ASSIGNMENT 4

Assignment Date	14 November 2022
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Maximum Marks	2 Marks

Ultrasonic sensor simulation in Wokwi

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 int payloadLength);
//-------credentials of IBM Accounts------
#define ORG "kotoq5"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678" //Token
String 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";

char token[] = TOKEN;
    char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
    WiFiClient wifiClient;
    PubSubClient client(server, 1883, callback ,wifiClient);
    const int trigPin = 5; const int echoPin = 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();
} }
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++) {
//Serial.print((char)payload[i]); data3 +=
(char)payload[i];
    }
    Serial.println("data: "+ data3); data3="";
    }
    } } 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();
} }
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: ");
```

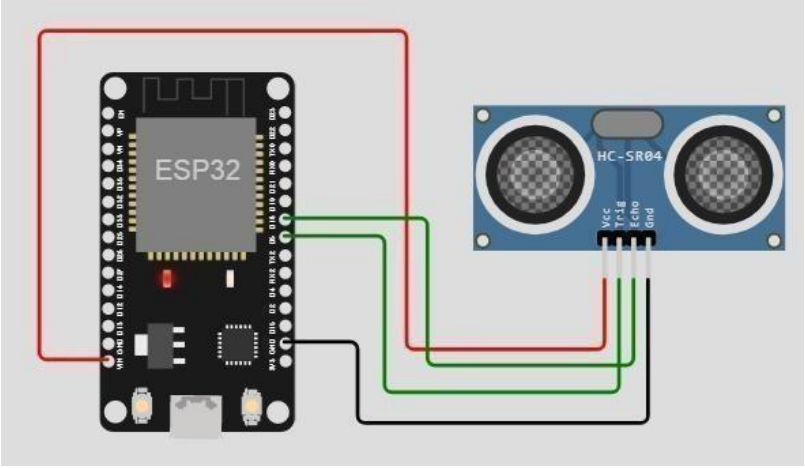
```
Serial.println(subscribetopic); for (int i =
0; i < payloadLength; i++) {
//Serial.print((char)payload[i]); data3 +=
(char)payload[i];
    }
    Serial.println("data: "+ data3); data3="";
    }
```

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: