

ASSIGNMENT-4

DISTANCE DETECTION USING ULTRASONIC SENSOR

Date	30 October 2022
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Student Roll Number	811519106179
Maximum Marks	2 Marks

Question1 :

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.

WOKWI LINK :

<https://wokwi.com/projects/305566932847821378> CODE :

```

1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3
4
5 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
6
7 //-----credentials of IBM Accounts-----
8
9 #define ORG "4hn@jp" //IBM ORGANITION ID
10 #define DEVICE_TYPE "ULTRASON" //Device type mentioned in ibm watson IOT Platform
11 #define DEVICE_ID "DISTANCEDETECT" //Device ID mentioned in ibm watson IOT Platform
12 #define TOKEN "wuo5s7PRjZSegVkr&x" //Token
13 String data3;
14 float dist;
15
16
17 //----- Customise the above values -----
18 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
19 char publishTopic[] = "iot-2/evt>Data/fmt/json"; // topic name and type of event perform and format in which data to be send
20 char subscribeTopic[] = "iot-2/cmd/test/fmt/String"; // cmd REPRESENT command type AND COMMAND IS TEST OF FORMAT STRING
21 char authMethod[] = "use-token-auth"; // authentication method
22 char token[] = TOKEN;
23 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
24
25
26 //-----
27 WiFiClient wifiClient; // creating the instance for wifiClient
28 PubSubClient client(server, 1883, callback, wifiClient); //calling the predefined client id by passing parameter like server id, port and wifi credential
29
30 int LED = 4;
31 int trig = 5;
32 int echo = 18;
33 void setup()
34 {
35 Serial.begin(115200);

```

```
esp32-blink.ino e    diagram    .json ●    libraries.txt ●    Library Manager ▾
36  pinMode(trig,OUTPUT);
37  pinMode(echo,INPUT);
38  pinMode(LED, OUTPUT);
39  delay(10);
40  wificonnect();
41  mqttconnect();
42 }
43 void loop()// Recursive Function
44 {
45
46  digitalWrite(trig,LOW);
47  digitalWrite(trig,HIGH);
48  delayMicroseconds(10);
49  digitalWrite(trig,LOW);
50  float dur = pulseIn(echo,HIGH);
51  float dist = (dur * 0.0343)/2;
52  Serial.print ("Distancein cm");
53  Serial.println(dist);
54
55
56  PublishData(dist);
57  delay(1000);
58  if (!client.loop()) {
59    mqttconnect();
60  }
61 }
62
63
64
65 /*.....retrieving to Cloud.....*/
66
67 void PublishData(float dist) {
68  mqttconnect(); //function call for connecting to ibm
69  /*
70   | | creating the String in in form JSON to update the data to ibm cloud
```

```

70     // creating the String in in form JSON to update the data to ibm cloud
71     /*
72     String object;
73     if (dist <100)
74     {
75         digitalWrite(LED,HIGH);
76         Serial.println("object is near");
77         object = "Near";
78     }
79     else
80     {
81         digitalWrite(LED,LOW);
82         Serial.println("no object found");
83         object = "No";
84     }
85
86     String payload = "{\"distance\":\"";
87     payload += dist;
88     payload += "," "object\":\"\"";
89     payload += object;
90     payload += "}";
91
92
93     Serial.print("Sending payload: ");
94     Serial.println(payload);
95
96
97
98

```

```

esp32-blink.ino • diagram.json • libraries.txt • Library Manager ▾
98
99     if (client.publish(publishTopic, (char*) payload.c_str())) {
100        Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print publish ok in Serial monitor or else it will print publish failed
101    } else {
102        Serial.println("Publish failed");
103    }
104
105 }
106 void mqttconnect() {
107     if (!client.connected()) {
108         Serial.print("Reconnecting client to ");
109         Serial.println(server);
110         while (!client.connect(clientId, authMethod, token)) {
111             Serial.print(".");
112             delay(500);
113         }
114
115         initManagedDevice();
116         Serial.println();
117     }
118 }
119 void wificonnect() //function defination for wificonnect
120 {
121     Serial.println();
122     Serial.print("Connecting to ");
123
124     WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
125     while (WiFi.status() != WL_CONNECTED) {
126         delay(500);
127         Serial.print(".");
128     }
129     Serial.println("");
130     Serial.println("WiFi connected");
131     Serial.println("IP address: ");
132     Serial.println(WiFi.localIP());

```

```
esp32-blink.ino • diagram.json • libraries.txt • Library Manager ▾
123
124     WiFi.begin("Wokwi-GUEST", "", 6); //passing the wifi credentials to establish the connection
125     while (WiFi.status() != WL_CONNECTED) {
126         delay(500);
127         Serial.print(".");
128     }
129     Serial.println("");
130     Serial.println("WiFi connected");
131     Serial.println("IP address: ");
132     Serial.println(WiFi.localIP());
133 }
134
135 void initManagedDevice() {
136     if (client.subscribe(subscribetopic)) {
137         Serial.println((subscribetopic));
138         Serial.println("subscribe to cmd OK");
139     } else {
140         Serial.println("subscribe to cmd FAILED");
141     }
142 }
143
144 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
145
146     Serial.print("callback invoked for topic: ");
147     Serial.println(subscribetopic);
148     for (int i = 0; i < payloadLength; i++) {
149         //Serial.print((char)payload[i]);
150         data3 += (char)payload[i];
151     }
152
153     //    Serial.println("data: " + data3);
154     //    if(data3=="Near")
155     //    {
156     //        Serial.println(data3);
157     //    }
158 }
```

```
esp32-blink.ino • diagram.json • libraries.txt • Library Manager ▾
142 }
143
144 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
145 {
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147     Serial.print("callback invoked for topic: ");
148     Serial.println(subscribetopic);
149     for (int i = 0; i < payloadLength; i++) {
150         //Serial.print((char)payload[i]);
151         data3 += (char)payload[i];
152     }
153
154     //    Serial.println("data: " + data3);
155     //    if(data3=="Near")
156     //    {
157     //        Serial.println(data3);
158     //        digitalWrite(LED,HIGH);
159
160     //    }
161
162     //    else
163     //    {
164     //        Serial.println(data3);
165     //        digitalWrite(LED,LOW);
166
167     //    }
168     data3="";
169
170
171 }
```

OUTPUT:

```

esp32-blink.ino ● diagram.json ● libraries.bd ● Library Manager
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22 char token[] = TOKEN;
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35   Serial.begin(115200);

```

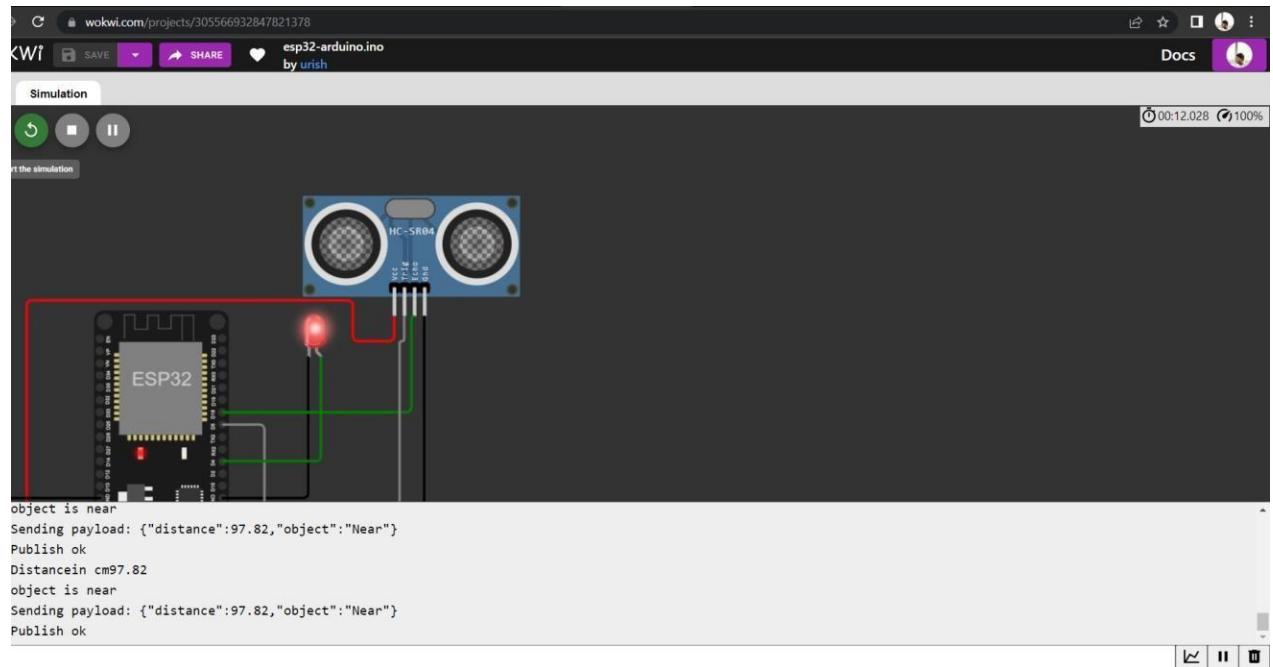
Simulation window showing the circuit and the publish log:

- no object found
- Sending payload: {"distance":141.21,"object":"No"}
- Publish ok
- Distance in cm141.21
- no object found
- Sending payload: {"distance":141.21,"object":"No"}
- Publish ok

Data send to the IBM cloud device when the object is far

Event	Value	Format	Last Received
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.18,"object":"No"}	json	a few seconds ago
Data	{"distance":141.2,"object":"No"}	json	a few seconds ago

when object is near to the ultrasonic sensor



Data sent to the IBM Cloud Device when the object is near

<https://wokwi.com/projects/305566932847821378>

The screenshot shows the IBM Cloud Device view for the project. On the left is a sidebar with icons for Home, Devices, Actions, Device Types, and Interfaces. The main area has tabs for **Browse**, **Action**, **Device Types**, and **Interfaces**. A blue button **Add Device** is in the top right. Below these are tabs for **DISTANCEDECTECT**, **Disconnected**, **ULTRASON**, **Device**, and the date **Oct 20, 2022 9:46 AM**. To the right of the tabs are navigation icons. The **Recent Events** tab is selected. The table below lists recent events:

Event	Value	Format	Last Received
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago

At the bottom, there are pagination controls: **Items per page 50**, **1 of 1 page**, and navigation arrows.