Assignment-4

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Problem Statement:

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 "vkk3lh"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP-32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "2019504030"//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\":";
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);
```

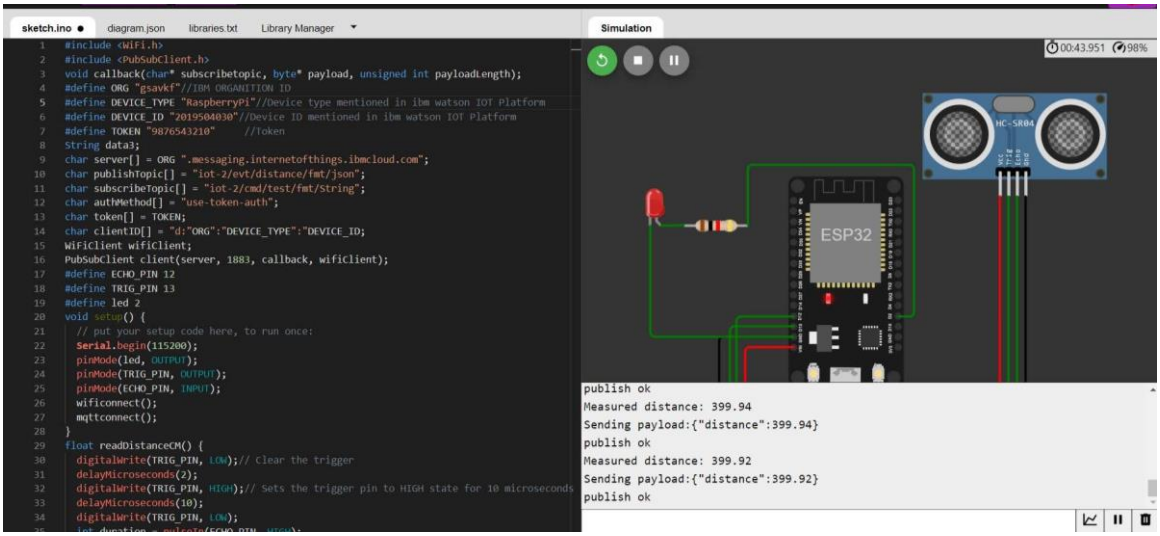
```
while (!!!client.connect(clientID, authMethod, token)) {
Serial.print(".");
delay(500);
}
initManagedDevice();
Serial.println();
}
}
void wificonnect() {
Serial.println();
Serial.print("Connecting to");
WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() != WL_CONNECTED) {
delay(500);
Serial.print(".");
}
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

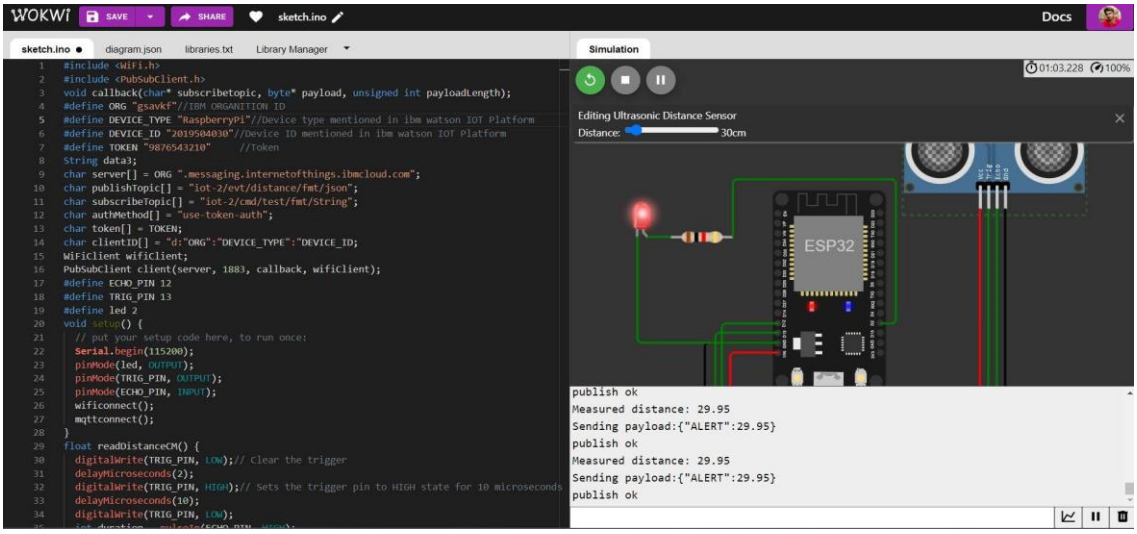
https://wokwi.com/projects/347143134975623762

output :

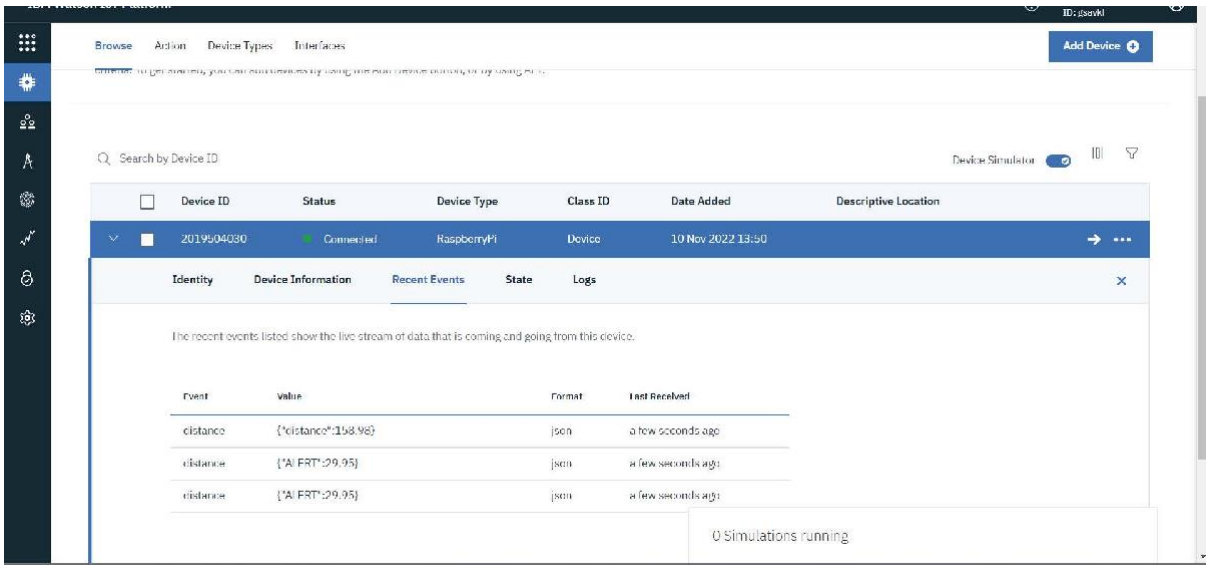
Normal Case:



Alert Case:



IBM Cloud Storage:


Browse
Action
Device Types
Interfaces
Add Device
Search by Device ID
Device Simulator
Device ID
Status
Device Type
Class ID
Date Added
Descriptive Location
2019504030
Connected
RaspberryPi
Device
10 Nov 2022 13:50
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":158.98}
json
a few seconds ago
distance
{"ALERT":29.95}
json
a few seconds ago
distance
{"ALERT":29.95}
json
a few seconds ago
0 Simulations running