

ASSIGNMENT – 4

Ultrasonic sensor simulation in Wokwi

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Project Name	Real-Time River Water Quality Monitoring and Control System.

QUESTIONS:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the 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(trig
Pin,
OUTPUT);
pinMode(ech
oPin,
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];
}
}

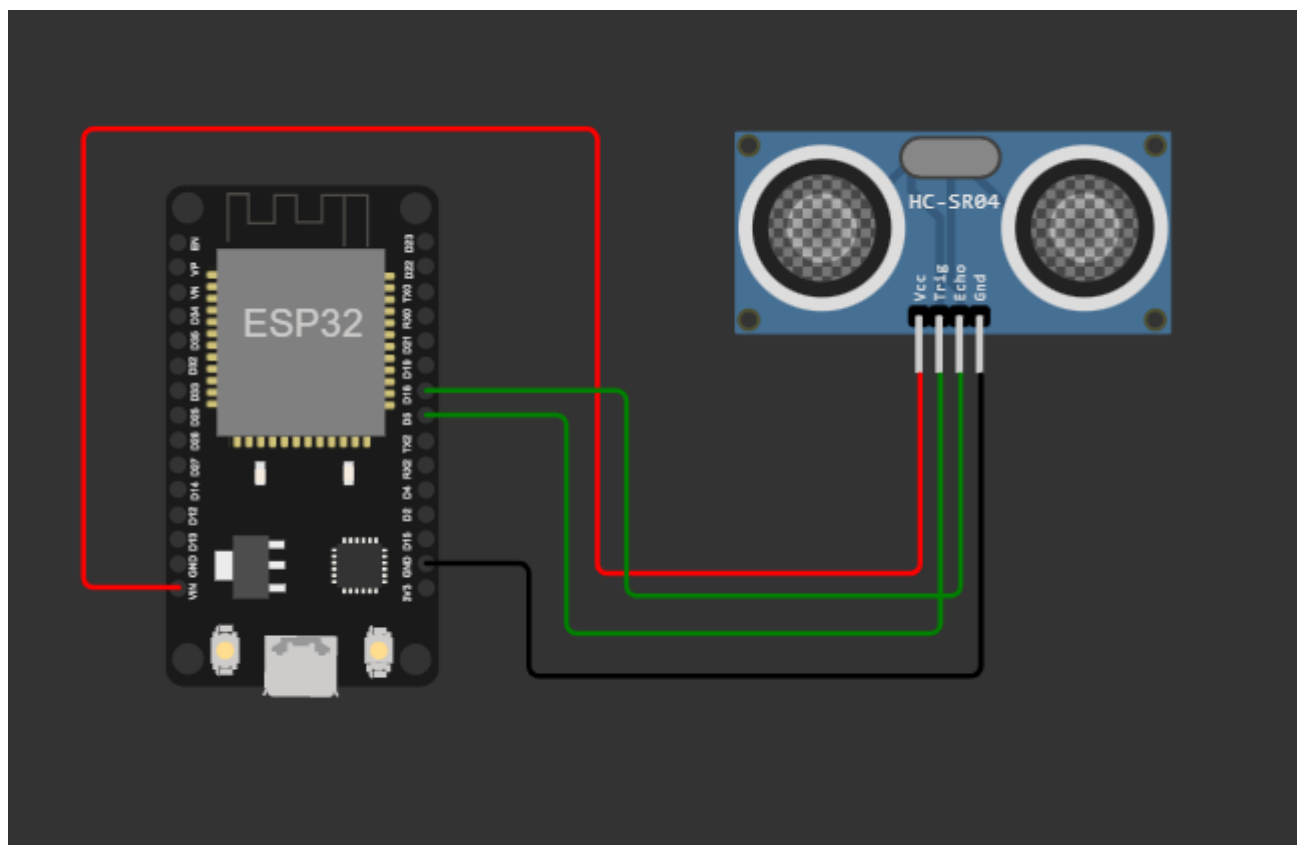
```

```
}  
Serial.println("data: "+ data3);  
data3="";  
}
```

.json CODE:

```
WOKWI SAVE SHARE ♥
sketch.ino diagram.json libraries.txt Library Manager ▼
1  [
2  "version": 1,
3  "author": "gokulakrishnan",
4  "editor": "wokwi",
5  "parts": [
6    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 34.94, "left": -132.61, "attrs": {} },
7    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} }
8  ],
9  "connections": [
10   [ "esp:TX0", "$serialMonitor:RX", "", [] ],
11   [ "esp:RX0", "$serialMonitor:TX", "", [] ],
12   [
13     "esp:VIN",
14     "ultrasonic1:VCC",
15     "red",
16     [ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]
17   ],
18   [ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],
19   [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],
20   [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]
21   ]
22 ]
```

CIRCUIT DIAGRAM:



Wokwi simulation link:

<https://wokwi.com/projects/347020612138435155>

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 Add Device +

Identity **Device Information** Recent Events State Logs X

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