

Assignment - 4

Assignment Date	21 OCTOBER 2022
Student Name	Steedhar R
Student Roll Number	513419106041
Maximum Marks	

Question-1:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

Solution ;

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "s6t3ve"
#define DEVICE_TYPE "Steedhar_R"
#define DEVICE_ID "13012002"
#define TOKEN "9360541304"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/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=18;
const int echopin=19;
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="";
}

```

The screenshot displays the Wokwi online IDE interface. On the left, the 'sketch.ino' file is open, showing an Arduino sketch for an ESP32 connected to an ultrasonic sensor (HC-SR04) and an LED. The sketch includes headers for WiFi and PubSubClient, defines constants for the server, device, and token, and implements a loop that publishes distance data to an MQTT topic. The right side of the interface shows a 'Simulation' window with a visual representation of the hardware. Below the simulation, a console window shows the output of the program, including 'Publish OK' messages and the payload: {'Normal Distance':89.96}.

```

1  #include <WiFi.h>
2  #include <PubSubClient.h>
3  WiFiClient wificlient;
4  String data3;
5  #define ORG "s6t3ve"
6  #define DEVICE_TYPE "steedhar_R"
7  #define DEVICE_ID "13012002"
8  #define TOKEN "9360541304"
9  #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Data/fmt/json";
13 char topic[] = "iot-2/cmd/home/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 void publishData();
19
20
21 const int trigpin=18;
22 const int echopin=19;
23 String command;
24 String data="";
25
26 long duration;
27 float dist;
28
29
30
31 void setup()
32 {
33   Serial.begin(115200);
34   pinMode(led, OUTPUT);
35   pinMode(trigpin, OUTPUT);

```

Simulation window shows:

- ESP32 microcontroller
- HC-SR04 ultrasonic sensor
- LED

Console output:

```

Publish OK
Sending payload: {"Normal Distance":89.96}
Publish OK
Sending payload: {"Normal Distance":89.95}
Publish OK

```

Service Details - IBM Cloud

IBM Watson IoT Platform

(5) WhatsApp

sketchino - Wokwi Arduino and

← → ↻ 🔍 📁 ☆ 🏠 ⓘ

🔒 s6t3ve.internetofthings.ibmcloud.com/dashboard/devices/browse

IBM Watson IoT Platform

813419106041@smarintarnz.com
ID: s6t3ve

⌵

⚙️

👤

📶

🔑

🔒

⚙️

Browse

Action

Device Types

Interfaces

Add Device

🔍 Search by Device ID

Device Simulator

Device ID

Status

Device Type

Class ID

Date Added

Descriptive Location

Added By

Device Class

13012002

Connected

Steedhar_R

Device

15 Nov 2022 15:56

513419106041@smarintarnz.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
Data	["Normal Distance":89.95]	json	a few seconds ago
Data	["Normal Distance":89.95]	json	a few seconds ago
Data	["Normal Distance":89.95]	json	a few seconds ago
Data	["Normal Distance":89.95]	json	a few seconds ago
Data	["Normal Distance":89.95]	json	a few seconds ago

Items per page 50 | 1-1 of 1 item

1 of 1 page

0 Simulations running

28°C
AQI 44

🔍 Search

📁 🗂️ 🌐 🏠 📄

🔼 🇬🇧
ENG
IN

📶 🔊 🔋

15:59
15-11-2022