# Assignment 4

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| Assignment Date | 28 October 2022 |
| Student Name | A.Dharani Dharan |
| Student Roll Number | 722819106016 |
| Maximum Marks | 2 Marks |

Write code and connections in wokwi for the ultrasonic sensor.
Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.
Upload document with wokwi share link and images of IBM cloud

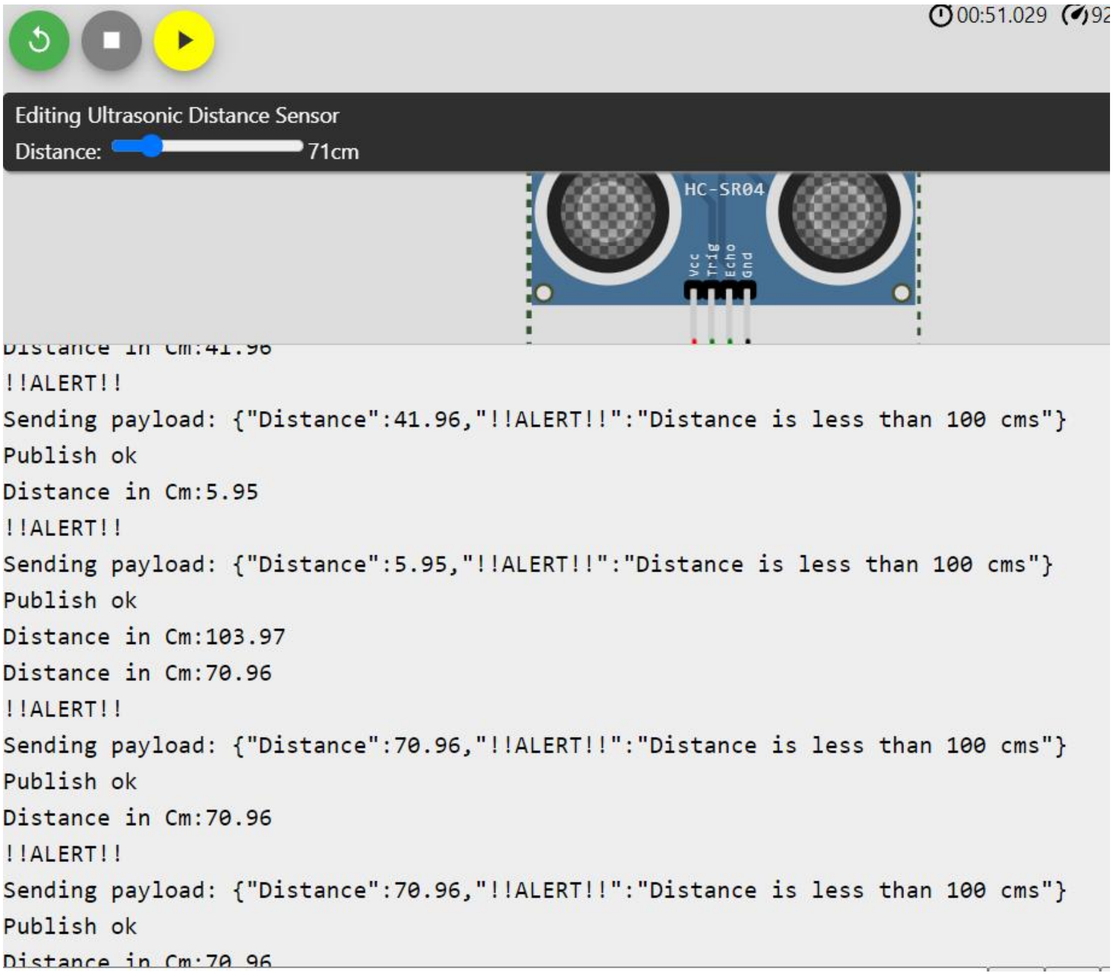
PROGRAM:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
const int T=2;
const int E=19;
long d;
float Distance;
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

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

#define ORG "qouf4x"//IBM ORGANITION ID
#define DEVICE_TYPE "Ultrasonic"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "123456"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "123456789"     //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); //calling the predefined client id by
passing parameter like server id,portand wificredential
void setup()// configureing the ESP32
{
  Serial.begin(115200);
  pinMode(T,OUTPUT);
  pinMode(E,INPUT);
  Serial.println();
  wificonnect();
  mqttconnect();
```

```
}

void loop()// Recursive Function
{
  digitalWrite(T,LOW);
  delay(1000);
  digitalWrite(T,HIGH);
  delay(1000);
  digitalWrite(T,LOW);
  d=pulseIn(E,HIGH);
  Distance=d*(0.034/2);
  Serial.print("Distance in Cm:");
  Serial.println(Distance);
  if(Distance<100)
  {
    Serial.println("!!ALERT!!");
    delay(1000);
  PublishData(Distance);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
  }
  delay(1000);
}

/*.....................................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 payload = "{\"Distance\":";
  payload += dist;
  payload += ",\"!!ALERT!!\":""\"Distance is less than 100 cms\"";
  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);
data3="";
}
```

Output:

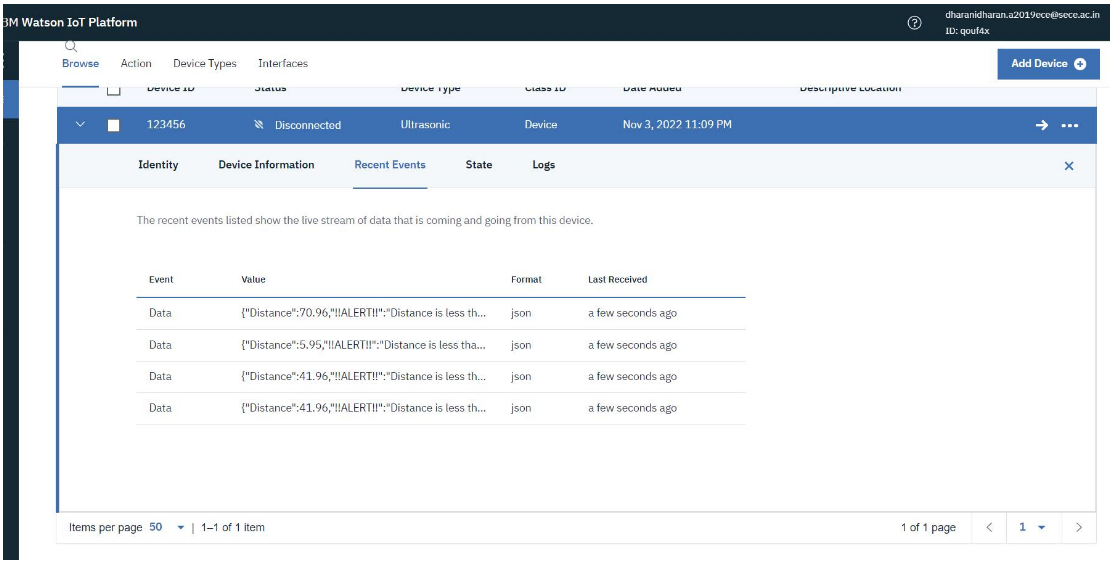


```
Distance in Cm:41.96
!!ALERT!!
Sending payload: {"Distance":41.96,"!!ALERT!!":"Distance is less than 100 cms"}
Publish ok
Distance in Cm:5.95
!!ALERT!!
Sending payload: {"Distance":5.95,"!!ALERT!!":"Distance is less than 100 cms"}
Publish ok
Distance in Cm:103.97
Distance in Cm:70.96
!!ALERT!!
Sending payload: {"Distance":70.96,"!!ALERT!!":"Distance is less than 100 cms"}
Publish ok
Distance in Cm:70.96
!!ALERT!!
Sending payload: {"Distance":70.96,"!!ALERT!!":"Distance is less than 100 cms"}
Publish ok
Distance in Cm:70.96
```

Wokwi Link:

https://wokwi.com/projects/347329166754972242

Recent Events in IBM



| □ | Device ID | Status | Device Type | Class ID | Date Added | Descriptive Location |
|---|---|---|---|---|---|---|
| □ | 123456 | Disconnected | Ultrasonic | Device | Nov 3, 2022 11:09 PM | |

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":70.96,"!!ALERT!!":"Distance is less th... | json | a few seconds ago |
| Data | {"Distance":5.95,"!!ALERT!!":"Distance is less tha... | json | a few seconds ago |
| Data | {"Distance":41.96,"!!ALERT!!":"Distance is less th... | json | a few seconds ago |
| Data | {"Distance":41.96,"!!ALERT!!":"Distance is less th... | json | a few seconds ago |