

Python Programming

Assignment Date	11 November 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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```
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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sketch.ino

diagram.json

libraries.txt

Library Manager

Simu

```
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);
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Library Manager

Simu

```
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 }
```

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OUTPUT:

The screenshot shows a Wokwi IoT dashboard for a device named 'DISTANCEDTECT' of type 'ULTRASONIC'. The device is currently 'Disconnected'. The 'Recent Events' tab is active, displaying a table of events. The table has columns for 'Event', 'Value', 'Format', and 'Last received'. There are five entries, all with the value '["distance":141.21,"object":"No"]' and a format of 'json'. The 'Last received' column shows 'a few seconds ago' for each entry. At the bottom, it indicates '1 of 1 page' and '1/2 of 2 items'.

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

DATA IS SENT TO IBM CLOUD WHEN NO OBJECT IS DETECTED When no object is detected

The screenshot shows the Wokwi IDE interface. On the left, the 'sketch.ino' file is open, displaying C++ code for an ESP32. The code includes libraries for WiFi and PubSubClient, defines IBM Cloud credentials, and sets up an ultrasonic sensor. The main loop checks for an object and sends data to IBM Cloud if none is found. On the right, the 'Simulation' window shows a visual representation of the ESP32 and the HC-SR04 ultrasonic sensor. Below the simulation, the serial output log shows the following messages: 'no object found', 'Sending payload: {"distance":141.21,"object":"No"}', 'Publish ok', 'Distancein cm141.21', 'no object found', 'Sending payload: {"distance":141.21,"object":"No"}', and 'Publish ok'.

```
1 #include<WiFi.h>//library for wifi
2 #include<PubSubClient.h>//library for MQTT
3 void callback(char* topic, byte
4 //-----credentials of IBM Account
5 #define ORG "izyy6o"// IBM ORGANIZATION
6 #define DEVICE_TYPE "iotdeviceproject"//
7 #define DEVICE_ID "229714"//DEVICE ID ME
8 #define TOKEN "24681012"//Token
9 String data3;
10 float dist;
11 //-----customize the above value-
12 char server[]=ORG ".messaging.internetof
13 char publishTopic[]="ultrasonic/evt/Data
14 and format in which data to be send*/
15 char subscribetopic[]="ultrasonic/cmd/te
16 COMMAND IS TEST OF FORMAT STRING*/
17 char authMethod[]="use-token-auth";//aut
18 char token[]=TOKEN;
19 char clientId[]="d:" ORG ":" DEVICE_TYPE
20 //-----
21 WiFiClient wifiClient;// creating an ins
22 PubSubClient client(server, 1883 , callb
23 by passing parameter like server id,port
24 int LED =4;
25 int trig =5;
26 int echo=18;
27 void setup()
28 {
29   Serial.begin(115200);
```

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

