

## ASSIGNMENT 4

Date	2 Nov 22
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Project Name	SmartFarmer-IoT Enabled Smart Farming Application

### 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 "okg929"

#define DEVICE_TYPE "Arunkumar"
#define DEVICE_ID "arun123"
#define TOKEN "&A@MQ9GIstWj-H4-KJ"

#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Arunkumar/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 "okg929"
6 #define DEVICE_TYPE "Arunkumar"
7 #define DEVICE_ID "arun123"
8 #define TOKEN "&A@KQ9G1stWj-H4-K3"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Arunkumar/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
```

Simulation

Connecting to Wifi. WiFi connected, IP address: 10.10.0.2  
Reconnecting MQTT client to  
okg929.messaging.internetofthings.ibmcloud.com  
IBM subscribe to cmd OK

Sending payload: {"Distance":400.04}  
Publish OK

Sending payload: {"Distance":399.96}  
Publish OK

Sending payload: {"Distance":399.96}

## IBM RECENT EVENTS

IBM Watson IoT Platform

Device Drilldown - arun123

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
Arunkumar	{"Distance":399.96}	json	a few seconds ago
Arunkumar	{"Distance":399.96}	json	a few seconds ago
Arunkumar	{"Distance":399.96}	json	a few seconds ago
Arunkumar	{"Distance":399.92}	json	a few seconds ago
Arunkumar	{"Distance":399.96}	json	a few seconds ago

## 2) When distance less than 100

The screenshot shows the Wokwi IDE interface. On the left, the sketch.ino file contains the following code:

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wifiClient;
4 String data3;
5 #define ORG "okg929"
6 #define DEVICE_TYPE "Arunkumar"
7 #define DEVICE_ID "arun123"
8 #define TOKEN "&A@MQ9G1stwj-H4-KJ"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Arunkumar/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
```

On the right, the simulation window shows a visual representation of the ESP32 and HC-05 module. Below the simulation, the console output shows the following messages:

```
Reconnecting MQTT client to
okg929.messaging.internetofthings.ibmcloud.com
IBM subscribe to cmd OK

Sending payload: {"Alert Distance":66.04}
Publish OK

Sending payload: {"Alert Distance":65.98}
Publish OK

Sending payload: {"Alert Distance":65.98}
```

## IBM RECENT EVENTS

The screenshot shows the IBM Watson IoT Platform dashboard. The page title is "Device Drilldown - arun123". The left sidebar contains navigation links: Back, Connection Information, Recent Events, State, Device Information, Metadata, Diagnostics, Connection Logs, and Device Actions. The "Recent Events" section is active, showing a table of recent events.

Event	Value	Format	Last Received
Arunkumar	{"Alert Distance":65.99}	json	a few seconds ago
Arunkumar	{"Alert Distance":65.98}	json	a few seconds ago
Arunkumar	{"Alert Distance":65.98}	json	a few seconds ago
Arunkumar	{"Alert Distance":65.98}	json	a few seconds ago
Arunkumar	{"Alert Distance":65.94}	json	a few seconds ago

## WOVKI LINK

<https://wokwi.com/projects/347292547003974228>