Write a code and connections 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 "kotoq5"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678" //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="";
      }
```

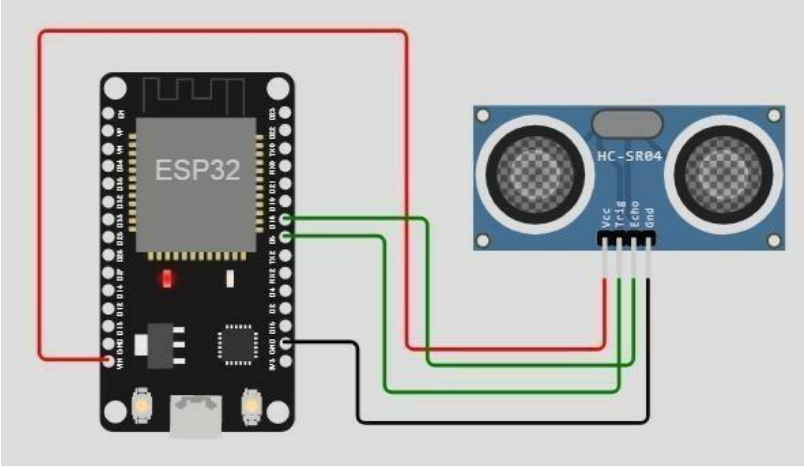
Diagram.json:

```
{
  "version": 1, "author":
  "sweetysharon",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67, "attrs": {} }, {
    "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} }
  ],
  "connections": [
```

```
      [ "esp:TX0", "$serialMonitor:RX", "", [] ], [
      "esp:RX0", "$serialMonitor:TX", "", [] ],
      [
        "esp:VIN",
        "ultrasonic1:VCC"
        , "red",
        [ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]
      ],
      [ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],
      [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],
      [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]

    ]
}
```

Circuit Diagram:



Output:

Wokwi output:

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

Distance (cm): 399.92
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.92
Distance (cm): 399.94
```

IBM cloud output: