# ASSIGNMENT – 4

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**Project Title:** Smart Solutions for Railways

**Question:**

Write code and connections in wokwi for the ultrasonic sensor.
Whenever the distance is less than 100 cm send an "alert" to the IBM cloud and display in the device recent events.
Upload document with wokwi share link and images of IBM cloud.

**PROGRAM:**

```
#include <WiFi.h>

#include <PubSubClient.h>

#include <ArduinoJson.h>

WiFiClient wifiClient;

#define ORG "wrcdxi"

#define DEVICE_TYPE "moha"

#define DEVICE_ID "1234"

#define TOKEN "moha@321"

#define speed 0.034

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

char publishTopic[] = "iot-2/evt/Data/fmt/json";

char topic[] = "iot-2/cmd/home/fmt/String";

char authMethod[] = "use-token-auth";

char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

PubSubClient client(server, 1883, wifiClient);

void publishData();

const int trigpin=13;

const int echopin=12;
```

```
String command;
String data="";
long duration;
int dist;
void setup()
{
Serial.begin(115200);
pinMode(trigpin, OUTPUT);
pinMode(echopin, INPUT);
wifiConnect();
mqttConnect();
}
void loop() {
publishData();
delay(500);
if (!client.loop()) {
mqttConnect();
}
}
void wifiConnect() {
Serial.print("Connecting to "); Serial.print("Wifi");
WiFi.begin("Wokwi-GUEST",  "", 6);
while (WiFi.status() != WL_CONNECTED)  {
delay(500);
Serial.print(".");
}
Serial.print("WiFi connected, IP address: ");
Serial.println(WiFi.localIP());
}
void mqttConnect() {
```

```
if (!client.connected()) {
Serial.print("Reconnecting MQTT client to "); Serial.println(server);
while (!client.connect(clientId, authMethod, token)) {
Serial.print(".");
delay(1000);
}
initManagedDevice();
Serial.println();
}
}
void initManagedDevice() {
if (client.subscribe(topic)) {
Serial.println(client.subscribe(topic));
Serial.println("subscribe to cmd OK");
} else {
Serial.println("subscribe to cmd FAILED");
}
}
void publishData()
{
digitalWrite(trigpin,LOW);
digitalWrite(trigpin,HIGH);
delayMicroseconds(10);
digitalWrite(trigpin,LOW);
duration=pulseIn(echopin,HIGH);
dist=duration*speed/2;
if(dist<100){
DynamicJsonDocument doc(1024);
String payload;
doc["Distance Alert:"]=dist;
```

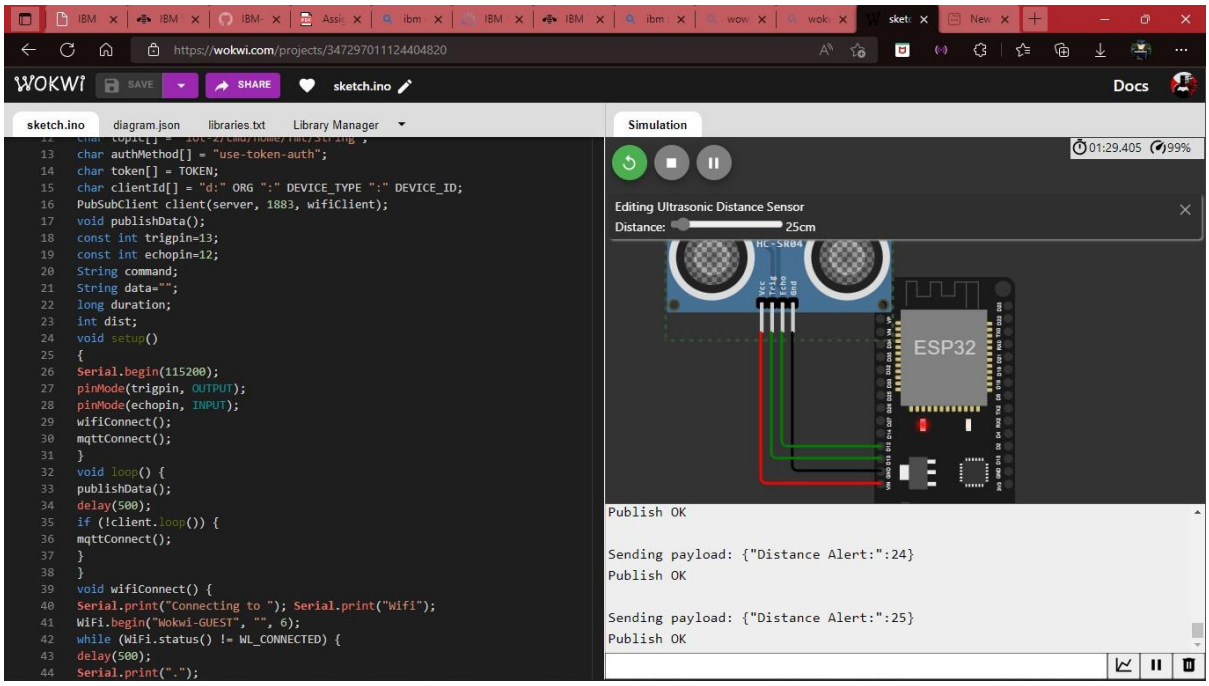
```
serializeJson(doc, payload);
delay(3000);
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish OK");
} else {
Serial.println("Publish FAILED");
}
}
}
```

**Wokwi Link:**

https://wokwi.com/projects/347297011124404820

## Output Images:

### Wokwi Output Screen



## IBM Cloud Result: