

## Assignment -4

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Tea ID-PNT2022TMID43101

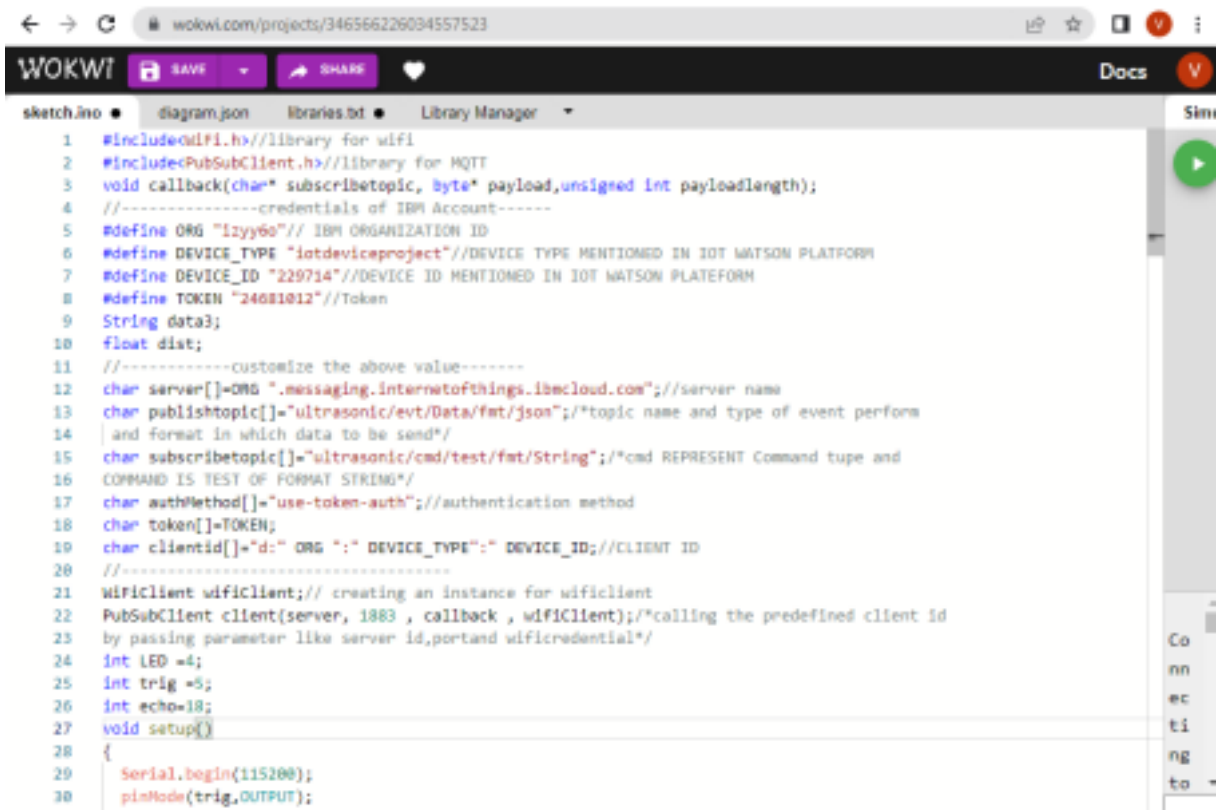
### Question-1:

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 "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

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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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← → ↻ wokwi.com/projects/346566226034557523

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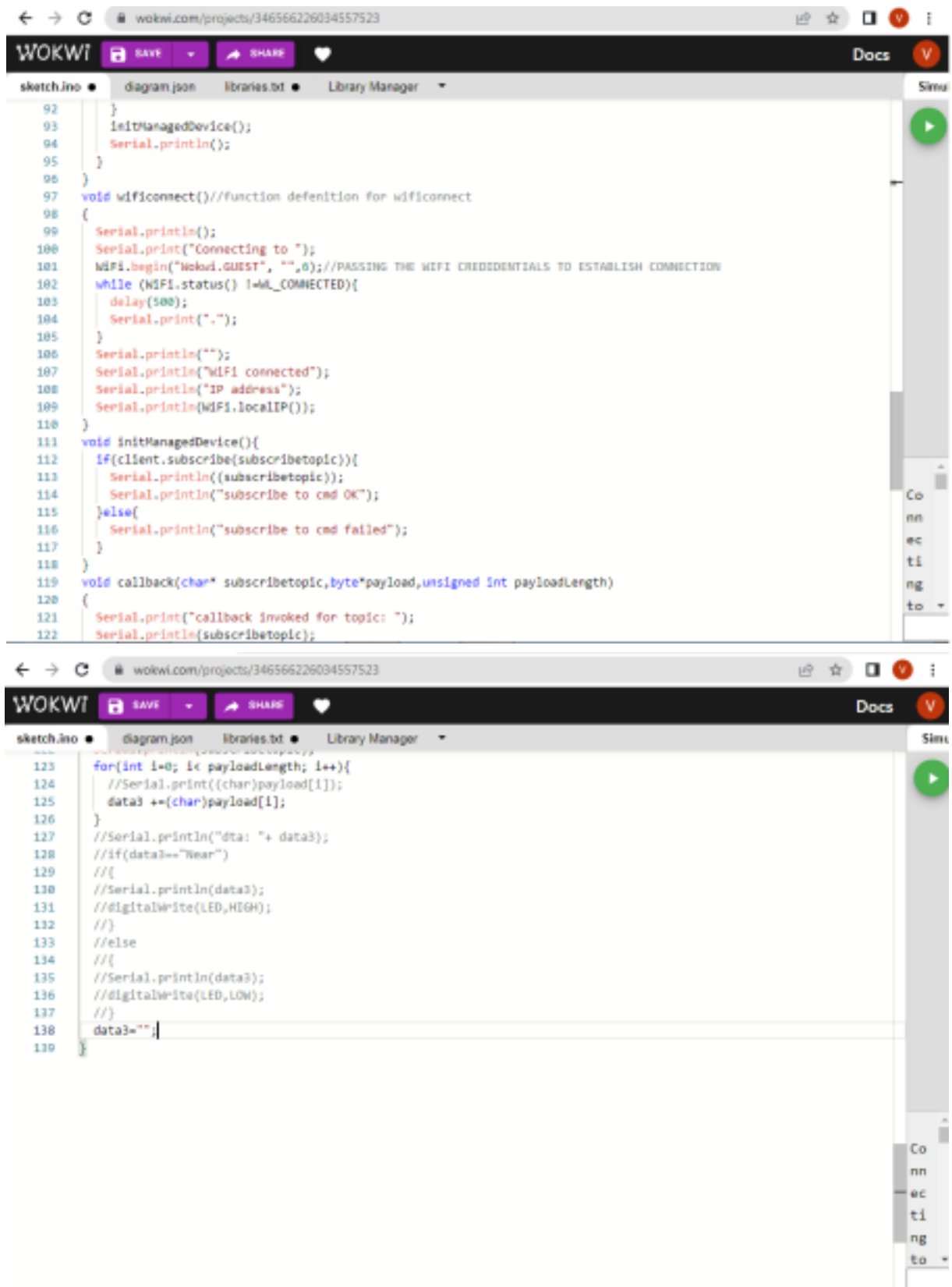
sketch.ino ● diagram.json libraries.txt Library Manager

```
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 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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OUTPUT:

<https://wokwi.com/projects/34729379061406165>

## DATA SENT TO IBM CLOUD ON NO OBJECT DETECTED

Browser

Actions

Device Types

Interfaces

ADD DEVICE

DISTANCEDETECT

Disconnected

ULTRASON

Device

Oct 20, 2022 9:46 AM

+

Identity

Device Information

Recent Events

State

Logs

30

The events are listed above the table. Click on the event to view the details and go to the logs.

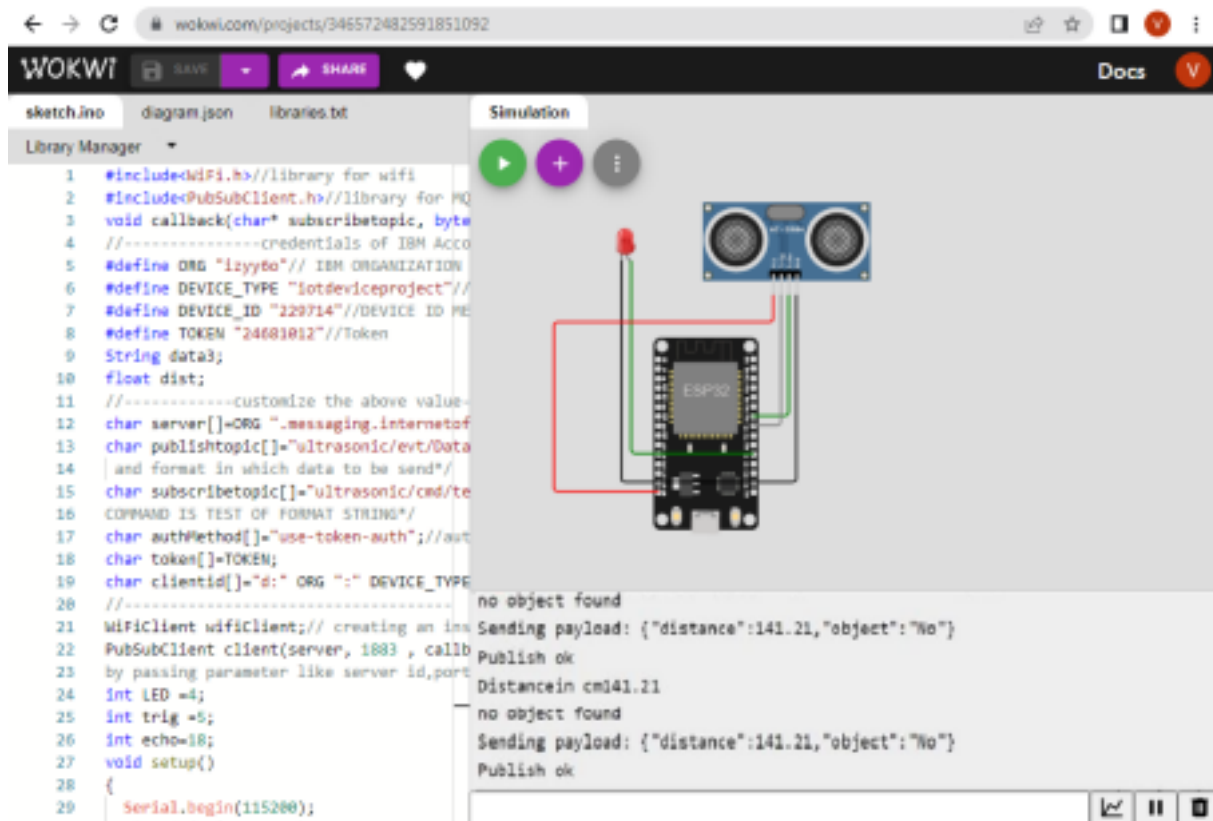
Event	Value	Format	Last Received
Data	{\"distance\":141.21,\"object\":\"None\"}	json	a few seconds ago
Data	{\"distance\":141.21,\"object\":\"None\"}	json	a few seconds ago
Data	{\"distance\":141.21,\"object\":\"None\"}	json	a few seconds ago
Data	{\"distance\":141.21,\"object\":\"None\"}	json	a few seconds ago
Data	{\"distance\":141.21,\"object\":\"None\"}	json	a few seconds ago

Items per page: 50

1-2 of 2 items

1 of 1 page

## WHEN NO OBJECT DETECTED BY ULTRASONIC DETECTOR



WOKWI

sketch.ino diagram.json libraries.txt

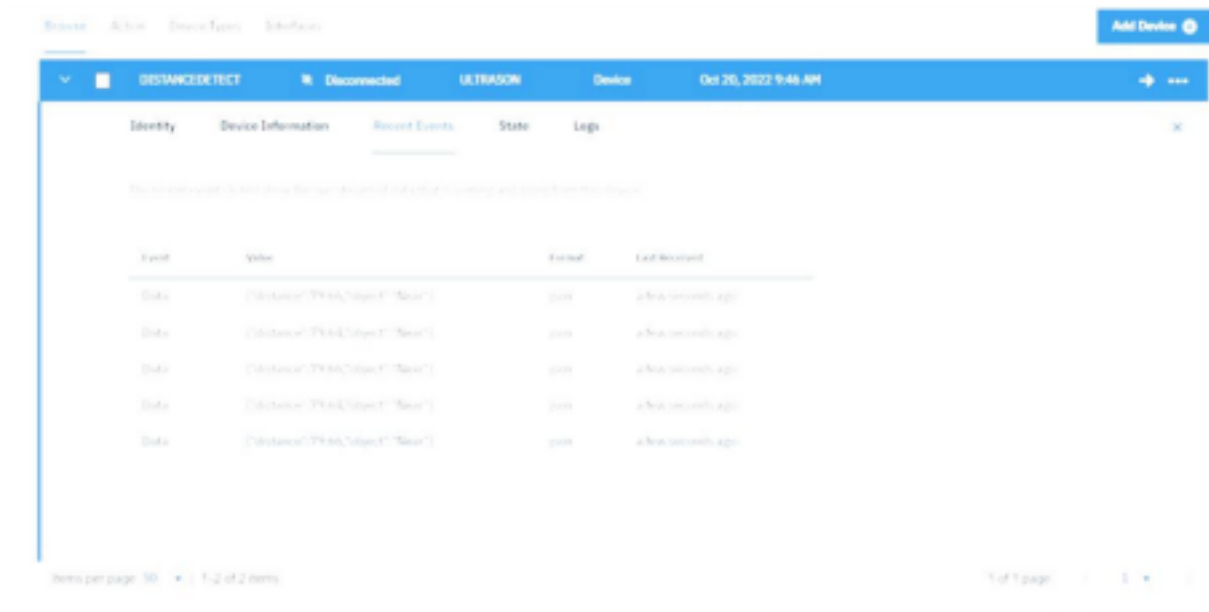
Library Manager

```
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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
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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);
```

Simulation

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



The screenshot shows the IBM Cloud IoT dashboard 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'. There are five rows of data, all showing a distance of 97.82 and the object 'Near'.

Event	Value	Format	Last Received
Data	[{"distance":97.82,"object":"Near"}]	json	a few seconds ago
Data	[{"distance":97.82,"object":"Near"}]	json	a few seconds ago
Data	[{"distance":97.82,"object":"Near"}]	json	a few seconds ago
Data	[{"distance":97.82,"object":"Near"}]	json	a few seconds ago
Data	[{"distance":97.82,"object":"Near"}]	json	a few seconds ago

## WHEN OBJECT DETECTED BY ULTRASONIC DETECTOR SENSOR

