# IOT Holidays Assignment

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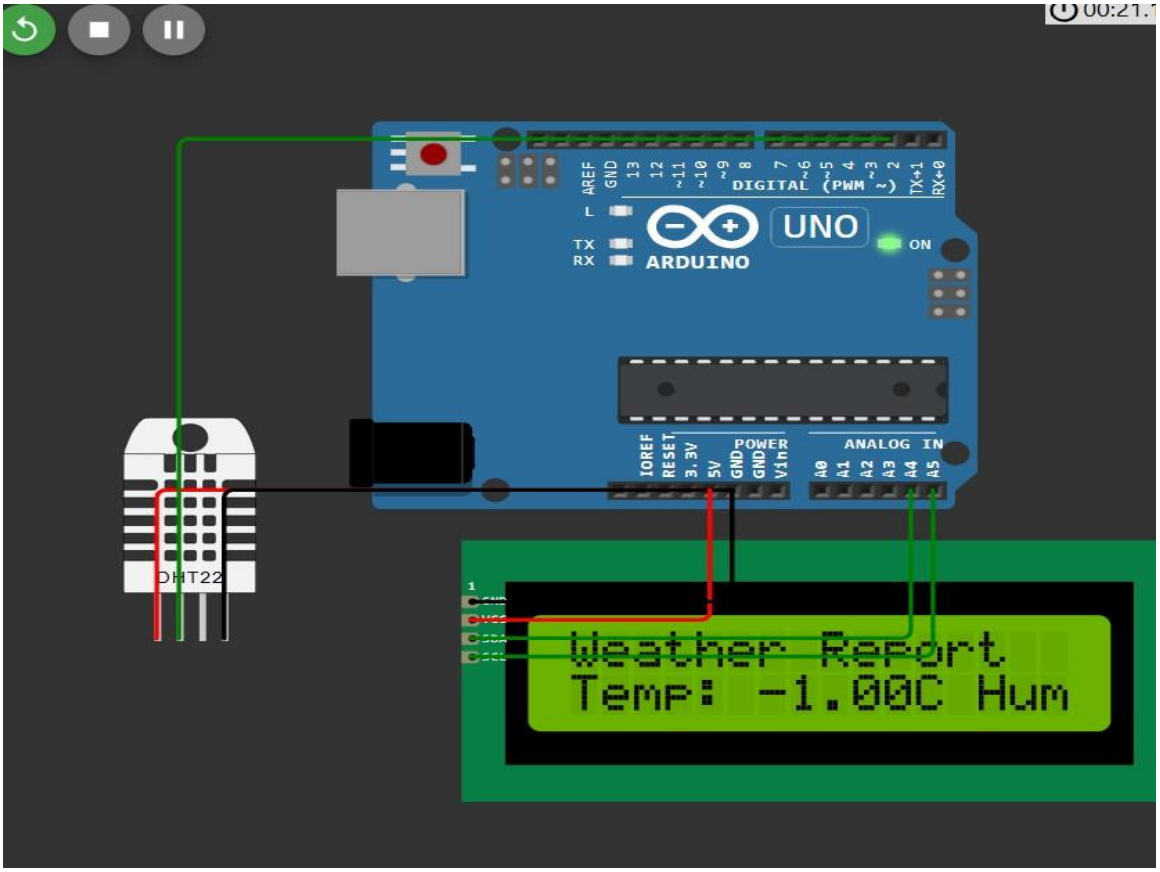
## 1.Write a Embedded C Program to Create a Weather Reporting System that provides real- time environmental data to users.

### 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);
}
```

## Circuit and result:



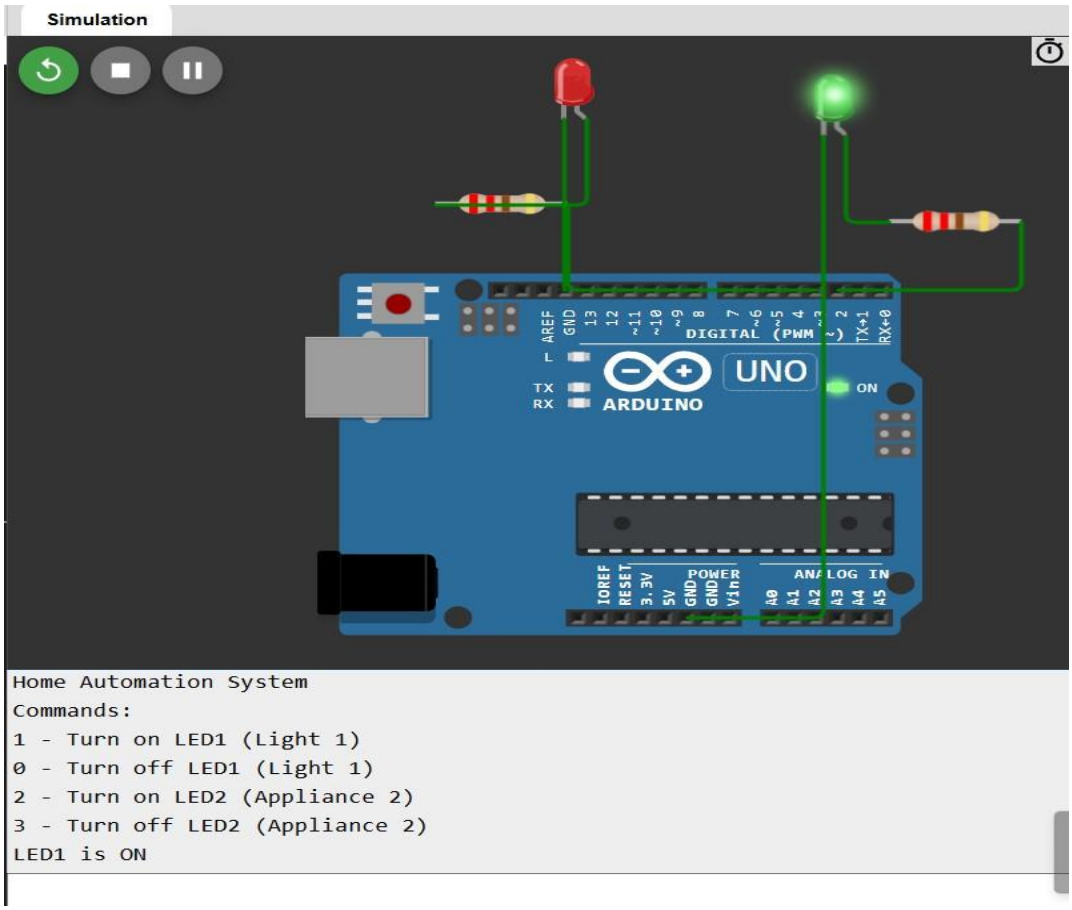

## 2.Write a Embedded C Program to Create a Home Automation System that simplifies daily routines (Any 2 Devices) by controlling devices remotely.

### 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");
    }
  }
}
```

Circuit and 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.

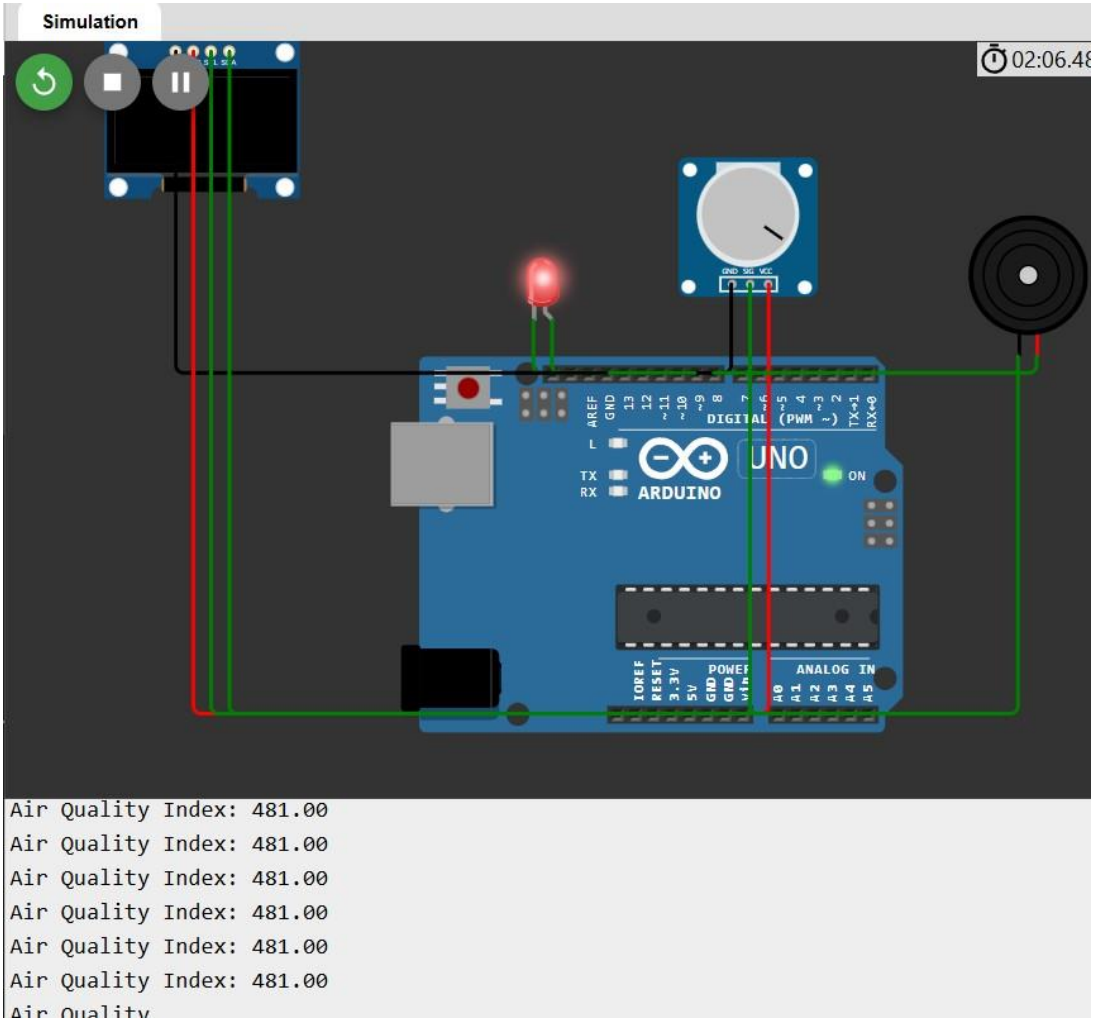
Code:

```
#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 :



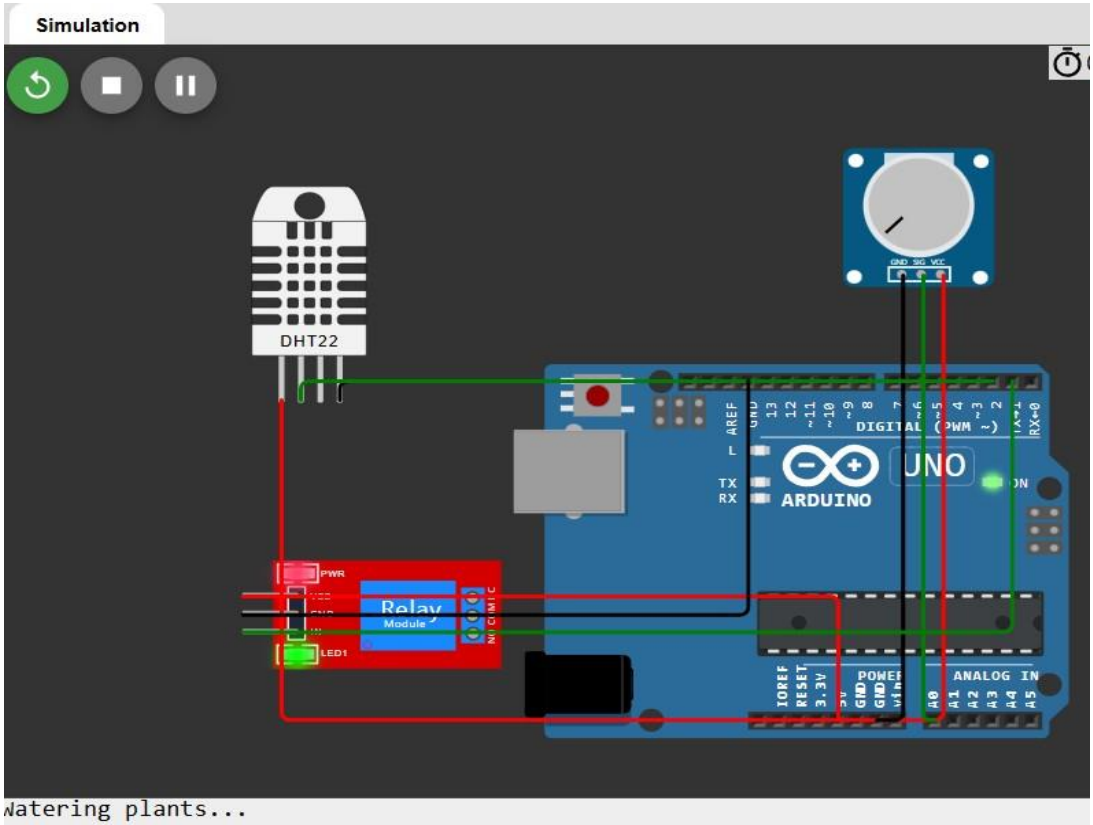

4.Write a Embedded C Program to Create an IoT-based Smart Irrigation System for Agriculture that automates watering based on weather and soil conditions Code:

```
#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: