

Assignment - 4

Ultrasonic sensor simulation in Wokwi

Assignment Date	November 7,2022
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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:

```
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1  #include <WiFi.h>
2  #include <PubSubClient.h>
3
4  void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
5
6  //-----credentials of IBM Accounts-----
7
8  #define ORG "1dzfs1"//IBM ORGANITION ID
9  #define DEVICE_TYPE "new"//Device type mentioned in ibm watson IOT Platform
10 #define DEVICE_ID "9655"//Device ID mentioned in ibm watson IOT Platform
11 #define TOKEN "nSZJrPH18PhDGXJr1F" //Token
12 String data3;
13
14 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
15 char publishTopic[] = "iot-2/evt/Data/fmt/json";
16 char subscribetopic[] = "iot-2/cmd/test/fmt/String";
17 char authMethod[] = "use-token-auth";
18 char token[] = TOKEN;
19 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
20 WiFiClient wifiClient;
21 PubSubClient client(server, 1883, callback ,wifiClient);
22 const int trigPin = 5;
23 const int echoPin = 18;
24 #define SOUND_SPEED 0.034
25 long duration;
26 float distance;
27
28 void setup() {
29   Serial.begin(115200);
30   pinMode(trigPin, OUTPUT);
31   pinMode(echoPin, INPUT);
32   wifiConnect();
33   mqttConnect();
34 }
35
36 void loop()
37 {
```

```

36 void loop()
37 {
38     digitalWrite(trigPin, LOW);
39     delayMicroseconds(2);
40     digitalWrite(trigPin, HIGH);
41     delayMicroseconds(10);
42     digitalWrite(trigPin, LOW);
43     duration = pulseIn(echoPin, HIGH);
44     distance = duration * SOUND_SPEED/2;
45     Serial.print("Distance (cm): ");
46     Serial.println(distance);
47     if(distance<100)
48     {
49         Serial.println("ALERT!!");
50         delay(1000);
51
52         PublishData(distance);
53         delay(1000);
54         if (!client.loop()) {
55             mqttconnect();
56         }
57     }
58     delay(1000);
59 }
60
61
62 void PublishData(float dist) {
63     mqttconnect();
64
65     String payload = "{\"Distance\": ";
66     payload += dist;
67     payload += ", \"ALERT!!\": \"\"Distance less than 100cms\"\"";
68     payload += "}";
69
70
71     Serial.print("Sending payload: ");

```

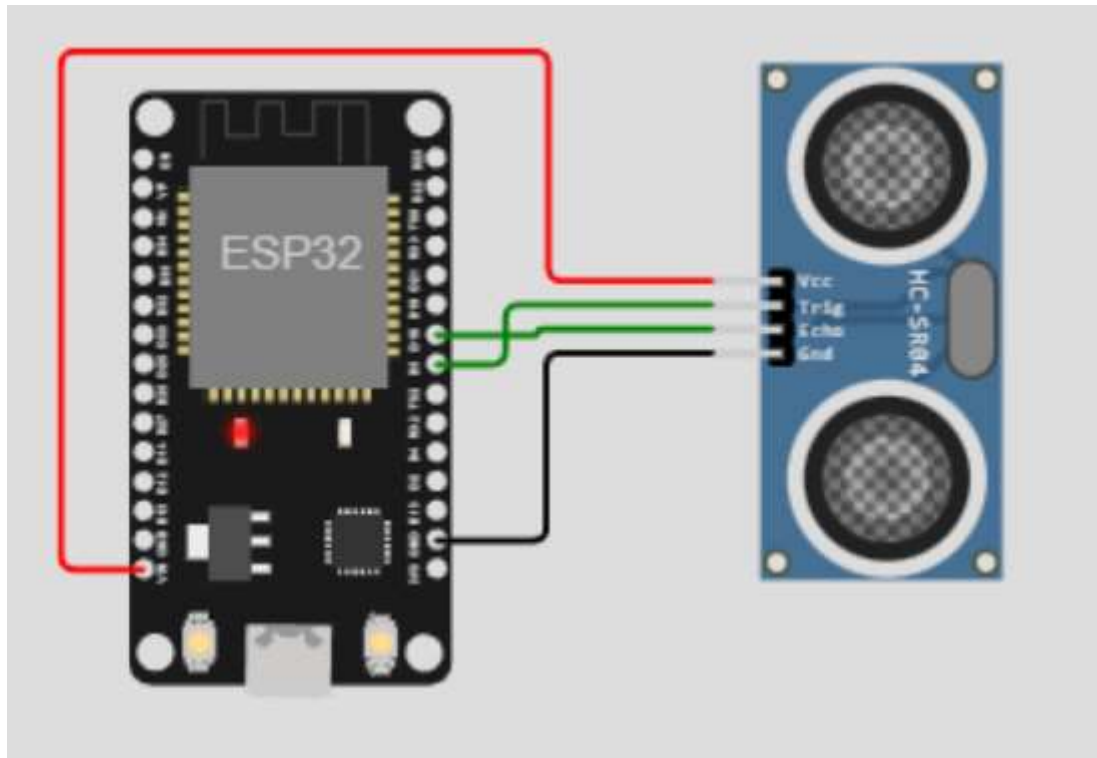
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```
72 Serial.println(payload);
73 if (client.publish(publishTopic, (char*) payload.c_str())) {
74     Serial.println("Publish ok");
75 } else {
76     Serial.println("Publish failed");
77 }
78
79
80 void mqttconnect() {
81     if (!client.connected()) {
82         Serial.print("Reconnecting client to ");
83         Serial.println(server);
84         while (!client.connect(clientId, authMethod, token)) {
85             Serial.print(".");
86             delay(500);
87         }
88
89         initManagedDevice();
90         Serial.println();
91     }
92 }
93 void wificonnect()
94 {
95     Serial.println();
96     Serial.print("Connecting to ");
97
98     WiFi.begin("Wokwi-GUEST", "", 6);
99     while (WiFi.status() != WL_CONNECTED) {
100         delay(500);
101         Serial.print(".");
102     }
103     Serial.println("");
104     Serial.println("WiFi connected");
105     Serial.println("IP address: ");
106     Serial.println(WiFi.localIP());
107 }
108 void initManagedDevice() {
```

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```
104 Serial.println("WiFi connected");
105 Serial.println("IP address: ");
106 Serial.println(WiFi.localIP());
107 }
108 void initManagedDevice() {
109     if (client.subscribe(subscribetopic)) {
110         Serial.println((subscribetopic));
111         Serial.println("subscribe to cmd OK");
112     } else {
113         Serial.println("subscribe to cmd FAILED");
114     }
115 }
116 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
117 {
118
119     Serial.print("callback invoked for topic: ");
120     Serial.println(subscribetopic);
121     for (int i = 0; i < payloadLength; i++) {
122         //Serial.print((char)payload[i]);
123         data3 += (char)payload[i];
124     }
125     Serial.println("data: " + data3);
126     data3="";
127 }
128
```

Circuit Diagram:



Output:

Wokwi output:

```
Connecting to ..
WiFi connected
IP address:
10.10.0.2
Reconnecting client to 1dzfs1.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 40.97
ALERT!!
Sending payload: {"Distance":40.97,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 40.97
ALERT!!
Reconnecting client to 1dzfs1.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Sending payload: {"Distance":40.97,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 40.97
ALERT!!
Sending payload: {"Distance":40.97,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 40.97
```

IBM cloud output:

IBM Watson IoT Platform

830119106310@smartinternz.com
ID: 1dck1

← Back

Device Drilldown - 9655

Recent Events

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	["Distance":40.97,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	["Distance":40.97,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	["Distance":40.97,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	["Distance":40.97,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	["Distance":40.97,"ALERT!":"Distance less than ...	json	a few seconds ago

0 Simulations running

Wokwi simulation link:

<https://wokwi.com/projects/347659185871127124>