

Assignment -4

Assignment Date	28 Oct 2022
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Project Name	SmartFarmer-IoT Enabled Smart Farming Application

Question:

Write a Code and Connections in wokwi 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 "g05aq3"
#define DEVICE_TYPE "selva"
#define DEVICE_ID "selva_assignment_4"
#define TOKEN "qwertyuio"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
```

```
char publishTopic[] = "iot-2/evt/selva/fmt/json";
char topic[] = "iot-2/cmd/status/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=19;
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

WOKWI

SAVE SHARE

sketch.ino diagram.json libraries.txt Library Manager

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wificlient;
4 String data3;
5 #define ORG "g05aq3"
6 #define DEVICE_TYPE "selva"
7 #define DEVICE_ID "selva_assignment_4"
8 #define TOKEN "qwertyuio"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/selva/fmt/json";
13 char topic[] = "iot-2/cmd/status/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=19;
22 const int echopin=18;
23 String command;
24 String data="";
25
26 long duration;
27 float dist;
```

Simulation

00:26.081 89%

Publish OK

Sending payload: {"Distance":160.97}

Publish OK

Sending payload: {"Distance":160.97}

Publish OK

Type here to search

20:38 24-10-2022

IBM RECENT EVENTS:

The screenshot displays the IBM Watson IoT Platform interface. The top navigation bar includes the platform name, a user profile, and the ID '312819106034@smartinternz.com ID: g05aq3'. The main content area shows a device named 'selva_assignment_4' in a 'Connected' state. Below the device header, the 'Recent Events' tab is active, displaying a table of live data events. The table has four columns: Event, Value, Format, and Last Received. Five events are listed, all with a 'Distance' value and a 'json' format, received 'a few seconds ago'. A notification at the bottom right indicates '1 Simulation running'.

IBM Watson IoT Platform

312819106034@smartinternz.com
ID: g05aq3

Browse Action Device Types Interfaces

selva_assignment_4 Connected selva Device Oct 24, 2022 8:13 PM

Add Device

Identity Device Information **Recent Events** State Logs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
selva	{"Distance":160.97}	json	a few seconds ago
selva	{"Distance":160.97}	json	a few seconds ago
selva	{"Distance":160.96}	json	a few seconds ago
selva	{"Distance":160.97}	json	a few seconds ago
selva	{"Distance":153.97}	json	a few seconds ago

1 Simulation running

Type here to search

20:37
24-10-2022

2. When distance less than 100 cm

Screenshot of the Wokwi IoT Platform interface showing a simulation of an ESP32 microcontroller connected to an Ultrasonic Distance Sensor.

Sketch Code (sketch.ino):

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wifiClient;
4 String data3;
5 #define ORG "g05aq3"
6 #define DEVICE_TYPE "selva"
7 #define DEVICE_ID "selva_assignment_4"
8 #define TOKEN "qwertyuio"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/selva/fmt/json";
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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=19;
22 const int echopin=18;
23 String command;
24 String data="";
25
26 long duration;
27 float dist;
28
29
30
```

Simulation Interface:

- Editing Ultrasonic Distance Sensor:** Distance: 87cm
- ESP32 Microcontroller:** Labeled "ESP32".
- Log Output:**
 - Publish OK
 - Sending payload: {"Alert Distance":86.96}
 - Publish OK
 - Sending payload: {"Alert Distance":86.96}
 - Publish OK

The interface also shows a Windows taskbar at the bottom with the search bar and system tray.

IBM RECENT EVENTS:

The screenshot displays the IBM Watson IoT Platform interface. The top navigation bar includes the IBM logo, the text 'Selvaraj Assignment 4 - Wokwi A', and the 'IBM Watson IoT Platform' tab. The browser address bar shows the URL 'g05aq3.internetofthings.ibmcloud.com/dashboard/devices/browse'. The main header of the platform shows the user's email '312819106034@smartinternz.com' and ID 'ID: g05aq3'. The left sidebar contains various icons for navigation. The main content area has tabs for 'Browse', 'Action', 'Device Types', and 'Interfaces'. A modal window is open, showing tabs for 'Identity', 'Device Information', 'Recent Events', 'State', and 'Logs'. The 'Recent Events' tab is active, displaying a table of events for the device 'selva'. The table has columns for 'Event', 'Value', 'Format', and 'Last Received'. All events are of type 'Alert Distance' with a value of 86.96, in JSON format, and received 'a few seconds ago'. A status box at the bottom right of the modal indicates '1 Simulation running'.

Event	Value	Format	Last Received
selva	{"Alert Distance":86.96}	json	a few seconds ago
selva	{"Alert Distance":86.96}	json	a few seconds ago
selva	{"Alert Distance":86.96}	json	a few seconds ago
selva	{"Alert Distance":86.96}	json	a few seconds ago
selva	{"Alert Distance":86.96}	json	a few seconds ago

1 Simulation running

WOKWI LINK :- <https://wokwi.com/projects/346410390406562387>