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PROJECT NAME	Real-Time River water Quality Monitoring and Control System
MAXIMUM MARKS	2 MARKS

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 intpayloadLength);
#define ORG "kotoq5"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm
watson IOTPlatform
#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
0.034long 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="";
}
```

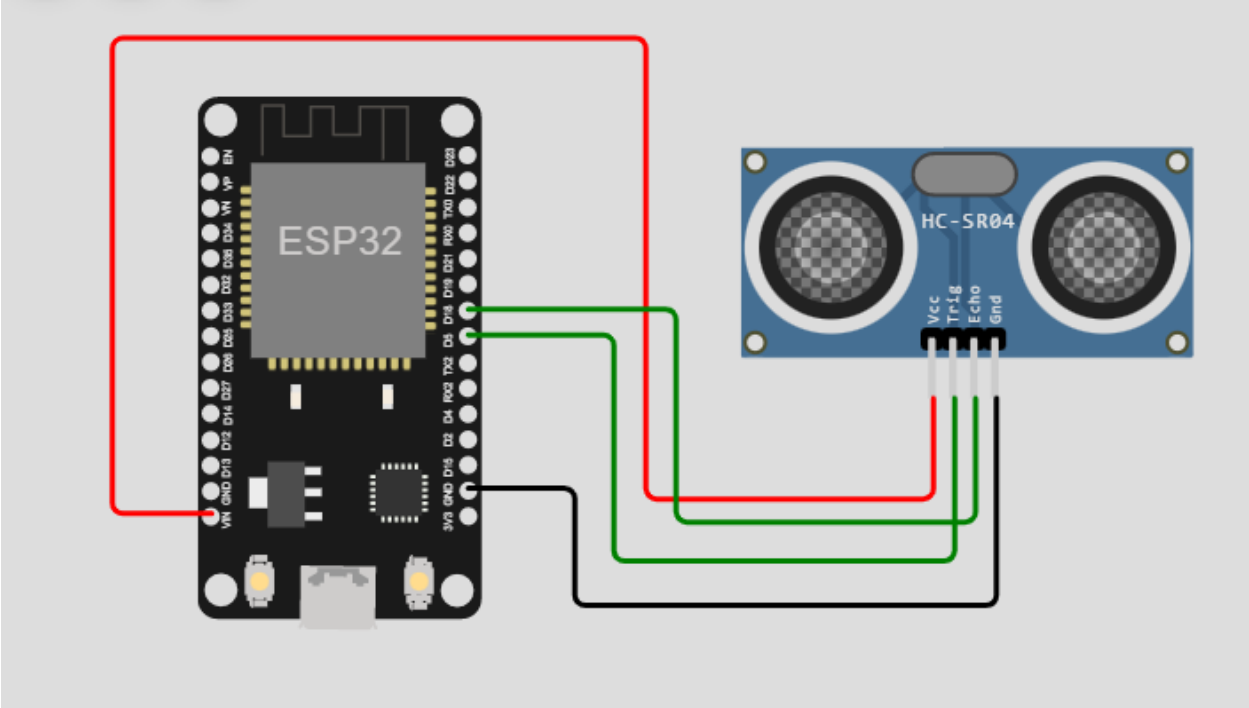
.json CODE:

WOKWI SAVE SHARE esp32-dht22.ino by urish

esp32-dht22.ino ● diagram.json ● libraries.txt Library Manager

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

CIRCUIT DIAGRAM:



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: