

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 "chytun"
#define DEVICE_TYPE "Dhakshesh"
#define DEVICE_ID "Assignment_4"
#define TOKEN " Ub4pKF9y))QDIwdhmi"

#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

The screenshot displays the WOKWI simulation interface. On the left, the sketch code is shown, which includes the following key elements:

- Includes for `WiFi` and `PubSubClient`.
- Defines the organization as `"chytun"`, device type as `"Dhakshesh"`, and device ID as `"Assignment_4"`.
- Defines the MQTT token and server URL.
- Configures the MQTT client and publishes distance data to the topic `"iot-2/cmd/event_1/fmt/String"`.
- Includes a `setup()` function that initializes the serial port and pins.

The simulation window on the right shows the device is connected to WiFi with IP address `10.10.0.2`. It also shows the MQTT client reconnecting and publishing distance data to the IBM IoT topic. The output log displays the following messages:

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

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

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

Sending payload: {"Distance":399.91}
Publish OK
```

IBM RECENT EVENTS

The screenshot shows the IBM Watson IoT Platform interface. The 'Recent Events' tab is selected, displaying a table of events for the device `Assignment_4`. The table has the following columns: Event, Value, Format, and Last Received.

Event	Value	Format	Last Received
Dhakshesh	{"Distance":399.94}	json	a few seconds ago
Dhakshesh	{"Distance":400.2}	json	a few seconds ago
Dhakshesh	{"Distance":399.96}	json	a minute ago
Dhakshesh	{"Distance":399.96}	json	a minute ago
Dhakshesh	{"Distance":399.98}	json	a minute ago

The interface also shows a sidebar with navigation options and a bottom status bar indicating '0 Simulations running'.

2) When distance less than 100

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wificlient;
4 String data;
5 #define ORG "chytun"
6 #define DEVICE_TYPE "Dhakshesh"
7 #define DEVICE_ID "Assignment_4"
8 #define TOKEN "Ub4pKF9y)Q0Iwdhml"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/dhakshesh/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
31 void setup()
32 {
33   Serial.begin(115200);
34   pinMode(led, OUTPUT);
35   pinMode(trigpin, OUTPUT);
```

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

Sending payload: {"Alert Distance":56.97}
Publish OK

Sending payload: {"Alert Distance":56.97}
Publish OK

IBM RECENT EVENTS

Event	Value	Format	Last Received
Dhakshesh	{"Alert Distance":56.97}	json	a few seconds ago
Dhakshesh	{"Alert Distance":56.95}	json	a minute ago
Dhakshesh	{"Alert Distance":56.95}	json	a minute ago
Dhakshesh	{"Alert Distance":56.95}	json	a minute ago
Dhakshesh	{"Alert Distance":56.95}	json	a minute ago

WOVKI LINK- <https://wokwi.com/projects/349396235459756628>