

IBM -NALAIYA THIRAN

INTERNET OF THINGS

BATCH : B3-3M5E

ASSIGNMENT NO : 4

NAME : RANJENI G

ASSIGNMENT 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.

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 "4hn0jp" //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 "wuo5s7PR)ZSegV&R&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,portand wificredential
29
30 int LED = 4;
31 int trig = 5;
32 int echo = 18;
33 void setup()
34 {
35   Serial.begin(115200);
```

esp32-blink.ino • 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
```

```

69 |
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 successfully 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 definition 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());

```

```
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
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     // Serial.println("Near detected");
159 }
```

esp32-blink.ino ●

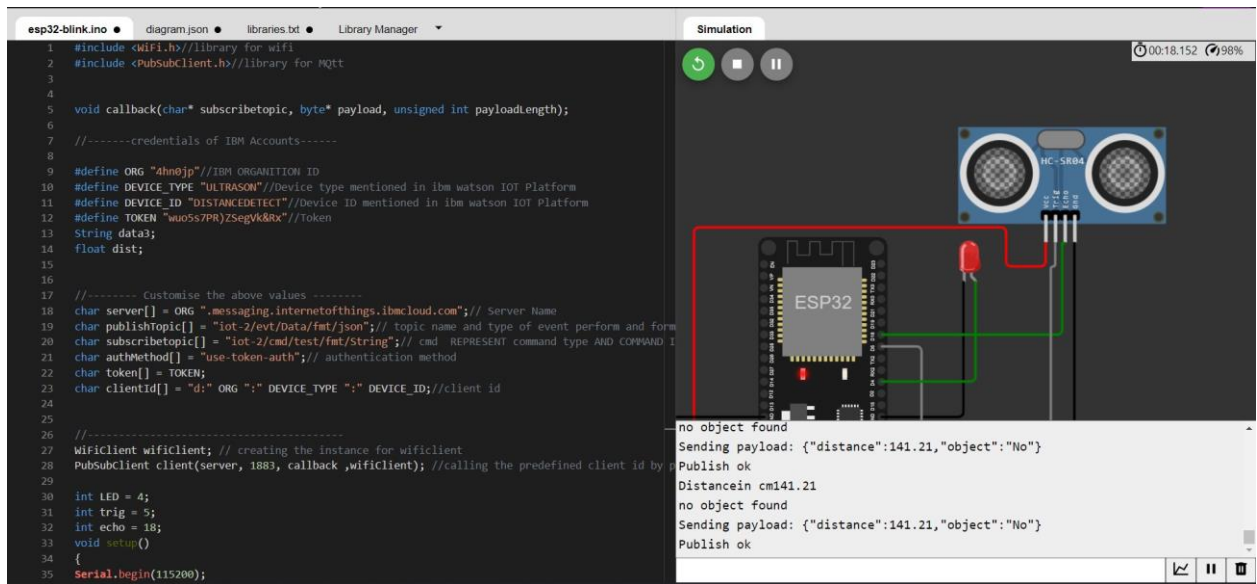
diagram.json ●

libraries.txt ●

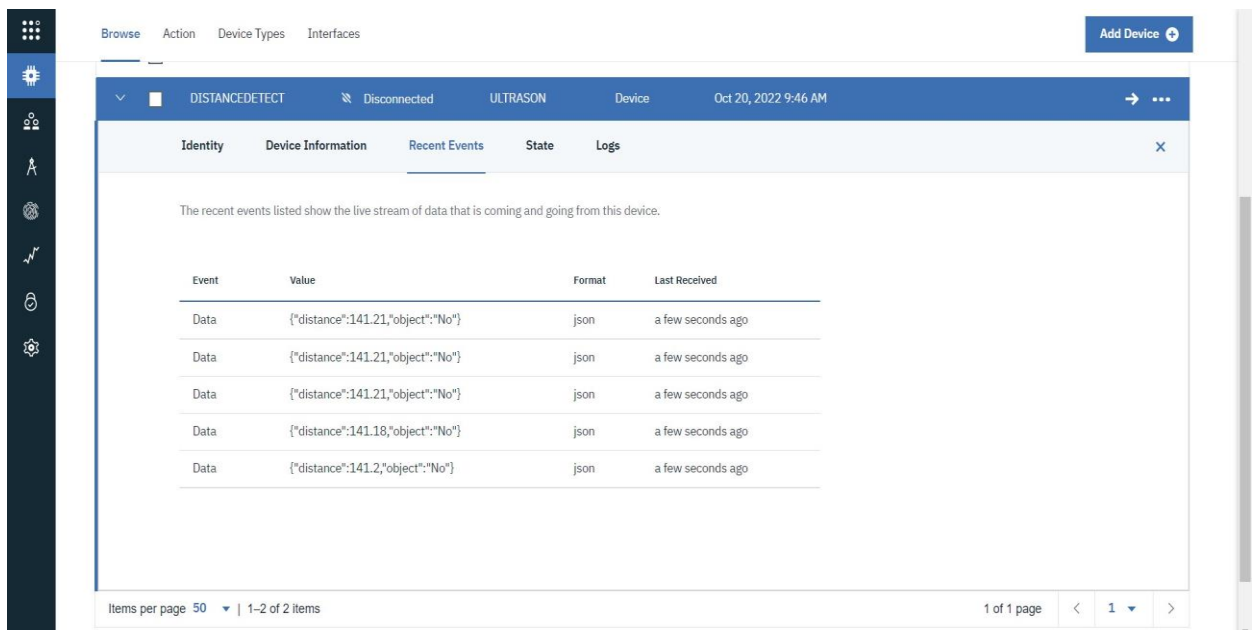
Library Manager ▼

```
142 }
143
144 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
145 {
146
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 }
```

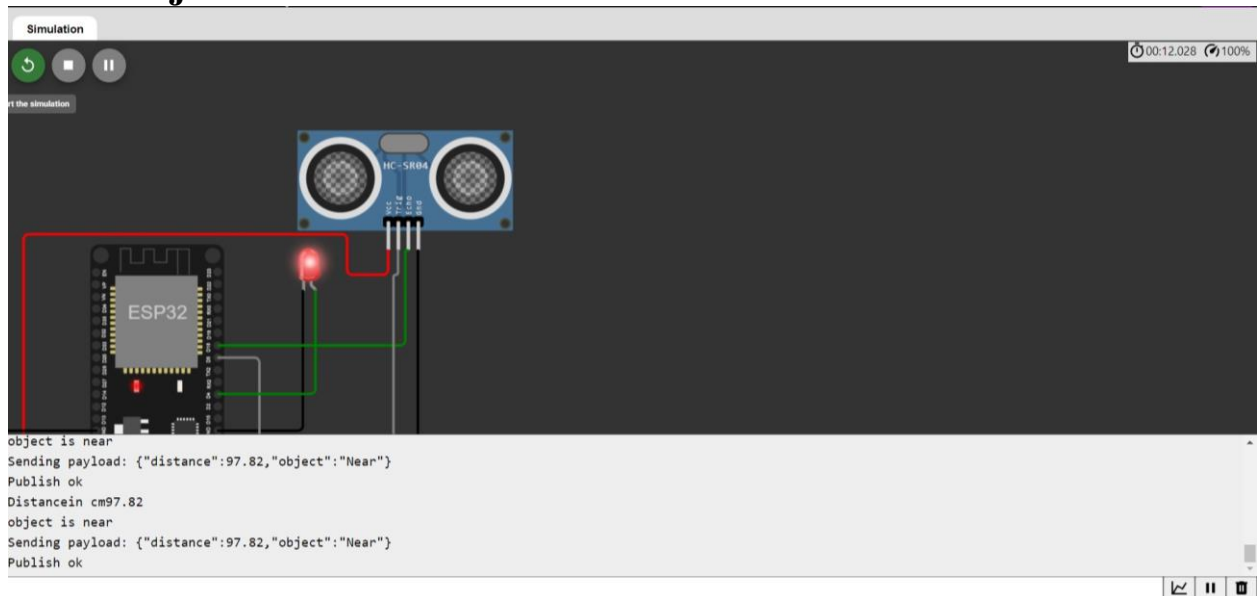
OUTPUT:



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



When object is near to the ultrasonic sensor



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

