Page No.
Date

Devanshu Surana
PC-23, 1032210755
Batch - C1

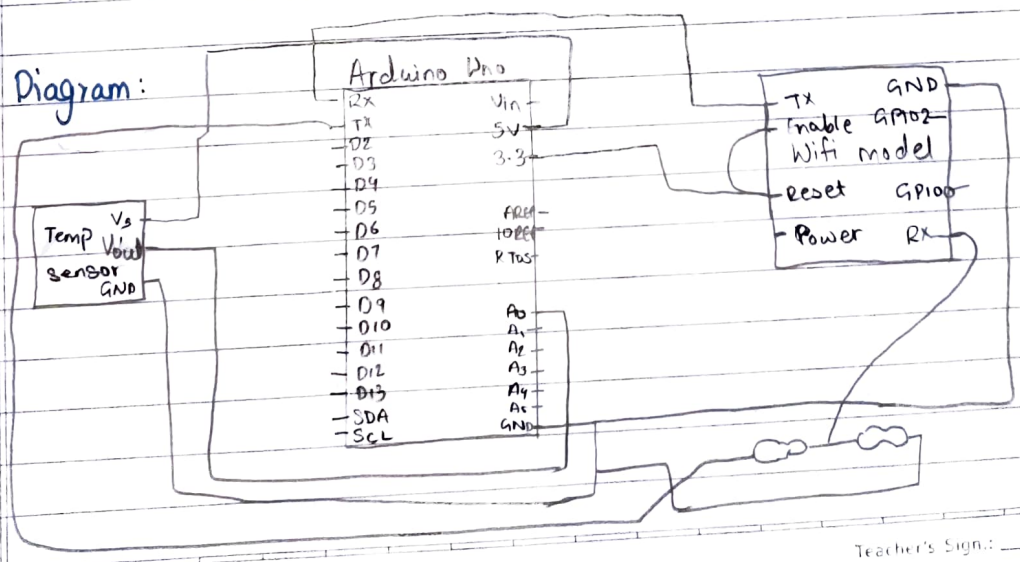
MAIoT Lab Assignment 6

Problem Statement: To sense the data from sensors and send it to cloud system. You can use any cloud system like Think speak cloud, Ubidot cloud, etc.

Objectives:
1) To understand how sensor data is sent to the cloud.
2) To learn various public cloud platforms.

Theory:
List of components:
1. 1X Arduino Uno R3
2. 1X Temperature Sensor [TMP36]
3. 1X Wifi Module (ESP8266)
4. 2X 1KΩ Resistor

Diagram:



Teacher's Sign.: _____

Write the steps for setting Think Speak Account. also add snapshots.

→ 1) Enter thinkspeak.com in url
2) Click on signup button.
3) enter your email address and password for your account.
4) Create a channel by clicking on new channel.
5) Enter a name and description for your channel and select data field you want to collect.
6) Click on save channel.
7) Now you can start collecting data.

Pseudo code:

→
```
String ssid = "simulator wifi";
string password = " ";
string host = "api.thinkspeak.com";
const int httpPort = 80;

String url = "/update?api_key=<16-digit>&field1=";
void setupESP8266(void){
        Serial.begin(115200);
        Serial.println('AT');
        delay(10);
          if(Serial.print("OK"))
            Serial.println("ESP8266 OK");
        Serial.println("AT+CWJAP=\"" + sssid + "\",\""
            + password + "\");
          delay(10);
        if(Serial.find("OK");
          Serial.println("ESP8266 connected to server")
        }
```

Teacher's Sign.: _____

```
void anydata (void) {
  val = analogRead (A0);
  voltage = val * 0.04882812S;
  temp = (voltage - 0.5) * 100.0;

String httpPacket = "GET" + url + String(temp) +
      "HTTP/1.1\r\nHost: " + host + "\n\n\r\n";
int length = httppacket.length();
   Serial.print ("AT+CIPSEND=");
   Serial.println (length);
    delay (10);

    Serial.print(httpPacket);
    delay(10);
     if (Serial.find ("Send OK \r\n"))
     Serial.println ("ESP8266 send data to the server");
     serial.println ("Temperature=    ");
      Serial.println(temp);
    }

void setup() {
    pinMode (A0, Input);
    setupESP8266();
    }
Void loop() {
   anydata();
   delay (4000);
  }
```

Page No.
Date

FAQ's

Ans1) ThinkSpeak allows you to aggregate, visualize, and analyze live data stream in the cloud.

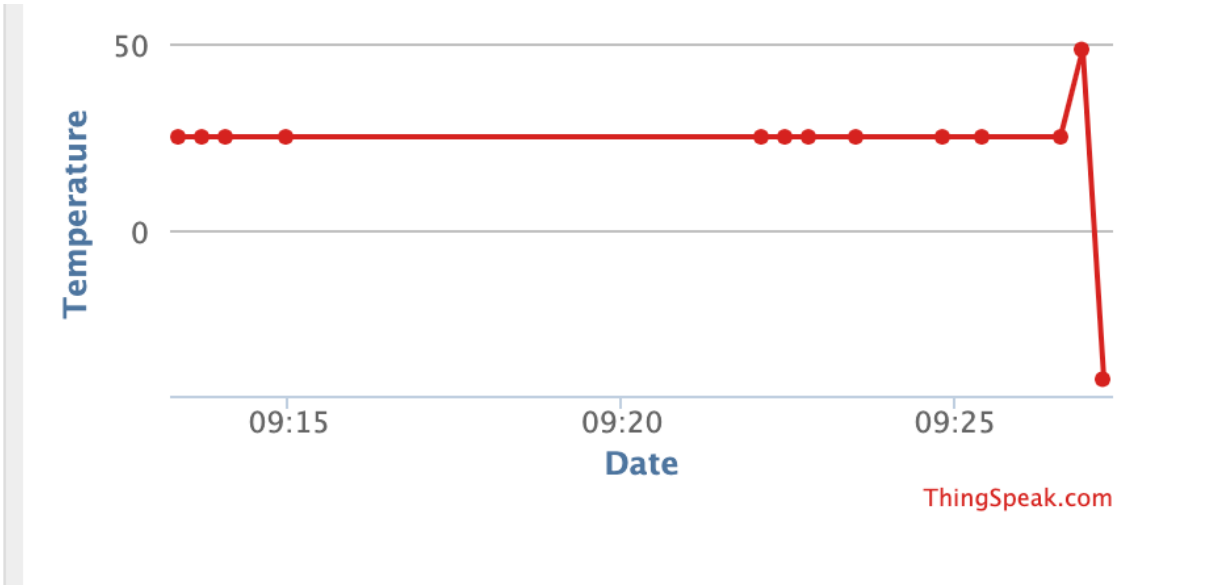
Ans 2) 1) Amazon Web service IoT
2) IBM Watson IoT
3) Microsoft Azure IoT
4) Google Cloud IoT
5) Cisco Jasper Control Center

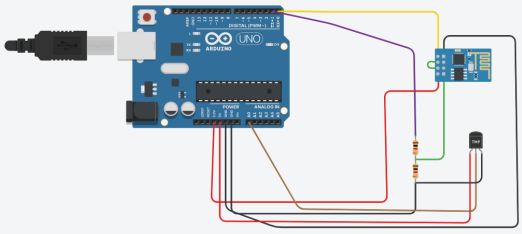
Ans 3) IBM Watson is a question answering computer system capable of answering questions posed in natural language.

Ans 4) AWS (Amazon Web service) provides on demand cloud computing services and API to individuals, companies and government, on a metered, pay-as-you-go basis.

Ans 5) The cloud provides a centralized platform for collecting processing, and analyzing the data generated by IoT devices. It offers scalability, flexibility, and powerful analytical tools to help organizations improve operational efficiency, reduce costs, and increase customer satisfaction.

Teacher's Sign.: _____





```
float val, voltage, temp;
String ssid     = "Simulator Wifi";  // SSID to connect to
String password = ""; //virtual wifi has no password
String host     = "api.thingspeak.com"; // Open Weather Map API
const int httpPort   = 80;
String url      = "/update?api_key=8F29UR0ISSWW9CX&field1=";
//Replace XXXXXXXXXXXXXXX by your ThingSpeak Channel API Key

void 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"))
    Serial.println("ESP8266 OK!!!");

  // Connect to Simulator Wifi
  Serial.println("AT+CWJAP=\"" + ssid + "\",\"" + password + "\"");
  delay(10);              // Wait a little for the ESP to respond
  if (Serial.find("OK"))
    Serial.println("Connected to WiFi!!!");

  // Open TCP connection to the host:
  //ESP8266 connects to the server as a TCP client.

  Serial.println("AT+CIPSTART=\"TCP\",\"" + host + "\"," + httpPort);
  delay(50);              // Wait a little for the ESP to respond
  if (Serial.find("OK"))
   Serial.println("ESP8266 Connected to server!!!") ;

}

void anydata(void) {

  val=analogRead(A0);
  voltage=val*0.0048828125;
  temp = (voltage - 0.5) * 100.0;

  // 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"))
    Serial.println("ESP8266 sends data to the server");

}


void setup()
{
  pinMode(A0, INPUT);
  setupESP8266();

}

void loop()
{

  anydata();

  delay(4000);
}
```