

ASSIGNMENT -4

Assignment Date	25 October 2022
Student Name	SATHYA NARAYANAN P
Student Roll Number	410619106017
Maximum Marks	2 Marks

Problem Statement:

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

Source Code:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic,byte* payload, unsigned int payloadLength);
#define ORG "p4s6t5"
#define DEVICE_TYPE "Ultrasonic_Sensor_ESP32"
#define DEVICE_ID "1923"
#define TOKEN "12345678"
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[]="iot-2/evt/distance/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);
#define ECHO_PIN 12
#define TRIG_PIN 13
#define led 2
void setup() {
// put your setup code here, to run once:
Serial.begin(115200);
pinMode(led, OUTPUT);
pinMode(TRIG_PIN, OUTPUT);
pinMode(ECHO_PIN, INPUT);
wificonnect();
mqttconnect();
}
```

```

float readDistanceCM() {
digitalWrite(TRIG_PIN, LOW); // Clear the trigger
delayMicroseconds(2);
digitalWrite(TRIG_PIN, HIGH); // Sets the trigger pin to HIGH state for 10
microseconds
delayMicroseconds(10);
digitalWrite(TRIG_PIN, LOW);
int duration=pulseIn(ECHO_PIN, HIGH);
//Serial.println(duration);
//duration = pulseIn(ECHO_PIN, HIGH);
return duration*0.017;
//Serial.println(duration);
}
void loop() {
float distance = readDistanceCM();
//Serial.println(distance);
bool isNearby = distance < 100;
digitalWrite(led, isNearby);
Serial.print("Measured distance: ");
Serial.println(distance);
if(distance<100){
PublishData2(distance);
}else{
PublishData1(distance);
}
//PublishData(distance);
delay(1000);
if(!client.loop()){
mqttconnect();
}
//delay(2000);
}
void PublishData1(float dist){
mqttconnect();
String payload= "{\"distance\":\"";
payload += dist;
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 PublishData2(float dist){
  mqttconnect();
  String payload= "{\"ALERT\":";
  payload += dist;
  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 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);
if(data3=="lighton"){
Serial.println(data3);
digitalWrite(led,HIGH);
}else{
Serial.println(data3);
digitalWrite(led,LOW);
}
data3="";
}
```

Wokwi Link:

<https://wokwi.com/projects/346460656706257490>

Normal and Alert case:

Wokwi - Wokwi Arduino and ...

wokwi.com/projects/346460656706257490

Gmail YouTube Maps Photo - Google Ph... Google

WOKWI SAVE SHARE

Docs

sketch.ino diagram.json libraries.txt Library Manager

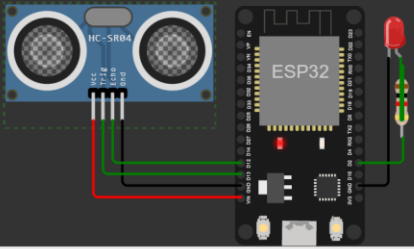
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2 #include <PubSubClient.h>
3 void callback(char* topic, byte* payload, unsigned int payloadlength);
4 #define ORG "p4s6t5"
5 #define DEVICE_TYPE "Ultrasonic_Sensor_ESP32"
6 #define DEVICE_ID "1923"
7 #define TOKEN "12345678"
8 String data;
9 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
10 char publishTopic[] = "iot-2/evt/distance/fmt/json";
11 char subscribeTopic[] = "iot-2/cmd/test/fmt/string";
12 char authMethod[] = "use-token-auth";
13 char token[] = TOKEN;
14 char clientId[] = "d:" + ORG + ":" + DEVICE_TYPE + ":" + DEVICE_ID;
15 WiFiClient wifiClient;
16 PubSubClient client(server, 1883, callback, wifiClient);
17 #define ECHO_PIN 12
18 #define TRIG_PIN 13
19 #define led 2
20 void setup() {
21   // put your setup code here, to run once:
22   Serial.begin(115200);
23   pinMode(led, OUTPUT);
24   pinMode(TRIG_PIN, OUTPUT);
25   pinMode(ECHO_PIN, INPUT);
26   wifiConnect();
27   mqttConnect();
28 }
29 float readDistanceCM() {
30   digitalWrite(TRIG_PIN, LOW); // Clear the trigger
31   delayMicroseconds(2);
32   digitalWrite(TRIG_PIN, HIGH); // Sets the trigger pin to HIGH state for 10 microseconds
33   delayMicroseconds(10);
34   digitalWrite(TRIG_PIN, LOW);
35   int duration = pulseIn(ECHO_PIN, HIGH);
36   //Serial.println(duration);
```

Simulation

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Editing Ultrasonic Distance Sensor

Distance: 392cm



publish ok
Measured distance: 391.95
Sending payload: {"distance": 391.95}
publish ok
Measured distance: 391.95
Sending payload: {"distance": 391.95}
publish ok

Wokwi - Wokwi Arduino and ...

wokwi.com/projects/346460656706257490

Gmail YouTube Maps Photo - Google Ph... Google

WOKWI SAVE SHARE

Docs

sketch.ino diagram.json libraries.txt Library Manager

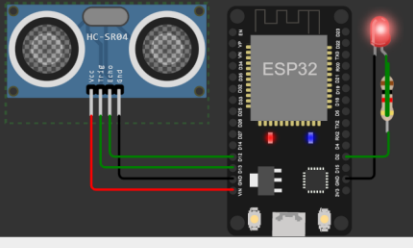
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26   wifiConnect();
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28 }
29 float readDistanceCM() {
30   digitalWrite(TRIG_PIN, LOW); // Clear the trigger
31   delayMicroseconds(2);
32   digitalWrite(TRIG_PIN, HIGH); // Sets the trigger pin to HIGH state for 10 microseconds
33   delayMicroseconds(10);
34   digitalWrite(TRIG_PIN, LOW);
35   int duration = pulseIn(ECHO_PIN, HIGH);
36   //Serial.println(duration);
```

Simulation

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Editing Ultrasonic Distance Sensor

Distance: 68cm



publish ok
Measured distance: 67.98
Sending payload: {"ALERT": 67.98}
publish ok
Measured distance: 67.98
Sending payload: {"ALERT": 67.98}
publish ok

IBM CLOUD OUTPUT:

Browse Action Device Types Interfaces Add Device +

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
event_1	{"distance":7,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":8,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago