Heater Control System - Assignment Submission

Candiate: Lisha Maria Rodrigues

Platform: Wokwi

Language: Ardunio(C++)

1. System Design Documentation

This project implements a basic heater control system using an Arduino Uno, DHT22 temperature sensor, and actuators (LED & buzzer). The system reads temperature continuously and switches the heater ON/OFF based on thresholds, with buzzer alerts on overheat.

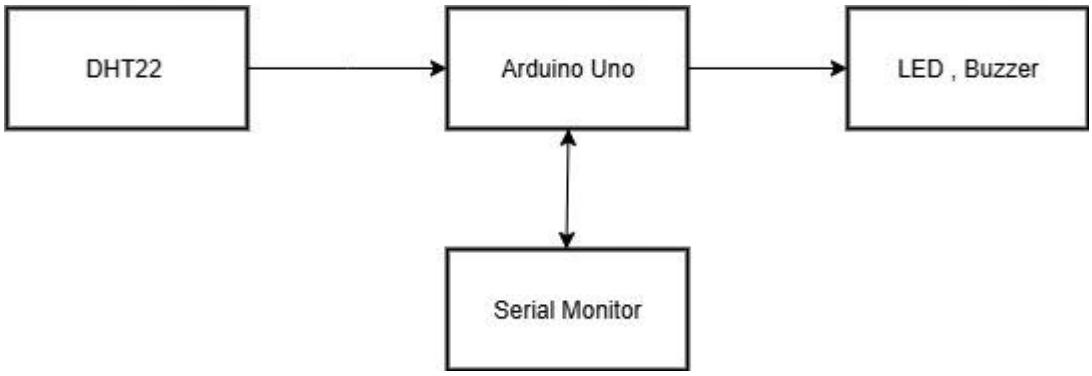
Components Used:-

- Arduino Uno
- DHT22 Temperature Sensor
- LED (heater indicator)
- Buzzer (overheat alert)
- Connecting wires

Communication Protocol:

The system uses **digital GPIO communication**. The DHT22 communicates with the Arduino a single-wire digital protocol. The LED and buzzer are controlled using digital output pins. This approach is simple, reliable, and suitable for low-complexity embedded systems.

Block Diagram:



Future Roadmap:

- Add overheating protection shutdown mechanism

- Support multiple heating profiles (warm, hot, sterilize)
- Add BLE/IoT control and mobile app integration
- Integrate an OLED/LCD display for real-time temperature display and control

2. Simulation and Code Links

Wokwi Simulation Link:

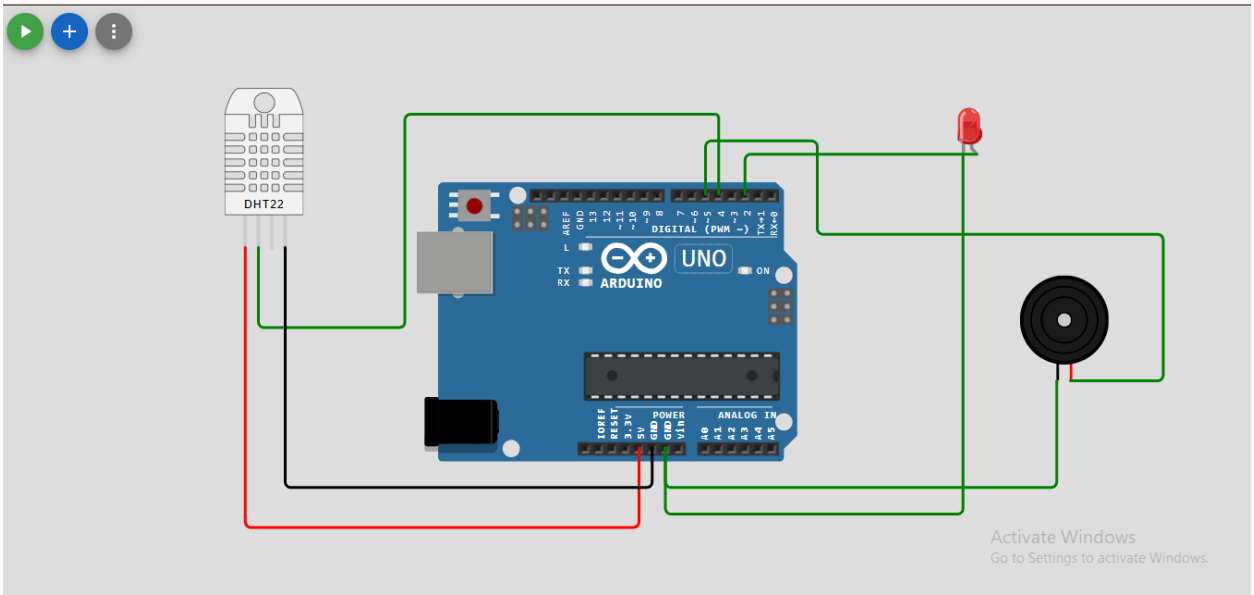
https://wokwi.com/projects/436706300350756865

GitHub/Code Repository Link:

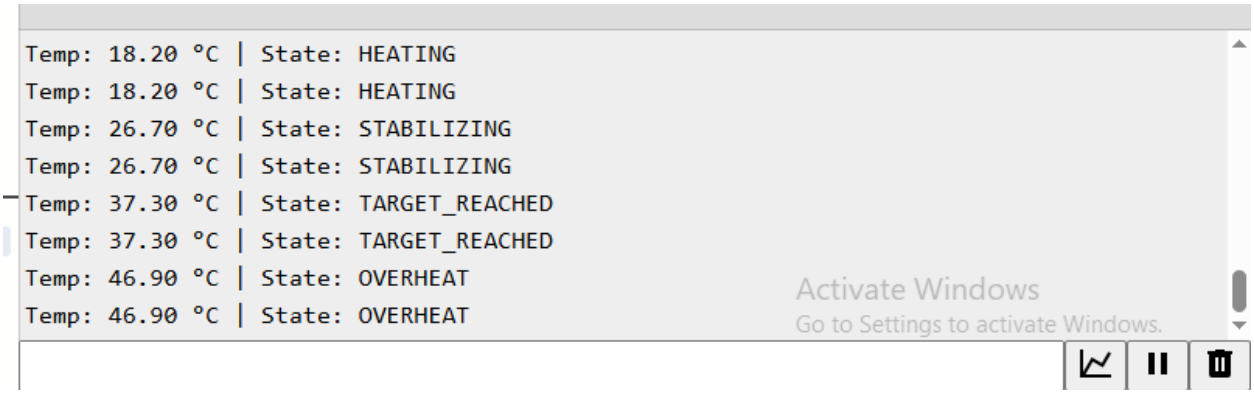
https://github.com/lisharodriguez/Heater-control

3.Screenshots and Observation:

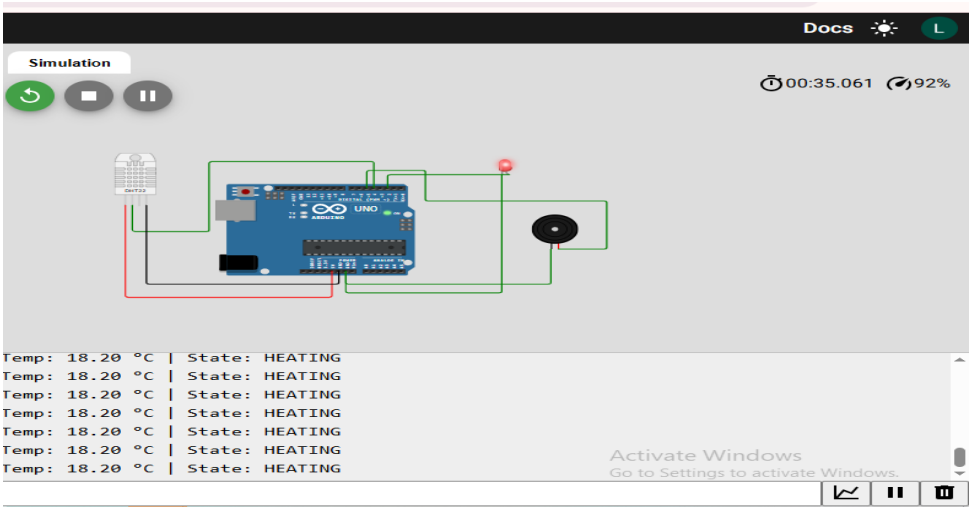
- Wokwi circuit layout



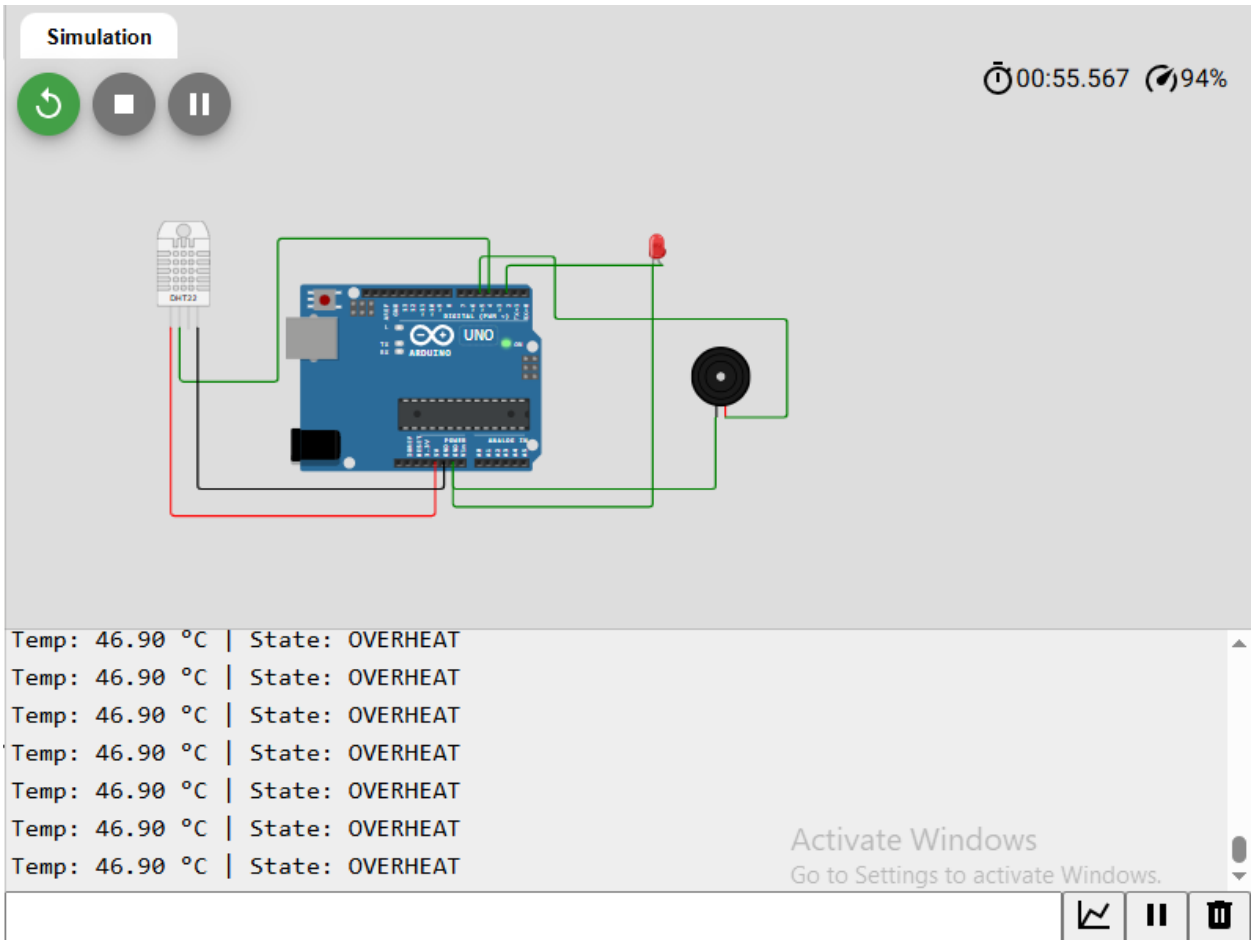
- Serial Monitor showing messages like



- LED ON during heating



- Buzzer ON during overheating



Observation:

The system successfully reads temperature from the DHT22 sensor and transitions between states:-

HEATING (Temp < 20 C): LED ON

STABILIZING (20 C to 30 C): LED ON

TARGET_REACHED (30 C to 40 C): LED OFF

OVERHEAT (Temp > 40 C): LED OFF, Buzzer ON