Automatic Room Temperature Controller

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INRODUCTION

1.1 OVERVIEW

In this project we will control the temperature of a room automatically. We will use temperature sensor to monitor temperature, display it on LCD screen and increase and decrease temperature using heater and fan respectively.

1.2 PURPOSE

The main advantage of this project is that it helps in energy conservation. Because when there is nobody inside the room then the lights are automatically turned off. Human efforts to count the number of persons is eliminated.

Also, the temperature will be accurately set to appropriate temperature, resulting in people avoiding getting sick due to sudden temperature change.

LITERATURE SURVEY

2.1 EXISTING PROBLEM

Energy wastage is increased due to electrical appliances running on unwanted levels at undesired time. Also, people get sick often due to uneven room temperature as compared to surrounding.

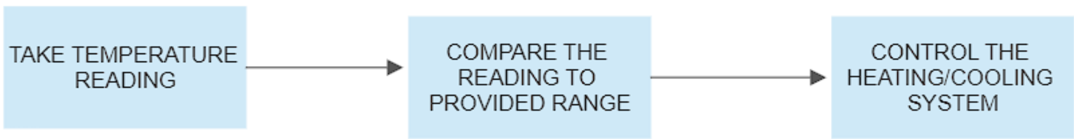
Many industrial processes require accurate temperature range in order to get required output. Doing so manually is impossible as a human can not be very accurate and changes are needed to be done very frequently, so chances of errors is very high.

2.2 PROPOSED SOLUTION

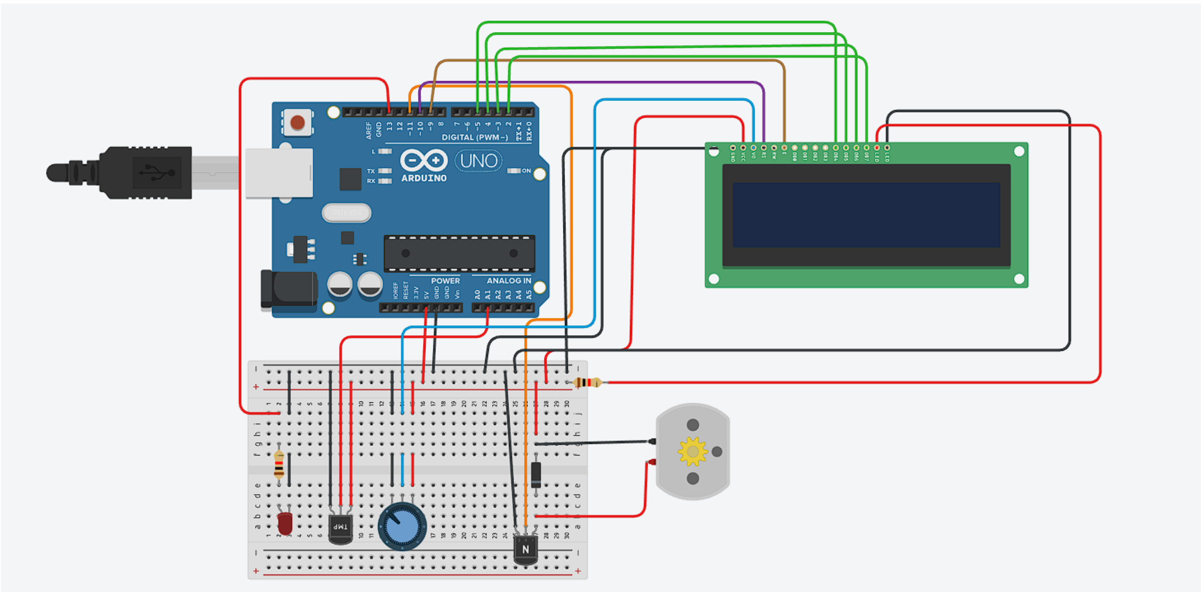
Above mentioned problems can be easily solved my automating temperature control systems. As the temperature will automatically be adjusted according to the range provided, energy will be saved. People will not get sick due to variations in temperature as the automation will adjust temperature to desired level quickly. Also, the industrial processes can be performed efficiently as the temperature can be set to desired levels accurately.

THEORITICAL ANALYSIS

3.1 BLOCK DIAGRAM



3.2 HARDWARE / SOFTWARE DESIGN



We used following hardware components-

- Arduino uno
- LCD (16 X 2)
- Motor (as fan)
- Temperature Sensor

- NPN Transistor (as heater)
- LED light
- Potentiometer
- Diode
- Bread board
- Wires

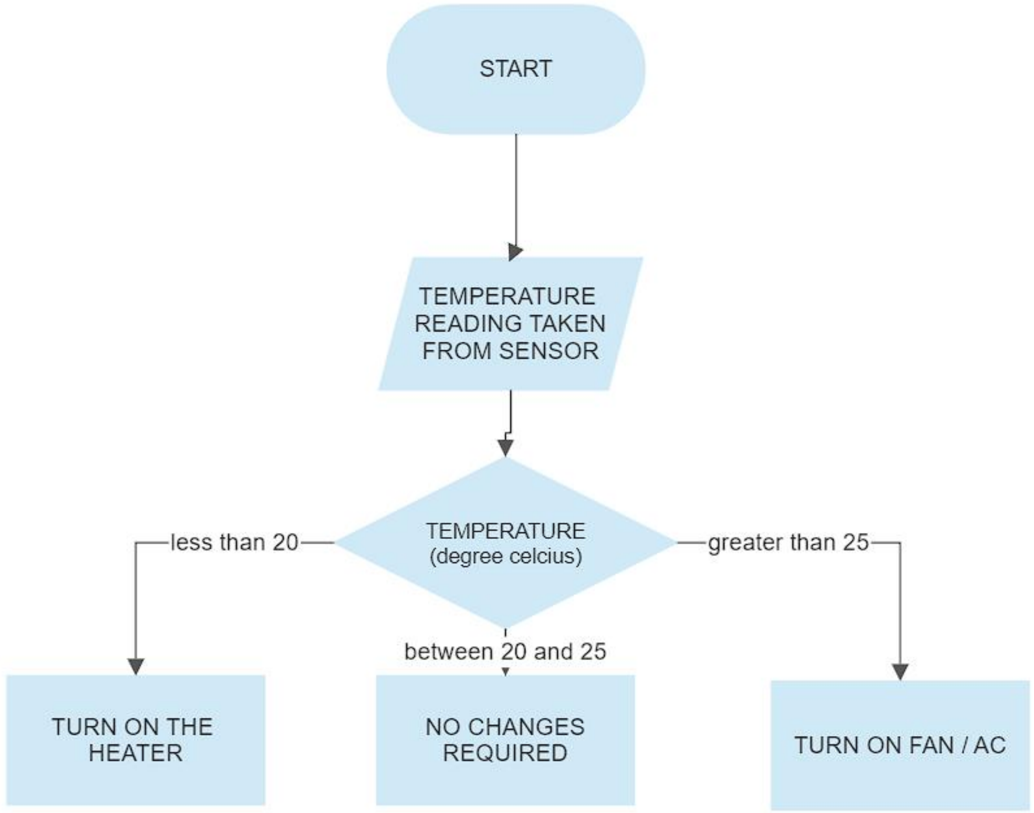
SOURCE CODE

```
const int temp_pin=A1;
const int heat_pin=13;
const int fan=11;

float mintemp=20, maxtemp=25;

#include<LiquidCrystal.h>
LiquidCrystal LCD(10,9,5,4,3,2);

void setup(){
  LCD.begin(16,2);
  pinMode(heat_pin,OUTPUT);
  pinMode(fan,OUTPUT);
  LCD.print("Room Temp (c): ");
  LCD.setCursor(2,1);
  LCD.print(mintemp);LCD.print("-");LCD.print(maxtemp);
  delay(2000);
}
void loop(){
  float eqv_volt, sensorTemp;
  eqv_volt=analogRead(temp_pin)*5.0/1023;
  sensorTemp=100.0*eqv_volt-50.0;
  LCD.clear();
```

```
LCD.print("sensor reading: ");
LCD.setCursor(2,1);
LCD.print(sensorTemp); LCD.print("C");
delay(2000);
if(sensorTemp>maxtemp){
 LCD.clear();
 LCD.print("tempe is high");
 LCD.setCursor(0,1); LCD.print("turn on fan");
 for (int i=0;i<=255;i++){
  analogWrite(fan, i);
 }
 delay(5000);
 LCD.clear();
 LCD.print("temp is normal");
 LCD.setCursor(0,1); LCD.print("tur off fan");
 for (int i=255;i>=0;i--){
  analogWrite(fan, i);
 }
 delay(2000);
}
else if(sensorTemp<mintemp){
 LCD.clear();
 LCD.print("temp is low");
 LCD.setCursor(0,1); LCD.print("turn on heater");
 digitalWrite(heat_pin,HIGH);
 delay(5000);

 LCD.clear();
 LCD.print("temp is normal");
 LCD.setCursor(0,1); LCD.print("turn off heater");
 digitalWrite(heat_pin,HIGH);
```

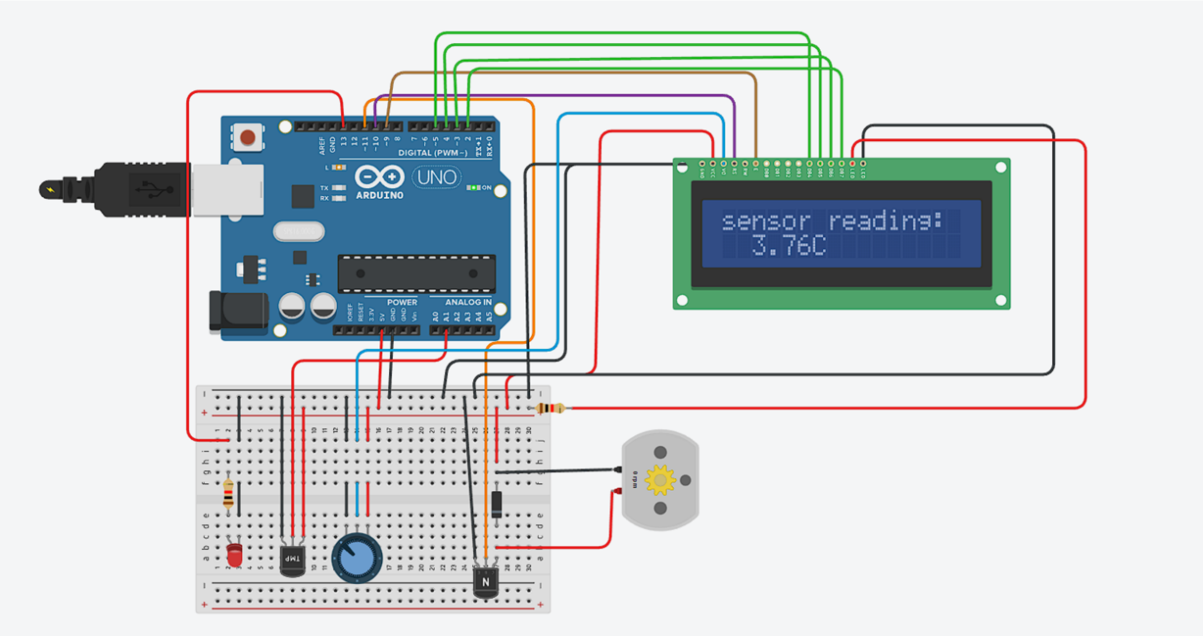
```
    delay(1000);
    LCD.clear();
  }
  else if(sensorTemp>mintemp && sensorTemp<maxtemp){
    LCD.clear();
    LCD.print("Temp is normal");
    LCD.setCursor(2,1);
    LCD.print("Turn off all");
    delay(1000);
  }
  else{
    LCD.clear();
		LCD.print("something went wrong");
    delay(1000);
    LCD.clear();
  }
  delay(1000);
}
```

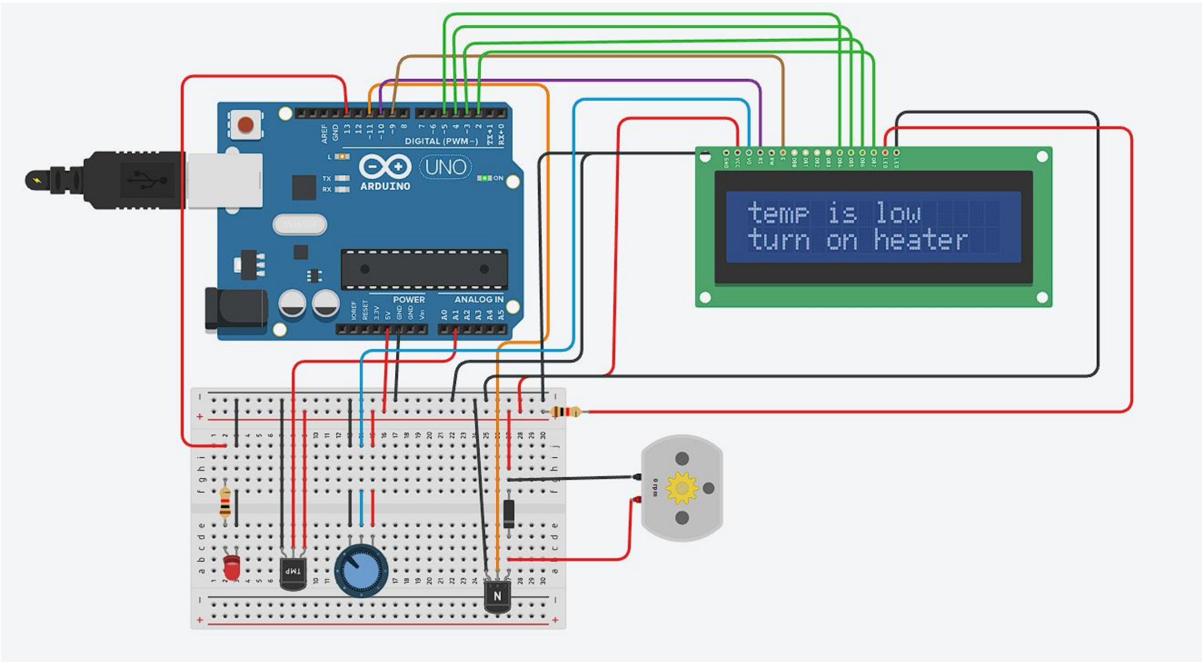
FLOW CHAR


START
TEMPERATURE READING TAKEN FROM SENSOR
TEMPERATURE (degree celcius)
less than 20
greater than 25
between 20 and 25
TURN ON THE HEATER
NO CHANGES REQUIRED
TURN ON FAN / AC

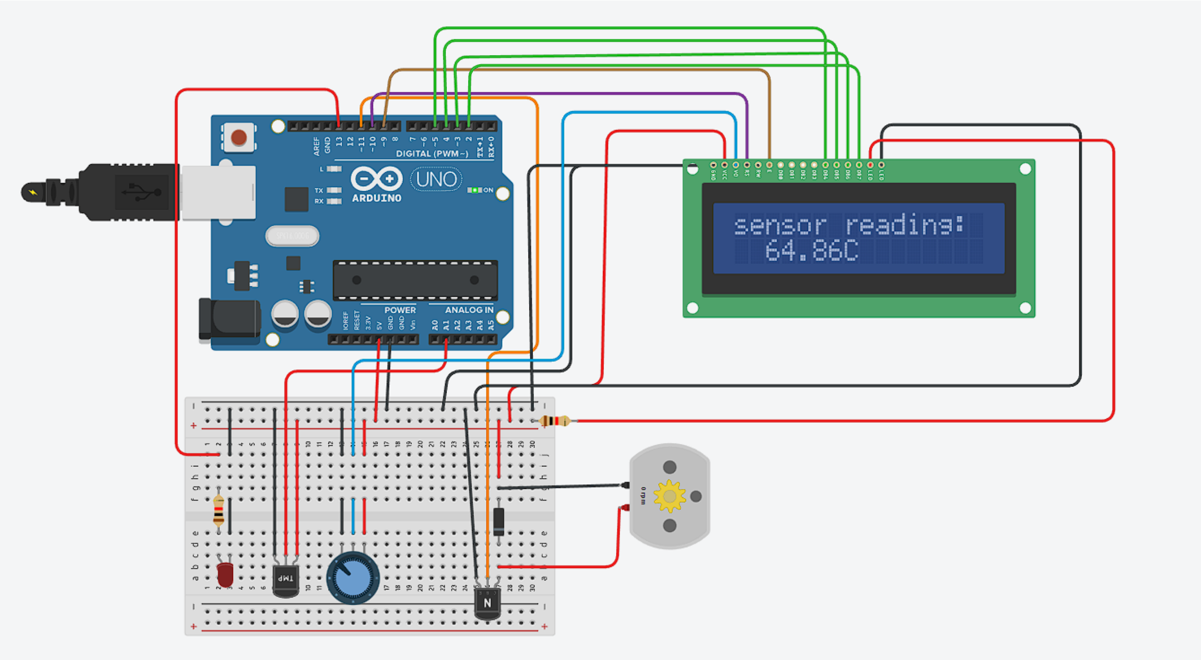
RESULT

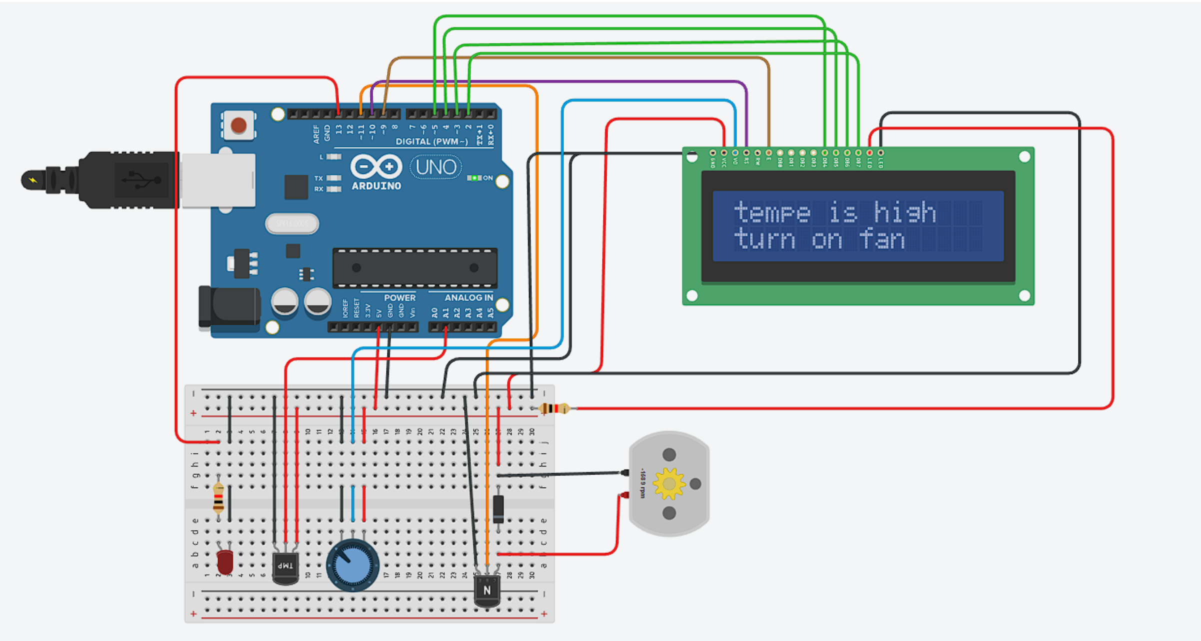
When temperature is less than 20 degrees Celsius





When temperature is greater than 25 degrees Celsius





ADVANTAGES AND DISADVANTSGES

ADVANTAGES

1) Employing a temperature monitoring system will save you money in the long run, on wasted stock, product recalls etc.

2) Efficient and convenient.

3) Accessible from anywhere.

4) User friendly.

5) More affordable than you thin.

DISADVANTAGES

1) The control is ‘stand-alone’, and cannot communicate with a remote controller or PLC (Programmable Logic Controller), although a high temperature cut-out may signal closure via a switch.
2) Limited sizes.
3) Limited pressure ratings.
4) Limited turndown.
5) Sensors tend to be much larger than the pneumatic and electronic equivalents and also much slower acting.

APPLICATIONS

1) Small jacketed pans.
2) Tracer lines.
3) Ironers.
4) Small tanks.
5) Acid baths.
6) Small storage calorifiers.
7) Small heater batteries.
8) Unit heaters.

CONCLUSION

We can say that overall, an automatic temperature control system is very helpful both financially and environmentally. With further technological advances it will be flawless. More and more people around the world are moving towards automation and it is an exponentially advancing field.