

ASSIGNMENT 4

Date	25 October 2022
Team ID	PNT2022TMID36156
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Project Name	Real-Time River Water Quality Monitoring and Control System.
Maximum Marks	2 Marks

Project Title: Real Time River water quality monitoring and Control system

QUESTION:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 CMS send "alert" to IBM cloud and display in device recent events.

CODE:

```
#include <WiFi.h>

#include <PubSubClient.h>

void callback(char* subscribe topic, byte* payload, unsigned int
payloadLength);

//-----credentials of IBM Accounts-----

#define ORG "qkg8nh"//IBM ORGANITION ID

#define DEVICE_TYPE "abcd"//Device type mentioned in IBM Watson IOT Platform

#define DEVICE_ID "1234"//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");

}

}

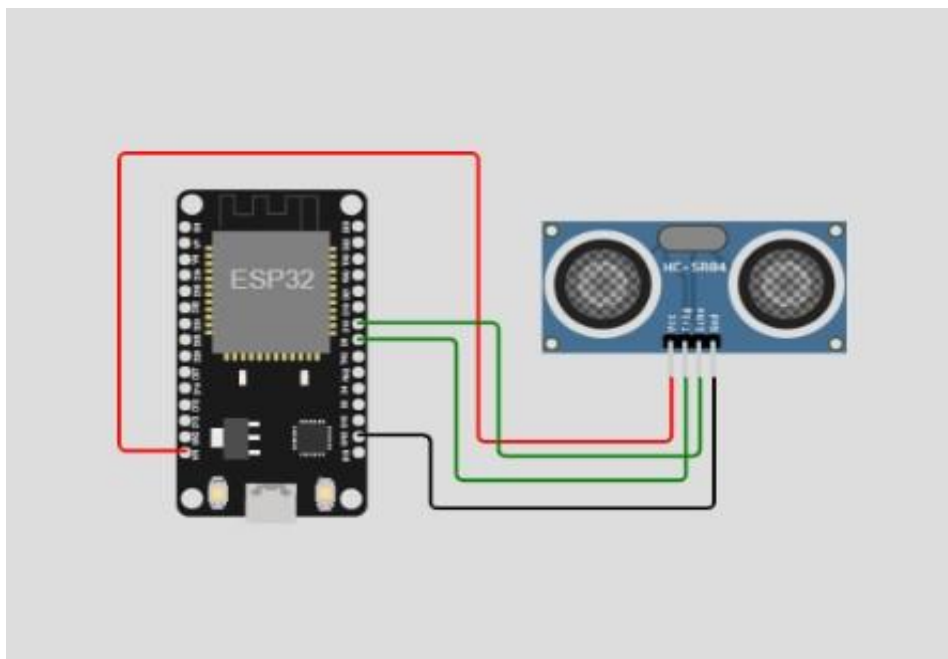
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)

{

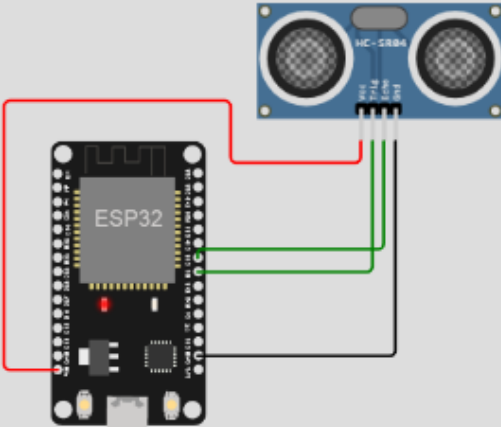
```

```
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="";  
  
}
```

SCHEMATIC/CIRCUIT DIAGRAM:



OUTPUT DIAGRAM:



The image shows a Wokwi simulation environment. At the top, there is a "Simulation" tab and three control buttons: a green circular button with a refresh icon, a grey square button, and a yellow circular button with a play icon. In the top right corner, a timer shows "00:04.864" and a refresh icon with "101%".

The main workspace displays an ESP32 microcontroller board connected to an HC-SR04 ultrasonic sensor module. The connections are as follows:

- A red wire connects the sensor's VCC pin to the ESP32's 5V pin.
- A green wire connects the sensor's GND pin to the ESP32's GND pin.
- A green wire connects the sensor's Trig pin to the ESP32's GPIO4 pin.
- A black wire connects the sensor's Echo pin to the ESP32's GPIO5 pin.

Below the workspace, a terminal window shows the following output:

```
Reconnecting client to qkg8nh.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.94
```

At the bottom right of the terminal, there are three icons: a left-pointing arrow, a pause symbol, and a trash can icon.

WOKWI LINK:

<https://wokwi.com/projects/347927608064737875>

IBM CLOUD OUTPUT:

Browse Action Device Types Interfaces

Add Device

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