

**Assignment -4**  
Python Programming

|                     |                  |
|---------------------|------------------|
| Assignment Date     | 28 October 2022  |
| Student Name        | Mr. AKSHAYRAM RB |
| Student Roll Number | 310619205007     |
| 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:**

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wokwi.com/projects/346566226034557523

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sketch.ino

diagram.json

libraries.txt

Library Manager

Sim

```
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 "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);
```

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Library Manager

Simu

```
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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Library Manager

Simu

```
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);
```

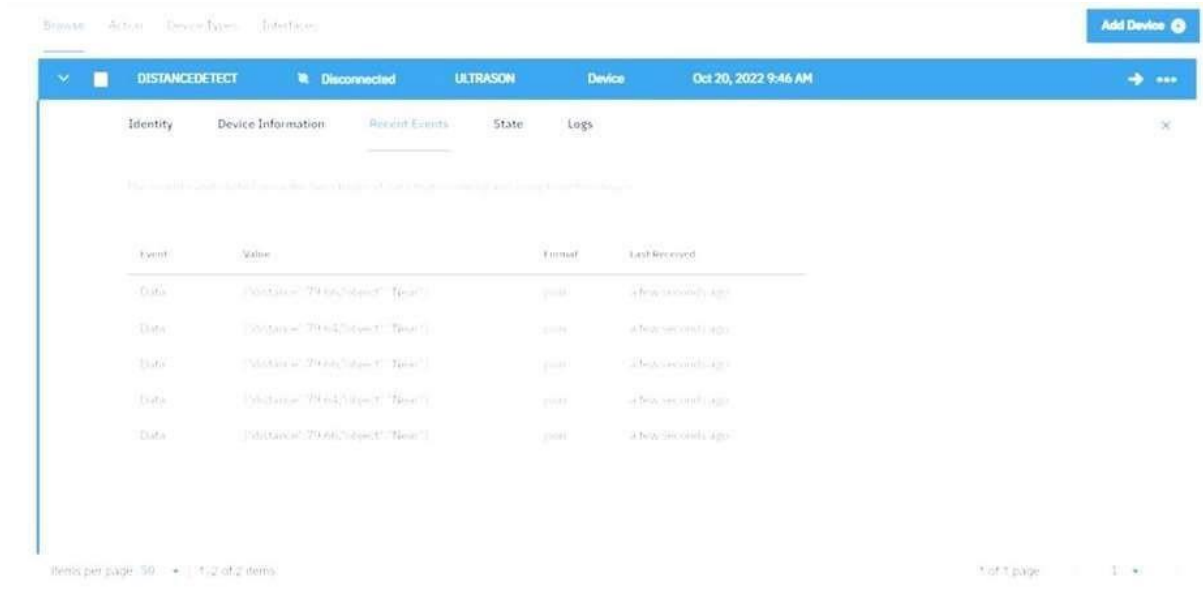
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```
123 for(int i=0; i< payloadLength; i++){
124   //Serial.print((char)payload[i]);
125   data3 +=(char)payload[i];
126 }
127 //Serial.println("dta: "+ data3);
128 //if(data3=="Near")
129 //{
130 //Serial.println(data3);
131 //digitalwrite(LED,HIGH);
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

| Event | Value                            | Format | Last Received       |
|-------|----------------------------------|--------|---------------------|
| Data  | "Distance=79.66/Subject: Near()" | json   | 4 hours 55 mins ago |
| Data  | "Distance=79.66/Subject: Near()" | json   | 4 hours 55 mins ago |
| Data  | "Distance=79.66/Subject: Near()" | json   | 4 hours 55 mins ago |
| Data  | "Distance=79.66/Subject: Near()" | json   | 4 hours 55 mins ago |
| Data  | "Distance=79.66/Subject: Near()" | json   | 4 hours 55 mins ago |

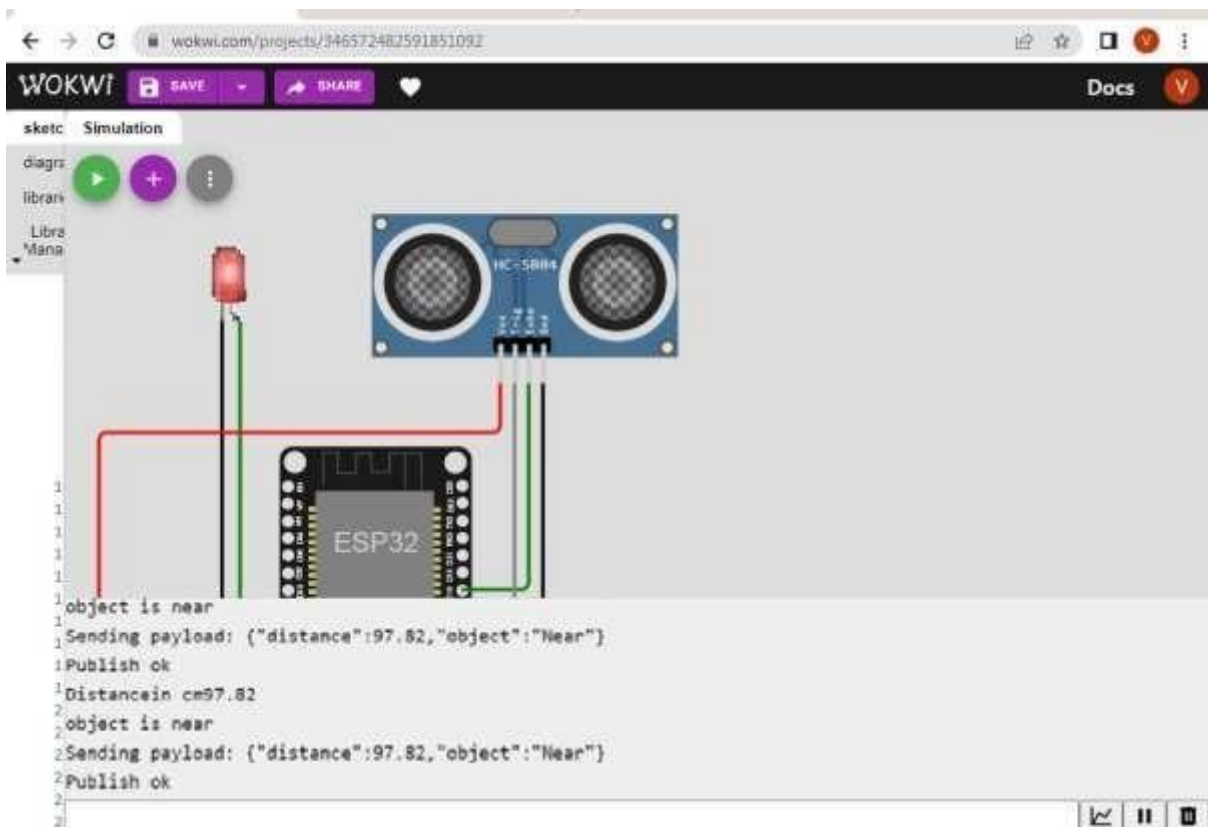
## When no object is detected



The screenshot shows the Wokwi web interface for a project named "DISTANCEDETECT". The device is an "ULTRASON" sensor, currently "Disconnected". The interface includes tabs for "Identity", "Device Information", "Recent Events", "State", and "Logs". The "Recent Events" tab is active, displaying a table of events. The table has columns for "Event", "Value", "Format", and "Last Received". The events are all "Data" type, with values indicating a distance of 79.66 cm and the object is "Near". The events are listed in descending order of time, from 4 hours and 5 minutes ago to 4 hours and 6 seconds ago. At the bottom, there is a pagination bar showing "Items per page: 50" and "1 of 1 page".

| Event | Value                                    | Format | Last Received         |
|-------|--|--------|-----------------------|
| Data  | {\"distance\":79.66,\"object\":\"Near\"} | json   | 4 hours 5 minutes ago |
| Data  | {\"distance\":79.66,\"object\":\"Near\"} | json   | 4 hours 6 seconds ago |
| Data  | {\"distance\":79.66,\"object\":\"Near\"} | json   | 4 hours 6 seconds ago |
| Data  | {\"distance\":79.66,\"object\":\"Near\"} | json   | 4 hours 6 seconds ago |
| Data  | {\"distance\":79.66,\"object\":\"Near\"} | json   | 4 hours 6 seconds ago |

## When object is detected in ultrasonic detector



The screenshot shows the Wokwi web interface for a project named "wokwi.com/projects/346572482591851092". The device is an "HC-SR04" ultrasonic sensor, currently "Connected". The interface includes tabs for "sketch", "Simulation", "diagram", "library", and "Libra Mana". The "Simulation" tab is active, displaying a circuit diagram of the sensor connected to an "ESP32" microcontroller. The sensor's red LED is lit, indicating it is powered on. The "Logs" tab is also active, showing the following log entries:

```
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
```