

Assignment -4
Python Programming

Assignment Date	25 October 2022
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Maximum Marks	2 Marks

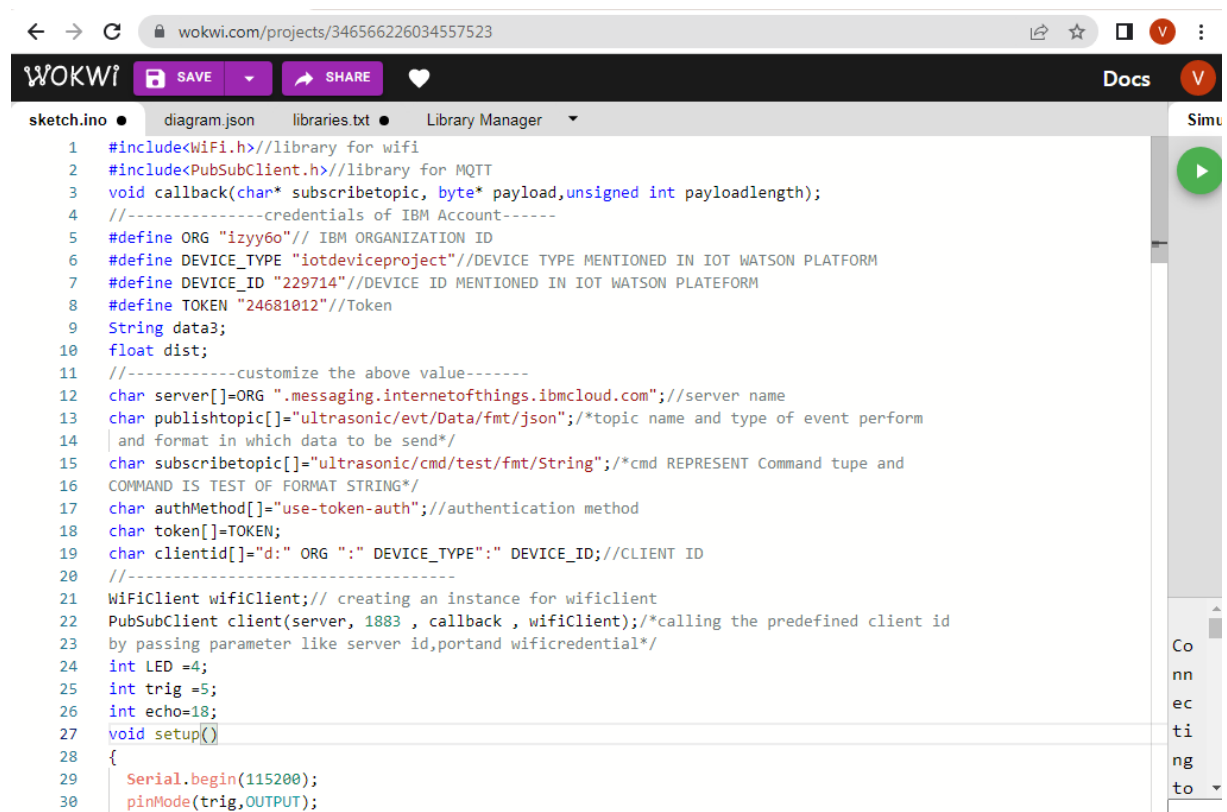
Question-1:

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);
```

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wokwi.com/projects/346566226034557523

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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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```
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:

<https://wokwi.com/projects/346572482591851092>

DATA SENT TO IBM CLOUD ON NO OBJECT DETECTED

The screenshot shows the IBM Cloud IoT Platform interface for a device named 'DISTANCEDETECT'. The device is in a 'Disconnected' state. The 'Recent Events' tab is selected, displaying a table of events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. All events are of type 'Data' and contain the same JSON payload: '{"distance":79.66,"object":"Near"}'. The format for all events is 'json', and they were all received 'a few seconds ago'. The interface also shows tabs for 'Identity', 'Device Information', 'State', and 'Logs'. At the bottom, it indicates 'Items per page: 50' and '1-2 of 2 items'.

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

WHEN NO OBJECT DETECTED BY ULTRASONIC DETECTOR

The screenshot shows the Wokwi IDE interface with a project titled 'wokwi.com/projects/346572482591851092'. The 'sketch.ino' file is open, showing code for an ESP32 connected to an ultrasonic sensor. The code includes comments and defines for IBM Cloud IoT Platform credentials and device information. The 'Simulation' tab is active, showing a visual representation of the ESP32 and the ultrasonic sensor. The console output shows the following sequence of events:

```
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
```

DATA SENT TO IBM CLOUD ON OBJECT BEING DETECTED

