

#### Assignment-4

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Team ID	PNT2022TMID17431
Date	30-October 2022
Project Name	Project -Smart farmer-IOT enabled smart Farming Application

#### Question:

Write code and connections in wokwi for ultrasonic sensor.

Whenever distance is less than 100cm send "alert" to IBM cloud and display in device recent events.

Upload document with wokwi share link and images of IBM cloud.

#### CODE:

```
#include <WiFi.h>
#include <WiFiClient.h>
#include <PubSubClient.h>

#define ORG "17lsro"
#define DEVICE_TYPE "MyDeviceType"
#define DEVICE_ID "12345"
#define TOKEN "GkatKdiUS?UVHKvnAD"

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char pubTopic1[] = "iot-2/evt/ASHWIN KUMAR S/fmt/json";
char pubTopic2[] = "iot-2/evt/status2/fmt/json";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
const int DHT_PIN = 15;
WiFiClient wifiClient;
PubSubClient client(server, 1883, NULL, wifiClient);

#define ECHO_PIN 12
#define TRIG_PIN 13

float readDistanceCM() ;
void setup() {
  Serial.begin(115200);
  pinMode(15, OUTPUT);
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);

  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);
```

```

while (WiFi.status() != WL_CONNECTED) {
    delay(50);
    Serial.print(".");
}
Serial.println("");

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

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

float readDistanceCM()
{
    digitalWrite(TRIG_PIN, LOW);
    delayMicroseconds(2);
    digitalWrite(TRIG_PIN, HIGH);
    delayMicroseconds(10);
    digitalWrite(TRIG_PIN, LOW);
    int duration = pulseIn(ECHO_PIN, HIGH);
    return duration * 0.034 / 2;
}

long lastMsg = 0;
void loop() {
    float distance = readDistanceCM();

    bool isNearby = distance < 100; //checking whether the distance is less than 100
    digitalWrite(15, isNearby);

    Serial.print("Measured distance: ");
    Serial.println(readDistanceCM());

    delay(100);
    if(isNearby) //Whenever the distance is less than 100 cms send an "alert" to the IBM
cloud
    {

        client.loop();
        long now = millis();
        if (now - lastMsg > 3000) {
            lastMsg = now;

            String payload = "{\"distance\":\"";

```

```
payload += distance;
```

```
payload += "}";
```

```
Serial.print("Sending payload: ");
```

```
Serial.println(payload);
```

```
if (client.publish(pubTopic1, (char*) payload.c_str())) {
```

```
    Serial.println("Publish ok");
```

```
} else {
```

```
    Serial.println("Publish failed");
```

```
}
```

```
}
```

```
}
```

## OUTPUT:

### Case: 1

When Distance Is Above 100 Cm

The screenshot displays the WOKWI IoT simulator interface. On the left, the 'sketch.ino' file is open in a code editor, showing C++ code for an ESP32 microcontroller. The code includes headers for WiFi, PubSubClient, and DHT sensors, and defines constants for the MQTT server, device ID, and token. It also defines pins for the DHT sensor and a red LED. The main loop calls a function to read distance from the DHT sensor and publishes the result to an MQTT topic. On the right, the 'Simulation' window shows a 3D model of the ESP32 board connected to an HC-SR04 ultrasonic sensor and a red LED. The simulation status bar at the bottom indicates the following sequence of events: 'Connecting to .....', 'WiFi connected, IP address: 10.10.0.2', 'Reconnecting client to 171sro.messaging.internetofthings.ibmcloud.com', 'Bluemix connected', 'Measured distance: 258.96', and 'Measured distance: 259.03'.

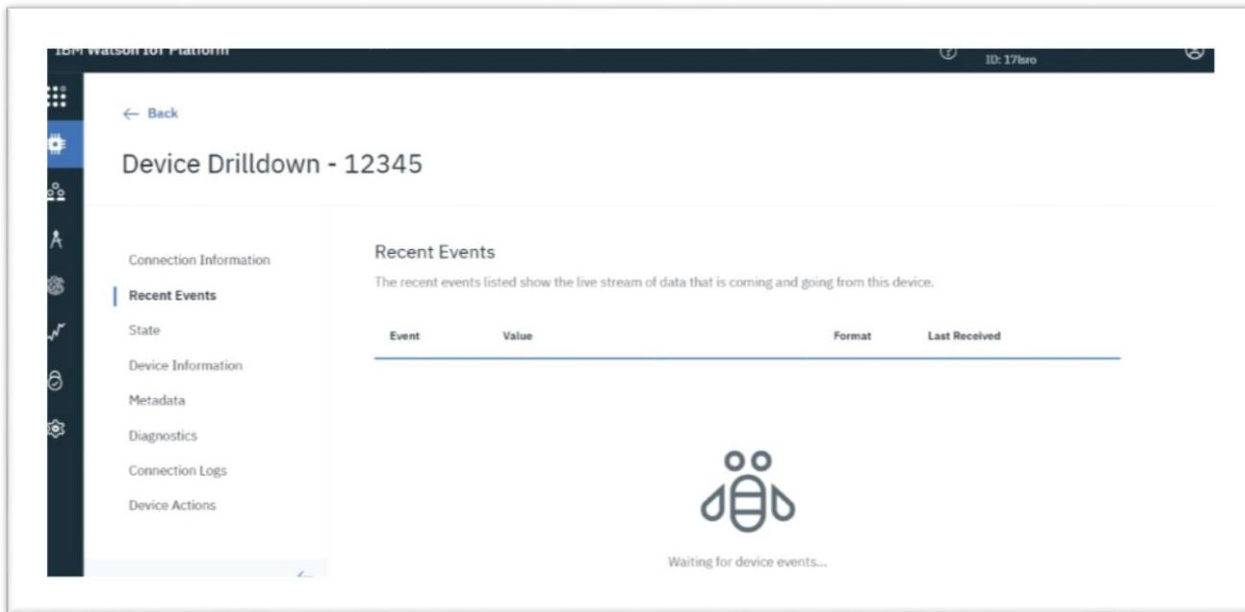
```
WOKWI [SAVE] [SHARE] [HEART] Docs [A]
```

sketch.ino diagram.json libraries.txt Library Manager

```
1 #include <WiFi.h>
2 #include <WiFiClient.h>
3 #include <PubSubClient.h>
4
5 #define ORG "171sro"
6 #define DEVICE_TYPE "MyDeviceType"
7 #define DEVICE_ID "12345"
8 #define TOKEN "GkatKdiUS?UVHKvNAD"
9
10 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
11 char pubTopic1[] = "iot-2/evt/ASHWIN KUMAR S/fmt/json";
12 char pubTopic2[] = "iot-2/evt/status2/fmt/json";
13 char authMethod[] = "use-token-auth";
14 char token[] = TOKEN;
15 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
16 const int DHT_PIN = 15;
17 WiFiClient wifiClient;
18 PubSubClient client(server, 1883, NULL, wifiClient);
19
20
21 #define ECHO_PIN 12
22 #define TRIG_PIN 13
23
24 float readDistanceCM();
25 void setup() {
26     Serial.begin(115200);
27     pinMode(15, OUTPUT);
28     pinMode(13, OUTPUT);
29 }
```

Simulation

Connecting to .....  
WiFi connected, IP address: 10.10.0.2  
Reconnecting client to  
171sro.messaging.internetofthings.ibmcloud.com  
Bluemix connected  
Measured distance: 258.96  
Measured distance: 259.03



Data Is Not Send to IBM IOT PLATFORM If Distance Is Above 100 Cm

## Case:2

When Distance Is Below 100 Cm

WOKWI

SAVE

SHARE

♥

Docs

A

sketch.ino

diagram.json

libraries.txt

Library Manager

Simulation

00:15.192 99%

```

1 #include <WiFi.h>
2 #include <WiFiClient.h>
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5 #define ORG "17lsro"
6 #define DEVICE_TYPE "MyDeviceType"
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10 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
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16 const int DHT_PIN = 15;
17 WiFiClient wifiClient;
18 PubSubClient client(server, 1883, NULL, wifiClient);
19
20
21 #define ECHO_PIN 12
22 #define TRIG_PIN 13
23
24 float readDistanceCM();
25 void setup() {
26   Serial.begin(115200);
27   pinMode(15, OUTPUT);
28   pinMode(13, OUTPUT);
29 }
30
31 void loop() {
32   readDistanceCM();
33   if (distance < 100) {
34     digitalWrite(13, HIGH);
35     client.publish(pubTopic1, "Distance: " + String(distance));
36     client.publish(pubTopic2, "Status: " + String(distance));
37   } else {
38     digitalWrite(13, LOW);
39   }
40 }

```

Connecting to .....

WiFi connected, IP address: 10.10.0.2

Reconnecting client to

17lsro.messaging.internetofthings.ibmcloud.com

Bluemix connected

Measured distance: 38.96

Measured distance: 38.95

IBM Watson IoT Platform

?

IBM Watson IoT Platform

ID: 17lsro

← Back

Device Drilldown - 12345

Connection Information

Recent Events

State

Device Information

Metadata

Diagnostics

Connection Logs

Device Actions

Recent Events

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

Event	Value	Format	Last Received
ASHWIN KU...	{"distance":38.96}	json	a few seconds ago
ASHWIN KU...	{"distance":38.96}	json	a few seconds ago
ASHWIN KU...	{"distance":38.96}	json	a few seconds ago

When The Distance Is Below 100Cm Data Is Sent To IBM Iot Platform