

# CPE 301 Final Project Report

Group 12 (Jonathan Stoll)

## 1. Project Description

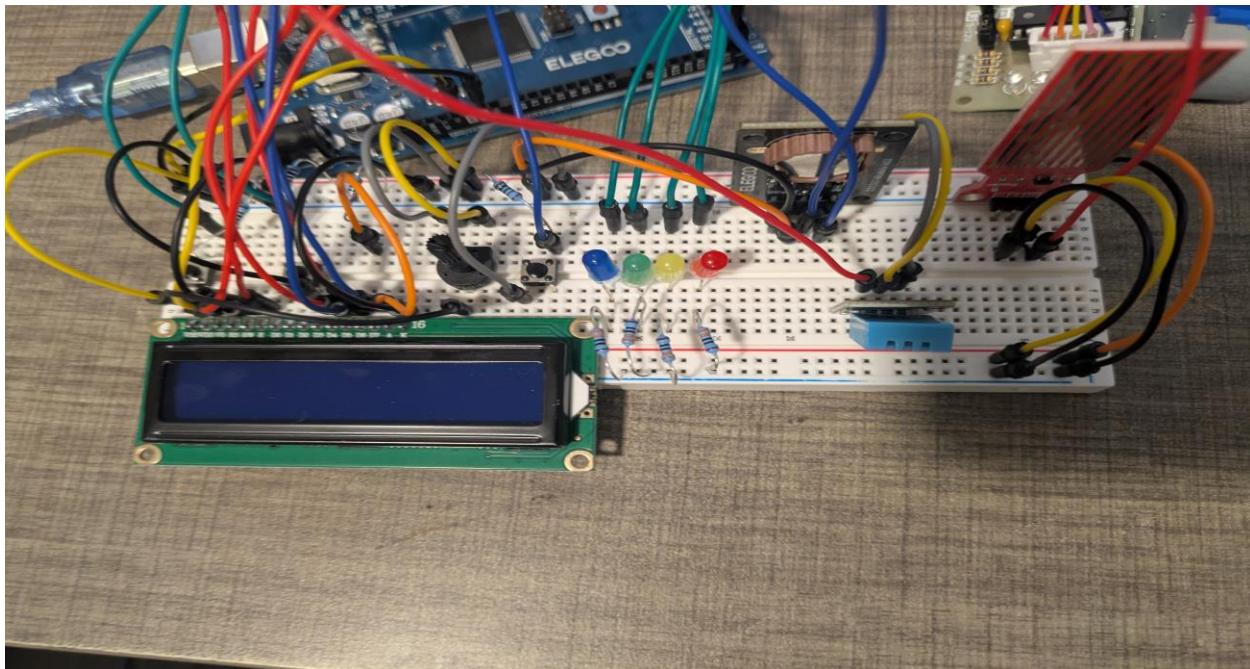
This project is a Swamp Cooler which senses the environment around it and uses fans and vents to cool the surroundings. The cooler was built using an Arduino microcontroller and several additional modules included in the Arduino kit. The core functionality of this system is controlled by two sensors: the DHT11 humidity and temperature sensor, and a simple water sensor. The system continually outputs humidity and temperature readings to the LCD display. When the temperature spikes above the desired range, the Arduino powers a fan to cool down. When there is not enough water available, the Arduino displays an error screen on the LCD. The user can change the vent angle anytime through two input buttons (one for higher, one for lower) and can disable the system temporarily with a third button. This cooler has four states as indicated by the included LEDs: Running – fan is enabled and water level is sufficient, Idle – fan is not running, Error – water level is too low, and Disabled – user has disabled the system.

## 2. Component Details

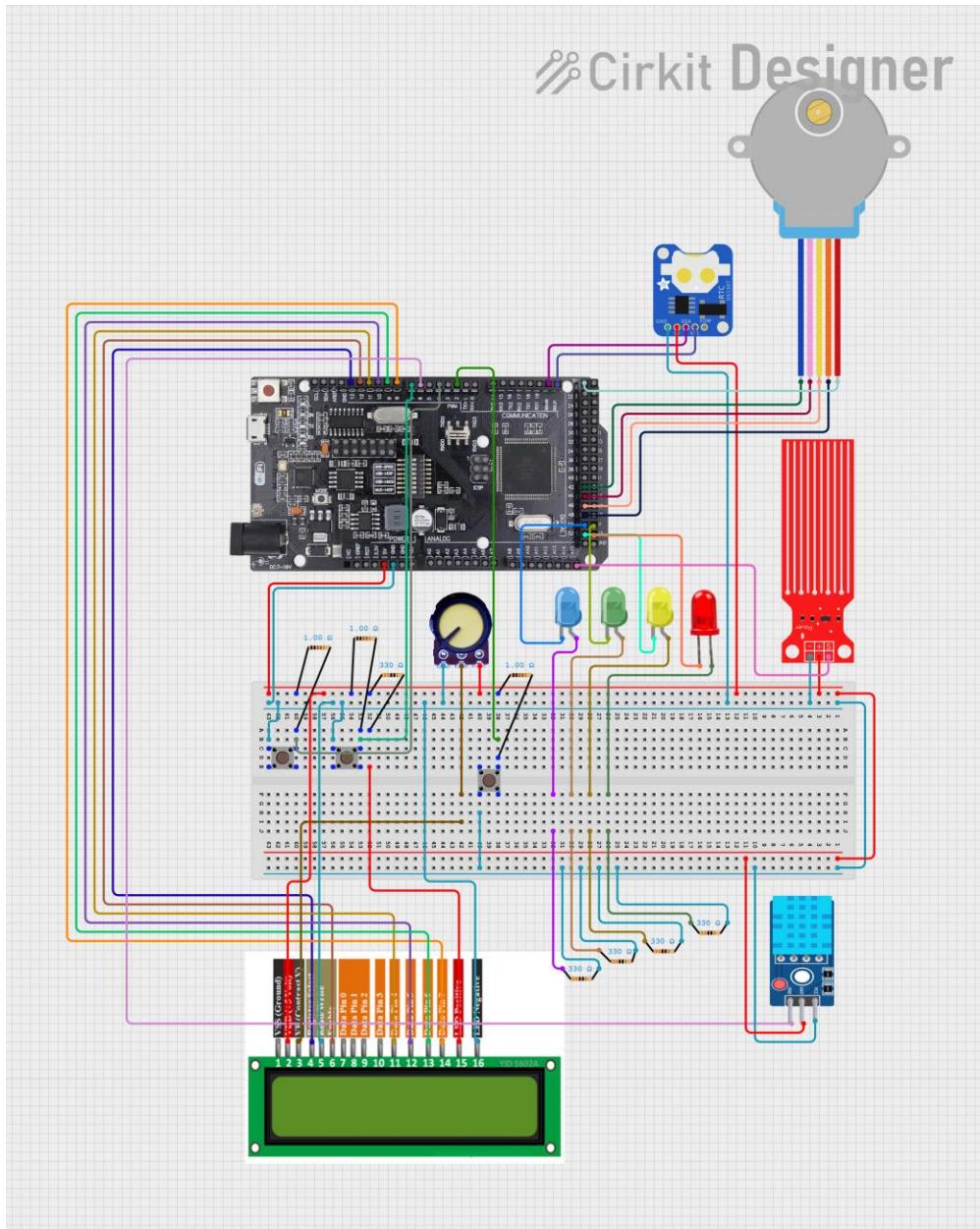
- LCD Display: 16 row, 2 column LCD display which outputs Temperature and Humidity readings and error messages.
- Potentiometer: 10k potentiometer wired to the LCD display to control the display's brightness.
- DHT11 Temperature and Humidity Sensor: Sensor which supplies temperature and humidity readings. Used with the DHT11.h Arduino library.
- Water Sensor: Sensor which supplies water level readings. Signal wire is wired straight to an Arduino analog input pin, and the signal is converted to digital using ADC functions.
- LEDs: Four LEDs (blue, green, yellow, red) used to indicate the state of the system. Each of these LEDs is wired to ground through a 330k resistor and wired to positive through an Arduino digital output pin. The output pins are controlled using bitwise operations to turn the LEDs on and off.
- Stepper Motor: Responds to use input from two buttons (up and down).
- Real Time Clock Module: Wired to an Arduino input pin to keep track of execution time. This is used to update temperature and humidity readings every 60 seconds.

- Buttons: Three buttons wired to digital input pins and used to control the stepper motor (vent) and to enable/disable the system. One button raises the vent, one lowers it, and the third toggles the enable/disable flag, to enable or disable the system.

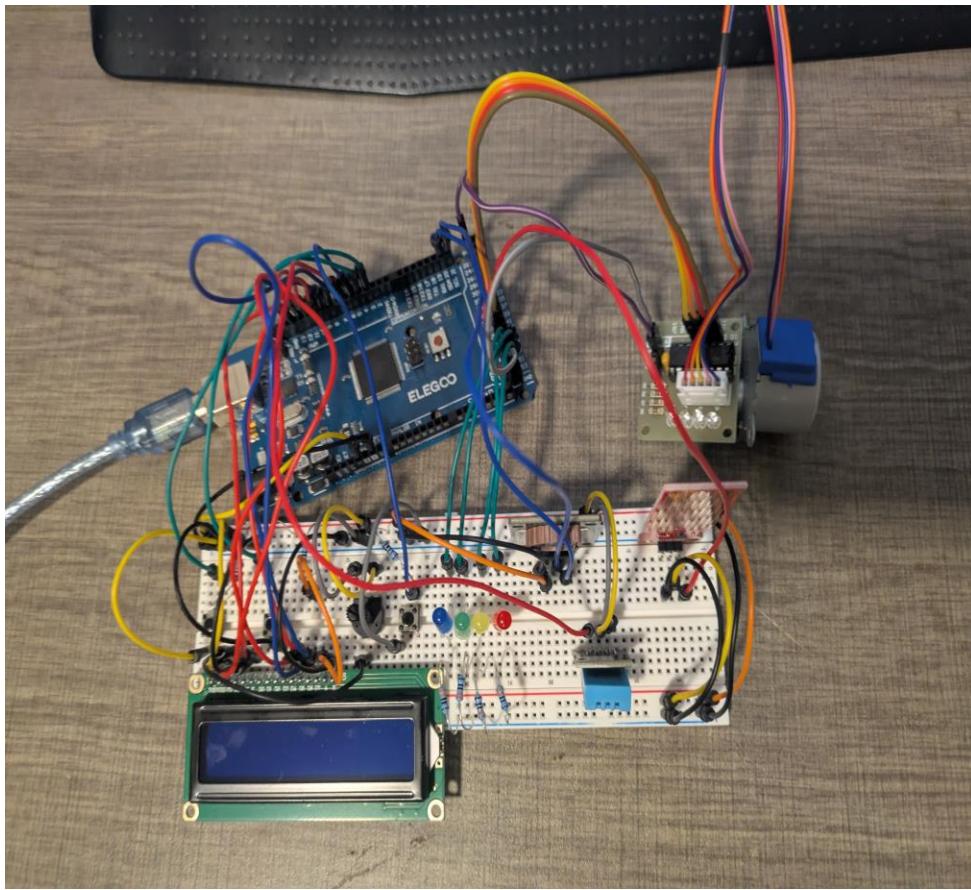
### 3. Circuit Image



### 4. Schematic Diagram



## 5. System Demonstration



Video Link: [https://www.youtube.com/watch?v=lO552\\_Xr61A](https://www.youtube.com/watch?v=lO552_Xr61A)

## 6. Submission Links

GitHub: [https://github.com/stoll-jonathan/CPE301\\_FinalProject](https://github.com/stoll-jonathan/CPE301_FinalProject)

Video: [https://www.youtube.com/watch?v=lO552\\_Xr61A](https://www.youtube.com/watch?v=lO552_Xr61A)

## 7. Team Information

This team consists of one member: Jonathan Stoll.