

Assignment -4
Python Programming

Assignment Date	01 Nov 2022
Student Name	Alfred Manuel Francis
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:

← → ↻ wokwi.com/projects/346566226034557523

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sketch.ino **diagram.json** **libraries.txt** **Library Manager** **Simu**

```
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 "iotedeviceproject" //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 type 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, port and 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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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 sucessfully upload data on the cloud then it will print
80   publish ok in serial monitor or else it will print poblish 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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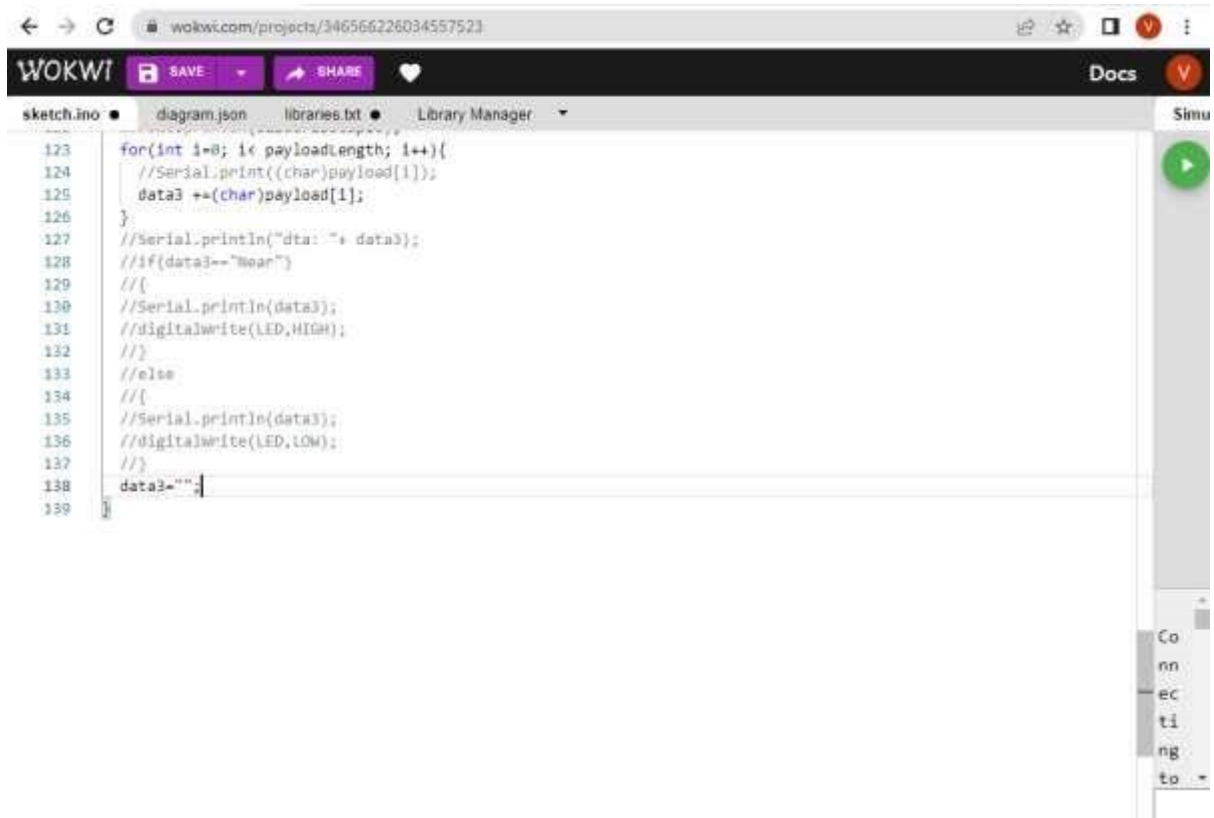
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sketch.ino diagram.json libraries.txt Library Manager

```
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);
```

Simu

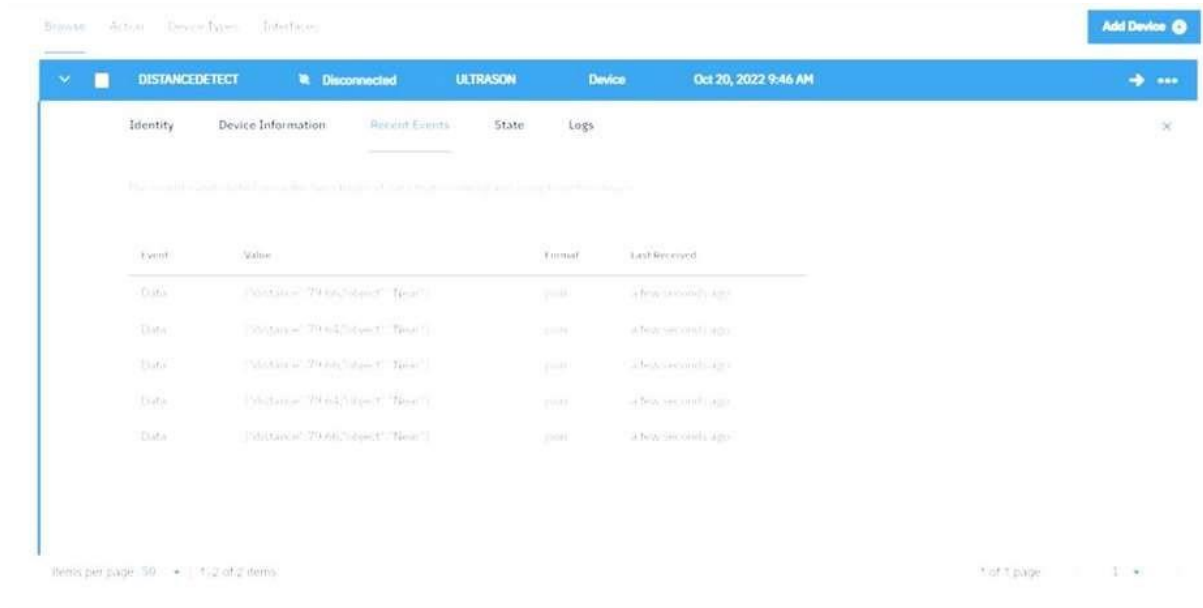
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OUTPUT:
DATA IS SENT TO IBM CLOUD WHEN NO OBJECT IS DETECTED

DISTANCEDETECT				
Disconnected				
ULTRASON				
Device				
Oct 20, 2022 9:46 AM				
Identity	Device Information	Recent Events	State	Logs
No record found. Add a new record to this page or create a new record.				
Event	Value	Format	Last Received	
Data	[{"distance": 79.64, "object": "Near"}]	json	4 hours 50 mins ago	
Data	[{"distance": 79.64, "object": "Near"}]	json	4 hours 50 mins ago	
Data	[{"distance": 79.64, "object": "Near"}]	json	4 hours 50 mins ago	
Data	[{"distance": 79.64, "object": "Near"}]	json	4 hours 50 mins ago	
Data	[{"distance": 79.64, "object": "Near"}]	json	4 hours 50 mins ago	

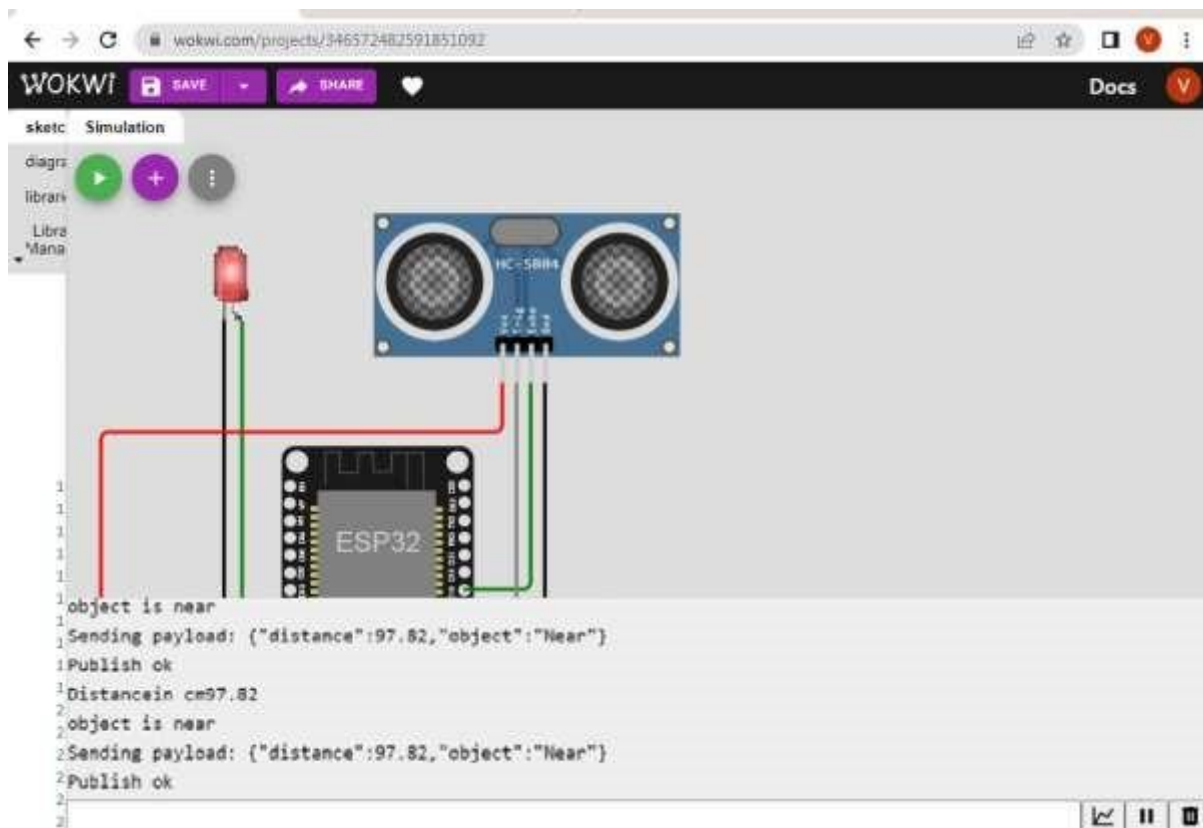
When no object is detected



Wokwi interface showing the 'DISTANCEDETECT' device status as 'Disconnected'. The 'Recent Events' tab is active, displaying a table of events where the 'object' is 'None'.

Event	Value	Format	Last Received
Data	{distance: 79.62, object: "None"}	json	a few seconds ago
Data	{distance: 79.62, object: "None"}	json	a few seconds ago
Data	{distance: 79.62, object: "None"}	json	a few seconds ago
Data	{distance: 79.62, object: "None"}	json	a few seconds ago
Data	{distance: 79.62, object: "None"}	json	a few seconds ago

When object is detected in ultrasonic detector



Wokwi interface showing a simulation of an ESP32 connected to an HC-SR04 ultrasonic sensor. The console output shows the sensor detecting an object at 97.82 cm and publishing the data.

```
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
```