CPE 301 Final Project Overview

https://github.com/Gutierrez-Cornejo-Emanuel/CPE301-Final-Project

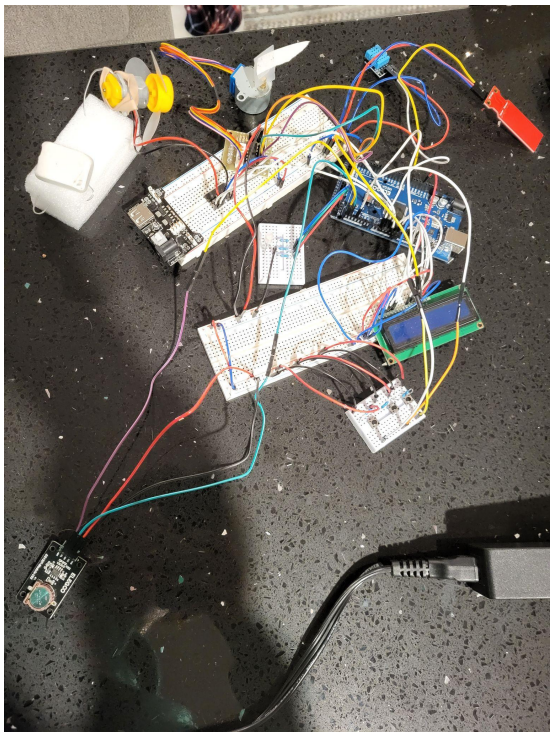
Design Overview

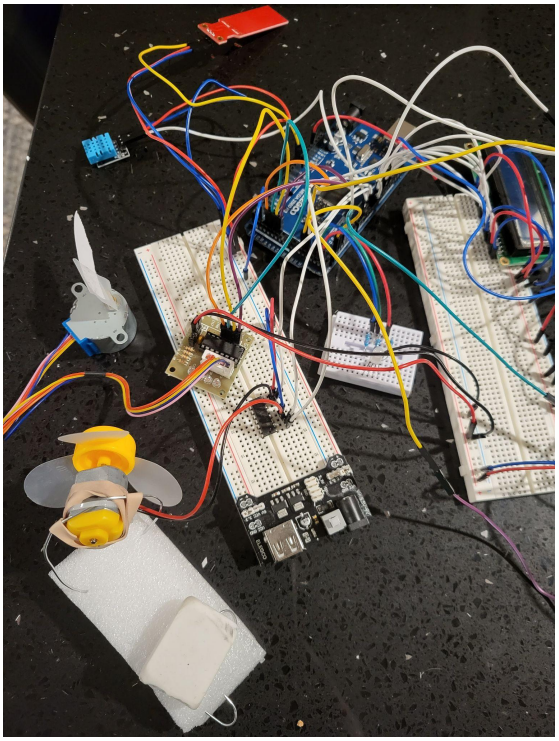
We built an evaporation cooling system, also known as a swamp cooler. Our design utilizes two 830 tie-points breadboards, one of which is mainly used in combination with the power supply in order to power the fan and stepper motors while the other is mostly used for the LCD display. It also utilizes two small breadboards, one for the status LED and another for the start/stop/reset button as well as the two direction control buttons for the vent.

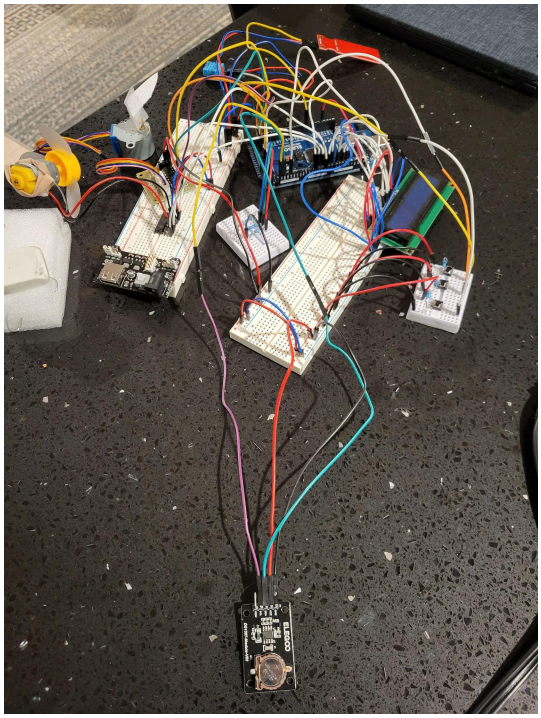
System Constraints and Specifications:

- Requires the arduino to be powered, as well as the power supply being connected to a power outlet through the 9V1A adapter.
- System enters RUNNING mode when temperature goes above 65°F and returns to IDLE mode when temperature drops below this same threshold. The temperature is reported to the user through the LCD in °F.
- System enters ERROR mode when the Water Level Sensor detects a threshold of 100 units or less and requires a reset from the button to re-enter IDLE mode after the water level is above this threshold.

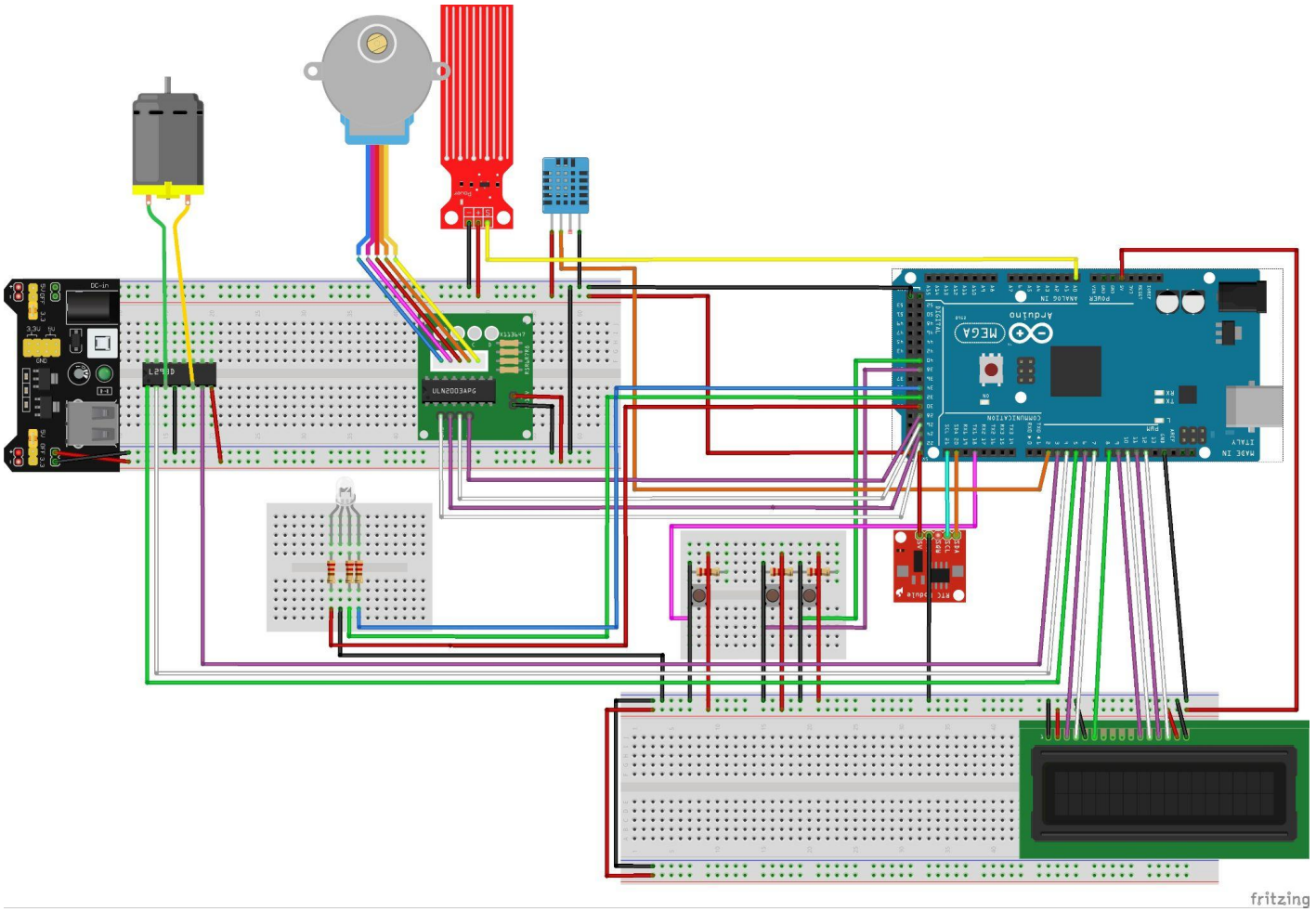
Final System Photos (Videos in GitHub Repository**):**







Schematic / Bill of Materials:



Bill of Materials: CPE301_Final_Project.fzz

C:/Users/ahend_000/Documents/Fritzing/bins/CPE301_Final_Project.fzz
Monday, December 12 2022, 20:23:30

Assembly List

Label	Part Type	Properties
DHT1	DHT11 Humitidy and Temperature Sensor	
IC1	L293D	variant L293D; package THT
LED3	RGB LED (com. cathode, rgb)	rgb RGB; pin order rgb; package 5 mm [THT]; polarity common cathode
M1	DC Motor	
MOTOR1	28BYJ-48 Stepper Motor	variant variant 1
Part1	Arduino Mega 2560 (Rev3)	type Arduino MEGA 2560 (Rev3)
Part2	Real Time Clock Module - DS1307 RTC Breakout Board	
R1	220Ω Resistor	resistance 220Ω; tolerance ±5%; package 0603 [SMD]
R2	220Ω Resistor	resistance 220Ω; tolerance ±5%; package 0603 [SMD]
R3	220Ω Resistor	resistance 220Ω; tolerance ±5%; package 0603 [SMD]
R5	Resistor	variant variant 1; resistance 1000; tolerance ±5%; package 2010 [SMD]; pin spacing 400 mil
R6	Resistor	variant variant 1; resistance 1000; tolerance ±5%; package 2010 [SMD]; pin spacing 400 mil
R7	Resistor	variant variant 1; resistance 1000; tolerance ±5%; package 2010 [SMD]; pin spacing 400 mil
S1	Momentary Switch	variant ksa_sealed; package ksa_sealed_tac_switch
S2	Momentary Switch	variant ksa_sealed; package ksa_sealed_tac_switch
S3	Momentary Switch	variant ksa_sealed; package ksa_sealed_tac_switch
U1	LCD-16X2	variant noholes; characters 16x2; package lcd-16x2_noholes
Water Level Sensor1	Water Level Sensor	variant variant 1; pins 3; package board; spacing 300mil
X1	X113647 Stepper Driver Board	variant variant 2; pins 11; chip label ULN2003APG; package board; spacing 300mil
YwRobot Power Supply1	YwRobot Breadboard Power Supply	variant 5v_3v3; part # 545043

Links to Relevant Specification Sheets for the Components Used

ATMEGA 2560

- https://ww1.microchip.com/downloads/en/devicedoc/atmel-2549-8-bit-avr-microcontroller-atmega640-1280-1281-2560-2561_datasheet.pdf

Fan Motor

- https://www.youtube.com/watch?v=_v0qlJ2J-xw

LCD

- https://create.arduino.cc/projecthub/hrsajjad844/lcd-display-without-potentiometer-and-resistor-0d1357
- https://create.arduino.cc/projecthub/captain_nemo01/lcd-without-potentiometer-f1a7ef?ref=part&ref_id=10308&offset=12

Stepper Motor:

- https://www.youtube.com/watch?v=avrdDZD7qEQ

RTC

- https://lastminuteengineers.com/ds1307-rtc-arduino-tutorial/

Water Level Sensor:

- https://lastminuteengineers.com/water-level-sensor-arduino-tutorial/

Temperature / Humidity Sensor:

- https://create.arduino.cc/projecthub/pibots555/how-to-connect-dht11-sensor-with-arduino-uno-f4d239

RGB LED

- https://create.arduino.cc/projecthub/muhammad-aqib/arduino-rgb-led-tutorial-fc003e