

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 shows the WOKWI IoT simulator interface. On the left, the 'sketch.ino' file is open, displaying the following code:

```

1 #include <WiFi.h>
2 #include <WiFiClient.h>
3 #include <PubSubClient.h>
4
5 #define ORG "17lsro"
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(TRIG_PIN, OUTPUT);
29 }
30
31 void loop() {
32     readDistanceCM();
33     digitalWrite(ECHO_PIN, HIGH);
34     delay(100);
35     digitalWrite(ECHO_PIN, LOW);
36     delay(100);
37     Serial.print("Distance: ");
38     Serial.println(readDistanceCM());
39     if (readDistanceCM() > 100) {
40         Serial.println("Distance is above 100 cm");
41         digitalWrite(LED_PIN, HIGH);
42         delay(1000);
43         digitalWrite(LED_PIN, LOW);
44     }
45 }

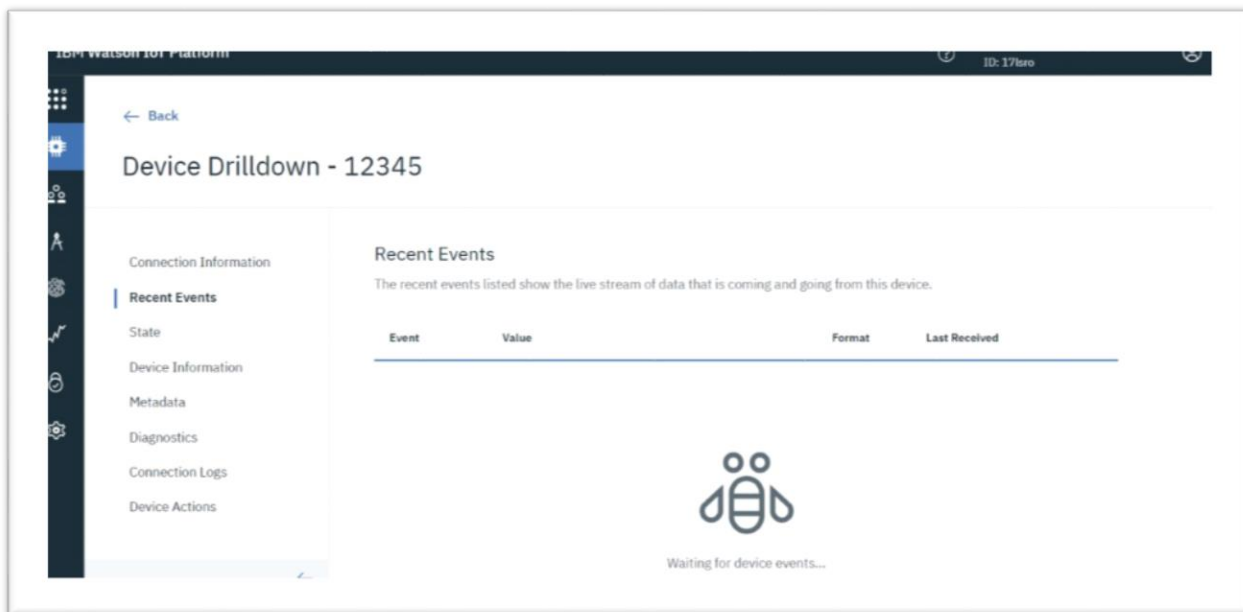
```

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 sensor's VCC is connected to the ESP32's 5V pin, GND to GND, TRIG to D13, and ECHO to D12. The LED's anode is connected to D15 and its cathode to GND. The simulation log at the bottom shows the following output:

```

Connecting to .....
WiFi connected, IP address: 10.10.0.2
Reconnecting client to
17lsro.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

sketch.ino

diagram.json

libraries.txt

Library Manager

```

1 #include <WiFi.h>
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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
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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);

```

Simulation

00:15.192

99%

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

?

ID: 17f5ro

← 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