ASSIGNMENT 4

TEAM ID : PNT2022TMID12810

PROJECT TITLE : SmartFarmer – IoT Enabled Smart Farming Application

SUBMITTED BY : Tharun G (718019L144)

GIVEN PROBLEM:

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

ESP32 CODE:

```
#include <WiFi.h>
#include "PubSubClient.h"
#define ECHO 2
#define TRIG 15
#define L LOW
#define H HIGH
#define ORG "b6kdov"
#define DEVICE_TYPE "ESP32"
#define DEVICE_ID "24_0A_C4_00_01_10"
#define TOKEN "G8F*JZcTgYJl6h!17W"

int distance = 0;
char SSID[] = "Wokwi-GUEST";
char PASSWORD[] = "";

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/update/fmt/json";
char topic[] = "iot-2/cmd/update/fmt/Number";
char AUTH[] = "use-token-auth";
char token[] = "G8F*JZcTgYJl6h!17W";
char CLIENTID[] = "d:"ORG":"DEVICE_TYPE":"DEVICE_ID;
```

```
WiFiClient wifiClient;
PubSubClient client(server, 1883, wifiClient);

void setup()
{
 Serial.begin(115200);
 pinMode(TRIG, OUTPUT);
 pinMode(ECHO, OUTPUT);
 pinMode(LED_BUILTIN, OUTPUT);

 WiFi.mode(WIFI_STA);
 WiFi.begin(SSID, PASSWORD);
 Serial.print("Trying to connect to WiFi.");
 while (WiFi.status() != WL_CONNECTED) {
  delay(500);
  Serial.print(".");
 }
 Serial.println();

 Serial.print("Connected to ");
 Serial.print(SSID);
 Serial.print("(IP Address: ");
 Serial.print(WiFi.localIP());
 Serial.println(")");

 Serial.print("MAC Address: ");
 Serial.println(WiFi.macAddress());

 mqttConnect();
```

```
}

float readDistanceValue()
{
 digitalWrite(TRIG, L);
 delayMicroseconds(2);
 digitalWrite(TRIG, H);
 delayMicroseconds(10);
 digitalWrite(TRIG, L);
 distance = pulseIn(ECHO, HIGH) * 0.034 / 2;
 return distance;
}

void mqttConnect()
{
  if (!client.connected())
  {
    Serial.print("Client trying to reconnect to ");
    Serial.println(server);
    while (!client.connect( CLIENTID, AUTH, TOKEN))
    {
      Serial.print(".");
      delay(500);
    }
    Serial.println();
    if (client.subscribe(topic))
    {
      Serial.println("Subscription Success!");
    }
    else
```

```
    {
      Serial.println("Subscription Failed!");
    }
  }
}

void loop() {
  float currDistance = readDistanceValue();
  Serial.println("Distance: " + String(currDistance, 2) + "m");
  Serial.println("-----");

  if (currDistance < 100)
  {
    String payload = "{\"Alert distance\":";
    payload += currDistance;
    payload += "}";
    Serial.print("Payload: ");
    Serial.println(payload);

    if (client.publish(publishTopic, (char *) payload.c_str()))
    {
      Serial.println("Published Successfully!");
    }
    else
    {
      Serial.println("Publish Failed!");
    }
  }
  else
  {
```

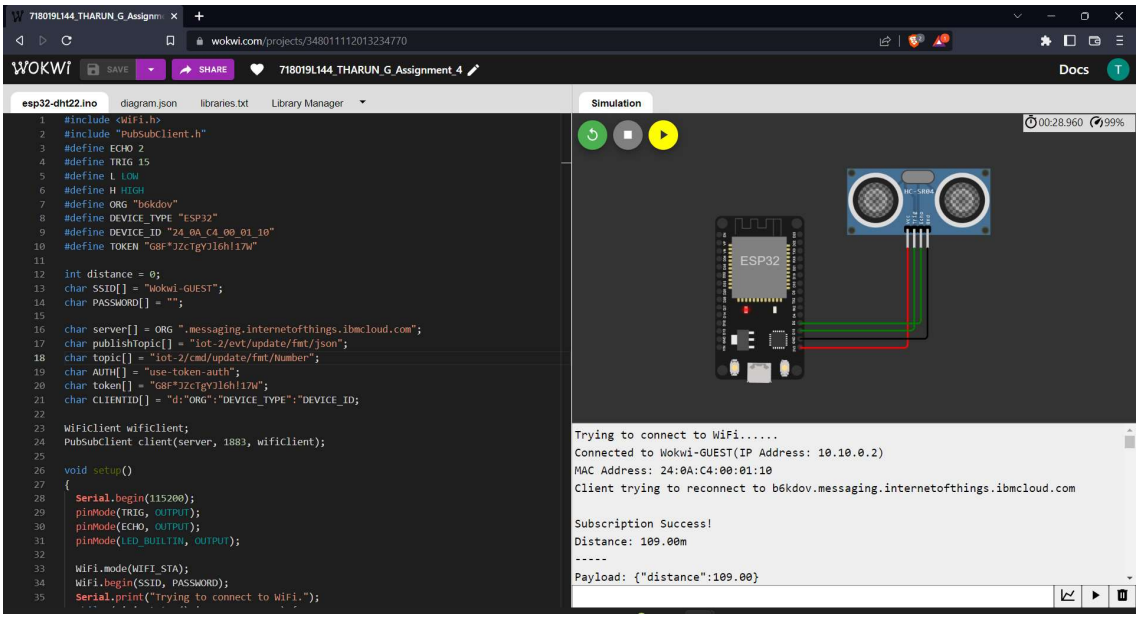
```
  String payload = "{\"Distance\":";
  payload += currDistance;
  payload += "}";
  Serial.print("Payload: ");
  Serial.println(payload);

  if (client.publish(publishTopic, (char *) payload.c_str()))
  {
    Serial.println("Published Successfully!");
  }
  else
  {
    Serial.println("Publish Failed!");
  }
 }
 if (!client.loop())
 {
  mqttConnect();
 }
 delay(10000);
}
```

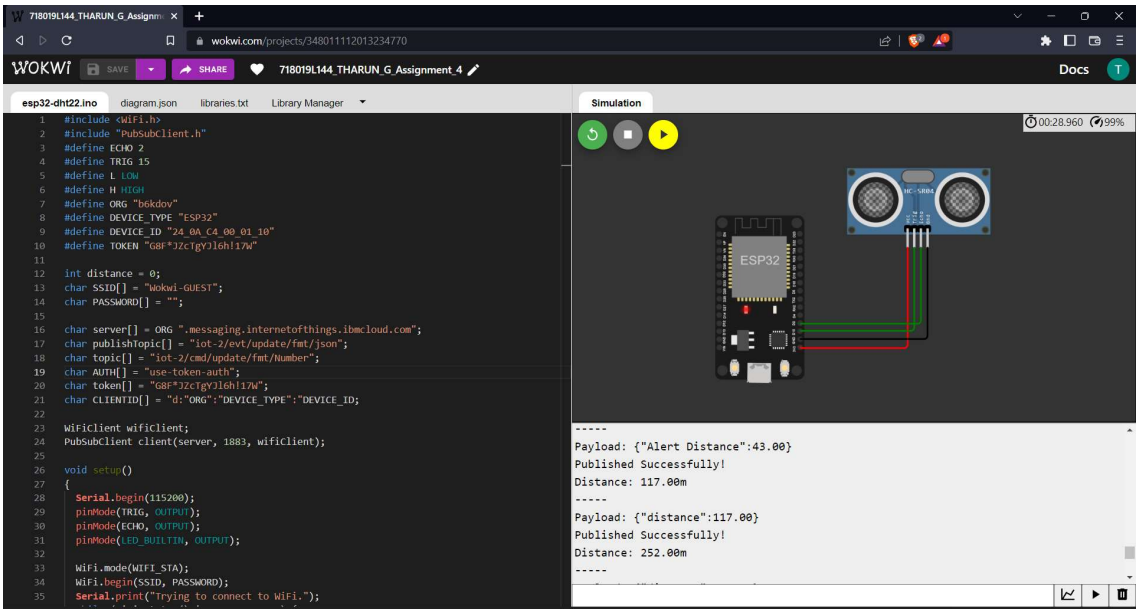
DIAGRAM.JSON

```
{
 "version": 1,
 "author": "Uri Shaked",
 "editor": "wokwi",
 "parts": [
  { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 0, "left": -48, "attrs": {} },
  {
   "type": "wokwi-hc-sr04",
```

```
    "id": "ultrasonic1",
    "top": -54.23,
    "left": 108.84,
    "attrs": { "distance": "110" }
   }
 ],
 "connections": [
   [ "esp:TX0", "$serialMonitor:RX", "", [] ],
   [ "esp:RX0", "$serialMonitor:TX", "", [] ],
   [ "ultrasonic1:VCC", "esp:3V3", "red", [ "v119.23", "h-125.12" ] ],
   [ "ultrasonic1:GND", "esp:GND.1", "black", [ "v108.56", "h-150.12" ] ],
   [ "ultrasonic1:TRIG", "esp:D15", "green", [ "v98.81", "h-133.94" ] ],
   [ "ultrasonic1:ECHO", "esp:D2", "green", [ "v90.31", "h-145.07" ] ]
 ]
}
```

OUTPUT SNIPPETS:




718019L144_THARUN_G_Assignm
wokwi.com/projects/348011112013234770
WOKWI
SAVE
SHARE
718019L144_THARUN_G_Assignment_4
Docs
esp32-dht22.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:28.960
99%
ESP32
HC-SR04
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#include "PubSubClient.h"
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#define L LOW
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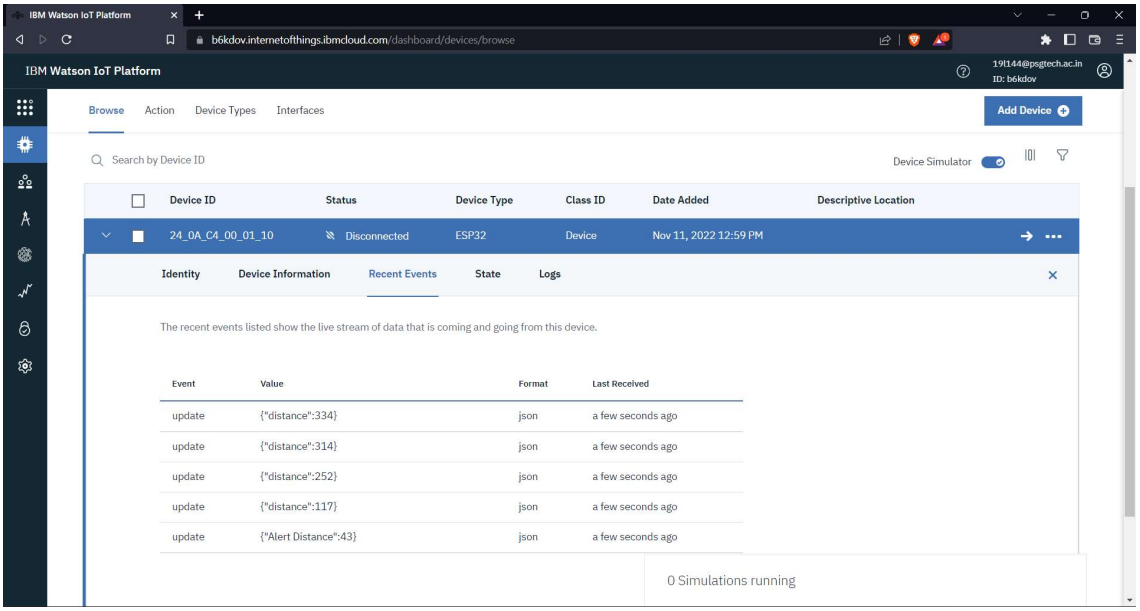
{
Serial.begin(115200);
pinMode(TRIG, OUTPUT);
pinMode(ECHO, OUTPUT);
pinMode(LED_BUILTIN, OUTPUT);
WiFi.mode(WIFI_STA);
WiFi.begin(SSID, PASSWORD);
Serial.print("Trying to connect to WiFi.");

Payload: {"Alert Distance":43.00}
Published Successfully!
Distance: 117.00m

Payload: {"distance":117.00}
Published Successfully!
Distance: 252.00m


IBM Watson IoT Platform
b6kdov.internetofthings.ibmcloud.com/dashboard/devices/browse
IBM Watson IoT Platform
19l144@psgtech.ac.in
ID: b6kdov
Browse
Action
Device Types
Interfaces
Add Device
Search by Device ID
Device Simulator
Device ID
Status
Device Type
Class ID
Date Added
Descriptive Location
24_0A_C4_00_01_10
Disconnected
ESP32
Device
Nov 11, 2022 12:59 PM
Identity
Device Information
Recent Events
State
Logs
The recent events listed show the live stream of data that is coming and going from this device.
Event
Value
Format
Last Received
update
{"distance":334}
json
a few seconds ago
update
{"distance":314}
json
a few seconds ago
update
{"distance":252}
json
a few seconds ago
update
{"distance":117}
json
a few seconds ago
update
{"Alert Distance":43}
json
a few seconds ago
0 Simulations running