

## ASSIGNMENT- 4

Assignment Date	06 NOVEMBER2022
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Project Name	Gas Leakage Monitoring and Alerting System

**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.**

### CODE:

```
#include <WiFi.h> //library for wifi
#include <PubSubClient.h> //library for MQTT

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-----credentials of IBM Accounts-----

#define ORG "97w8oj" //IBM ORGANITION ID
#define DEVICE_TYPE "ESP32" //Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "024" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN "Logisha@2002" //Token
String data3;
float dist;

//----- 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); //calling the predefined client id by passing parameter like server id,portand wificredential

```
int LED = 4;
int trig = 5;
int echo = 18;
void setup()
{
  Serial.begin(115200);
  pinMode(trig,OUTPUT);
  pinMode(echo,INPUT);
  pinMode(LED, OUTPUT);
  delay(10);
  wificonnect();
  mqttconnect();
}
void loop()// Recursive Function
{

  digitalWrite(trig,LOW);
  digitalWrite(trig,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig,LOW);
  float dur = pulseIn(echo,HIGH);
  float dist = (dur * 0.0343)/2;
  Serial.print ("Distancein cm");
  Serial.println(dist);

  PublishData(dist);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}
/* .....retrieving to Cloud..... */

void PublishData(float dist) {
  mqttconnect();//function call for connecting to ibm
  /*
   creating the String in in form JSon to update the data to ibm cloud
  */
  String object;
  if (dist <100)
  {
    digitalWrite(LED,HIGH);
    Serial.println("object is near");
    object = "Near";
```

```

}
else
{
    digitalWrite(LED,LOW);
    Serial.println("no object found");
    object = "No";
}

String payload = "{\"distance\": ";
payload += dist;
payload += ", \"object\": ";
payload += object;
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];
    }

    // Serial.println("data: "+ data3);
    // if(data3=="Near")
    // {
    // Serial.println(data3);
    // digitalWrite(LED,HIGH);

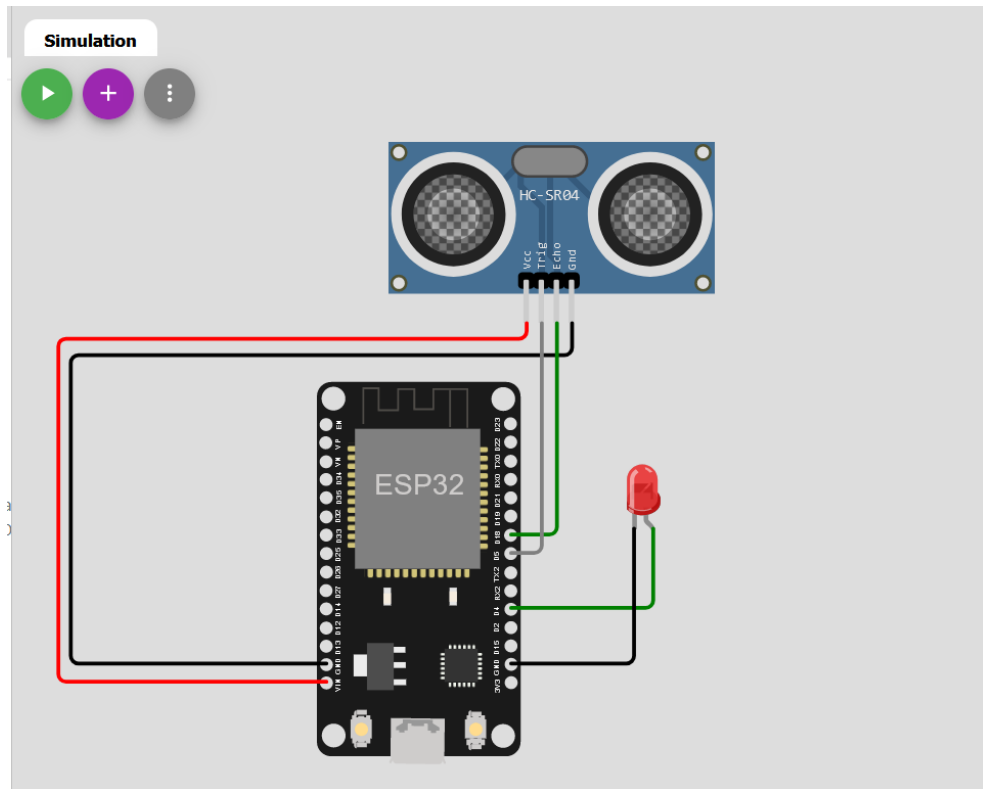
    // }

    // else
    // {
    // Serial.println(data3);
    // digitalWrite(LED,LOW);

    // }
    data3="";
}

```

## CIRCUIT DIAGRAM:

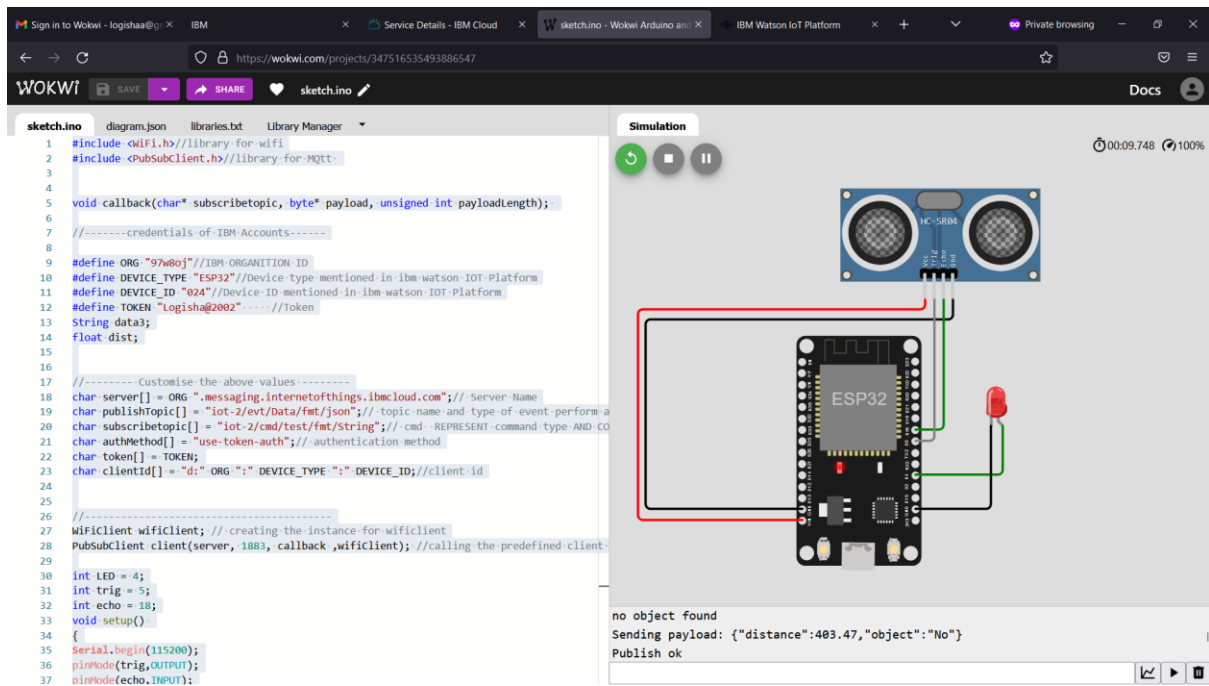


## WOWKI OUTPUT:

```
IP address:
10.10.0.2
Reconnecting client to 97w8oj.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distancein cm59.51
object is near
Sending payload: {"distance":59.51,"object":"Near"}
Publish ok
Distancein cm59.61
object is near
Sending payload: {"distance":59.61,"object":"Near"}
Publish ok
```

## WOWKI CIRCUIT:

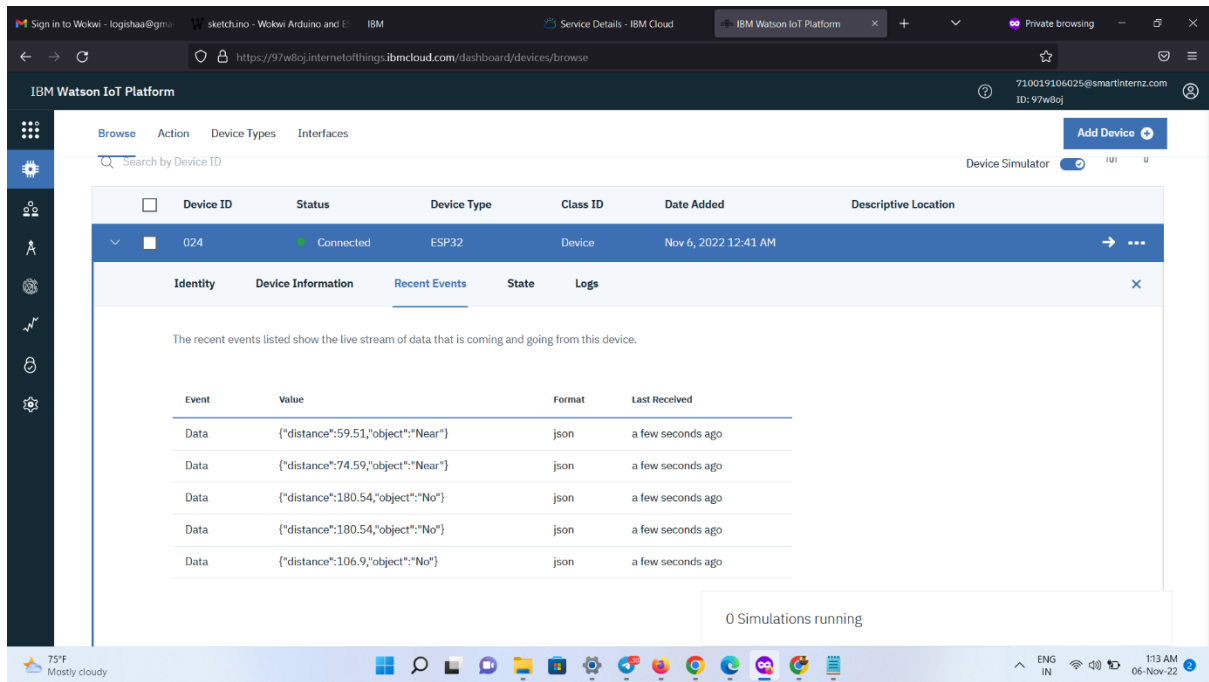


The screenshot shows the Wokwi IDE interface. On the left, the 'sketch.ino' file contains the following code:

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3
4 void callback(char* subscribetopic, byte* payload, unsigned int payloadlength);
5
6 //-----credentials of IBM Accounts-----
7
8 #define ORG "97w8oj" //IBM-ORGANIZATION ID
9 #define DEVICE_TYPE "ESP32" //Device type mentioned in ibm watson IoT Platform
10 #define DEVICE_ID "024" //Device ID mentioned in ibm watson IoT Platform
11 #define TOKEN "Logisha@2002" //Token
12 String data;
13 float dist;
14
15 //----- Customise the above values -----
16
17 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
18 char publishTopic[] = "iot-2/evt/data/fmt/json"; // topic name and type of event perform a
19 char subscribetopic[] = "iot-2/cmd/test/fmt/String"; // cmd REPRESENT command type AND CO
20 char authMethod[] = "use-token-auth"; // authentication method
21 char token[] = TOKEN;
22 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID ;/client id
23
24 //-----
25
26 WiFiClient wifiClient; // creating the instance for wifi client
27 PubSubClient client(server, 1883, callback, wifiClient); //calling the predefined client
28
29
30 int LED = 4;
31 int trig = 5;
32 int echo = 18;
33 void setup()
34 {
35   Serial.begin(115200);
36   pinMode(trig, OUTPUT);
37   pinMode(echo, INPUT);
38 }
```

On the right, the 'Simulation' window shows a circuit diagram of an ESP32 board connected to an HC-SR04 ultrasonic sensor. The simulation status bar indicates 'no object found' and 'Sending payload: {"distance":403.47,"object":"No"}'. The 'Publish ok' button is visible.

## IBM CLOUD OUTPUT:



The screenshot shows the IBM Watson IoT Platform dashboard. The 'Browse' tab is selected, and the 'Device ID' search filter is applied. The table below lists the device details:

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
024	Connected	ESP32	Device	Nov 6, 2022 12:41 AM	

The 'Recent Events' tab is selected, showing a list of events:

Event	Value	Format	Last Received
Data	{"distance":59.51,"object":"Near"}	json	a few seconds ago
Data	{"distance":74.59,"object":"Near"}	json	a few seconds ago
Data	{"distance":180.54,"object":"No"}	json	a few seconds ago
Data	{"distance":180.54,"object":"No"}	json	a few seconds ago
Data	{"distance":106.9,"object":"No"}	json	a few seconds ago

The bottom status bar indicates '0 Simulations running'.

## WOWKI LINK:

<https://wokwi.com/projects/347516535493886547>