

ASSIGNMENT 4

Date	2 Nov 22
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Project Name	IOT Based Smart Crop Protection System for Agriculture

QUESTION :

Write code and connection in wovki for ultrasonic sensor. Whenever distance is less than 100 cms send “alert” to IBM cloud and display in device recent events

CODE :

```
#include <WiFi.h> //library for wifi
#include <PubSubClient.h> //library for MQTT
WiFiClient wifiClient;
String data3;
#define ORG "78ujck"

#define DEVICE_TYPE "Lingaraja"
#define DEVICE_ID "Lingaraja_assignment_4"
#define TOKEN "12345678"

#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Lingaraja/fmt/json";
char topic[] = "iot-2/cmd/event_1/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 :

1) When Distance greater than 100 cm

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wificlient;
4 String data3;
5 #define ORG "78Ujck"
6 #define DEVICE_TYPE "Lingaraja"
7 #define DEVICE_ID "Lingaraja_assignment_4"
8 #define TOKEN "12345678"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Lingaraja/fmt/json";
13 char topic[] = "iot-2/cmd/event_1/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 PubSubClient client(server, 1883, wificlient);
18
19
20
21 const int trigpin=5;
22 const int echopin=18;
23 String command;
24 String data="";
25
26 long duration;
27 float dist;
28
29
30
```

Connecting to Wifi...WiFi connected, IP address: 10.10.0.2
Reconnecting MQTT client to
78Ujck.messaging.internetofthings.ibmcloud.com
IBM subscribe to cmd OK

Sending payload: {"Distance":199.97}
Publish OK

Sending payload: {"Distance":199.95}
Publish OK

IBM RECENT EVENTS

Event	Value	Format	Last Received
Lingaraja	{"Distance":199.97}	json	a few seconds ago
Lingaraja	{"Distance":199.95}	json	a few seconds ago
Lingaraja	{"Distance":199.95}	json	a few seconds ago
Lingaraja	{"Distance":199.97}	json	a few seconds ago

2) When distance less than 100

The screenshot displays the Wokwi IoT Platform interface. On the left, the Arduino sketch code is visible, which includes MQTT client setup and distance publishing logic. The simulation area on the right shows an ESP32 microcontroller connected to an HC-SR04 ultrasonic sensor. The console log indicates the device has successfully connected to the internet and published distance data to the IBM Watson IoT Platform.

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wifiClient;
4 String data3;
5 #define ORG "78ujck"
6 #define DEVICE_TYPE "Lingaraja"
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8 #define TOKEN "12345678"
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11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
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16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 PubSubClient client(server, 1883, wifiClient);
18
19
20
21 const int trigpin=5;
22 const int echopin=18;
23 String command;
24 String data="";
25
26 long duration;
27 float dist;
28
29
30
```

Simulation Log:

```
Connecting to Wifi.Wifi connected, IP address: 10.10.0.2
Reconnecting MQTT client to
78ujck.messaging.internetofthings.ibmcloud.com
IBM subscribe to cmd OK

Sending payload: {"Alert Distance":73.01}
Publish OK

Sending payload: {"Alert Distance":72.96}
Publish OK
```

IBM RECENT EVENTS

The screenshot shows the IBM Watson IoT Platform dashboard. The 'Recent Events' tab is selected for the device 'Lingaraja_assignment_4'. The table below lists the recent events, showing the event name, the JSON payload value, the format, and the time it was received.

Event	Value	Format	Last Received
Lingaraja	{"Alert Distance":72.96}	json	a few seconds ago
Lingaraja	{"Alert Distance":72.96}	json	a few seconds ago
Lingaraja	{"Alert Distance":72.96}	json	a few seconds ago
Lingaraja	{"Alert Distance":72.96}	json	a few seconds ago

WOVKI LINK-

<https://wokwi.com/projects/346563506325160531>