

Assignment -4

Assignment Date	25 October 2022
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Maximum Marks	2 Marks

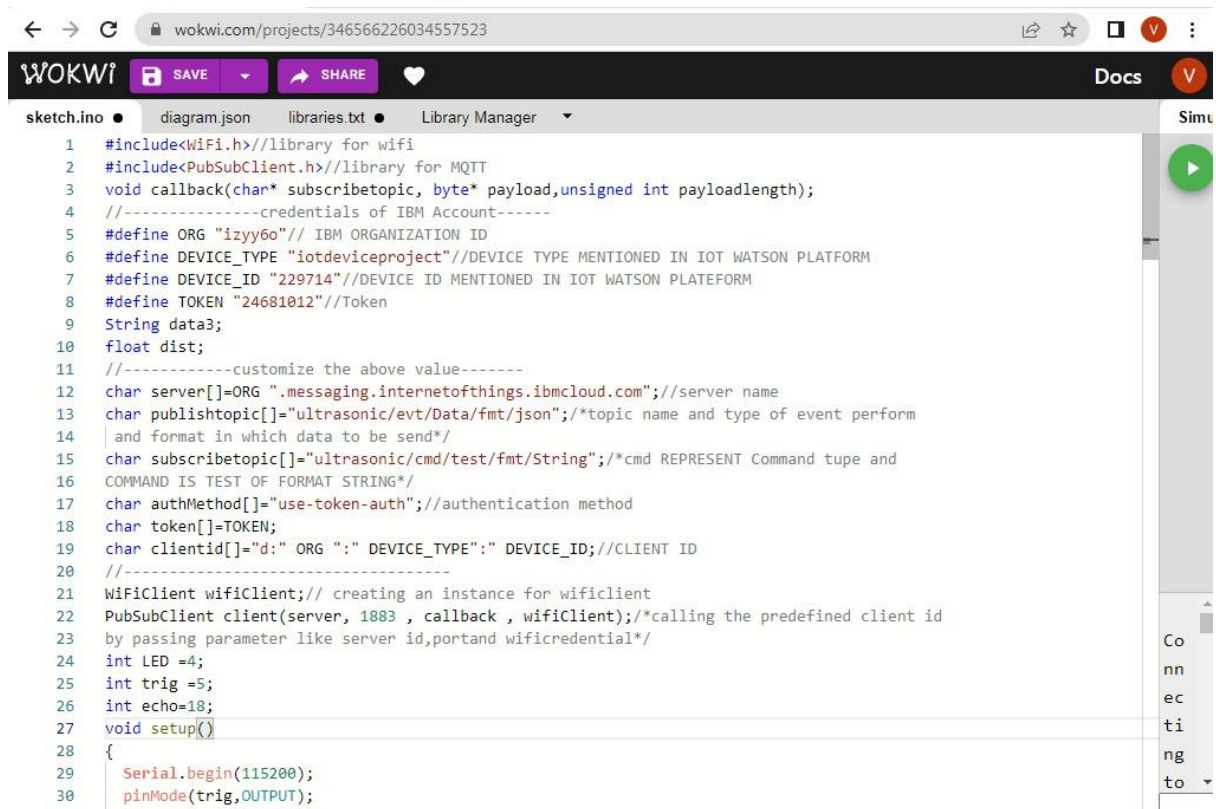
Question-1:

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.

Upload document with wokwi share link and images of ibm cloud

Solution:



```
1 #include<WiFi.h>//library for wifi
2 #include<PubSubClient.h>//library for MQTT
3 void callback(char* subscribetopic, byte* payload,unsigned int payloadlength);
4 //-----credentials of IBM Account-----
5 #define ORG "izyy6o"// IBM ORGANIZATION ID
6 #define DEVICE_TYPE "iotdeviceproject"//DEVICE TYPE MENTIONED IN IOT WATSON PLATFORM
7 #define DEVICE_ID "229714"//DEVICE ID MENTIONED IN IOT WATSON PLATFORM
8 #define TOKEN "24681012"//Token
9 String data3;
10 float dist;
11 //-----customize the above value-----
12 char server[]=ORG ".messaging.internetofthings.ibmcloud.com";//server name
13 char publishtopic[]="ultrasonic/evt/Data/fmt/json";//topic name and type of event perform
14 |and format in which data to be send*/
15 char subscribetopic[]="ultrasonic/cmd/test/fmt/String";//cmd REPRESENT Command tupe and
16 |COMMAND IS TEST OF FORMAT STRING*/
17 char authMethod[]="use-token-auth";//authentication method
18 char token[]=TOKEN;
19 char clientid[]="d:" ORG ":" DEVICE_TYPE":" DEVICE_ID;//CLIENT ID
20 //-----
21 WiFiClient wifiClient;// creating an instance for wificlient
22 PubSubClient client(server, 1883 , callback , wifiClient);/*calling the predefined client id
23 |by passing parameter like server id,portand wificredential*/
24 int LED =4;
25 int trig =5;
26 int echo=18;
27 void setup()
28 {
29   Serial.begin(115200);
30   pinMode(trig,OUTPUT);
```

← → ↺ wokwi.com/projects/346566226034557523

WOKWI SAVE SHARE

Docs

sketch.ino ● diagram.json libraries.txt ● Library Manager

```
31 pinMode(echo,INPUT);
32 pinMode(LED,OUTPUT);
33 delay(10);
34 wificonnect();
35 mqttconnect();
36 }
37 void loop()//recursive function
38 {
39   digitalWrite(trig,LOW);
40   digitalWrite(trig,HIGH);
41   delayMicroseconds(10);
42   digitalWrite(trig,LOW);
43   float dur=pulseIn(echo,HIGH);
44   float dist=(dur * 0.0343)/2;
45   Serial.print("distance in cm");
46   Serial.println(dist);
47   PublishData(dist);
48   delay(1000);
49   if (!client.loop()){
50     mqttconnect();
51   }
52 }
53 /*.....retriving to cloud.....*/
54 void PublishData(float dist){
55   mqttconnect();//function call for connecting to ibm
56   /*creating the string in form of JSON to update the data to ibm cloud*/
57   String object;
58   if(dist<100)
59   {
60     digitalWrite(LED,HIGH);
```

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sketch.ino ● diagram.json libraries.txt ● Library Manager

```
61 Serial.println("no object is near");
62 object="Near";
63 }
64 else
65 {
66   digitalWrite(LED,LOW);
67   Serial.println("no object found");
68   object="No";
69 }
70 String payload="{\"distance\": ";
71 payload +=dist;
72 payload +=",\" \"object\": \"\"";
73 payload += object;
74 payload += "\";";
75
76 Serial.print("Sending payload: ");
77 Serial.println(payload);
78 if(client.publish(publishtopic, (char*) payload.c_str())){
79   Serial.println("Publish ok");/* if its sucessfully upload data on the cloud then it will print
80   publish ok in serial monitor or else it will print publish failed*/
81 } else{
82   Serial.println("Publish failed");
83 }
84 }
85 void mqttconnect(){
86   if(!client.connected()){
87     Serial.print("Reconnecting client to ");
88     Serial.println(server);
89     while(!client.connect(clientid,authMethod, token)){
90       Serial.print(".");
91       delay(500);
```

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```
92     }
93     initManagedDevice();
94     Serial.println();
95 }
96 }
97 void wificonnect();//function defenition for wificonnect
98 {
99     Serial.println();
100    Serial.print("Connecting to ");
101    WiFi.begin("Wokwi.GUEST", "",6);//PASSING THE WIFI CREDENTIALS TO ESTABLISH CONNECTION
102    while (WiFi.status() !=WL_CONNECTED){
103        delay(500);
104        Serial.print(".");
105    }
106    Serial.println("");
107    Serial.println("WiFi connected");
108    Serial.println("IP address");
109    Serial.println(WiFi.localIP());
110 }
111 void initManagedDevice(){
112     if(client.subscribe(subscribetopic)){
113         Serial.println((subscribetopic));
114         Serial.println("subscribe to cmd OK");
115     }else{
116         Serial.println("subscribe to cmd failed");
117     }
118 }
119 void callback(char* subscribetopic,byte*payload,unsigned int payloadLength)
120 {
121     Serial.print("callback invoked for topic: ");
122     Serial.println(subscribetopic);
```

```
123     for(int i=0; i< payloadLength; i++){
124         //Serial.print((char)payload[i]);
125         data3 +=(char)payload[i];
126     }
127     //Serial.println("dta: "+ data3);
128     //if(data3=="Near")
129     //{
130     //Serial.println(data3);
131     //digitalWrite(LED,HIGH);
132     //}
133     //else
134     //{
135     //Serial.println(data3);
136     //digitalWrite(LED,LOW);
137     //}
138     data3="";
139 }
```

OUTPUT:

DATA IS SENT TO IBM CLOUD WHEN NO OBJECT IS DETECTED

Wokwi IoT Platform interface showing a device named DISTANCEDetect (ULTRASON) with a status of Disconnected. The interface includes tabs for Identity, Device Information, Recent Events, State, and Logs. The Recent Events tab displays a table of 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

Items per page: 50 | 1-2 of 2 items | 1 of 1 page

When no object is detected

Wokwi IoT Platform interface showing a project named DISTANCEDetect (ULTRASON) with a status of Disconnected. The interface includes tabs for Identity, Device Information, Recent Events, State, and Logs. The Recent Events tab displays a table of events:

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":141.21,"object":"No"	json	a few seconds ago
Data	"distance":141.21,"object":"No"	json	a few seconds ago

Items per page: 50 | 1-2 of 2 items | 1 of 1 page

Data is sent to ibm cloud when object is detected

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Add Device

DISTANCEDETECT			
Disconnected			
ULTRASON			
Device			
Oct 20, 2022 9:46 AM			
Identity	Device Information	Recent Events	State
Logs			
This is a test event. Select a device from the list of devices and click on the "Add" button to add it to the system.			
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

Items per page: 50 | 1 of 2 items

1 of 1 page

When object is detected in ultrasonic detector

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sketc **Simulation**

diagra ▶ + ⋮

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Libra

Mana

```

1 object is near
1 Sending payload: {"distance":97.82,"object":"Near"}
1 Publish ok
1 Distance in cm 97.82
2 object is near
2 Sending payload: {"distance":97.82,"object":"Near"}
2 Publish ok
2
2
2
  
```

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