

## Assignment -4

### Python Programming

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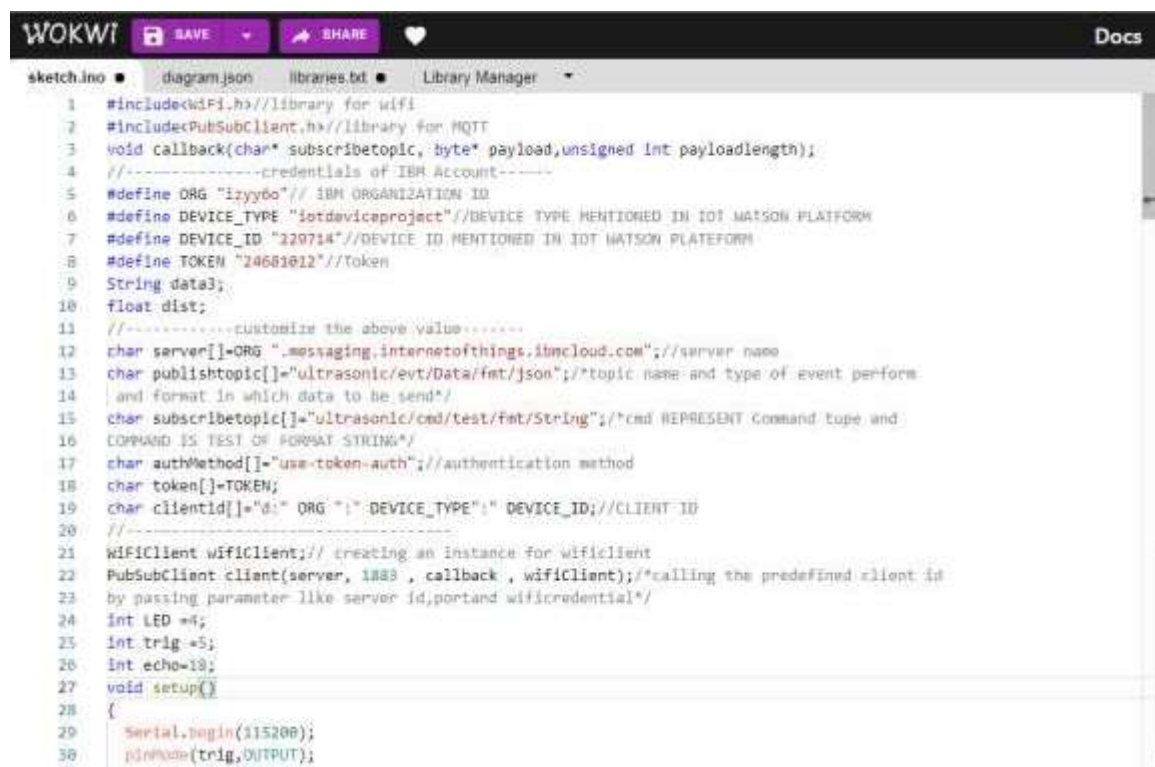
#### Question-1:

Write code and connections in wokwi for ultrasonic sensor.

Whenever distance is less than 100 cm's send "alert" to IBM cloud and display in device recent events.

Upload document with wokwi share link and images of IBM cloud.

#### Solution:



```
WOKWI SAVE SHARE Docs
sketch.ino diagram.json libraries.txt Library Manager
1 #include<WiFi.h> //library for wifi
2 #include<PubSubClient.h> //library for MQTT
3 void callback(char* subscribtopic, byte* payload, unsigned int payloadlength);
4 //-----credentials of IBM Account-----
5 #define ORG "iyy6o" // IBM ORGANIZATION ID
6 #define DEVICE_TYPE "iotdeviceproject" //DEVICE TYPE MENTIONED IN IOT WATSON PLATFORM
7 #define DEVICE_ID "129714" //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 subscribtopic[] = "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);
```

← → C wokwi.com/projects/346566226034557523

WOKWI SAVE SHARE 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);
```

← → C wokwi.com/projects/346566226034557523

WOKWI SAVE SHARE Docs

sketch.ino diagram.json libraries.txt Library Manager

```
92 }
93 initManagedDevice();
94 Serial.println();
95 }
96 }
97 void wificonnect();//function defaeition for wificonnect
98 {
99   Serial.println();
100   Serial.print("Connecting to ");
101   WiFi.begin("Wokwi-GUEST", "",6);//PASSING THE WIFI CREDIDENTIALS 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 Doc  
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("data: "+ data3);  
128 //if(data3=="near")  
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:

DATA IS SENT TO IBM CLOUD WHEN NO OBJECT IS DETECTED

Browse Action Device Types Interfaces Add Device

DISTANCEDETECT

Disconnected

ULTRASON

Device

Oct 20, 2022 9:46 AM

→ ...

Identity

Device Information

Recent Events

State

Logs

✕

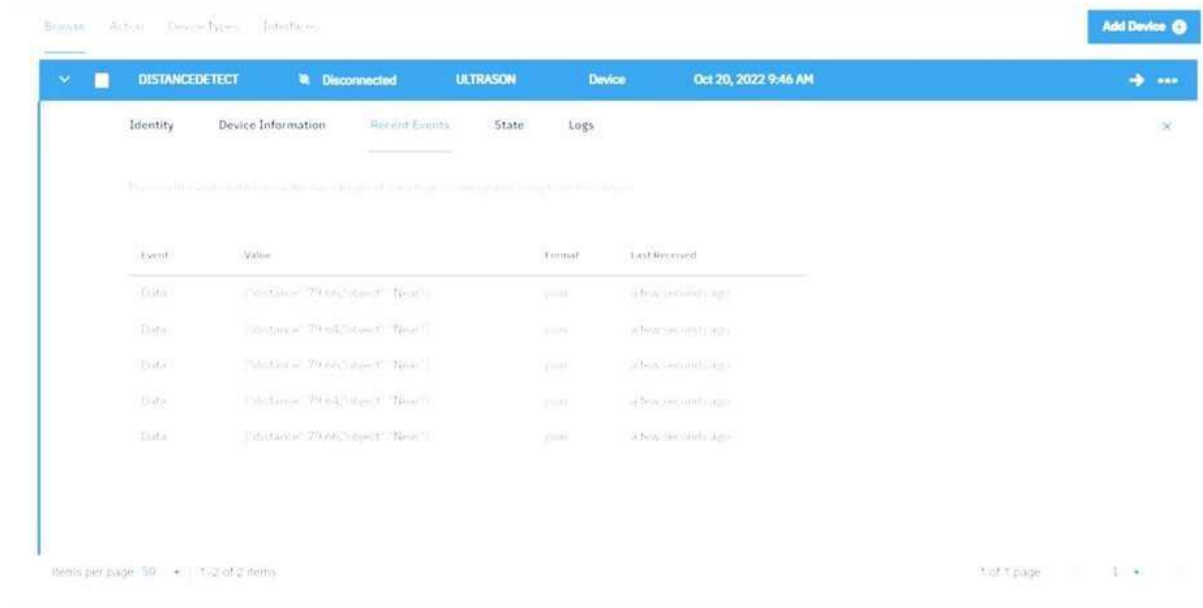
Hardware (2022-10-20 09:46:00) will be sent right of this page and will be sent right of this page.

Event	Value	Format	Last Received
Data	[{"distance": 79.66, "object": "None"}]	json	4 hours, 50 minutes ago
Data	[{"distance": 79.66, "object": "None"}]	json	4 hours, 50 minutes ago
Data	[{"distance": 79.66, "object": "None"}]	json	4 hours, 50 minutes ago
Data	[{"distance": 79.66, "object": "None"}]	json	4 hours, 50 minutes ago
Data	[{"distance": 79.66, "object": "None"}]	json	4 hours, 50 minutes ago

Items per page: 50 1 2 of 2 items

1 of 1 page 1 2

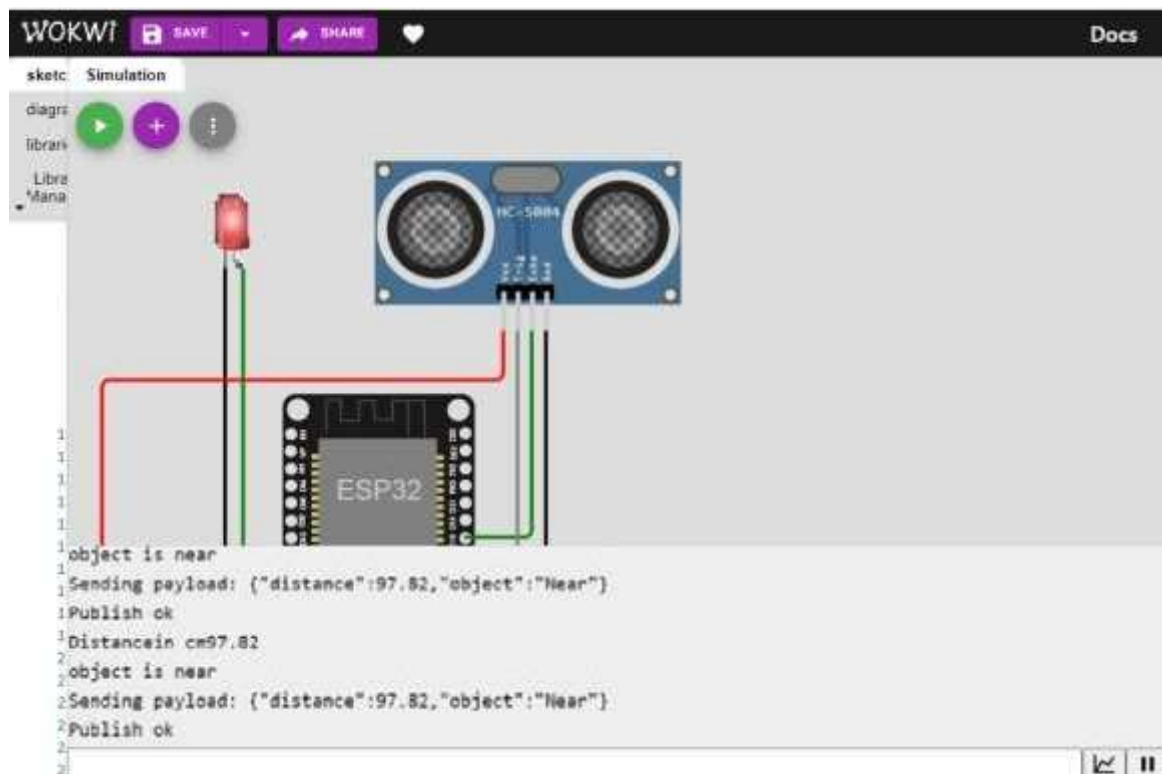
## When no object is detected



The screenshot shows the Wokwi IoT dashboard for a device named 'DISTANCEDETECT' of type 'ULTRASON' which is currently 'Disconnected'. The 'Recent Events' tab is active, displaying a table of events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. It lists five 'Data' events, each with a value of 'Distance: 79.62/object: "Near"', a 'json' format, and a timestamp of '4 few seconds ago'. The interface includes navigation tabs for 'Identity', 'Device Information', 'Recent Events', 'State', and 'Logs'. A blue 'Add Device' button is in the top right corner. At the bottom, it indicates 'Items per page: 50' and '1 of 2 items'.

Event	Value	Format	Last Received
Data	Distance: 79.62/object: "Near"	json	4 few seconds ago
Data	Distance: 79.62/object: "Near"	json	4 few seconds ago
Data	Distance: 79.62/object: "Near"	json	4 few seconds ago
Data	Distance: 79.62/object: "Near"	json	4 few seconds ago
Data	Distance: 79.62/object: "Near"	json	4 few seconds ago

## When object is detected in ultrasonic detector



The screenshot shows the Wokwi simulation interface. At the top, there are 'SAVE' and 'SHARE' buttons. The 'Simulation' tab is active. On the left, a sidebar contains 'diagram', 'library', and 'Libra Mana'. The main workspace displays a circuit diagram with an ESP32 microcontroller, an HC-SR04 ultrasonic sensor, and a red LED. Wires connect the sensor's VCC to the ESP32's 5V pin, GND to GND, and Trig to D4. The LED's anode is connected to D4 and its cathode to GND. Below the diagram, a terminal window shows the following log output:

```
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
```