Smart Farmer-IOT Enabled Smart FarmingApplication

IBM NALAIYATHIRAN

TITLE	**Smart Farmer-IOT Enabled Smart Farming Application**
DOMAIN NAME	INTERNET OF THINGS
TEAM ID	PNT2022TMID08684
LEADER NAME	KRISHNAPRASATH U
TEAM MEMBER NAME	SIVAROHITH A GIRIPRASATH S S NIRUTHEESH R HARIHARASUTHAN M

WOKWI CODE

```
#include <WiFi.h>//library for wifi

#include <PubSubClient.h>//library for MQtt

#include "DHT.h"// Library for dht11

#define DHTPIN 15     // what pin we're connected to

#define DHTTYPE DHT22   // define type of sensor DHT 11

#define LED 2


DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin and typr of dht connected


void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);


//-------credentials of IBM Accounts------


#define ORG "rx0dbd"//IBM ORGANITION ID

#define DEVICE_TYPE "ab"//Device type mentioned in ibm watson IOT Platform

#define DEVICE_ID "12"//Device ID mentioned in ibm watson IOT Platform

#define TOKEN "12345678"     //Token

String data3;

float h, t;


//-------- Customise the above values --------

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name

char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and format in which data to be send

char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd  REPRESENT command type AND COMMAND IS TEST OF FORMAT STRING

char authMethod[] = "use-token-auth";// authentication method
```

```
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id


//----------------------------------------
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client id by passing parameter like server id,portand wificredential


void setup()// configureing the ESP32
{
  Serial.begin(115200);
  dht.begin();
  pinMode(LED,OUTPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}

void loop()// Recursive Function
{

  h = dht.readHumidity();
  t = dht.readTemperature();
  Serial.print("temp:");
  Serial.println(t);
  Serial.print("Humid:");
  Serial.println(h);
```

```
  PublishData(t, h);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}



/*.....retrieving to Cloud.....*/


void PublishData(float temp, float humid) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"temp\":";
  payload += temp;
  payload += "," "\"Humid\":";
  payload += humid;
  payload += "}";
  Serial.print("Sending payload: ");
  Serial.println(payload);
  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print publish ok in
Serial monitor or else it will print publish failed
  } else {
    Serial.println("Publish failed");
  }
}
```

```
void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!!!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }
     initManagedDevice();
     Serial.println();
  }
}
void wificonnect() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");
  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}
void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println((subscribetopic));
```

```
   Serial.println("subscribe to cmd OK");
  } else {
   Serial.println("subscribe to cmd FAILED");
  }
}
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
  Serial.print("callback invoked for topic: ");
  Serial.println(subscribetopic);
  for (int i = 0; i < payloadLength; i++) {
   //Serial.print((char)payload[i]);
   data3 += (char)payload[i];
  }
  Serial.println("data: "+ data3);
  if(data3=="lighton")
  {
Serial.println(data3);
digitalWrite(LED,HIGH);
  }
  else
  {
Serial.println(data3);
digitalWrite(LED,LOW);
  }
data3="";
}
```

DIAGRAM CODE

```
{
  "version": 1,
  "author": "Anonymous maker",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 4.8, "left": -127.69, "attrs": {} },
    { "type": "wokwi-dht22", "id": "dht1", "top": -76.72, "left": 137.76, "attrs": {} },
    {
      "type": "wokwi-led",
      "id": "led1",
      "top": -16.04,
      "left": 21.83,
      "attrs": { "color": "red" }
    },
    {
      "type": "wokwi-resistor",
      "id": "r1",
      "top": 41.63,
      "left": 48.17,
      "attrs": { "value": "100" }
    }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "dht1:VCC", "esp:3V3", "red", [ "v0" ] ],
    [ "dht1:GND", "esp:GND.1", "black", [ "v0" ] ],
    [ "led1:A", "r1:1", "green", [ "v0" ] ],
```

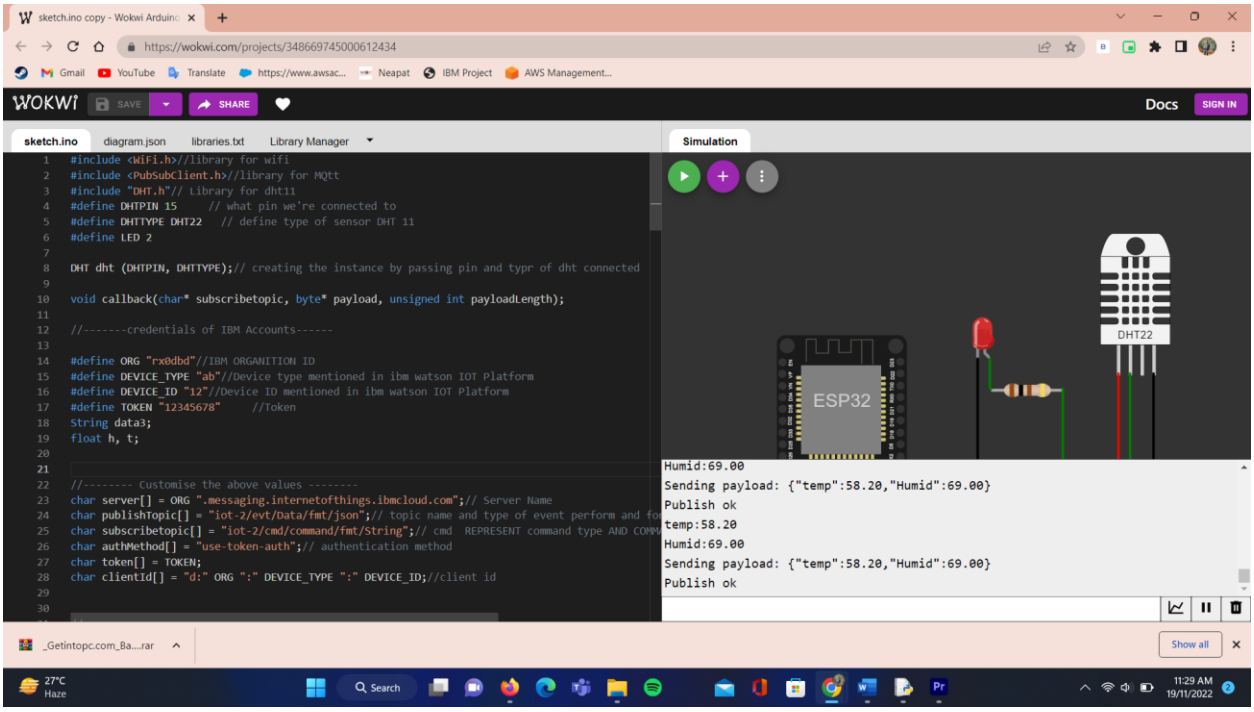
```
    [ "led1:C", "esp:GND.1", "black", [ "v0" ] ],
    [ "dht1:SDA", "esp:D15", "green", [ "v101.76", "h-2.06" ] ],
    [ "r1:2", "esp:D2", "green", [ "v80.85", "h-3.49" ] ]
  ]
}
```

PUBLISH AND SUBSCRIBE CODE

```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random
#Provide your IBM Watson Device Credentials
organization = "rx0dbd"
deviceType = "ab"
deviceId = "12"
authMethod = "token"
authToken = "12345678"
# Initialize GPIO
def myCommandCallback(cmd):
   print("Command received: %s" % cmd.data['command'])
   status=cmd.data['command']
   if status=="lighton":
      print ("led is on")
   else :
      print ("led is off")
   #print(cmd)
try:
        deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method":
authMethod, "auth-token": authToken}
        deviceCli = ibmiotf.device.Client(deviceOptions)
        #.....................................
```

```
except Exception as e:
        print("Caught exception connecting device: %s" % str(e))
        sys.exit()


# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type "greeting" 10 times
deviceCli.connect()


while True:
    #Get Sensor Data from DHT11


    temp=random.randint(0,100)
    Humid=random.randint(0,100)


    data = { 'temp' : temp, 'Humid': Humid }
    #print data
    def myOnPublishCallback():
      print ("Published Temperature = %s C" % temp, "Humidity = %s %%" % Humid, "to IBM Watson")
    success = deviceCli.publishEvent("IoTSensor", "json", data, qos=0, on_publish=myOnPublishCallback)
    if not success:
      print("Not connected to IoTF")
    time.sleep(1)
    deviceCli.commandCallback = myCommandCallback
# Disconnect the device and application from the cloud
deviceCli.disconnect()
```

OUTPUT


sketch.ino copy - Wokwi Arduino
https://wokwi.com/projects/348669745000612434
WOKWI
SAVE
SHARE
Docs
SIGN IN
sketch.ino
diagram.json
libraries.txt
Library Manager
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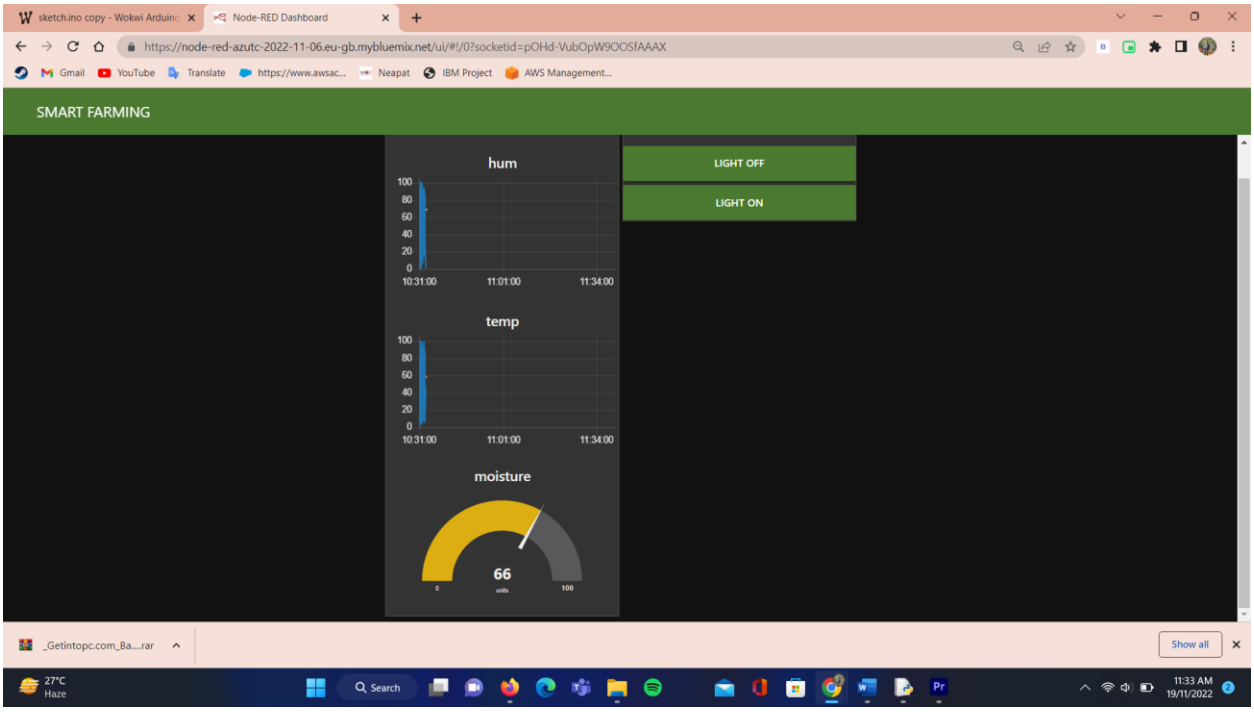
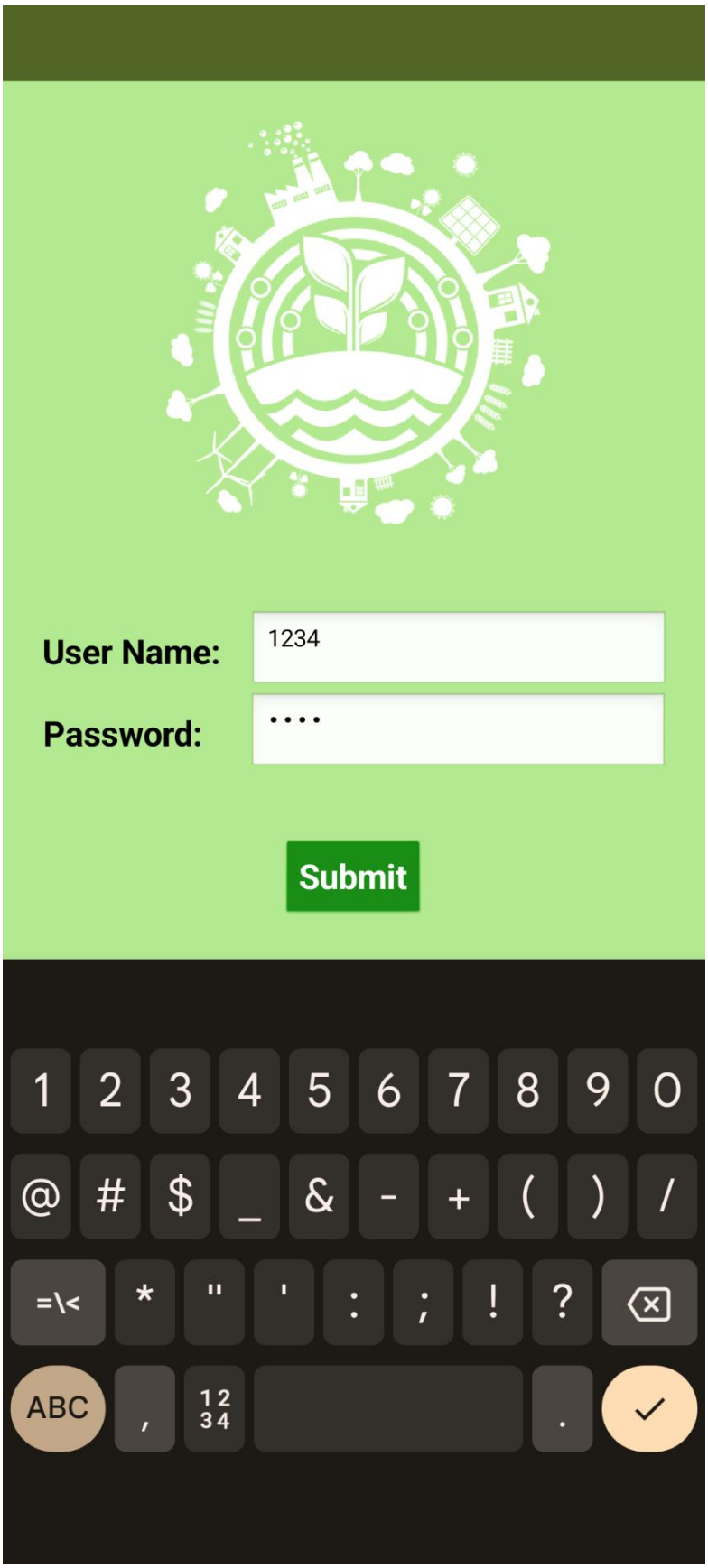
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd REPRESENT command type AND COMM
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
Simulation
ESP32
DHT22
Humid:69.00
Sending payload: {"temp":58.20,"Humid":69.00}
Publish ok
temp:58.20
Humid:69.00
Sending payload: {"temp":58.20,"Humid":69.00}
Publish ok
_Getintopc.com_Ba....rar
Show all
27°C
Haze
Search
11:29 AM
19/11/2022


sketch.ino copy - Wokwi Arduino
Node-RED Dashboard
https://node-red-azutc-2022-11-06.eu-gb.mybluemix.net/ui/#!/0?socketid=pOHd-VubOpW9OOSfAAAX
SMART FARMING
hum
100
80
60
40
20
0
10:31:00
11:01:00
11:34:00
temp
100
80
60
40
20
0
10:31:00
11:01:00
11:34:00
moisture
66
units
0
100
LIGHT OFF
LIGHT ON
_Getintopc.com_Ba....rar
Show all
27°C
Haze
Search
11:33 AM
19/11/2022

User Name:

Password:

Submit


User Name:
1234
Password:
Submit
1 2 3 4 5 6 7 8 9 0
@ # $ _ & - + ( ) /
=\< * " ' : ; ! ?
ABC
12 34

SMART FARMING

Temperature: 96

Humidity: 100

Switch board

MOTOR ON **MOTOR OFF**