit()

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))
else:
    print('Failed to get Reading. Try Again !')
    sys.exit()
```

### 2. Upload room Temperature on Cloud ( Thinspeak )

Code : Adafruit\_DHT.py

```
import sys
import Adafruit_DHT
import RPi.GPIO as GPIO
import urllib2

myAPI = 'JR0EK9X8Z7VN2LP6'

baseURL = 'https://api.thingspeak.com/update?api_key=%s' %
myAPI

GPIO.setmode(GPIO.BCM)
sensor_args = { '11' : Adafruit_DHT.DHT11,
                 '22' : Adafruit_DHT.DHT22,
                 '2302' : Adafruit_DHT.DHT2302
               }
if len(sys.argv) == 3 and sys.argv[1] in sensor_args:
    sensor = sensor_args[sys.argv[1]]
    pin = sys.argv[2]
else:
    print("Usage : sudo ./Adafruit_DHT.py [11|22|2302] <GPIO
pin number> ")
    print("Example : sudo ./Adafruit_DHT.py 2302 4 - Read
From AM2302 Connected to GPIO pin #4")
    sys.exit()

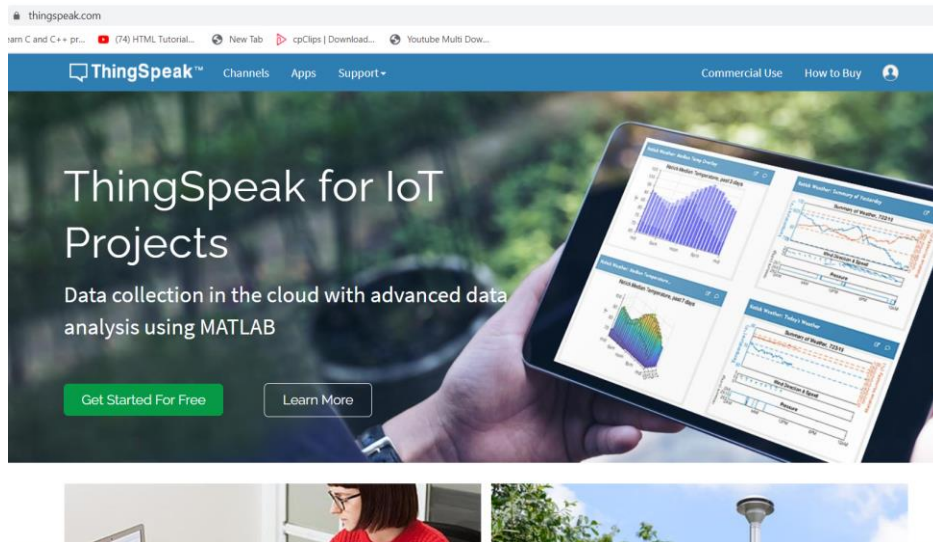
print("Starting Uploading Data . . .")
humidity,temperature = Adafruit_DHT.read_retry(sensor,pin)

while True:
    try:
        print("Uploading Tem[erature %.1f"%temperature)
        print(baseURL +
&field1=%s&field2=%s"%(temperature,humidity))
```

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```
f = urllib2.urlopen(baseUrl +
&field1=%s&field2=%s"%(temperature,humidity))
f.close()
except:
    print("Exiting .")
    break
```

1. Sign Up on [www.thingspeak.com](http://www.thingspeak.com) using your email id



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First Name

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Last Name

Sureja

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SMART CONNECTED DEVICES

DATA AGGREGATION AND ANALYTICS

ThingSpeak

MATLAB

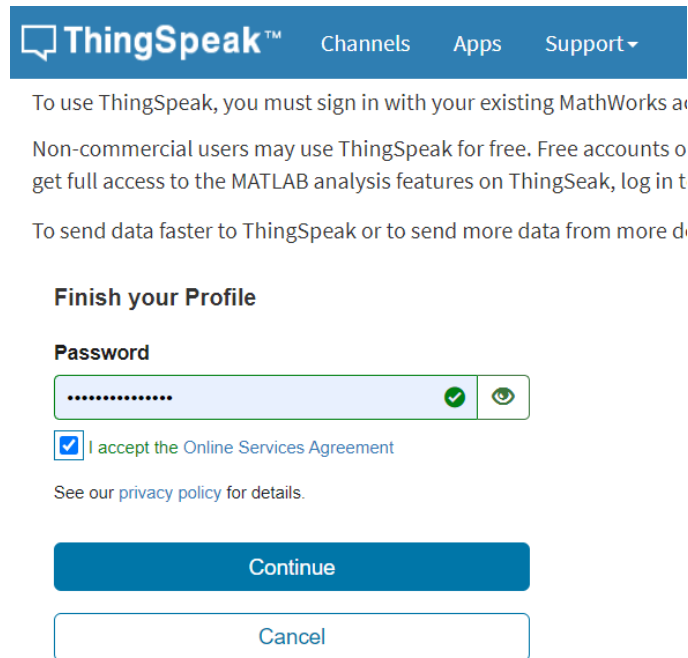
ALGORITHM DEVELOPMENT

SENSOR ANALYTICS

Dharmay Sureja(17012011056)

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2. Make sure to click the checkbox saying "By signing up, you agree to the Terms of Use and Privacy Policy".



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**Password**

..... ✓ [eye icon]

☒ I accept the Online Services Agreement


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Continue

Cancel

3. Goto Channels and Create a New Channel
4. Fill the following Details
  1. Any Name for Your Channel
  2. Description : if you have any description like “Temperature Channel”
  3. Field 1 Label as “Temperature ” Since we are going to upload .
5. Save Channel

## Practical-9

 Channels - Apps - Support -

### New Channel

Name	<input type="text" value="SensorData Upload"/>	
Description	<input type="text" value="Raspberry Pi's Temperature Sensor Data Upload"/>	
Field 1	<input type="text" value="Temperature Channel"/>	<input checked="" type="checkbox"/>
Field 2	<input type="text"/>	<input type="checkbox"/>
Field 3	<input type="text"/>	<input type="checkbox"/>
Field 4	<input type="text"/>	<input type="checkbox"/>
Field 5	<input type="text"/>	<input type="checkbox"/>
Field 6	<input type="text"/>	<input type="checkbox"/>
Field 7	<input type="text"/>	<input type="checkbox"/>
Field 8	<input type="text"/>	<input type="checkbox"/>
Metadata	<input type="text"/>	
Tags	<input type="text"/>	
	<small>(Tags are comma separated)</small>	
Link to External Site	<input type="text" value="http://"/>	
Link to GitHub	<input type="text" value="https://github.com/"/>	
Elevation	<input type="text"/>	
Show Channel Location	<input type="checkbox"/>	
Latitude	<input type="text" value="0.0"/>	
Longitude	<input type="text" value="0.0"/>	
Show Video	<input type="checkbox"/>	
	<input checked="" type="radio"/> YouTube	
	<input type="radio"/> Vimeo	
Video URL	<input type="text" value="http://"/>	
Show Status	<input type="checkbox"/>	
	<input type="button" value="Save Channel"/>	



## Practical-9

6. Saving Process might Take a While

7. Please Select Your Channel.

8. You would see tabs like

1. Private View
2. Public View
3. Channel Settings
4. API Keys
5. Data Import/Export

### SensorData Upload

Channel ID: 1229205

Author: mwa0000020335815

Access: Private

Raspberry Pi's Temperature Sensor Data Upload

Private View

Public View

Channel Settings

Sharing

API Keys

Data Import / Export

+ Add Visualizations

+ Add Widgets

Export recent data

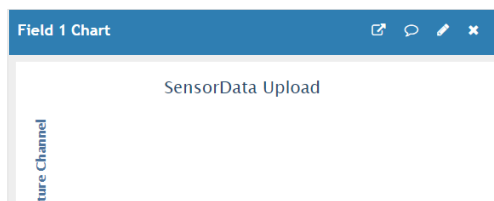
MATLAB Analysis

MATLAB Visualization

### Channel Stats

Created: [about a minute ago](#)

Entries: 0



9. Click API Keys Tab

10. You will Find API Key similar to this : “7BMH83M0KARON75Z”

### SensorData Upload

Channel ID: 1229205  
Author: mwa0000020335815  
Access: Private

Raspberry Pi's Temperature Sensor Data Upload

Private View Public View Channel Settings Sharing API Keys Data Import / Export

#### Write API Key

Key JR0EK9X8Z7VN2LP6

Generate New Write API Key

#### Read API Keys

Key UJ85VCS8M9WFXRZM

Note

Save Note

Delete API Key

#### Help

API keys enable you to write data to a channel or read data from a private channel. API keys are auto-generated when you create a new channel.

#### API Keys Settings

- **Write API Key:** Use this key to write data to a channel. If you feel your key has been compromised, click **Generate New Write API Key**.
- **Read API Keys:** Use this key to allow other people to view your private channel feeds and charts. Click **Generate New Read API Key** to generate an additional read key for the channel.
- **Note:** Use this field to enter information about channel read keys. For example, add notes to keep track of users with access to your channel.

#### API Requests

##### Write a Channel Feed

GET [https://api.thingspeak.com/update?api\\_key=JR0EK9X8Z7VN2LP6&field](https://api.thingspeak.com/update?api_key=JR0EK9X8Z7VN2LP6&field)

##### Read a Channel Feed

GET [https://api.thingspeak.com/channels/1229205/feeds.json?api\\_key=UJ85VCS8M9WFXRZM](https://api.thingspeak.com/channels/1229205/feeds.json?api_key=UJ85VCS8M9WFXRZM)

11. Please run the following commands in Your SSH Connection .

```
sudo python ~/Projects/temp_upload.py YOURWRITEAPIKEY
```

```
~/raspberrypi$ ls
Adafruit_DHT.py
~/raspberrypi$ sudo python Adafruit_DHT.py JR0EK9X8Z7VN2LP6
```

12. Once the script starts running it will upload the temperature values of the room.

## Raspberry Pi's Temperature Sensor Data Upload

## Data Import / Export

 Export recent data

## MATLAB Visualization