**ASSIGNMENT 4**

**Ultrasonic sensor simulation in Wokwi**

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| Date | 25 October 2022 |
| Team  Members | 1)**Jeevitha C (Team leader)**  2)Indhumathi B  3)Jeeva Jothi D  4)Kanishka K |
| Team ID | PNT2022TMID17245 |
| Project Name | **Gas leakage monitoring and alerting system** |

**Question-1:**

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an “Alert” to IBM cloud and display in the device recent events. **Code:**

#include <WiFi.h> #include <PubSubClient.h> void callback (char\* subscribetopic, byte\* payload, unsigned int payloadLength);

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

#define ORG "kotoq5"//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 "12345678" //Token String data3; char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; char publishTopic[] = "iot-2/evt/Data/fmt/json"; char subscribetopic[] = "iot-2/cmd/test/fmt/String"; char authMethod[] = "use-token-auth"; char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE\_TYPE ":" DEVICE\_ID;

WiFiClient wifiClient;

PubSubClient client(server, 1883, callback

,wifiClient); const int trigPin = 5; const int echoPin = 18; #define SOUND\_SPEED 0.034 long duration; float distance; void setup() { **Serial**.begin(115200); pinMode(trigPin, OUTPUT); pinMode(echoPin, INPUT); wificonnect(); mqttconnect(); } void loop() { digitalWrite(trigPin, LOW); delayMicroseconds(2); digitalWrite(trigPin, HIGH); delayMicroseconds(10); digitalWrite(trigPin, LOW); duration = pulseIn(echoPin, HIGH); distance = duration \* SOUND\_SPEED/2;

**Serial**.print("Distance (cm): ");

**Serial**.println(distance); if(distance<100)

{

**Serial**.println("ALERT!!"); delay(1000); PublishData(distance); delay(1000); if (!client.loop()) { mqttconnect(); } } delay(1000); } void PublishData(float dist) { mqttconnect();

String payload = "{\"Distance\":"; payload += dist; payload += ",\"ALERT!!\":""\"Distance less than 100cms\""; payload += "}";

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

if (client.publish(publishTopic, (char\*) payload.c\_str())) {

**Serial**.println("Publish ok");

} 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() {

**Serial**.println();

**Serial**.print("Connecting to ");

WiFi.begin("Wokwi-GUEST", "", 6); 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); data3="";

}

**Diagram.json:**

{

"version": 1,

"author": "sweetysharon",

"editor": "wokwi",

"parts": [

{ "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67, "attrs": {} },

{ "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} }

],

"connections": [

[ "esp:TX0", "$serialMonitor:RX", "", [] ],

[ "esp:RX0", "$serialMonitor:TX", "", [] ],

[

"esp:VIN",

"ultrasonic1:VCC",

"red",

[ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]

],

[ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],

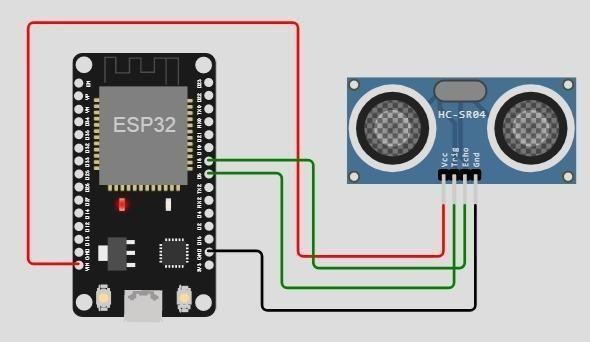
[ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],

[ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]

]

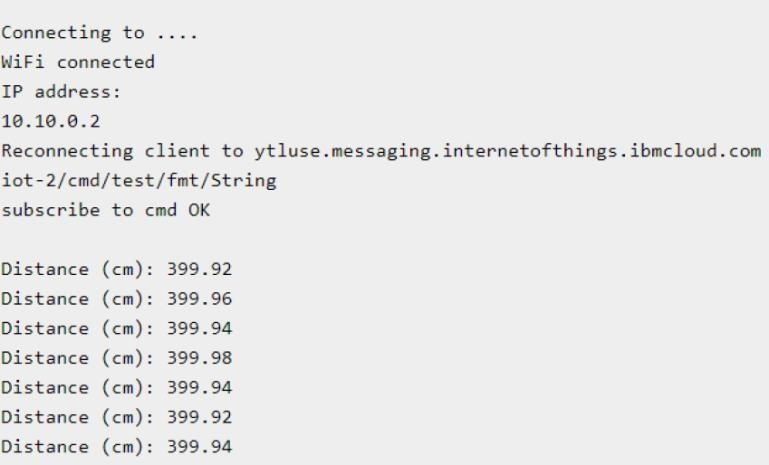
}

**Circuit Diagram:**

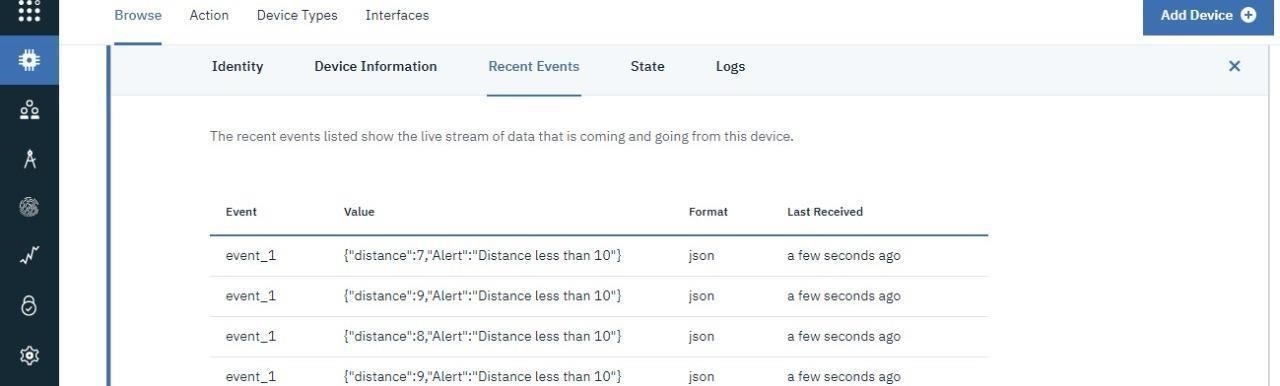


**Output:**

Wokwi output:



**IBM cloud output:**



**Wokwi simulation link:**

[**https://wokwi.com/projects/346404308518961748**](https://wokwi.com/projects/346404308518961748)