

Assignment -4

Assignment Date	28 Oct 2022
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Student Roll Number	92172019102116
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

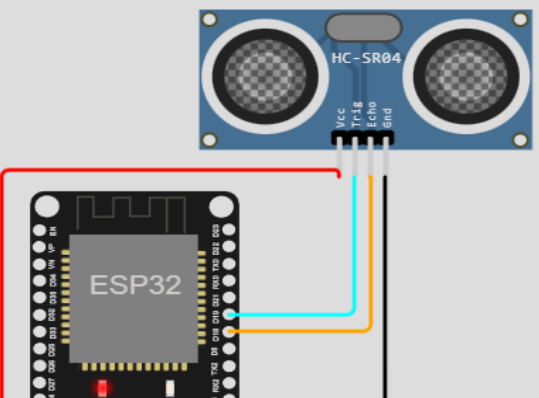
SAVE SHARE

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'. The main content area shows a list of devices, with 'selva_assignment_4' selected. The 'Recent Events' tab is active, displaying a table of events. The table has four columns: Event, Value, Format, and Last Received. The events are listed in descending order of time, with the most recent event at the top. The events are all of type 'selva' and represent distance measurements in JSON format. The last received time for all events is 'a few seconds ago'. A status message 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

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

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"
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11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
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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 address bar shows the URL 'g05aq3.internetofthings.ibmcloud.com/dashboard/devices/browse'. The main header area contains the 'IBM Watson IoT Platform' logo, a user profile icon with the email '312819106034@smartinternz.com' and ID 'g05aq3', and an 'Add Device' button. The left sidebar features a vertical menu with icons for 'Browse', 'Action', 'Device Types', and 'Interfaces'. The 'Browse' tab is selected, and the 'Recent Events' sub-tab is active. The main content area shows a table of recent events for the device 'selva'. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. All events are of type 'selva' and contain the value '{"Alert Distance":86.96}' in 'json' format, received '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>