

ASSIGNMENT4

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Write code and connections in wokwi for ultrasonic sensor. Whenever the distance is less than 100cm send "alert" to IBM cloud and display in device cent events.

code:

```
#include<WiFi.h>#include
<PubSubClient.h>WiFiClientwi
fiClient;Stringdata3;#defineOR
G"x0fxss"
#defineDEVICE_TYPE"Noder"#de
fineDEVICE_ID"1234"
#defineTOKEN"987654321"
#define speed0.034
#defineled14
charserver[]="ORG".messaging.internetofthings.ibmcloud.com";charpublishTopic[]="
iot-2/evt/shanmugam_assignment4/fmt/json";chartopic[]="iot-
2/cmd/home/fmt/String";
charauthMethod[]="use-token-
auth";chartoken[]=TOKEN;
charclientId[]="d:ORG":DEVICE_TYPE":DEVICE_ID;
PubSubClientclient(server,1883,wifiClient);
```

```
constinttrigpin=5;cons
tintechopin=18;Stringc
ommand;
```

```
String data="";
```

```
long duration;float
```

```
dist;
```

```
void setup()
```

```
{
```

```
    Serial.begin(115200);pinMode(led,
```

```
    OUTPUT);pinMode(trigpin,OUTPUT);
```

```
    pinMode(echopin,INPUT);wifiConne
```

```
    ct();mqttConnect();
```

```
}
```

```
void loop(){
```

```
    bool isNearby=dist<100;digitalWrite
```

```
    (led,isNearby);
```

```
    publishData();delay(500);
```

```
    if(!client.loop()){mqttConnect();
```

```
}
```

```
}
```

```
void wifiConnect(){
```

```
    Serial.print("Connecting to");Serial.print("Wifi");WiFi.b
```

```
   egin("Wokwi-GUEST","",6);
```

```
    while(WiFi.status()!=WL_CONNECTED){del
```

```
        ay(500);
```

```
        Serial.print(".");
```

```
}
```

```

    Serial.print("WiFiconnected,IPaddress:");Serial.println(WiFi.localIP());
}

void mqttConnect(){
    if(!client.connected()) {
        Serial.print("ReconnectingMQTTclientto");Serial.println(server);while(!client.c
        onnect(clientId,authMethod,token)){
            Serial.print(".");delay(500);
        }
        initManagedDevice();
        Serial.println();
    }
}

void initManagedDevice(){
    if(client.subscribe(topic)){
        //Serial.println(client.subscribe(topic));Serial.println("
        IBMsubscribetocmdOK");
    }else{
        Serial.println("subscribetocmdFAILED");
    }
}

void publishData()
{
    digitalWrite(trigpin,LOW);digitalWrite(tri
    gpin,HIGH);delayMicroseconds(10);digit
    alWrite(trigpin,LOW);duration=pulseIn(e
    chopin,HIGH);dist=duration*speed/2;if(di
    st<100){
        Stringpayload="{\"AlertDistance\":\"";payload+=di
        st;
        payload+="}";
    }
}

```

```

Serial.print("\n");Serial.print("Sen
dingpayload:");Serial.println(payload);
if(client.publish(publishTopic,(char*)payload.c_str())){Serial.println("PublishOK");
}

}

if(dist>100){
Stringpayload="{\"Distance\":";payload+=
dist;
payload+="}";

Serial.print("\n");Serial.print("Sen
dingpayload:");Serial.println(payload);
if(client.publish(publishTopic,(char*)payload.c_str())){Serial.println("PublishOK");
}else{
    Serial.println("PublishFAILED");
}

}

}

```

OUTPUT:-i)Whendistancegreaterthan 100cm

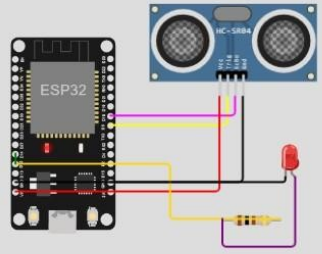
WOKWI

sketch.ino diagram.json libraries.txt Library Manager

```
1 {
2   "version": 1,
3   "author": "Keerthika J",
4   "editor": "wokwi",
5   "parts": [
6     { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 92.67, "left": 45.3
7     {
8       "type": "wokwi-led",
9       "id": "led1",
10      "top": 194.54,
11      "left": 309.26,
12      "attrs": { "color": "red" }
13    },
14    {
15      "type": "wokwi-hc-sr04",
16      "id": "ultrasonic1",
17      "top": 60.71,
18      "left": 185.64,
19      "attrs": { "distance": "139" }
20    },
21    {
22      "type": "wokwi-resistor",
23      "id": "r1",
24      "top": 269.89,
25      "left": 260.39,
26      "attrs": { "value": "100" }
27    }
28  ],
29  "connections": [
30    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
31    [ "esp:GND", "r1:one", "" ],
32    [ "led1:anode", "r1:other", "" ],
33    [ "led1:cathode", "r1:other", "" ],
34    [ "ultrasonic1:VCC", "esp:5V", "" ],
35    [ "ultrasonic1:GND", "esp:GND", "" ],
36    [ "ultrasonic1:Trig", "esp:IO4", "" ],
37    [ "ultrasonic1:Echo", "esp:IO5", "" ]
38  ]
39 }
```

Simulation

00:43.263 69%



Publish OK

Sending payload: {"Distance":138.96}

Publish OK

Sending payload: {"Distance":138.98}

Publish OK

IBM

IBM-Project-21602-1659785 IBM Watson IoT Platform ASSIGNMENT 4 sketch.ino - Wokwi Arduino

9pjm1.internetofthings.ibmcloud.com/dashboard/devices/browse

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IBM Watson IoT Platform

Browse Action Device Types Interfaces

Add Device

Identity Device Information Recent Events State Logs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Node	{"distance":17}	json	a few seconds ago
Node	{"distance":153}	json	a minute ago
Node	{"distance":154}	json	a minute ago
Node	{"distance":155}	json	a minute ago
Node	{"distance":170}	json	a minute ago

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1 Simulation running

ii) When distance is less than 100cms.

The screenshot shows the Wokwi IDE interface. On the left, the 'diagram.json' file is open, displaying a JSON configuration for a circuit. The configuration includes an ESP32 devkit, an LED, an ultrasonic sensor, and a resistor. The right pane shows the simulation interface with a circuit diagram and a console output.

```
1 {
2   "version": 1,
3   "author": "Keerthika J",
4   "editor": "wokwi",
5   "parts": [
6     { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 92.67, "left": 45.3
7   },
8     {
9       "type": "wokwi-led",
10      "id": "led1",
11      "top": 194.54,
12      "left": 309.26,
13      "attrs": { "color": "red" }
14    },
15    {
16      "type": "wokwi-hc-sr04",
17      "id": "ultrasonic1",
18      "top": 60.71,
19      "left": 185.64,
20      "attrs": { "distance": "139" }
21    },
22    {
23      "type": "wokwi-resistor",
24      "id": "r1",
25      "top": 269.89,
26      "left": 260.39,
27      "attrs": { "value": "100" }
28    }
29  ],
30  "connections": [
31    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
32    [ "ultrasonic1:VCC", "r1:1", "" ],
33    [ "ultrasonic1:GND", "r1:2", "" ],
34    [ "ultrasonic1:Trig", "led1:anode", "" ],
35    [ "ultrasonic1:Echo", "led1:cathode", "" ]
36  ]
37 }
```

The simulation interface shows a circuit diagram with an ESP32 devkit, an LED, an ultrasonic sensor, and a resistor. The console output shows the following messages:

```
Sending payload: {"Alert Distance":93.96}
Publish OK
Sending payload: {"Alert Distance":93.96}
Publish OK
```

The screenshot shows the IBM Watson IoT Platform dashboard. The 'Recent Events' tab is selected, displaying a table of events. The table has columns for Event, Value, Format, and Last Received. The events show distance readings of 91, 45, 4, 19, and 94 cm.

Event	Value	Format	Last Received
Node	{"distance":91}	json	a few seconds ago
Node	{"distance":45}	json	a few seconds ago
Node	{"distance":4}	json	a few seconds ago
Node	{"distance":19}	json	a few seconds ago
Node	{"distance":94}	json	a few seconds ago

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1 Simulation running

WOKWILINK

<https://wokwi.com/projects/346491488923812434>