

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 "vwcvi9"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "CAC55122-B0DB-4C2B-8DF5-9385E20A41AD"//Device ID mentioned in
ibm watson IOT Platform
#define TOKEN "hDorltw6NBxba0godG" //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(100);
PublishData(distance);
delay(100);
if (!client.loop()) {
mqttconnect();
}
}
delay(100);
}
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(100);
}
initManagedDevice();
Serial.println();
}
}
void wificonnect()
{
Serial.println();
Serial.print("Connecting to ");
WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() != WL_CONNECTED) {
delay(100);
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": -112.87, "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" ] ],
  ]
}

```

```

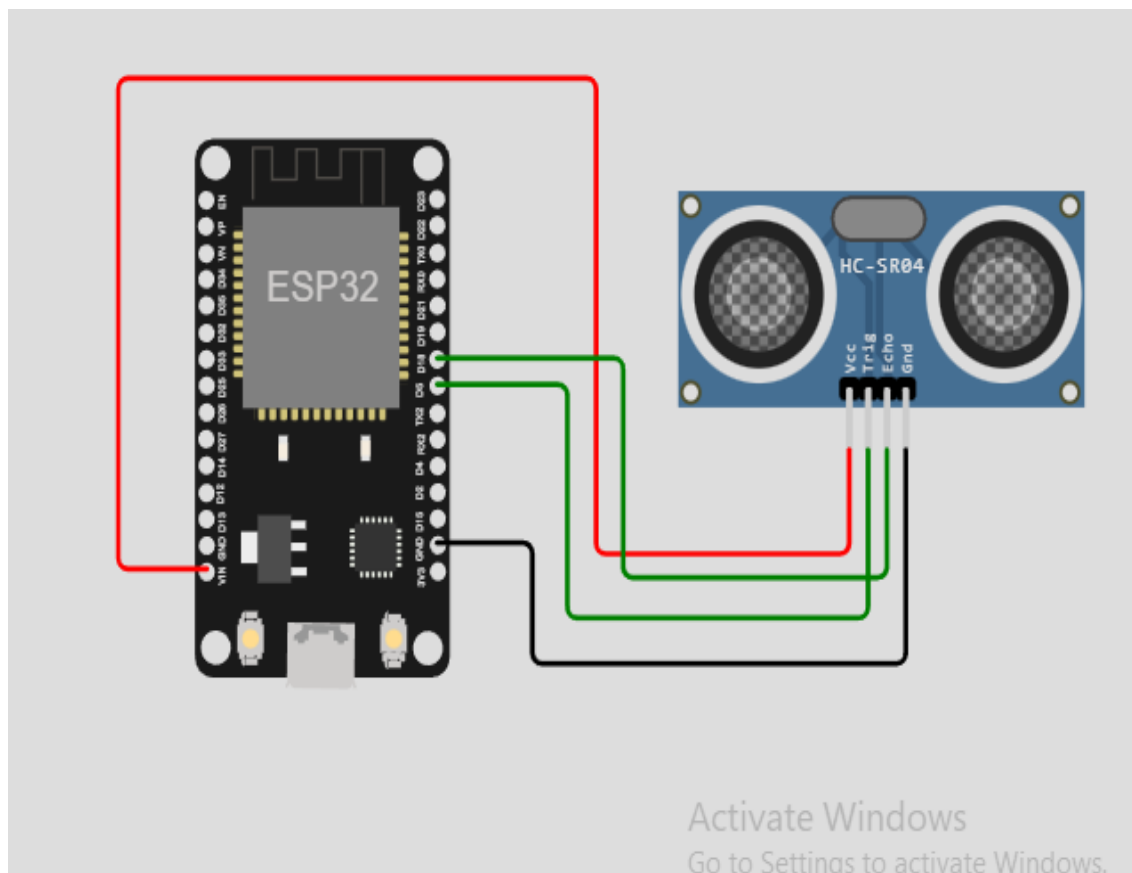
    [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],
    [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]
  ]
}

```

Wokwi simulation link:

<https://wokwi.com/projects/346508314441417298>

Circuit Diagram:



Output:

Wokwi output:

```
Connecting to .
WiFi connected
IP address:
10.10.0.2
Reconnecting client to vwcvi9.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

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

Activate Windows
Go to Settings to activate Windows.

IBM cloud output:

The screenshot shows the IBM IoT Platform interface. At the top, there's a navigation bar with 'Browse', 'Action', 'Device Types', and 'Interfaces'. A search icon is on the left, and an 'Add Device' button is on the right. Below the navigation bar, a table lists devices. The first device is selected, showing its details: Device ID (CAC55122-B0DB-4C2B-8DF5-9385E20A41AD), Status (Connected), Device Type (ESP32), Class ID (Device), and Date Added (5 Nov 2022 02:26). Below the device details, there's a section for 'Recent Events'. It contains a table with columns: Event, Value, Format, and Last Received. The table lists five events, all of type 'Data', with values containing distance measurements and alerts, in 'json' format, received 'a few seconds ago'.

Event	Value	Format	Last Received
Data	{"Distance":399.94,"ALERT!":"Distance less tha...	json	a few seconds ago
Data	{"Distance":399.94,"ALERT!":"Distance less tha...	json	a few seconds ago
Data	{"Distance":399.96,"ALERT!":"Distance less tha...	json	a few seconds ago
Data	{"Distance":399.94,"ALERT!":"Distance less tha...	json	a few seconds ago
Data	{"Distance":399.96,"ALERT!":"Distance less tha...	json	a few seconds ago