Assignment - 4

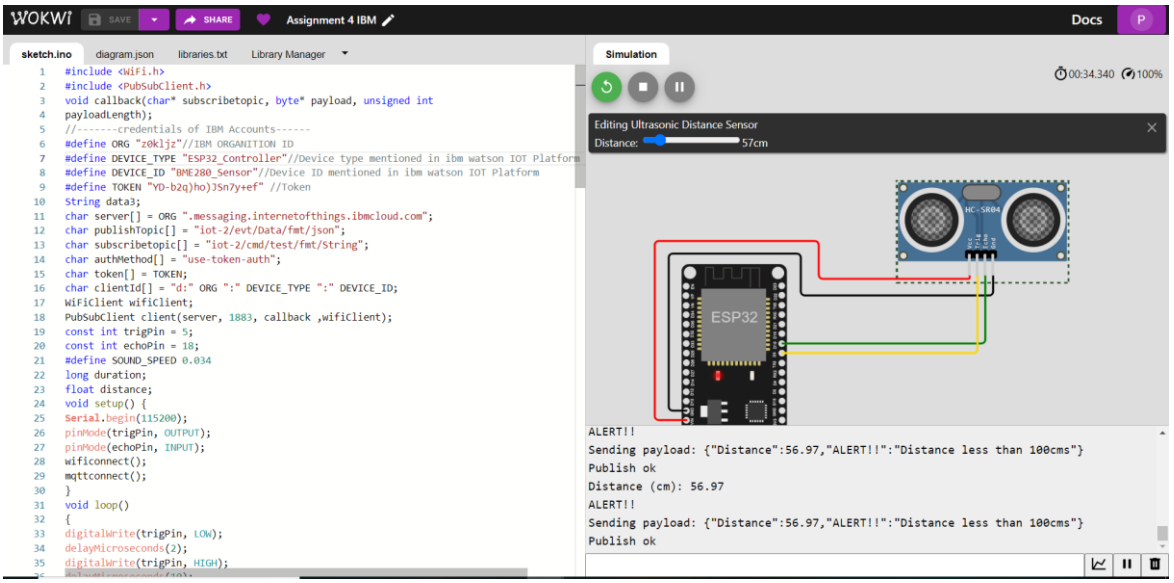
Problem Statement:

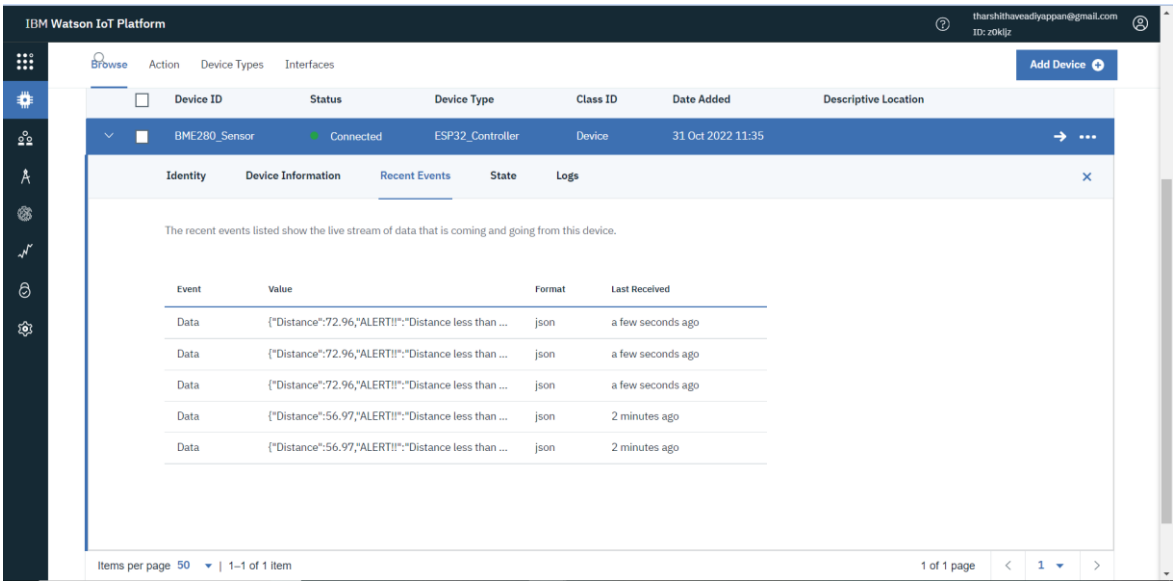
Write code and connections in Wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events. Upload document with Wokwi share link and images of IBM cloud.

Solution:

Wokwi Link: https://wokwi.com/projects/347233654068478547

Circuit Diagram with output:





Program Code:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);

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

#define ORG "z0kljz"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32_Controller"//Device type mentioned in ibm watson
IOT Platform
#define DEVICE_ID "BME280_Sensor"//Device ID mentioned in ibm watson IOT
Platform
#define TOKEN "YD-b2q)ho)JSn7y+ef" //Token

String data3;

//--------Customise the above values-------

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "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);
      // Sets the trigpin on HIGH state for 10 microseconds
```

```
        digitalWrite(trigPin, HIGH);
        delayMicroseconds(10);
        digitalWrite(trigPin, LOW);
        // Reads the echoPin, Return the sound wave travel in microseconds
        duration = pulseIn(echoPin, HIGH);
        // Calculate the distance in centimeters
        distance = duration * SOUND_SPEED/2;


        Serial.print("Distance (cm): ");
        Serial.println(distance);
        //Checking of the status
        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();
        /*
          Creating the string in the form of JSON to update the data to IBM
        Cloud
        */
        String payload = "{\"Distance\":";
        payload += dist;
        payload += "cm,\"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="";
}
```