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PROJECT TITLE	REAL TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM
TOPIC	CONNECTIONS IN WOKWI FOR ULTRASONIC SENSOR WHENEVER THE DISTANCE IS LESS THAN 100 cms SEND AN ALERT TO IBM CLOUD
ASSIGNMENT	04
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CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic,byte* payload, unsigned int
payloadLength);
#define ORG "112t39"
#define DEVICE_TYPE "ESP32"
#define DEVICE_ID "54321"
#define TOKEN "123456789"
String data3;
char server[]= ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[]="iot-2/evt/distance/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);
#define ECHO_PIN 2
#define TRIG_PIN 4
#define led 5
void setup() {
// put your setup code here, to run once:
Serial.begin(115200);
pinMode(led, OUTPUT);
pinMode(TRIG_PIN, OUTPUT);
pinMode(ECHO_PIN, INPUT);
wificonnect();
mqttconnect();
}
float readDistanceCM() {
digitalWrite(TRIG_PIN, LOW);
delayMicroseconds(2);
digitalWrite(TRIG_PIN, HIGH);
delayMicroseconds(10);
digitalWrite(TRIG_PIN, LOW);
int duration=random(1,200);
//Serial.println(duration);
//duration = pulseIn(ECHO_PIN, HIGH);
return duration ;
//Serial.println(duration);
}void loop() {
float distance = readDistanceCM();
//Serial.println(distance);
bool isNearby = distance < 100;
digitalWrite(led, isNearby);
Serial.print("Measured distance: ");
Serial.println(distance);
```

```

if(distance<100){
PublishData2(distance);
}else{
PublishData1(distance);
}
//PublishData(distance);
delay(1000);
if(!client.loop()){
mqttconnect();
}
//delay(2000);
}
void PublishData1(float dist){
mqttconnect();
String payload= "{\\"distance\":";
payload += dist;
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 PublishData2(float dist){
mqttconnect();
String payload= "{\\"ALERT\":";
payload += dist;
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 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++){data3 += (char)payload[i];
  }
  Serial.println("data:"+ data3);
  if(data3=="lighton"){
    Serial.println(data3);
    digitalWrite(led,HIGH);
  }else{
    Serial.println(data3);
    digitalWrite(led,LOW);
  }
  data3="";
}

```

WOKWI LINK:

<https://wokwi.com/projects/346683745196048979>

WOKWI SIMULATION:

The Wokwi simulation interface displays a circuit with an ESP32 microcontroller, a red LED, and an HC-SR04 ultrasonic sensor. The code in the sketch.ino file is as follows:

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* topic, byte* payload, unsigned int payloadLength);
4 #define ORG "112t39"
5 #define DEVICE_TYPE "ESP32"
6 #define DEVICE_ID "54321"
7 #define TOKEN "123456789"
8 String data;
9
10 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
11 char publishTopic[] = "iot-2/evt/distance/fmt/json";
12 char subscribeTopic[] = "iot-2/cmd/distance/fmt/String";
13 char authMethod[] = "use-token-auth";
14 char token[] = TOKEN;
15 char clientId[] = "d:" + ORG + ":" + DEVICE_TYPE + ":" + DEVICE_ID;
16
17 WiFiClient wifiClient;
18 PubSubClient client(server, 1883, callback, wifiClient);
19
20 #define ECHO_PIN 2
21 #define TRIG_PIN 4
22 #define led 5
23
24 void setup() {
25   // put your setup code here, to run once:
26   Serial.begin(115200);
27   pinMode(led, OUTPUT);
28   pinMode(TRIG_PIN, OUTPUT);
29   pinMode(ECHO_PIN, INPUT);
30 }
```

The simulation output shows the following sequence of events:

```
publish ok
Measured distance: 35.00
Sending payload: {"ALERT":35.00}
publish ok
Measured distance: 52.00
Sending payload: {"ALERT":52.00}
publish ok
```

CLOUD STORAGE:

The IBM Watson IoT Platform interface displays the details for a device with ID 54321. The device is currently disconnected. The recent events listed show the live stream of data coming and going from this device.

Event	Value	Format	Last Received
distance	{"distance":150}	json	a few seconds ago
distance	{"distance":187}	json	a few seconds ago
distance	{"ALERT":28}	json	a few seconds ago
distance	{"distance":191}	json	a few seconds ago
distance	{"ALERT":94}	json	a few seconds ago