Ultrasonic sensor simulation in Wokwi

Date	2st November 2022
Team ID	PNT2022TMID00641
Project Name	Gas Leakage Monitoring and Alerting System
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 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);

    Pu
    bl
    is
    hD
    at
    a(
    di
    st
    an
    ce
    );
    de
    la
    y(
    10
    00
    );
    if
    (!
    cl
    ie
    nt
    .l
    oo
    p(
    ))
    {
    mq
    tt
    co
    nn
    ec
    t(
    );
    } }
    delay(1000
    ); } void
    PublishDat
    a(float
    dist) {
```

```
    mqttconnec
    t();
    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
    mqttco
    nnect(
    ) { if
    (!clie
    nt.con
    nected
    ()) {
    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(s
ubscribetopic)) {
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(subscribet
opic); for (int i = 0; i
< payloadLength; i++) {
//Serial.print((char)payl
oad[i]); data3 +=
(char)payload[i];
    }
    Serial.println("data:
    "+ data3); data3="";
    }
```

Diagram.json:

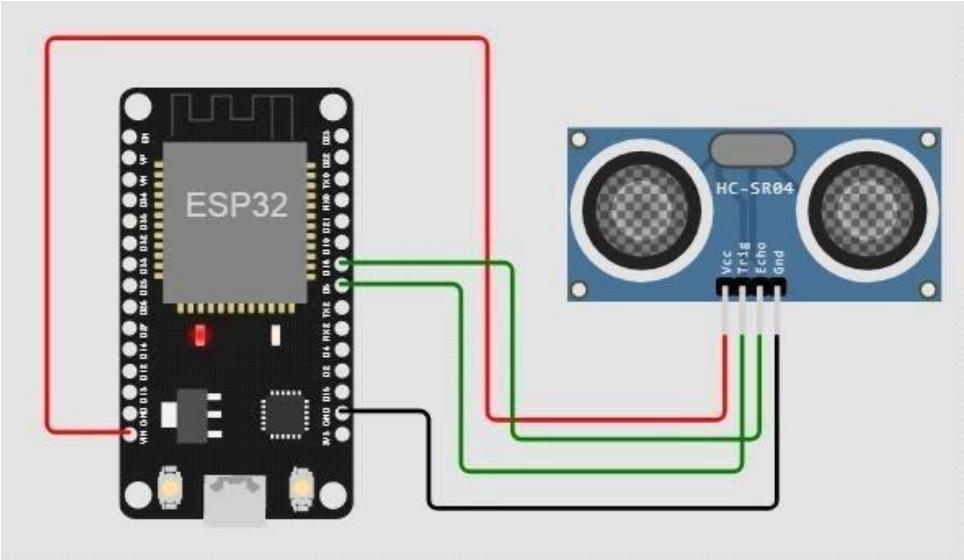
```
{
  "version": 1,
  "author": "sweetysharon",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -
    114.67, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left":
    89.17, "attrs": {} }
  ],
```

```
  "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" ]
    ]
  ]
}
```

Wokwi simulation link:

https://wokwi.com/projects/347230109877404243

Circuit Diagram:



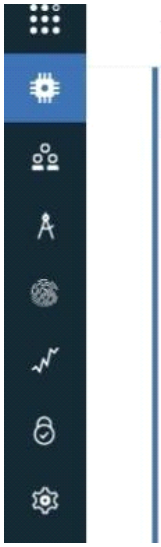
Output:

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

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