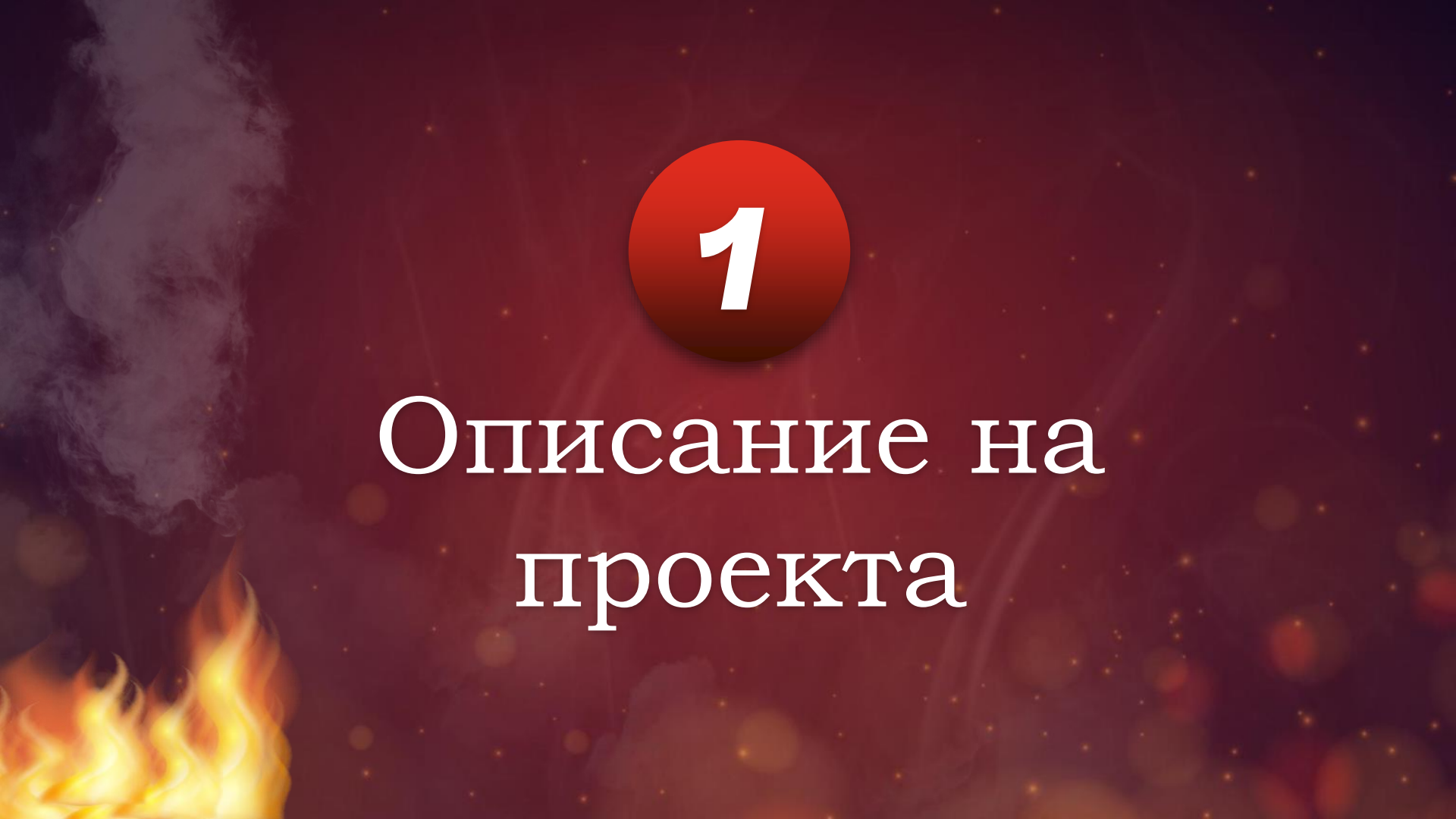
Fire Alarm Security System

Изготвила: Радина Иванова

Съдържание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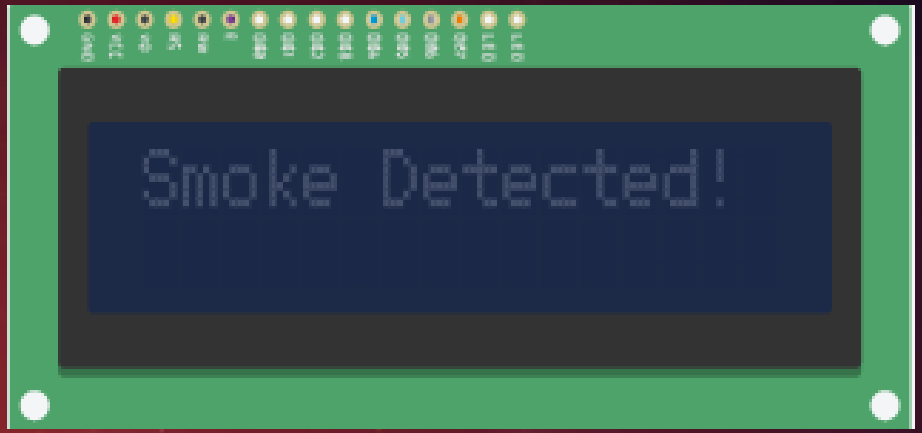
Описание на проекта

Проектът представлява прототип на противопожарна аларма, засичаща дим и температурни промени в затворено помещение. Изработен е в уеб платформата Thinkercad.

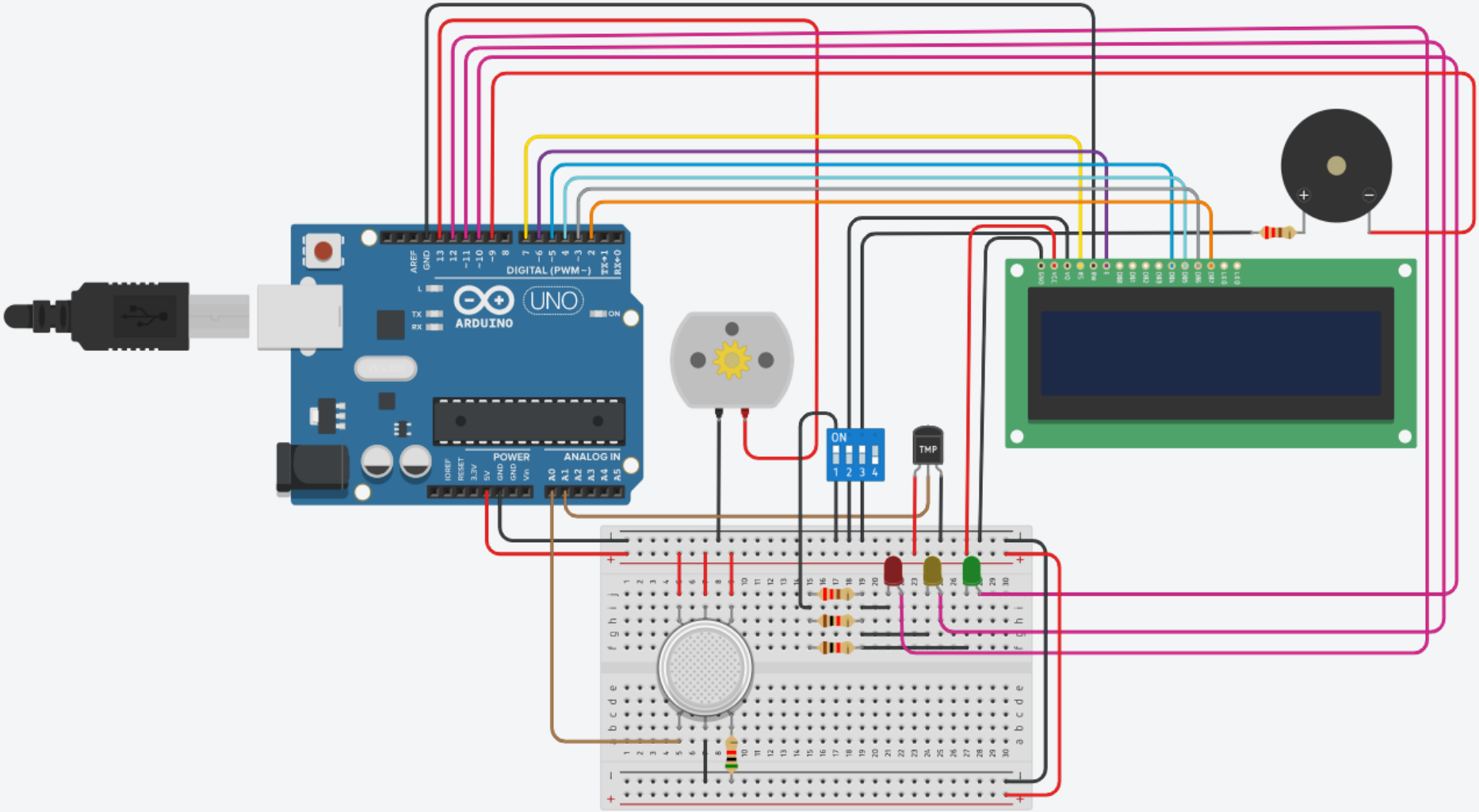
Снимки на дисплея


Safe Environment


Smoke Detected!

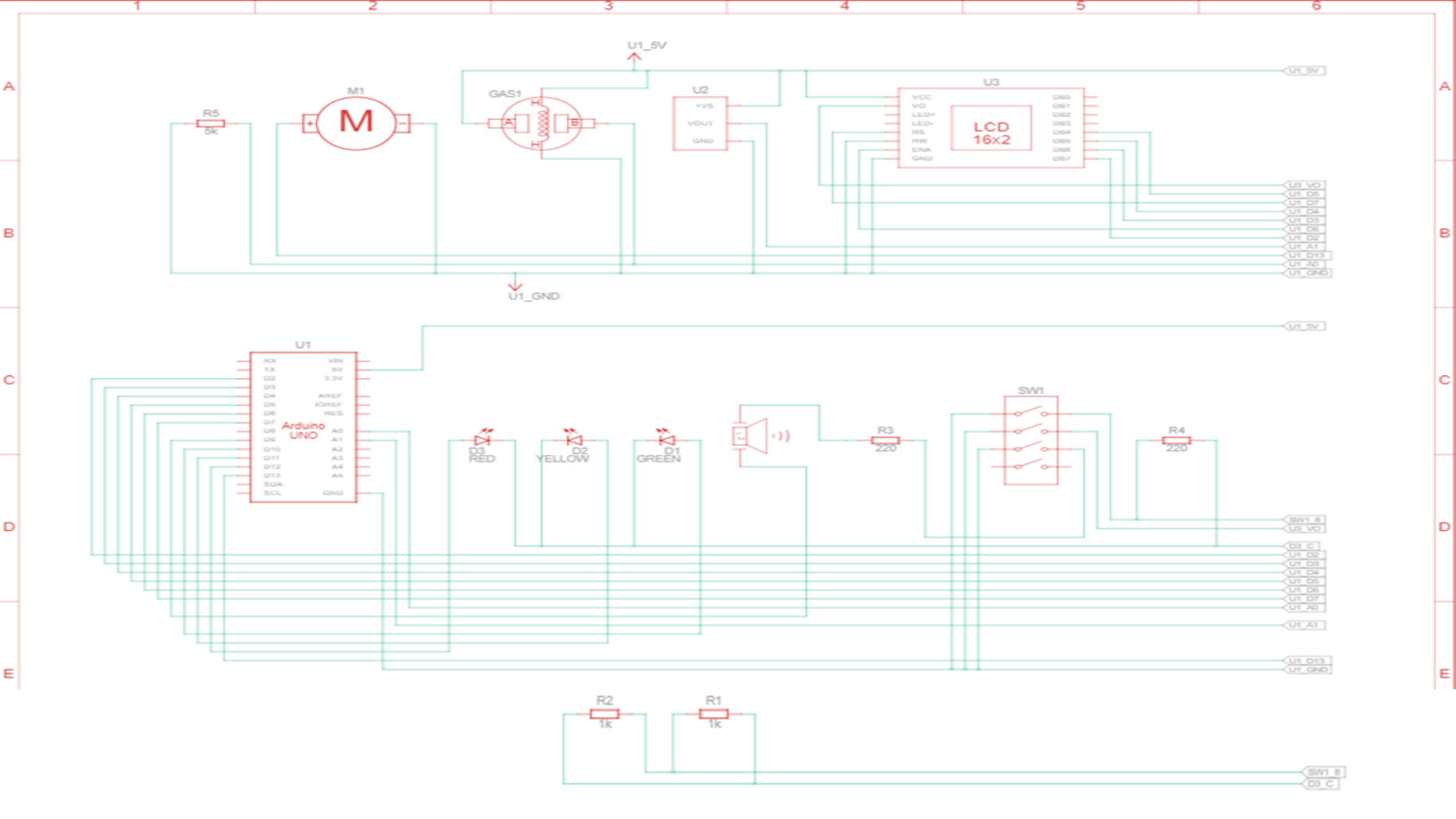

ALERT!
THERE IS A FIRE!

2 Блокова схема


DIGITAL (PWM~)
UNO
ARDUINO
POWER
ANALOG IN
ON
TMP

Електрическа схема

3


U1_5V
M1
R5
5k
GAS1
U2
U3
LCD
16x2
U1_GND
U1
Arduino
UNO
D3
RED
D2
YELLOW
D1
GREEN
R3
220
SW1
R4
220
R2
1k
R1
1k

Съставни части

Съставни части

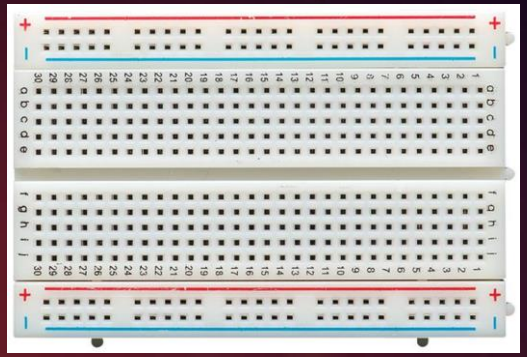
1. Arduino Uno R3
2. DC Motor
3. LCD 16x2
4. Breadboard
5. Resistors:
   - 1 x 5kΩ
   - 2 x 1kΩ
   - 2 x 220Ω
6. Temperature Sensor [TMP36]
7. DIP Switch SPST x 4
8. Gas Sensor
9. Piezo
10. LED x 3

Снимки на съставните части

220Ω

1kΩ

5kΩ

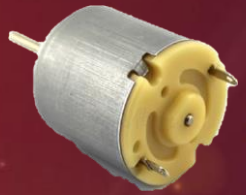


Breadboard

LED

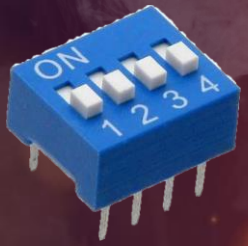
Temperature Sensor [TMP36]

Arduino Uno R3

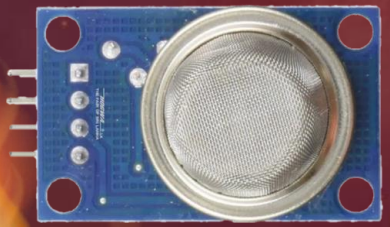


DC Motor

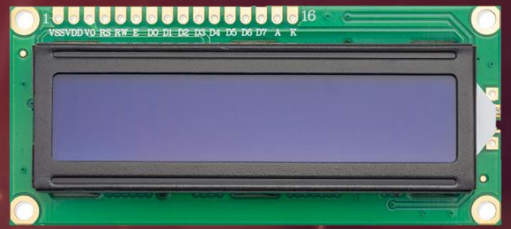
Piezo



DIP Switch SPST x 4



Gas Sensor



LCD 16x2

5

Сорс код

```
#include <LiquidCrystal.h>
// LCD Pin Number
LiquidCrystal lcd(7, 6, 5, 4, 3, 2);

// Assigned variables to their respective pin number
int redLED = 12;
int yellowLED=11;
int greenLED=10;
int buzzer = 9;
int smokeSensor = 0;
int sensorThreshold = 700;
int sensorPin = A1;
int motorPin=13;

 float temperatureC=0;
```

```
void setup()
{
  //Turn on display backlight
  lcd.begin(16,2);

  pinMode(redLED, OUTPUT);
  pinMode(yellowLED, OUTPUT);
  pinMode(greenLED, OUTPUT);
  pinMode(buzzer, OUTPUT);
  pinMode(smokeSensor, INPUT);
  pinMode(motorPin, OUTPUT);

  Serial.begin(9600);
}
```

```
void loop()
{

  int analogSensor = analogRead(smokeSensor);
  int reading = analogRead(sensorPin);
  float voltage = reading * 4.68;
  voltage /= 1024.0;

  // Convert voltage to Celsius degrees
   temperatureC = (voltage - 0.5) * 100;
  Serial.print(temperatureC);


  /*
    If smoke value is greater than gas threshold the LCD Displays
    Smoke Detected
  */
  if (analogSensor > sensorThreshold)
  {
    /*
      If the temperature is greater than 27 the buzzer activates,
      the red LED thurns on and the motor thurns on
    */
    if(temperatureC > 35)
    {
        FireMode();
    }
    // Else the yellow LED thurn on and the motor thurns on
    else
    {
        SmokeMode();
    }

  }
  // Else the display output is "Safe Environment"
  else
  {
     SafeMode();
  }

  delay(100);
  // Refresh LCD Display
  lcd.clear();
}
```

```
77  void FireMode(){
78    lcd.clear();
79    // Print message
80    lcd.print("     ALERT!");
81    lcd.setCursor(0,1);
82    lcd.print("THERE IS A FIRE!");
83
84    // Green and yellow leds are turned OFF, red led is turned ON
85      digitalWrite(redLED, HIGH);
86      digitalWrite(greenLED, LOW);
87      digitalWrite(yellowLED, LOW);
88
89    //Motor thurns ON
90      digitalWrite(motorPin, HIGH);
91
92    //Start-stop the buzzer for 3 times
93    for(int i=0;i<3;i++)
94    {
95      tone(buzzer, 1000, 10000);
96      delay(100);
97      noTone(buzzer);
98      delay(100);
99    }
100 }
```

```
119 void SafeMode()
120 {
121   //Print message
122     lcd.write("Safe Environment");
123
124
125   // Yellow and red leds are turned OFF, green led is turned ON
126     digitalWrite(redLED, LOW);
127     digitalWrite(yellowLED, LOW);
128     digitalWrite(greenLED, HIGH);
129
130   // The buzzer is thurned OFF
131     noTone(buzzer);
132
133   // The mottor is turned OFF
134     digitalWrite(motorPin, LOW);
135 }
```

```
102 void SmokeMode()
103 {
104   // Print message
105     lcd.print("Smoke Detected!");
106
107
108   // Green and red leds are turned OFF, yellow led is turned ON
109     digitalWrite(yellowLED, HIGH);
110     digitalWrite(redLED, LOW);
111     digitalWrite(greenLED, LOW);
112
113   // The buzzer is thurned OFF
114     noTone(buzzer);
115
116   // The motor is turned OFF
117     digitalWrite(motorPin, LOW);
118 }
```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Заключение

Процесът по изработването на прототипа на противопожарна аларма беше много интересен, изпълнен с трудности, с които успях да се справя. Научих много нови неща. Проектът надхвърли очакванията ми. Финалният продукт е много по-различен от началната идея, но и много по-добър. В заключение, успях да изпълня поставените си цели и да реализирам проекта по най-добрия начин.

Благодаря за вниманието