

Assignment -4

Python Programming

Assignment Date	31 October 2022
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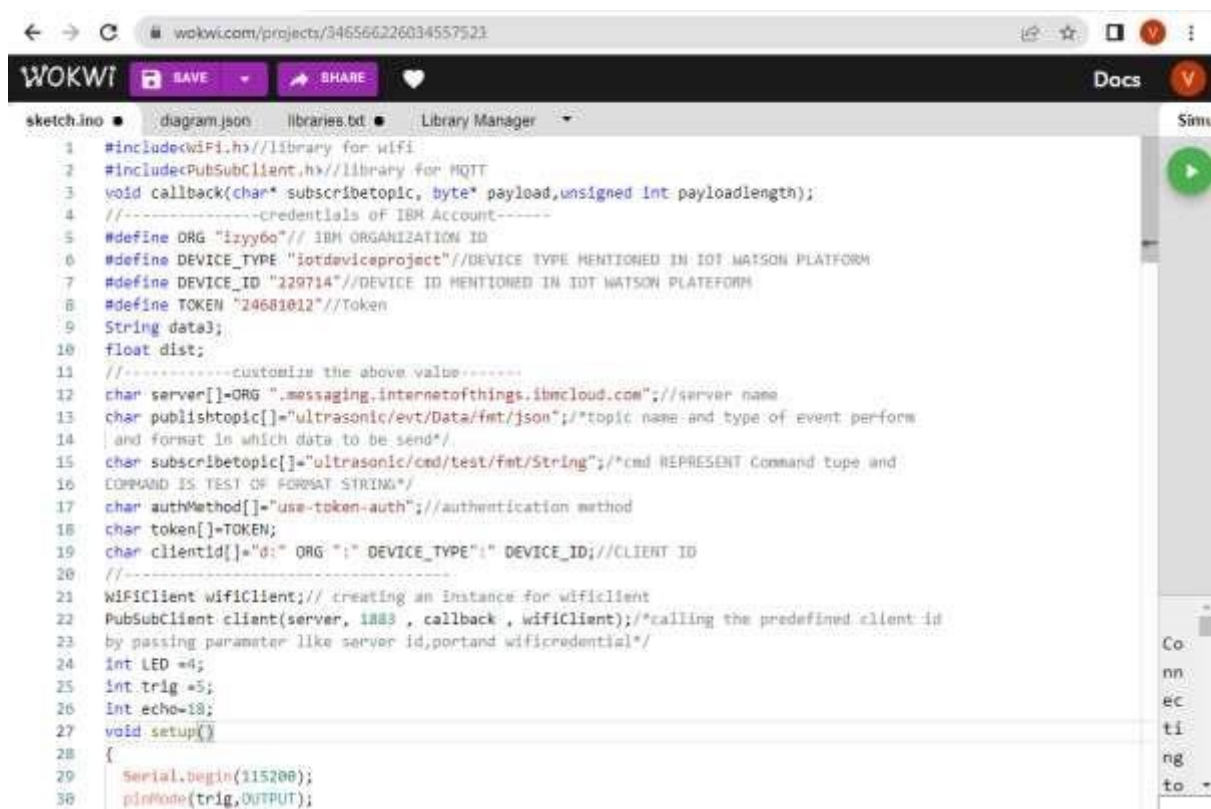
Question-1:

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 type and
16 //COMMAND IS TEST OF FORWAT 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 wifi credential*/
24 int LED = 4;
25 int trig = 5;
26 int echo = 18;
27 void setup()
28 {
29   Serial.begin(115200);
30   pinMode(trig, OUTPUT);
31 }
```

WOKWI

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Docs

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);
```

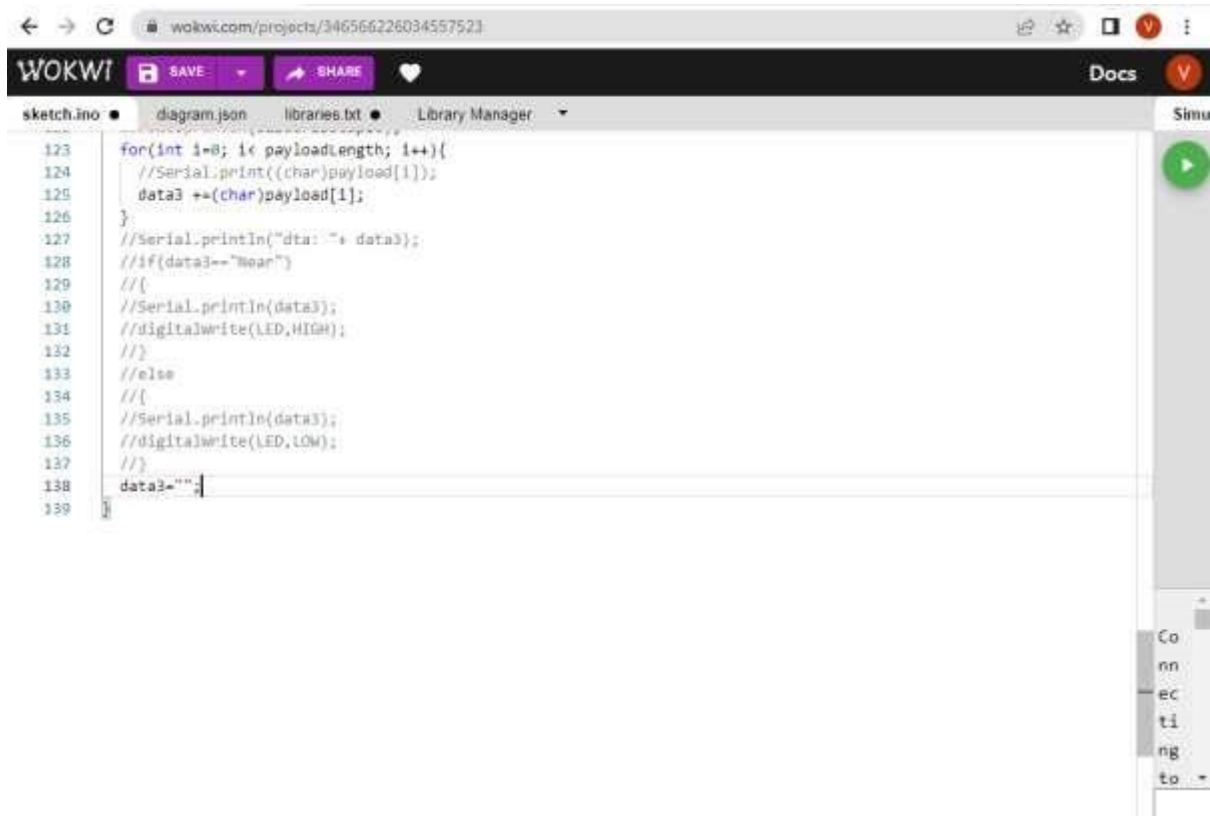
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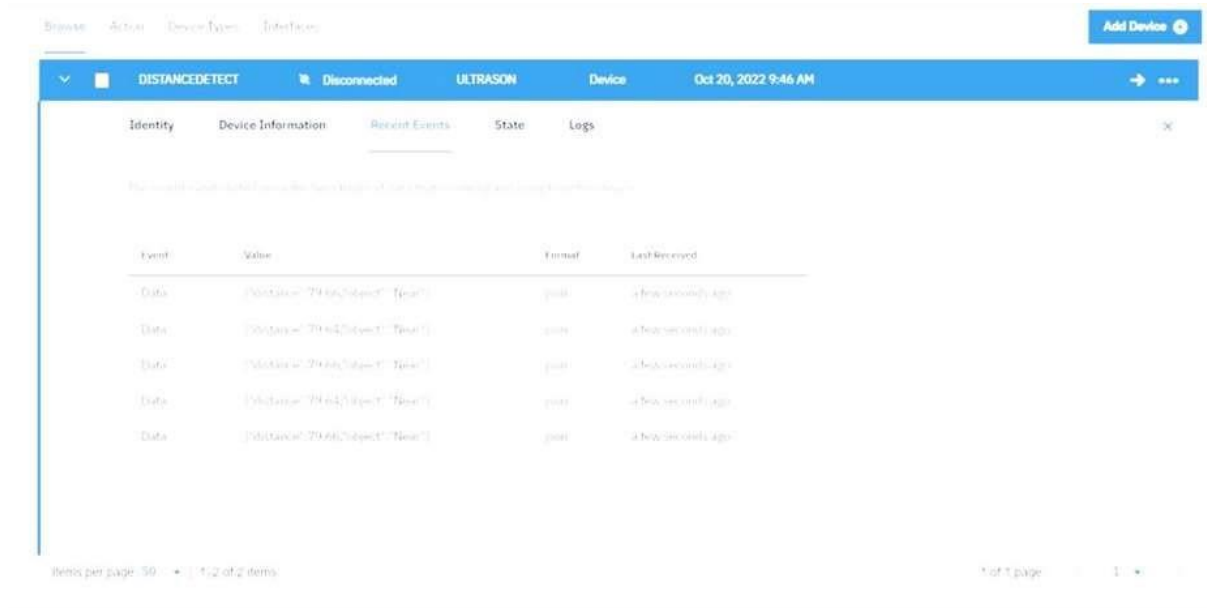
```
92 }
93 initManagedDevice();
94 Serial.println();
95 }
96 }
97 void wificonnect();//function defenition for wificonnect
98 {
99     Serial.println();
100     Serial.print("Connecting to ");
101     WiFi.begin("Wokwi-GUEST", "",6);//PASSING THE WIFI CREDENTIALS TO ESTABLISH CONNECTION
102     while (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);
```



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 events found. Add Events. No new events found. No new events found. No new events found.				
Event	Value	Format	Last Received	
Data	[{"distance": 79.46, "object": "Near"}]	json	a few seconds ago	
Data	[{"distance": 79.46, "object": "Near"}]	json	a few seconds ago	
Data	[{"distance": 79.46, "object": "Near"}]	json	a few seconds ago	
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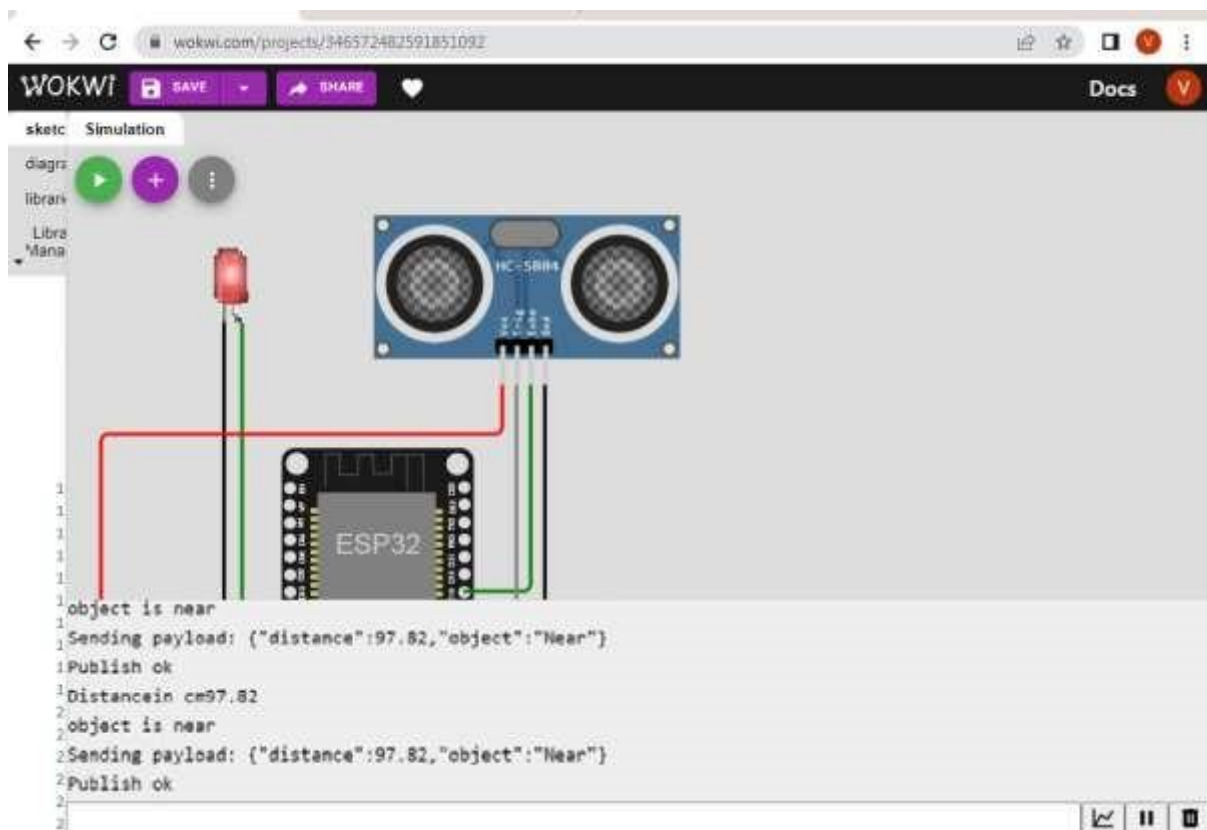
When no object is detected



The screenshot shows the Wokwi IoT dashboard for a device named 'DISTANCEDETECT'. The device is in a 'Disconnected' state. The 'Recent Events' tab is selected, showing a table of events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. There are five rows of data, all with the value '[Distance: 79.62/object: "Near"]' and the format 'json'. The 'Last Received' column shows times like 'a few seconds ago'.

Event	Value	Format	Last Received
Data	[Distance: 79.62/object: "Near"]	json	a few seconds ago
Data	[Distance: 79.62/object: "Near"]	json	a few seconds ago
Data	[Distance: 79.62/object: "Near"]	json	a few seconds ago
Data	[Distance: 79.62/object: "Near"]	json	a few seconds ago
Data	[Distance: 79.62/object: "Near"]	json	a few seconds ago

When object is detected in ultrasonic detector



The screenshot shows the Wokwi IoT dashboard for a device named 'DISTANCEDETECT'. The device is in a 'Disconnected' state. The 'Recent Events' tab is selected, showing a table of events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. There are five rows of data, all with the value '[Distance: 79.62/object: "Near"]' and the format 'json'. The 'Last Received' column shows times like 'a few seconds ago'.

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Data	[Distance: 79.62/object: "Near"]	json	a few seconds ago

Below the table, there is a simulation window showing a circuit diagram. The circuit includes an ESP32 microcontroller, an HC-SR04 ultrasonic sensor, and a red LED. The sensor is connected to the ESP32, and the LED is connected to the sensor's output. The simulation window shows the following code:

```
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
```