Link for access project:

<https://www.tinkercad.com/things/ednH3lQUT46-copy-of-copy-of-brilliant-kup>

Code:

#include <LiquidCrystal.h>

// LCD pins: RS, E, D4, D5, D6, D7

LiquidCrystal lcd(12, 11, 7, 6, 3, 2);

// Pin definitions

const int gasSensorPin = 5; // Digital gas sensor output (HIGH means gas detected)

const int pirSensorPin = 4; // PIR motion sensor output (HIGH means motion detected)

const int greenLEDPin = 8; // Green LED pin for safe

const int redLEDPin = 9; // Red LED pin for fire alert

const int buzzerPin = 10; // Buzzer pin

const int tempSensorPin = A0; // TMP36 analog input for temperature

const int ldrPin = A1; // LDR analog input for light level

// Threshold values — Adjust these after testing your hardware

const int LDR\_THRESHOLD = 300; // LDR value below this means low light (possible smoke)

const float TEMP\_THRESHOLD = 50.0; // Temperature threshold in Celsius for fire

void setup() {

// Setup pins

pinMode(gasSensorPin, INPUT);

pinMode(pirSensorPin, INPUT);

pinMode(greenLEDPin, OUTPUT);

pinMode(redLEDPin, OUTPUT);

pinMode(buzzerPin, OUTPUT);

// Initialize Serial for debugging

Serial.begin(9600);

// Initialize LCD

lcd.begin(16, 2);

lcd.setCursor(0, 0);

lcd.print("System Ready");

delay(2000);

lcd.clear();

}

void loop() {

// Read sensors

int gasDetected = digitalRead(gasSensorPin); // HIGH if gas detected

int motionDetected = digitalRead(pirSensorPin); // HIGH if motion detected

int ldrValue = analogRead(ldrPin); // Light level (0-1023)

int tempRaw = analogRead(tempSensorPin); // Raw TMP36 analog value

// Convert TMP36 raw analog to Celsius

float voltage = tempRaw \* (5.0 / 1023.0);

float temperature = (voltage - 0.5) \* 100.0;

// Debug print for calibration and testing

Serial.print("Gas: ");

Serial.print(gasDetected);

Serial.print(" | Motion: ");

Serial.print(motionDetected);

Serial.print(" | LDR: ");

Serial.print(ldrValue);

Serial.print(" | Temp: ");

Serial.print(temperature);

Serial.println(" C");

// Fire detection logic:

// Fire suspected if any condition:

// 1. Gas sensor detects gas (smoke)

// 2. Temperature above threshold AND low light detected (smoke blocks light)

// 3. Motion detected (optional: may indicate emergency presence)

bool fireDetected = (gasDetected == HIGH) ||

(temperature > TEMP\_THRESHOLD && ldrValue < LDR\_THRESHOLD) ||

(motionDetected == HIGH);

if (fireDetected) {

// Fire alert: turn red LED and buzzer ON, green LED OFF

digitalWrite(redLEDPin, HIGH);

digitalWrite(greenLEDPin, LOW);

tone(buzzerPin, 1000); // 1 kHz tone for buzzer

// Display alert on LCD

lcd.clear();

lcd.setCursor(0, 0);

lcd.print("!! FIRE ALERT !!");

lcd.setCursor(0, 1);

lcd.print("Temp:");

lcd.print((int)temperature);

lcd.print("C LDR:");

lcd.print(ldrValue);

} else {

// Safe state: green LED ON, red LED and buzzer OFF

digitalWrite(greenLEDPin, HIGH);

digitalWrite(redLEDPin, LOW);

noTone(buzzerPin);

// Display safe status on LCD

lcd.clear();

lcd.setCursor(0, 0);

lcd.print("SAFE - Temp:");

lcd.print((int)temperature);

lcd.print("C");

lcd.setCursor(0, 1);

lcd.print("LDR:");

lcd.print(ldrValue);

}

delay(1000); // 1-second delay between readings

}