

ASSIGNMENT-4

QUESTION:

Write 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. Upload document with wokwi share link and images of ibm cloud.

SOLUTION:

PROGRAM:

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;

#define DEVICE_TYPE "ABCD"
#define DEVICE_ID "DCBA"
#define TOKEN "987654321"
#define speed 0.034
#define led 14
#define ORG "kvnnui"
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/status/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
void publishData();

const int trigpin=5;
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 = "{\"Normal 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>101 && dist<111){
        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("Warning crosses 110cm -- it automaticaly of the loop");
            digitalWrite(led,HIGH);
        }else {
            Serial.println("Publish FAILED");
        }
    }
}

```

```

}
void callback(char* subscribeTopic, byte* payload, unsigned int payloadLength){
Serial.print("callback invoked for topic:");
Serial.println(subscribeTopic);
for(int i=0; i<payloadLength; i++){
    dist += (char)payload[i];
}
Serial.println("data:"+ data3);
if(data3=="lighton"){
    Serial.println(data3);
    digitalWrite(led,HIGH);
}
data3="";
}
}

```

SIMULATION SCREENSHOTS:

The top screenshot shows the 'Browse Devices' page in the SmartThings simulator. It features a navigation bar with 'Browse', 'Action', 'Device Types', and 'Interfaces'. A search bar is present, and a table lists the devices. One device, 'DCBA', is shown with status 'Connected', type 'ABCD', and class 'Device'. Below the table, a message states '0 Simulations running'.

The bottom screenshot shows the 'Recent Events' page for the device 'DCBA'. It displays a table of events with columns for 'Event', 'Value', 'Format', and 'Last Received'. The events are status updates with the value '({\"Alert distance\":107.97})' in JSON format, received 'a few seconds ago'. A message at the bottom indicates '0 Simulations running'.

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location	Added By
DCBA	Connected	ABCD	Device	Oct 27, 2022 7:08 AM		711619206702@smartintenz.com

Event	Value	Format	Last Received
status	({\"Alert distance\":107.97})	json	a few seconds ago
status	({\"Alert distance\":107.97})	json	a few seconds ago
status	({\"Alert distance\":107.97})	json	a few seconds ago
status	({\"Alert distance\":107.97})	json	a few seconds ago
status	({\"Alert distance\":107.97})	json	a few seconds ago

sketch.ino

diagram.json

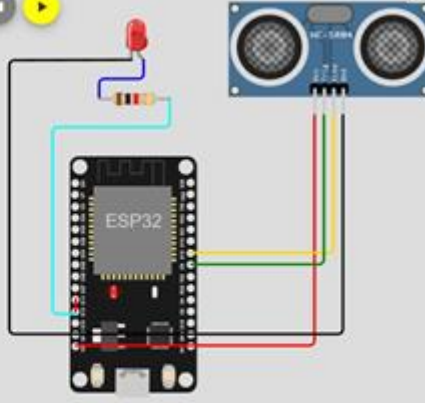
libraries.txt

Library Manager

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wificlient;
4 String data3;
5
6 #define DEVICE_TYPE "ABCD"
7 #define DEVICE_ID "DCBA"
8 #define TOKEN "987654321"
9 #define speed 0.034
10 #define led 14
11 #define ORG "kvnnui"
12 char server[] = ORG ".messaging.internetofthings.iibecloud.com";
13 char publishTopic[] = "iot-2/evt/status/fat/json";
14 char topic[] = "iot-2/cmd/home/fat/String";
15 char authMethod[] = "use-token-auth";
16 char token[] = TOKEN;
17 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
18 PubSubClient client(server, 1883, wificlient);
19 void publishData();
20
21
22 const int trigpin=5;
23 const int echopin=18;
24 String command;
25 String data="";
26
27 long duration;
28 float dist;
29
30
31
```

Simulation

01:37.927 85%



Sending payload: {"Alert distance":107.97}

Warning crosses 110cm -- it automatically of the loop

Browse Action Device Types Interfaces

Add Device

No devices Unregister

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Search by Device ID

Device Simulator

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location	Added By	
DCBA	Connected	ABCD	Device	Oct 27, 2022 7:00 AM		713619104701@emartelabs.com	
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				
status	("Alert distance":107.97)	json	a few seconds ago				
status	("Alert distance":107.97)	json	a few seconds ago				
status	("Alert distance":107.97)	json	a few seconds ago				
status	("Alert distance":107.97)	json	a few seconds ago				
status	("Alert distance":107.97)	json	a few seconds ago				

0 Simulations running