

Build Your First IOT Project with Arduino

The world is going smarter everyday and the biggest reason behind this are evolution of smart technology. As a tech enthusiast you must have heard about the term IOT which means Internet of Things. Internet of things means controlling and feeding the data of devices over internet or any network without human to machine interaction.

So in this tutorial we are going to build an IOT Project using the very friendly Arduino UNO. Aim of this project is to feed data collected from LDR(Light Sensor) and LM35(Temperature sensor) to internet and these data you can access from anywhere in the world.

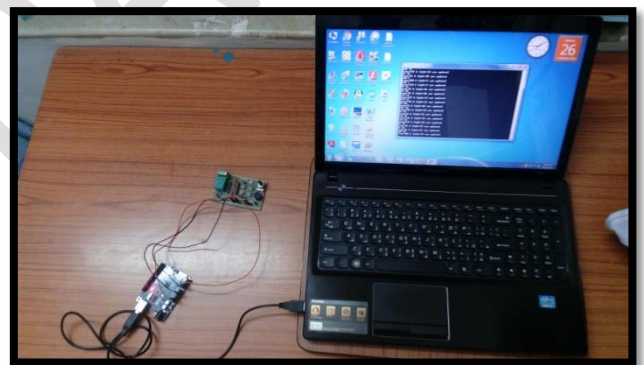
You will need the following things for this project:

Hardware Requirements →

- Arduino UNO
- PC
- Arduino Serial USB cable
- LM35 (Temperature Sensor)
- LDR (Light Dependent Resistor)
- Connecting wire

Software Requirements →

- Arduino IDE
- Python 3.4



Step 1 : Assemble the circuit and interface with Arduino

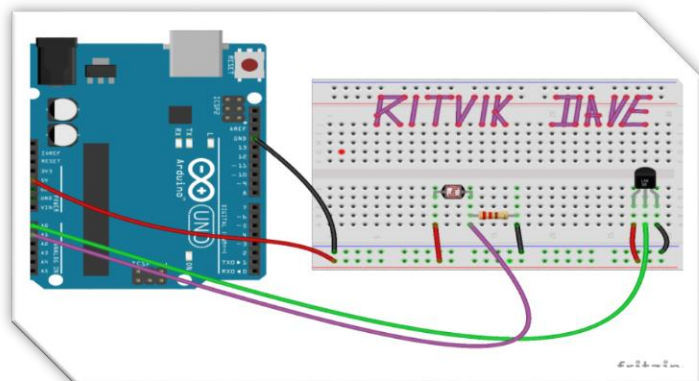
Assemble the circuit as given in the picture below.

→ LM35

- (Pin 1)----> 5v of Arduino
- (Pin 2)----> A0 pin of Arduino
- (Pin 3)----> Ground of Arduino

→ LDR

- One terminal----> 5v of Arduino
- Second terminal---> 220Ω Resistance ---> Ground of Arduino
- Junction of LDR & Resistance--> A1 pin of Arduino



Step 2 : Programming with Arduino IDE

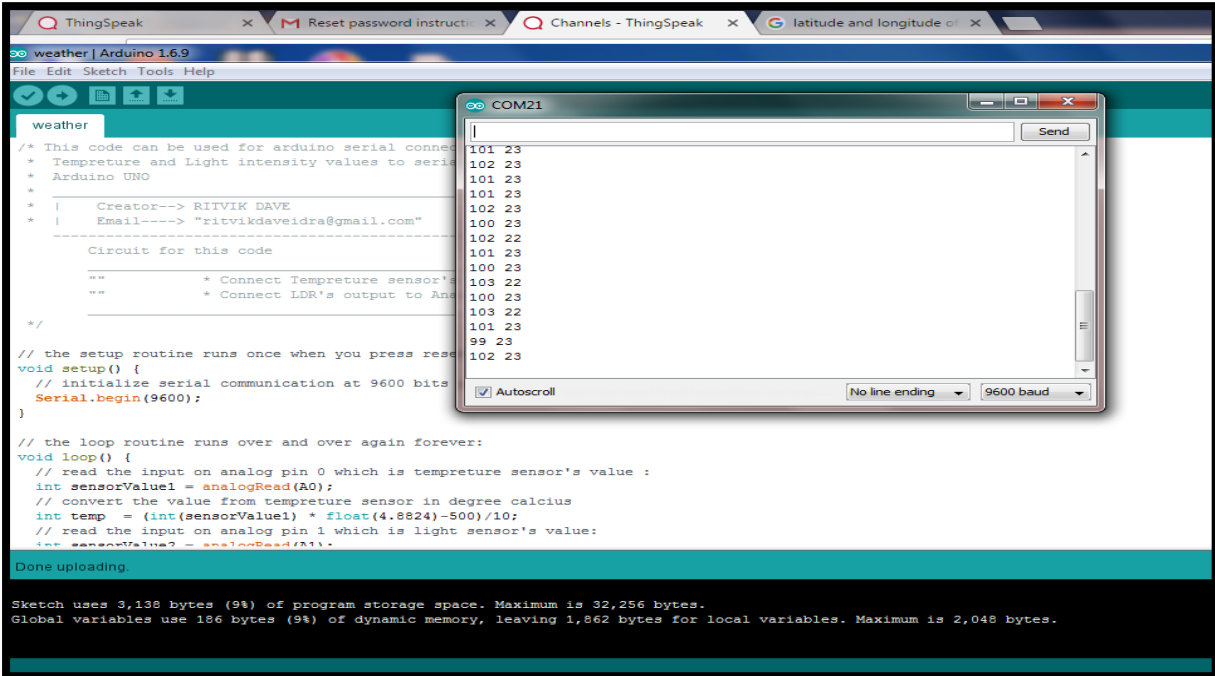
- Download and Install Arduino IDE from here
“<https://www.arduino.cc/en/Main/Software>”
- Now connect Arduino UNO board to serial USB connector of your PC.
- Open Arduino IDE
- Change Tools-> Board -> “Arduino/Genuino Uno”
- Change Tools-> Port -> <Arduino connected port> #Note down this Port no. , it will be needed in the future.
- Paste the below code and upload it on to your Arduino.

```
// the setup routine runs once when you press reset:
void setup() {
    // initialize serial communication at 9600 bits per second:
    Serial.begin(9600);
}

// the loop routine runs over and over again forever:
void loop() {
    // read the input on analog pin 0 which is temperature sensor's value :
    int sensorValue1 = analogRead(A0);
    // convert the value from temperature sensor in degree celsius
    int temp = (int(sensorValue1) * float(4.8824)-500)/10;
    // read the input on analog pin 1 which is light sensor's value:
    int sensorValue2 = analogRead(A1);
    // convert the value from light sensor into lux
    int Lux = 1024.0 * 10 / sensorValue2 - 10;
    // print out the value you read:
    Serial.print(temp);Serial.print(" ");Serial.print(Lux);Serial.print("\n");
    // Converting the data in the format of "temp_reading<space>light_intensity"
    delay(1000);    // delay in between reads for stability
}
```

- When uploading is done, it means your Arduino is programmed for a weather station.
- Now open Tools->Serial Monitor
- Set baud rate at 9600

You should see something like this...

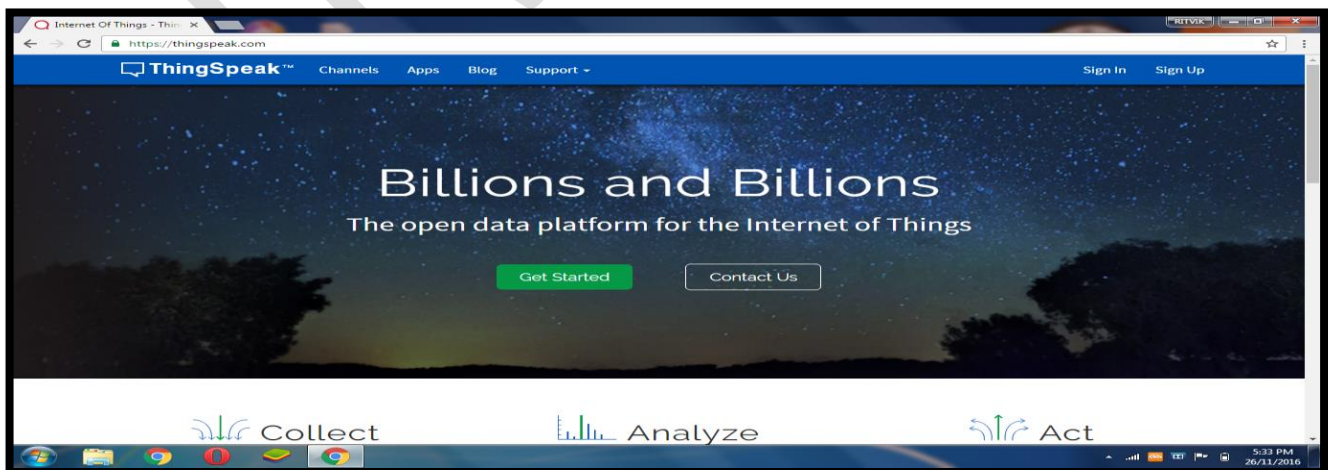


- Now close Arduino IDE.

Step 3: Create an ThingSpeak channel for Data logging

Now to upload this serial data to an internet cloud we will require an stream for that cloud. ThingSpeak is a famous cloud for IOT applications. Follow these steps

- Go to www.thingspeak.com
- Sign Up to thing Speak
- Now go to "Get Started"



- Create a "New Channel"

- Fill up the information for this channel as shown in the image below.
- Now “Save” this Channel

ThingSpeak™ Channels Apps Blog Support

New Channel Help

Name

Description

Field 1 ☒

Field 2 ☒

Tags
(Tags are written separately)

Make Public ☒

URL

Elevation

Show Location ☒

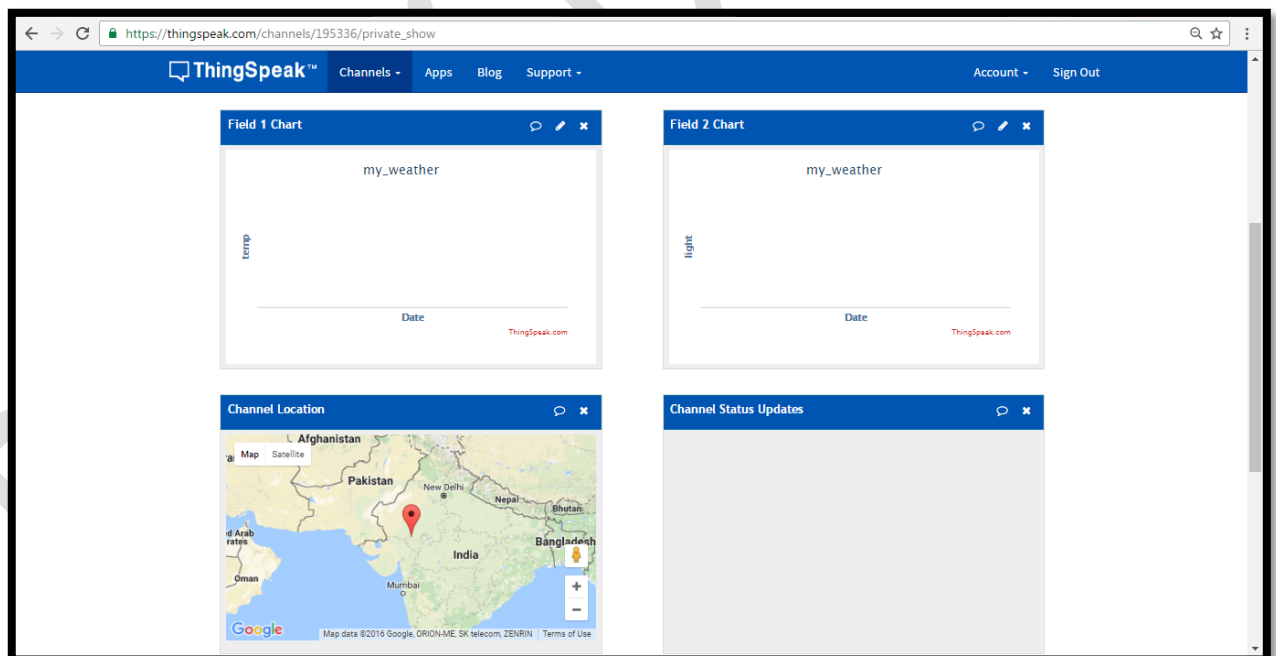
Latitude

Longitude

Show Status ☒

[Save Channel](#)

- You will be redirected to a page as below which is actually the cloud and you will see graphs and location of your weather data.



- Now go to “API Keys” as shown below

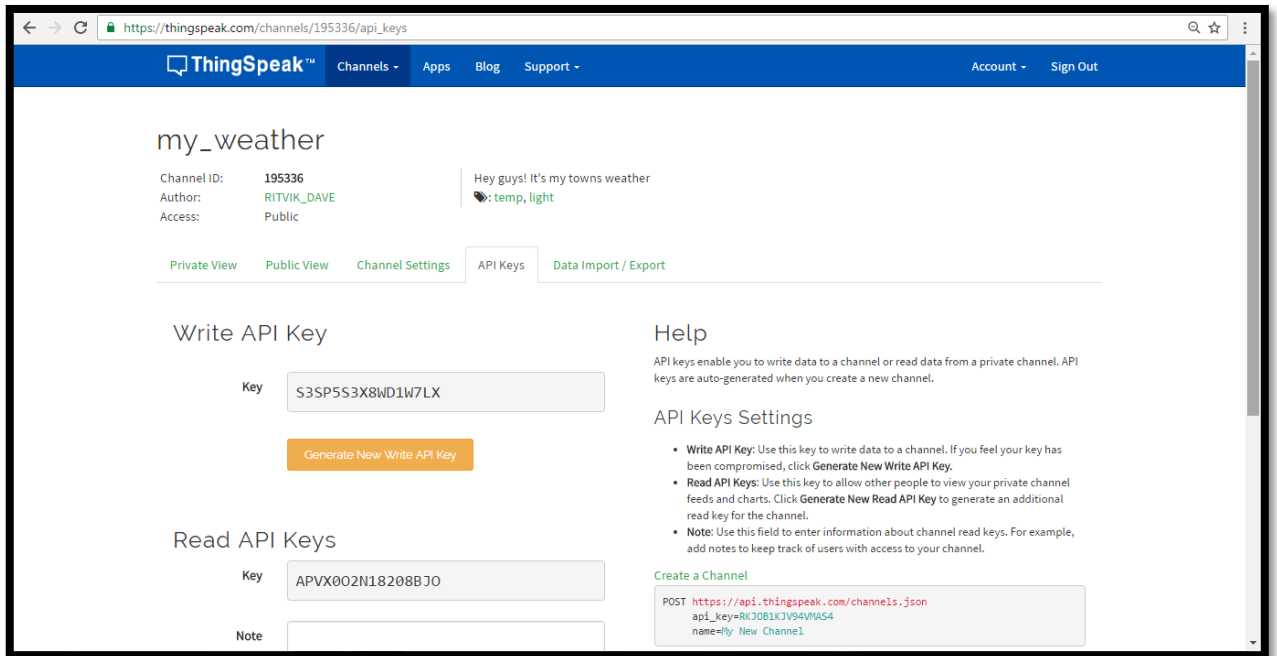
Author: RITVIK_DAVE

Access: Public

: temp, light

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

- Note down both “Channel ID” & “Write & Read API’s” you will need them later



Step 4: Develop a Python server for data logging to internet

- Now download and install python from <https://www.python.org/download/releases/2.7/> Ignore this step if you already have python installed.
- Open start_menu/notepad on your windows pc.
- Copy & paste the below python code onto notepad.

```
import serial
import time
import urllib
count=0
arduino = serial.Serial('COM19', 9600, timeout=.1)
while True:
    data = arduino.readline()[:-1]          #the last bit gets rid of the new-line chars
    if data:
        if count==0:
            new=[0,0]
            count=1
        else:
```

```

new=data.split()

new=data.split()

temp=int(new[0])

light=int(new[1])

f=urllib.urlopen('https://api.thingspeak.com/update?key=NIJW2KFLALYDFNZE&field1=%s&field=%s'%(temp,light))

print "temp=%d & light=%d are updated"%(temp,light)

time.sleep(3)

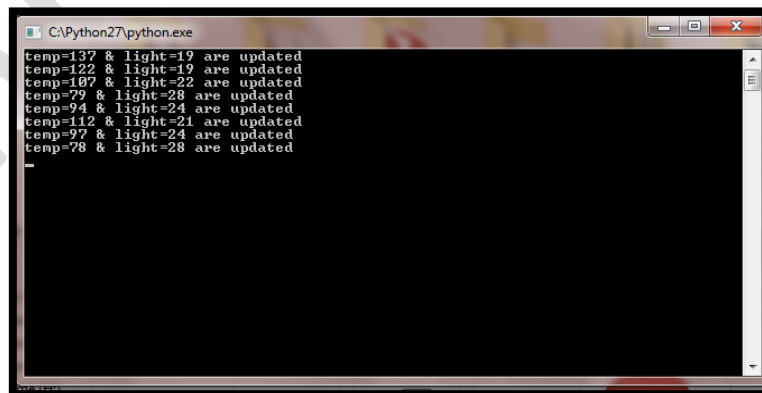
```

- Do the following correction in this code
 1. Replace 'COM19' to Port on which your Arduino is connected.
 2. <https://api.thingspeak.com/update?key=NIJW2KFLALYDFNZE&field1=%s&field=%s>
change "key=<Your_thingspeak_channels_write_API_key>"
- Save_as your file with name "weather.py".

All done! ;-)

Now follow these steps to see your first IOT that you just build up...

- Connect Arduino with your PC on the same port, in case connected port has changed then do correction in weather.py file "COM19→ COM<whatever is the port>"
- Your PC must have internet connection
- Open "weather.py" file with python.exe that you have installed before.
 1. Right click on weather.py
 2. Click on "Open with..."
 3. Browse "Python.exe" and open with it.
- You should see something like this



```

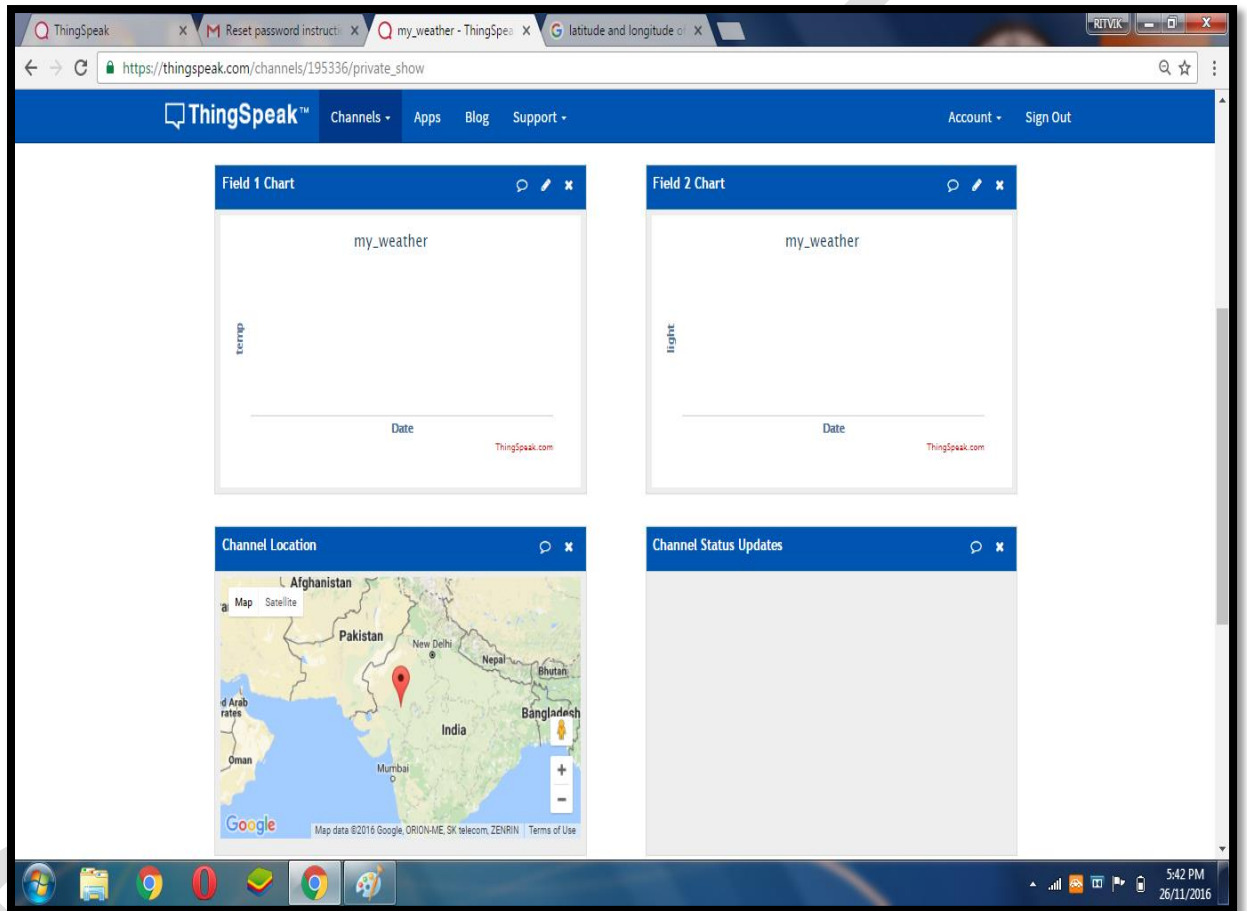
C:\Python27\python.exe
temp=137 & light=19 are updated
temp=122 & light=19 are updated
temp=167 & light=22 are updated
temp=79 & light=28 are updated
temp=94 & light=24 are updated
temp=112 & light=21 are updated
temp=97 & light=24 are updated
temp=78 & light=28 are updated

```

- Now open a browser in your phone

- Type the following URL in the format
`https://thingspeak.com/channels/<Your Channel ID>?key=<Your Read API Key>`
example:
<https://thingspeak.com/channels/178314?key=KTYFWIH9JFYU5K0M>

You will see the real time weather data from your Arduino



Hehh! Your first IOT Project is completed..

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