

# 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(
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];
}
}

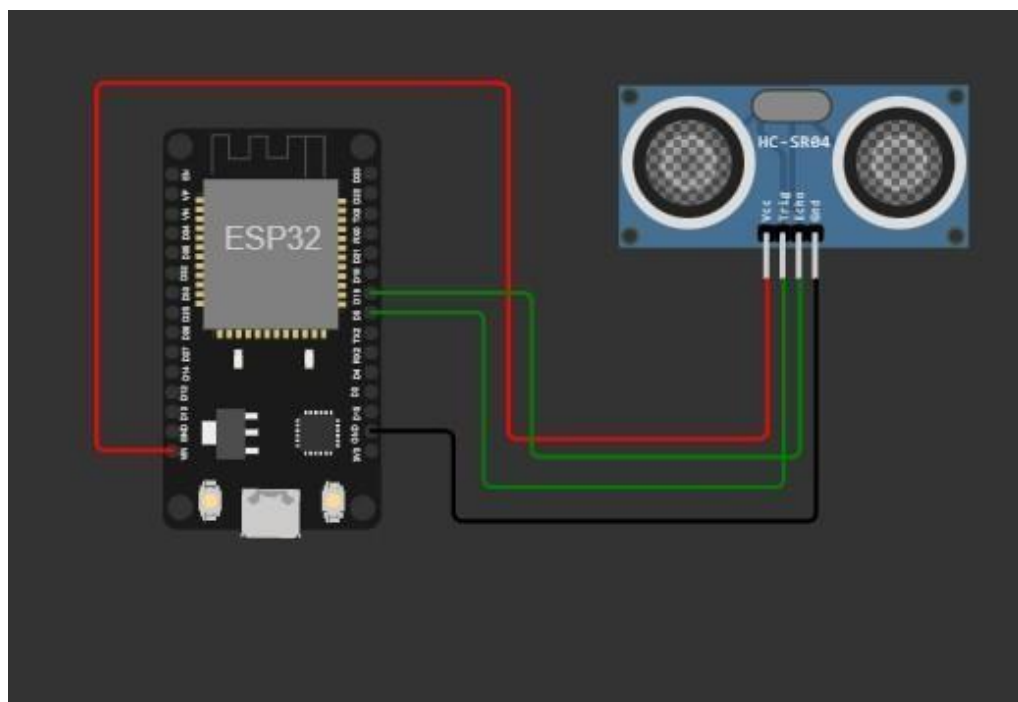
```

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

## .json CODE:

```
sketch.ino  diagram.json  libraries.txt  Library Manager  ▼
1  {
2    "version": 1,
3    "author": "anbalagan",
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:



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