

Assignment -4

Assignment Date	24 Oct 2022
Team ID	PNT2022TMID04737
Project Name	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(lcd, 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 = "{\nDistance\n:";
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"
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;
```

The right side of the interface shows a 'Simulation' window with a visual representation of the ESP32 microcontroller and the HC-SR04 ultrasonic sensor connected by wires. Below the simulation, a log displays the following messages:

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

The bottom of the screen shows a Windows taskbar with the search bar, task view icon, and system tray area indicating the time as 20:38 on 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 icon, and the email address 312819106034@smartinternz.com with ID: g05aq3. 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 for the device 'selva' and show distance measurements in JSON format. 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

Docs

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;
28
29
30
```

Simulation

00:33.027 85%

Editing Ultrasonic Distance Sensor

Distance: 87cm

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 the IBM logo, the text 'Selvaraj Assignment 4 - Wokwi A', and the 'IBM Watson IoT Platform' title. The main header shows the user's email '312819106034@smartinternz.com' and ID 'g05aq3'. The left sidebar contains various icons for navigation. The main content area is titled 'Browse' and features a 'Recent Events' tab. Below this tab, a table lists recent events for the device 'selva'. The table has four columns: '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 bar at the bottom indicates '1 Simulation running'.

IBM Watson IoT Platform

312819106034@smartinternz.com
ID: g05aq3

Browse Action Device Types Interfaces

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	{"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

Type here to search

21:12
24-10-2022