

ASSIGNMENT 4

Ultrasonic sensor simulation in Wokwi

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IBM ID : IBM-Project-31889-1660205917

Question :

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an “Alert” to IBM cloud and display in the device recent events.

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 "ketslb" //IBM ORGANITION ID
#define DEVICE_TYPE "testid003sptype" //Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "testid003spid" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN "pi3!kdUW4yqbsS7itU" //Token
String data3;
float 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()// configuring the ESP32
{
  Serial.begin(115200);
  dht.begin();
  pinMode(LED,OUTPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}
void loop()// Recursive Function
{
  t = dht.readTemperature();
  Serial.print("temperature:");
  Serial.println(t);
  PublishData(t);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}
/*.....retrieving to Cloud.....*/

void PublishData(float temp) {mqttconnect();//function call for connecting to ibm

/*

creating the String in in form JSon to update the data to ibm cloud

*/
String payload = "{\"temperature\":";
payload += temp;
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.json:

```
{
  "version": 1,
  "author": "Fershi",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 20.66, "left": -128, "attrs": {} },
    { "type": "wokwi-dht22", "id": "dht1", "top": -45.26, "left": 125.9, "attrs": {} },
    {
      "type": "wokwi-led",
      "id": "led1",
      "top": -47.26,
      "left": 1.24,
      "attrs": { "color": "red" }
    },
    {
      "type": "wokwi-resistor",
      "id": "r1",
      "top": 14.4,
      "left": 40.23,
      "attrs": { "value": "1000" }
    }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "dht1:GND", "esp:GND.1", "black", [ "v0" ] ],
    [ "r1:2", "esp:D2", "green", [ "v0" ] ],
    [ "dht1:SDA", "esp:D15", "green", [ "v0" ] ],
    [ "r1:1", "led1:A", "green", [ "v0" ] ],
    [ "led1:C", "esp:GND.1", "black", [ "v0" ] ],
    [ "dht1:VCC", "esp:3V3", "red", [ "v0" ] ]
  ]
}
```

Wokwi simulation link:

<https://wokwi.com/projects/347639757494288978>

Code&Output:

Activities Google Chrome Nov 11 6:30 PM Vpi*6fqyXCudmD...

(2) WhatsApp x sketch.ino - Wokwi Ard... x IBM Watson IoT Platfor... x Node-RED : node-red-e x test.ino - Wokwi Arduin x

wokwi.com/projects/347639757494288978

WOKWI SAVE SHARE divya.ino Docs

divya.ino • diagram.json libraries.txt Library Manager

```

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6 #define LED 2
7 DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin and t
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9 void callback(char* subscribetopic, byte* payload, unsigned int payload
10
11 //-----credentials of IBM Accounts-----
12
13 #define ORG "ketslb"//IBM ORGANITION ID
14 #define DEVICE_TYPE "testid003sptype"//Device type mentioned in ibm wat
15 #define DEVICE_ID "testid003spid"//Device ID mentioned in ibm watson IC
16 #define TOKEN "pi3!kdUw4yqbsS7itU" //Token
17 String data3;
18 float t;
19
20 //----- Customise the above values -----
21
22 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Serve
23 char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type
24 char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd REPRESENT
25 char authMethod[] = "use-token-auth";// authentication method
26 char token[] = TOKEN;
27 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
28
29

```

Simulation

00:25.208 73%

Connecting to
WiFi connected
IP address:
10.10.0.2
Reconnecting client to
ketslb.messaging.internetofthings.ibmcloud.com
.....

Activities Google Chrome Nov 11 6:24 PM Vpi*6fqyXCudmD...

(2) WhatsApp x sketch.ino - Wokwi Ard... x IBM Watson IoT Platfor... x Node-RED : node-red-e x test.ino - Wokwi Arduin x

ketslb.internetofthings.ibmcloud.com/dashboard/boards/30a42aa6-2911-4e7e-9b80-03bd303dedc2

IBM Watson IoT Platform

ass4

+ Add New Card Settings

Device list

| Device ID | Device type |
|---------------|-----------------|
| testid003spid | testid003sptype |

Line chart

10 seconds now

1 Simulation running

Activities Google Chrome Nov 11 6:12 PM {"version": 1... 100 %

(2) WhatsApp x sketch.ino - Wokwi Ardi x IBM Watson IoT Platfor x Node-RED : node-red-e x test.ino - Wokwi Ardi x +

ketslb.internetofthings.ibmcloud.com/dashboard/devices/browse

IBM Watson IoT Platform

kiruthikas028.ece@dgct.ac.in ID: ketslb

Browse Action Device Types Interfaces Add Device +

| Device ID | Status | Device Type | Class ID | Date Added |
|-------------------|-----------|-----------------|----------|----------------------|
| testid003sptype_1 | Connected | testid003sptype | Device | Nov 11, 2022 5:58 PM |

Identity Device Information Groups Recent Events State Logs

Showing Raw Data | No Interfaces Available

| Property | Value | Type | Event | Last Received |
|-------------|-------|--------|---------|-------------------|
| Temperature | 65 | Number | event_1 | a few seconds ago |
| humidity | 44 | Number | event_1 | a few seconds ago |

Items per page 50 | 1-1 of 1 item 1 of 1 page 1

1 Simulation running

Activities Google Chrome Nov 11 6:12 PM {"version": 1... 100 %

(2) WhatsApp x sketch.ino - Wokwi Ardi x IBM Watson IoT Platfor x Node-RED : node-red-e x test.ino - Wokwi Ardi x +

ketslb.internetofthings.ibmcloud.com/dashboard/devices/browse

IBM Watson IoT Platform

kiruthikas028.ece@dgct.ac.in ID: ketslb

Browse Action Device Types Interfaces Add Device +

The recent events listed show the live stream of data that is coming and going from this device.

| Event | Value | Format | Last Received |
|---------|----------------------------------|--------|-------------------|
| event_1 | {"Temperature":24,"humidity":46} | json | a few seconds ago |
| event_1 | {"Temperature":56,"humidity":94} | json | a few seconds ago |
| event_1 | {"Temperature":29,"humidity":54} | json | a few seconds ago |
| event_1 | {"Temperature":21,"humidity":27} | json | a few seconds ago |
| event_1 | {"Temperature":18,"humidity":85} | json | a minute ago |

Items per page 50 | 1-1 of 1 item 1 Simulation running