

ASSIGNMENT-4

TEAM ID: PNT2022TMID19465

PROJECT NAME: Smart Solutions For Railways

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QUESTION:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cms send “alert” to ibm cloud and display in device recent events.

SOURCE CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribtopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "s1oivk"//IBM ORGANITION ID
#define DEVICE_TYPE "railway46"//Device type mentioned in ibm watson IOT
Platform#define DEVICE_ID "device46"//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 subscribtopic[] = "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="";  
}
```

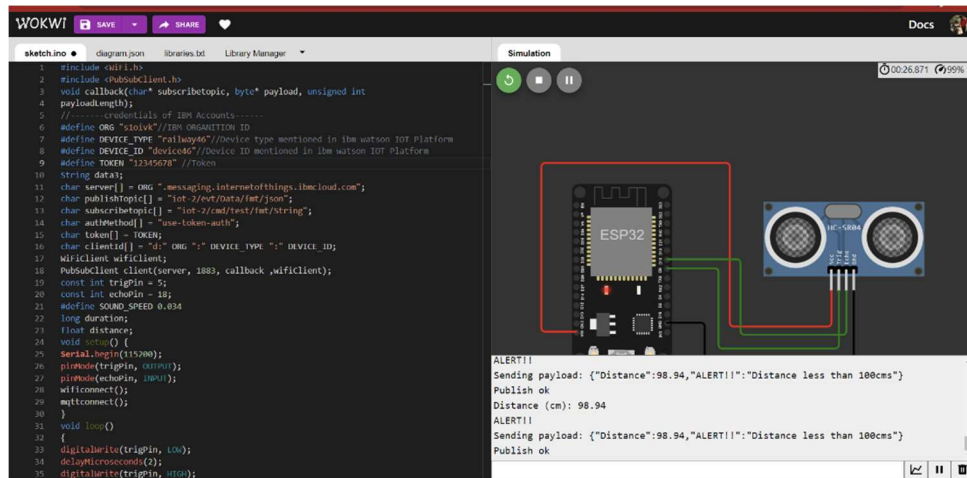
Diagram.json code:

```
{  
  "version": 1,  
  "author": "sweetysharon",  
  "editor": "wokwi",  
  "parts": [  
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -112.87, "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" ] ]  
  ]  
}
```

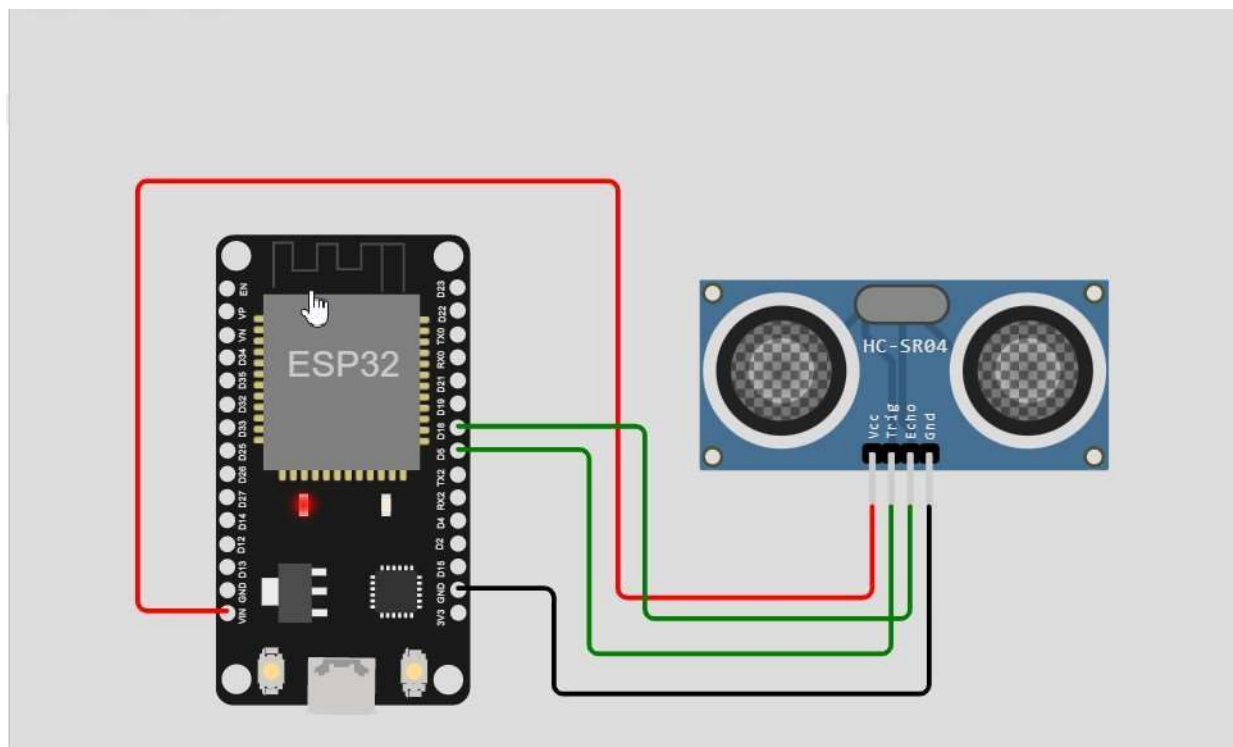
Wokwi simulator link:

<https://wokwi.com/projects/347962302156243540>

OUTPUT:



Circuit Diagram:



IBM Cloud Output:

The screenshot displays the IBM Watson IoT Platform interface. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A search bar is present with the text 'Search by Device ID'. The main content area shows a table of devices. The selected device, 'device56', is in a 'Connected' state, with a device type of 'railway56' and a class ID of 'Device'. It was added on 'Nov 10, 2022 10:58 PM'. Below the table, the 'Recent Events' tab is active, showing a stream of data events. The events are listed in a table with columns: Event, Value, Format, and Last Received. The events are JSON strings representing distance alerts.

Event	Value	Format	Last Received
Data	{"Distance":98.94,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":98.94,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":98.94,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":98.94,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":98.94,"ALERT!!":"Distance less than ...	json	a few seconds ago