Canon Rank

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CPE 301

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# Swamp Cooler Project Write Up

**Overview:**

The constraints I used for this project were a room operating temperature of 73 degrees Fahrenheit to 77 degrees Fahrenheit. In addition one thing that made the whole circuit more consistent was the use of a DC power supply plugged into an outlet and connected to the external power supply module.

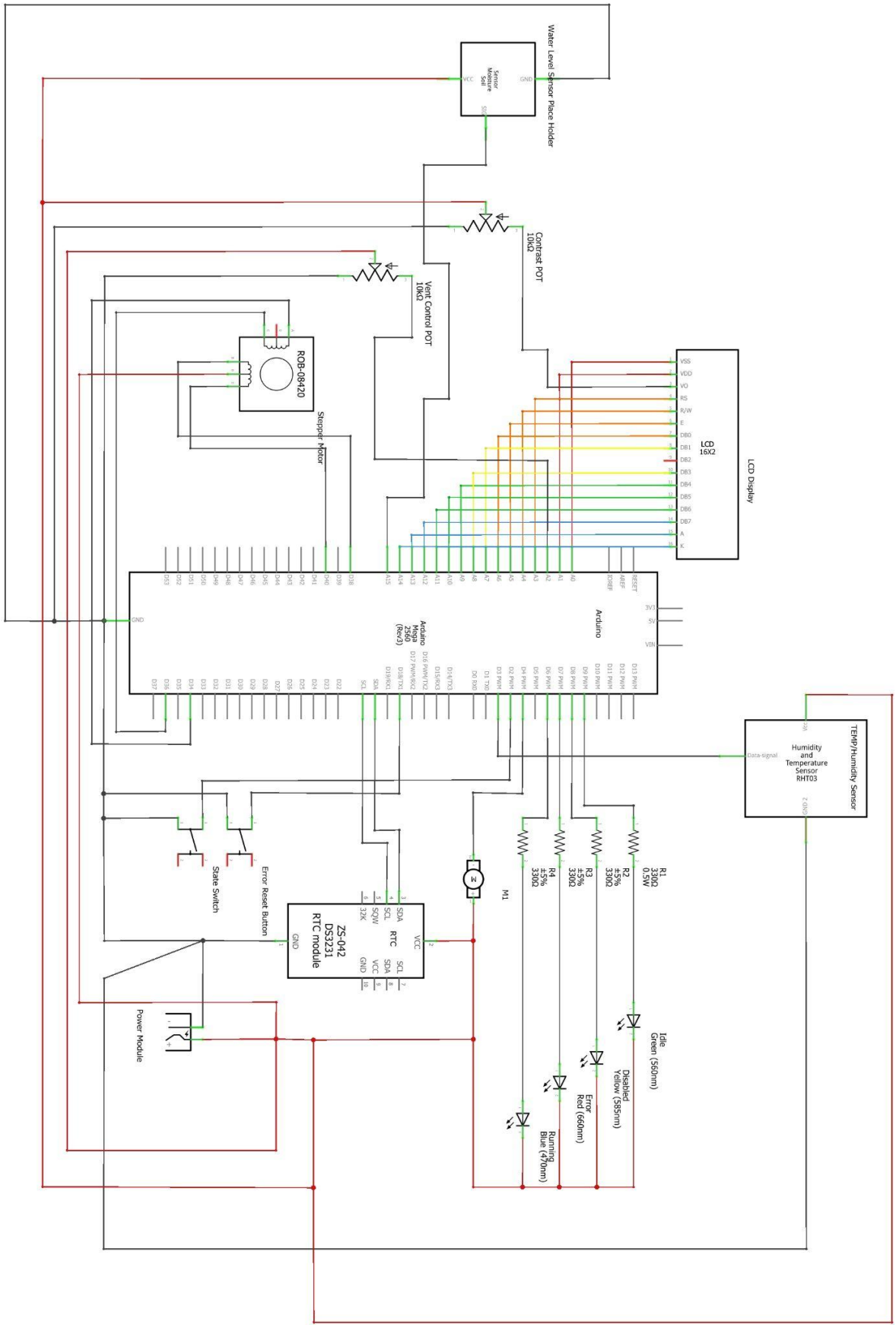
This project offered many learning experiences. Some more simple ones are the use of project boards and documenting changes in the circuit as new additions are added or breakthroughs are made. From a coding standpoint I have been told that pseudocode is useful to get a project started and that was certainly the case here. I also learned better ways to debug and make quick efficient changes for trying new ideas. Making use of the Serial Monitor and a multimeter helped me extensively to check what was happening with certain states and parts of circuit  confusion.

Along with learning outcomes, there were also difficulties during design, testing, and building. Some of these I was able to resolve and others I could not. For starters, the use of the DC kit motor turned out to be more difficult than I thought it would be. Using the power supply board helped with startup current but after that there were struggles in the code to make it properly run.  Another problem was the RTC behaving erratically after the addition of the vent control potentiometer. Occasionally it would shut off and make it so that interrupts were not

working. To resolve this I made it so that the clock would have to start again in the state machine. I also made the deadzone for the vent control potentiometer larger so that it would be less buggy and require more of a move to change the direction of the vent. A super simple problem that was resolved was the use of a potentiometer for the contrast of the LCD screen.

Along with the successes, there were a couple problems I could not resolve in time. One of these was the use of the interrupt or comparator for the water level sensor. I could not figure out the correct use of the analog interrupt registers. I spent a reasonable amount of time researching different registers and came to no solution. Another problem was the update time. I could not figure out how to update the LCD display once a minute and also keep the interrupts working at the same time so they would happen instantaneously. Due to this my code has a bug in it where the temperature sensor sometimes misses readings and the display will read NAN (not a number). During debugging I believe that it is due to the timing of the code and the use of the clock interacting with state machine and the sensor readings.

## Images and Schematics:

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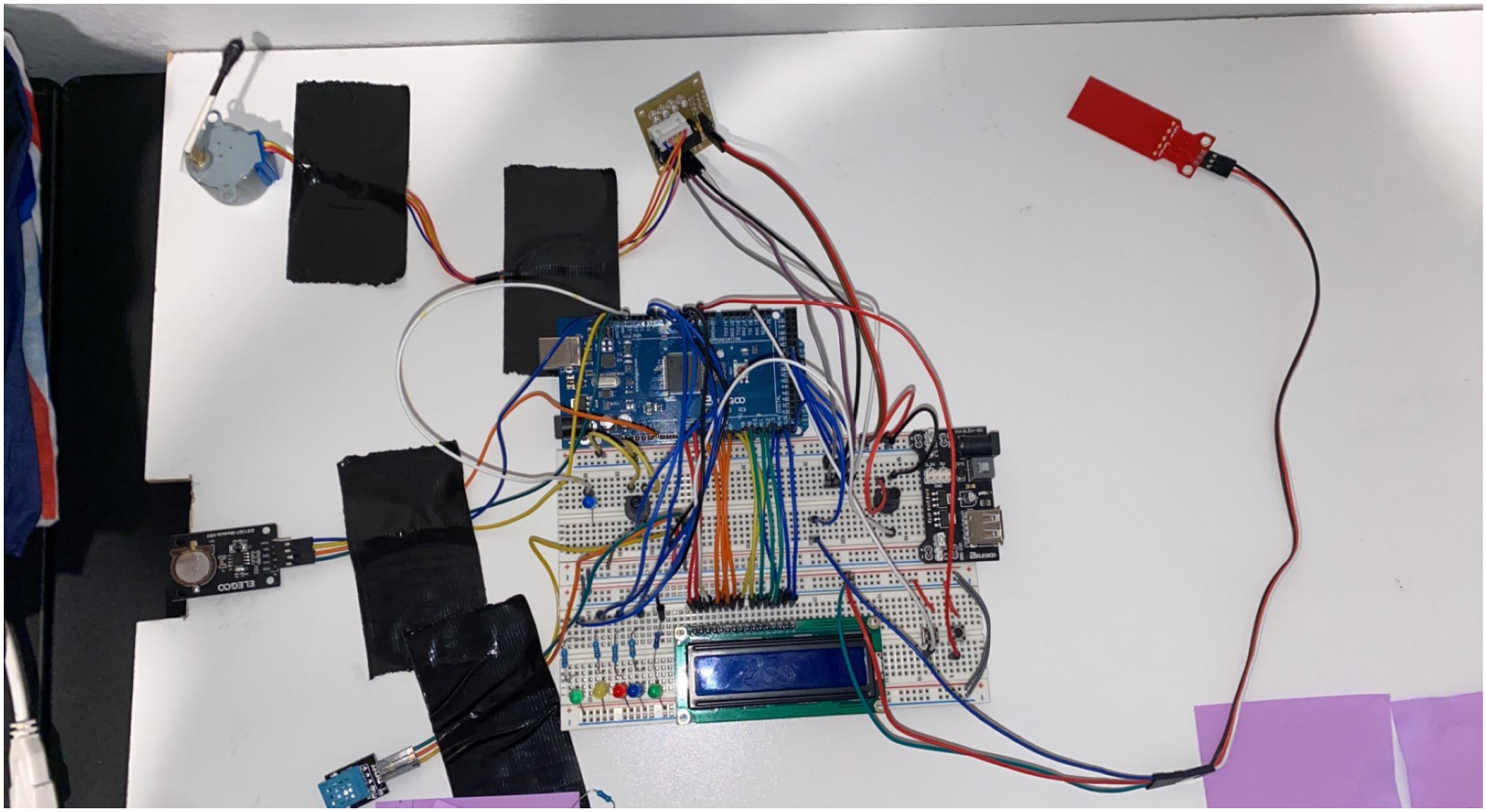

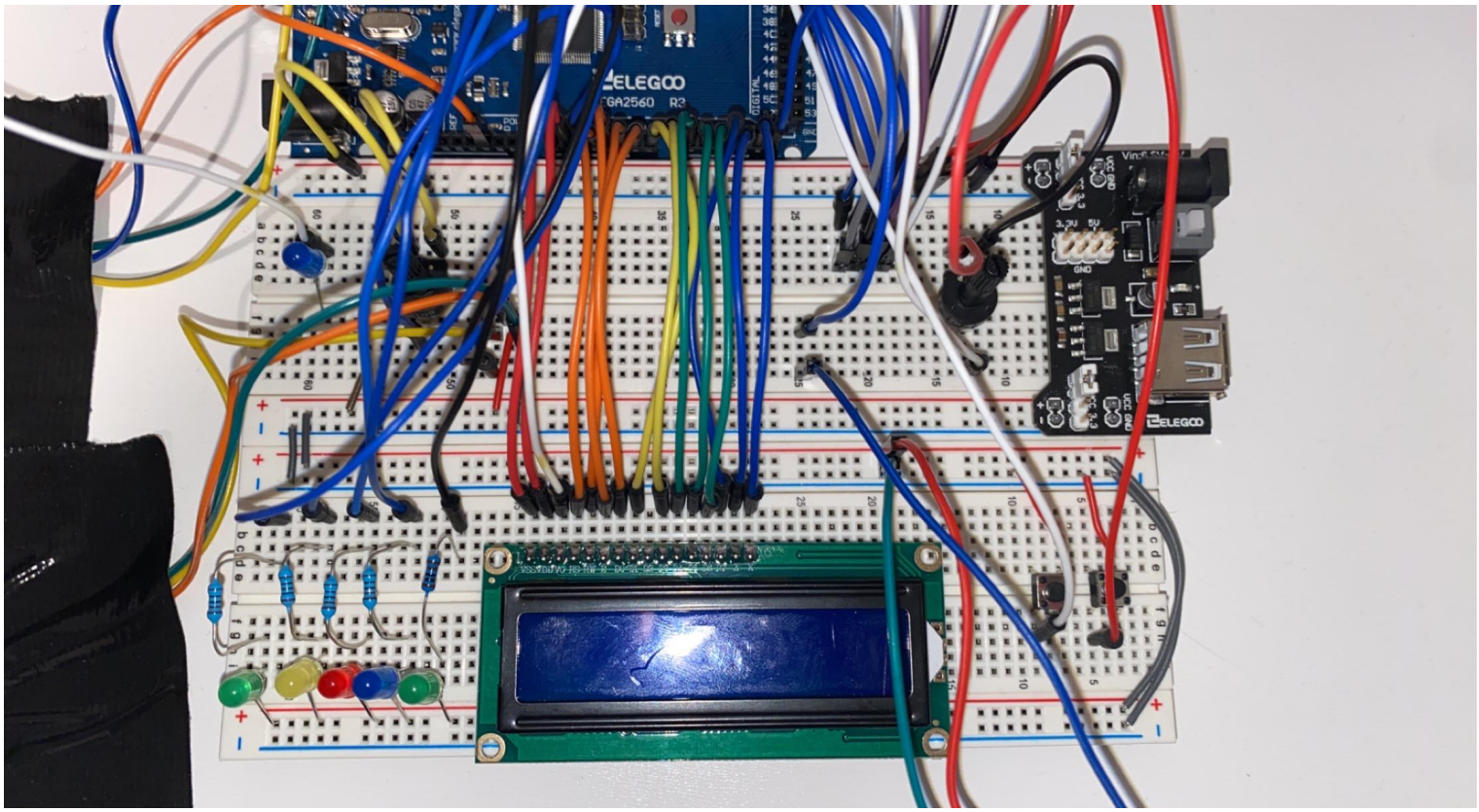


**There is an additional blue LED in the top left corner of the breadboard circuit. This was added for debugging purposes after the schematic was made.**

**Video Link: (also in github repository)**

https://drive.google.com/file/d/1qmTB55hhrBgMaebPYIq_bYLI4gYbngJ5/view?usp=sharing

**GitHub Repository Link:**

https://github.com/1104-Rank-Canon/CPE301_Rank_Canon_FinalProject

**References**


https://create.arduino.cc/projecthub/guptaaryan1010/easiest-way-to-connect-lcd-screen-to-arduino-mega-973682

https://content.arduino.cc/assets/Pinout-Mega2560rev3_latest.pdf

https://components101.com/sites/default/files/component_datasheet/DHT11-Temperature-Sensor.pdf

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https://components101.com/sites/default/files/component_datasheet/28byj48-step-motor-datasheet.pdf

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