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**Project Name :** Smart Solutions for Railways

## Assignment-4

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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.

### Solution code:

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```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQTT
#define ORG "q1wscz"
#define DEVICE_E "sampledevice"
#define DEVICE_D "24052002"
#define TOKEN "K9)II1C@tX6yO(J6L1"

const int T_PIN = 5;
const int E_PIN = 4;

//----- Customise the above values -----

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name

char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and
format in which data to be send

char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT command type
AND COMMAND IS TEST OF FORMAT STRING

char authMethod[] = "use-token-auth";// authentication method

char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE_E ":" DEVICE_D;//client id

// .....

WiFiClient wifiClient; // creating the instance for wificlient

PubSubClient client(server, 1883, wifiClient); //calling the predefined client id by passing
parameter like server id,portand wificredential

void setup() {
```

```

Serial.begin(115200);

pinMode(T_PIN, OUTPUT);
pinMode(E_PIN, INPUT);
wificonnect();
mqttconnect();
}

float readDistanceCM() {
    digitalWrite(T_PIN, LOW);
    delayMicroseconds(2);
    digitalWrite(T_PIN, HIGH);
    delayMicroseconds(10);
    digitalWrite(T_PIN, LOW);
    int duration = pulseIn(E_PIN, HIGH);
    return duration * 0.034 / 2;
}

void loop() {

    float distance = readDistanceCM();
    Serial.print("Measured distance: ");
    Serial.println(distance);
    if(distance<=100){
        PublishData(distance);
    }

    delay(1000);
    if (!client.loop()) {
        mqttconnect();
    }
}

void PublishData(float distance) {

```

```

mqttconnect();//function call for connecting to ibm
/*
    creating the String in in form JSon to update the data to ibm cloud
*/
bool status=true;
String payload = "{\"ALERT_MESSAGE\":\"";
payload += status;
payload += "," "\"DISTANCE\":\"";
payload += distance;
payload += "}\"";

Serial.print("Sending payload: ");
Serial.println(payload);

if(client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print
    publish ok in Serial monitor or else it will print publish failed
} 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();
}
}

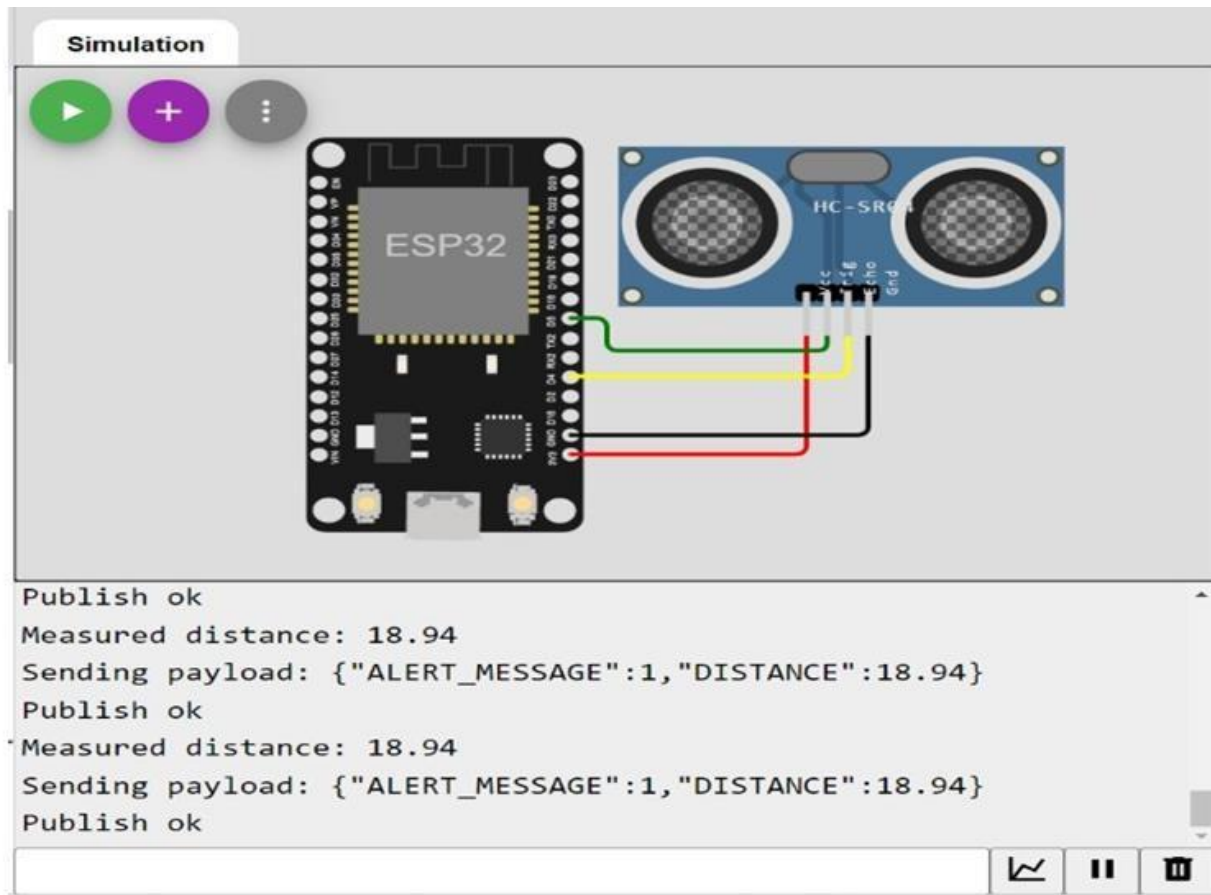
void wificonnect() //function definition for wificonnect
{
    Serial.println();
    Serial.print("Connecting to ");

    WiFi.begin("Wokwi-GUEST", "", 6); //passing the wifi credentials to establish the
connection
    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");
    }
}
}

```

## Output:



## IBM Cloud Image:

IBM Cloud IoT Platform interface showing a device simulation.

Device ID: 24052002, Status: Connected, Device Type: sampledevice, Class ID: Device, Date Added: Oct 6, 2022 7:50 PM

Recent Events:

Event	Value	Format	Last Received
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.95}	json	a few seconds ago
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.98}	json	a few seconds ago
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.98}	json	a few seconds ago
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.98}	json	a few seconds ago
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.98}	json	a few seconds ago

0 Simulations running