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CPE 301

Final Project

Overview:

For our project, we created an evaporation cooling system, using tools we have learned throughout the semester. The cooler monitors water levels, alerts when the water level is too low, prints the humidity and temperature on a LCD screen, uses a fan based on the temperature levels, adjusts the angle of the vent, and records the time.

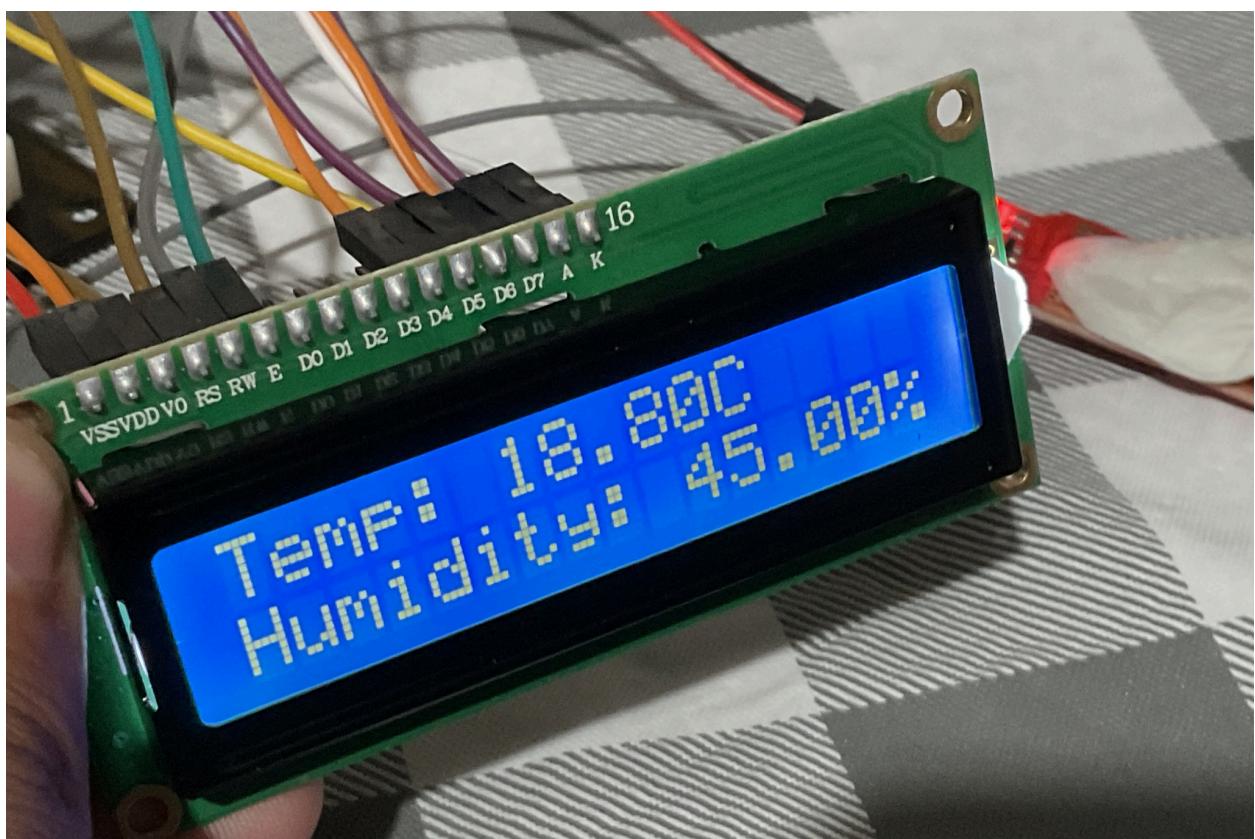
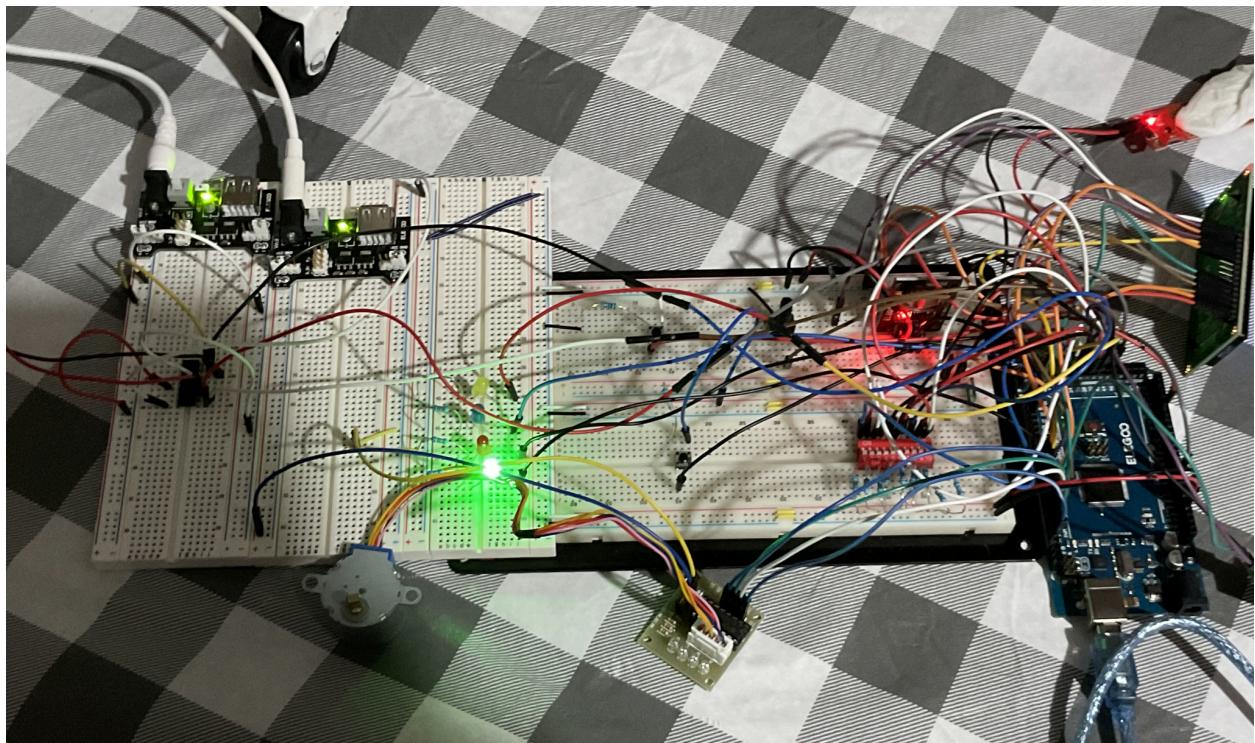
To monitor the water levels, we used the water level detection sensor module included in our kit. The sensor functions similarly to a potentiometer except with water rather than light. If the water level is less than the threshold, the state will be set to error which turns on the red LED and displays an error message to the LCD.

The humidity and temperature sensor we used is the DHT11 included in our kit. When the system is idle or running, the sensor is reading the values. When the value is greater than the threshold, the system is in a running state. The values of the humidity and temperature are printed to the LCD screen consistently.

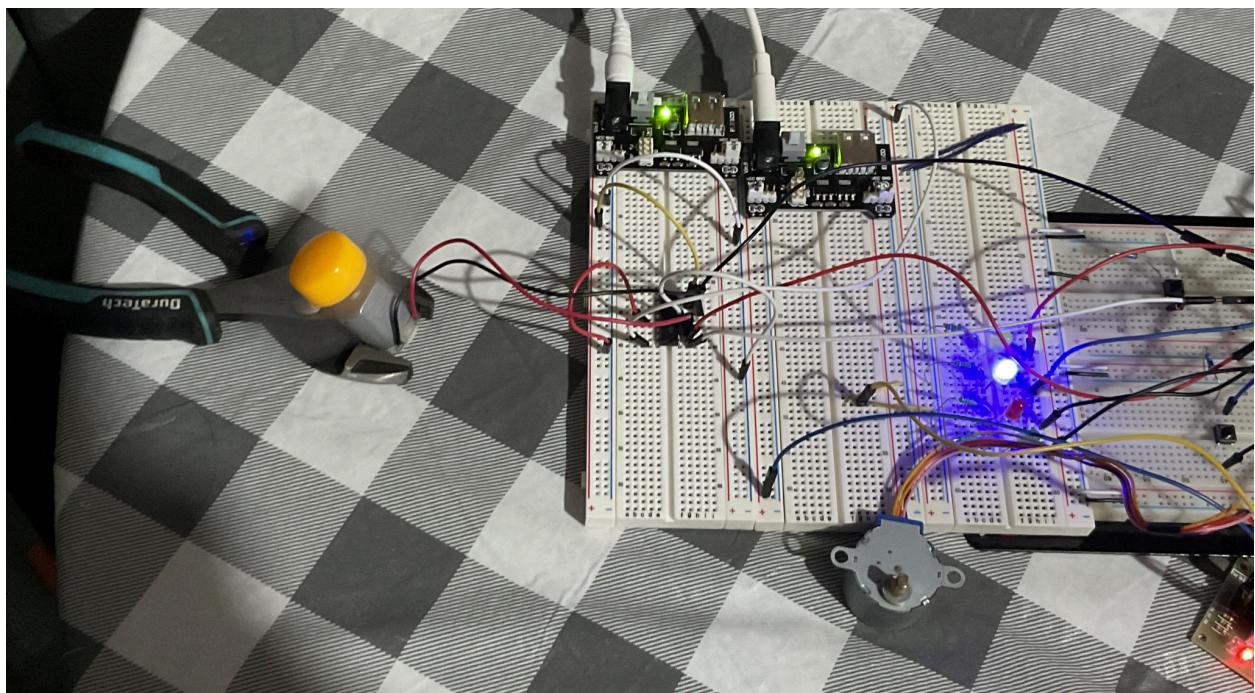
The fan motor turns on and off depending on the state of the system. The vent angle is adjusted by the switch. The RTC module used is the DS1307 included in our kit. This module is used to update the time in the serial monitor when states of the system are changed.

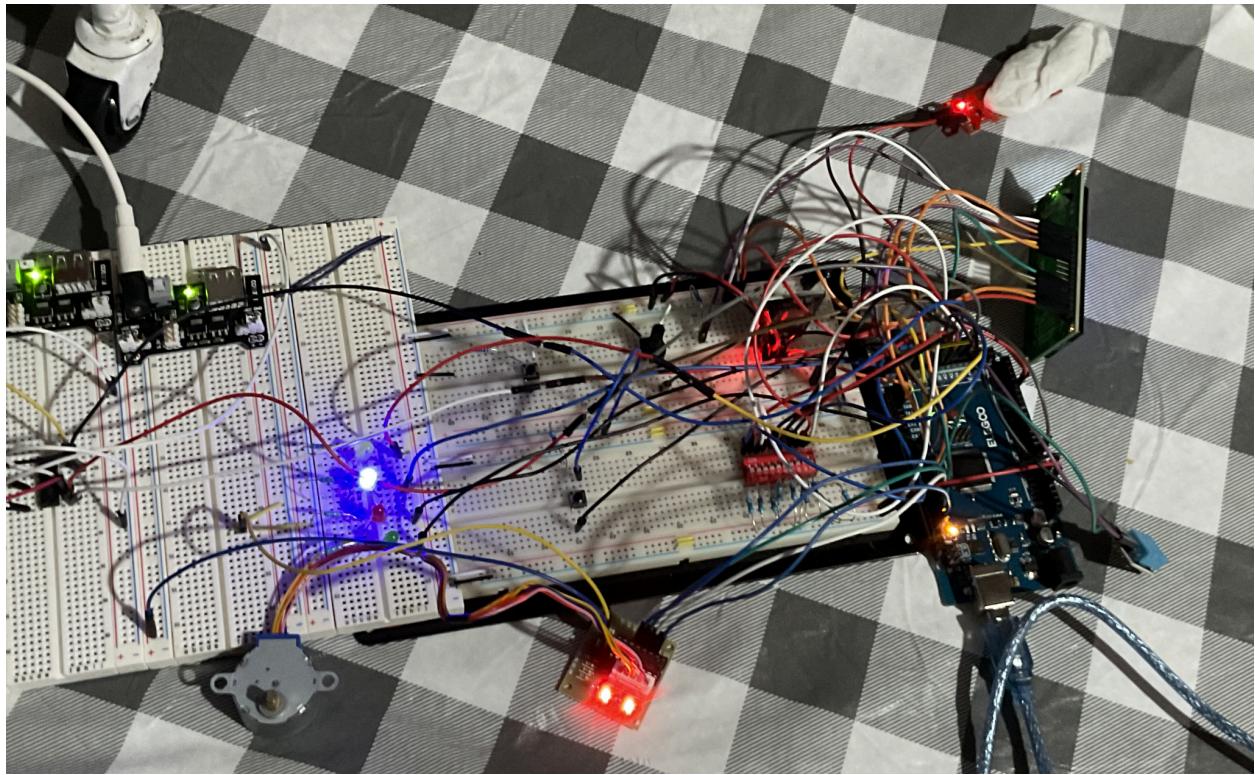
There are 4 States the system can be in (images for each state are included below):

- Idle
 - In this state the green LED is on, the LCD updates with the temperature and humidity, and the stepper motor can be adjusted.

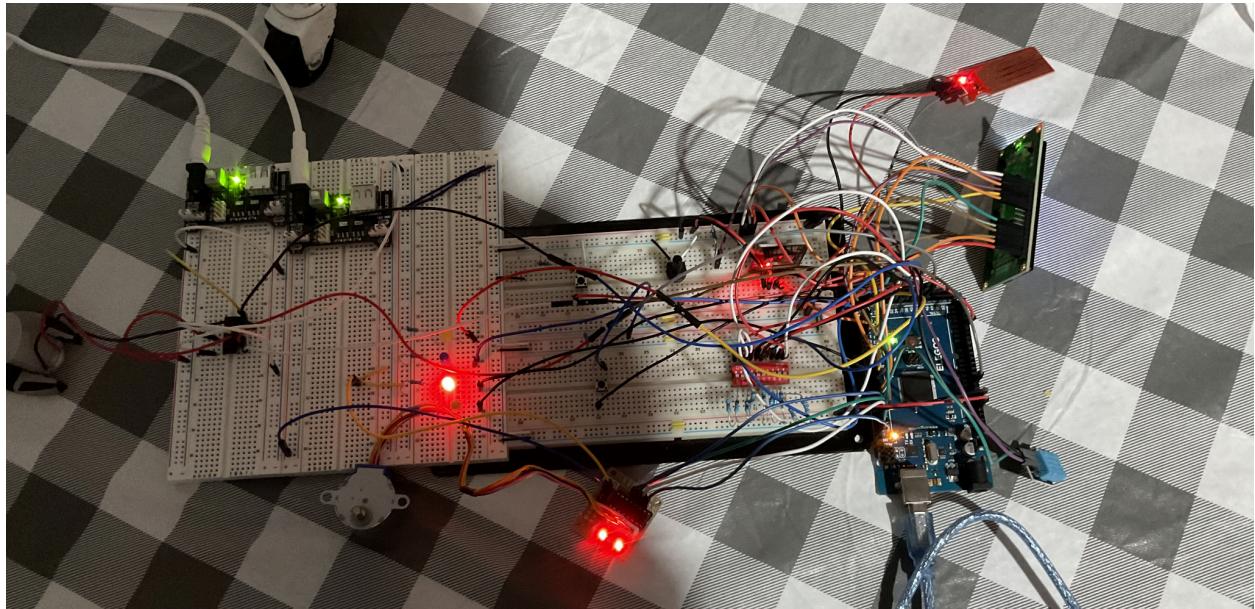


- Running
 - In this state the blue LED is on, the fan motor is turned on, the water level is not too low, and the stepper motor can be adjusted.



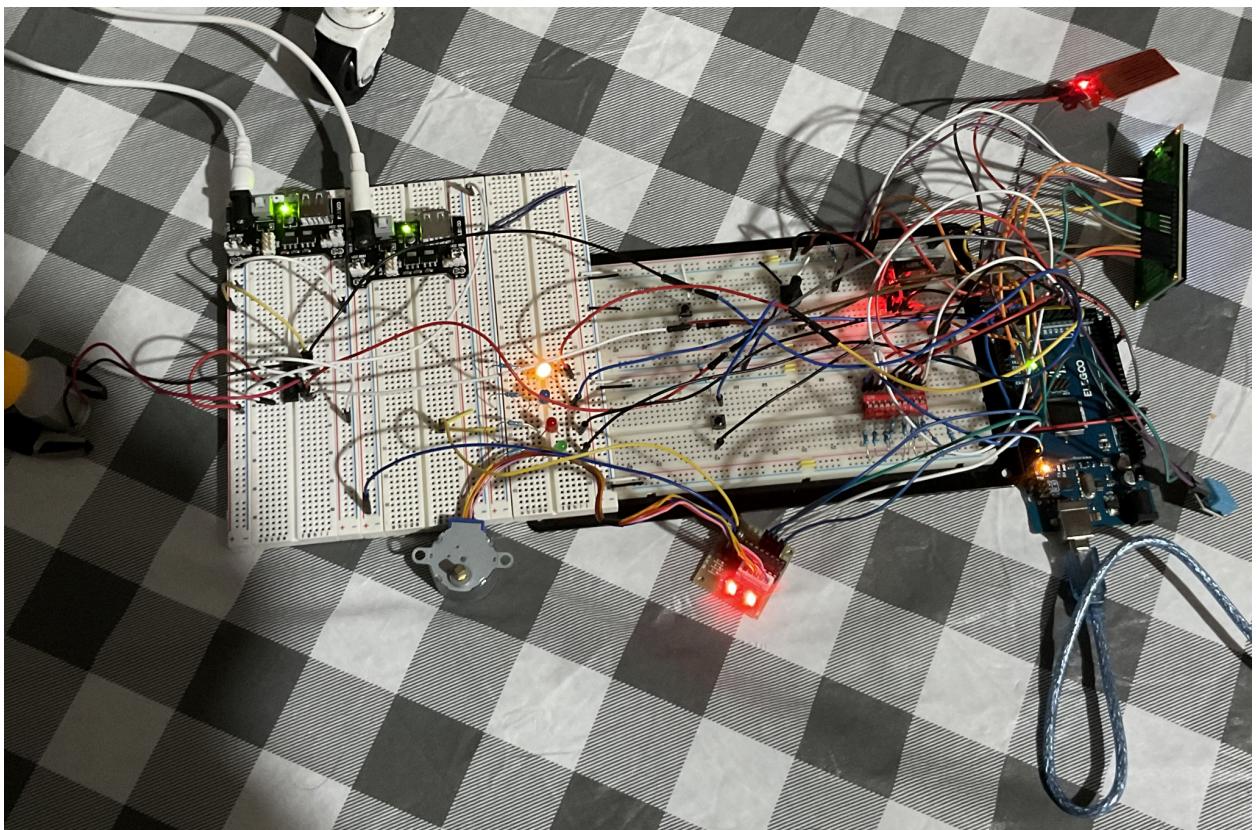


- Error
 - In this state the red LED is turned on, the water level is too low, and the LCD displays error.





- Disabled
 - In this state the yellow LED is turned on, and by pressing the start button we can return to idle.





System Constraints:

Our temperature threshold is set to 24°C. The DHT11 temperature and humidity sensor is limited to measuring temperatures between 0°C and 50°C, and humidity between 20-90%. Our system does not contain an actual vent, since that was not a requirement of the project. The operation of changing the direction is simulated through the stepper motor and switch. The circuit is powered using 5V which is sufficient for all components.

Links: (contact me at joseeliaz100@gmail.com if any link is not working)

Video:

[Final Project CPE 301 - Water cooler \(youtube.com\)](#)

GitHub:

https://github.com/1104-Soto-JoseDeJesus/CPE301_FinalProject.git

Notes on repository: Within the repository are partial codes, these codes we used and combined to create the project, the code for submission should be named FinalCode.ino, additionally a copy of the schematic is also included in the repository as FinalSchematic.jpeg, any code with (MODULE) or (INTEGRATED) as well as IntegratedCode.ino are simply test codes and should not be opened (unless interested :))

Component Data Sheets:

DC motor (fan): [DCmotor.PDF \(arduino.cc\)](#)

Push Buttons: [Button.pdf \(arduino.cc\)](#)

LEDs: [The LED datasheet | All About LEDs | Adafruit Learning System](#)

Potentiometer: [Arduino - Potentiometer | Arduino Tutorial \(arduinogetstarted.com\)](#)

Fan Driver: [I293d.pdf \(ti.com\)](#)

Stepper Motor: [stepd-01-data-sheet-1143075.pdf \(mouser.com\)](#)

Stepper Motor Driver: [ULN2003 Datasheet\(PDF\) - STMicroelectronics \(alldatasheet.com\)](#)

Water Sensor: [42240.pdf \(datasheethub.com\)](#)

RTC: [DS1307.pdf \(analog.com\)](#)

Temp & Humidity sensor: [DHT11-Technical-Data-Sheet-Translated-Version-1143054.pdf \(mouser.com\)](#)

LCD: [lcd016n002bcfhet.pdf \(vishay.com\)](#)

Arduino MEGA: [Mega 2560 Rev3 | Arduino Documentation](#)

Schematic:

(220 Ohm Resistors used for LEDs and LCD)

(100 Ohm resistors used for buttons)

(1000 ohm resistors used for switch)

