

Real-Time River Water Quality Monitoring and Control Systems

Assignment - 4

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Question-1:

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* subscribtopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "uwujz1"
//IBM ORGANITION ID
#define DEVICE_TYPE "esp"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "asdfghjkl" //Token
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribtopic[] = "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(".");

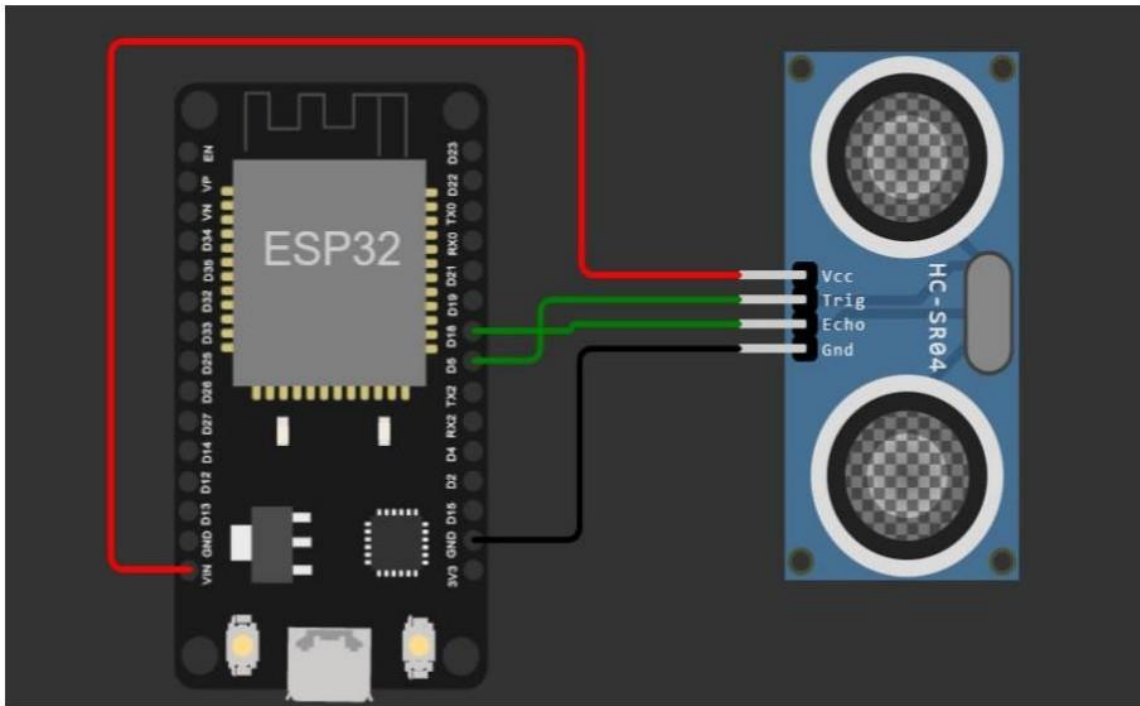
```

```

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="";
}

```

Circuit Diagram:



IBM Cloud Output:

IBM Watson IoT Platform

ibmiotwater@gmail.com
ID: uwujz1

Browse Action Device Types Interfaces Add Device

Search by Device ID Device Simulator

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
12345	Disconnected	esp	Device	Oct 30, 2022 2:32 PM	

Identity Device Information Recent Events State Logs

Showing Raw Data | No Interfaces Available

Property	Value	Type	Event	Last Received
Distance	41.96	Number	Data	a few seconds ago
ALERT!!	Distance less than 100cms	String	Data	a few seconds ago

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Message	Timestamp
Closed connection. The client ID was reused.	Oct 30, 2022 2:45 PM
Closed connection. The client ID was reused.	Oct 30, 2022 2:45 PM
Token auth succeeded: ClientID='d:uwujz1:esp:...	Oct 30, 2022 2:45 PM
Token auth succeeded: ClientID='d:uwujz1:esp:...	Oct 30, 2022 2:45 PM
Closed connection. The connection timed out	Oct 30, 2022 2:43 PM
Token auth succeeded: ClientID='d:uwujz1:esp:...	Oct 30, 2022 2:42 PM
Token auth succeeded: ClientID='d:uwujz1:esp:...	Oct 30, 2022 2:41 PM

Output:

```
Connecting to ...
WiFi connected
IP address:
10.10.0.2
Reconnecting client to uwujz1.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 41.97
ALERT!!
Sending payload: {"Distance":41.97,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 41.96
ALERT!!
Sending payload: {"Distance":41.96,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 41.96
ALERT!!
Sending payload: {"Distance":41.96,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 41.96
ALERT!!
```