

Assignment -4

Python Programming

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

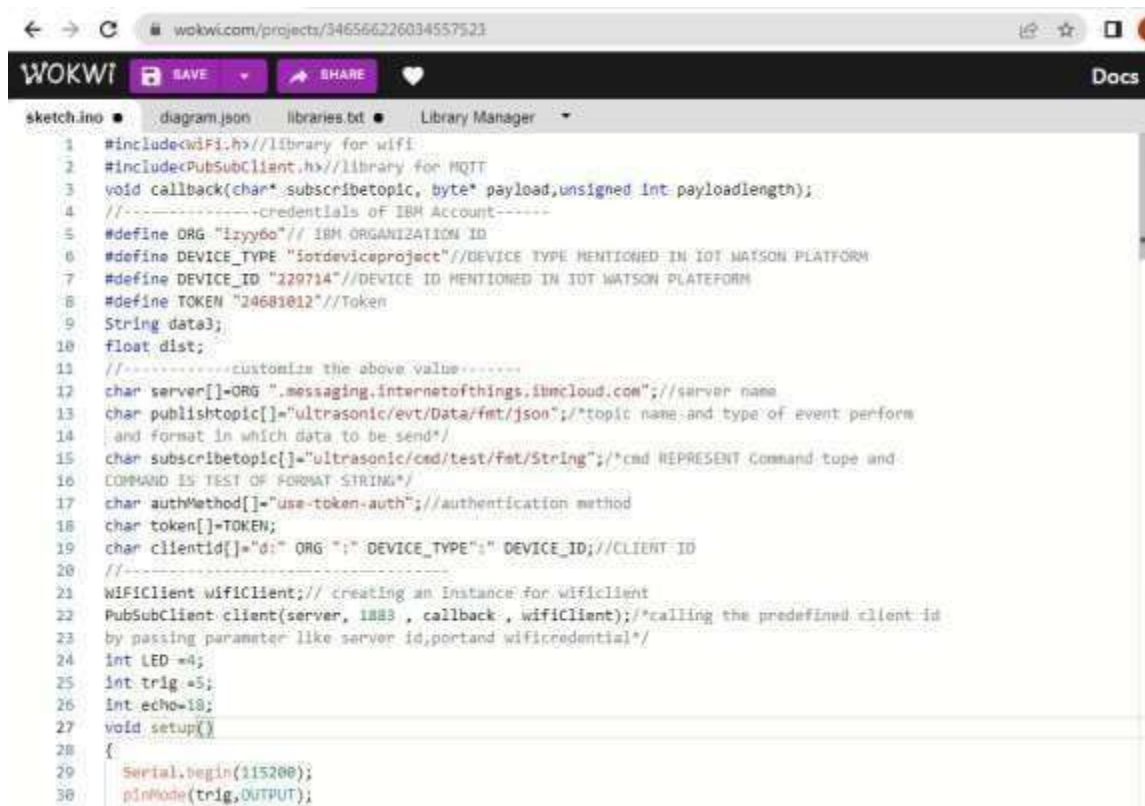
Question-1:

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);
```

```

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

```

← → C wokwi.com/project 3345

sketch.ino • Diagram.json • Libraries.txt • Library Manager

```

61 Serial.println
62   object=")
63 }
64 else
65 {
66   digitalWrite(LED,LOW)
67   Serial.println("No")
68   object="No";
69 }
70 String payload="{\"dist\": ";
71 payload +=dist;
72 payload +=",\"topic\":\"\"";
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(" "); /* if its successfull, upload data on the cloud then it will print
80   publish ok in serial mon or else it will print publish failed*/
81 } else{
82   Serial.println("Publish failed");
83 }
84 }
85 void mqttconnect(){

```

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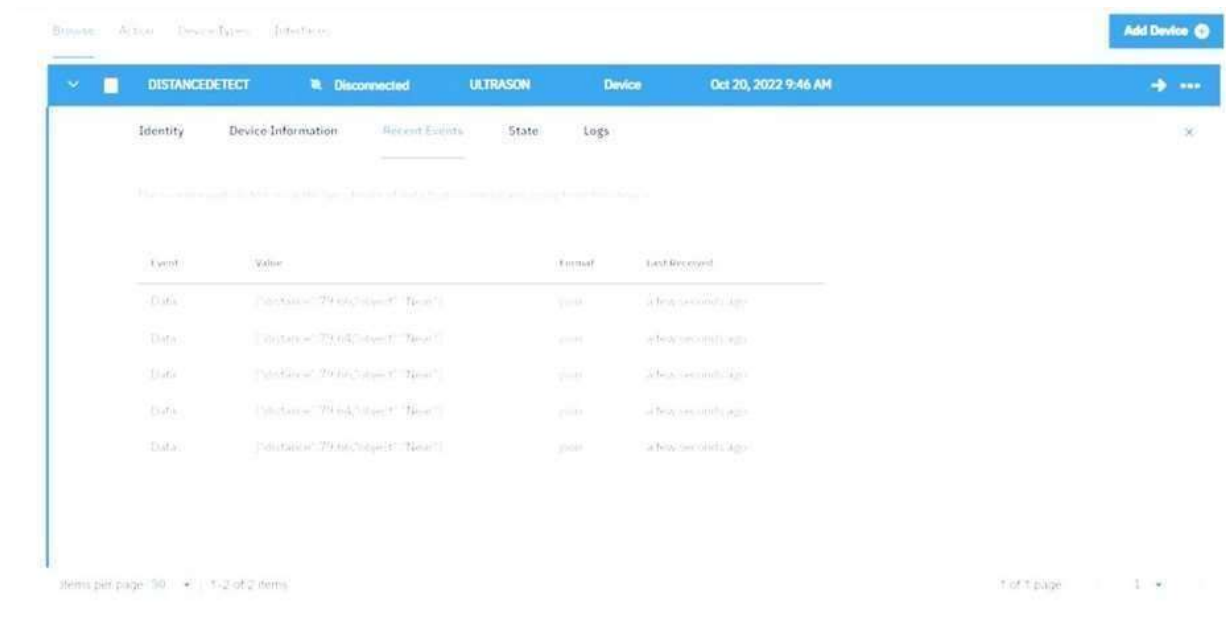
```
WOKWI SAVE SHARE Docs
sketch.ino diagram.json libraries.txt Library Manager
92 }
93 initManagedDevice();
94 Serial.println();
95 }
96 }
97 void wificonnect()//function definition for wificonnect
98 {
99   Serial.println();
100   Serial.print("Connecting to:");
101   WiFi.begin("Wokwi.GUEST", "",6);//PASSING 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);
```

```
WOKWI SAVE SHARE Docs
sketch.ino diagram.json libraries.txt Library Manager
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>

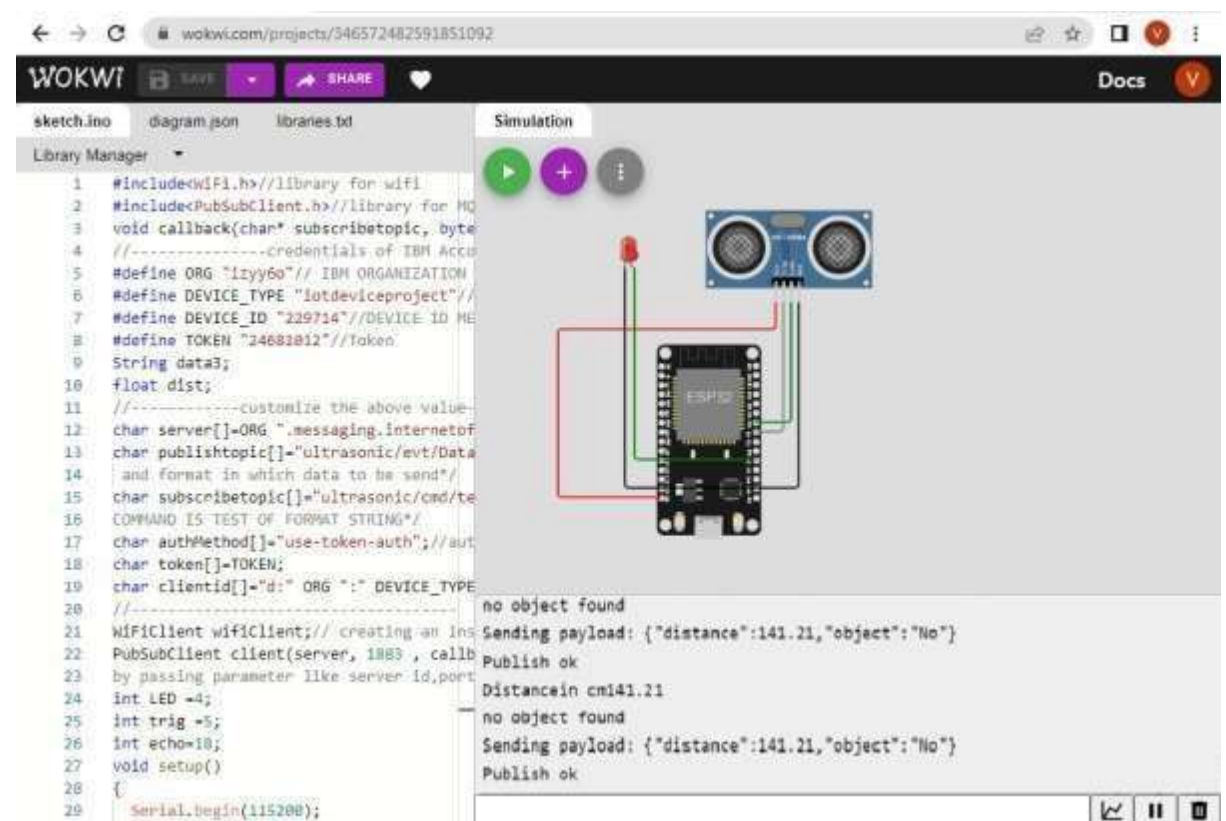
DATA SENT TO IBM CLOUD ON NO OBJECT DETECTED



The screenshot shows the IBM IoT Dashboard interface. At the top, there's a navigation bar with 'DISTANCEDETECT' selected. Below it, there's a table with columns: Event, Value, Format, and Last Received. The table contains five rows of data, all with the value 'Distance: 79.64/Subject: Near'. The status of the device is 'Disconnected'.

Event	Value	Format	Last Received
Data	Distance: 79.64/Subject: Near	json	4 hrs, 55 mins, 49 s ago
Data	Distance: 79.64/Subject: Near	json	4 hrs, 55 mins, 49 s ago
Data	Distance: 79.64/Subject: Near	json	4 hrs, 55 mins, 49 s ago
Data	Distance: 79.64/Subject: Near	json	4 hrs, 55 mins, 49 s ago
Data	Distance: 79.64/Subject: Near	json	4 hrs, 55 mins, 49 s ago

WHEN NO OBJECT DETECTED BY ULTRASONIC DETECTOR



The screenshot shows the Wokwi IDE interface. On the left, there's a code editor with a sketch. The sketch includes headers for WiFi and PubSubClient, and defines constants for the IBM organization, device type, device ID, and token. It also defines a callback function for the ultrasonic sensor. The main loop of the sketch checks for an object and sends data to the IBM Cloud IoT platform. On the right, there's a simulation window showing the hardware components (ESP8266, ultrasonic sensor, and breadboard) and the output of the simulation. The output shows the sensor detecting 'no object found' and sending a payload to the IBM Cloud IoT platform.

```
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 "lzyy60" // IBM ORGANIZATION
6 #define DEVICE_TYPE "iotdeviceproject"
7 #define DEVICE_ID "229714" //DEVICE ID ME
8 #define TOKEN "24682012" //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 = 10;
27 void setup()
28 {
29   Serial.begin(115200);
```

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. Double click on an event to see its details.					
Event	Value	Format	Test Received		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 26 mins ago		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 26 mins ago		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 26 mins ago		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 26 mins ago		
Data	[{"distance":79.82,"object":"Near"}]	json	4 hrs 26 mins ago		

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

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WHEN OBJECT DETECTED BY ULTRASONIC DETECTOR SENSOR

← → ↻

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WOKWI

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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

```