

Assignment -4

Assignment Date	08 November 2022
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Student Roll Number	111919106009
Maximum Marks	2 Marks

Question-1: Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

Soln:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
#define ORG "fo8tkk"
#define DEVICE_TYPE "Wokwi"
#define DEVICE_ID "21222122"
#define TOKEN "87654321"
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++) {
    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": -112.87, "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" ] ]  
]  
}
```

WOKWI LINK:

<https://wokwi.com/projects/347678878108484179>

IBMAssigmentsInternet of ThingsIoT-33-3MSE (Eve)Ultrasonic sensorApplication DetailIEM Watson IoTIBM Cloud

wokwi.com/projects/547678878108484179

Suggested SitesGmailYouTubeMaps

WOKWI

SAVESHARE

Ultrasonic sensor simulation

Docs

esp32-dht22.ino

diagram.json

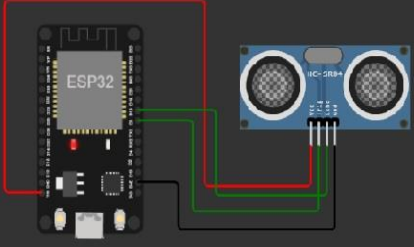
libraries.txt

Library Manager

```
1 #include <Arduino.h>
2 #include <PubSubClient.h>
3 void callback(char* topic, byte* payload, unsigned int
4 payload.length);
5 #define ORG "foatkk"
6 #define DEVICE_TYPE "wokwi"
7 #define DEVICE_ID "21222122"
8 #define TOKEN "87654321"
9 String data;
10 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
11 char publishTopic[] = "iot-2/evt/data/fmt/json";
12 char subscribeTopic[] = "iot-2/cmd/test/fmt/string";
13 char authMethod[] = "use-token-auth";
14 char token[] = TOKEN;
15 char clientId[] = "dt:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
16 WiFiClient wificlient;
17 PubSubClient client(server, 1883, callback, wificlient);
18 const int trigPin = 5;
19 const int echoPin = 18;
20 #define SOUND_SPEED 0.034
21 long duration;
22 float distance;
23 void setup() {
24   Serial.begin(115200);
25   pinMode(trigPin, OUTPUT);
26   pinMode(echoPin, INPUT);
27   wificlient.connect();
28   mqttConnect();
29 }
30 void loop()
31 {
32   digitalWrite(trigPin, LOW);
33   delayMicroseconds(2);
34   digitalWrite(trigPin, HIGH);
35   delayMicroseconds(10);
36   digitalWrite(trigPin, LOW);
37   duration = pulseIn(echoPin, HIGH);
38   distance = (duration / 2) / SOUND_SPEED;
39   Serial.print("Distance: ");
40   Serial.println(distance);
41   if (distance < 100) {
42     String alert = "ALERT!!";
43     String payload = "{\"Distance\":" + String(distance) + "," + alert + "":"Distance less than 100cms"}";
44     client.publish(publishTopic, payload);
45     Serial.println("Publish ok");
46   }
47   delay(1000);
48 }
```

Simulation

02:33.874 92%



Distance (cm): 166.01
Distance (cm): 165.95
Distance (cm): 52.96
ALERT!!
Sending payload: {"Distance":52.96,"ALERT!!":"Distance less than 100cms"}
Publish ok

25°C Raining now

Search

ENG IN

11:11-2022

IBM

Assignments

Internet of Things

IoT-B3-3MSE (Ev

Ultrasonic sensor

Application Deta

IBM Watson IoT

IBM Cloud

+

fo8tkk.internetofthings.ibmcloud.com/dashboard/devices/browse

Suggested Sites

Gmail

YouTube

Maps

IBM Watson IoT Platform

111919106009@smartinternz.com
ID: fo8tkk

Browse

Action

Device Types

Interfaces

Add Device +

21222122

Connected

Wokwi

Device

8 Nov 2022 6:17 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
Data	{"Distance":91.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":91.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":91.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":91.99,"ALERT!!":"Distance less than ...	json	3 minutes ago
Data	{"Distance":91.99,"ALERT!!":"Distance less than ...	json	3 minutes ago

>

2341

Disconnected

demo123

Device

9 N

2 Simulations running