

Assignment-4

Assignment Date	16 Oct 2022
Student Name	Prakash E
Student Roll Number	2019504045
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 "srycbo"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "Prakash54"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "9876543210" //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!-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 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{

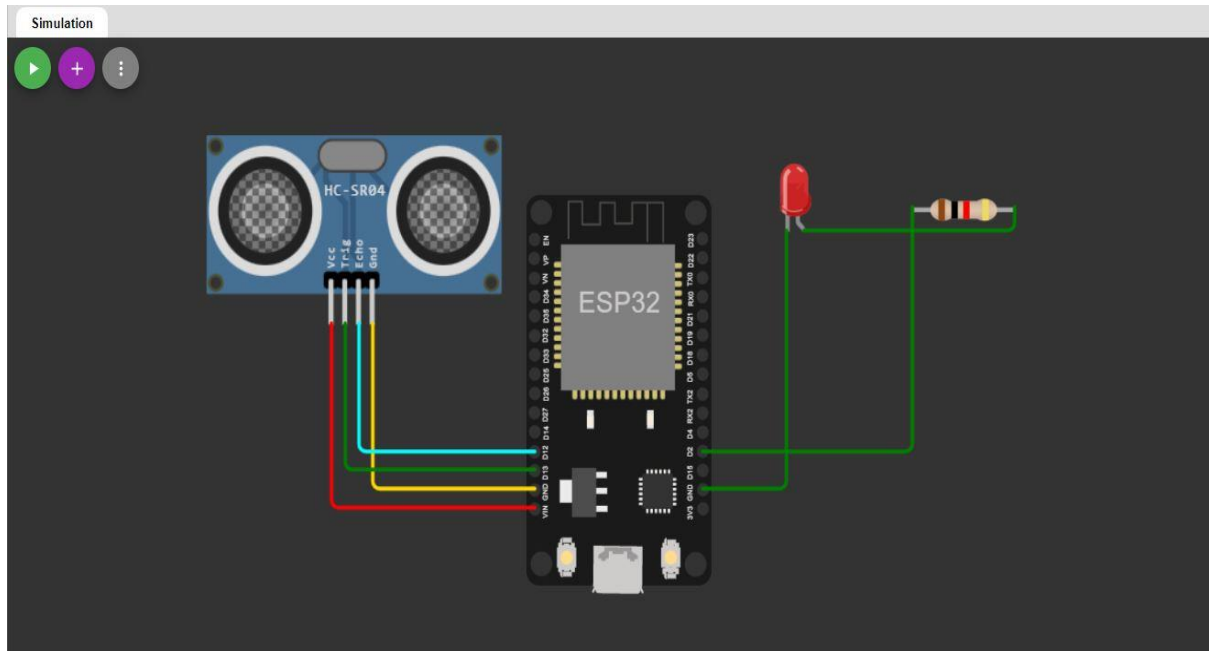
```

```

Serial.println(data3);
digitalWrite(led,LOW);
}
data3="";
}

```

Simulation Circuit:



Output:

Case1:When the distance of the object from the ultrasonic sensor is greater than 100 cm(LED doesn't glow and no alert message is displayed)

The output window displays the following data:

- Distance: 259cm
- Sending payload:{"Distance":258.98}
- publish ok
- Measured distance: 258.93
- Sending payload:{"Distance":258.93}
- publish ok
- Measured distance: 258.94
- Sending payload:{"Distance":258.94}
- publish ok
- Measured distance: 258.99
- Sending payload:{"Distance":258.99}
- publish ok

IBM Watson IoT Platform

prakashe21101@gmail.com
ID: srycbo

Browse Action Device Types Interfaces

Add Device +

Device ID	Status	Device Type	Class ID	Date Added
Prakash54	Connected	ESP32	Device	Oct 30, 2022 12:48 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":258.99}	json	a few seconds ago
distance	{"Distance":258.94}	json	a few seconds ago
distance	{"Distance":258.98}	json	a few seconds ago
distance	{"Distance":258.93}	json	a few seconds ago
distance	{"Distance":258.93}	json	a few seconds ago

Case2:When the distance of the object from the ultrasonic sensor is lesser than 100 cm(LED glows and the alert message is displayed)

02:37.082 10%

Editing Ultrasonic Distance Sensor
Distance: 66cm

```

Sending payload:{"ALERT!-Distance":66.03}
publish ok
Measured distance: 65.99
Sending payload:{"ALERT!-Distance":65.99}
publish ok
Measured distance: 65.96
Sending payload:{"ALERT!-Distance":65.96}
publish ok
Measured distance: 65.98
Sending payload:{"ALERT!-Distance":65.98}
publish ok
  
```



Browse Action Device Types Interfaces

Add Device +

<input type="checkbox"/>	Device ID	Status	Device Type	Class ID	Date Added	
▼ <input type="checkbox"/>	Prakash54	Connected	ESP32	Device	Oct 30, 2022 12:48 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	{"ALERTI-Distance":65.98}	json	a few seconds ago
distance	{"ALERTI-Distance":65.98}	json	a few seconds ago
distance	{"ALERTI-Distance":65.98}	json	a few seconds ago
distance	{"ALERTI-Distance":65.98}	json	a few seconds ago
distance	{"ALERTI-Distance":66.03}	json	a few seconds ago