PROBLEM STATEMENT:

IoT BASED GAS LEAKAGE MONITORING AND ALERTING SYSTEM

DOMAIN:

INTERNET OF THINGS

ASSIGNMENT 4:

DISTANCE DETECTION USING ULTRASONIC SENSOR

BY

SARANYA M (62351910635)

SRIPRIYA .S (623519106042)

SANTHOSH .S (623519106033)

SOUNDARYA .P (623519106037)

RANJITH KUMAR .L (623519106027)

QUESTION-1:

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

WOKWI LINK:

https://wokwi.com/projects/347920390209667666

```cpp
#include <WiFi.h>
#include <WiFiClient.h>
#include <PubSubClient.h>
const int trigPin = 5;
const int echoPin = 18;
//define sound speed in cm/uS
#define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701
long duration;
float distanceCm;
float distanceInch;
```

```cpp
void callback(char* subscribetopic, byte* payload, unsigned  int payloadLength);
 //-------credentials of IBM Accounts------

#define ORG "830c1b"//IBM ORGANITION ID
#define DEVICE_TYPE "Esp-32device"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "sripriya"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "9677880343"    //Token
String data3;




//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event
perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd  REPRESENT command
type AND COMMAND IS TEST OF FORMAT STRING
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id

WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient);

void setup() {
  Serial.begin(115200); // Starts the serial communication
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT); // Sets the echoPin as an Input
  Serial.println();
  wificonnect();
  mqttconnect();

}

void loop() {
  // Clears the trigPin
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin on HIGH state for 10 micro seconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
```

```arduino
  // Reads the echoPin, returns the sound wave travel time in microseconds
  duration = pulseIn(echoPin, HIGH);

  // Calculate the distance
  distanceCm = duration * SOUND_SPEED/2;

  // Convert to inches
  distanceInch = distanceCm * CM_TO_INCH;

  // Prints the distance in the Serial Monitor
  Serial.print("Distance (cm): ");
  Serial.println(distanceCm);
  Serial.print("Distance (inch): ");
  Serial.println(distanceInch);

  PublishData(distanceCm);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}

  void PublishData(float Cm) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"Distance (cm)\":";
  payload += Cm;
  payload += "}";


  Serial.print("Sending payload: ");
  Serial.println(payload);


  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud
then it will print publish ok in Serial monitor or else it will print publish
failed
  } 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() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish
the connection
  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];
  }
}
```

```
11   float distanceInch;
12
13
14   void callback(char* subscribetopic, byte* payload, unsigned int payloadLength
15     //-------credentials of IBM Accounts------
16
17   #define ORG "830c1b"//IBM ORGANITION ID
18   #define DEVICE_TYPE "Esp-32device"//Device type mentioned in ibm watson IOT Pl
19   #define DEVICE_ID "sripriya"//Device ID mentioned in ibm watson IOT Platform
20   #define TOKEN "9677880343"    //Token
21   String data3;
22
23
24
25   //-------- Customise the above values --------
26   char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
27   char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of even
28   char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd  REPRESENT command
29   char authMethod[] = "use-token-auth";// authentication method
30   char token[] = TOKEN;
31   char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
32
33   WiFiClient wifiClient; // creating the instance for wificlient
34   PubSubClient client(server, 1883, callback ,wifiClient);
35
36   void setup() {
37     Serial.begin(115200); // Starts the serial communication
38     pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
39     pinMode(echoPin, INPUT); // Sets the echoPin as an Input
40     Serial.println();
41     wificonnect();
```

Simulation

⟳ ■ ❚❚   ⏱ 00:40.767 ◔42%

Distance (inch): 85.41
Sending payload: {"Distance (cm)":216.94}
Publish ok
Distance (cm): 216.94
Distance (inch): 85.41
Sending payload: {"Distance (cm)":216.94}
Publish ok

Browse   Action   Device Types   Interfaces   **Add Device ⊕**

	Device ID	Status	Device Type ▲	Class ID	Date Added	
∨ ☑	sripriya	● Connected	Esp-32device	Device	9 Nov 2022 22:20	→ ⋯

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
Data	{"Distance (cm)":216.99}	json	a few seconds ago
Data	{"Distance (cm)":216.97}	json	a few seconds ago

Items per page 50 ▼ | 1–1 of 1 item   1 of 1 page   ‹ 1 ▼ ›