

Assignment -4

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Question:

Write code and connection 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.

Coding:

Sketch.ino

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "iqhx38"//IBM ORGANITION ID
#define DEVICE_TYPE "Device1"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "distance"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "714019106015" //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="";
}

```

Diagram.json:

```

{
  "version": 1,
  "author": "Biplab Das S",
  "editor": "ibmssfr",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 13.19, "left": -141.14, "attrs": {} },
    {
      "type": "wokwi-hc-sr04",
      "id": "ultrasonic1",
      "top": -119.46,
      "left": -109.51,
      "attrs": { "distance": "73" }
    }
  ]
}

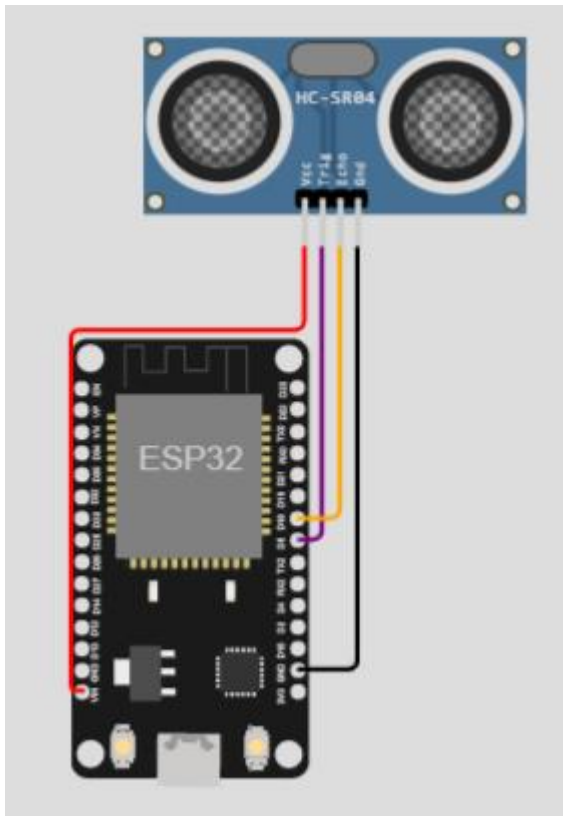
```

```

    }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [ ] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [ ] ],
    [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v36.21", "h-103.59", "v168.16" ] ],
  ],
  [
    [ "ultrasonic1:TRIG", "esp:D5", "purple", [ "v0" ] ],
    [ "ultrasonic1:ECHO", "esp:D18", "orange", [ "v0" ] ],
    [ "ultrasonic1:GND", "esp:GND.1", "black", [ "v0" ] ]
  ]
}

```

Connection given:



Link for the simulation:

<https://wokwi.com/projects/347045912021828179>

Simulation Output:

WOKWI

sketch.ino

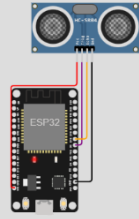
```

1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* subscribetopic, byte* payload, unsigned int
4   payloadLength);
5 //-----credentials of IBM Accounts-----
6 #define ORG "iqhx38"//IBM ORGANIZATION ID
7 #define DEVICE_TYPE "Device1"//Device type mentioned in ibm watson IOT Platform
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9 #define TOKEN "714019106015" //Token
10 String data3;
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Data/fmt/json";
13 char subscribetopic[] = "iot-2/cmd/test/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 WiFiClient wificlient;
18 PubSubClient client(server, 1883, callback, wificlient);
19 const int trigPin = 5;
20 const int echoPin = 18;
21 #define SOUND_SPEED 0.034
22 long duration;
23 float distance;
24 void setup() {
25   Serial.begin(115200);
26   pinMode(trigPin, OUTPUT);
27   pinMode(echoPin, INPUT);
28   wificlient.connect();
29   mqttconnect();

```

Simulation

01:40.800 34%



Sending payload: {"Distance":72.96,"ALERT!!":"Distance less than 100cms"}

Publish ok

Distance (cm): 72.96

ALERT!!

Sending payload: {"Distance":72.96,"ALERT!!":"Distance less than 100cms"}

Publish ok

IBM cloud Output:

IBM Watson IoT Platform

714019106015@smartinternz.com
ID: iqhx38

Browse Action Device Types Interfaces

Add 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":72.96,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":72.96,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":73,"ALERT!!":"Distance less than 10...	json	a few seconds ago
Data	{"Distance":72.96,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":72.96,"ALERT!!":"Distance less than ...	json	a few seconds ago

1 Simulation running