ASSIGNMENT 4

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
{
```

```
68   Serial.println("Publish failed");
69 }
70 }
71 void mqttconnect() {
72 if (!client.connected())
73 {
74   Serial.print("Reconnecting client to ");
75   Serial.println(server);
76 while (!!!client.connect(clientId, authMethod, token))
77 {
78   Serial.print(".");
79   delay(500);
80 }
81 initManagedDevice();
82 Serial.println();
83 }
84 }
85 void wificonnect()
86 {
87 Serial.println();
88 Serial.print("Connecting to ");
89 WiFi.begin("Wokwi-GUEST", "", 6);
90 while (WiFi.status() != WL_CONNECTED)
91 {
92   delay(500);
93   Serial.print(".");
94 }
95 Serial.println("");
96 Serial.println("WiFi connected");
97 Serial.println("IP address: ");
98 Serial.println(WiFi.localIP());
99 }
100 void initManagedDevice()
101 {
102 if (client.subscribe(subscribetopic))
103 {
104   Serial.println((subscribetopic));
105   Serial.println("subscribe to cmd OK");
106 }
107 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:

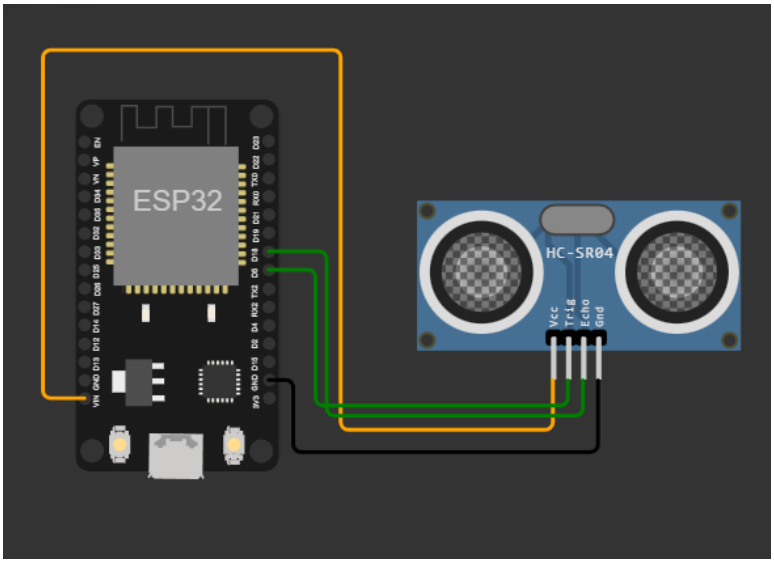
```
{
  "version": 1,
  "author": "6052 Thirumal S",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 6, "left": -98, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 60.63, "left": 80.5, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [
      "ultrasonic1:VCC",
      "esp:VIN",
```

```
      "orange",
      [ "v25.91", "h-111.11", "v-198.67", "h-156", "v176.67" ]
    ],
    [ "ultrasonic1:TRIG", "esp:D5", "green", [ "v13.22", "h-132.21", "v-9.25" ] ],
    [ "ultrasonic1:ECHO", "esp:D18", "green", [ "v18.58", "h-134.26", "v-82.72" ] ],
    [ "ultrasonic1:GND", "esp:GND.1", "black", [ "v37.55", "h-159.66", "v-37.47" ] ]
  ]
}
```

Wokwi simulation link:

https://wokwi.com/projects/346818851299656276

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: