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Project Name : Gas Leakage monitoring & Alerting system for Industries

Assignment-4

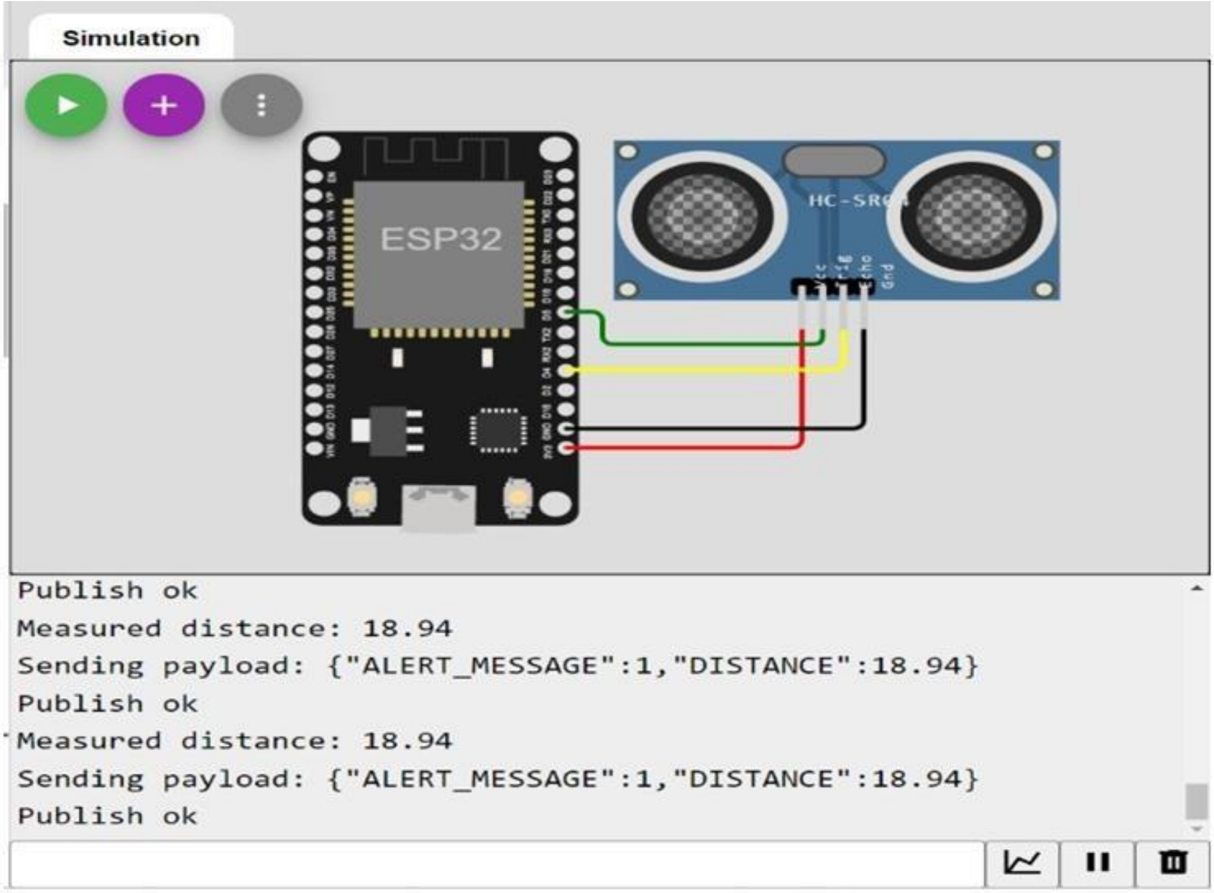
Write code and connections in wokwi for ultrasonic sensor.

Whenever distance is less than 100 cms send "alert" to ibm cloud and display in device recent events.

Solution code:

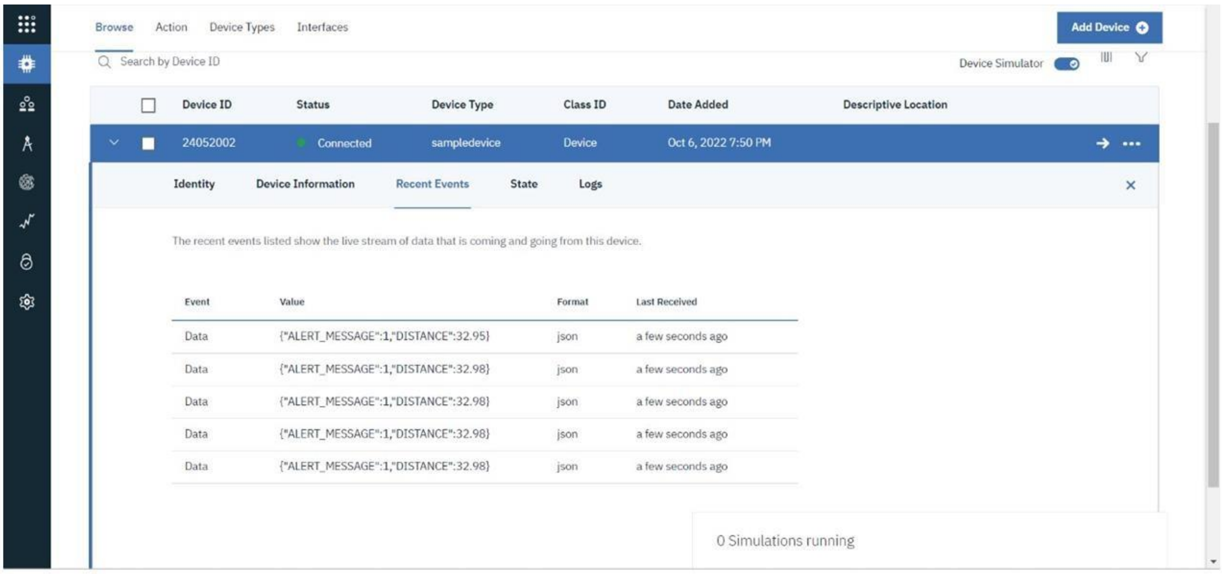
```
#include <WiFi.h>//library for wifi

#include <PubSubClient.h>//library for MQtt

#define ORG "q1wscz”

#define DEVICE_E "sampledevice"

#define DEVICE_D "24052002

#define TOKEN "K9)lI1C@tX6yO(J6L1"

const int T_PIN = 5;

const int E_PIN = 4;

//-------- Customise the above values --------

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name

char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and
format in which data to be send

char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT command type
AND COMMAND IS TEST OF FORMAT STRING

char authMethod[] = "use-token-auth";// authentication method

char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE_E ":" DEVICE_D;//client id

//..................................................................

WiFiClient wifiClient; // creating the instance for wificlient

PubSubClient client(server, 1883, wifiClient); //calling the predefined client id by passing
parameter like server id,portand wificredential


void setup() {
  Serial.begin(115200);
  pinMode(T_PIN, OUTPUT);
  pinMode(E_PIN, INPUT);
  wificonnect();
  mqttconnect();
}

float readDistanceCM() {
  digitalWrite(T_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(T_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(T_PIN, LOW);
  int duration = pulseIn(E_PIN, HIGH);
  return duration * 0.034 / 2;
}

void loop() {

  float distance = readDistanceCM();
  Serial.print("Measured distance: ");
  Serial.println(distance);
  if(distance<=100){
  PublishData(distance);
  }

  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}

void PublishData(float distance) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  bool status=true;
  String payload = "{\"ALERT_MESSAGE\":";
  payload += status;
  payload += "," "\"DISTANCE\":";
  payload += distance;
  payload += "}";

  Serial.print("Sending payload: ");
  Serial.println(payload);



  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print publish ok in Serial monitor or else it will print publish failed
  } 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() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  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");
  }
}
```

Output:



```
Publish ok
Measured distance: 18.94
Sending payload: {"ALERT_MESSAGE":1,"DISTANCE":18.94}
Publish ok
Measured distance: 18.94
Sending payload: {"ALERT_MESSAGE":1,"DISTANCE":18.94}
Publish ok
```

IBM Cloud Image:



Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
24052002	Connected	sampledevice	Device	Oct 6, 2022 7:50 PM	

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.95}	json	a few seconds ago
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.98}	json	a few seconds ago
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.98}	json	a few seconds ago
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.98}	json	a few seconds ago
Data	{"ALERT_MESSAGE":1,"DISTANCE":32.98}	json	a few seconds ago