

CPE 301, Spring 2024
Final Project: Swamp Cooler

Team Name:

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Team Members:

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1. Introduction

For the final project we are instructed to create a swamp cooler without the body. The concept is easy on the surface, but the class's objective was to go more in depth with the Arduino microcontroller and not use the given library functions.

2. Experimental Design

This project presented a lot of good and bad about working this kind of project as the only idea funnel is just you and essentially the coding part itself will be difficult. The first thing I decided to do was just calibrate each component. I used both TINKERCAD and other websites cited below to help me with this first part. I then modified the library functions that we were not allowed to use and implement the functions we were taught in class and in the labs. After I looked through and calibrated all the parts, the only part I unfortunately have left out was the stepper motor, more on that in Section 3 of this report.

When the calibration tests were done, it was time to put it all together. My first approach was to implement all the libraries I used in the calibration round. Then I took the “my_delay” and “adc” functions with its given variables and then started to setup. I first put the interrupt button with an if-else statement to test if the LEDs function properly with what I need it to do. Then I add the water and DHT sensors to include more if-else statements for more LED testing. Then I implemented the LCD Display to display the temperature and humidity when it is in its idle state. (Also, in its disabled state, I added a little statement to let the user know that the cooler is currently inactive.) I then added the fan to activate when it needs to and to be turned off when it is not. Finally, I added the RTC and finished up the project with the video.

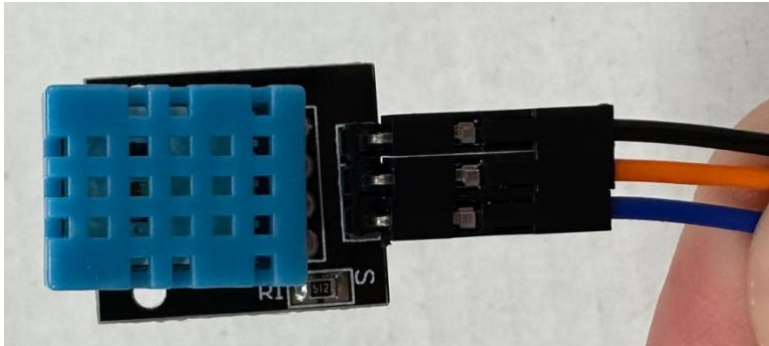
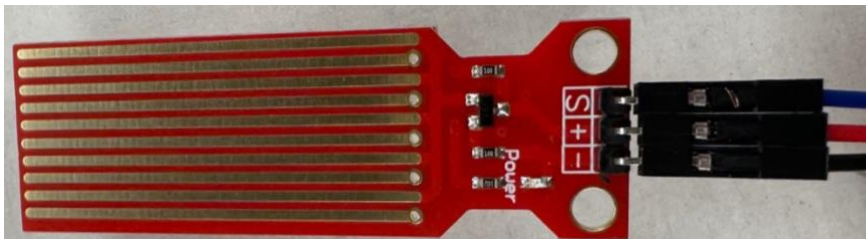
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3. Errors Encountered

There was only 1 error I encountered and could not solve., the stepper motor. I decided not to include the motor as there was no definitive source where I could rely on and give me the code and schematic to use it. The tutoring center in SEM was also unable to help me and so I shall take the deductions where necessary.

4. Final Design

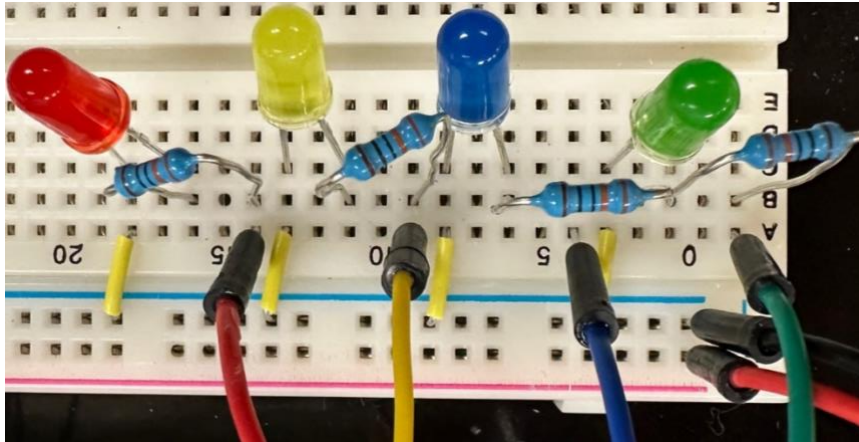
I was only a little unhappy with the structure of the whole circuit as there was most definitely a way to alter it to make it look nicer and for the human eye to be able to follow the leads and where it connects to. I have also provided a table as to where each lead from each component connects to just to have some ease of grading. Below are the images and the table of where each component led to in the Arduino.

Component Name	Component Image	Component Leads								
DHT Sensor		<table><tr><th>Component Pin</th><th>Arduino Pin</th></tr><tr><td>Bottom pin</td><td>D44 / PL5</td></tr><tr><td>Middle Pin</td><td>Power</td></tr><tr><td>Top Pin</td><td>Ground</td></tr></table>	Component Pin	Arduino Pin	Bottom pin	D44 / PL5	Middle Pin	Power	Top Pin	Ground
Component Pin	Arduino Pin									
Bottom pin	D44 / PL5									
Middle Pin	Power									
Top Pin	Ground									
Water Level Sensor		<table><tr><th>Component Pin</th><th>Arduino Pin</th></tr><tr><td>+</td><td>D7 / PH4</td></tr><tr><td>-</td><td>Ground</td></tr><tr><td>S</td><td>A5</td></tr></table>	Component Pin	Arduino Pin	+	D7 / PH4	-	Ground	S	A5
Component Pin	Arduino Pin									
+	D7 / PH4									
-	Ground									
S	A5									

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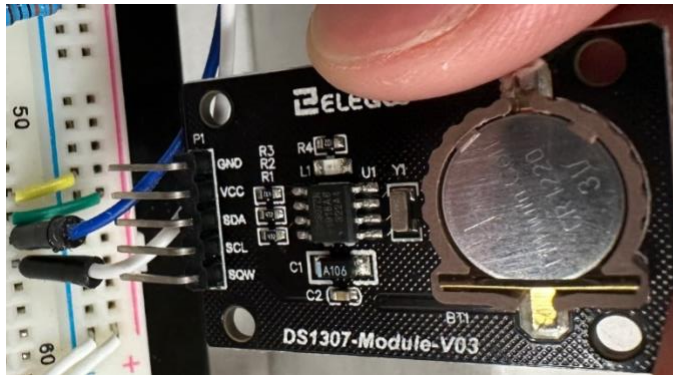
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LEDs



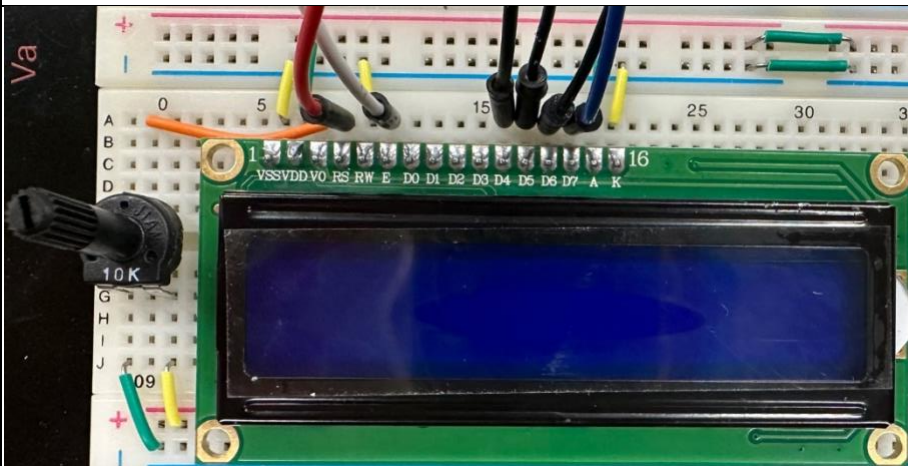
LED Color	Arduino Pin
Green	D13 / PB7
Blue	D12 / PB6
Yellow	D11 / PB5
Red	D10 / PB4

DS1307
Module (RTC)



Component Pin	Arduino Pin
GND	Ground
VCC	Power
SDA	D20 / SDA
SCL	D21 / SCL

LCD Display

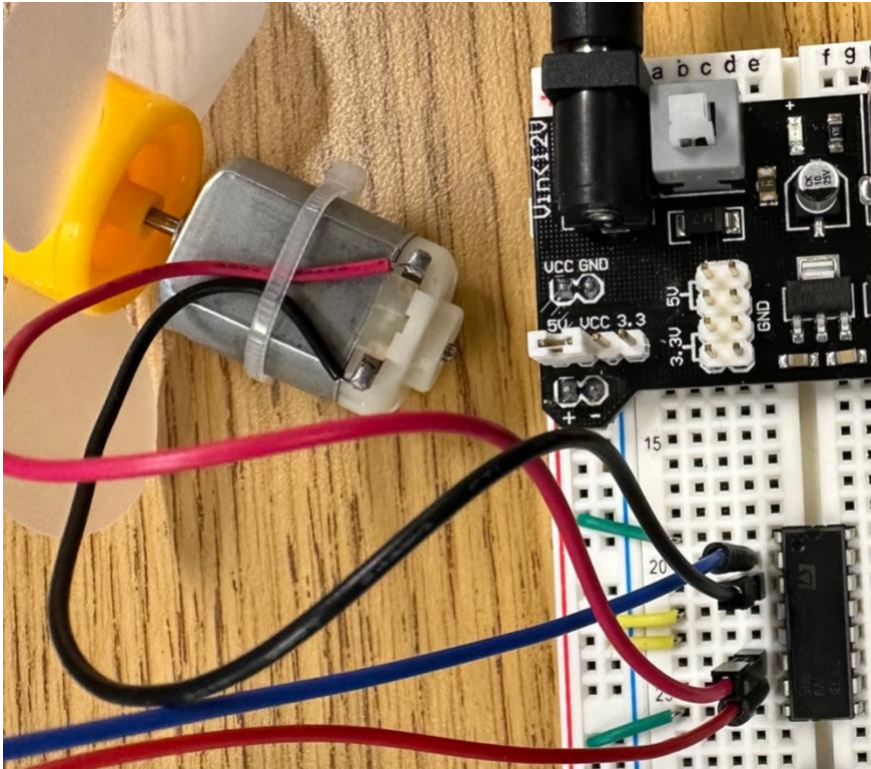


Component Pin	Arduino Pin
VSS	Ground
VDD	Power
V0	Potentiometer
RS	D52 / PB1
RW	Ground
EN	D53 / PB0
D4	D50 / PB3
D5	D51 / PB2
D6	D48 / PL1
D7	D49 / PL0

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DC Fan



L293D Motor Driver Pins	Arduino Pin
1	Power
2	D23 / PA1
3	Fan Ground
4	Ground
5	Ground
6	Fan Power
7	D25 / PA3
8	Power

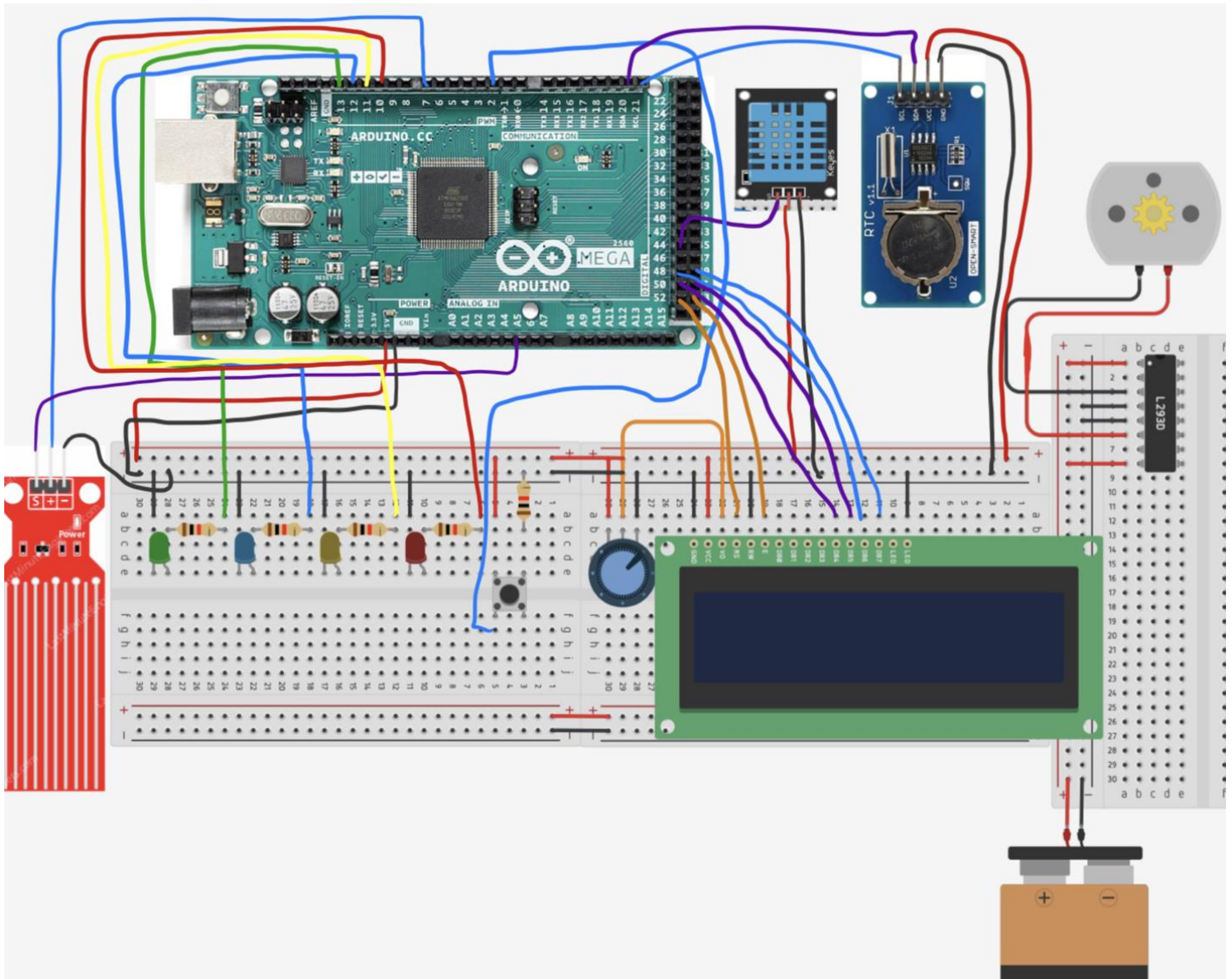
5. Closing Remarks

This whole project was stressful and rewarding at the same time. Hopefully you can tell I put in a lot of time and effort into this project just from this report as well. Although I am going to lose points on the stepper motor not being present, this was still an extremely fun and challenging to put the whole circuit and code together.

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6. Schematic



7. Links to Github and Video

[Github](#)

[Video To Google Drive](#)

[Video To YouTube](#)