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Subject Name and Code:	Date of Experiment:
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Task:
Implement IoT connectivity using Arduino.

Components:
 Arduino UNO, DHT 11 sensor,ESP8266-01 module

About the Project:

IOT:-

IoT is a network of physical devices with sensors and embedded software . These devices connect to the internet and exchange data. Devices and objects with built in sensors are connected to an Internet of Things platform, which integrates data from the different devices and applies analytics to share the most valuable information with applications built to address specific needs. These powerful IoT platforms can pinpoint exactly what information is useful and what can safely be ignored. This information can be used to detect patterns, make recommendations, and detect possible problems before they occur. The information picked up by connected devices enables to make smart decisions based on real-time information, which help us to save time and money, and makes a process faster and more efficient

DHT 11 sensor:-
The DHT11 is a commonly used Temperature and humidity sensor. The sensor comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data. The sensor is also factory calibrated and hence easy to interface with other microcontrollers.The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of ±1°C and ±1%. So if you are looking to measure in this range then this sensor might be the right choice for you.

ESP8266-01 module:-
The ESP8266 ESP-01 is a Wi-Fi module that allows microcontrollers access to a Wi-Fi network. This module is a self-contained SOC (System On a Chip) that doesn't necessarily need a microcontroller to manipulate inputs and outputs as you would normally do with an Arduino, for example, because the ESP-01 acts as a small computer

Interfacing:-

We will first connect the jumper wire to Arduino Uno and ESP8266-01 . Then we connect DHT 11 sensor in the breadboard and then give connection of it with a=Arduino uno. Write the code in our pc and connect our pc with Arduino board using USB cable. Then we have to open a account on Things speak . On Things speak we get a API key ,we will write that key in our code . Connect our PC with Wifi and write that wifi name and password in our code and then we will upload the code. After uploading it we will connect it with things speak ,we be able to see the reaing of temperature and humidity .
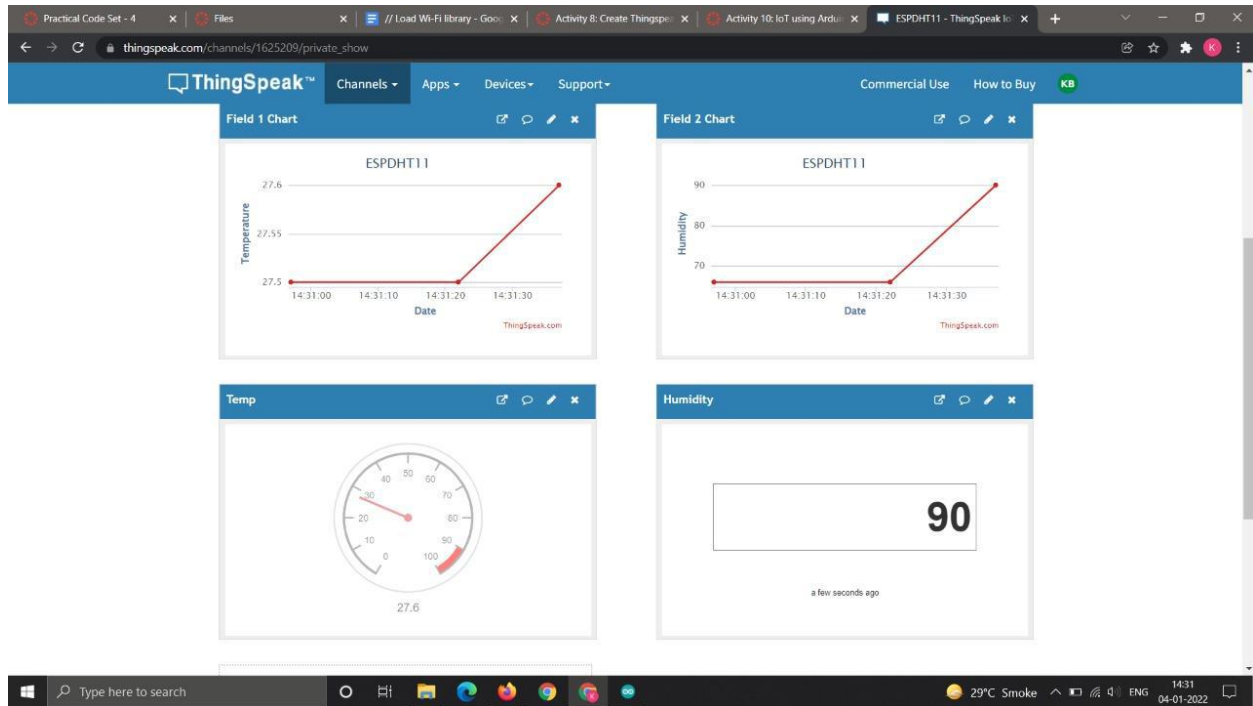
Schematic:
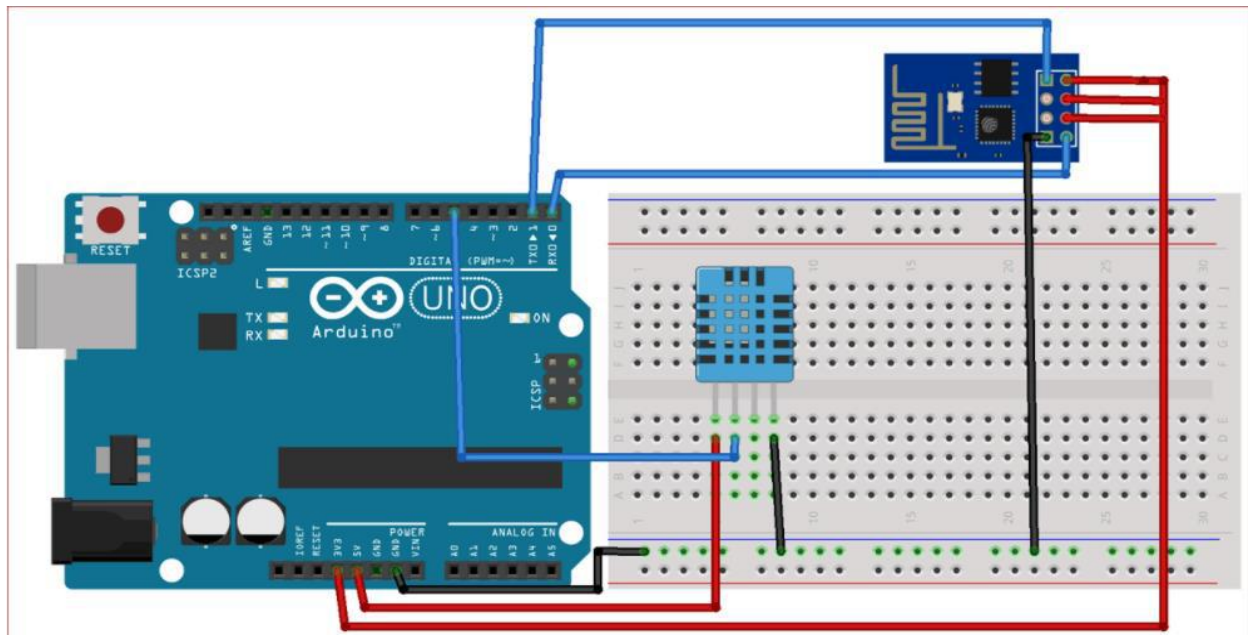
Output: (your circuit implementation and its working photo)
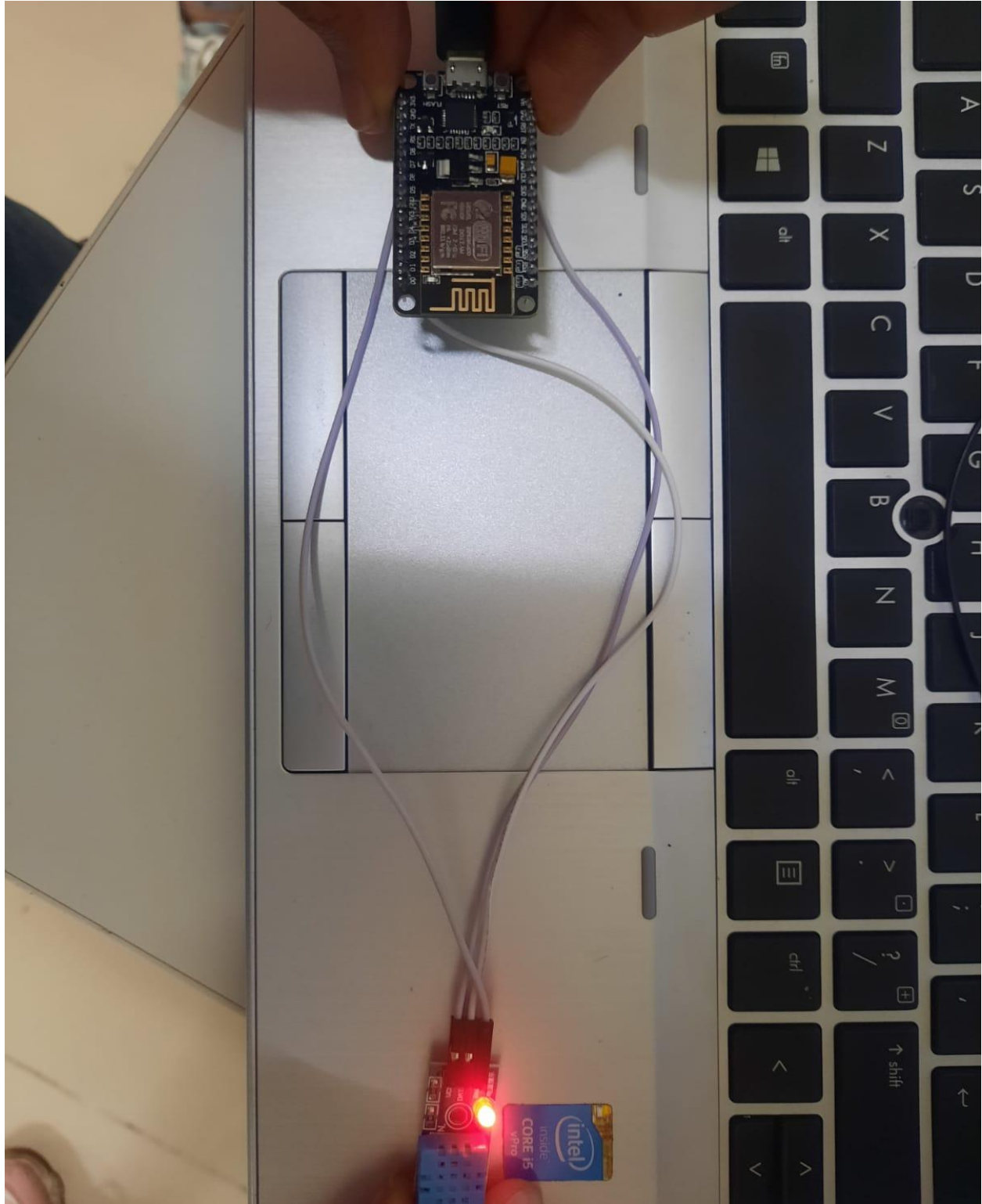
Code:

```
#include <DHT.h>
#include <DHT_U.h>
#include <ESP8266WiFi.h>
String apiKey = "89AIJ5Y9CY2FVK7H"; // Enter your Write API key from ThingSpeak
const char *ssid = "WIFI NAME"; // replace with your wifi ssid and wpa2 key
const char *pass = "PASSWORD";
const char* server = "api.thingspeak.com";
#define DHTPIN 0 //pin where the dht11 is connected
DHT dht(DHTPIN, DHT11);
WiFiClient client;
void setup()
{
Serial.begin(115200);
```

```
delay(10);
dht.begin();
Serial.println("Connecting to ");
Serial.println(ssid);
WiFi.begin(ssid, pass);
while (WiFi.status() != WL_CONNECTED)
{
delay(500);
Serial.print(".");
}
Serial.println("");
Serial.println("WiFi connected");
}
void loop()
{
float h = dht.readHumidity();
float t = dht.readTemperature();
if (isnan(h) || isnan(t))
{
Serial.println("Failed to read from DHT sensor!");
return;
}
if (client.connect(server,80)) // "184.106.153.149" or api.thingspeak.com
{
String postStr = apiKey;
postStr +="&field1=";
postStr += String(t);
postStr +="&field2=";
postStr += String(h);
postStr += "\r\n\r\n";
client.print("POST /update HTTP/1.1\n");
client.print("Host: api.thingspeak.com\n");
client.print("Connection: close\n");
client.print("X-THINGSPEAKAPIKEY: "+apiKey+"\n");
client.print("Content-Type: application/x-www-form-urlencoded\n");
client.print("Content-Length: ");
client.print(postStr.length());
client.print("\n\n");
client.print(postStr);
Serial.print("Temperature: ");
Serial.print(t);
Serial.print(" degrees Celcius, Humidity: ");
Serial.print(h);
Serial.println("%. Send to Thingspeak.");
}
client.stop();
Serial.println("Waiting...");
delay(1000);
}
```

Application:

DHT sensor is used to get temperature and humidity reading , Iot is used is used to exchange this data. When we combine DHT sensor and Iot we can share the reading of humidity and temperature of a place to other through internet.

Conclusion:

At last, we can conclude from the above tasks that,
Internet of Things is the concept in which the virtual world of information technology connected to the real world of things. The technologies of Internet of things such as RFID and Sensor make our life become better and more comfortable. We can monitor the DHT11 Sensor Data from anywhere in the World just by sitting in front of a computer. This project could be your first implementation towards a bigger and better Weather Station with many other sensors.