

Assignment -4

Python Programming

Assignment Date	25 October 2022
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Team ID	PNT2022TMID07524
Maximum Marks	2 Marks

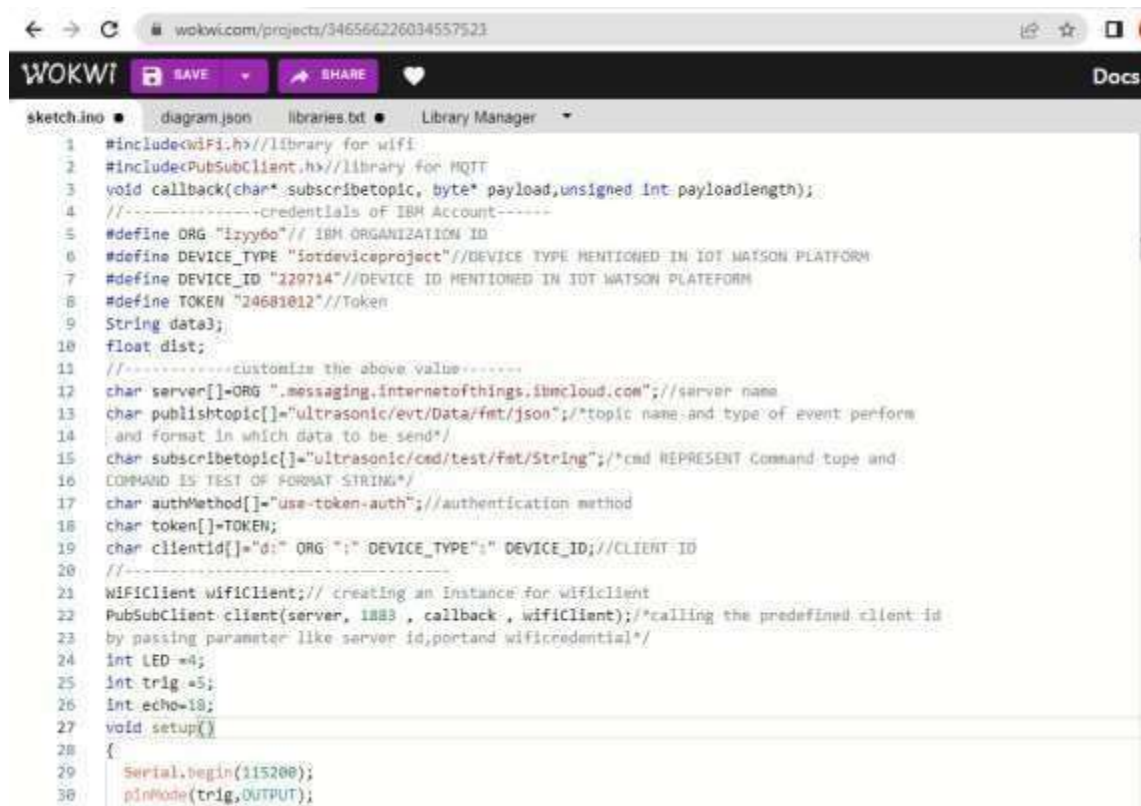
Question-1:

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* topic, byte* payload,unsigned int payloadlength);
4 //-----credentials of IBM Account-----
5 #define ORG "i3yy6o"// 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 tope 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

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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 successfully 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);
```

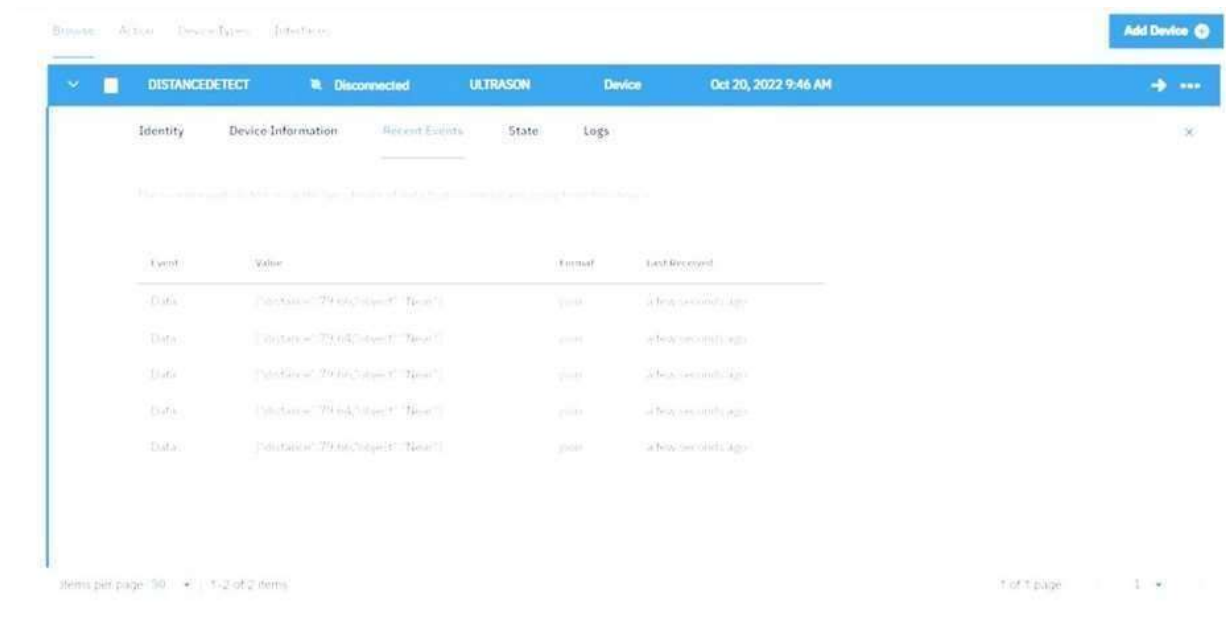
```
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92 }
93 initManagedDevice();
94 Serial.println();
95 }
96 }
97 void wificonnect()//function definition for wificonnect
98 {
99   Serial.println();
100   Serial.print("Connecting to:");
101   WiFi.begin("Wokwi.GUEST", "",6);//PASSING THE WIFI CREDENTIALS 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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123 for(int i=0; i< payloadLength; i++){
124   //Serial.print((char)payload[i]);
125   data3 +=(char)payload[i];
126 }
127 //Serial.println("dto: "+ data3);
128 //if(data3=="Wear")
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>

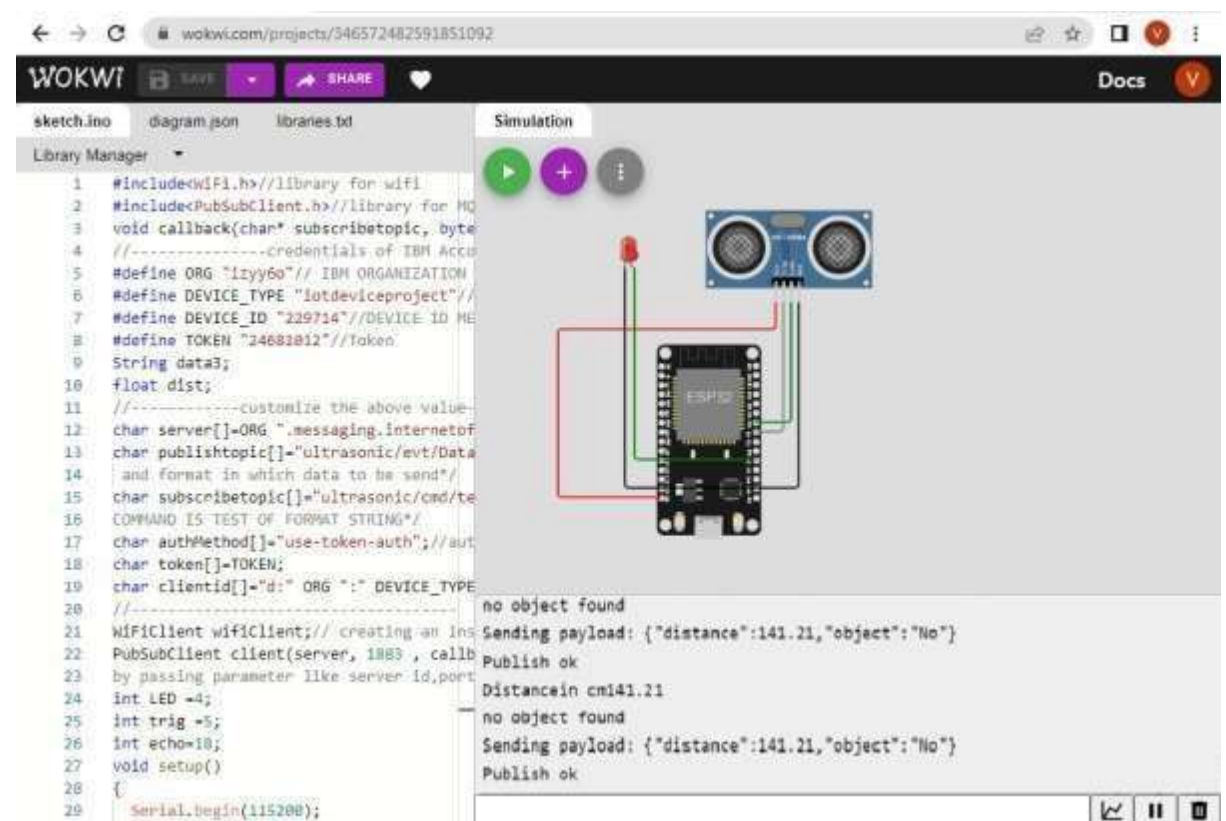
DATA SENT TO IBM CLOUD ON NO OBJECT DETECTED



The screenshot shows the IBM IoT Dashboard interface. At the top, there's a navigation bar with 'DISTANCEDETECT' selected. Below it, a table displays recent events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. The events are all 'Data' type, with values like 'Distance: 79.64, Object: "No"', 'Format' is 'json', and 'Last Received' is '4 hrs, 55 mins, 11 s ago'.

Event	Value	Format	Last Received
Data	Distance: 79.64, Object: "No"	json	4 hrs, 55 mins, 11 s ago
Data	Distance: 79.64, Object: "No"	json	4 hrs, 55 mins, 11 s ago
Data	Distance: 79.64, Object: "No"	json	4 hrs, 55 mins, 11 s ago
Data	Distance: 79.64, Object: "No"	json	4 hrs, 55 mins, 11 s ago
Data	Distance: 79.64, Object: "No"	json	4 hrs, 55 mins, 11 s ago

WHEN NO OBJECT DETECTED BY ULTRASONIC DETECTOR



The screenshot shows the Wokwi IDE interface. On the left, the 'sketch.ino' file is open, displaying code for an ESP8266 connected to an ultrasonic sensor. The code includes comments and defines variables for the sensor's pin numbers and the MQTT server details. On the right, the 'Simulation' window shows a visual representation of the hardware. Below the simulation, the console output displays the following messages:

```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distance in cm: 141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```

DATA SENT TO IBM CLOUD ON OBJECT BEING DETECTED

Browser	Action	Device Types	Interactions	Add Device	
▼	■	DISTANCEDETECT	Disconnected	ULTRASON	Device
Oct 20, 2022 9:46 AM					→ ...
Identity	Device Information	Recent Events	State	Logs	✕
There were 5 events in the log. Click on any event to see details and logs.					
Event	Value	Format	Test Received		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 2 seconds ago		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 2 seconds ago		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 2 seconds ago		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 2 seconds ago		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 2 seconds ago		

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WHEN OBJECT DETECTED BY ULTRASONIC DETECTOR SENSOR

← → ↻

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Docs

sketch

Simulation

diagram

library

Libraries

Manager

```

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

```