

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 IoT Platform interface showing a simulation of an ESP32 microcontroller connected to an HC-SR04 ultrasonic sensor. The code in the sketch.ino file is as follows:

```
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
```

The simulation shows the ESP32 connected to the HC-SR04 sensor. The output log displays the following messages:

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

The interface also shows a timer at 00:26.081 and a battery level at 89%.

2. When distance less than 100 cm

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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"
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11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
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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;
```

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

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