IoT tutorial

This tutorial explains how to make IoT projects

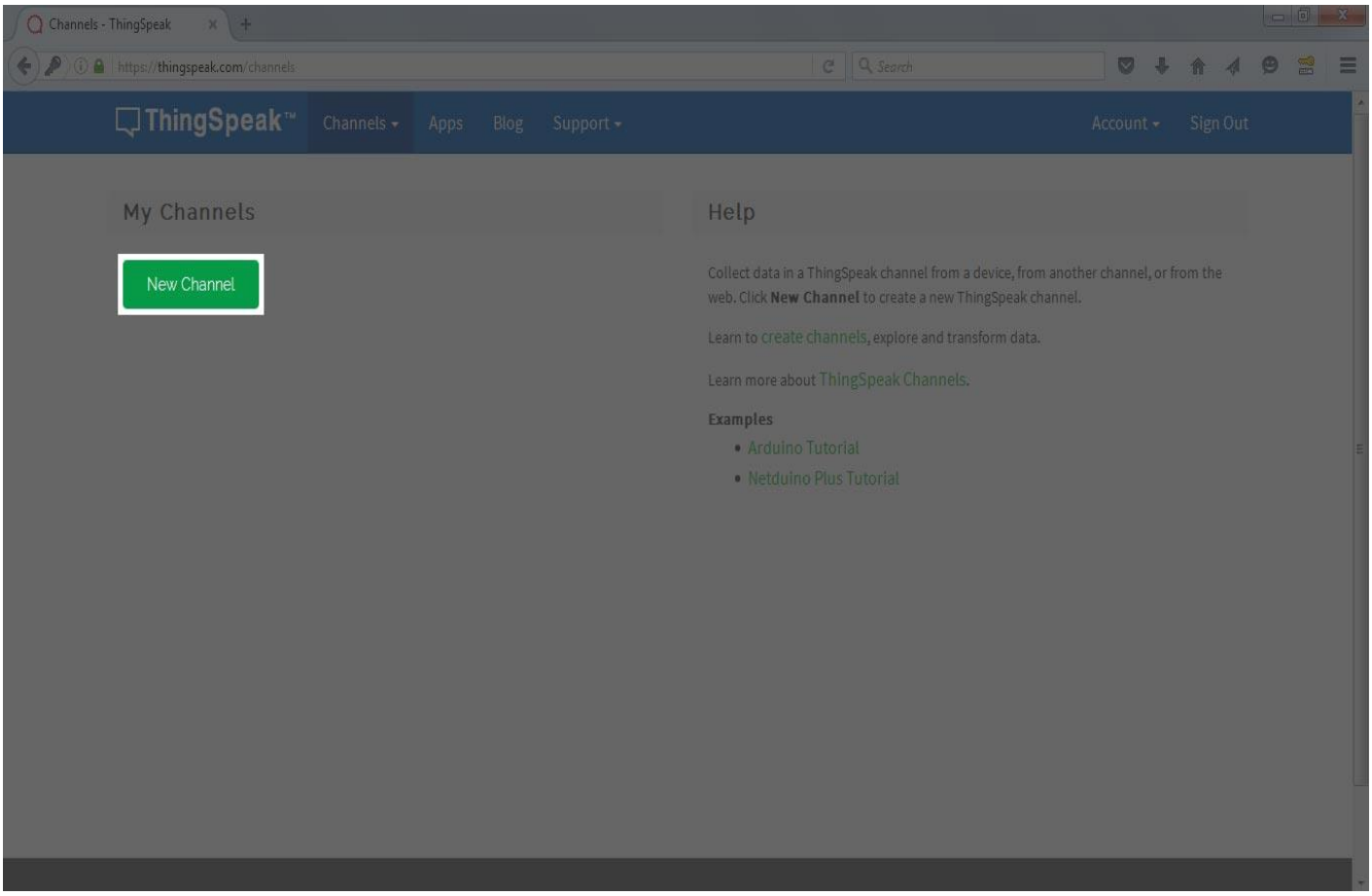
1.ThingSpeak Basics and account setup

ThingSpeak is an open cloud data platform where you can store and retrieve data.

URL : https://thingspeak.com/

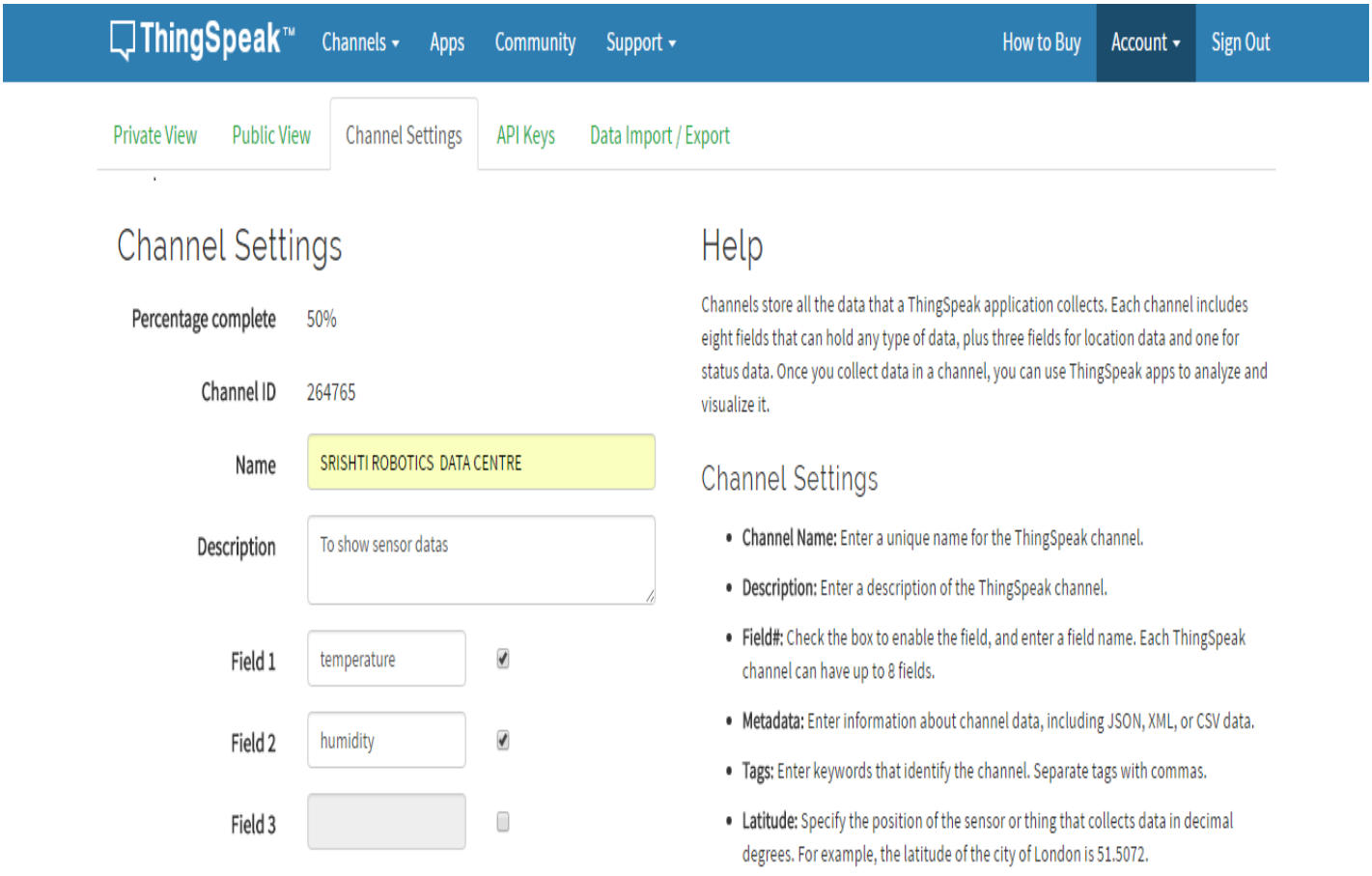
If you do not have a ThingSpeak account create one. Once you have a ThingSpeak account login to your account.

Create a new channel by clicking on the button as shown in below image - A channel is the source for your data. Where you can store and retrieve data. A channel can have maximum 8 fields. It means you can store 8 different data to a channel.

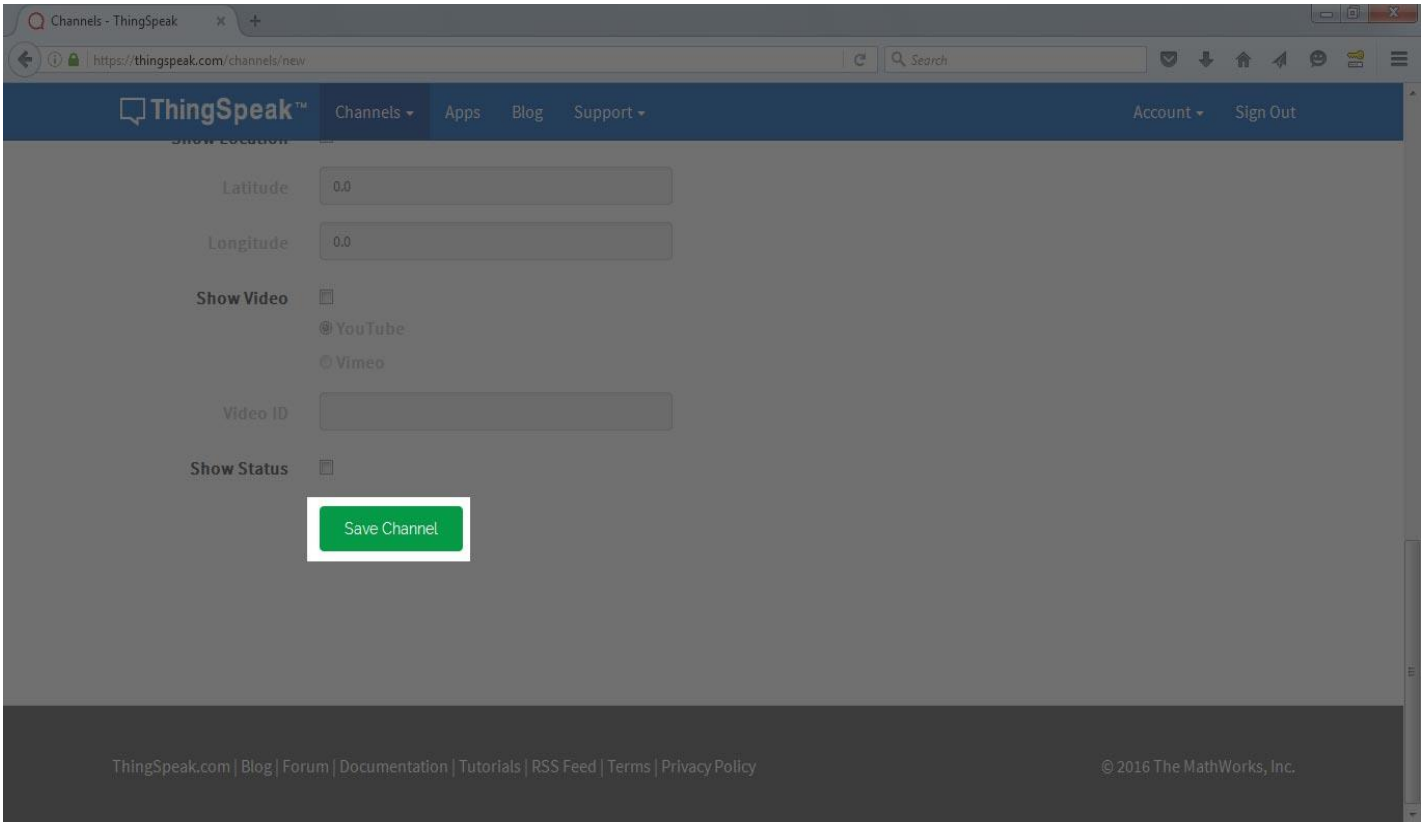


2.Enter basic details of the channel

here we are creating channel to store data from LM35 temperature and humidity sensor so we need two fields.

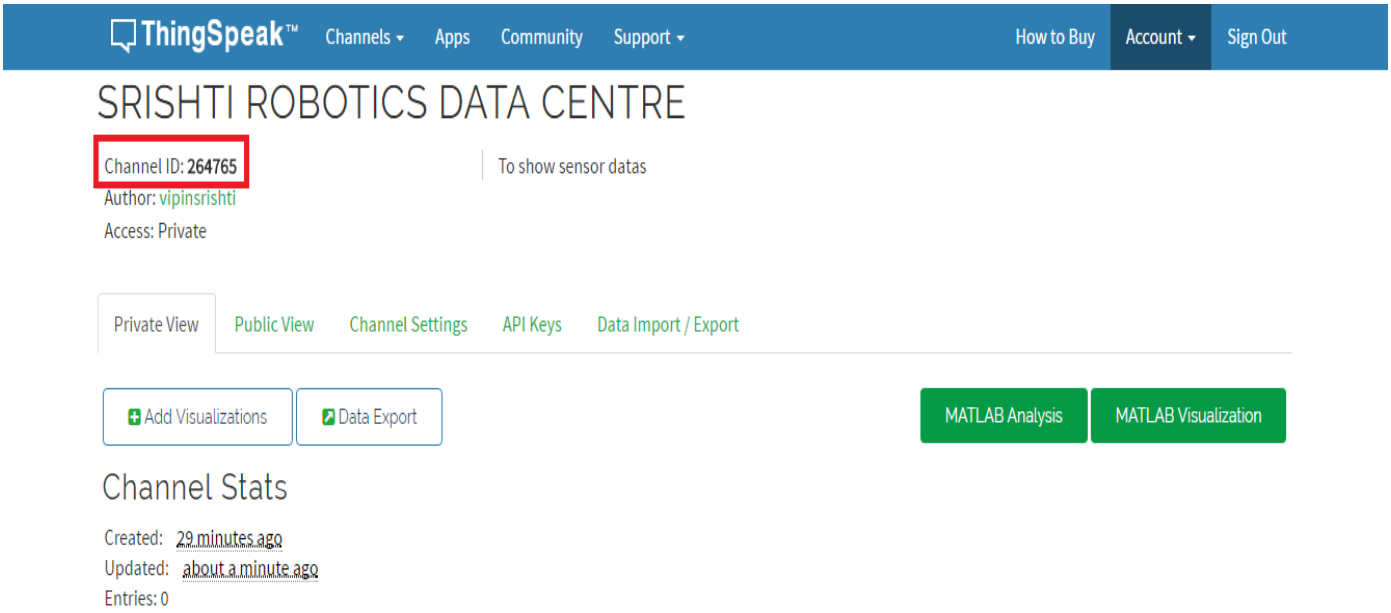


3. Scroll down and save the channel



4.Channel ID

Channel Id is the identity of your channel. Note down this.



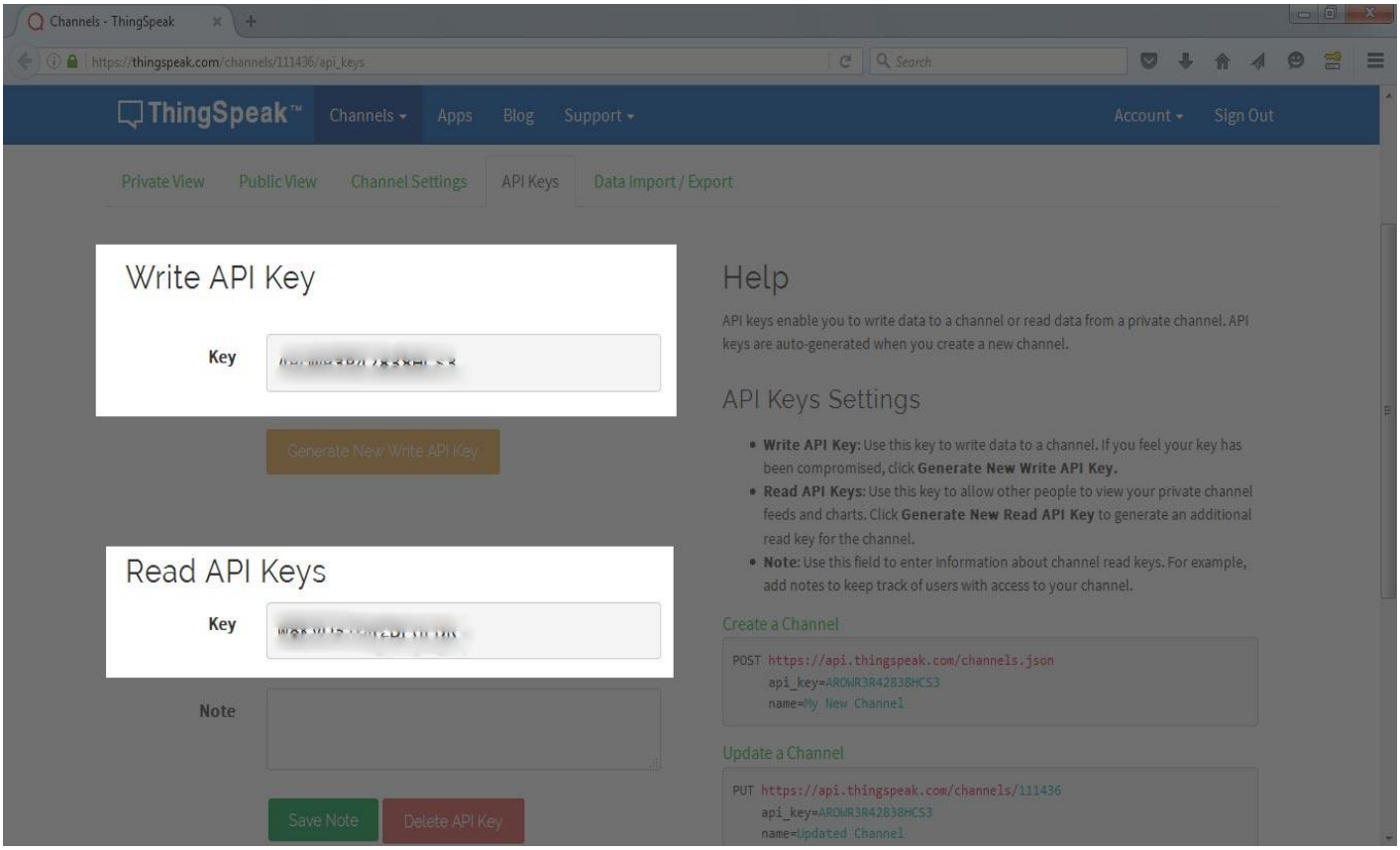
5.API Keys

API (Application Programming Interface) keys are the keys to access to your channel. In simple language you can understand that these are password to access your channel. You can access your channel in two ways-

1. To update channel / data logging : API Write Key will be used to access in this mode.

2. To retrieve data : API Read Key will be used to access in this mode.

Click on the API tab to know your API keys. We have blurred our API Keys for security reasons.



6.Accessing Channel:

You may use following URLs to access your channel -

To Update channel / data uploading / data logging

URL: *http://api.thingspeak.com/update?api_key=**YOUR-API**&field1=**VAR-1**&field2=**VAR-2***

make the following replacements in the above mentioned URL -

1. YOUR-API : Your API Write Key

2. VAR-1 : Temperature Data

3. VAR-2 : Humidity Data

Response : If you get a positive number that means the data has been uploaded to your channel. The number is index of the last entry you have made.

Retrieve channel / data reading

URL: http://api.thingspeak.com/channels/***YOUR-CHANNEL-ID***/fields/***FIELD***.json?results=***NOS-OF-RESULTS***&api_key=***YOUR-API***

make the following replacements in the above mentioned URL -

1.YOUR-CHANNEL-ID - Your channel ID

2. FIELD - Field you want to retrieve. Write 1 for Field1, 2 for Field2

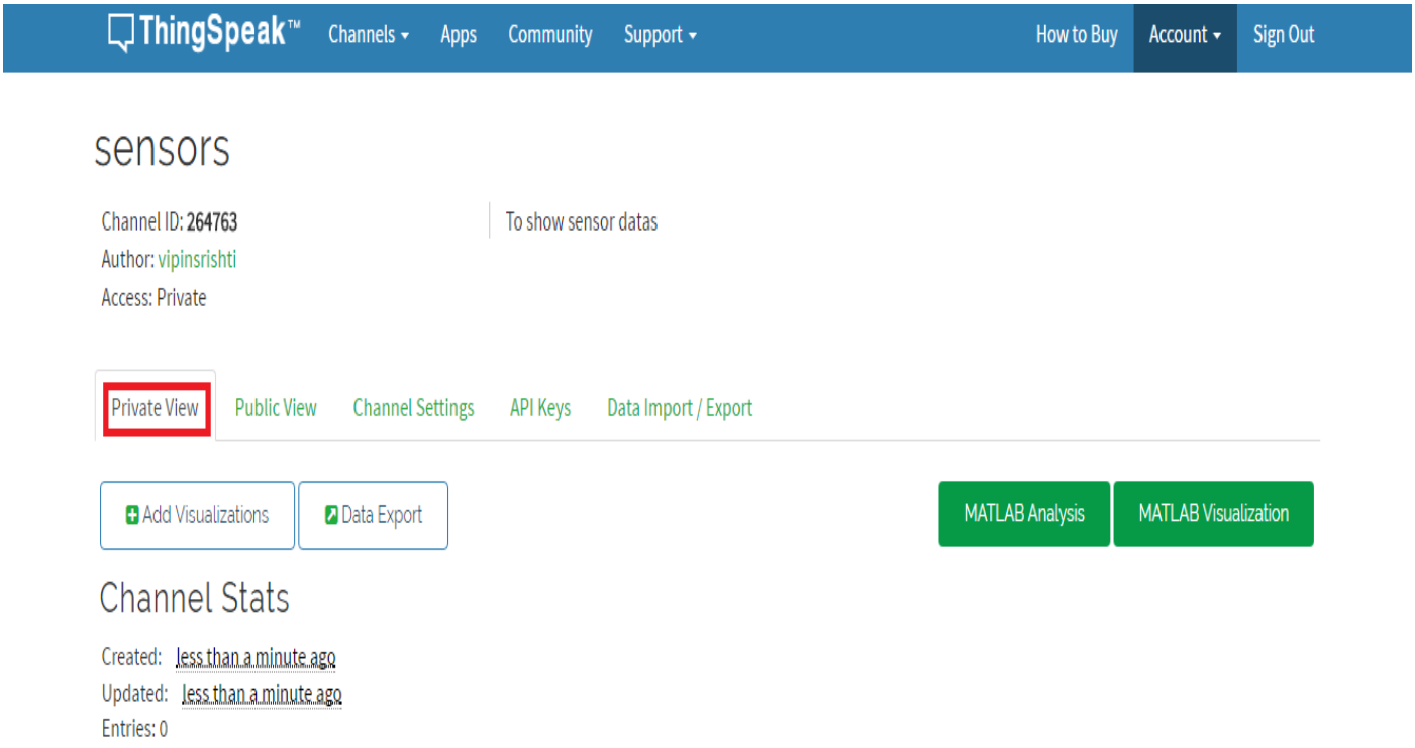
3. NOS-OF-RESULTS = The number of rows you want to retrieve.

4. YOUR-API : Your API Read Key

Response : You will get data as per your specifications in JSON format.

7.Reading data through ThingSpeak website.

Login to your account. Select your channel and click on the view as shown in the following image.



PROJECT 1: DAM LEVEL INDICATOR

Hardware

1x Ultrasonic sensor

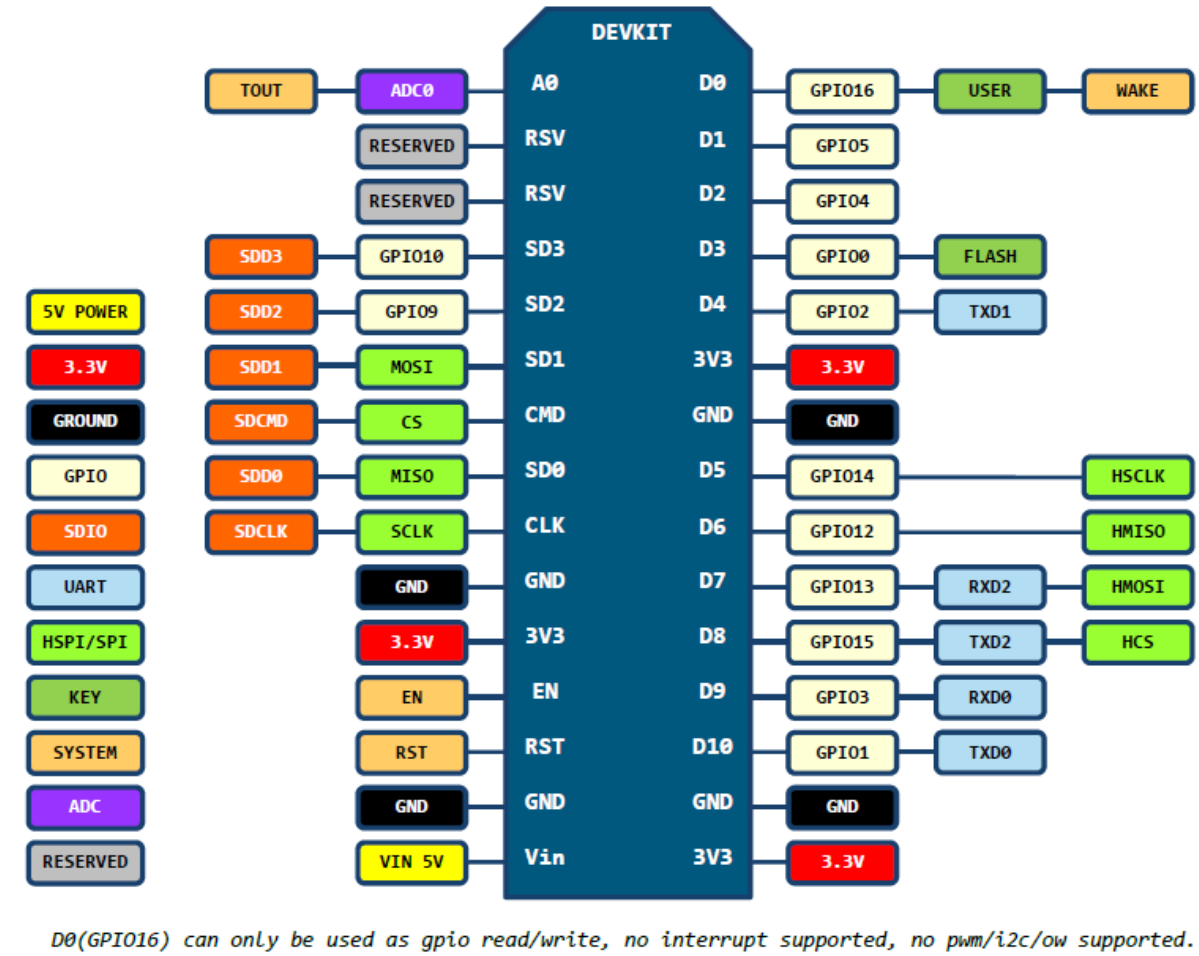
1x NodeMCU

1x Access Point Connected to Internet(Wi-Fi)

Software:

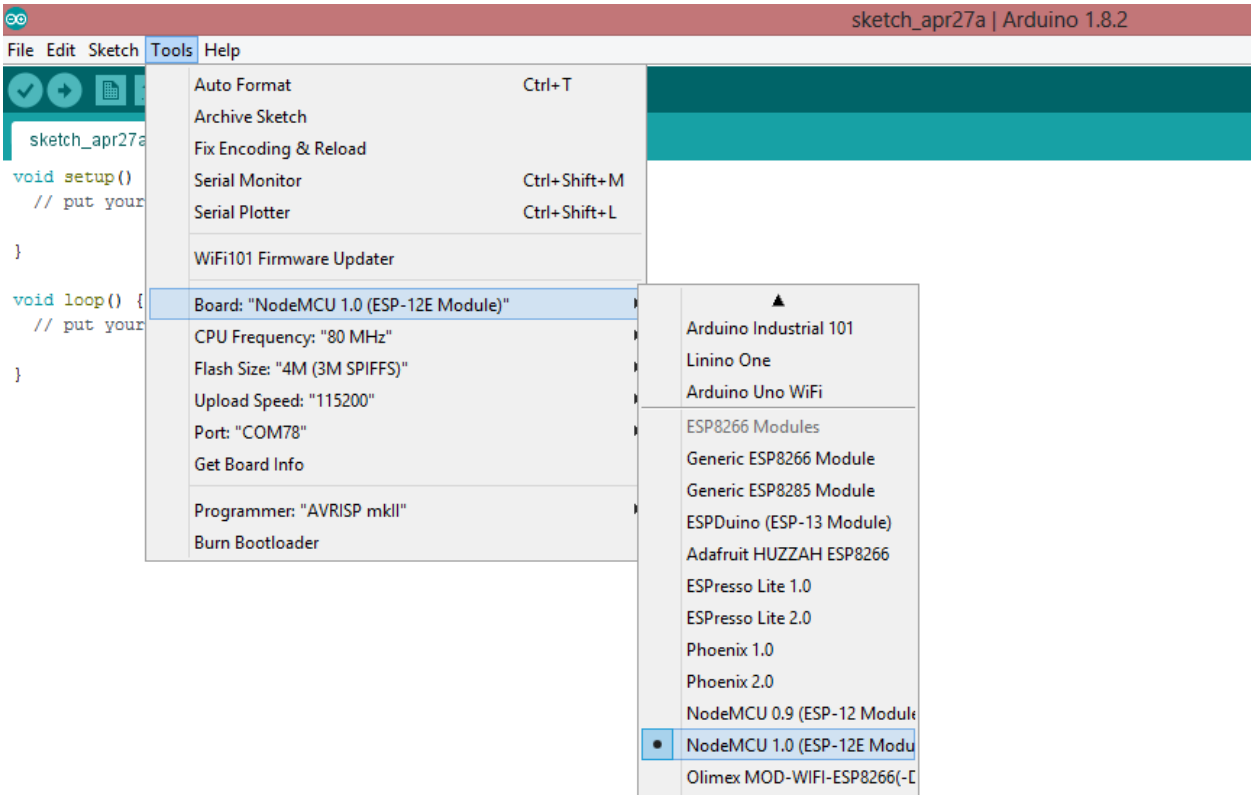
Arduino IDE

The physical pins on NodeMCU v1.0 does not correspond to pins in Arduino IDE. Check out figure for pin mapping



1. Connect 3.3v and gnd from NodeMCU v1.0 to Ultrasonic sensor respectively.
2. Connect echo and trigger pins from Ultrasonic sensor to NodeMCU v1.0

Connect microUSB to NodeMCU v1.0



Launch ESP8266 Arduino IDE, Select Tools -> Board -> NodeMCU v1.0; and ensure parameters are correct. Refer to screenshot.

Program the source code to read Ultrasonic sensor and the acquired data to be sent to thingspeak.

sketch_apr27b §

```
#include "ThingSpeak.h"
#include <ESP8266WiFi.h>

char ssid[] = "SRISHTI ROBOTICS";          //  your network SSID (name)
char pass[] = "srishtirobotics123";   // your network password

int status = WL_IDLE_STATUS;
WiFiClient  client;

unsigned long myChannelNumber = 234946; // modify this with your own Channel Number
const char * myWriteAPIKey = "G294VC763KY2LBLJ";modify this with your own API

void setup() {
  Serial.begin(9600); // for debugging reasons
  WiFi.begin(ssid, pass);
  ThingSpeak.begin(client);
}
void loop() {
  int sensorValue = analogRead(A0);
  Serial.println(sensorValue);
  ThingSpeak.writeField(myChannelNumber, 1, sensorValue, myWriteAPIKey);
  delay(20000);
  }
```

Now observe water level on thingspeak.