

ASSIGNMENT4

Date	08 OCTOBER 2022
Team ID	PNT2022TMID15007
Project Name	HAZARDOUS AREA MONITORING FOR INDUSTRIAL PLANT POWERED BY IOT

Ultrasonic sensor simulation in Wokwi

Question:

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cm, send an "Alert" to IBM cloud and display in the device recent events.

Code:

```
#include
<WiFi.h>#include<PubSubC
lient.h>
voidcallback(char*subscribetopic,byte*payload,unsignedintpayloadLe
ngth);
//-----credentialsofIBMAccounts-----
#defineORG"s4jk68"//IBMORGANITIONID
#defineDEVICE_TYPE"MyDeviceType"//DevicetypementionedinibmwatsonIOTPlatform#define DEVICE_ID "12345"//Device
ID mentioned in ibmwatson IOT Platform
#defineTOKEN"12345"//Token
Stringdata3;
charserver[]=ORG".messaging.internetofthings.ibmcloud.com";charpub
lishTopic[]="iot-2/evt/Data/fmt/json";
charsubscribetopic[]="iot-
```

```

2/cmd/test/fmt/String";charauthMethod[]="use-token
auth";
char token[]=TOKEN;
char clientId[]="d:"ORG": "DEVICE_TYPE": "DEVICE_ID
; WiFiClient wifiClient;
PubSubClient client(server,1883,callback,wifiClient);consti
n t trigPin =5;
const int echoPin =
18;#define SOUND_SPEED 0.0
34 long duration;
float distance;
void setup(){
Serial.begin(115200);pinMod
e(trigPin,OUTPUT);pinMode(e
choPin,
INPUT);wifiConnect();mqttCo
nnect();
}
void loop()
{
digitalWrite(trigPin,
LOW);delayMicroseconds(2);digitalWr
ite(trigPin,
HIGH);delayMicroseconds(10);digital
Write(trigPin,LOW);duration =
pulseIn(echoPin,
HIGH);distance=duration*SOUND_SPEED
/2;Serial.print("Distance (cm):
");Serial.println(distance);if(dist
ance<100)
{
Serial.println("ALERT!!");de
lay(1000);
PublishData(distance);
delay(1000);
if(!client.loop()){mq
ttconnect();

```

```

}
}
delay(1000);
}
void PublishData(float dist){mqttconnect(
);
String payload="{\"Distance\":";payload+=
=dist;
payload+=",\"ALERT!!\":\"\"Distancelessthan100cms\"";payload+=
}\"";
Serial.print("Sendingpayload:");
Serial.println(payload);

if(client.publish(publishTopic,(char*)payload.c_str()))
{ Serial.println("Publishok");
}else{
Serial.println("Publishfailed");
}
}
void mqttconnect(){
if (!client.connected())
{Serial.print("Reconnectingclientto");S
erial.println(server);
while(!!!client.connect(clientId,authMethod,token))
{ Serial.print(".");
delay(500);
}
}
initManagedDevice();
Serial.println();
}
}
void wificonnect()
{
Serial.println(); Serial.print("Connecting to
");WiFi.begin("Wokwi-GUEST", "", 6); while (WiFi.status()
!=WL_CONNECTED){delay(500);
Serial.print(".");

```

```

}
Serial.println("");
Serial.println("WiFiconnected");
Serial.println("IP address:
");Serial.println(WiFi.localIP());
}
voidinitManagedDevice(){
if (client.subscribe(subscribetopic))
{Serial.println((subscribetopic));
Serial.println("subscribe  tocmdOK");
}else{
Serial.println("subscribetocmdFAILED");
}
}
voidcallback(char*subscribetopic,byte*payload,unsignedintpayloadLength
) {
Serial.print("callbackinvokedfortopic:");
Serial.println(subscribetopic);
for(inti=0;i<payloadLength;i++){
//Serial.print((char)payload[i]);
data3+=(char)payload[i];
}
Serial.println("data:"+data3);data3="";
}

```

Diagram.json:

```

{
  "version":1,
  "author":
    "sweetysharon", "editor":
    "wokwi", "parts":[
      {"type":"wokwi-esp32-devkit-v1", "id":"esp", "top":-4.67, "left":-114.67, "attrs":{}}
    , {"type":"wokwi-hc-sr04", "id":"ultrasonic1", "top":15.96, "left":89.17, "attrs":{}}

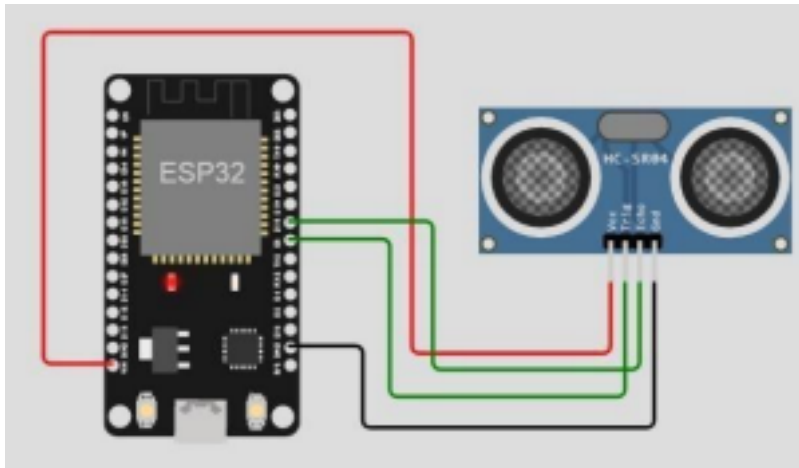
```

```

],
"connections":[
  ["esp:TX0","$serialMonitor:RX","",[]],
  ["esp:RX0","$serialMonitor:TX","",[]],
  ["esp:VIN","ultrasonic1:VCC","red",
  ["h-37.16","v-178.79","h200","v173.33","h100.67"]
  ],
  ["esp:GND.1","ultrasonic1:GND","black",["h39.87","v44.04","h170"]],
  ["esp:D5","ultrasonic1:TRIG","green",["h54.54","v85.07","h130.67"]],
  ["esp:D18","ultrasonic1:ECHO","green",["h77.87","v80.01","h110"]]
]
}

```

CircuitDiagram:



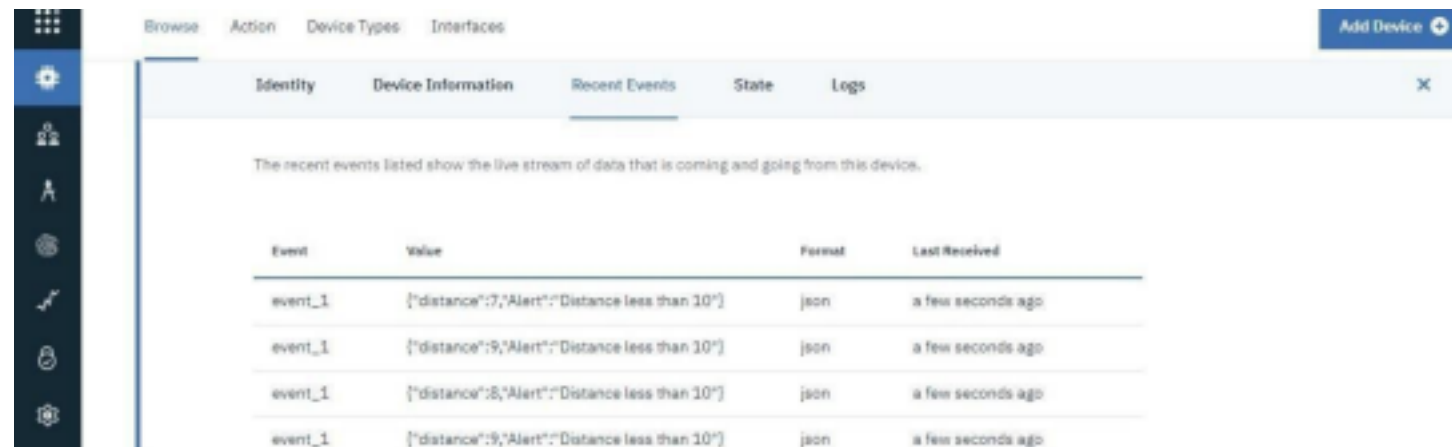
Output:

Wokwioutput:

```
Connecting to ....
Wifi connected
IP address:
10.10.0.2
Reconnecting client to ytiuse.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 399.92
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.92
Distance (cm): 399.94
```

IBMcloudoutput:



The screenshot shows the IBM Cloud IoT Platform console. The left sidebar contains navigation icons. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. The 'Add Device' button is visible in the top right. The main content area is titled 'Recent Events' and contains a table of events.

Event	Value	Format	Last Received
event_1	{"distance":7,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":8,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago