

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

The screenshot displays the Wokwi IoT simulation interface. The top navigation bar includes the Wokwi logo, a 'SAVE' button, a 'SHARE' button, and a 'Docs' link. The main workspace is divided into three sections: a code editor on the left, a circuit diagram in the center, and a simulation console on the right.

Code Editor (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";
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;
```

Circuit Diagram: The diagram shows an ESP32 microcontroller connected to an Ultrasonic Distance Sensor. The sensor's VCC pin is connected to the ESP32's VCC pin, and its GND pin is connected to the ESP32's GND pin. The sensor's Trig pin is connected to the ESP32's pin 19, and its Echo pin is connected to the ESP32's pin 18.

Simulation Console:

- Editing Ultrasonic Distance Sensor
- Distance: 87cm
- Publish OK
- Sending payload: {"Alert Distance":86.96}
- Publish OK
- Sending payload: {"Alert Distance":86.96}
- Publish OK

The bottom status bar shows the system clock at 21:12 on 24-10-2022, along with various system icons.