COLLEGE OF ARTS AND SCIENCES (CAS)

SCHOOL OF COMPUTING (SOC)

BACHELOR OF SCIENCE (COMPUTER SCIENCES)

FIRST SEMESTER OF THE 2023/2024 SESSION

SKIH3113 SENSOR-BASED SYSTEMS (A)

ASSIGNMENT 1: RESPONSIBLE CV LANDING PAGE DEVELOPMENT

PREPARED BY:

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DUE DATE:

9TH MEI 2024

SIGNATURE::

Chira

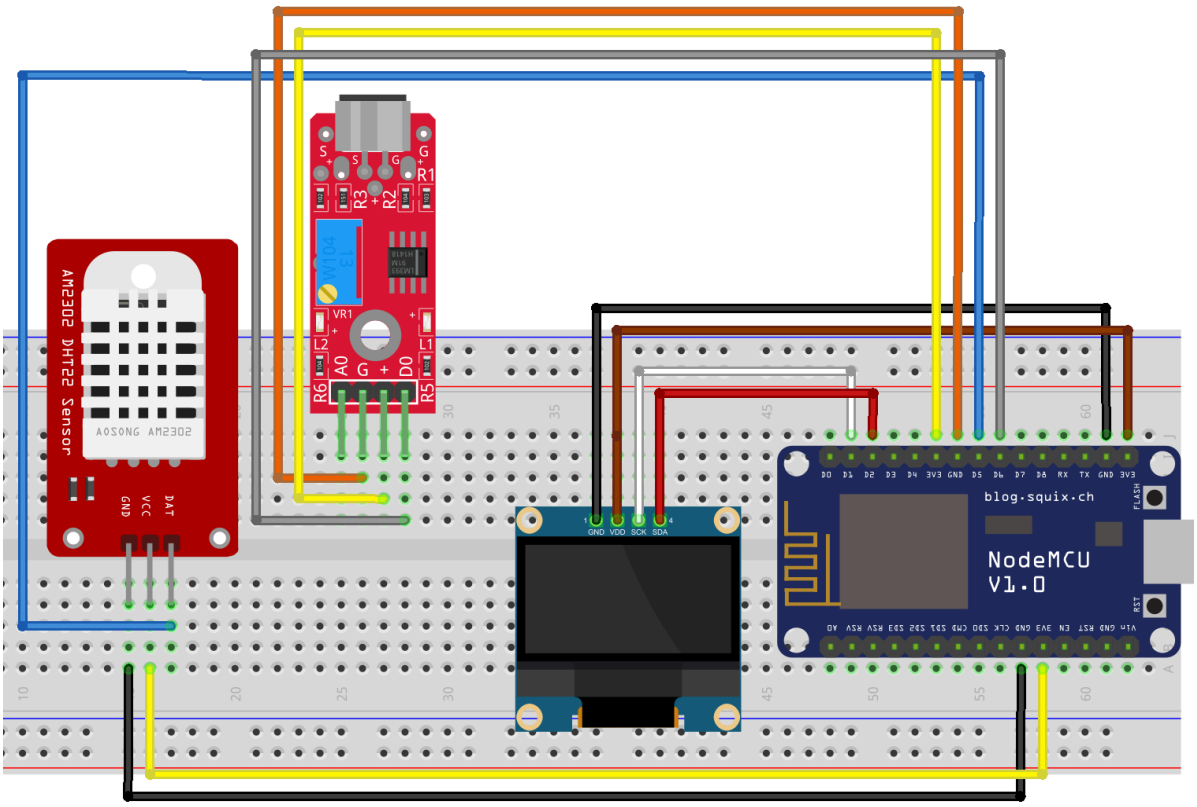
1.0 Define theme

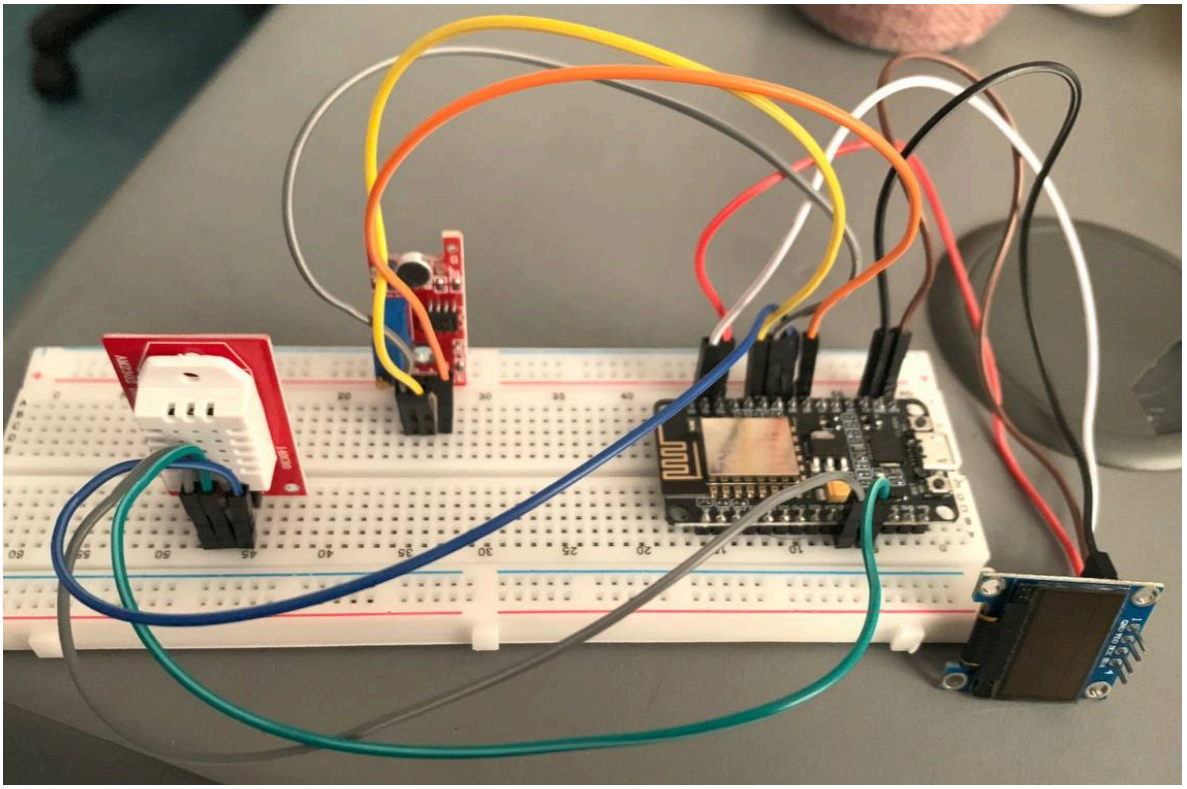
Theme: Smart Environmental Monitoring System

This assignment contains ESP8266, DHT22 Sensor, OLED display and Sound Detector w/ Amplifier LM393. “Smart Environment Monitoring System” will be the theme for this assignment. This theme is designed to intelligently gauge and report environment data. The ESP8266 is the central processing unit, facilitating Wi-Fi connectivity that enables both remote data access and system control. The DHT22 Sensor is for the precise measurement of temperature and humidity, which are vital parameters for comprehensive environmental monitoring. The OLED display then will display the clear and immediate output of the sensor data for on-site monitoring. Further augmenting the system’s capabilities is the sound detector module coupled with an LM393 amplifier, which is capable of detecting noise levels that are crucial in environments where sound levels need to be monitored for safety or comfort. This feature is particularly beneficial in settings where maintaining specific sound thresholds is imperative for ensuring safety or enhancing comfort. The system’s modular design ensures versatility and scalability, making it suitable for a wide range of applications, from residential smart homes to expansive greenhouses, industrial environments, and even urban areas for monitoring noise pollution. The “Smart Environmental Monitoring System” encapsulates not only the operational essence of the project but also its adaptability to diverse real-world scenarios.

2.0 Prototype

Here is the connection between the components:





3.0 Source Code

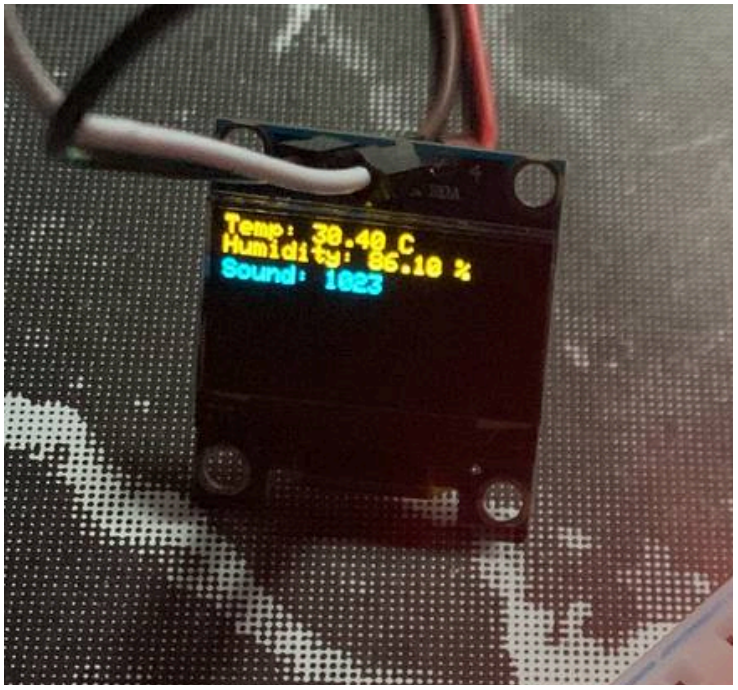
Here is my code:

```
#include <ESP8266WiFi.h> // Include the ESP8266 Wi-Fi library
#include <Adafruit_GFX.h> // Include the Adafruit Graphics library
#include <Adafruit_SSD1306.h> // Include the Adafruit OLED display library
#include <DHT.h> // Include the DHT sensor library

// WiFi credentials
const char* ssid = "UUMWiFi_Guest"; // SSID of the Wi-Fi network
const char* password = ""; // Password of the Wi-Fi network

// DHT22 sensor setup
#define DHTPIN D5 // Pin where the DHT22 is connected
#define DHTTYPE DHT22 // DHT22 sensor type
DHT dht(DHTPIN, DHTTYPE); // Create a DHT sensor object

// OLED display setup
#define SCREEN_WIDTH 128 // OLED display width, in pixels
#define SCREEN_HEIGHT 64 // OLED display height, in pixels
#define OLED_RESET    -1 // OLED reset pin (not used)
Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, OLED_RESET); // Create an OLED display object

// Sound detector setup
#define SOUND_PIN D6 // Pin where the sound detector is connected

void setup() {
  Serial.begin(115200); // Start the serial communication
  dht.begin(); // Initialize the DHT22 sensor

  // Initialize the OLED display
  if(!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
    Serial.println(F("SSD1306 allocation failed"));
     for(;;); // Infinite loop if the display initialization fails
  }
  display.display(); // Show initial display buffer
  delay(2000); // Delay for 2 seconds
  display.clearDisplay(); // Clear the display buffer
```

```
  // Connect to Wi-Fi
  WiFi.begin(ssid, password); // Start Wi-Fi connection
   while (WiFi.status() != WL_CONNECTED) { // Wait for Wi-Fi
connection
    delay(500); // Delay half a second
    Serial.print("."); // Print dots while connecting
  }
  Serial.println(""); // New line after connecting
   Serial.println("WiFi connected"); // Print Wi-Fi connected
message
  Serial.print("IP address: "); // Print IP address message
  Serial.println(WiFi.localIP()); // Print the IP address
}

void loop() {
  // Read humidity and temperature from DHT22
  float humidity = dht.readHumidity(); // Read humidity
     float temperature = dht.readTemperature(); // Read
temperature

  // Read sound level from the sound detector
  int soundLevel = analogRead(SOUND_PIN); // Read sound level

  // Display sensor readings on the OLED
  display.clearDisplay(); // Clear the display buffer
  display.setTextSize(1); // Set text size
  display.setTextColor(WHITE); // Set text color
  display.setCursor(0,0); // Set cursor position
  display.print("Temp: "); // Print temperature label
  display.print(temperature); // Print temperature value
  display.println(" C"); // Print temperature unit

  display.print("Humidity: "); // Print humidity label
  display.print(humidity); // Print humidity value
  display.println(" %"); // Print humidity unit

  display.print("Sound: "); // Print sound level label
  display.print(soundLevel); // Print sound level value
  display.display(); // Update the display with all the above

  delay(5000); // Wait for 5 seconds before the next loop
}
```

4.0 Appendix

Here is my output displayed on OLED



Here is my github link:
https://github.com/SuchiraSumon/ASSIGNMENT-1-SKIH3113.git