SRM Institute of Science and Technology

College of Engineering and Technology

Department of Electronics and Communication Engineering

18ECO108J & Embedded System design using Arduino

Fifth Semester, 2021-22 (odd semester)

Mini Project Report

Name : **Sagnik Roy**

Register No. : **1911027010013**

Day / Session : **DO-4**

Venue : **Online**

Project Title : **Automatic Room Temperature Controller**

Lab Supervisor : **Joshua J**

Team Member : **Zuber Rehman**

Particulars	Max. Marks	Marks Obtained
Objective & Description	10	
Results	10	
Presentation	10	
Report	10	
Total	**40**	

REPORT VERIFICATION

Date :

Staff Name :

Title

Objectives: To demonstrate the functioning of the Automatic Room Temperature Controller

Abstract:
Weather changes become hard to adapt. That is, during Winter we face difficulties tolerating the freezing cold, and that is why people often prefer wearing coats during the season. On the other hand, the weather becomes too warm in summer. Thus, having understood the switching operation of transistors, unidirectional current flow in diodes, the principle of operation of motors, the resistance from resistors combined with the transformation capability of the transducer, the temperature sensor in this case, the automatic room temperature controller has been made.

Hardware/Software Requirements:
NOTE: ALL THE MENTIONED COMPONENTS ARE USED VIRTUALLY IN TINKERCAD.

1. **Resistor 221 Ohm x3**
2. **Standard LCD(16x2) x1**
3. **LED x1**
4. **General Purpose NPN x1**
5. **Temperature Sensor x1**
6. **1N4007 – High Voltage, High Current Rated Diode**
7. **DC Motor**

Program:
Code :

```
// Declare/assign Arduino IO-pins

 const int temp_trans_pin = A0, Heater_pin = 13, FAN_pin = 6;
/*FAN_pin: here I used DC motor in stead of FAN because
 I couldn't find the symbol for it. Similarly,for the
  Heater (Heater_pin), I used LED.*/

// Set the range of the desired temperature

  float MinTemp = 20, MaxTemp = 25;/*Room temperature is [20,25] degree C */

// Include the LCD library code

 #include <LiquidCrystal.h>

// Initialize the library with the numbers of the interface pins

 LiquidCrystal LCD(12, 11, 5, 4, 3, 2);

 void setup() {

 // System initialization

   LCD.begin(16, 2);
   pinMode(Heater_pin, OUTPUT);//LED in our case
   pinMode(FAN_pin, OUTPUT);

 // Display the desired range of temperature
```

```
  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;

// Read voltage and convert to temperature (Celsius)

  Eqv_volt = analogRead(temp_trans_pin) * 5.0 / 1023;
  SensorTemp = 100.0 * Eqv_volt-50.0;

 // Display the sensor reading

  LCD.clear();
  LCD.print("Sensor reading:");
  LCD.setCursor(2,1);
  LCD.print(SensorTemp); LCD.print(" C");

  delay(2000);

/*Compare the sensor reading with the range of
 acceptable temperatures*/
```

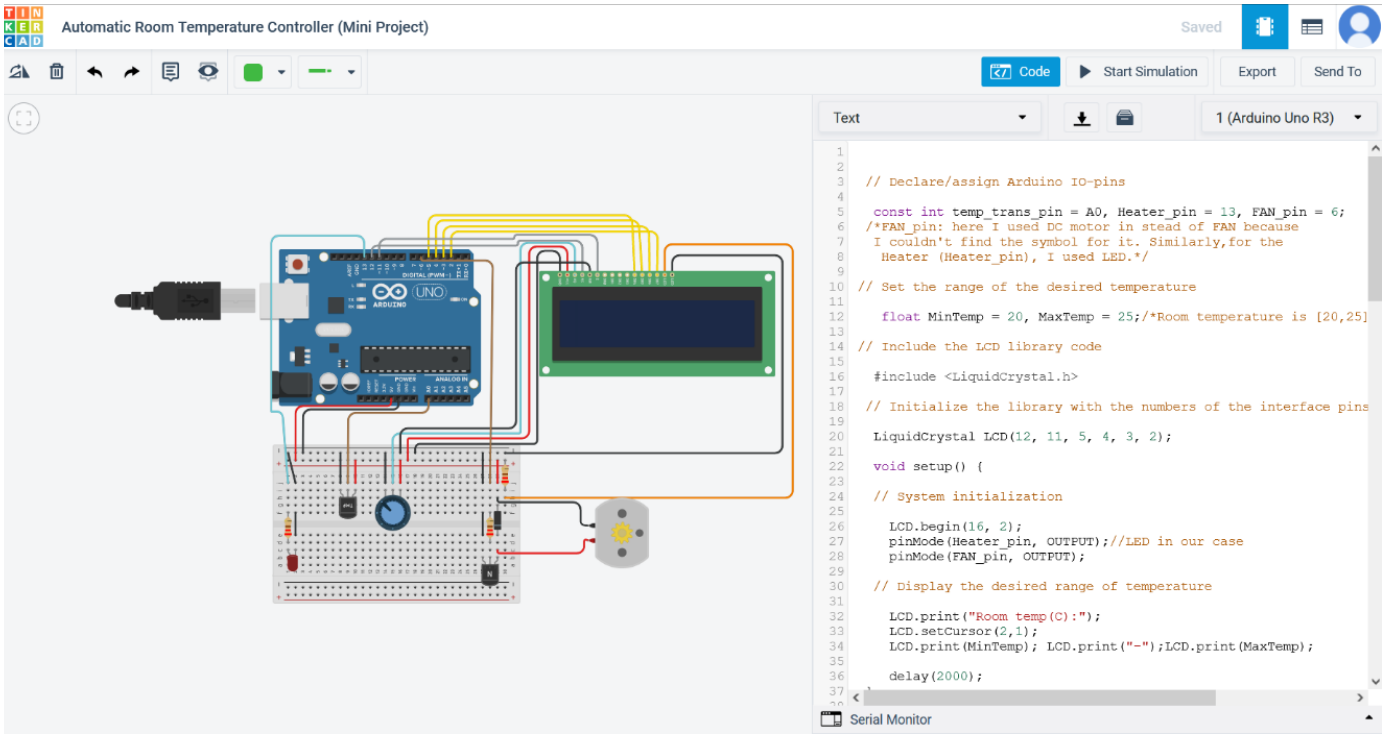
```
 if(SensorTemp > MaxTemp){
    LCD.clear();
    LCD.print("temp is HIGHER!");//higher than the max

    /*Turn on FAN (dc motor)! to regulate the temp.
     Increase FAN speed at a slow rate*/

    LCD.setCursor(0, 1);LCD.print("Turn on FAN!");
    for( int i = 0; i <= 255; i++ ) {
     analogWrite(FAN_pin, i);
    }
    delay(2000);

    LCD.clear();
    LCD.print("Now temp is OK!");
    LCD.setCursor(0, 1);
    LCD.print("Turn off FAN!");

// Turn off FAN slowly
    for( int i = 255; i >= 0; i-- ) {
     analogWrite(FAN_pin, i);
    }
     delay(2000);
    }
else if(SensorTemp < MinTemp){
    LCD.clear();
    LCD.print("temp is LOWER!");//Less than the mini
```

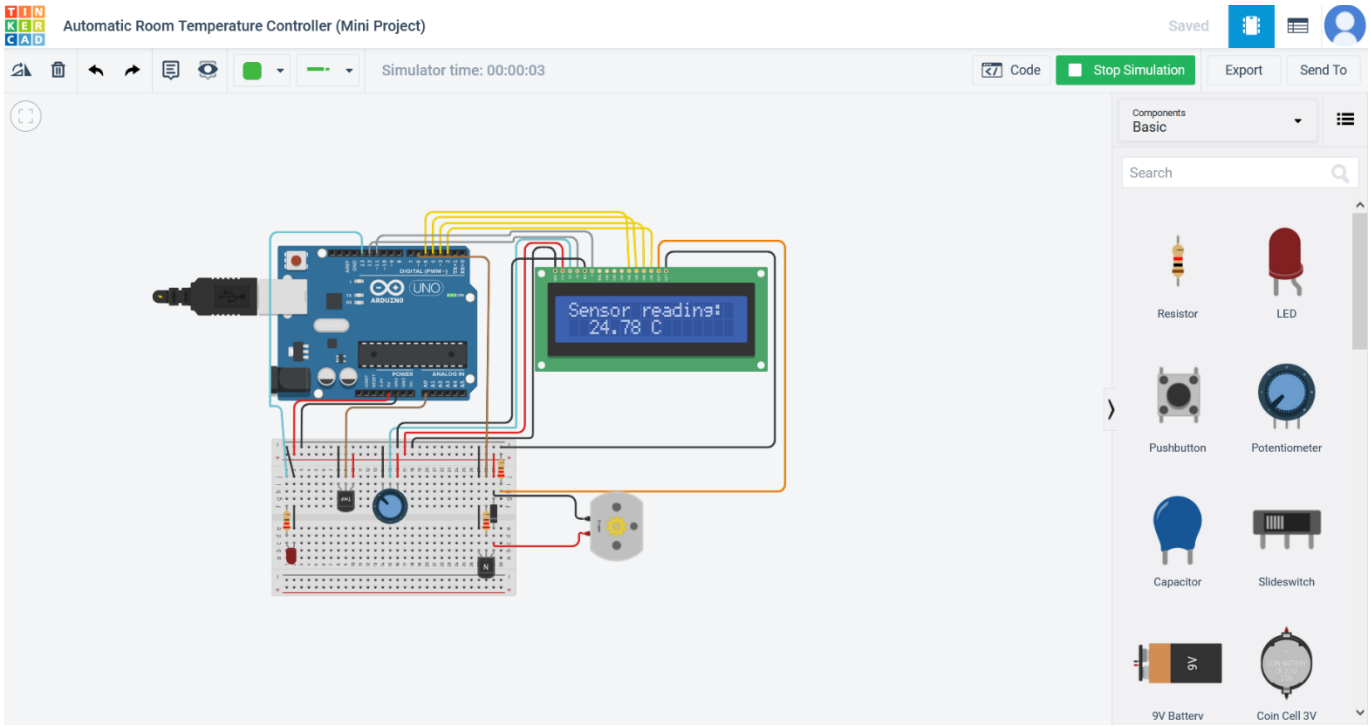
```
  LCD.setCursor(0, 1);
  LCD.print("Turn on HEATER!");

 //Turn the heater ON, LED in our case

  digitalWrite(Heater_pin, HIGH);

  delay(3000);

  LCD.clear();
  LCD.print("Now temp is OK!");
  LCD.setCursor(0, 1);
  LCD.print("Turn off HEATER!");

  delay(1000);

  digitalWrite(Heater_pin, LOW);
  LCD.clear();
  }
else if(SensorTemp > MinTemp && SensorTemp < MaxTemp){/*Now temperature is perfect.
   That is,it is in the desired range. Hence no need of changes!!*/
  LCD.clear();
  LCD.print("Temp is NORMAL!");LCD.setCursor(2,1);
  LCD.print("Turn off all!");

  delay(1000);
  LCD.clear();
}
```

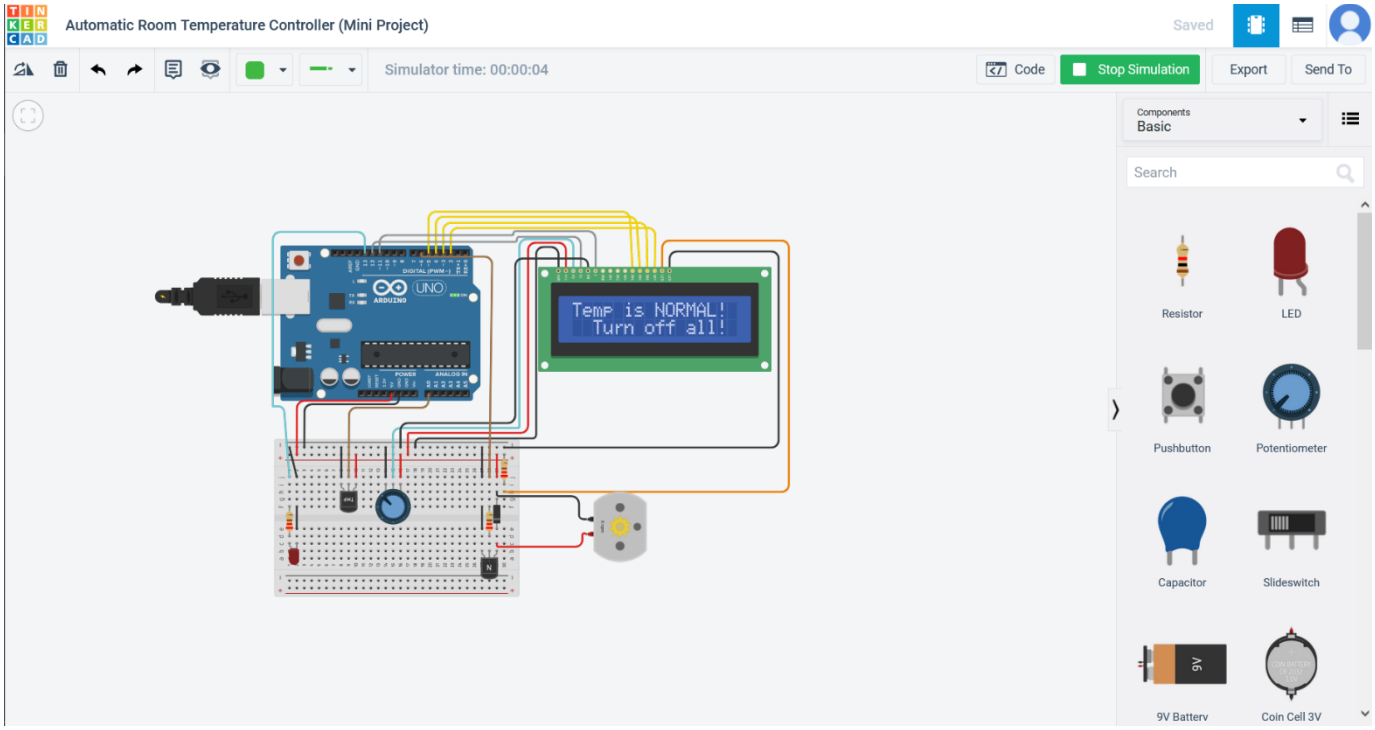
```
else {
   LCD.clear();
   LCD.print("Something went");
   LCD.setCursor(2,1); LCD.print("WRONG in the ckt");
   delay(1000);
   LCD.clear();
 }
 delay(1000);
}
```

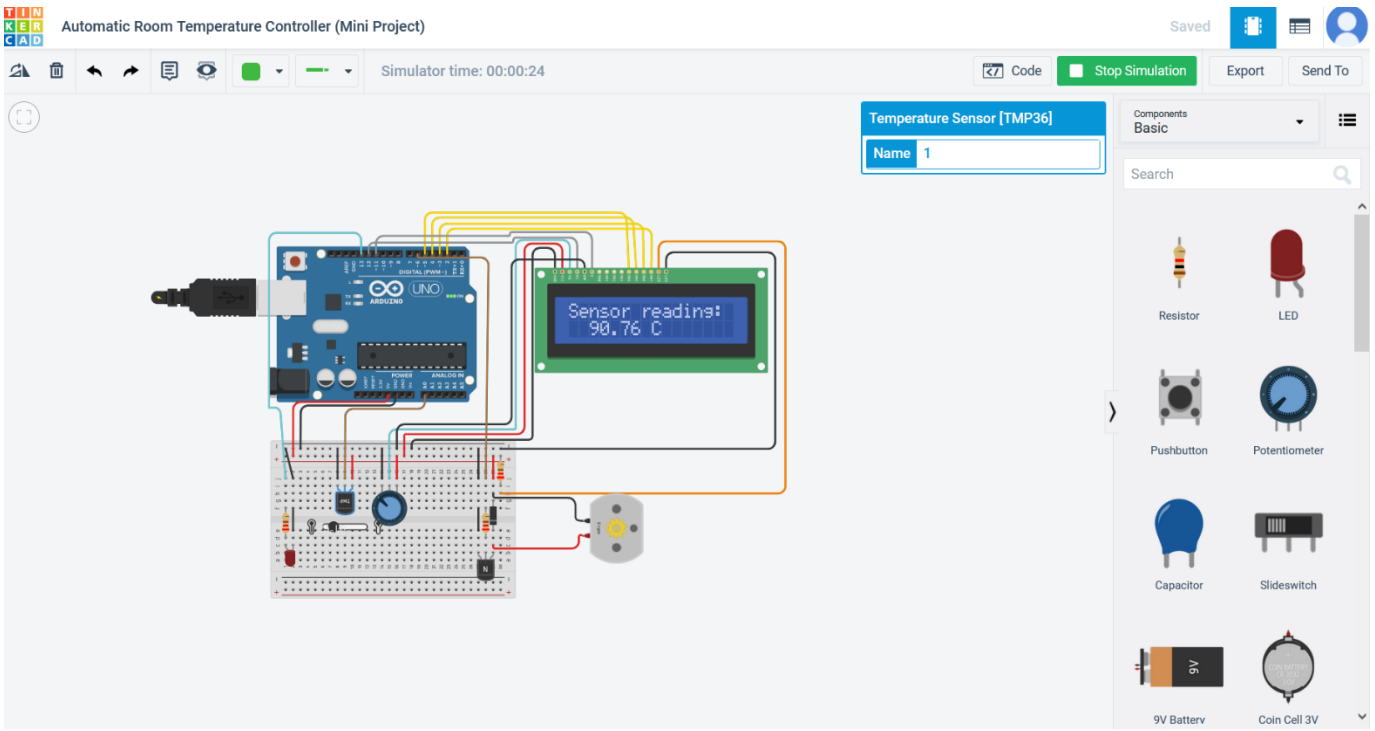
Output:

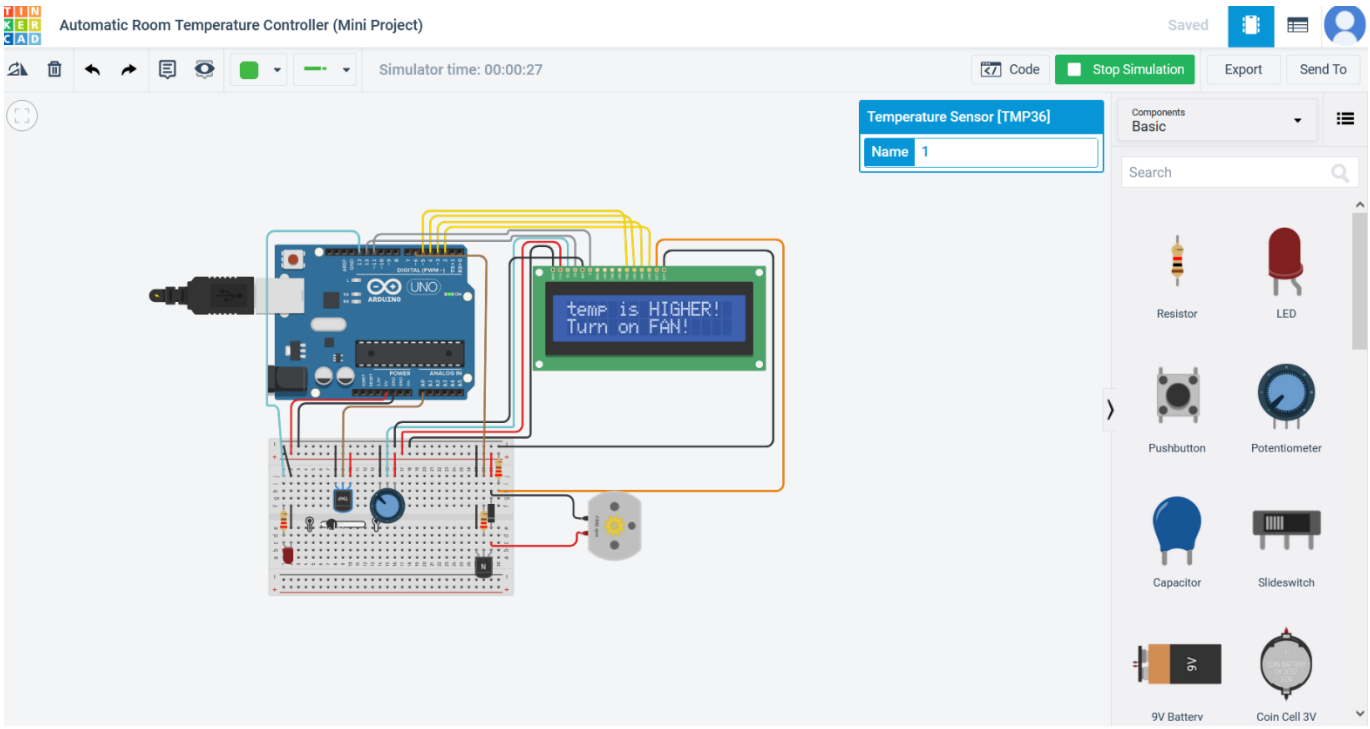
Screenshots

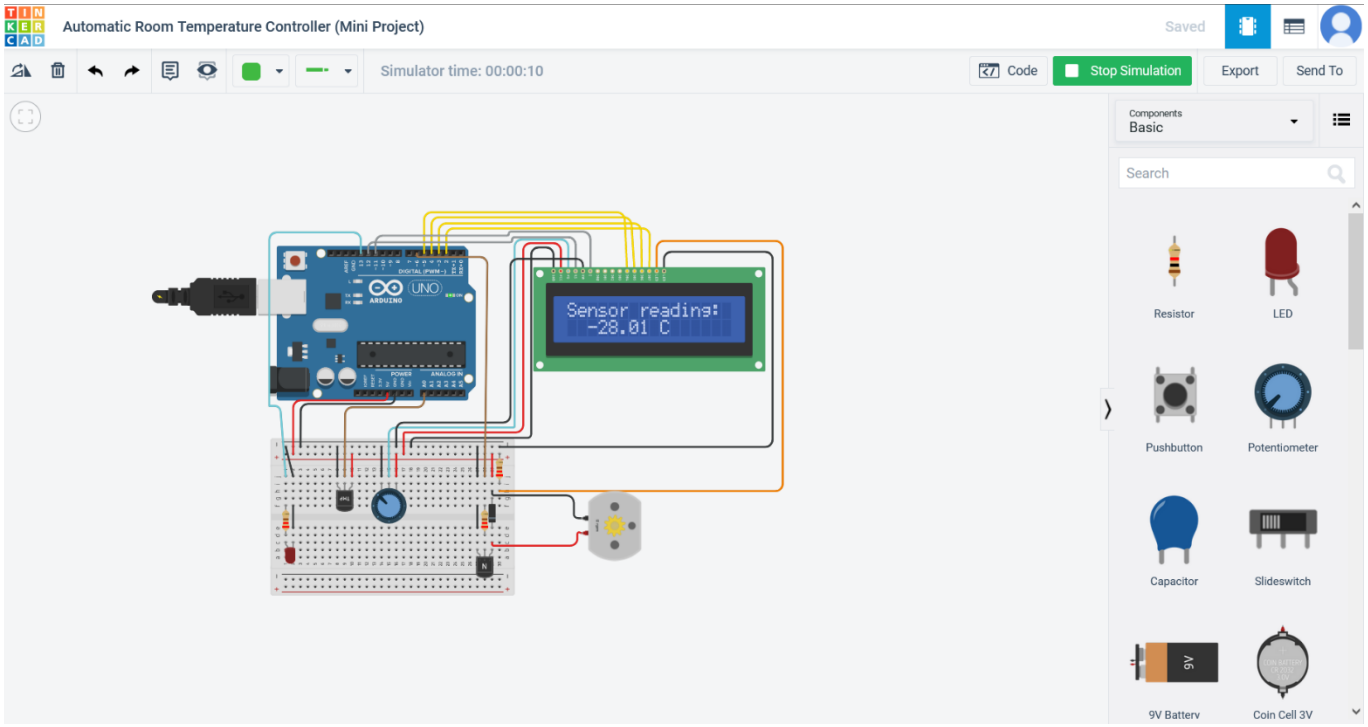

Automatic Room Temperature Controller (Mini Project)
Saved
Code
Start Simulation
Export
Send To
Text
1 (Arduino Uno R3)
// Declare/assign Arduino IO-pins
const int temp_trans_pin = A0, Heater_pin = 13, FAN_pin = 6;
/*FAN_pin: here I used DC motor in stead of FAN because
I couldn't find the symbol for it. Similarly,for the
Heater (Heater_pin), I used LED.*/
// Set the range of the desired temperature
float MinTemp = 20, MaxTemp = 25;/*Room temperature is [20,25]
// Include the LCD library code
#include <LiquidCrystal.h>
// Initialize the library with the numbers of the interface pins
LiquidCrystal LCD(12, 11, 5, 4, 3, 2);
void setup() {
// System initialization
LCD.begin(16, 2);
pinMode(Heater_pin, OUTPUT);//LED in our case
pinMode(FAN_pin, OUTPUT);
// Display the desired range of temperature
LCD.print("Room temp(C):");
LCD.setCursor(2,1);
LCD.print(MinTemp); LCD.print("-");LCD.print(MaxTemp);
delay(2000);
Serial Monitor

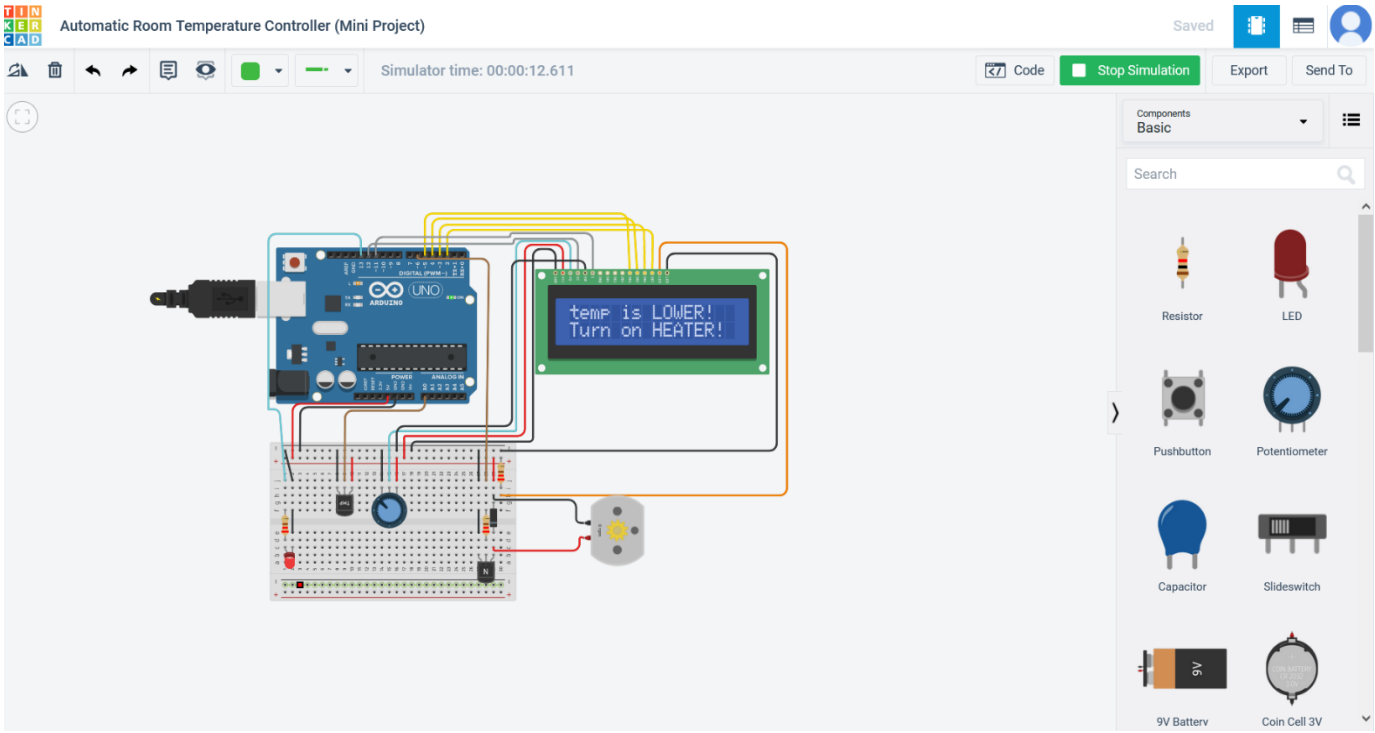

Automatic Room Temperature Controller (Mini Project)
Saved
Simulator time: 00:00:03
Code
Stop Simulation
Export
Send To
Sensor reading:
24.78 C
Components
Basic
Search
Resistor
LED
Pushbutton
Potentiometer
Capacitor
Slideswitch
9V Battery
Coin Cell 3V

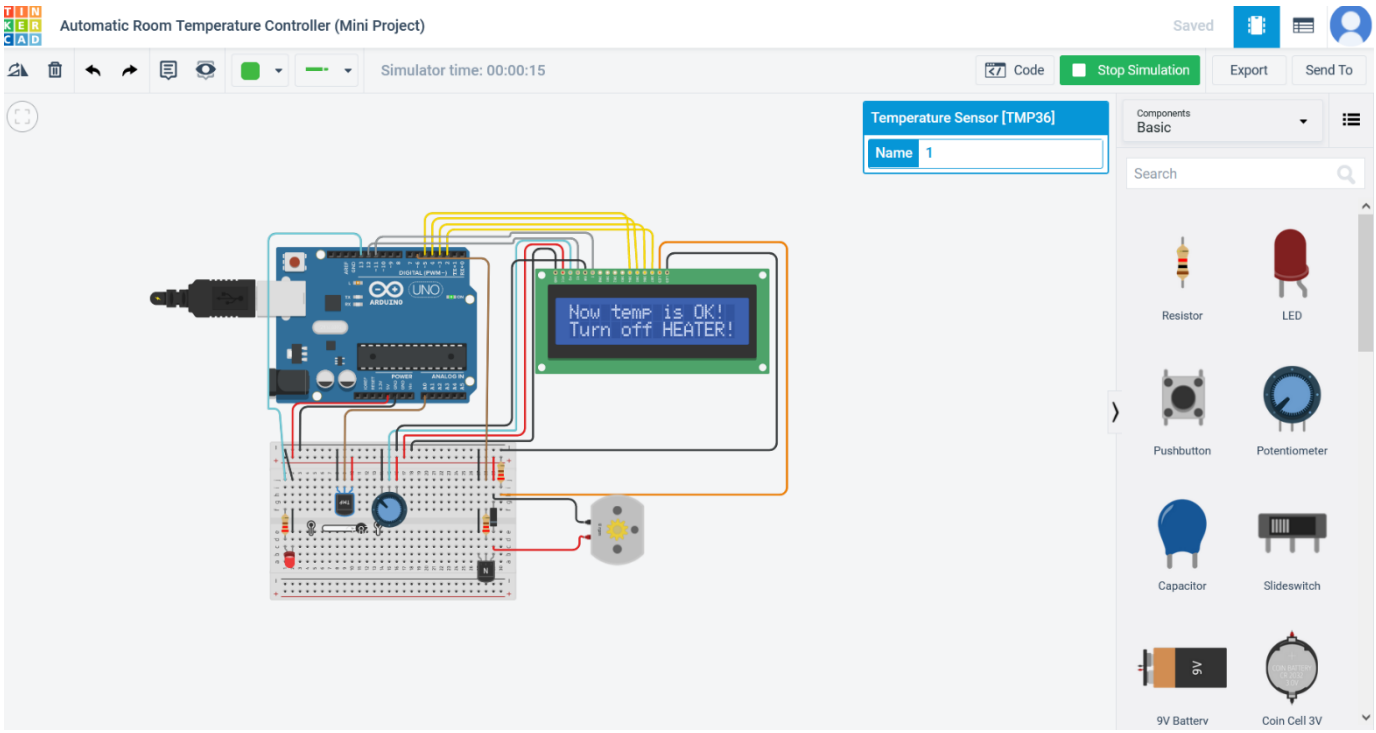

Automatic Room Temperature Controller (Mini Project)
Saved
Simulator time: 00:00:04
Code
Stop Simulation
Export
Send To
Components
Basic
Search
Temp is NORMAL!
Turn off all!
Resistor
LED
Pushbutton
Potentiometer
Capacitor
Slideswitch
9V Battery
Coin Cell 3V


Automatic Room Temperature Controller (Mini Project)
Saved
Simulator time: 00:00:24
Code
Stop Simulation
Export
Send To
Temperature Sensor [TMP36]
Name
1
Components
Basic
Search
Sensor reading:
90.76 C
Resistor
LED
Pushbutton
Potentiometer
Capacitor
Slideswitch
9V Battery
Coin Cell 3V


Automatic Room Temperature Controller (Mini Project)
Saved
Simulator time: 00:00:27
Code
Stop Simulation
Export
Send To
Temperature Sensor [TMP36]
Name 1
Components
Basic
Search
temp is HIGHER!
Turn on FAN!
Resistor
LED
Pushbutton
Potentiometer
Capacitor
Slideswitch
9V Battery
Coin Cell 3V


Automatic Room Temperature Controller (Mini Project)
Saved
Simulator time: 00:00:10
Code
Stop Simulation
Export
Send To
Components
Basic
Search
Sensor reading:
-28.01 C
Resistor
LED
Pushbutton
Potentiometer
Capacitor
Slideswitch
9V Battery
Coin Cell 3V


Automatic Room Temperature Controller (Mini Project)
Saved
Simulator time: 00:00:12.611
Code
Stop Simulation
Export
Send To
Components
Basic
Search
temp is LOWER!
Turn on HEATER!
Resistor
LED
Pushbutton
Potentiometer
Capacitor
Slideswitch
9V Battery
Coin Cell 3V



Conclusion: **Hence the mini project of Automatic Room Temperature Controller has been successfully demonstrated**