

## 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

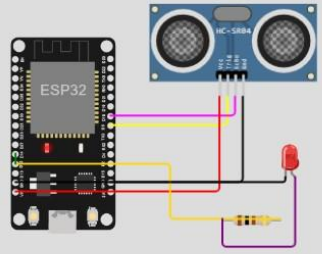
WOKWI

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": "led1",
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", "$serialMonitor:RX", "", [] ],
31    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
32    [ "ultrasonic1:VCC", "esp:5V", "", [] ],
33    [ "ultrasonic1:GND", "esp:GND", "", [] ],
34    [ "ultrasonic1:TRIG", "esp:1", "", [] ],
35    [ "ultrasonic1:ECH", "esp:2", "", [] ],
36    [ "led1:GND", "esp:GND", "", [] ],
37    [ "led1:VCC", "esp:5V", "", [] ],
38    [ "r1:1", "led1:GND", "", [] ],
39    [ "r1:2", "led1:VCC", "", [] ]
40  ]
41 }
```

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

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1 Simulation running

ii) When distance less than 100 cms.

The screenshot shows the Wokwi web-based simulation environment. On the left, the 'diagram.json' file is open, displaying a JSON configuration for a circuit. The configuration includes an ESP32 devkit, an LED, an ultrasonic sensor, and a resistor. The simulation window on the right shows the circuit components connected. A 'Publish OK' message is visible, indicating successful data transmission.

```
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": "led1",
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      [ "ultrasonic1:VCC", "r1:1", "" ],
32      [ "ultrasonic1:GND", "r1:2", "" ],
33      [ "led1:anode", "r1:3", "" ],
34      [ "led1:cathode", "r1:4", "" ],
35      [ "led1:GND", "r1:5", "" ]
36    ]
37  }
```

The screenshot shows the IBM Watson IoT Platform dashboard. The 'Recent Events' tab is selected, displaying a table of events. The table has columns for Event, Value, Format, and Last Received. The events show a sequence of distance measurements from an ultrasonic sensor, with values decreasing from 91 to 19 and then increasing to 94.

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

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1 Simulation running

## WOKWI LINK

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

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