

Assignment -4

Assignment Date	1 nov 2022
Team ID	PNT2022TMID47823
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Student Roll Number	91171914069
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

The screenshot displays the Wokwi IoT simulation 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 "g05aq3"
6 #define DEVICE_TYPE "selva"
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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;
```

On the right, the **Simulation** window shows a virtual circuit with an ESP32 microcontroller and an HC-SR04 ultrasonic sensor. The sensor's VCC pin is connected to the ESP32's 5V pin, and its GND pin is connected to the ESP32's GND pin. The Trig pin is connected to pin 19, and the Echo pin is connected to pin 18. The simulation status bar indicates a runtime of 00:26.081 and 89% completion.

The simulation output log shows the following messages:

```
Publish OK
Sending payload: {"Distance":160.97}
Publish OK
Sending payload: {"Distance":160.97}
Publish OK
```

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'. The main content area shows a list of devices, with 'selva_assignment_4' selected. The 'Recent Events' tab is active, displaying a table of live data streams. The table has four columns: Event, Value, Format, and Last Received. The data shows five events for the 'selva' device, all in JSON format, with values representing distance measurements. A status box at the bottom right indicates '1 Simulation running'.

IBM Watson IoT Platform

312819106034@smartinternz.com
ID: g05aq3

Browse Action Device Types Interfaces

Add Device +

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

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

Wokwi Assignment 4 - Wokwi A x IBM Watson IoT Platform x +

wokwi.com/projects/346410390406562387

WOKWI SAVE SHARE

sketch.ino diagram.json libraries.txt Library Manager

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17 PubSubClient client(server, 1883, wifiClient);
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19
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21 const int trigpin=19;
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23 String command;
24 String data="";
25
26 long duration;
27 float dist;
```

Simulation

00:33.027 85%

Editing Ultrasonic Distance Sensor

Distance: 87cm

ESP32

Publish OK

Sending payload: {"Alert Distance":86.96}

Publish OK

Sending payload: {"Alert Distance":86.96}

Publish OK

Type here to search

21:12 24-10-2022

IBM RECENT EVENTS:

The screenshot displays the IBM Watson IoT Platform interface. The top navigation bar includes tabs for 'Browse', 'Action', 'Device Types', and 'Interfaces'. The 'Browse' tab is active, showing a list of devices. The 'selva' device is selected, and the 'Recent Events' tab is active within its details view. The 'Recent Events' tab shows a table of events with columns: Event, Value, Format, and Last Received. The table contains five rows of data, all with the event name 'selva' and the value '{"Alert Distance":86.96}'. The format is 'json' and the last received time is 'a few seconds ago'. A status box at the bottom right 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

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