Basic Heater Control System

This project consists of temperature sensor called DHT22 which sense surrounding temperature and sends the data to the arduino board which acts central unit where the logic works and all the other pheripherls were connected to it like LCD display, Buzzer and heating(LED)

1. Minimum Sensors Required

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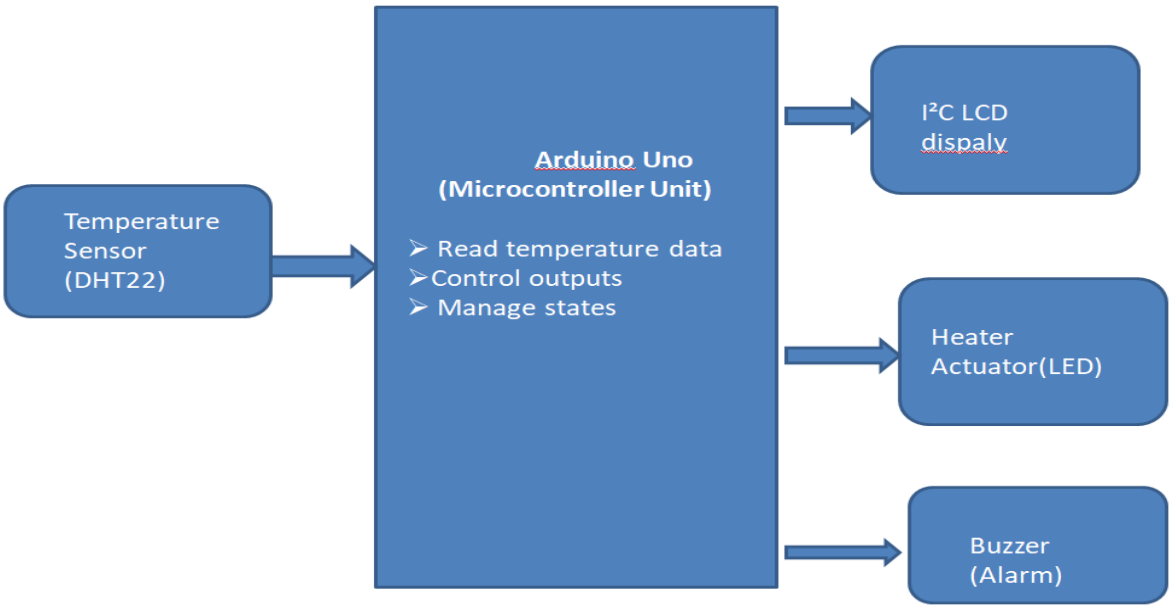
Sensor	Purpose	Justification
Temperature Sensor DHT22	Measures ambient or device temperature	Core input for deciding when to start/stop heating
Heating Device(LED)	It is used for heating device	Here led used as Actuating device when temperature falls this will glow and maintain temperature

2. Communication Protocol Used

Protocol: I²C (Inter-Integrated Circuit)

- Simple wiring – Only two data lines (SDA, SCL) plus power and ground.
- Supports multiple devices – Allows connecting the temperature sensor, LCD, and other peripherals on the same bus.
- Widely supported–Many Arduino-compatible sensors and displays use I²C.
- Efficient– Low data overhead for small sensor readings.
- Example in current design: The LCD display uses I²C, freeing up digital pins for the heater relay and buzzer.

3. Block Diagram



4. Future Roadmap

Overheating Protection

- Automatic heater shutdown when temperature exceeds critical limit.
- Audible/visual alert using buzzer or LED.
- Data logging to track overheating events.

Summary Table

Component	Minimum Now	Future Upgrade
Sensor	1× Temp sensor	Multiple sensors for zones
Display	I²C LCD	Touchscreen interface
Control	LED	PID + multi-profile
Alerts	Buzzer	Mobile notifications
Communication	I²C	Wi-Fi/Bluetooth remote