

Write-up	Correctness of Program	Documentation of Program	Viva	Timely Completion	Total	Dated Sign of Subject Teacher
2	2	2	2	2	10	

Assignment No. 04

Date of Performance:

Title: Upload data from environmental sensor to cloud server (You can use any public cloud IBM Watson IoT cloud or Google or AWS etc.)

Objective: To explore cloud environment for IoT.

Theory:

- ThingSpeak is an open data platform for monitoring your data online. You can set the data as private or public depending on your choice. ThingSpeak takes minimum of 15 seconds to update your readings. It's a great platform for building your IOT projects.
- We will read the temperature and humidity from the DHT22 and then we will send it to the API of the ThingSpeak channel. We will get the API after creating the channel.
- **Temperature sensor:** It is a device, a thermocouple or RTD, that provides temperature measurement through an electrical signal.
- **Thermocouple:** It is made from two dissimilar metals that generate electrical voltage in direct proportion to changes in temperature. The wires are joined together to form measuring junction and reference junction.
- **RTD:** Resistor temperature detection is variable resistor that will change its electrical resistance in direct proportion to changes in temperature in precise, repeatable & linear manner.

Components Required:

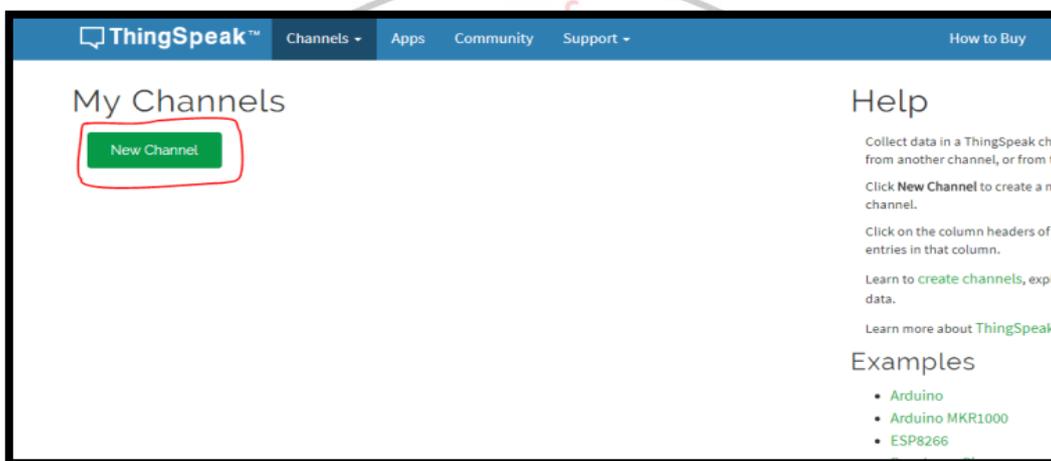
- Raspberry Pi 3
- DHT22
- 10k Resistor
- Jumper cables

Setting up the ThingSpeak Account:

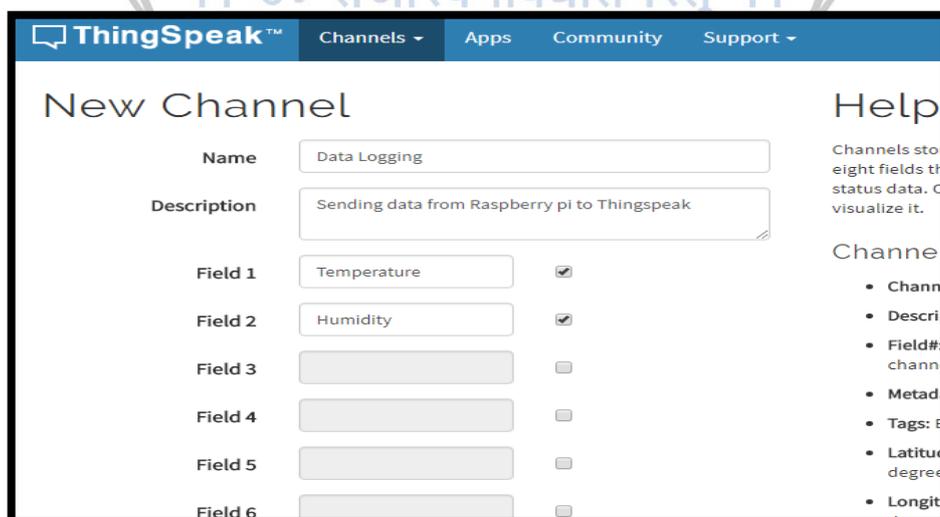
1. First of all, go to the following link and sign up to ThingSpeak. If you already have an account, then sign in. <https://thingspeak.com/>



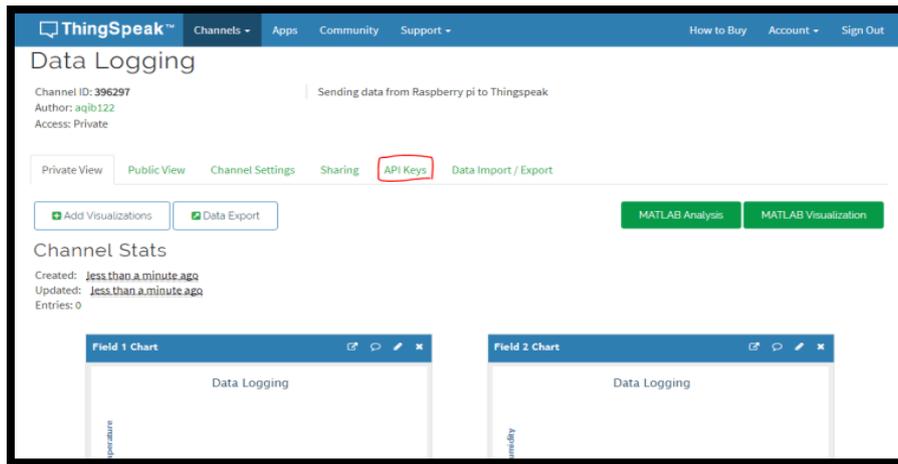
2. After creating the account or logging in, click on new channel.



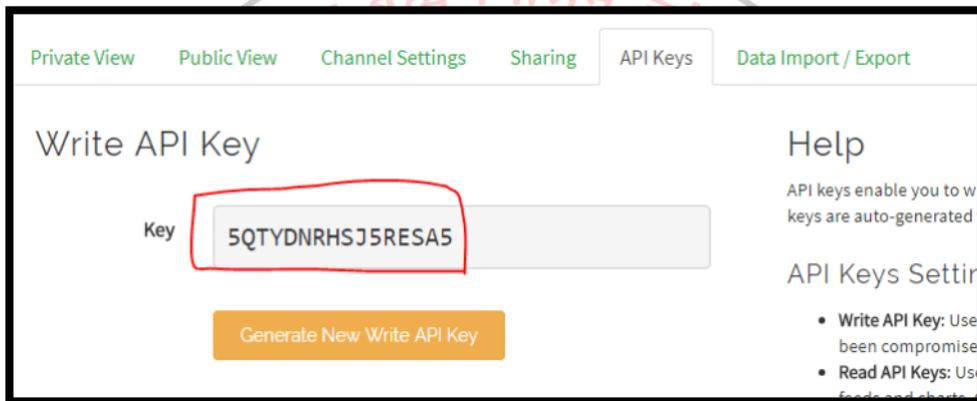
3. Fill the information about the channel. Select two fields because we will be sending the data for the two fields from the raspberry pi. Leave the other information as it is and save the channel.



4. Go to the API keys tab.



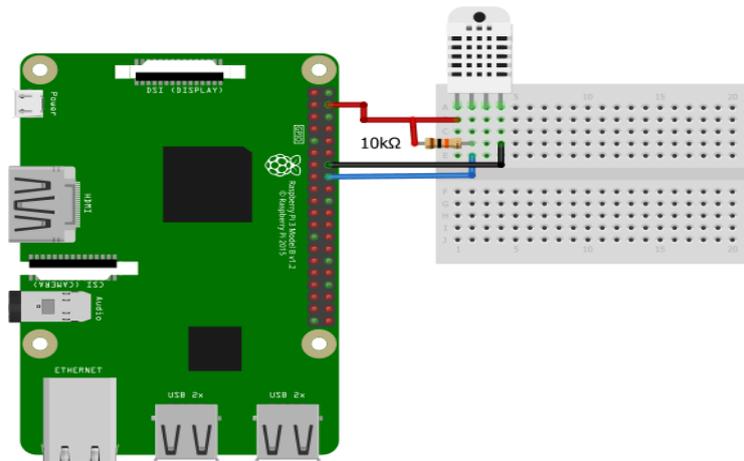
- In the API keys tab, copy the write API key. This is the API key at which we will send the data from the Raspberry Pi.



Circuit Diagram and Explanation:

Connect DHT22 with the Raspberry pi as described below

DHT22 Pin	Raspberry pi
VCC	5V
Data Pin	Connect to GPIO 23 and also connect to 5V through 10K resistor
GND	GND



Installing the DHT22 Library:

1. Enter the below command to clone the library
`git clone https://github.com/adafruit/Adafruit_Python_DHT.git`
2. Then enter in to the installed directory using the below command
`cd Adafruit_Python_DHT`
3. Now download the required modules using the below command
`sudo apt-get install build-essential python-dev`
4. Then install the library using the below command
`sudo python setup.py install`

Raspberry Pi Pseudo Code

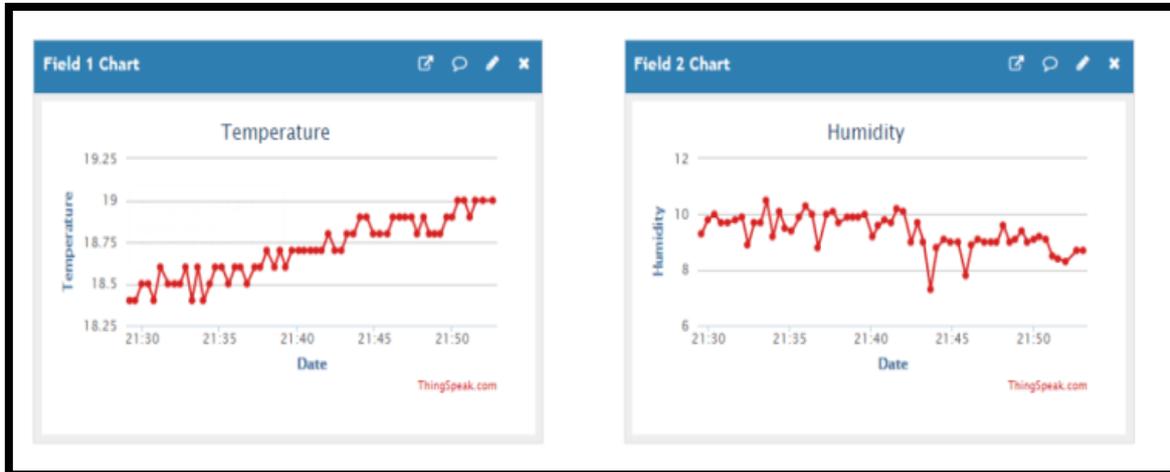
```

1. import sys
2. import urllib2
3. from time import sleep
4. import Adafruit_DHT as dht
5. # Enter Your API key here
6. myAPI = '5QTYDNRHSJ5RESA5'
7. # URL where we will send the data, Don't change it
8. baseURL = 'https://api.thingspeak.com/update?api_key=%s' % myAPI
9. def DHT22_data():
10. # Reading from DHT22 and storing the temperature and humidity
11. humi, temp = dht.read_retry(dht.DHT22, 23)
12. return humi, temp
13. while True:
14. try:
15. humi, temp = DHT22_data()
16. # If Reading is valid
17. if isinstance(humi, float) and isinstance(temp, float):
18. # Formatting to two decimal places
19. humi = '%.2f' % humi
20. temp = '%.2f' % temp
21. # Sending the data to thingspeak
22. conn = urllib2.urlopen(baseURL + '&field1=%s&field2=%s' % (temp, humi))
23. print conn.read()
24. # Closing the connection
25. conn.close()
26. else:
27. print 'Error'

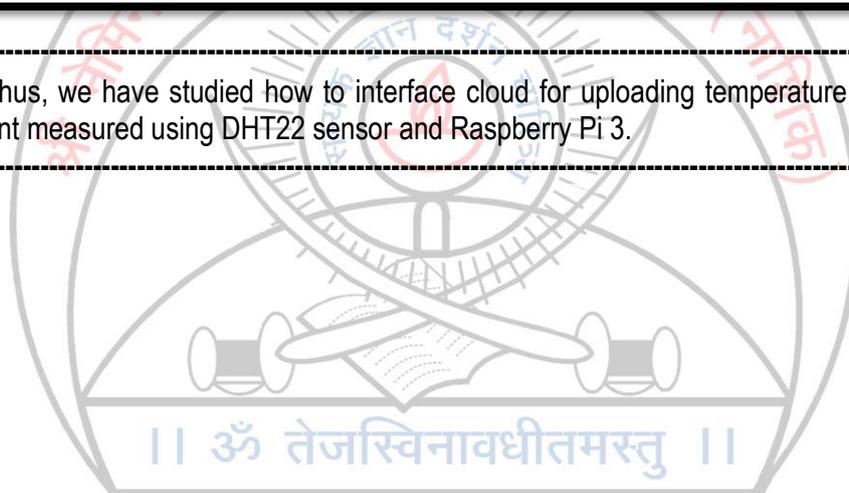
```

```
28. # DHT22 requires 2 seconds to give a reading, so make sure to add delay of  
    # above 2 seconds.  
29. sleep(20)  
30. except:  
31. break
```

After running it, output looks like below



Outcome: - Thus, we have studied how to interface cloud for uploading temperature and humidity in the environment measured using DHT22 sensor and Raspberry Pi 3.



ESTD - 1928