

University of Nevada, Reno

# Final Project

CPE 301 Embedded System Design

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# Project Overview

For this project, we were tasked with developing a swamp cooler using the tools in our Arduino Starter kit. Although I worked independently on this project, building the circuitry for this project wasn't as difficult as I thought it would be. However, I faced some hurdles in my coding when attempting to switch states between ERROR and RUNNING. I also struggled with creating a schematic as most of the parts used, as I was unable to locate any TinkerCad components for many of the components utilized. If I did this project again, I would give myself more time to find a proper schematic website.

- **DISABLED**

- State works as intended.
  - Vent moves 90 degrees back and forth when button is pushed.

- **IDLE**

- State works but switches to RUNNING state quickly.
  - If the water level is below 100, the state should switch to ERROR, but didn't seem to work.
  - DHT11 only allows a measurement between 20-90% humidity, and cannot read above 30 degrees Celsius.

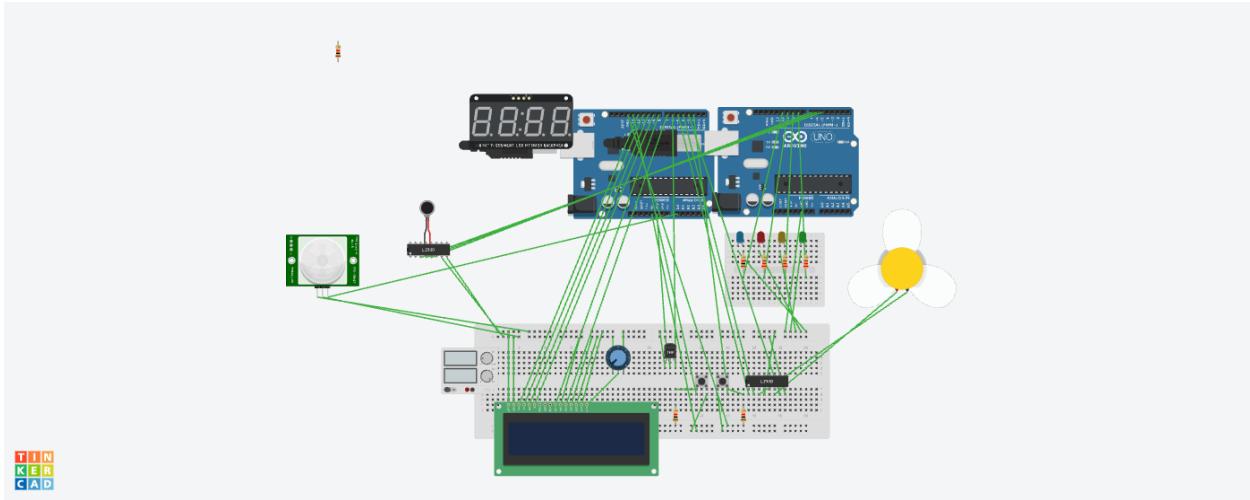
- **ERROR**

- State works by itself, but not when in a switch scenario.
  - Should automatically switch states when water is above 100.

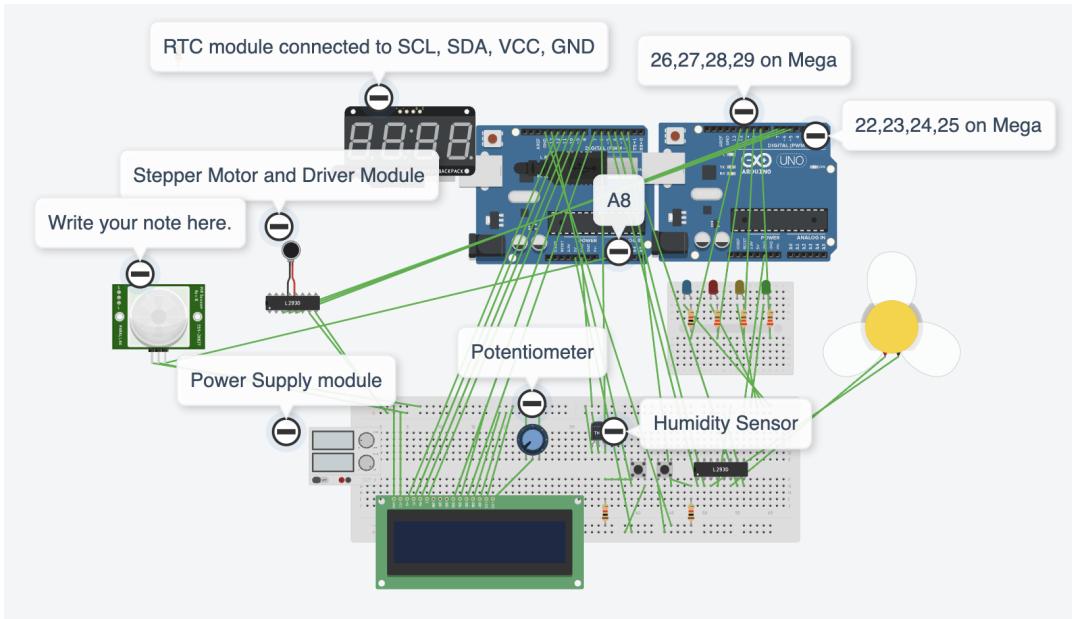
- **RUNNING**

- The fan requires a Power Supply Module to prevent it from harming the Arduino board.
  - The fan should turn on automatically, but one of the wires broke, so I was unable to film it.
  - Should Switch to ERROR state if water level is below 100, but didn't seem to work.

# Design

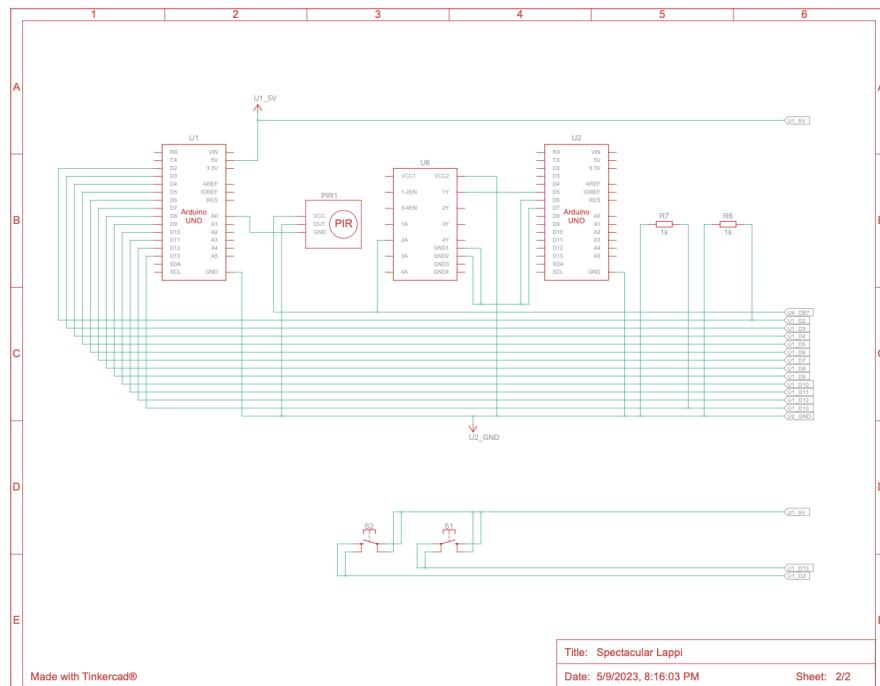
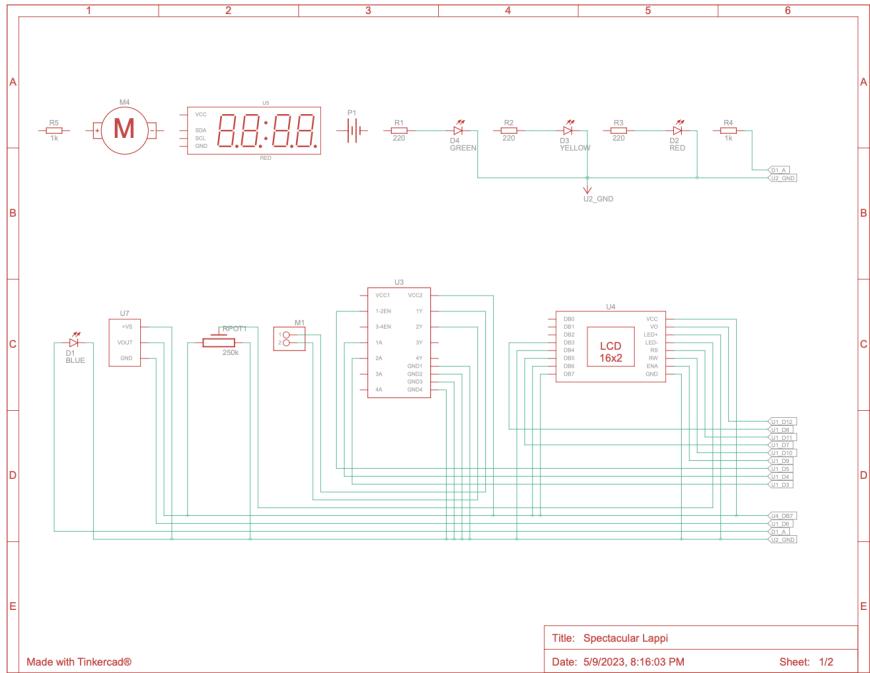


Most of the parts used weren't listed on TinkerCad. Instead of an Arduino Mega, I had to use two Arduino Unos to demonstrate my design.



I provided comments on this one so that it was easier to tell which item I meant to use.

# Schematics



The schematics aren't as accurate as I'd like them to be, as some of the components are incorrect. Unfortunately, I could not find any programs to make a more accurate one.

## Specification Sheets

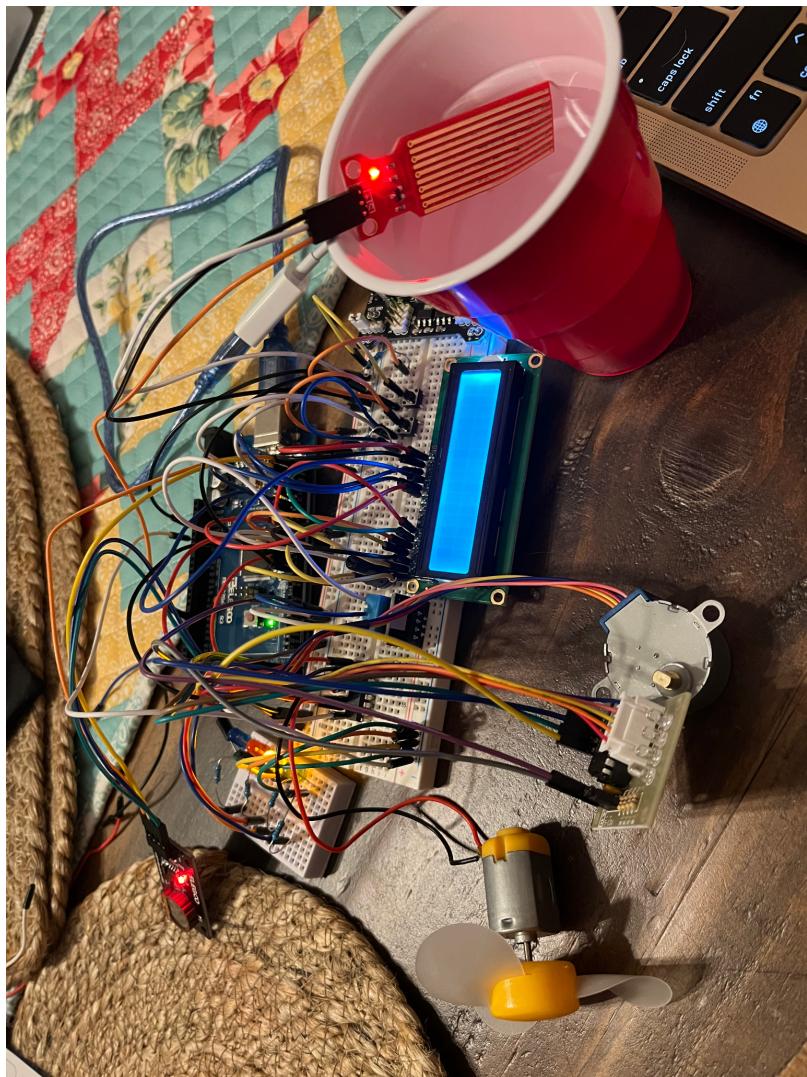
- HD44780U (2x16 LCD display): <https://www.sparkfun.com/datasheets/LCD/HD44780.pdf>
- Atmel 2560 Pinout - <http://4.bp.blogspot.com/-Sj4AEX-ndNo/UeqPDIJo3DI/AAAAAAA AJN4/uN5tE84jGPI/s1600/MEGA2560.jpg>
- Arduino Mega Pinout - <https://www.electronicshub.org/wp-content/uploads/2021/01/Arduino-Mega-Pinout.jpg>
- Atmel 2560 Datasheet - [http://ww1.microchip.com/downloads/en/DeviceDoc/Atmel-2549-8-bit-AVR-Microcontroller-ATmega640-1280-1281-2560-2561\\_datasheet.pdf](http://ww1.microchip.com/downloads/en/DeviceDoc/Atmel-2549-8-bit-AVR-Microcontroller-ATmega640-1280-1281-2560-2561_datasheet.pdf)
- DS1307 (real time clock module):  
<https://www.sparkfun.com/datasheets/Components/DS1307.pdf>
- LED: <https://cdn-shop.adafruit.com/datasheets/WP7113SRD-D.pdf>
- DHT11 (humidity/temperature sensor):  
<https://www.mouser.com/datasheet/2/758/DHT11-Technical-Data-Sheet-Translated-Vers ion-1143054.pdf>
- ULN2003 stepper motor driver board: <https://www.st.com/resource/en/datasheet/uln2001.pdf>
- DC motor: <https://components101.com/motors/toy-dc-motor>
- Button: <https://www.arduino.cc/documents/datasheets/Button.pdf> -

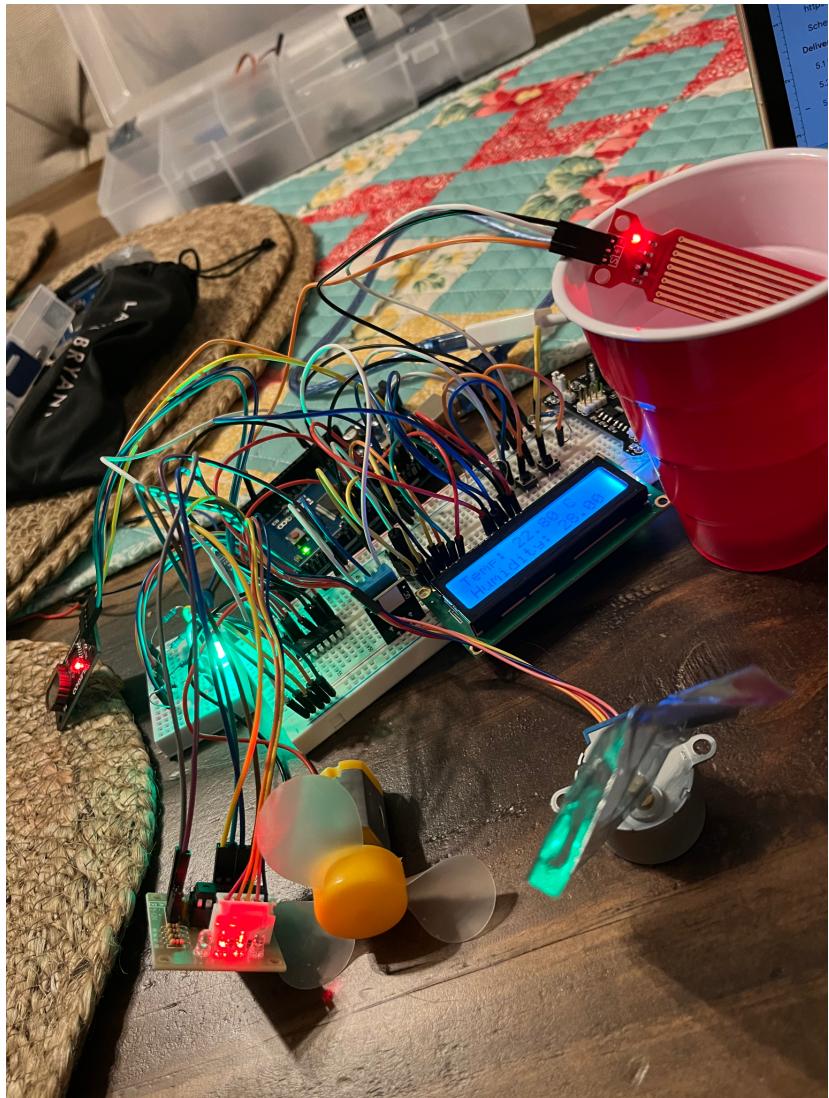
## Github Repository

<https://github.com/sariahw/CPE301-Final-Sariahw.git>

## Pictures Of Operation







## Video Of Operation

<https://youtu.be/Czy5TkTIxMw>