

# COCSC20- INTERNET OF THINGS

## EXERCISE- 5

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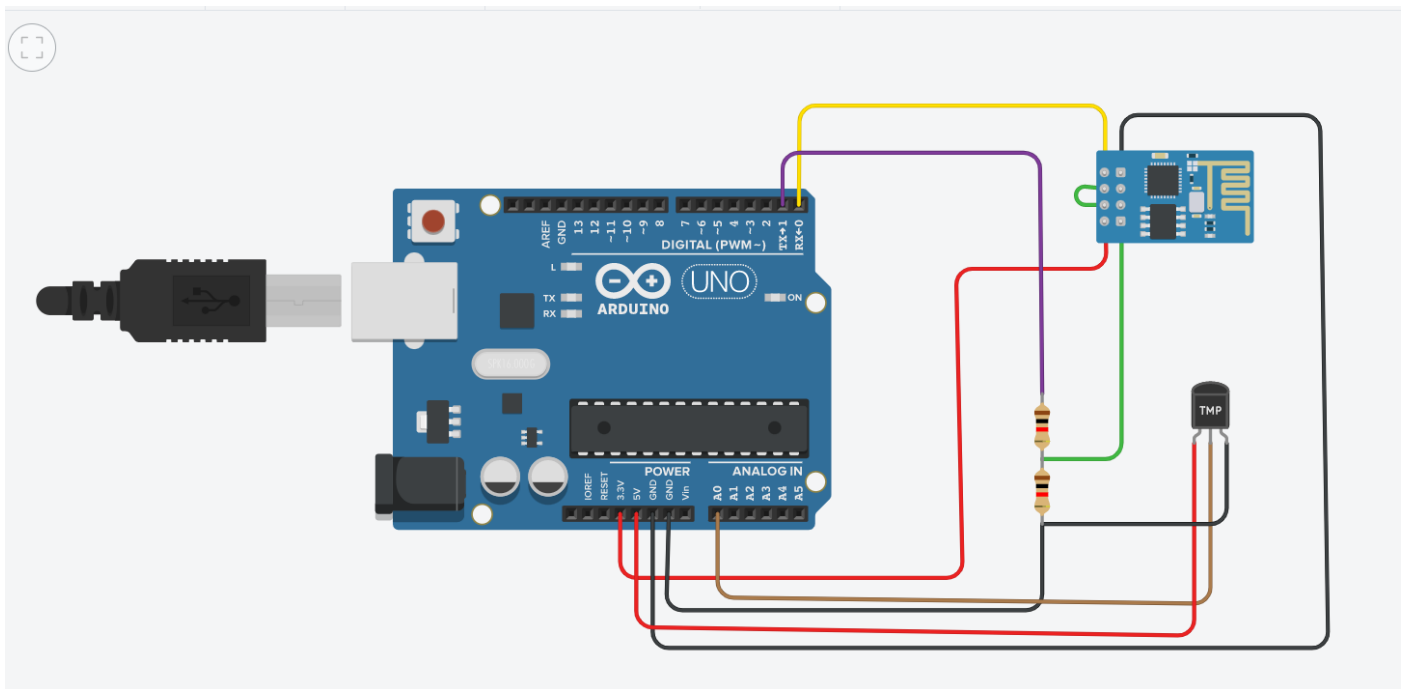
### PROBLEM:

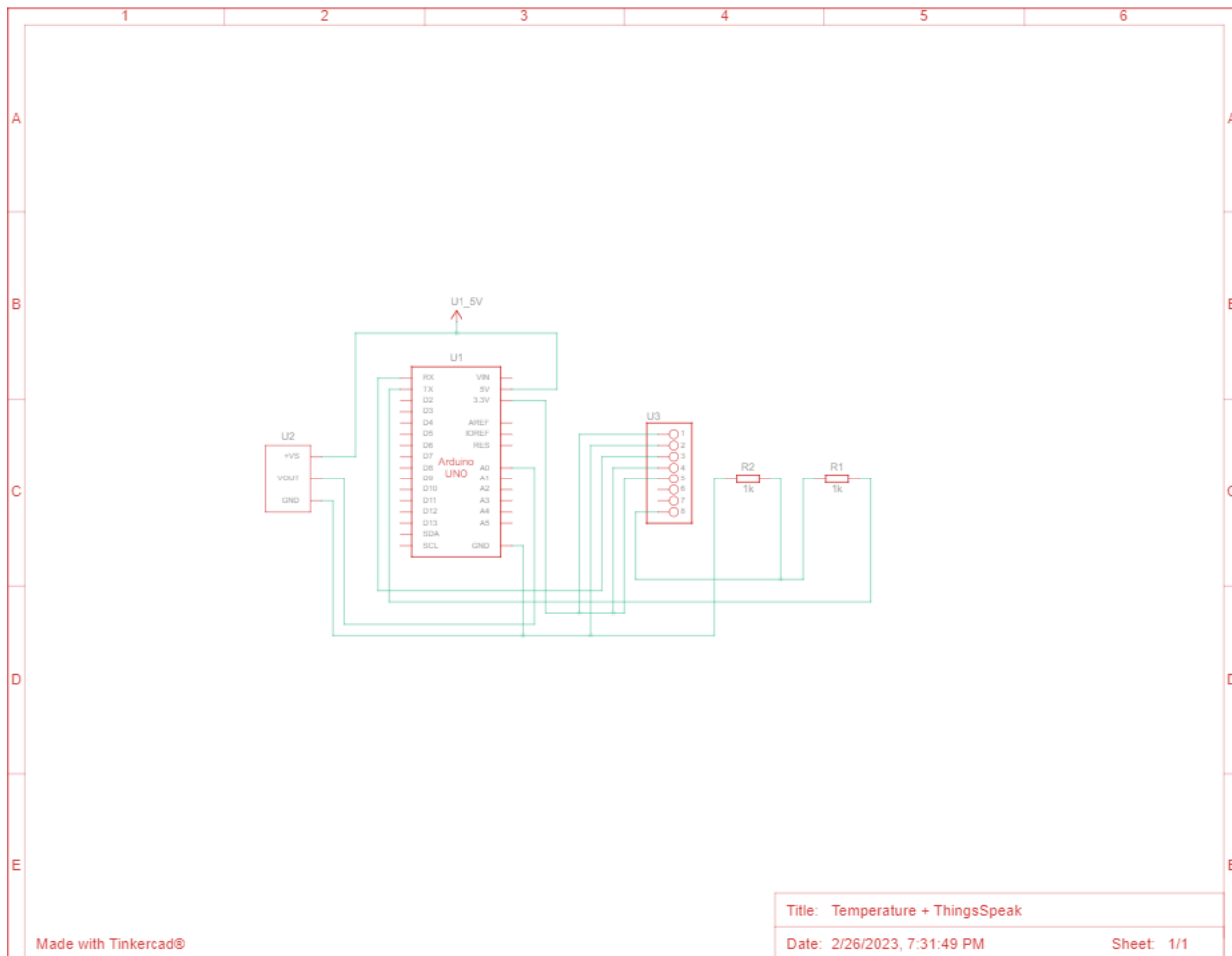
Explore ThingSpeak cloud platform for capturing, analyse and process the different sensors data. Transmit any random data from your microcontroller to ThingSpeak Cloud.

### COMPONENTS REQUIRED:

- 1 x Arduino Uno
- 1 x Temperature sensor
- 1 x Wifi Module
- 2 x 1 kilo ohm resistor

### CIRCUIT DIAGRAM:





## CODE:

```
String ssid = "Simulator Wifi"; // SSID to connect to

String password = ""; // Our virtual wifi has no password
String host = "api.thingspeak.com"; // Open Weather Map API
const int httpPort = 80;
String url = "/update?api_key=[REDACTED]&field1="; // Data write API Key

int setupESP8266(void) {
    // Start our ESP8266 Serial Communication
    Serial.begin(115200); // Serial connection over USB to computer
    Serial.println("AT"); // Serial connection on Tx / Rx port to ESP8266
    delay(10); // Wait a little for the ESP to respond
    if (!Serial.find("OK")) return 1;

    // Connect to 123D Circuits Simulator Wifi
    Serial.println("AT+CWLAP=\"" + ssid + "\",\"" + password + "\"");
    delay(10); // Wait a little for the ESP to respond
    if (!Serial.find("OK")) return 2;

    // Open TCP connection to the host:
    Serial.println("AT+CIPSTART=\"TCP\",\"" + host + "\", " + httpPort);
    delay(50); // Wait a little for the ESP to respond
    if (!Serial.find("OK")) return 3;

    return 0;
}
```

```

void anydata(void) {
  int temp = map(analogRead(A0),20,358,-40,125);
  // Construct our HTTP call
  String httpPacket = "GET " + url + String(temp) + " HTTP/1.1\r\nHost: " + host + "\r\n\r\n";
  int length = httpPacket.length();
  // Send our message length
  Serial.print("AT+CIPSEND=");
  Serial.println(length);
  delay(10); // Wait a little for the ESP to respond if (!Serial.find(">")) return -1;

  // Send our http request
  Serial.print(httpPacket);
  delay(10); // Wait a little for the ESP to respond
  if (!Serial.find("SEND OK\r\n")) return;
}

void setup() {
  setupESP8266();
}

void loop() {
  anydata();
  delay(10000);
}

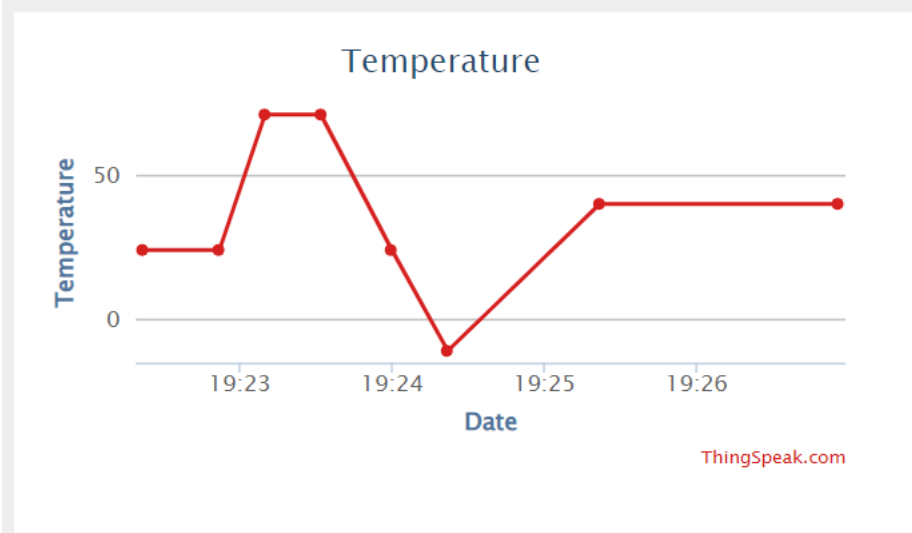
```

**Programming Skills Gained:** Learnt to interface ThingsSpeak with microcontroller and transfer data for analysis.

## RESULT:

The screenshot displays the ThingsSpeak web interface for a channel named "Temperature" (ID: 2045606). The channel is set to "Private" and was created 15 minutes ago. The interface includes a navigation bar with "Channels", "Apps", "Devices", and "Support" tabs. Below the channel name, there are tabs for "Private View", "Public View", "Channel Settings", "Sharing", "API Keys", and "Data Import / Export". There are buttons for "Add Visualizations", "Add Widgets", "Export recent data", "MATLAB Analysis", and "MATLAB Visualization". A "Field 1 Chart" is visible at the bottom, titled "Temperature". The Windows taskbar at the bottom shows the date as 26-02-2023 and the time as 19:36.

## Field 1 Chart



The data read by the temperature sensor has been successfully transferred to ThingSpeak cloud platform. The line chart shows the variation in temperature as measured by the sensor with respect to time. Further MATLAB can be used in addition with ThingSpeak platform to analyze data and for data analytics.

Similarly, data from other sensors can also be transferred to the cloud platform using the API key for the read and write operations.