ASSIGNMENT 4

PNT2022TMID38188 **SUBMITTED BY SHARMILA.B**

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="";
     }
```

Diagram.json:

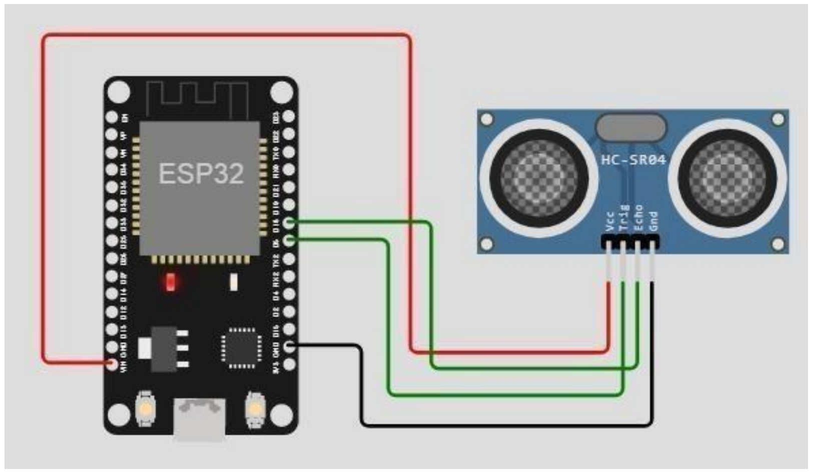
```
{
  "version": 1,
  "author": "sweetysharon",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67, "attrs": {}
    },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} }
  ],
  "connections":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

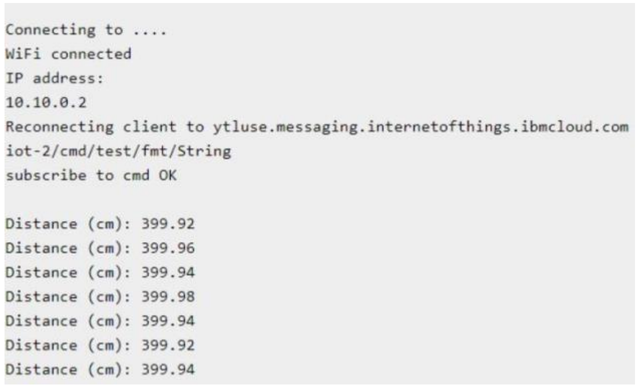
https://wokwi.com/projects/346508314441417298

Circuit Diagram:



Output:

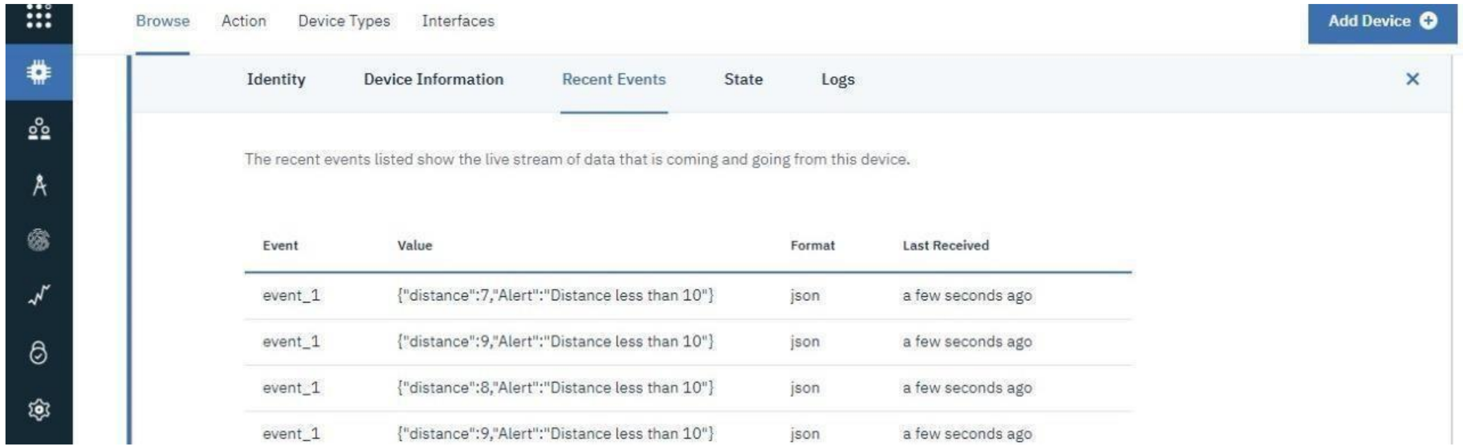
Wokwi output:



```
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:



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