

AUTOMATIC THERMOSTAT SYSTEM – ARDUINO-BASED

Mini Project | SY B.Tech (CSE) | Academic Year 2025–26

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ABSTRACT

- This project presents an Arduino-based automatic thermostat system.
- It reads room temperature using a DHT11 sensor and automatically controls
- a LED (as a heater) and a DC fan to maintain a comfortable range ($\sim 25^{\circ}\text{C}$).
- The system uses an L298N motor driver for control, and all readings appear
- on a 16×2 I2C LCD display. It operates reliably and demonstrates fundamental
- concepts of sensors, actuators, and control logic with Arduino programming.

PROBLEM STATEMENT & GOAL

- Manually controlling fans and heaters is inconvenient.
- Goal: Build a low-cost, automatic temperature control system that:
 - Measures temperature using DHT11 sensor
 - Controls a heater and a fan
 - Displays data on LCD
 - Keeps temperature around 25°C automatically



WHY THIS PROJECT

- Everyday relevance: Used in homes and offices
- Educational value: Demonstrates Arduino basics (sensors, PWM, LCD, motor driver)
- Low budget: Under ₹700
- Easy to build and beginner-friendly

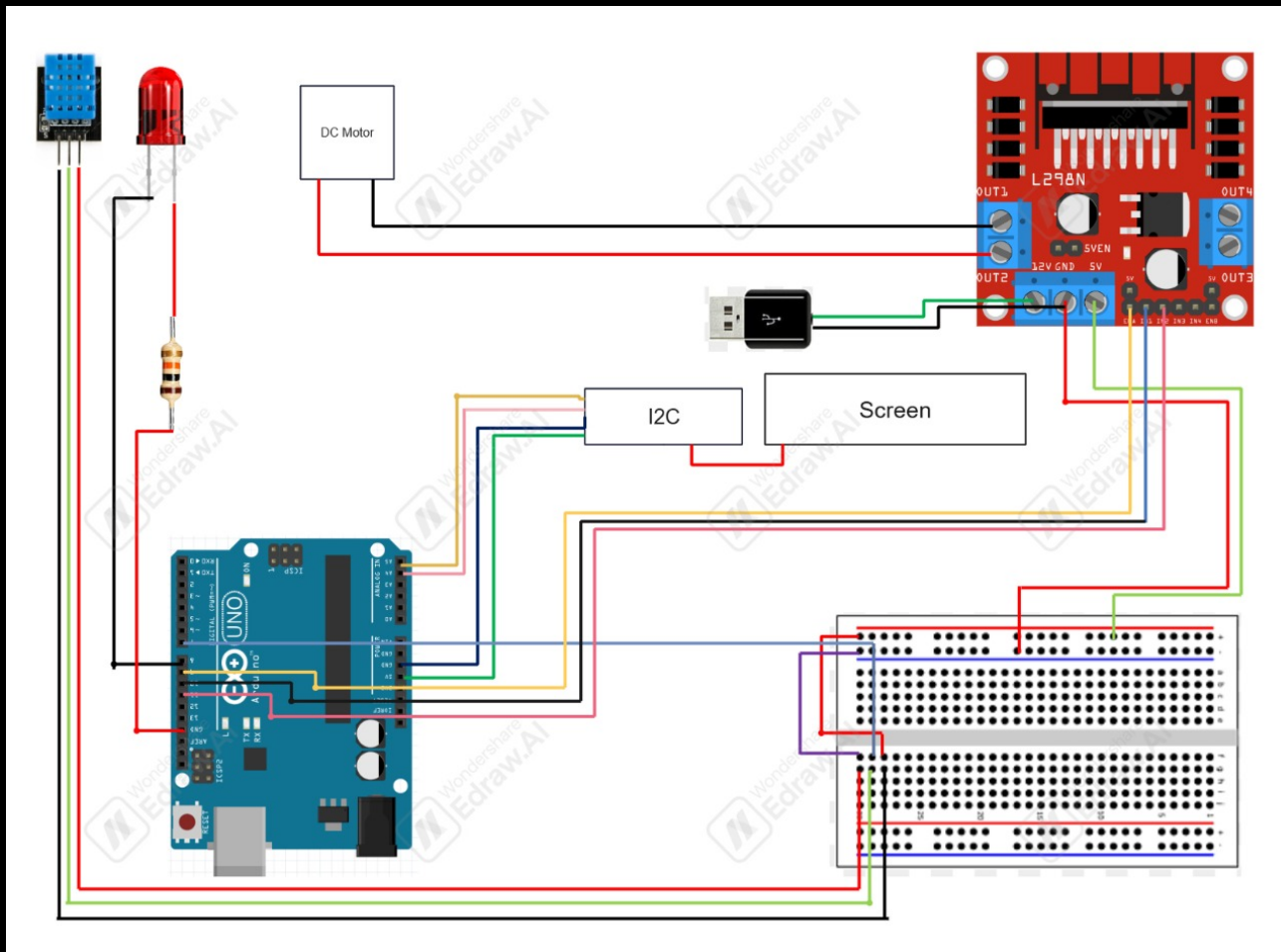
COMPONENTS & THEIR FUNCTION

- Arduino UNO – brain of the system
- DHT11 Sensor – measures temperature
- L298N Motor Driver – controls fan and led
- LED(with 1k ohm register) – acts as heater
- 5V DC Fan – cools the room
- 16×2 I2C LCD – displays temperature & system status
- Breadboard, jumper wires, power supply

WORKING PRINCIPLE / BLOCK DIAGRAM

- Arduino reads temperature from DHT11
- $<27^{\circ}\text{C} \rightarrow \text{Heater ON}$
- $27-29^{\circ}\text{C} \rightarrow \text{Fan LOW}$
- $30-32^{\circ}\text{C} \rightarrow \text{Fan MEDIUM}$
- $\geq 32^{\circ}\text{C} \rightarrow \text{Fan HIGH}$

BLOCK DIAGRAM





SOFTWARE FLOW / ALGORITHM

1. Initialize LCD and DHT11 sensor
2. Read temperature
3. Compare temperature range
4. Control heater/fan accordingly
5. Display info on LCD
6. Repeat continuously

TESTING & OBSERVATIONS

Sr no.	Temperature	Action	Display
1	27-29(°C)	Motor speed=low	Temperature = x(°C) Fan speed = low
2	29-32(°C)	Motor speed=medium	Temperature = x(°C) Fan speed = medium
3	32+ (°C)	Motor speed=high	Temperature = x(°C) Fan speed = high
4	<27(°C)	Heater (LED) ON	Temperature = x(°C) Heater ON
5	Error reading temperature	Error!	Temperature sensor error!



CONCLUSION & FUTURE SCOPE

- We successfully built an Arduino-based automatic thermostat that can heat or cool a room automatically.
- Future enhancements:
 - Add Wi-Fi (IoT) for remote control
 - Use PID for smoother response
 - Add battery backup for portability

REFERENCES

1. Arduino.cc – UNO Rev3 Datasheet
2. Aosong DHT11 Datasheet
3. STMicroelectronics L298N Datasheet
4. Frank de Brabander, LiquidCrystal_I2C Library
5. Massimo Banzi, “Getting Started with Arduino”, O’Reilly Media (2022)

GitHub Repository

The screenshot shows the GitHub interface for the repository 'Temperature-controller' by user 'suyashbarad'. The repository is public and has 0 stars, 0 forks, and 0 watchers. The main branch is 'main'. The repository contains three files: 'I2C_address.ino', 'README.md', and 'Temperature_Controller_Main.ino'. The README file is selected and shows the title 'Temperature-controller' and a description: 'This project is a Temperature Controller System built using an Arduino, DHT11 temperature sensor, and a motor (or fan) driver module. The system continuously monitors the surrounding temperature using the DHT11 sensor and automatically turns ON/OFF the motor or fan based on preset temperature conditions.' The right sidebar shows the 'About' section with a description of the project and a list of links: Readme, Activity, 0 stars, 0 watching, and 0 forks. The bottom section is labeled 'Releases'.

Temperature-controller Public

main 1 Branch 0 Tags

Go to file Add file Code

Files

I2C_address.ino	To get I2C address	6 minutes ago
README.md	project details	7 minutes ago
Temperature_Controller_Main.ino	Main code	6 minutes ago

README

Temperature-controller

This project is a Temperature Controller System built using an Arduino, DHT11 temperature sensor, and a motor (or fan) driver module. The system continuously monitors the surrounding temperature using the DHT11 sensor and automatically turns ON/OFF the motor or fan based on preset temperature conditions.

About

This project is a Temperature Controller System built using an Arduino, DHT11 temperature sensor, and a motor (or fan) driver module. The system continuously monitors the surrounding temperature using the DHT11 sensor and automatically turns ON/OFF the motor or fan based on preset temperature conditions.

- Readme
- Activity
- 0 stars
- 0 watching
- 0 forks

Releases

[HTTPS://GITHUB.COM/SUYASHBARAD/TEMPERATURE-CONTROLLER](https://github.com/suyashbarad/temperature-controller)



THANK YOU!