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ASSIGNMENT 4 QUESTION :

Write code and connections in wokwi for the ultrasonic sensor.

Whenever the distance is less than 100cms sense an "alert" to the IBM cloud and display in the device recent events

Upload document with wokwi share link and image of IBM cloud .

CODE:

```
#include <WiFi.h>

#include <PubSubClient.h>

void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);

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

#define ORG "wpf8mr"//IBM ORGANITION ID

#define DEVICE_TYPE "esp32"//Device type mentioned in ibm watson IOT Platform

#define DEVICE_ID "libi0123"//Device ID mentioned in ibm watson IOT Platform

#define TOKEN "assignment4code" //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;
```

```cpp
#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();
```

```cpp
    }

  }

  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();

  }
```

```cpp
}
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("WiFiconnected");
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

```json
{
  "version": 1,
  "author": "Kanipriya 19EC008",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 14, "left": -86.67, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": -11.37, "left": 71.83, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [
      "esp:VIN",
      "ultrasonic1:VCC",
      "red",
      [ "h-55.16", "v-209.46", "h178", "v-1.33", "h12.67", "v154.67", "h0", "v3.33", "h92.67" ]
    ],
    [ "esp:GND.1", "ultrasonic1:GND", "black", [ "h117.87", "v0.04", "h38.67" ] ],
    [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h28.54", "v34.4", "h108.67", "v8" ] ],
    [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h69.87", "v56.67", "h74", "v-0.67" ] ]
  ]
}
```

Wokwi simulation link :

CIRCUIT DIAGRAM :
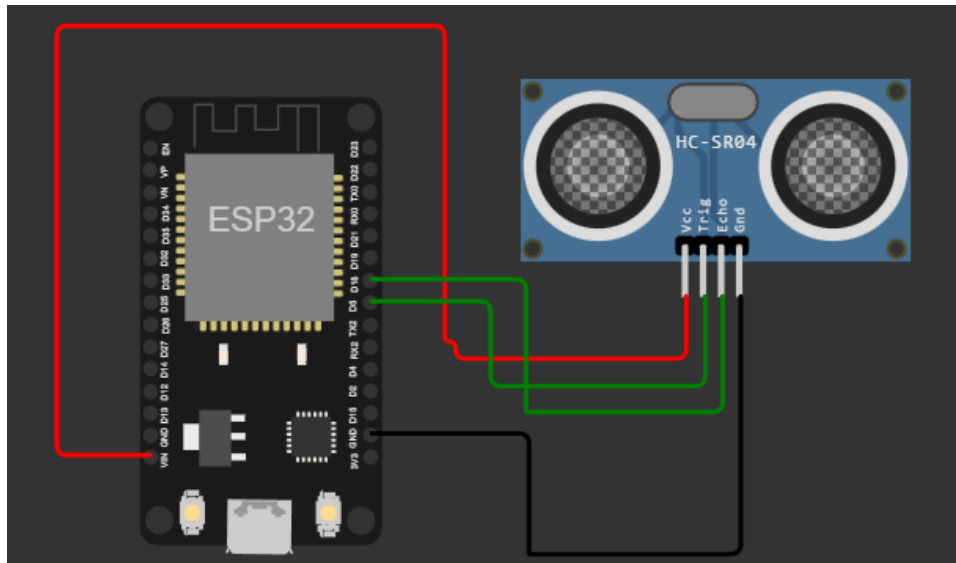
OUTPUT :

```
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:

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
event_1	{"distance":7,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":8,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago