B.AKSHAJ

2211CS020071

AIML-ZETA

IOT HOLIDAY ASSIGNMENT

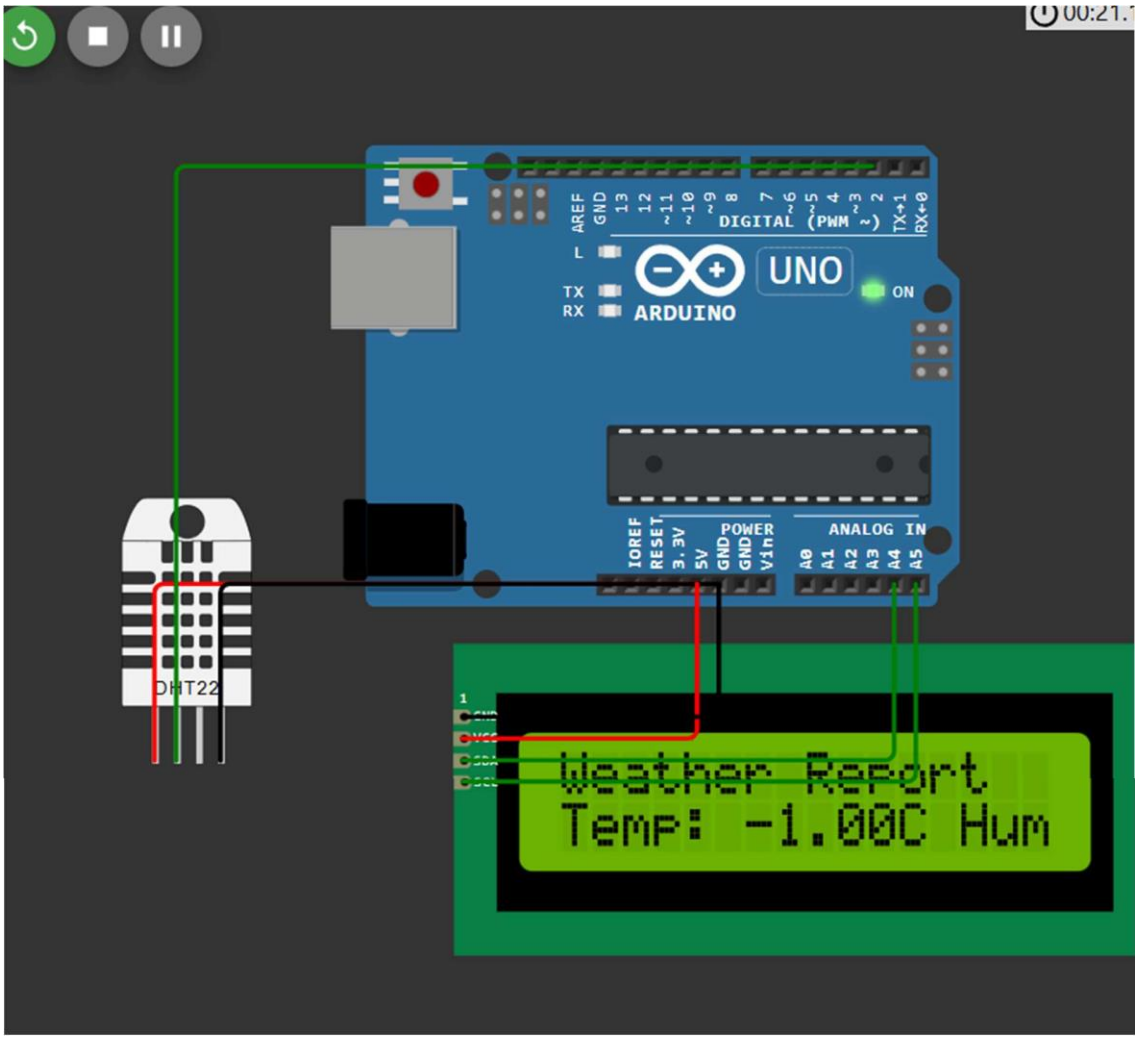
1. **Write a Embedded C Program to Create a Weather Reporting System that provides real- time environmental data to users.**

Code:

```
#include <DHT.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

#define DHTPIN 2
#define DHTTYPE DHT11

DHT dht(DHTPIN, DHTTYPE);
LiquidCrystal_I2C lcd(0x27, 16, 2);

void setup() {
  dht.begin();
  lcd.init();
  lcd.backlight();
  lcd.setCursor(0, 0);
  lcd.print("Weather Report");
}

void loop() {
```

```
  float temp = dht.readTemperature();
  float hum = dht.readHumidity();

  if (isnan(temp) || isnan(hum)) {
    lcd.setCursor(0, 1);
    lcd.print("Error Reading");
    return;
  }

  lcd.setCursor(0, 1);
  lcd.print("Temp: ");
  lcd.print(temp);
  lcd.print("C ");
  lcd.print("Hum: ");
  lcd.print(hum);
  lcd.print("%");
  delay(2000);
}
```

OUTPUT:



2. **Write a Embedded C Program to Create a Home Automation System that simplifies daily routines (Any 2 Devices) by controlling devices remotely.**

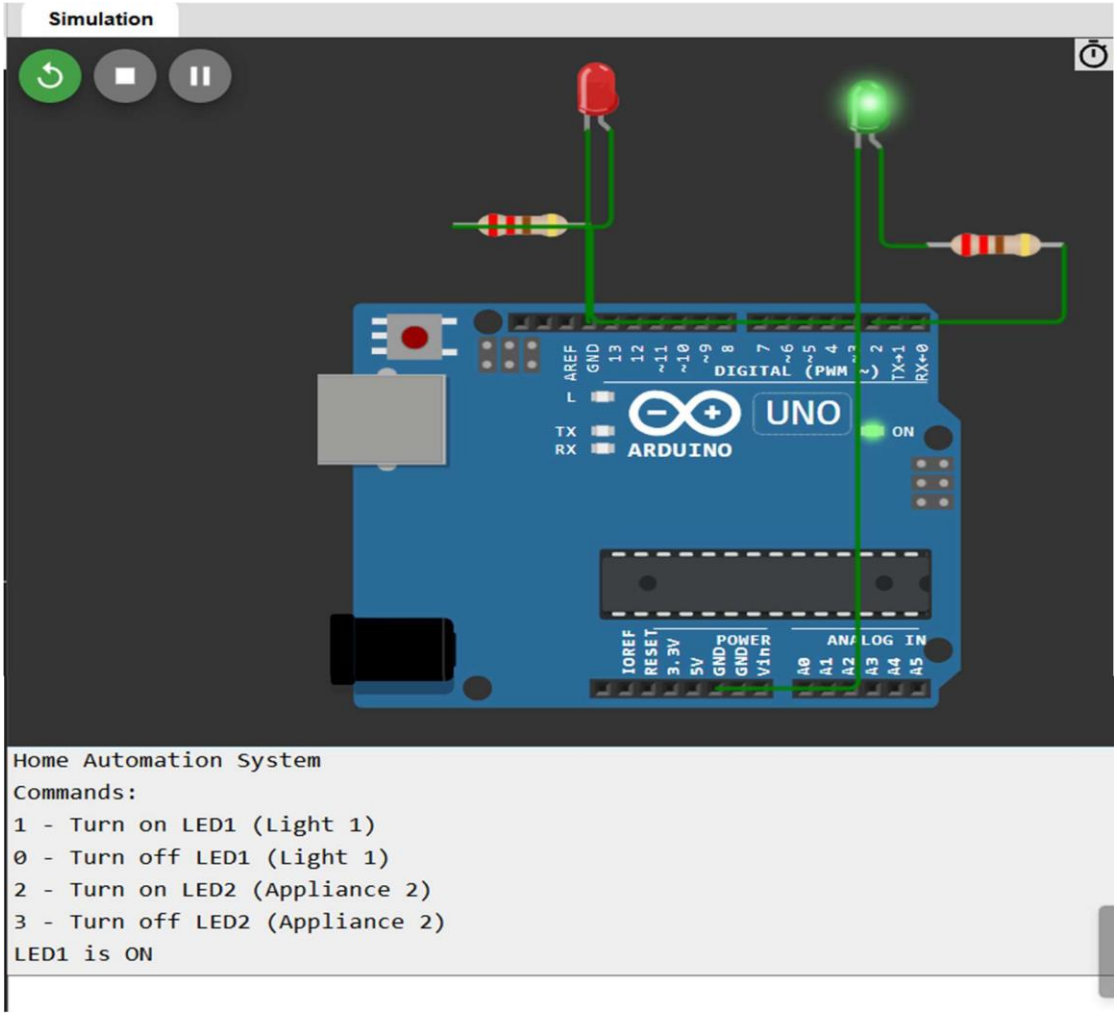
Code:

```
#define LED1 2
#define LED2 3

void setup() {
```

```
  // Initialize the LEDs as outputs
  pinMode(LED1, OUTPUT);
  pinMode(LED2, OUTPUT);

  // Start serial communication
  Serial.begin(9600);
  Serial.println("Home Automation System");
  Serial.println("Commands: ");
  Serial.println("1 - Turn on LED1 (Light 1)");
  Serial.println("0 - Turn off LED1 (Light 1)");
  Serial.println("2 - Turn on LED2 (Appliance 2)");
  Serial.println("3 - Turn off LED2 (Appliance 2)");
}

void loop() {
  // Check if data is available on Serial
  if (Serial.available()) {
    char command = Serial.read();  // Read the incoming command

    // Control LED1 (Light 1)
    if (command == '1') {
      digitalWrite(LED1, HIGH);  // Turn on LED1
      Serial.println("LED1 is ON");
    }
    if (command == '0') {
      digitalWrite(LED1, LOW);    // Turn off LED1
      Serial.println("LED1 is OFF");
```

```
    }

    // Control LED2 (Appliance 2)
    if (command == '2') {
      digitalWrite(LED2, HIGH);  // Turn on LED2
      Serial.println("LED2 is ON");
    }
    if (command == '3') {
      digitalWrite(LED2, LOW);    // Turn off LED2
      Serial.println("LED2 is OFF");
    }
  }
}
```

OUTPUT:



3. **Write a Embedded C Program to Create an Air Pollution Monitoring System that tracks air quality levels in real-time to ensure a healthier environment.**

Code:

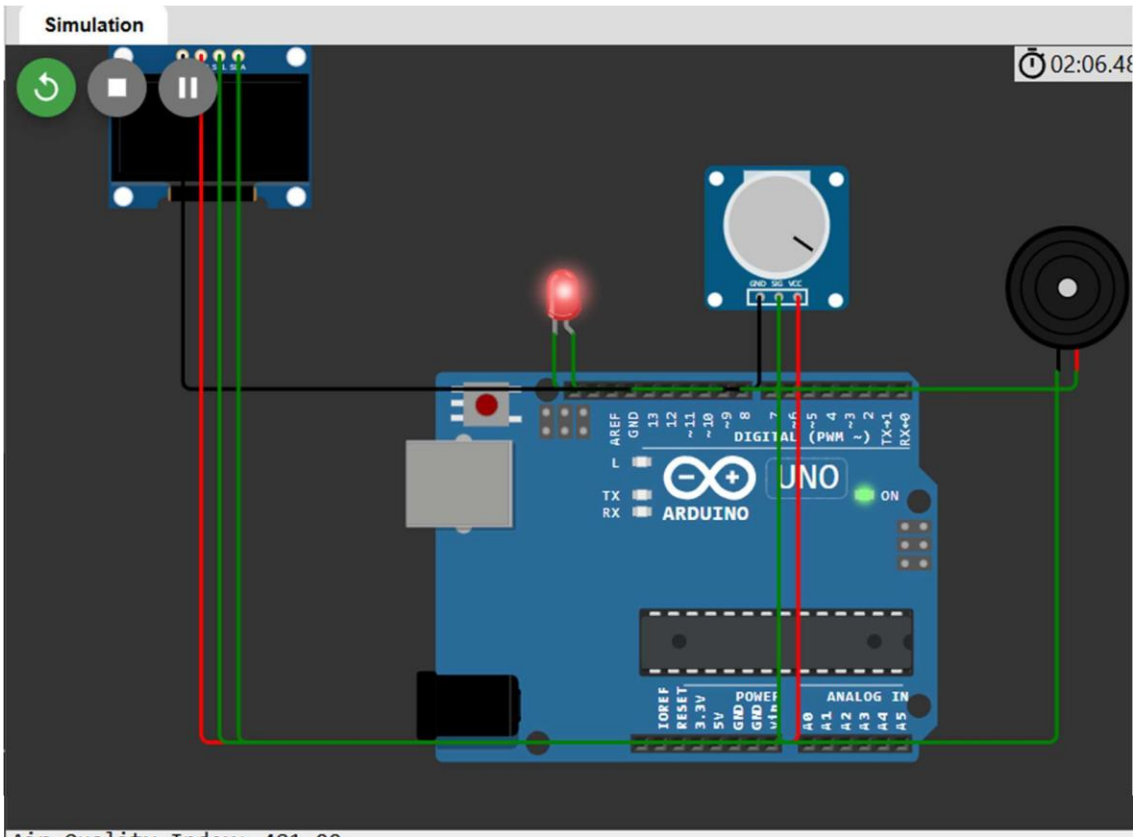
```
#include <Wire.h>

#include <Adafruit_SSD1306.h>

#include <Adafruit_GFX.h>
```

```
#define SSD1306_I2C_ADDRESS 0x3C  // I2C address for OLED display

#define POT_PIN A0  // Analog pin for potentiometer
#define BUZZER_PIN 8
#define LED_PIN 9

// OLED settings
#define SCREEN_WIDTH 128
#define SCREEN_HEIGHT 64
#define OLED_RESET -1  // No reset pin needed
Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, OLED_RESET);

void setup() {
  Serial.begin(115200);

  // Set up Buzzer and LED pins
  pinMode(BUZZER_PIN, OUTPUT);
  pinMode(LED_PIN, OUTPUT);

  // Initialize OLED
  if (!display.begin(SSD1306_I2C_ADDRESS, OLED_RESET)) {
    Serial.println(F("OLED allocation failed"));
    for (;;);
  }

  display.clearDisplay();
  display.setTextColor(SSD1306_WHITE);
```

```
  display.setTextSize(2);  // Increase text size for better visibility
  display.setCursor(0, 0);
  display.print("Air Pollution Monitor");
  display.display();
  delay(2000);
}

void loop() {
  int sensorValue = analogRead(POT_PIN);
  float airQualityIndex = map(sensorValue, 0, 1023, 0, 500);

  Serial.print("Air Quality Index: ");
  Serial.println(airQualityIndex);

  display.clearDisplay();
  display.setCursor(0, 0);
  display.print("Air Quality Index:");
  display.setCursor(0, 20);
  display.print(airQualityIndex);
  display.print(" ppm");

  if (airQualityIndex > 300) {
    display.setCursor(0, 40);
    display.print("Warning: Poor Air Quality!");
    digitalWrite(BUZZER_PIN, HIGH);
    digitalWrite(LED_PIN, HIGH);
  } else {
```

```
    display.setCursor(0, 40);
    display.print("Air Quality is Good");
    digitalWrite(BUZZER_PIN, LOW);
    digitalWrite(LED_PIN, LOW);
  }
  display.display();
  delay(1000);
}
```

OUTPUT:




```
Air Quality Index: 481.00
Air Quality Index: 481.00
Air Quality Index: 481.00
Air Quality Index: 481.00
Air Quality Index: 481.00
Air Quality Index: 481.00
Air Quality
```

4. Write a Embedded C Program to Create an IoT-based Smart Irrigation System for Agriculture that automates watering based on weather and soil conditions.

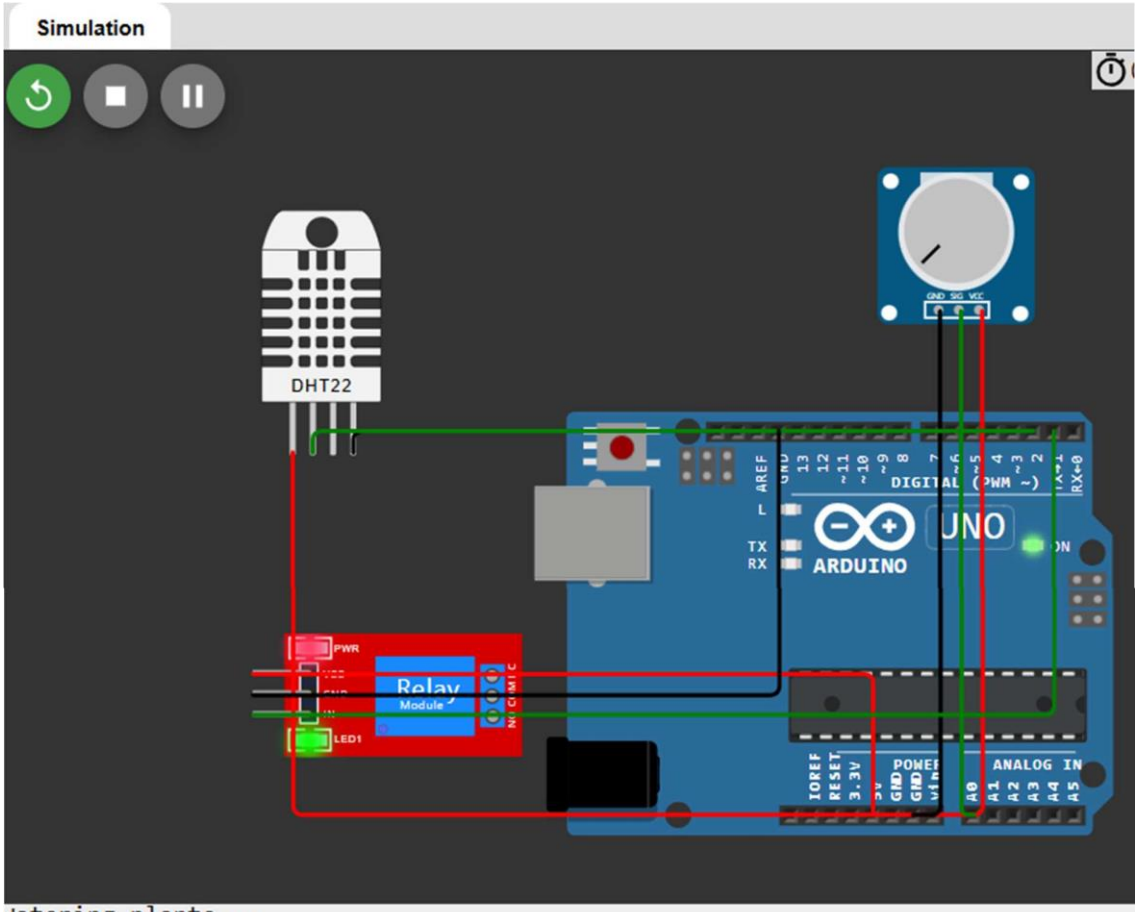
Code:

```
#include <DHT.h>  // Include the DHT sensor library

 // Define pins

#define SOIL_MOISTURE_PIN A0   // Analog pin for soil moisture sensor (Potentiometer)

#define DHT_PIN 2              // Digital pin for DHT11 sensor (simulated)

#define RELAY_PIN 1            // Digital pin for relay (water pump)


// DHT sensor setup

DHT dht(DHT_PIN, DHT11);  // DHT11 sensor on the specified pin


// Variables

int soilMoistureValue = 0;

float temperature = 30.0;  // Simulate temperature of 30°C

float humidity = 0.0;

bool isWateringRequired = false;


void setup() {

  Serial.begin(115200);

  pinMode(RELAY_PIN, OUTPUT);

  digitalWrite(RELAY_PIN, LOW);  // Ensure relay is off at startup


  // Initialize DHT sensor

  dht.begin();
```

```
}

void loop() {
  // Read soil moisture (Potentiometer value)
  soilMoistureValue = analogRead(SOIL_MOISTURE_PIN);
  Serial.print("Soil Moisture: ");
  Serial.println(soilMoistureValue);

  // Simulate temperature (30°C)
  temperature = 35.0;  // Manually set temperature to 30°C for testing

  // Print simulated temperature and humidity
  Serial.print("Temperature: ");
  Serial.print(temperature);
  Serial.print(" °C | Humidity: ");
  humidity = dht.readHumidity();  // Read humidity from DHT11
  Serial.print(humidity);
  Serial.println(" %");

  // Logic for automatic irrigation: if soil is dry and temperature is high, water the plants
  if (soilMoistureValue < 400 && temperature > 30.0) {
    isWateringRequired = true;
  } else {
    isWateringRequired = false;
  }

  // Control water pump (Relay)
```

```
  if (isWateringRequired) {
    Serial.println("Watering plants...");
    digitalWrite(RELAY_PIN, HIGH);  // Turn on water pump
  } else {
    Serial.println("No need to water.");
    digitalWrite(RELAY_PIN, LOW);  // Turn off water pump
  }

  delay(5000);  // Wait before next reading
}
```

OUTPUT:




```
Watering plants...
Soil Moisture: 0
Temperature: 35.00 °C | Humidity: 15.40 %
Watering plants...
Soil Moisture: 0
Temperature: 35.00 °C | Humidity: 15.40 %
Watering plants...
```

5. Write a Embedded C Program to Create a Smart Alarm Clock that adjusts to your schedule and environment, waking you up intelligently.

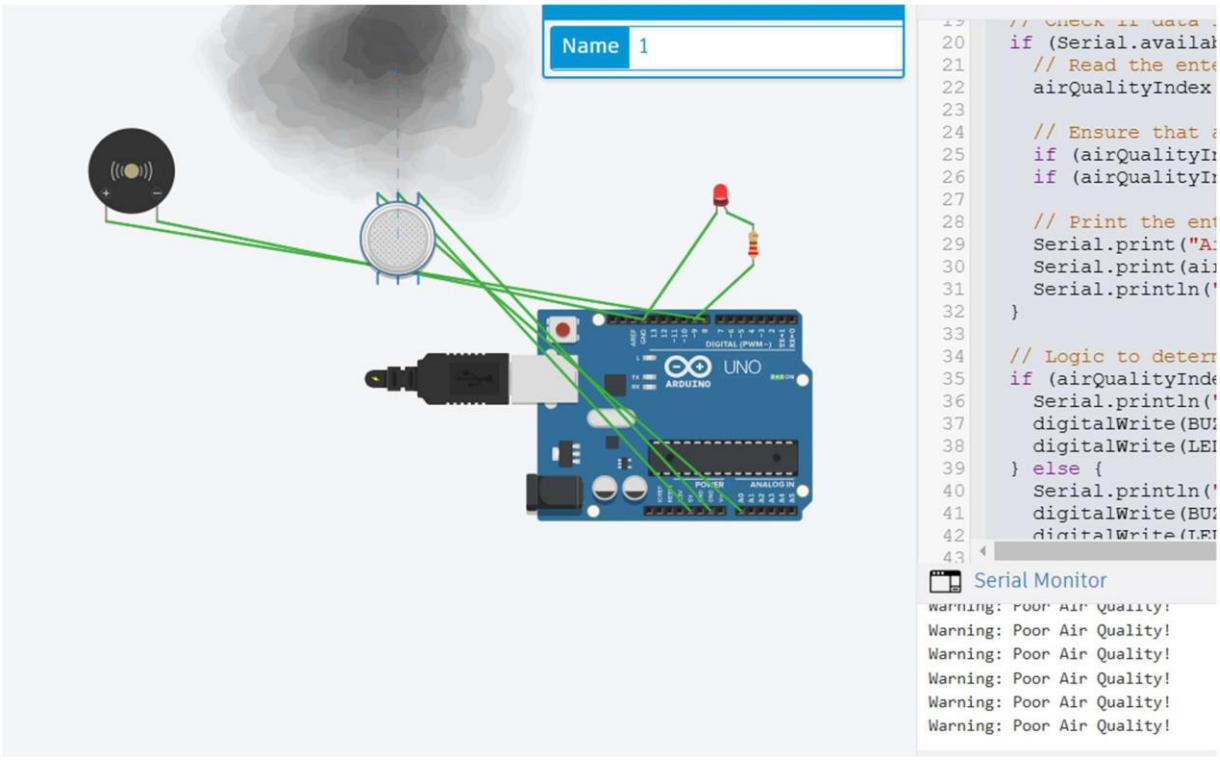
Code:

```
#define BUZZER_PIN 8        // Digital pin for buzzer
#define LED_PIN 9           // Digital pin for LED
```

```
int airQualityIndex = 0;  // Default value of air quality index

void setup() {
  Serial.begin(115200);  // Start serial communication for debugging

  // Set up Buzzer and LED pins
  pinMode(BUZZER_PIN, OUTPUT);
  pinMode(LED_PIN, OUTPUT);

  // Print initial message to Serial Monitor
  Serial.println("Air Pollution Monitoring System Initialized");
  Serial.println("Enter Air Quality Index (0-500): ");
}

void loop() {
  // Check if data is available in Serial Monitor
  if (Serial.available() > 0) {
    // Read the entered value
    airQualityIndex = Serial.parseInt();

    // Ensure that air quality index stays within the range (0 - 500)
    if (airQualityIndex < 0) airQualityIndex = 0;
    if (airQualityIndex > 500) airQualityIndex = 500;

    // Print the entered air quality index to the Serial Monitor
    Serial.print("Air Quality Index: ");
    Serial.print(airQualityIndex);
```

```
  Serial.println(" ppm");
 }

 // Logic to determine if air quality is good or poor
 if (airQualityIndex > 300) {
 Serial.println("Warning: Poor Air Quality!");
  digitalWrite(BUZZER_PIN, HIGH);  // Turn on the buzzer
  digitalWrite(LED_PIN, HIGH);     // Turn on the LED
 } else {
  Serial.println("Air Quality is Good");
  digitalWrite(BUZZER_PIN, LOW);  // Turn off the buzzer
  digitalWrite(LED_PIN, LOW);      // Turn off the LED
 }

 delay(1000);  // Wait for 1 second before checking again
}
```

OUTPUT:


Name
1
UNO
ARDUINO
Serial Monitor
Warning: Poor Air Quality!
Warning: Poor Air Quality!
Warning: Poor Air Quality!
Warning: Poor Air Quality!
Warning: Poor Air Quality!
Warning: Poor Air Quality!