

Assignment 4

Assignment Date	19 October 2022
Student Name	Mr. SANJEEV A
Student Roll Number	737819ECL233
Maximum Marks	2 Marks

Question-1:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

Solution:

```
#include <WiFi.h> //library for wifi
#include <PubSubClient.h> //library for MQTT
const int trigPin = 19;
const int echoPin = 18;

//-----credentials of IBM Accounts-----

#define ORG "y0ptv0" //IBM ORGANITION ID
#define DEVICE_TYPE "abcd" //Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "2314" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678" //Token

#define SOUND_SPEED 0.034

long duration;
float dist;

//----- Customise the above values -----
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/command/fmt/String";
char authMethod[] = "use-token-auth"; // authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id

//-----
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, wifiClient); //calling the predefined
client id by passing parameter like server id, port and wificredential
```

```

void setup()// configuring the ESP32
{
    Serial.begin(115200);
    pinMode(trigPin, OUTPUT);
    pinMode(echoPin, INPUT);
    delay(10);
    Serial.println();
    wificonnect();
    mqttconnect();
}

void loop()// Recursive Function
{

    digitalWrite(trigPin, LOW);
    delayMicroseconds(2);
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);
    duration = pulseIn(echoPin, HIGH);
    dist = duration * SOUND_SPEED/2;

    // Prints the distance in the Serial Monitor
    Serial.print("Distance: ");
    Serial.print(dist);
    Serial.println(" cm");
    delay(1000);

    PublishData(dist);
    delay(1000);
    if (!client.loop()) {
        mqttconnect();
    }
}
/*.....retrieving to
Cloud. .... */

void PublishData(float dist) {
    mqttconnect();//function call for connecting to ibm
    /*
        creating the String in form JSON to update the data to ibm cloud
    */
    if(dist<100)
    {
        String payload = "{\"Alert! Distance is less than 100\":";
        payload += dist;
        payload += "}";
        Serial.print("Sending payload: ");
        Serial.println(payload);
        if (client.publish(publishTopic, (char*) payload.c_str())) {
            Serial.println("Publish ok");
        }
    }
}

```

```

else {
    Serial.println("Publish failed");
}
}
else{
    String payload = "{\"Distance\":\"";
    payload += dist;
    payload += "\"}";
    Serial.print("Sending payload: ");
    Serial.println(payload);
    if (client.publish(publishTopic, (char*) payload.c_str())) {
        Serial.println("Publish ok");
    } else {
        Serial.println("Publish failed");
    }
}
}

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

void wificonnect() //function defination for wificonnect
{
    Serial.println();
    Serial.print("Connecting to ");

    WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to
    establish the connection
    while (WiFi.status() != WL_CONNECTED) {
        delay(500);
        Serial.print(".");
    }
    Serial.println("");
    Serial.println("WiFi connected");
    Serial.println("IP address: ");
    Serial.println(WiFi.localIP());
}

```

OUTPUT IN WOKWI:

WOKWI

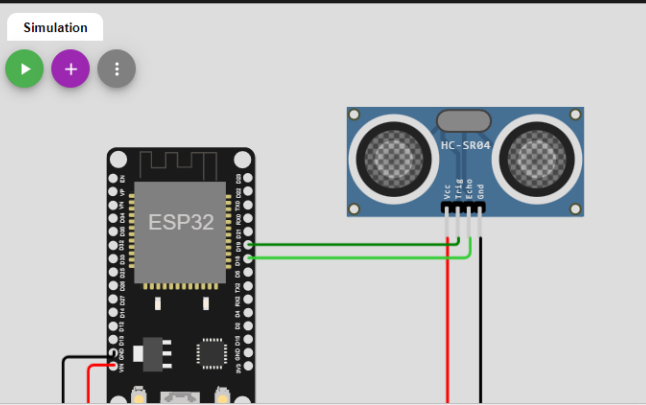
SAVE SHARE

Docs

sketch.ino diagram.json libraries.txt Library Manager

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 const int trigPin = 19;
4 const int echoPin = 18;
5
6 //-----credentials of IBM Accounts-----
7
8 #define ORG "y0ptv0" //IBM ORGANITION ID
9 #define DEVICE_TYPE "abcd" //Device type mentioned in ibm watson IOT Platform
10 #define DEVICE_ID "1234" //Device ID mentioned in ibm watson IOT Platform
11 #define TOKEN "12345678" //Token
12
13 #define SOUND_SPEED 0.034
14
15 long duration;
16 float dist;
17
18
19 //----- Customise the above values -----
20 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
21 char publishTopic[] = "iot-2/evt/IoTSensor/fmt/json"; // topic name and type of
22 char subscribetopic[] = "iot-2/cmd/command/fmt/String"; // cmd REPRESENT comma
23 char authMethod[] = "use-token-auth"; // authentication method
24 char token[] = TOKEN;
25 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
26
27
28 //-----
29 WiFiClient wificlient; // creating the instance for wificlient
30 PubSubClient client(server, 1883, wificlient); //calling the predefined client
```

Simulation



Connecting to ...
WiFi connected
IP address:
10.10.0.2
Reconnecting client to y0ptv0.messaging.internetofthings.ibmcloud.com

Activate Windows
Go to Settings to activate Windows.

WOKWI

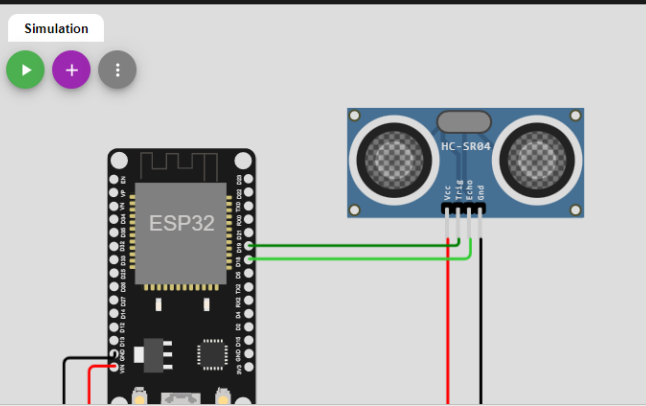
SAVE SHARE

Docs

sketch.ino diagram.json libraries.txt Library Manager

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 const int trigPin = 19;
4 const int echoPin = 18;
5
6 //-----credentials of IBM Accounts-----
7
8 #define ORG "y0ptv0" //IBM ORGANITION ID
9 #define DEVICE_TYPE "abcd" //Device type mentioned in ibm watson IOT Platform
10 #define DEVICE_ID "1234" //Device ID mentioned in ibm watson IOT Platform
11 #define TOKEN "12345678" //Token
12
13 #define SOUND_SPEED 0.034
14
15 long duration;
16 float dist;
17
18
19 //----- Customise the above values -----
20 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
21 char publishTopic[] = "iot-2/evt/IoTSensor/fmt/json"; // topic name and type of
22 char subscribetopic[] = "iot-2/cmd/command/fmt/String"; // cmd REPRESENT comma
23 char authMethod[] = "use-token-auth"; // authentication method
24 char token[] = TOKEN;
25 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
26
27
28 //-----
29 WiFiClient wificlient; // creating the instance for wificlient
```

Simulation



Distance: 391.97 cm
Sending payload: {"Distance":391.97}
Publish ok
Distance: 391.97 cm
Sending payload: {"Distance":391.97}
Publish ok
Distance: 391.97 cm

Activate Windows
Go to Settings to activate Windows.

Wokwi link: <https://wokwi.com/projects/348292761786516050>