Temperature control system

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Introduction:

This project helps us to know the surrounding temperature level, and seeks to install the desired temperature in the following:

_The ideal temperature of the heat will work green led.

_ In case of temperature increases, green led will turn off and red led will turn on, the fan will work in a suitable speed To adjust the temperature.

_In case of low temperature, green led will turn off and blue led will turn on, the Fireplace will work to adjust the temperature

Project Description:

This project was built using ARDUINO UNO as a microcontroller, we have used it to read the values from LM35 sesor and wrote on the LCD screen. By implementing the system, we are able to know the temperature in the room and adjust it to suit the user.

Hardware Design:

Arduino UNO:

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output pins that can be interfaced to various expansion boards and other circuits

LCD:

A LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16×2 LCD display is a very basic module commonly used in DIYs (Do It Yourself) and circuits. The 16×2 translates a display of 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5×7-pixel matrix

GND and Vcc -> GND and 5V of the Arduino UNO

V0 -> to the potentiometer

Rs -> pin number 2 of the Arduino UNO

RW -> GND

E -> pin Number 3 of the Arduino UNO

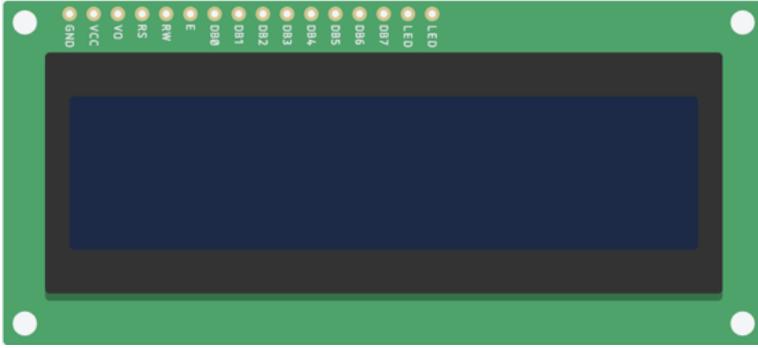The Led anode to the 200-ohm resistor

The Led cathode to GND

DB4 -> pin number 4

DB5 -> pin number 5

DB6 -> pin number 6

DB7 -> pin number 7

Breadboard:

A breadboard is a construction base for prototyping of electronics. Originally the word referred to a literal bread board, a polished piece of wood used for slicing bread. In the 1970s the solderless breadboard became available and nowadays the term "breadboard" is commonly used to refer to these [4].
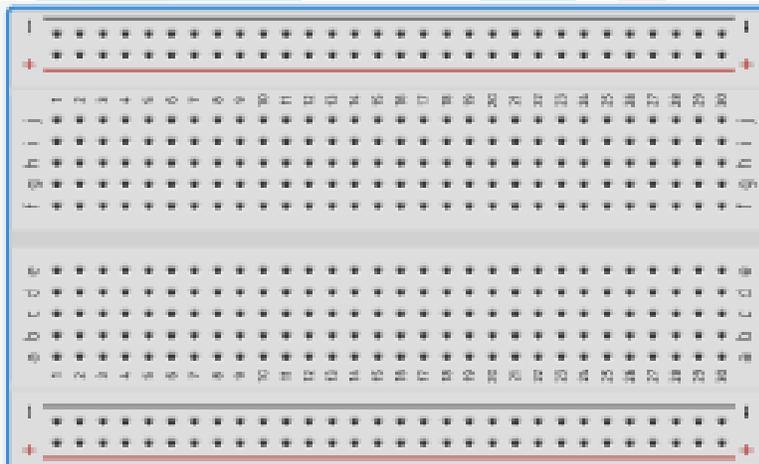
Temperature Sensor: (LM35)

The temperature sensor in Arduino converts the surrounding temperature to voltage. Then we can use this output voltage and convert it into temperature values.
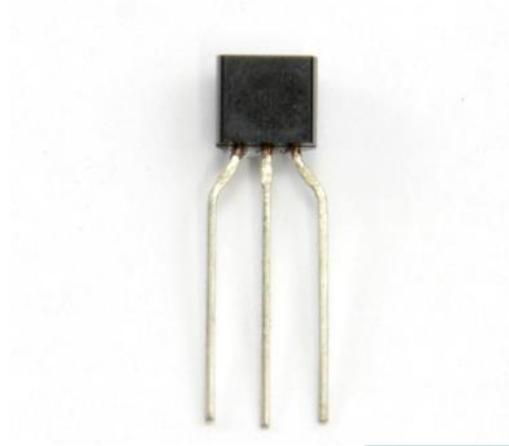
3x220-ohm Resistor:

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce the current flow, adjust signal levels, divide voltages, bias active elements and terminate the transmission lines.
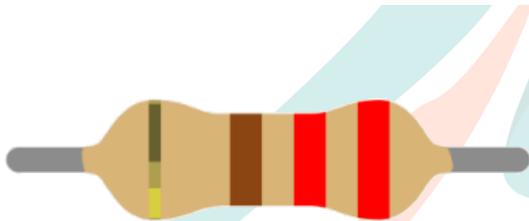
colored LEDs:

we are using those three LEDs as a statue LEDs

the red one lights when the Temperature > 35 and the yellow one lights up when the Temperature<10 and the green one lights in the other cases

DC brushless fan:

Depending on the pid system… the fan rotates when the temperature >35 and does in the rest of the cases

2xRelay SPDT:

An SPDT Relay or Single Pole Double Throw Relay is a type of relay that has one input and two outputs. Including the coil terminals. It not only provides the switching function even it can route the signal. An SPDT relay can control two electrical or electronic circuits. It operates in two contacts position.

Heat source: Lamp

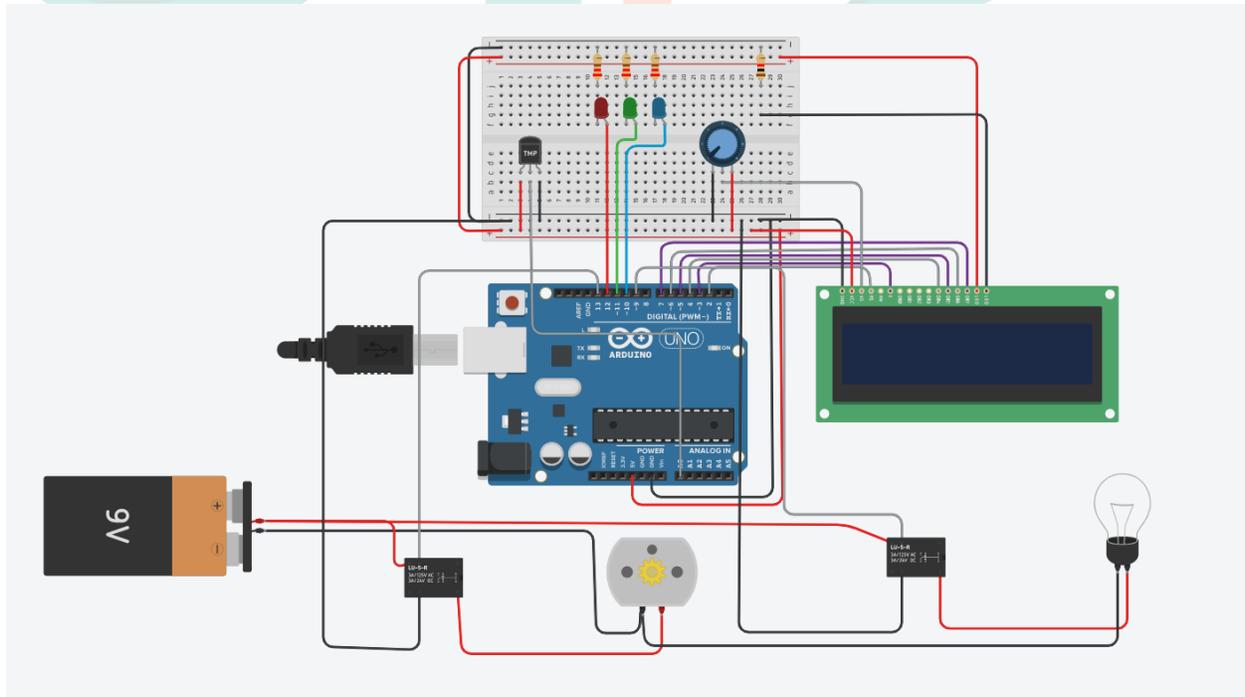the Lamp one lights when the Temperature <10 in order to adjust the temperature

potentiometer:

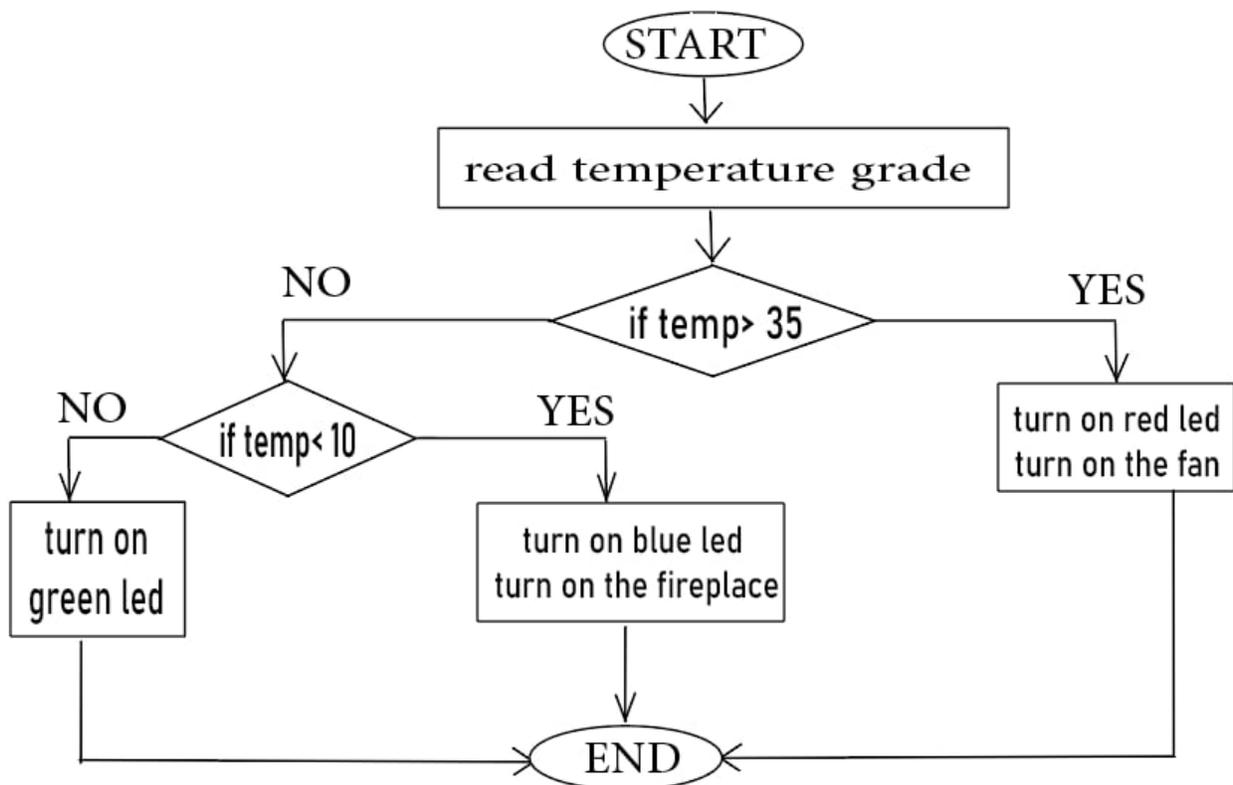We are going to use the potentiometer to control the contrast of the LCD

The Circuit:

Software Used:

We have used Tinker CAD software to design and implement our system.

Tinker CAD includes software tools that allows us to build the project virtually. Also, it allows us

to implement the code needed for all the functions

Flowchart:

The code:

```
#include <LiquidCrystal.h>

// Declare constants
const int LM35 = A0;
const int fan = 13;
const int heater = 9;
const int Led Red = 12;
const int Led Green = 11;
const int Led Blue = 10;

  LiquidCrystal lcd (2, 3, 4, 5, 6, 7);

void setup () {
  Serial. begin (9600);
  lcd. begin (16, 2);
  lcd. Print ("Hello, World!");
  pin Mode (fan, OUTPUT);
  pin Mode (heater, OUTPUT);
  pin Mode (LedRed, OUTPUT);
  pin Mode (LedGreen, OUTPUT);
  pin Mode (LedBlue, OUTPUT);
```

```arduino
  delay (2000);
  lcd. Clear ();
  lcd. Print ("Temp= ");
  lcd. set Cursor (0,1);
  lcd. Print ("Fan= ");
  lcd. setCursor (8,1);
  lcd.print ("&");
  lcd. setCursor (9,1);
  lcd.print ("Hot= ");
}

void loop () {
  // Section for the temperature sensor
  int value = analog Read (LM35);
  float Temperature = value * 500.0 / 1023.0;
  lcd. setCursor (6,0);
  lcd.print (Temperature);

  // Section of the fan and heater
  if (Temperature > 35) {
    digitalWrite (fan, HIGH);
    digitalWrite (heater, LOW);
    digitalWrite (LedRed, HIGH);
    digitalWrite (LedGreen, LOW);
    digitalWrite (LedBlue, LOW);
```

```
      lcd. setCursor (5,1);
      lcd.print ("ON ");
      lcd. setCursor (13,1);
      lcd.print ("OFF ");


}
   else if (Temperature < 10) {
    digitalWrite (fan, LOW);
    digitalWrite (heater, HIGH);
    digitalWrite (LedRed, LOW);
    digitalWrite (LedGreen, LOW);
    digitalWrite (LedBlue, HIGH);
    lcd. setCursor (5,1);
    lcd.print("OFF");
    lcd. setCursor (13,1);
    lcd.print ("ON ");
  }
  else {
    digitalWrite (fan, LOW);
    digitalWrite (heater, LOW);
    digitalWrite (LedRed, LOW);
    digitalWrite (LedGreen, HIGH);
    digitalWrite (LedBlue, LOW);
    lcd. setCursor (5,1);
    lcd.print("OFF");
```

```
  lcd. setCursor (13,1);
  lcd.print ("OFF ");
 }

  delay (1000);
}
```