

ASSIGNMENT 4

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Write code and connections in wokwi for ultrasonic sensor. Whenever the distance is less than 100 cms send "alert" to IBM cloud and display in device recent events.

code:

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "x0fxss"
#define DEVICE_TYPE "Noder"
#define DEVICE_ID "1234"
#define TOKEN "987654321"
#define speed 0.034
#define led 14

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/shanmugam_assignment4/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);

const int trigpin=5;
const int echopin=18;
String command;
```

```
String data="";

long duration;
float dist;

void setup()
{
    Serial.begin(115200);
    pinMode(led, OUTPUT);
    pinMode(trigpin, OUTPUT);
    pinMode(echopin, INPUT);
    wifiConnect();
    mqttConnect();
}

void loop() {
    bool isNearby = dist < 100;
    digitalWrite(led, isNearby);

    publishData();
    delay(500);

    if (!client.loop()) {
        mqttConnect();
    }
}

void wifiConnect() {
    Serial.print("Connecting to "); Serial.print("Wifi");
    WiFi.begin("Wokwi-GUEST", "", 6);
    while (WiFi.status() != WL_CONNECTED) {
        delay(500);
        Serial.print(".");
    }
}
```

```

    Serial.print("WiFi connected, IP address: ");
Serial.println(WiFi.localIP());
}

void mqttConnect() {
    if (!client.connected()) {
        Serial.print("Reconnecting MQTT client to "); Serial.println(server);
        while (!client.connect(clientId, authMethod, token)) {
            Serial.print(".");
            delay(500);
        }
        initManagedDevice();
        Serial.println();
    }
}

void initManagedDevice() {
    if (client.subscribe(topic)) {
        // Serial.println(client.subscribe(topic));
        Serial.println("IBM subscribe to cmd OK");
    } else {
        Serial.println("subscribe to cmd FAILED");
    }
}

void publishData()
{
    digitalWrite(trigpin, LOW);
    digitalWrite(trigpin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigpin, LOW);
    duration=pulseIn(echopin, HIGH);
    dist=duration*speed/2;
    if(dist<100){
        String payload = "{\"Alert Distance\":\"";
        payload += dist;
        payload += "\"}";
    }
}

```

```

    Serial.print("\n");
    Serial.print("Sending payload: ");
    Serial.println(payload);
    if (client.publish(publishTopic, (char*) payload.c_str())) {
        Serial.println("Publish OK");
    }
}

if(dist>100){
    String payload = "{\"Distance\":\"";
    payload += dist;
    payload += "}";

    Serial.print("\n");
    Serial.print("Sending payload: ");
    Serial.println(payload);
    if(client.publish(publishTopic, (char*) payload.c_str())) {
        Serial.println("Publish OK");
    }else {
        Serial.println("Publish FAILED");
    }
}
}
}

```

OUTPUT:- i) When distance greater than 100 cm

WOKWI

sketch.ino diagram.json libraries.txt Library Manager

```
1 {
2   "version": 1,
3   "author": "Keerthika J",
4   "editor": "wokwi",
5   "parts": [
6     { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 92.67, "left": 45.3
7     },
8     { "type": "wokwi-led",
9       "id": "ledi",
10      "top": 194.54,
11      "left": 309.26,
12      "attrs": { "color": "red" }
13    },
14    {
15      "type": "wokwi-hc-sr04",
16      "id": "ultrasonic1",
17      "top": 60.71,
18      "left": 185.64,
19      "attrs": { "distance": "139" }
20    },
21    {
22      "type": "wokwi-resistor",
23      "id": "r1",
24      "top": 269.89,
25      "left": 260.39,
26      "attrs": { "value": "100" }
27    }
28  ],
29  "connections": [
30    [ "esp:TX0", "$serialMonitor:RX", "", [ ] ],
31    [ "esp:GND", "r1:one end", "resistor", [ ] ],
32    [ "r1:other end", "ledi:anode", "led", [ ] ],
33    [ "ledi:cathode", "esp:GND", "led", [ ] ],
34    [ "ultrasonic1:VCC", "esp:5V", "ultrasonic", [ ] ],
35    [ "ultrasonic1:GND", "esp:GND", "ultrasonic", [ ] ],
36    [ "ultrasonic1:Trig", "esp:IO4", "ultrasonic", [ ] ],
37    [ "ultrasonic1:Echo", "esp:IO5", "ultrasonic", [ ] ]
38  ]
39 }
```

Simulation

00:43.263 69%

Publish OK

Sending payload: {\"Distance\":138.96}

Publish OK

Sending payload: {\"Distance\":138.98}

Publish OK

IBM

IBM-Project-21602-1659785

IBM Watson IoT Platform

ASSIGNMENT 4

sketch.ino - Wokwi Arduino

9pjm1.internetofthings.ibmcloud.com/dashboard/devices/browse

IBM Watson IoT Platform

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Browse Action Device Types Interfaces

Add Device

Identity Device Information Recent Events State Logs

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

Event	Value	Format	Last Received
Node	{\"distance\":17}	json	a few seconds ago
Node	{\"distance\":153}	json	a minute ago
Node	{\"distance\":154}	json	a minute ago
Node	{\"distance\":155}	json	a minute ago
Node	{\"distance\":170}	json	a minute ago

Items per page 50 | 1-1 of 1 item

1 Simulation running

Type here to search

31°C Haze

06:27 PM

25-10-2022

ii) When distance less than 100 cms.

The screenshot shows the Wokwi IDE interface. On the left, the 'diagram.json' file is open, displaying the following JSON configuration:

```
1 {
2   "version": 1,
3   "author": "Keerthika J",
4   "editor": "wokwi",
5   "parts": [
6     { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 92.67, "left": 45.3,
7       "type": "wokwi-led",
8       "id": "led1",
9       "top": 194.54,
10      "left": 309.26,
11      "attrs": { "color": "red" }
12    },
13    { "type": "wokwi-hc-sr04",
14      "id": "ultrasonic1",
15      "top": 60.71,
16      "left": 185.64,
17      "attrs": { "distance": "139" }
18    },
19    { "type": "wokwi-resistor",
20      "id": "r1",
21      "top": 269.89,
22      "left": 260.39,
23      "attrs": { "value": "100" }
24    }
25  ],
26  "connections": [
27    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
28    [ "ultrasonic1:VCC", "r1:1", "" ],
29    [ "ultrasonic1:GND", "r1:2", "" ],
30    [ "ultrasonic1:Trig", "led1:~", "" ],
31    [ "ultrasonic1:Echo", "led1:~", "" ]
32  ]
33 }
```

On the right, the 'Simulation' window shows a circuit diagram with an ESP32, an LED, and an ultrasonic sensor. Below the diagram, the console output shows the following messages:

```
Publish OK
Sending payload: {"Alert Distance":93.96}
Publish OK
Sending payload: {"Alert Distance":93.96}
Publish OK
```

The screenshot shows the IBM Watson IoT Platform dashboard. The 'Recent Events' tab is selected, displaying a table of events:

Event	Value	Format	Last Received
Node	{"distance":91}	json	a few seconds ago
Node	{"distance":45}	json	a few seconds ago
Node	{"distance":4}	json	a few seconds ago
Node	{"distance":19}	json	a few seconds ago
Node	{"distance":94}	json	a few seconds ago

At the bottom of the dashboard, a status bar indicates '1 Simulation running'.

WOKWI LINK

<https://wokwi.com/projects/346491488923812434>