

Assignment - 4

Ultrasonic sensor simulation in Wokwi

Assignment Date	21 October 2022
Student Name	Afreen Minu Fathima K
Student Roll Number	312319106006
Maximum Marks	2 Marks

Question-1:

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

Code:

```
#include <WiFi.h>
#include <PubSubClient.h>

void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);

//-----credentials of IBM Accounts-----

#define ORG "ytluse"//IBM ORGANITION ID
#define DEVICE_TYPE "2702"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "O+n)Eh+1NX0y3?rG!8" //Token
String data3;

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient;
PubSubClient client(server, 1883, callback ,wifiClient);
const int trigPin = 5;
const int echoPin = 18;
#define SOUND_SPEED 0.034
long duration;
float distance;

void setup() {
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
```

```

    wificonnect();
    mqttconnect();
}

void loop()
{
    digitalWrite(trigPin, LOW);
    delayMicroseconds(2);
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);
    duration = pulseIn(echoPin, HIGH);
    distance = duration * SOUND_SPEED/2;
    Serial.print("Distance (cm): ");
    Serial.println(distance);
    if(distance<100)
    {
        Serial.println("ALERT!!");
        delay(1000);

        PublishData(distance);
        delay(1000);
        if (!client.loop()) {
            mqttconnect();
        }
    }
    delay(1000);
}

void PublishData(float dist) {
    mqttconnect();

    String payload = "{\"Distance\": ";
    payload += dist;
    payload += ", \"ALERT!!\": \"\"Distance less than 100cms\"\"";
    payload += "}";

    Serial.print("Sending payload: ");
    Serial.println(payload);

    if (client.publish(publishTopic, (char*) payload.c_str())) {
        Serial.println("Publish ok");
    } else {
        Serial.println("Publish failed");
    }
}

```

```

void mqttconnect() {
    if (!client.connected()) {
        Serial.print("Reconnecting client to ");
        Serial.println(server);
        while (!!!client.connect(clientId, authMethod, token)) {
            Serial.print(".");
            delay(500);
        }

        initManagedDevice();
        Serial.println();
    }
}

void wificonnect()
{
    Serial.println();
    Serial.print("Connecting to ");

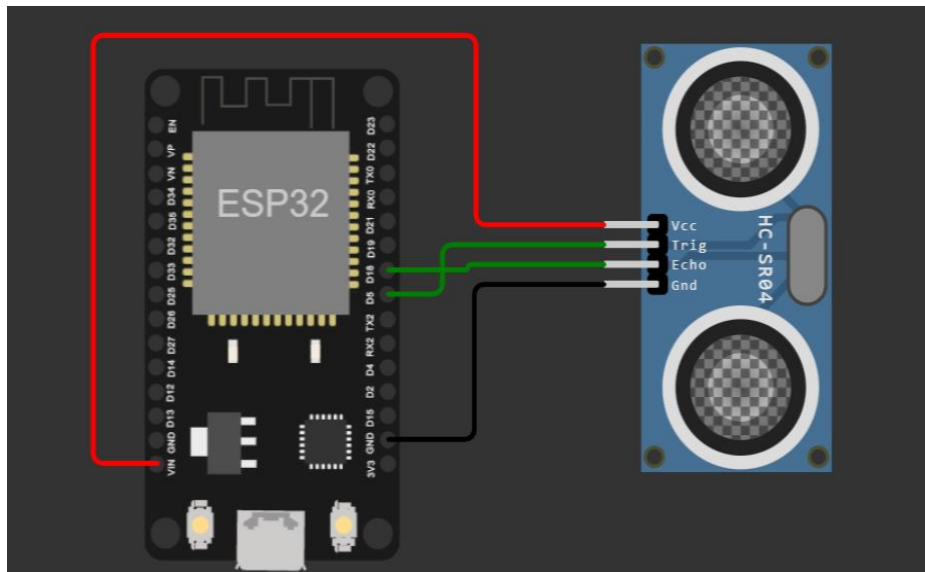
    WiFi.begin("Wokwi-GUEST", "", 6);
    while (WiFi.status() != WL_CONNECTED) {
        delay(500);
        Serial.print(".");
    }
    Serial.println("");
    Serial.println("WiFi connected");
    Serial.println("IP address: ");
    Serial.println(WiFi.localIP());
}

void initManagedDevice() {
    if (client.subscribe(subscribetopic)) {
        Serial.println((subscribetopic));
        Serial.println("subscribe to cmd OK");
    } else {
        Serial.println("subscribe to cmd 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++) {
        //Serial.print((char)payload[i]);
        data3 += (char)payload[i];
    }
    Serial.println("data: "+ data3);
    data3="";
}

```

Circuit Diagram:



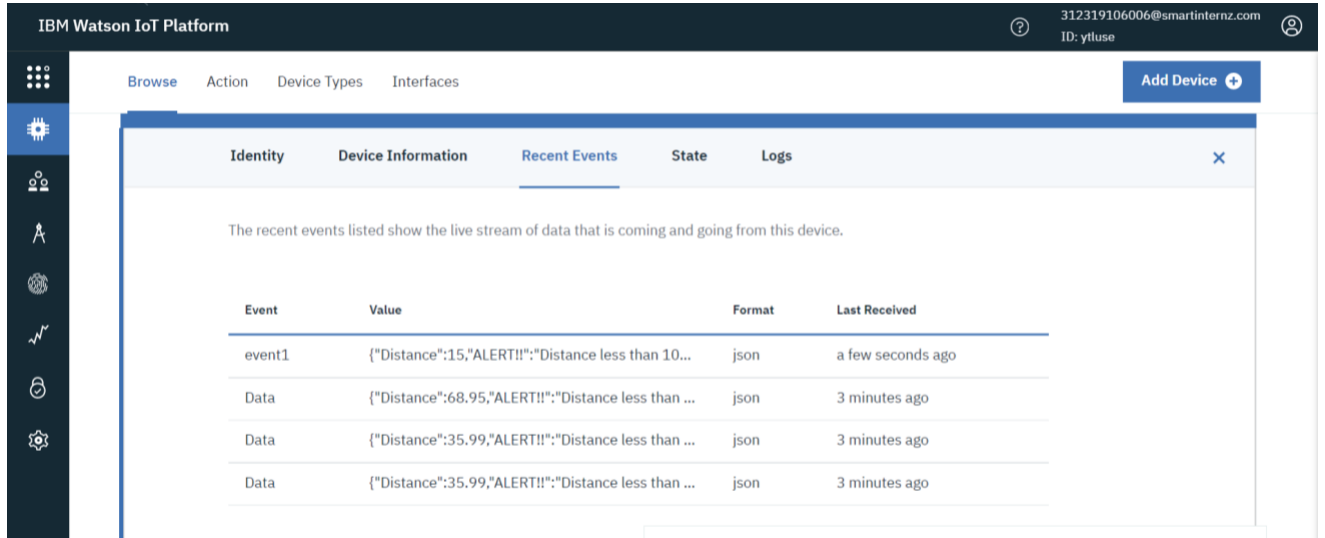
Output:

Wokwi output:

```
Connecting to ...
WiFi connected
IP address:
10.10.0.2
Reconnecting client to ytluse.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 35.99
ALERT!!
Sending payload: {"Distance":35.99,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 35.99
ALERT!!
Sending payload: {"Distance":35.99,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 68.95
ALERT!!
Sending payload: {"Distance":68.95,"ALERT!!":"Distance less than 100cms"}
Publish ok
```

IBM cloud output:



IBM Watson IoT Platform

312319106006@smartinternz.com
ID: ytluse

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
event1	{"Distance":15,"ALERT!!":"Distance less than 10...	json	a few seconds ago
Data	{"Distance":68.95,"ALERT!!":"Distance less than ...	json	3 minutes ago
Data	{"Distance":35.99,"ALERT!!":"Distance less than ...	json	3 minutes ago
Data	{"Distance":35.99,"ALERT!!":"Distance less than ...	json	3 minutes ago

Wokwi simulation link:

<https://wokwi.com/projects/346236324918854227>