ASSIGNMENT 4

Ultrasonic sensor simulation in Wokwi

Date	4 November 2022
Student Name	Bhoshika M
Student Roll Number	610519106007
Maximum Marks	2 Marks

Question-1:

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;
```

```cpp
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())
{
```

```cpp
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": "19-ECE-021 JEEVAJOTHI M",
    "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" ] ],
```
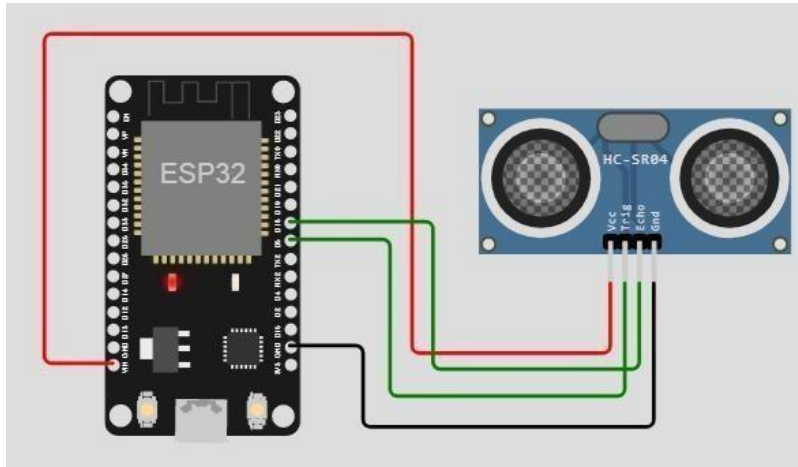
```
    [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]
  ]
}
```
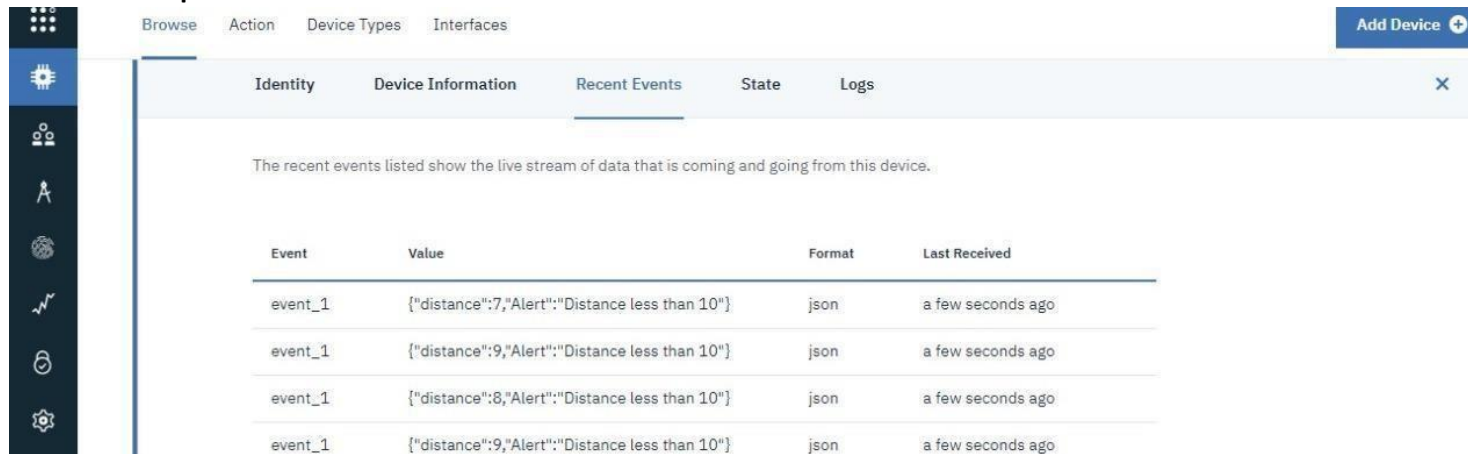
Circuit Diagram:

Output:

Wokwi output:

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

Wokwi simulation link:
 https://wokwi.com/projects/347737552142205524