

ASSIGNMENT-4

Date	23 October 2022
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Name	Snekapriya A
MaximumMarks	2Marks

Question 1:

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

CODE:

```
1 #include <SPI.h> //library for wifi
2 #include <PubSubClient.h> //library for mqtt
3
4
5 void callback(char* topic, byte* payload, unsigned int payloadlength);
6
7 //-----Credentials of IBM Accounts-----
8
9 #define ORG "ibm" //IBM ORGANIZATION ID
10 #define DEVICE_TYPE "ULTRASON" //Device type mentioned in the Watson IoT Platform
11 #define DEVICE_ID "DISTANCEDETECT" //Device ID mentioned in the Watson IoT Platform
12 #define TOKEN "watoz799j2Segv68a" //Token
13 String data;
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 IN TEXT OR 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);
```

```

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
185
186 if (client.publish(publishTopic, (char*) payload_c_str)) {
187     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
188 } else {
189     Serial.println("Publish failed");
190 }
191
192 void wificonnect() {
193     if (!client.connected()) {
194         Serial.print("Reconnecting client to ");
195         Serial.println(server);
196         while (!client.connect(clientId, authMethod, token)) {
197             Serial.print(".");
198             delay(500);
199         }
200
201         initManagedDevice();
202         Serial.println();
203     }
204 }
205
206 void wificonnect() //function definition for wificonnect
207 {
208     Serial.println();
209     Serial.print("Connecting to ");
210
211     WiFi.begin("Mokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
212     while (WiFi.status() != WL_CONNECTED) {
213         delay(500);
214         Serial.print(".");
215     }
216
217     Serial.println("");
218     Serial.println("WiFi connected");
219     Serial.println("IP address: ");
220     Serial.println(WiFi.localIP());

```

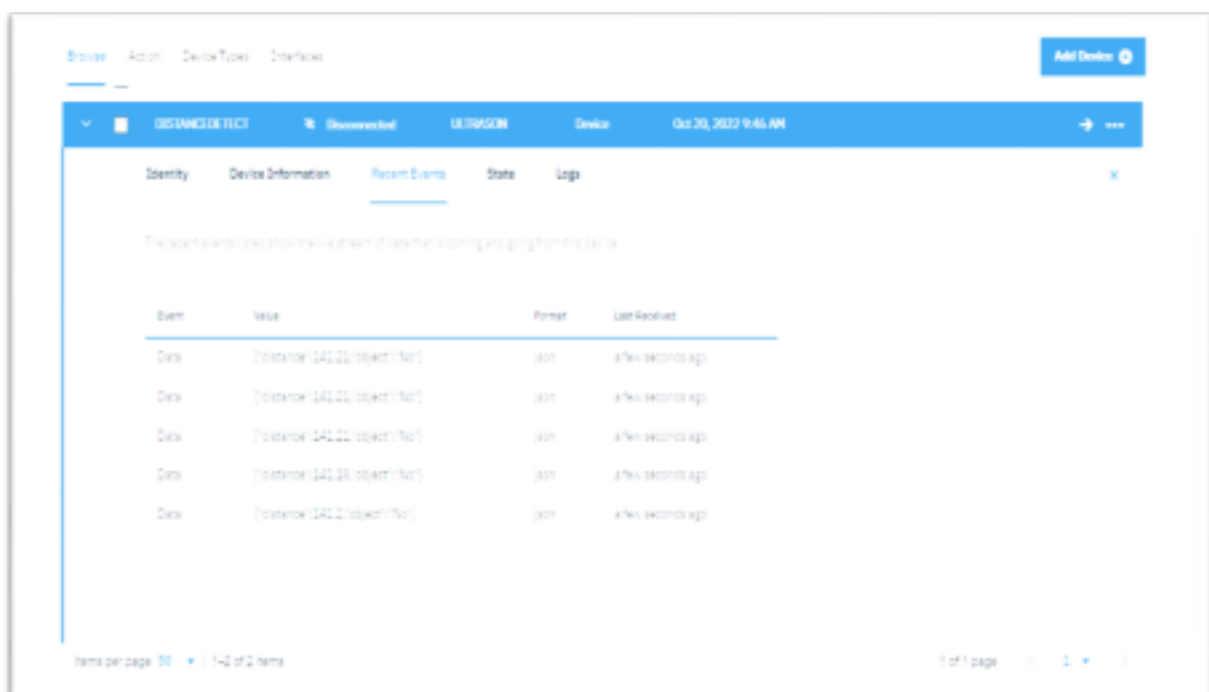
```

esp32-blink.ino • diagram.json • libraries.txt • Library Manager
124 WiFi.begin("Mokwi-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     //     // if it successfully upload data on the cloud then it will print publish ok in Serial monitor or else it will print publish failed

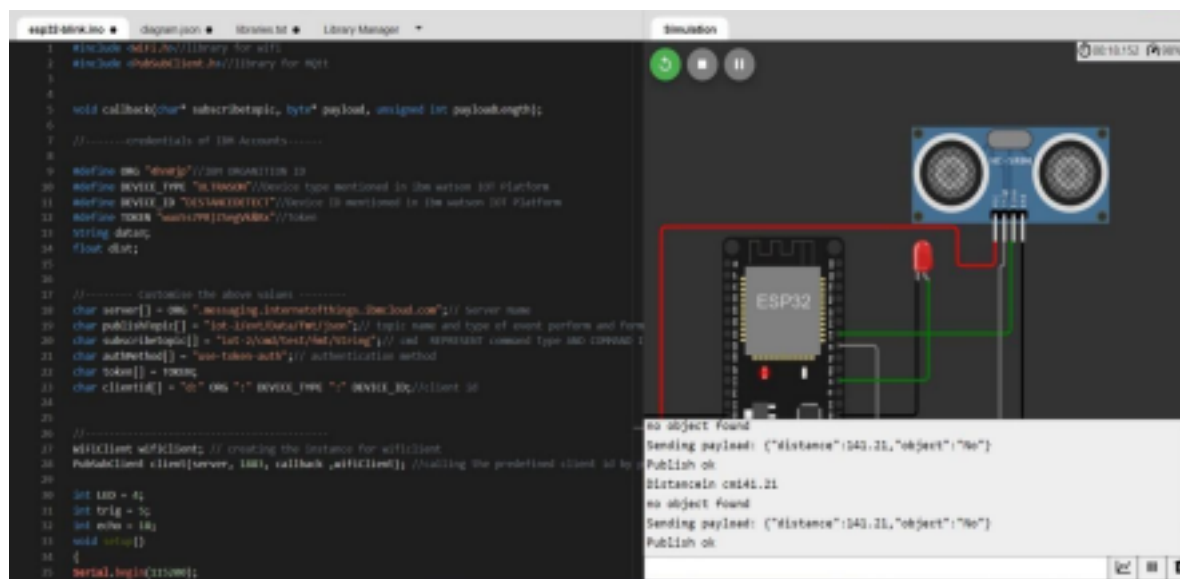
```

```
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     // else
162     // {
163     // Serial.println(data3);
164     // digitalWrite(LED,LOW);
165     // }
166
167     data3="";
168
169
170
171 }
```

OUTPUT:



Data send to the IBMcloud device when the objectics far



Data sent to the IBMCloud Device when the objectics near

DistanceDetect

Disconnected

ULTRASONIC

Device

Oct 26, 2022 9:46 AM

Identity	Device Information	Recent Events	State	Logs
Event	State	Event	Last Received	
Data	("Distance":179.44,"object":"No")	json	45 seconds ago	
Data	("Distance":179.42,"object":"No")	json	45 seconds ago	
Data	("Distance":179.44,"object":"No")	json	45 seconds ago	
Data	("Distance":179.42,"object":"No")	json	45 seconds ago	
Data	("Distance":179.44,"object":"No")	json	45 seconds ago	

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1 of 1 page

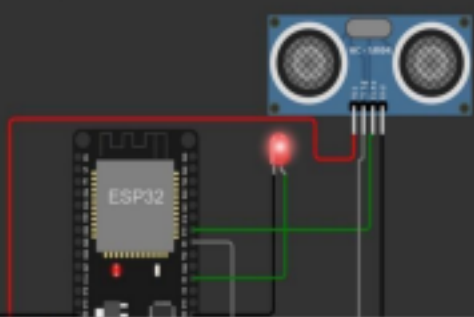
When objectics near to the ultrasonic sensor

wokwi.com/projects/20256831247321179

esp32-arduino.ino
by arash

Simulation

90.12.820 100%



object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
Distancein cm97.82
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok