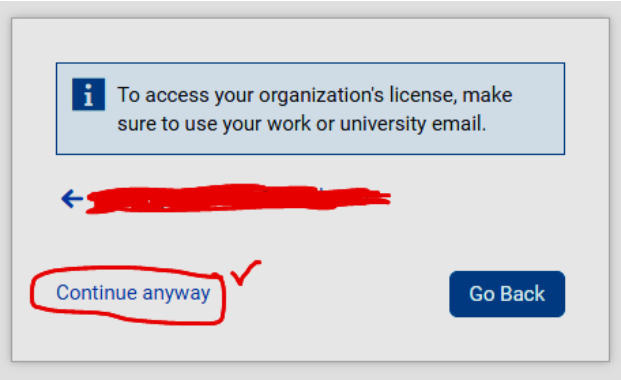
Exp-4: Using ESP32 on Wokwi simulator for Streaming IoT sensor data to ThingSpeak cloud.

Step-1: **Creating a new account on ThingSpeak cloud.**

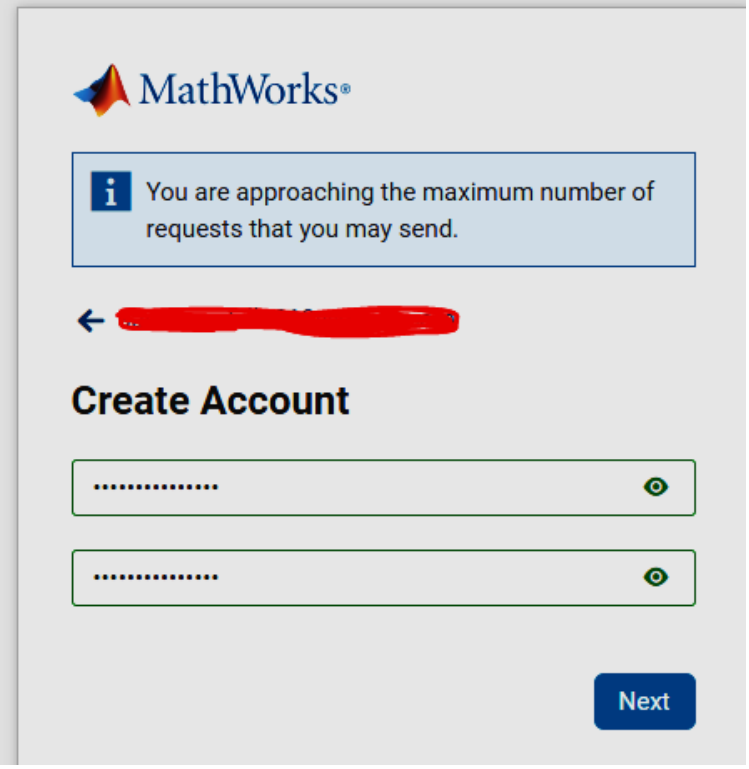
Visit https://thingspeak.com/login?skipSSOCheck=true and create a new account by using your email address. An activation link would be sent on your email id, open that email and verify the email address.

Then, go to https://in.mathworks.com/mwaccount/account/create?uri= and use the same email to create an account.

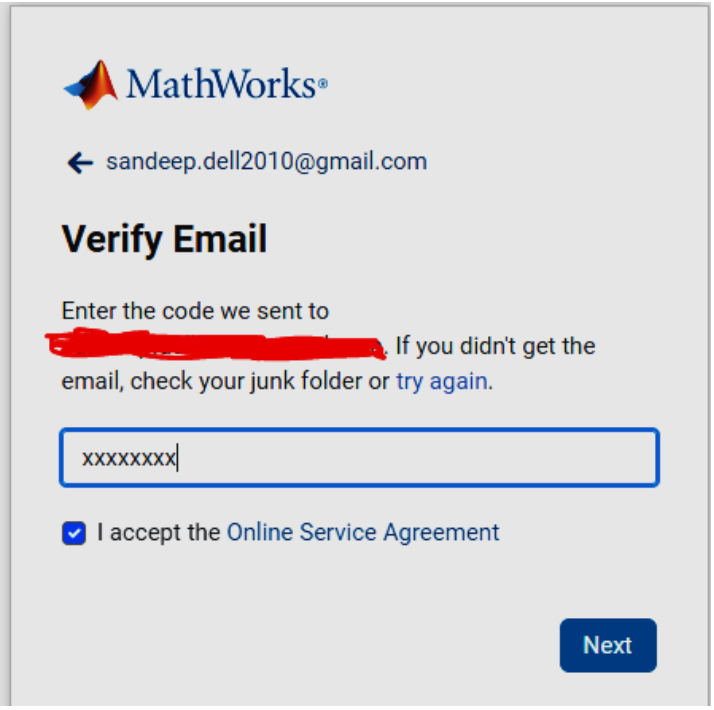
Click on '***continue anyway***' as shown in snap below:



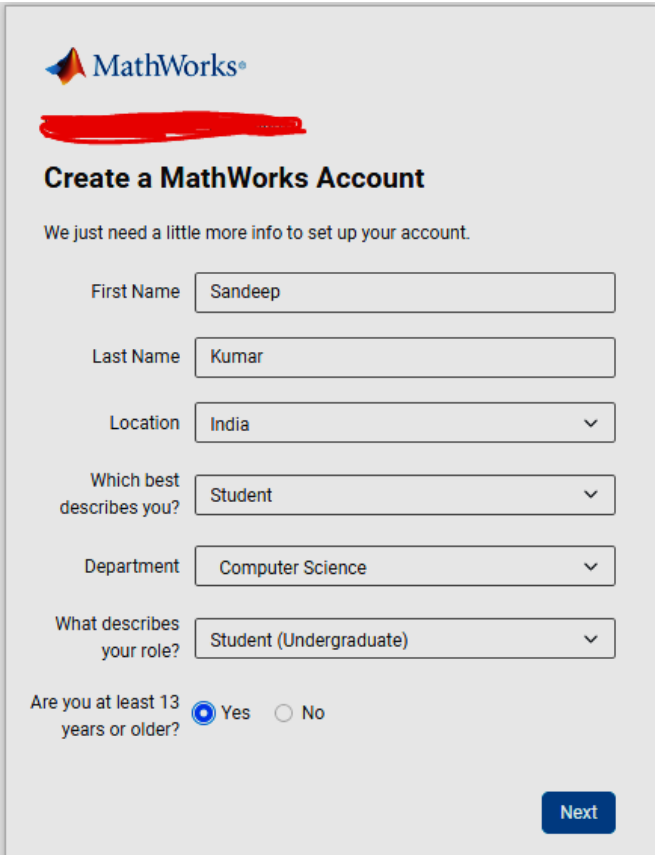
Then, it will ask for creating the password as shown in snap below:



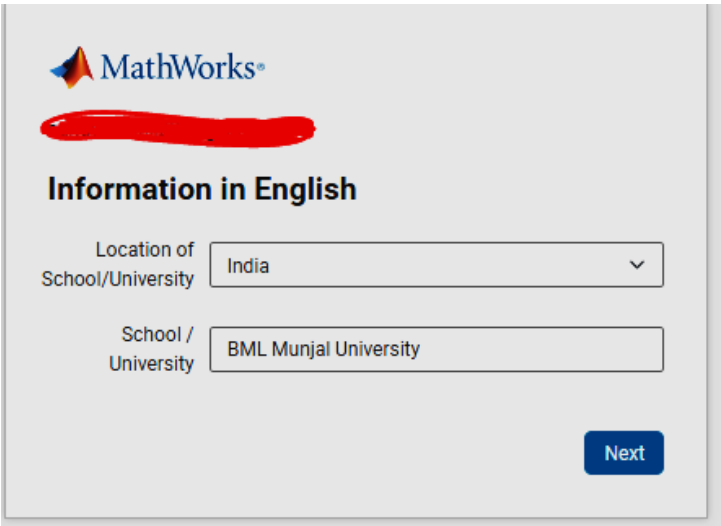
A 'code word' would be sent to your email address. Fill that code and click on next as shown in snap below:



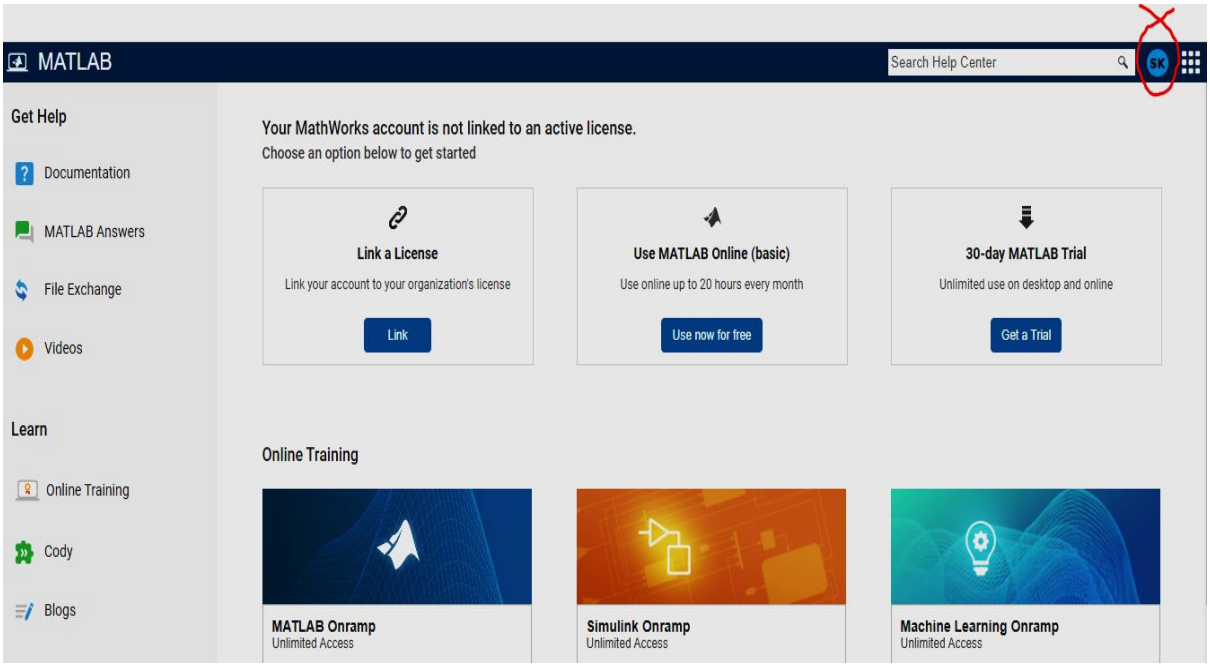
Then fill-in the requisite details and click on next as shown in snap below:



Then fill-in the university info and click on next (see snap below):

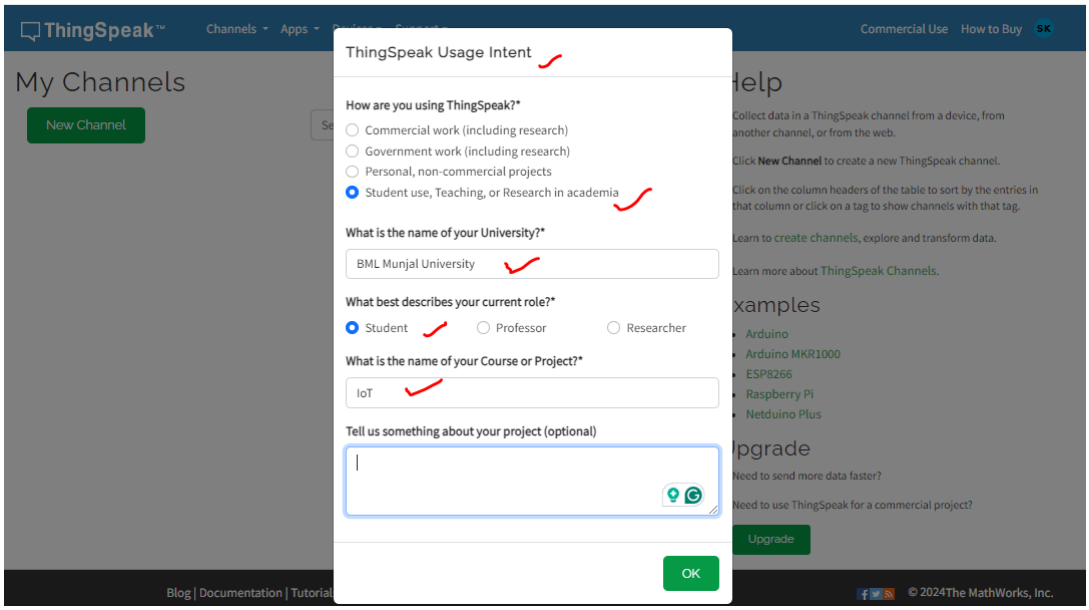


Finally, your account would be created and you will see the main screen of mathworks MATLAB as shown below:

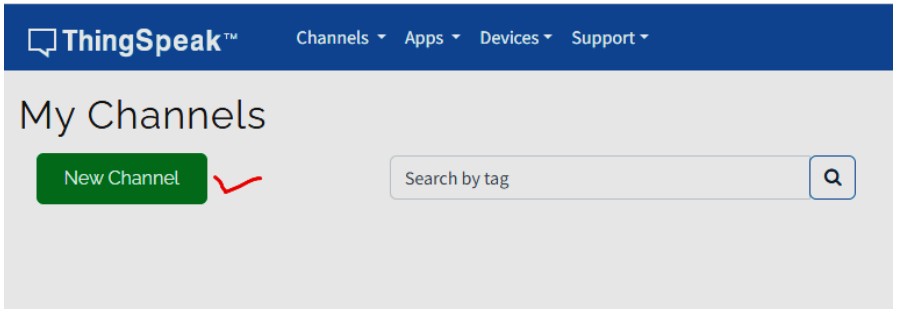


Step-2: **Logging in to the ThingSpeak cloud.**

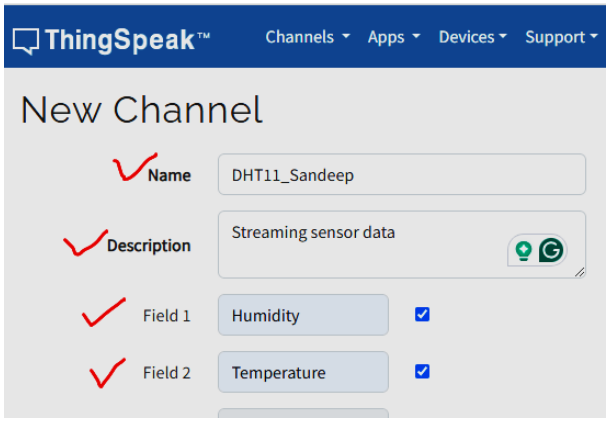
Visit https://thingspeak.com/login?skipSSOCheck=true and use the registered email id (used in step-1. Then, fill-in the password (created in step-2) and click on sign-in. You will see the window asking for 'Usage intent'. Fill-in the requite info and click on OK as shown in the snap below:

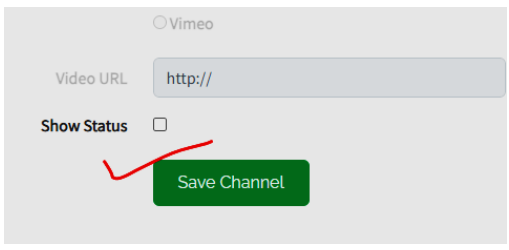


Step-3: On the main screen, click on click on channels → My channels → New channel.



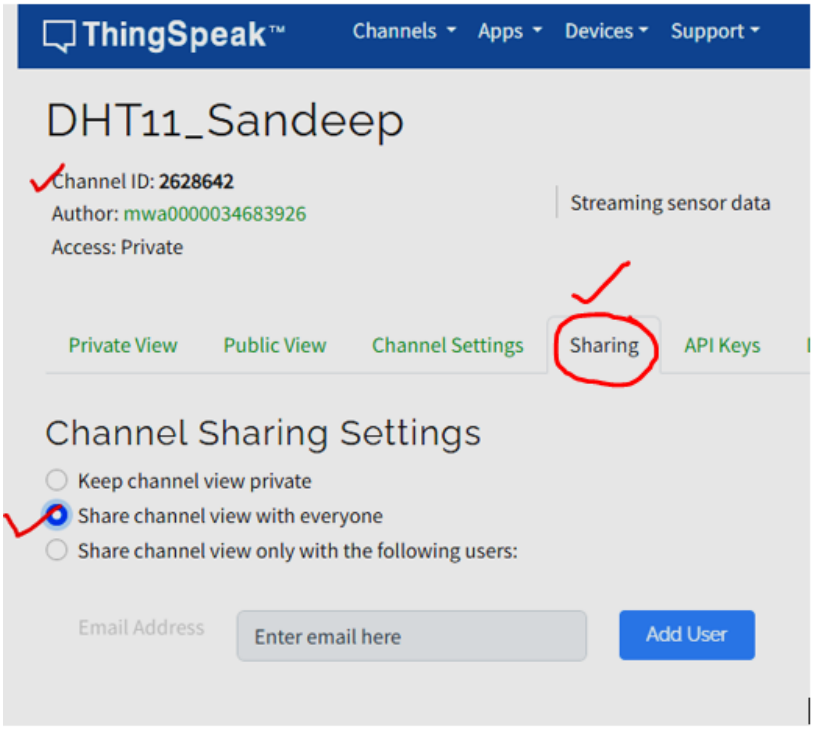
Step-4: Fill-in the following details, scroll down and click on save as shown the two snaps below:



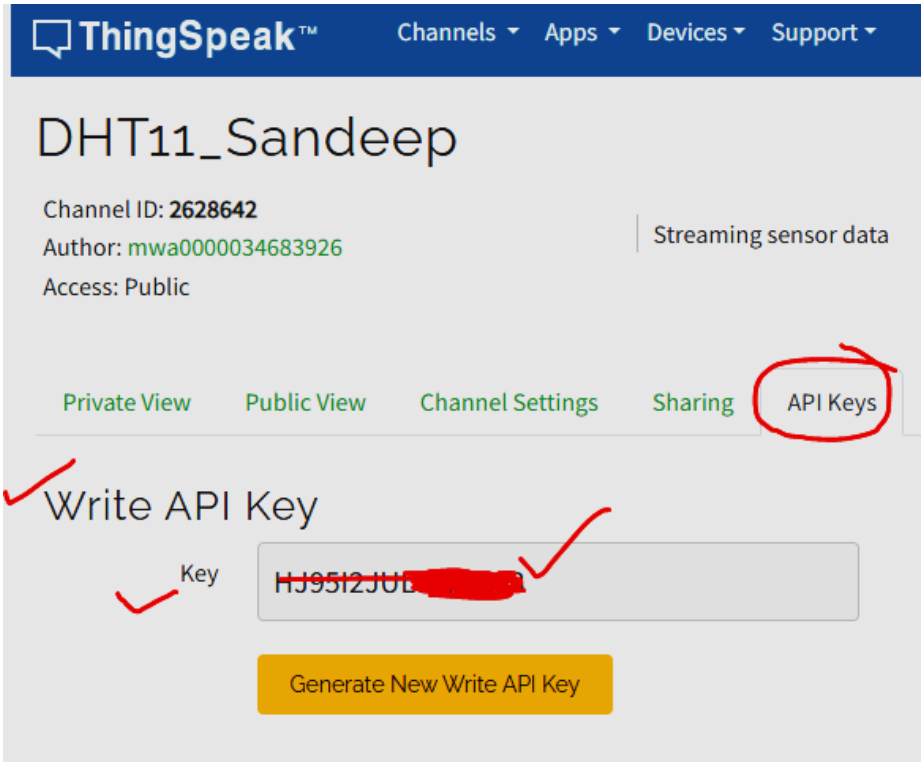


You will be directed to the main screen.

Step-5: There click on '**sharing**' and select '***share channel to everyone***' as shown below. ***Also note down your channel ID which will be used to see your sensor data on a Mobile App in further steps to come.***



Step-6: Then click on the '***API keys***' and note down the '***write API key***' (to be used in code/program in coming step) as shown below:



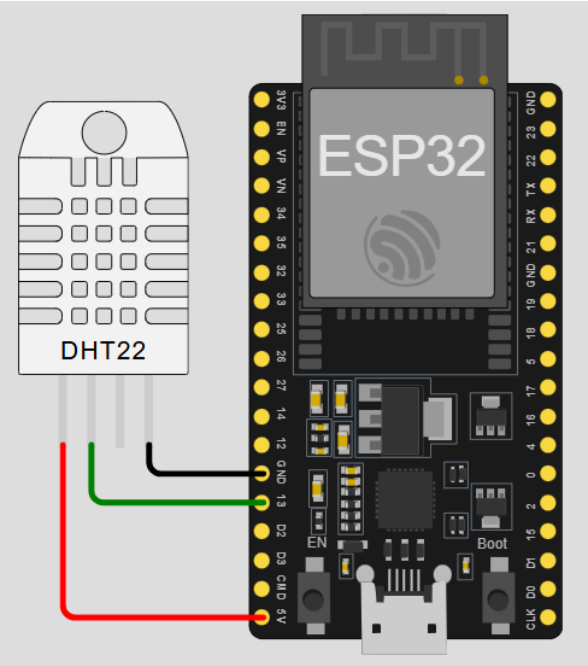
Step-7 Login to online Wokwi Simulator (*https://wokwi.com/*) with BMU email ID and write the following program under '*sketch.ino*':

```
#include <WiFi.h>
#include "DHTesp.h"
#include "ThingSpeak.h"
const int DHT_PIN = 13;
const char* WIFI_NAME = "Wokwi-GUEST";
const char* WIFI_PASSWORD = "";
const int myChannelNumber = 2589918 ; // REPLACE WITH Your ThingSpeak CHANNEL ID
const char* myApiKey = "VCZY6VJ5JIVX5QUZ"; // REPLACE WITH Your ThingSpeak API KEY
const char* server = "api.thingspeak.com";
DHTesp dhtSensor;
WiFiClient client;
```

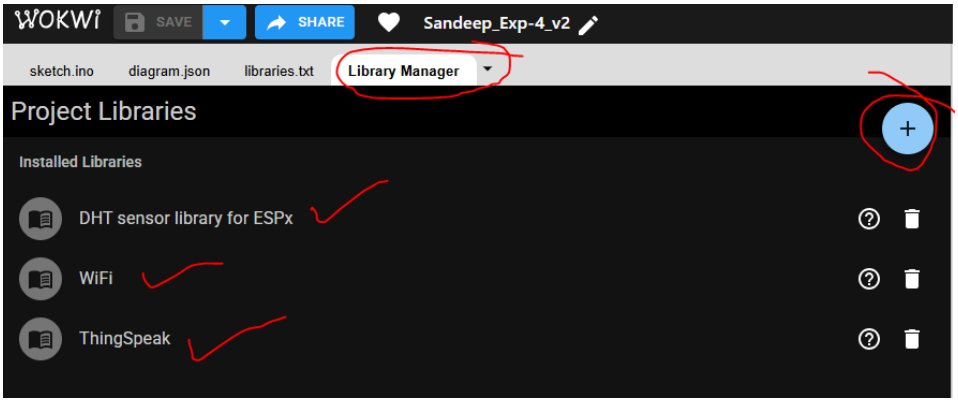
```
void setup()
{
  Serial.begin(115200);
  dhtSensor.setup(DHT_PIN, DHTesp::DHT22);
  WiFi.begin(WIFI_NAME, WIFI_PASSWORD);
  while (WiFi.status() != WL_CONNECTED)
  {
    delay(1000);
    Serial.println("Wifi not connected");
  }
  Serial.println("Wifi connected !");
  Serial.println("Local IP: " + String(WiFi.localIP()));
  WiFi.mode(WIFI_STA);
  ThingSpeak.begin(client);
}
```

```
void loop()
{
  TempAndHumidity  data = dhtSensor.getTempAndHumidity();
  ThingSpeak.setField(1,data.humidity);
  ThingSpeak.setField(2,data.temperature);
  int x = ThingSpeak.writeFields(myChannelNumber,myApiKey);
  Serial.println("Temp: " + String(data.temperature, 2) + "°C");
  Serial.println("Humidity: " + String(data.humidity, 1) + "%");
  if(x == 200)
  {
    Serial.println("Data pushed successfull");
  }
  else
  {
    Serial.println("Push error" + String(x));
  }
  Serial.println("---");
  delay(10000);
}
```

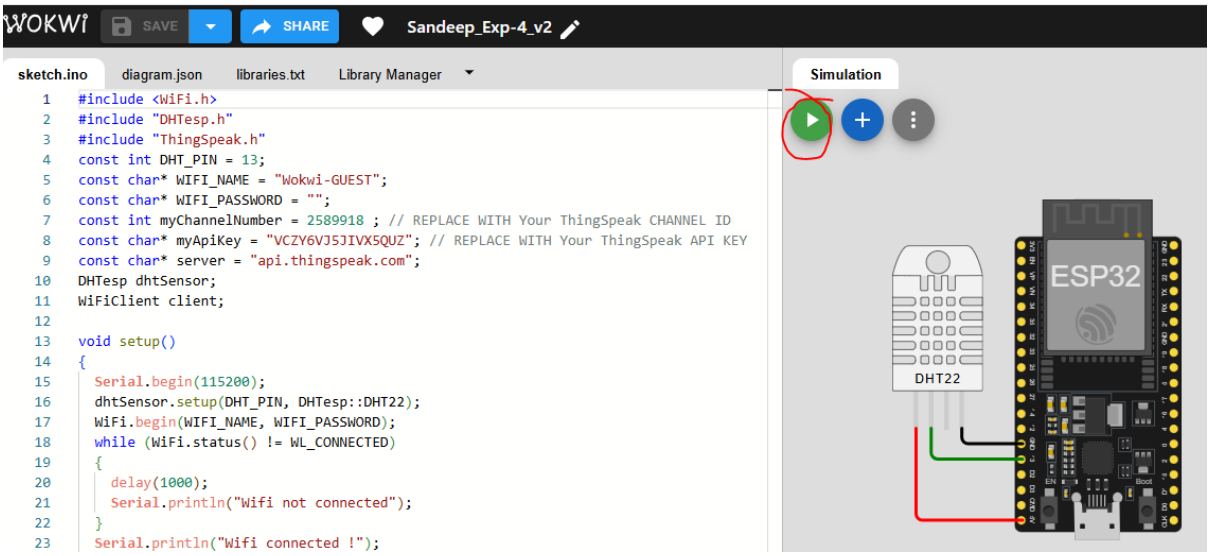
Step-8 Design the following circuit on the **Wokwi** simulator:



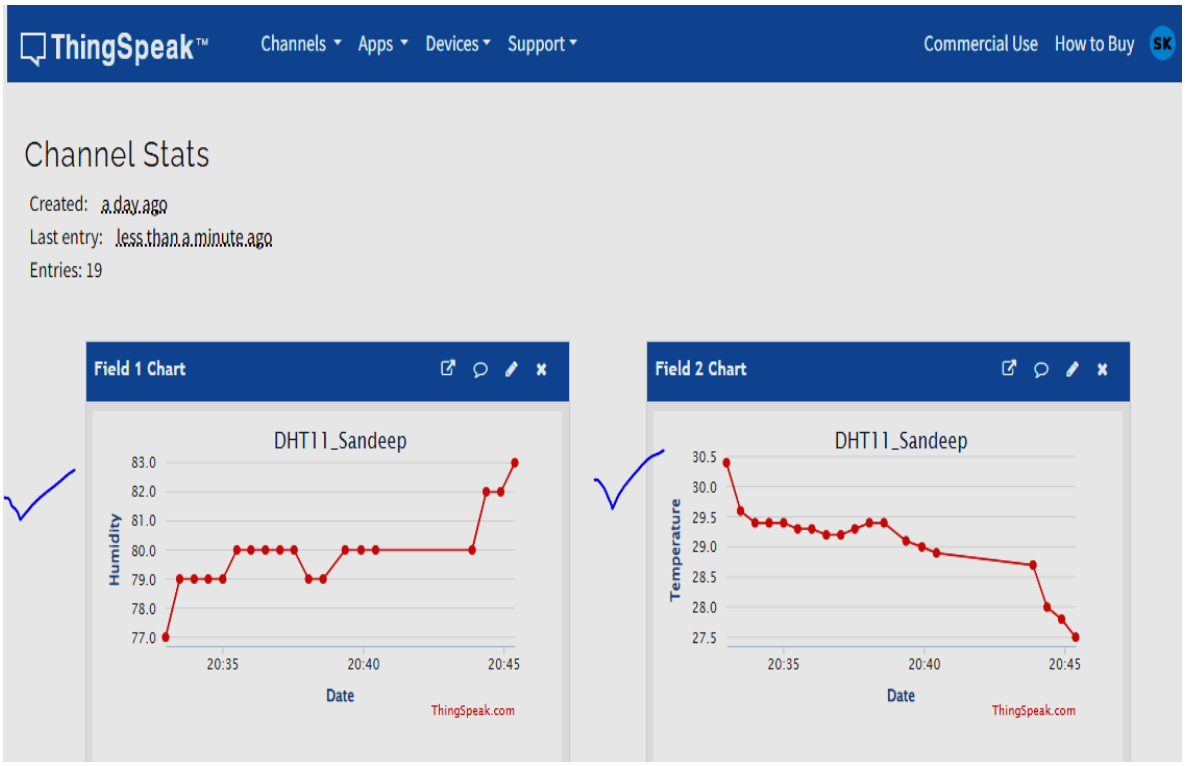
Step-9 Include the following **libraries** (see in the snap below)



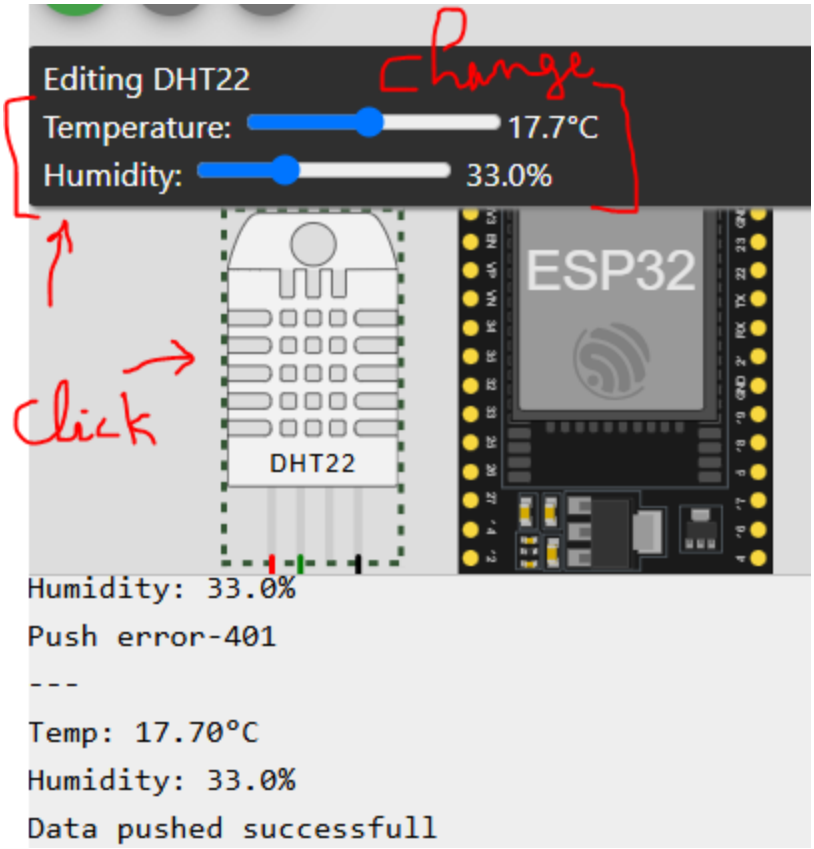
Step-10 Save your design and **Simulate** it. [It may take a few minutes. If fails repeatedly, refresh the browser.]



Step-11: Again, go to ThingSpeak portal (already logged in previous steps). Go to channels →My channels → DHT11_Sandeep (***whatever your channel name***). ***You must see the IoT (DHT sensor) data uploaded to the ThingSpeak cloud in the form of graphs as shown below***.

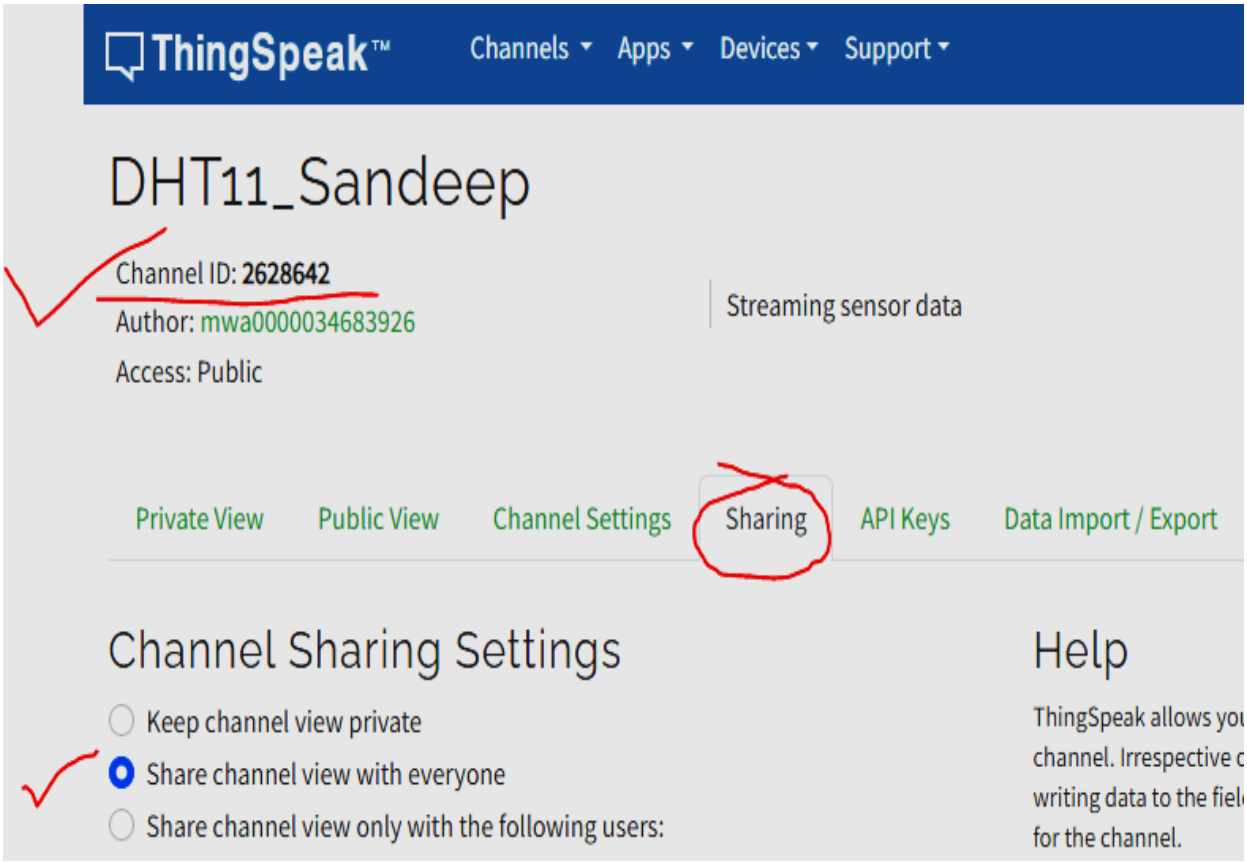


NOTE: Click on DHT22 sensor to change the values of temperature and humidity and wait a few seconds. The same must be uploaded on ThingSpeak.

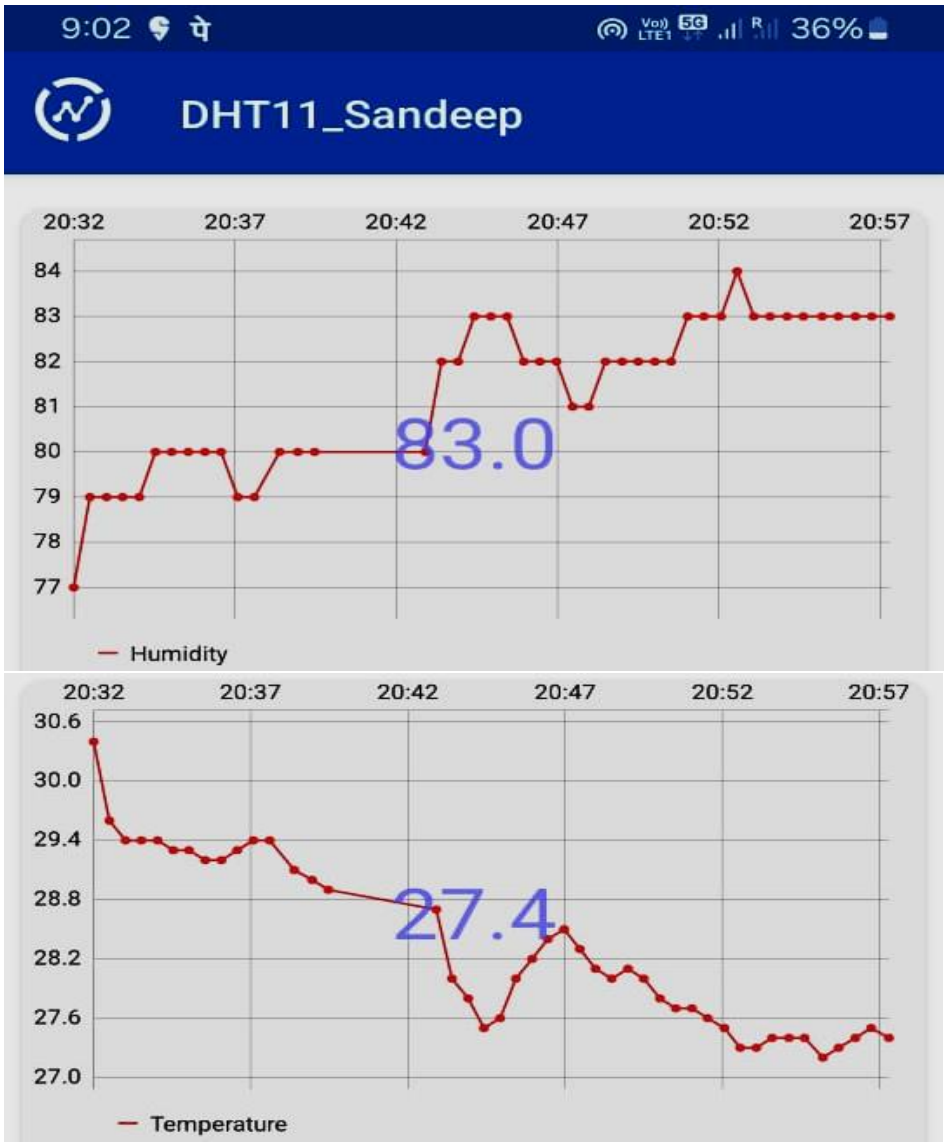


Step-12 *Accessing the IoT Sensor data on your Smartphone:*

First go to the main screen of ThingSpeak portal, click on Sharing → select (click on) share channel with everyone → note down the channel ID. (see snap below)



Now, search the App '***ThingView***' – **ThingSpeak viewer** on play store and install it on your smartphone → Open the app → Click on '**+**' sign on the right bottom → click on Add channel → input the channel ID (found above) → click on search → click on DONE (confirm channel) → You can see your channel name (DHT11_Sandeep) there → click on that channel name → Now you must be able to see the IoT (DHT sensor) data on your smartphone in the form of graphs as shown below:


9:02
36%
DHT11_Sandeep
20:32
20:37
20:42
20:47
20:52
20:57
84
83
82
81
80
79
78
77
83.0
Humidity
20:32
20:37
20:42
20:47
20:52
20:57
30.6
30.0
29.4
28.8
28.2
27.6
27.0
27.4
Temperature