ASSIGNMENT 4

Python programming

Assignment Date	19th September 2022
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Maximum Mark	2 marks

Question :

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an “Alert” to IBM cloud and display in the device recent events.

Code:

```
#include <WiFi.h> #include <PubSubClient.h>void callback(char* subscribetopic,
byte* payload, unsigned intpayloadLength);
//-------credentials of IBM Accounts------
#define ORG "kotoq5"//IBM ORGANITION ID
```

```
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibmwatson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibmwatson IOT Platform
#define TOKEN "12345678" //TokenString 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";
chartoken[] = TOKEN;
charclientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; WiFiClientwifiClient;
PubSubClient client(server, 1883, callback ,wifiClient); constinttrigPin = 5;
constintechoPin = 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();
} }
voidwificonnect()
{
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: ");
```

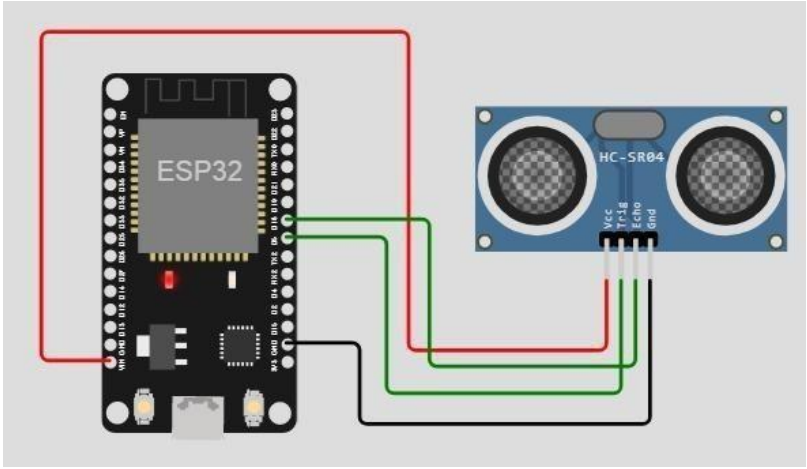
```
Serial.println(WiFi.localIP());
}
voidinitManagedDevice() { if
(client.subscribe(subscribetopic)) {
Serial.println((subscribetopic)); Serial.println("subscribe to cmd
OK");
} else {
Serial.println("subscribe to cmd FAILED");
} }void callback(char* subscribetopic, byte* payload, unsigned
intpayloadLength)
{
Serial.print("callback invoked for topic: ");
Serial.println(subscribetopic); for (inti = 0; i
<payloadLength; i++) {
//Serial.print((char)payload[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": -114.67, "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" ] ]
  ]
}
```

Circuit Diagram:



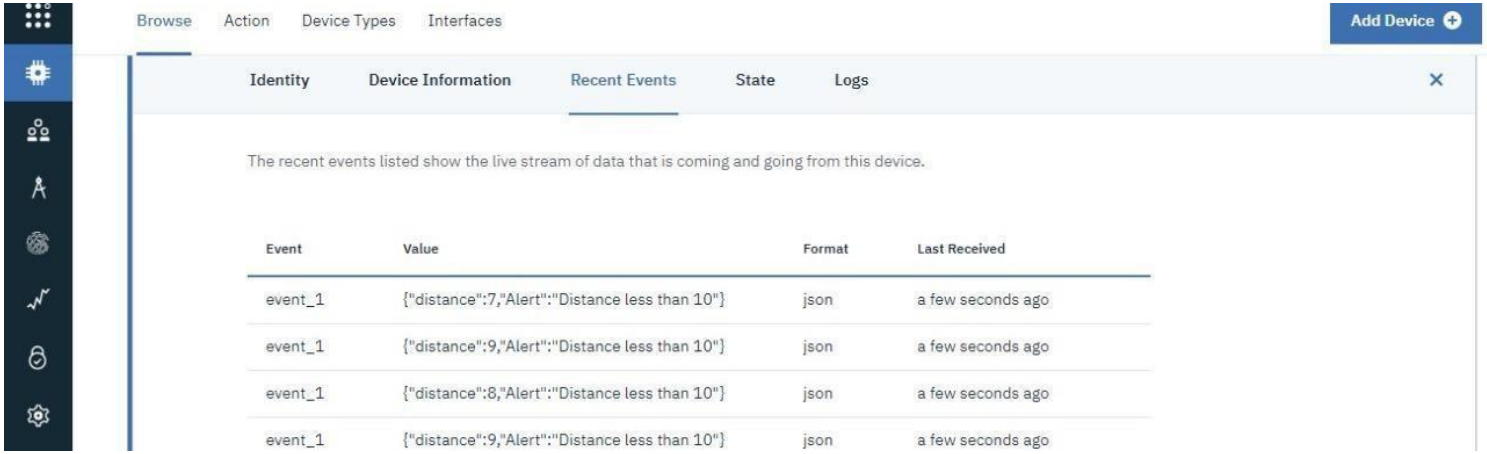
Output:

Wokwi output:

```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to ytluse.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 399.92
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.92
Distance (cm): 399.94
```

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