

Assignment - 4

Assignment Date	24 September 2022
Student Name	Joey Infant Rex A
Student Roll Number	2019504531
Maximum Marks	2 Marks

Question:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cm 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 "wf2kmp"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "JOEY123"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "234514253524" //Token
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="";
}

```

Reference:

<https://wokwi.com/projects/346658160739615314>

Output:

Case -1: Less than 100cm – (Bulb glows and Message - “Alert”)

sketch.ino

diagram.json

Ultrasonic.h

Ultrasonic.cpp

libraries.txt

Library Manager

```

1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* subscribtopic,byte* payload,unsigned int payloadLen)
4 #define ORG "wf2kmp"//IBM ORGANITION ID
5 #define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Plat
6 #define DEVICE_ID "JOEY123"//Device ID mentioned in ibm watson IOT Platf
7 #define TOKEN "234514253524" //Token
8 String data3;
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();

```

Simulation

00:31.048 94%

publish ok

Measured distance: 82.98

Sending payload:{"ALERT":82.98}

publish ok

Measured distance: 82.98

Sending payload:{"ALERT":82.98}

publish ok

IBM Watson IoT Platform

201904531@student_annauniv.edu ID: wf2kmp

Browse

Action

Device Types

Interfaces

Add Device +

JOEY123

Disconnected

ESP32

Device

Oct 27, 2022 1:17 PM

...

Identity

Device Information

Recent Events

State

Logs

X

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":75}	json	a few seconds ago
Data	{"Alert Distance":48}	json	a few seconds ago
Data	{"Alert Distance":83}	json	a few seconds ago
Data	{"Alert Distance":99}	json	a minute ago
Data	{"Alert Distance":79}	json	a minute ago

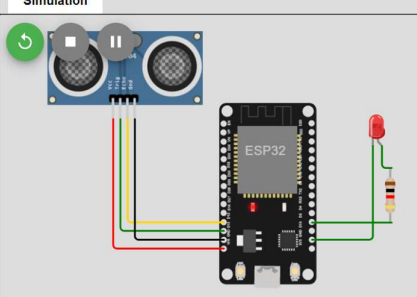
Case -2: More than 100cm – (bulb off and Message “distance”)

sketch.ino diagram.json Ultrasonic.h Ultrasonic.cpp libraries.txt

Library Manager

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* topic, byte* payload, unsigned int payloadLength) {
4 #define ORG "wf2kmp" //IBM ORGANIZATION ID
5 #define DEVICE_TYPE "ESP32" //Device type mentioned in ibm watson IOT Platform
6 #define DEVICE_ID "JOEY123" //Device ID mentioned in ibm watson IOT Platform
7 #define TOKEN "234514253524" //Token
8 String data3;
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();
```

Simulation



publish ok
Measured distance: 183.97
Sending payload:{"distance":183.97}
publish ok
Measured distance: 183.92
Sending payload:{"distance":183.92}
publish ok

IBM Watson IoT Platform

2019504531@student.unsw.edu.au
ID: wf2kmp

Browse Action Device Types Interfaces

Add Device

Device ID	Status	Device Type	Class ID	Date Added
JOEY123	Disconnected	ESP32	Device	Oct 27, 2022 1:17 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
distance	{"distance":108.95}	json	a few seconds ago
distance	{"distance":108.95}	json	a few seconds ago
distance	{"distance":179.98}	json	a few seconds ago
distance	{"distance":179.98}	json	a few seconds ago
distance	{"distance":179.96}	json	a few seconds ago