

# ASSIGNMENT 4

## Ultrasonic sensor simulation in Wokwi

### Question :

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an “Alert” to IBM cloud and display in the device recent events.

### Code:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "xz5tn5"//IBM ORGANITION ID
#define DEVICE_TYPE "iot_device"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "1234"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "123456789" //Token
String data3;
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);
  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());
}

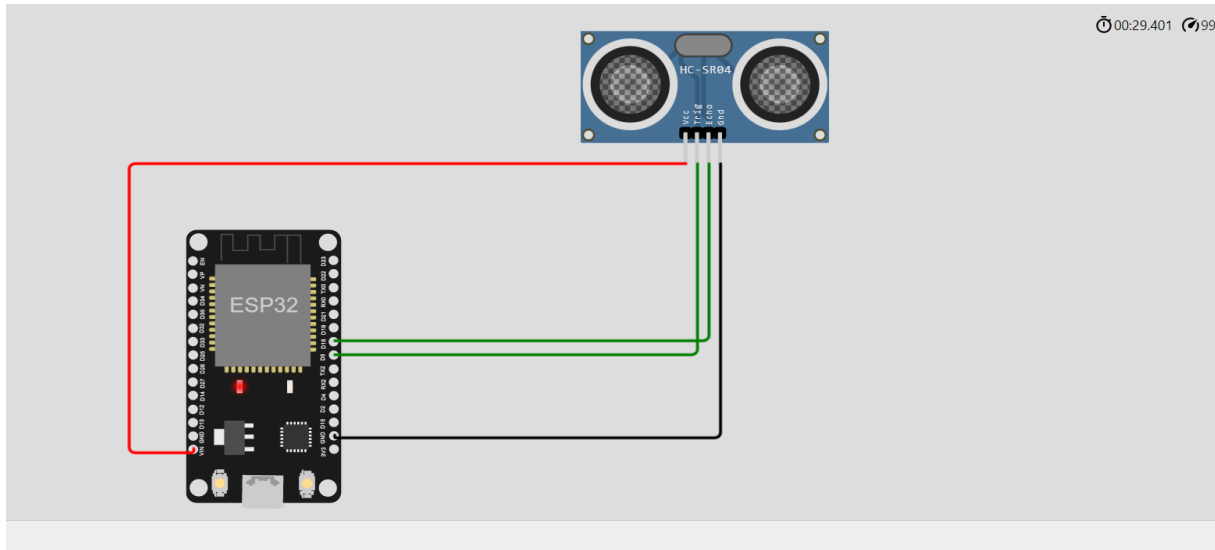
void initManagedDevice() {
    if (client.subscribe(subscribetopic)) {
        Serial.println((subscribetopic));
    }
}
```

```
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="";
}
```

**Wokwi simulation link:**

<https://wokwi.com/projects/348012333262438996>

## Circuit Diagram:



## Output:

Wokwi output:

```
Connecting to ...
WiFi connected
IP address:
10.10.0.2
Reconnecting client to xz5tn5.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 15.01
ALERT!!
Sending payload: {"Distance":15.01,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 14.98
ALERT!!
```

IBM cloud output:

IBM Watson IoT Platform

?

vijipv1107@gmail.com

ID: xz5tn5

Browse

Action

Device Types

Interfaces

Add Device

>

1234

Disconnected

ESP32

▼

1234

Disconnected

iot\_device

→

...

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":70.96,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":70.96,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":14.98,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":14.98,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":14.98,"ALERT!!":"Distance less than ...	json	a few seconds ago