

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 "4tsuyg"
#define DEVICE_TYPE "waasan"
#define DEVICE_ID "9876"
#define TOKEN "keerthivasan"
#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");

}

}

}

}

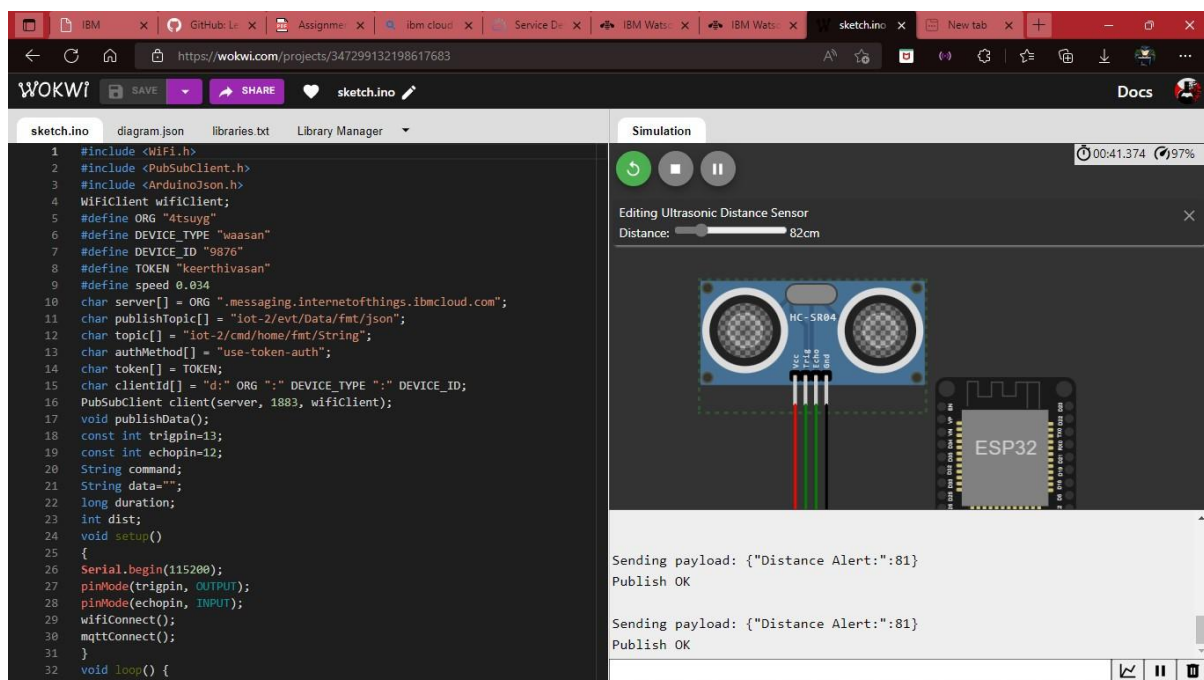
```

Wokwi Link:

<https://wokwi.com/projects/347299132198617683>

Output Images:

Wokwi Output Screen



IBM Cloud Result:

The screenshot displays the IBM Watson IoT Platform dashboard. The top navigation bar includes tabs for 'Browse', 'Action', 'Device Types', and 'Interfaces'. A user profile for 'keerthi2002kv@gmail.com' with ID '4tsuyg' is visible in the top right. The main content area shows details for a device named 'waasan' (ID 9876), which is 'Connected'. The 'Recent Events' tab is active, displaying a table of events. The table has columns for 'Event', 'Value', 'Format', and 'Last Received'. Two events are listed, both with the value '["Distance Alert":46]' and format 'json'. The bottom of the dashboard shows pagination controls indicating '1 of 1 page'.

Event	Value	Format	Last Received
Data	["Distance Alert":46]	json	a few seconds ago
Data	["Distance Alert":46]	json	a few seconds ago