HAZARDOUS AREA MONITORING FOR INDUSTRIAL PLANTS POWERED BY IOT

SUBMITTED BY

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BACHELOR OF ENGINEERING IN ELECTRONICS AND COMMUNICATION ENGINEERING

ASSIGNMENT-04

Question:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than100cms send “alert” to ibm cloud and display in device recent events.

Upload document with wokwi share link and images of ibm cloud.

Solution:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt

#define ECHO_GPIO 12
#define TRIGGER_GPIO 13
#define MAX_DISTANCE_CM 100 // Maximum of 5 meters
#include "Ultrasonic.h"

Ultrasonic ultrasonic(13, 12);
int distance;

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

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

#define ORG "dv1snq"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "45682367915"     //Token
String data3;
float h, t;


//-------- 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/command/fmt/String";// cmd  REPRESENT
command type AND COMMAND IS TEST OF FORMAT STRING
```

```
char authMethod[] = "use-token-auth";// authentication methodchar token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id


//-------------------------------------------------------------------------------
WiFiClient wifiClient; // creating the instance for wificlient PubSubClient client(server, 1883,
callback ,wifiClient); //calling thepredefined client id by passing parameter like server
id,portand wificredential

void setup()// configureing the ESP32
{
  Serial.begin(115200);
  delay(10); Serial.println();
  wificonnect(); mqttconnect();
}

void loop()// Recursive Function
{

  distance = ultrasonic.read(CM); if(distance <
  100){ Serial.print("Distance in CM: ");
  Serial.println(distance);
  PublishData(distance); delay(1000);
  if (!client.loop()) {mqttconnect();
  }

  }

  delay(1000);


}

/*.....retrieving to
Cloud..... */

void PublishData(float temp) { mqttconnect();//function call for
  connecting to ibm
  /*
      creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"Alert Distance:\":";
```

```
    payload += temp;
    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 cloudthen 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 defination for wificonnect
{
    Serial.println(); Serial.print("Connecting
    to ");

    WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establishthe connection
    while (WiFi.status() != WL_CONNECTED) {
        delay(500);
        Serial.print(".");
    }
    Serial.println(""); Serial.println("WiFi
    connected");Serial.println("IP address: ");
    Serial.println(WiFi.localIP());
}
```

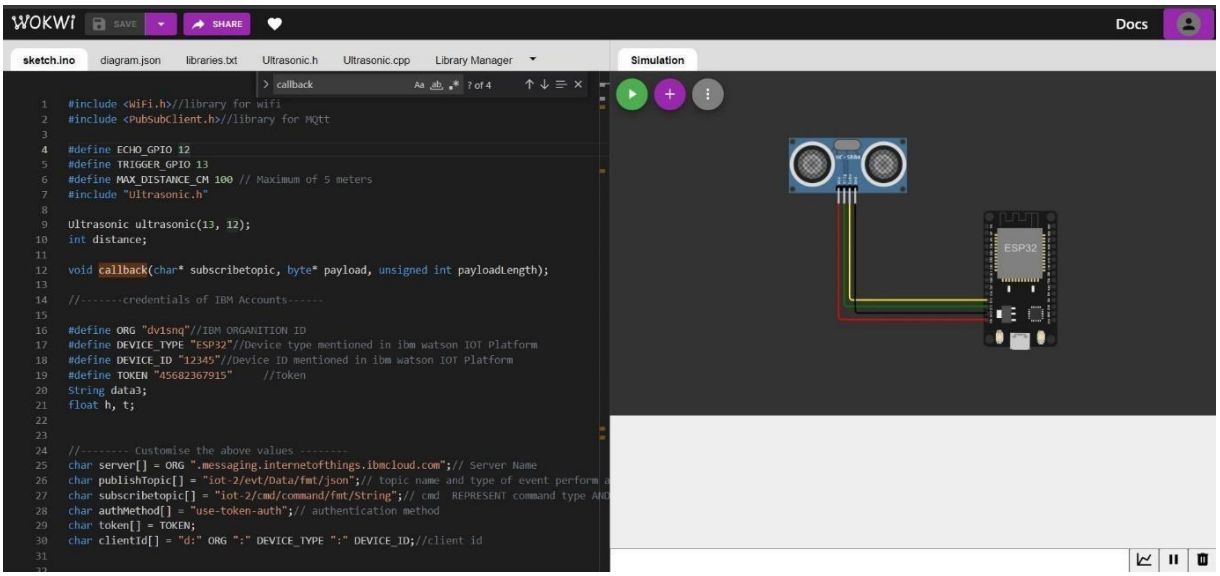
```
void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println((subscribetopic));
    Serial.println("subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd FAILED");
  }
}

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);
  if(data3=="lighton")
  {
Serial.println(data3);
  }
  else
  {
Serial.println(data3);
  }
data3="";
}
```

Wokwi link:

https://wokwi.com/projects/346737091615392340


WOKWI
SAVE
SHARE
Docs
sketch.ino
diagram.json
libraries.txt
Ultrasonic.h
Ultrasonic.cpp
Library Manager
Simulation
callback
ESP32
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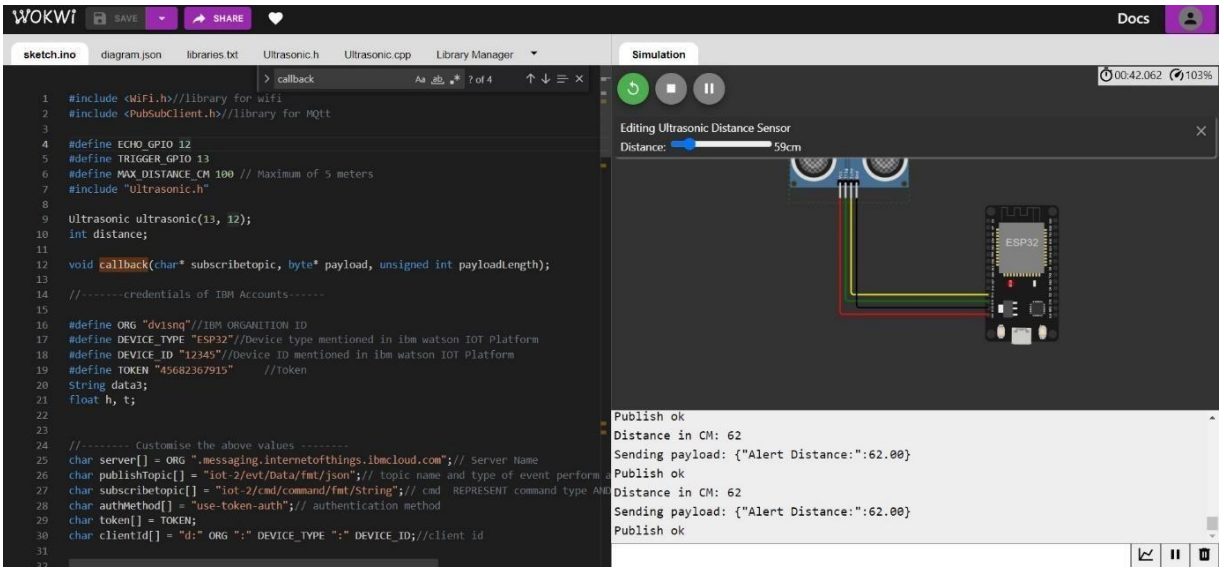
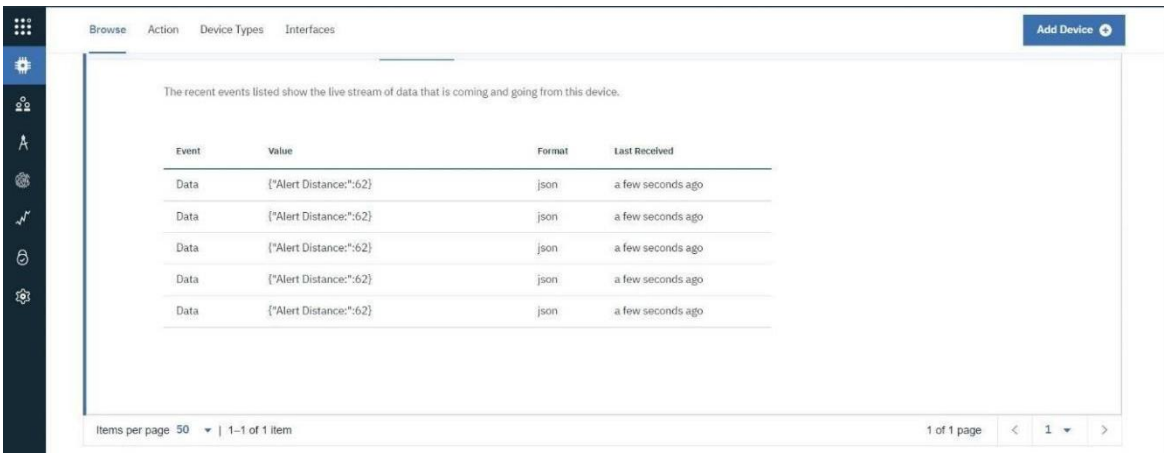
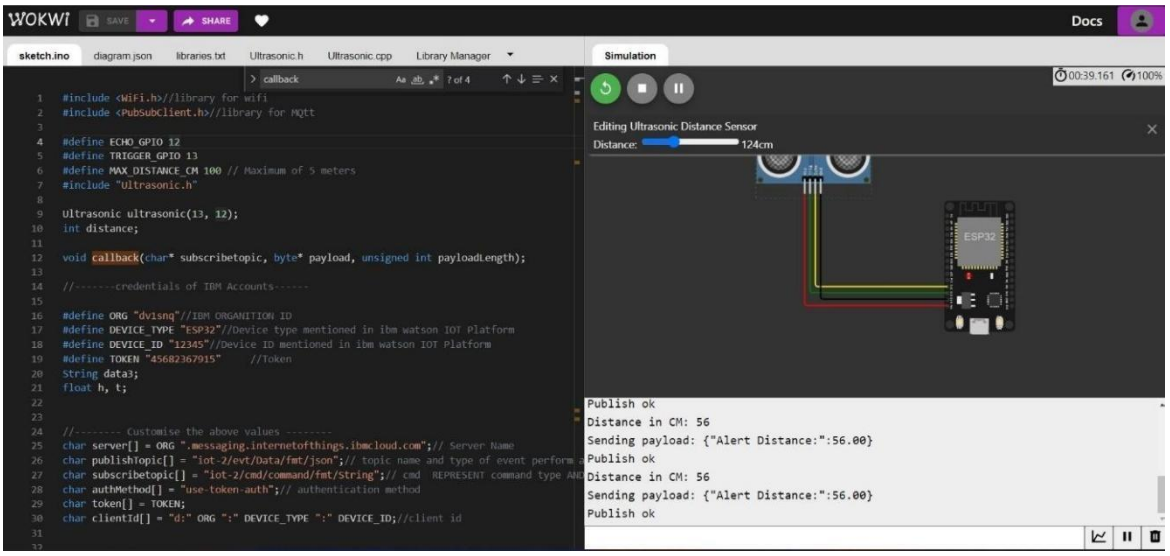

WOKWI
SAVE
SHARE
Docs
sketch.ino
diagram.json
libraries.txt
Ultrasonic.h
Ultrasonic.cpp
Library Manager
Simulation
00:42.062
103%
Editing Ultrasonic Distance Sensor
Distance:
59cm
ESP32
Publish ok
Distance in CM: 62
Sending payload: {"Alert Distance:":62.00}
Publish ok
Distance in CM: 62
Sending payload: {"Alert Distance:":62.00}
Publish ok


Browse
Action
Device Types
Interfaces
Add Device
The recent events listed show the live stream of data that is coming and going from this device.
Event
Value
Format
Last Received
Data
{"Alert Distance:":62}
json
a few seconds ago
Items per page 50
1–1 of 1 item
1 of 1 page


WOKWI
SAVE
SHARE
Docs
sketch.ino
diagram.json
libraries.txt
Ultrasonic.h
Ultrasonic.cpp
Library Manager
Simulation
callback
? of 4
00:39.161
100%
Editing Ultrasonic Distance Sensor
Distance:
124cm
ESP32
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#include <PubSubClient.h>//library for MQtt
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char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
Publish ok
Distance in CM: 56
Sending payload: {"Alert Distance:":56.00}
Publish ok
Distance in CM: 56
Sending payload: {"Alert Distance:":56.00}
Publish ok