

ASSIGNMENT- 4

TEAM ID: PNT2022TMID19555

PROJECT NAME: Gas Leakage Monitoring and Alerting System for Industries

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QUESTION:

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.

SOURCE CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribtopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "ubswd1"//IBM ORGANITION ID
#define DEVICE_TYPE "gasleakage01"//Device type mentioned in ibm watson IOT
Platform#define DEVICE_ID "Device112"//Device ID mentioned in ibm watson IOT
Platform#define TOKEN "01234567" //Token
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribtopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);
const int trigPin = 5;
const int echoPin = 18;
```

```

#define SOUND_SPEED 0.034
long duration;
float distance;
void setup() {
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  wifiConnect();
  mqttConnect();
}
void loop()
{
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = duration * SOUND_SPEED/2;
  Serial.print("Distance (cm): ");
  Serial.println(distance);
  if(distance<100)
  {
    Serial.println("ALERT!!");
    delay(1000);
    PublishData(distance);
    delay(1000);
    if (!client.loop()) {
      mqttConnect();
    }
  }
  delay(1000);
}
void PublishData(float dist) {
  mqttConnect();
  String payload = "{\"Distance\":\"";
  payload += dist;
  payload += "\",\"ALERT!!\":\"\"Distance less than 100cms\"";
  payload += "\"}";
  Serial.print("Sending payload: ");
  Serial.println(payload);

  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");
  }
}

```

```

} else {
  Serial.println("Publish failed");
}
}

void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.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("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}

void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println(subscribetopic);
    Serial.println("subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd FAILED");
  }
}

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
  Serial.print("callback invoked for topic: ");
  Serial.println(subscribetopic);
  for (int i = 0; i < payloadLength; i++) {
    //Serial.print((char)payload[i]);
  }
}

```

```

data3 += (char)payload[i];
}
Serial.println("data: "+ data3);
data3="";
}

```

Diagram.json code:

```

{
  "version": 1,
  "author": "sweetysharon",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -112.87, "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" ] ]
  ]
}

```

Wokwi simulator link:

<https://wokwi.com/projects/347015477471478354>

OUTPUT:

sketch.ino

diagram.json

libraries.txt

Library Manager

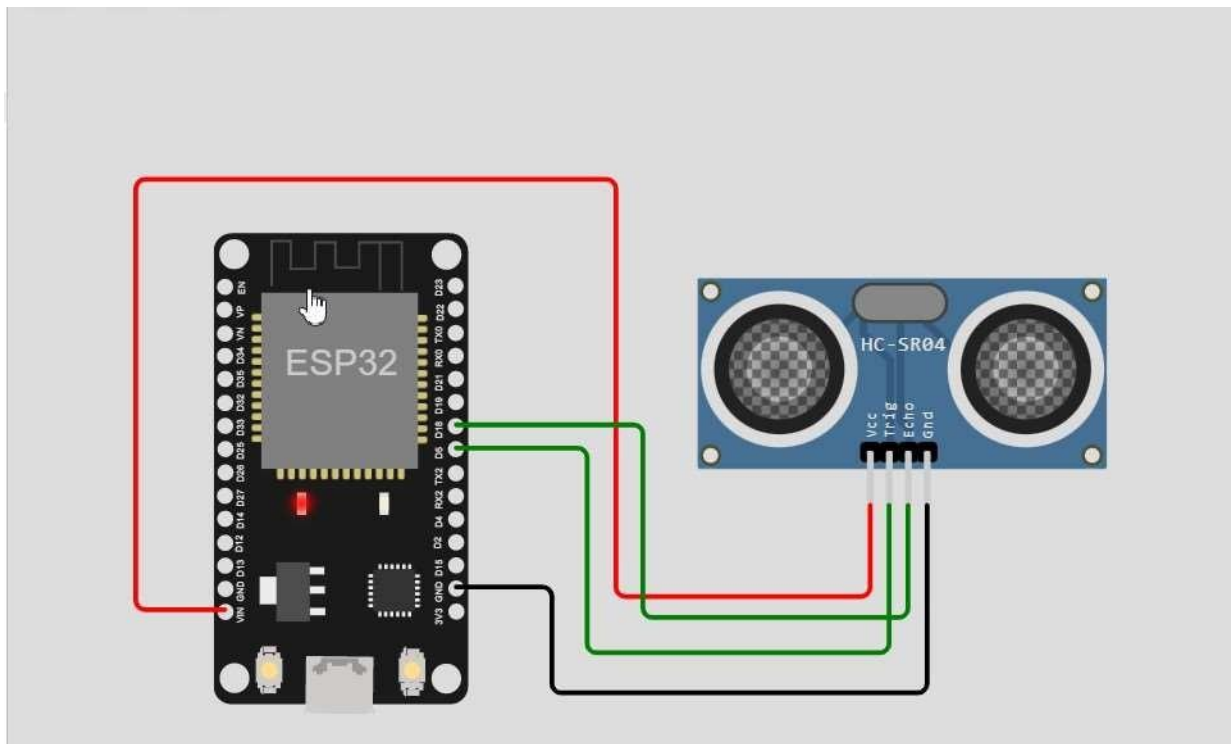
```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* subscribetopic, byte* payload, unsigned int
4 payloadlength);
5 //-----credentials of IBM Accounts-----
6 #define ORG "km0dve"//IBM ORGANITION ID
7 #define DEVICE_TYPE "ESP32"//device type mentioned in ibm watson IOT Platform
8 #define DEVICE_ID "device1"//device ID mentioned in ibm watson IOT Platform
9 #define TOKEN "987654321" //Token
10 String data3;
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Data/fmt/json";
13 char subscribetopic[] = "iot-2/cmd/test/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 WiFiClient wificlient;
18 PubSubClient client(server, 1883, callback ,wificlient);
19 const int trigPin = 5;
20 const int echoPin = 18;
21 #define SOUND_SPEED 0.034
22 long duration;
23 float distance;
24 void setup() {
25   Serial.begin(115200);
26   pinMode(trigPin, OUTPUT);
27   pinMode(echoPin, INPUT);
28   wificlient.connect();
29   mqttconnect();
30 }
31 void loop()
32 {
33   digitalWrite(trigPin, LOW);
```

Simulation

02:51.975 99%

Connecting to
WiFi connected
IP address:
10.10.0.2
Reconnecting client to km0dve.messaging.internetofthings.ibmcloud.com

Circuit Diagram:



Wokwi output:

```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to km0dve.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

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

IBM Cloud Output:

The screenshot displays the IBM Watson IoT Platform dashboard. The top navigation bar includes tabs for 'Browse', 'Action', 'Device Types', and 'Interfaces'. A search bar labeled 'Search by Device ID' is present. The main content area shows a table of devices, with 'Device112' selected. The device status is 'Connected', and its type is 'gasleakage01'. Below the device list, the 'Recent Events' tab is active, showing a stream of data events. The events table has columns for 'Event', 'Value', 'Format', and 'Last Received'. The events are JSON strings containing distance and alert information.

Event	Value	Format	Last Received
Data	{"Distance":98.94,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":98.96,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":98.94,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":98.94,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":98.94,"ALERT!":"Distance less than ...	json	a few seconds ago