Swamp Cooler - Final Project
CPE 301
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**Overview**:

- Design Overview: Our swamp cooler design involves a box to house its fundamental electronics, accompanied by multiple exterior components. Inside of our box, there is an arduino and a breadboard responsible for hosting and carrying instructions to the exterior components, and an extra power supply module to provide more power for some power-hungry components. Among our exterior components, there are receivers gathering input, and devices performing outputs. The receivers gathering inputs include a small component reading the temperature and humidity, another reading the water level of an external water container, and a breadboard with buttons to deliver instructions to the cooler. The components responsible for outputs include a fan to cool the surrounding area, a stepper motor simulating vent control, individual LEDs that indicate the current state, and an LCD screen which displays varying information based on the current state.

- Constraints:
    - Temp: Maximum of 21 Degrees Celsius Before Running Mode is activated
    - Water Level: Minimum 1 cm before Error mode is Activated
    - Power Draw: The cooler has an average power draw of roughly 2 watts when activated.

- Modes of Operation:

    - Disabled: As the title suggests, when disabled the cooler is powered off and non-functional. This mode can be left by pressing the start button, bringing the cooler to the idle mode.

    - Idle: When idle, the cooler is operational, and will continuously read the temperature and water levels. The acceptable ranges are temperatures below 21 °C,  and water levels above 1 cm. If the temperature rises above the limit, the cooler will switch to the “Running”  mode. If the water level falls below 1 cm, the cooler will switch to the “Error” mode. If the stop button is pressed while in the Idle mode, the cooler will return to the disabled mode.

    - Running: When running, the fan will continuously operate to cool the surrounding area. If the temperature falls back below 21 °C, then the cooler will swap back to the idle mode. If the water falls below 1 cm, the cooler will swap to the error mode. If the stop button is pressed while in the Running mode, the cooler will return to the disabled mode.

- Error: When in the error mode, the cooler is running critically low on water, at a level of less than 1 cm. When the water level is raised to above 1 cm, the cooler will return to idle mode. If the stop button is pressed while in the Error mode, the cooler will return to the disabled mode.

**Final System Pictures and Video Link**:

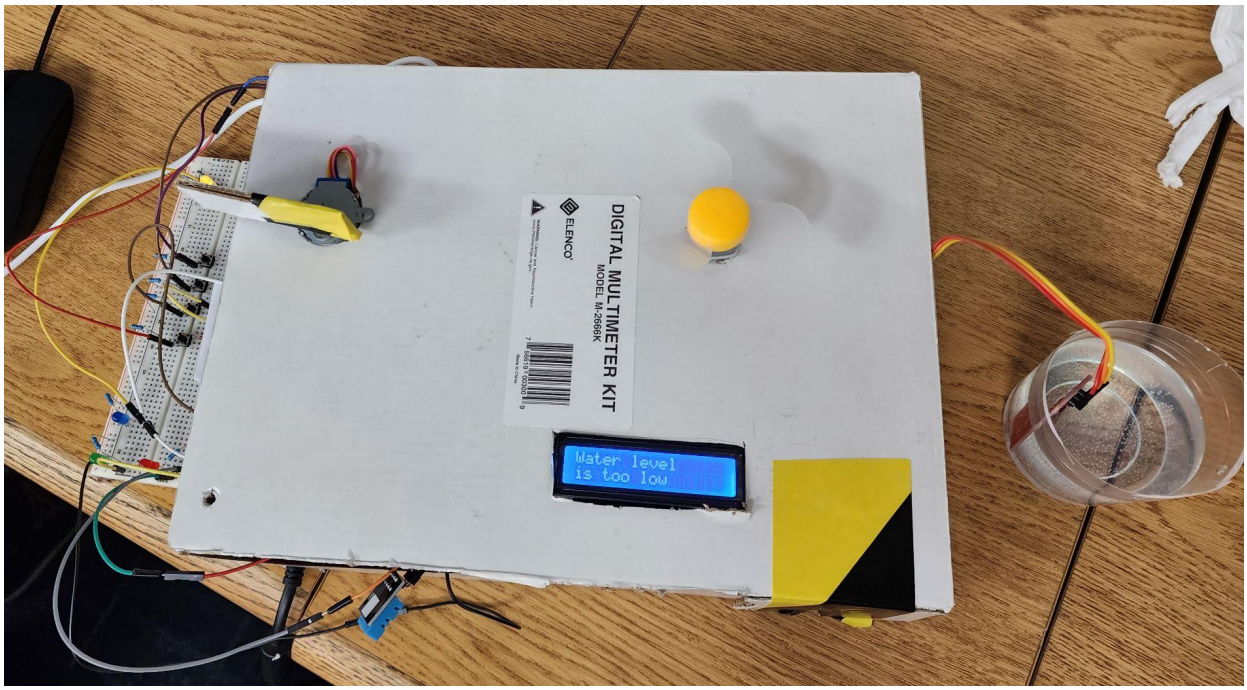



Figure 1: Cooler Exterior

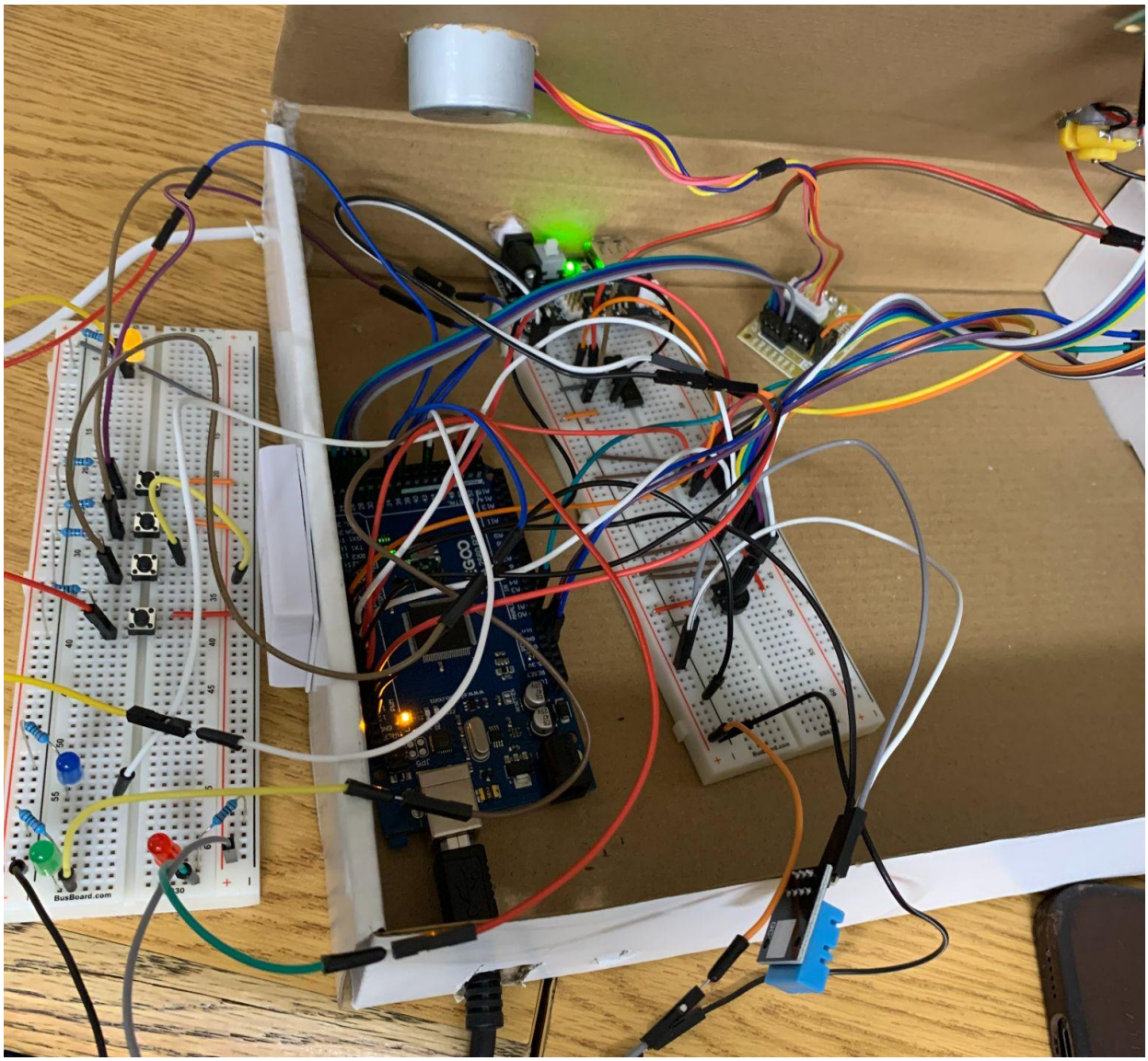
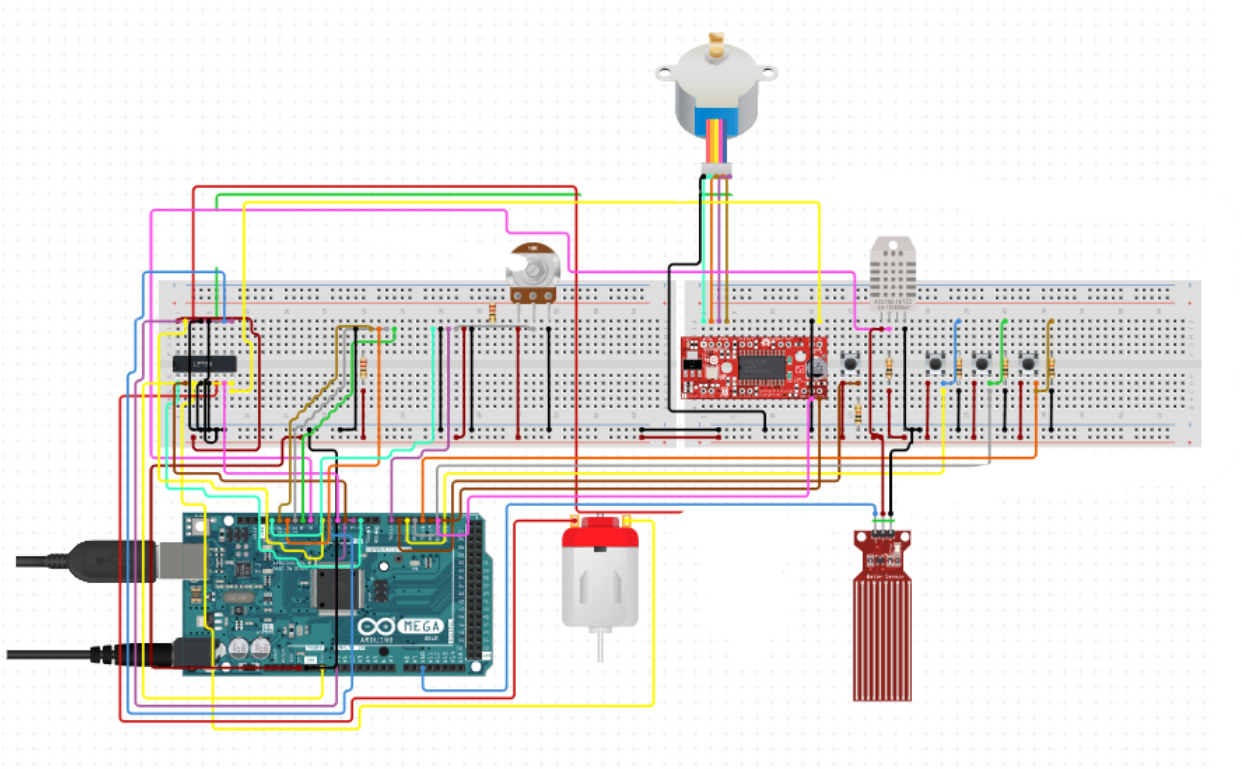
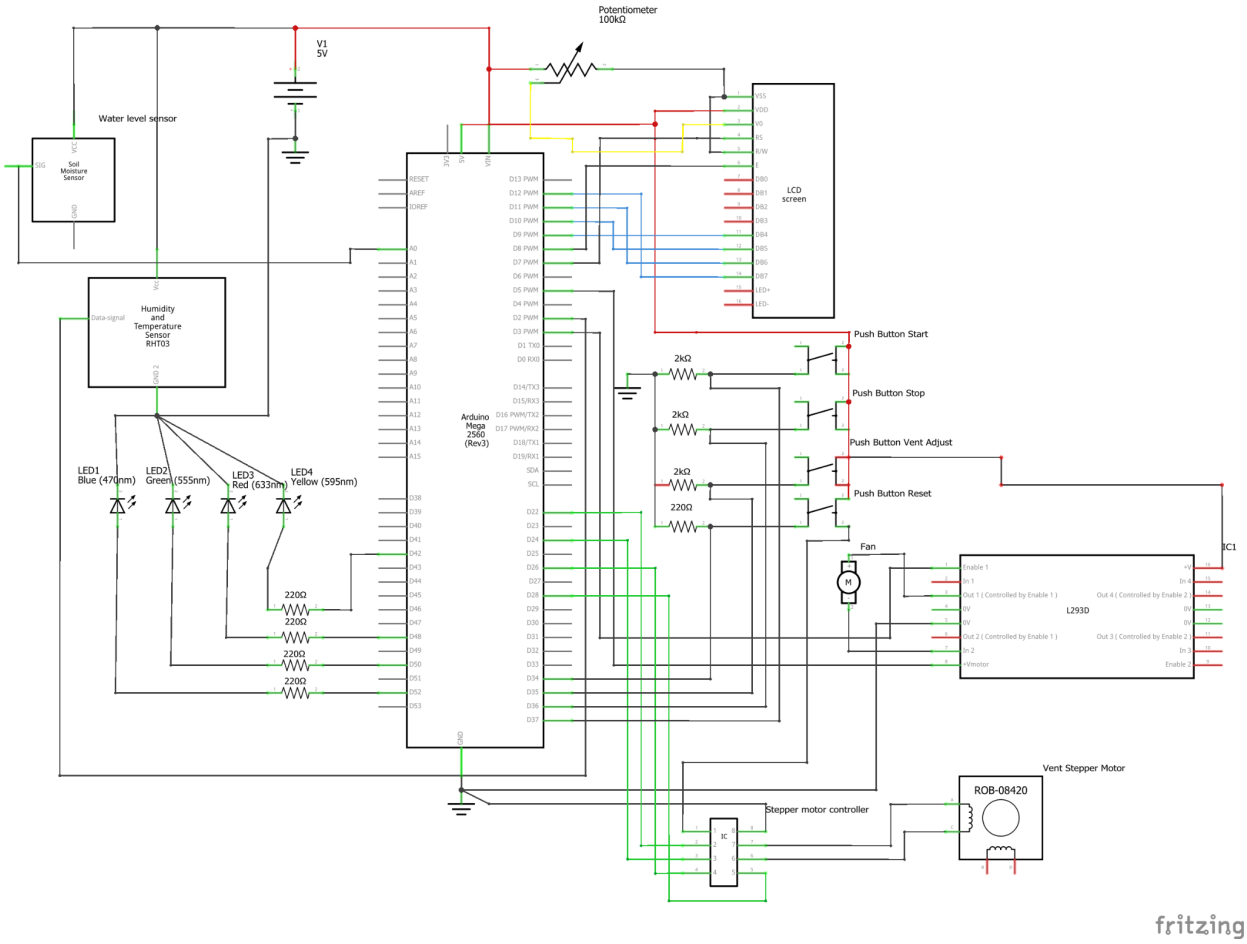


Figure 2: Cooler Interior

Video Link: https://youtu.be/iziovCoTnhE

**Schematic and Relevant Links**:


MEGA




Schematic Link:
https://www.tinkercad.com/things/21KZbPV00Qf-stunning-jaiks/editel?sharecode=jag6mnhDLRXG0j25oLIesHI76R3FYvqaPiwWJexRs2k

Arduino Mega 2560 Specification Sheet:
https://docs.arduino.cc/hardware/mega-2560

Water Level Detection Sensor Module Specification Sheet:
https://asset.conrad.com/media10/add/160267/c1/-/en/001485323DS01/datasheet-1485323-iduino-moisture-sensor-module-1-pcs-se045.pdf

Power Supply Module Specification Sheet:
https://components101.com/modules/5v-mb102-breadboard-power-supply-module

Stepper Motor Specification Sheet:
http://eeshop.unl.edu/pdf/Stepper+Driver.pdf

LCD 1602 Module Specification Sheet:
https://www.openhacks.com/uploadsproductos/eone-1602a1.pdf

L293D Transistor Specification Sheet:
https://www.st.com/content/ccc/resource/technical/document/datasheet/04/ac/22/f9/20/5d/43/a1/CD00000059.pdf/files/CD00000059.pdf/jcr:content/translations/en.CD00000059.pdf

Fan Blade and 3-6V Motor Specification Sheet:
https://www.osepp.com/accessories/motors/136-ls-00026-r260-3-6v-12000-rpm-brushed-dc-motor

830 Tie-Points Breadboard Specification Sheet:
https://www.jameco.com/Jameco/Products/ProdDS/2125026.pdf

2 pin LED
https://www.digikey.com/en/products/detail/kingbright/WP7113YD/1747683?utm_adgroup=General&utm_source=google&utm_medium=cpc&utm_campaign=PMax:%20Smart%20Shopping_Product_Zombie%20SKUS&utm_term=&utm_content=General&gclid=CjwKCAiAv9ucBhBXEiwA6N8nYCfPTD53lSLaC7sDkEIlw3oNS8W2AtClyIcr1f7r9woew9ZiuGzmLRoChmIQAvD_BwE

**Github Link**:

https://github.com/1103-Nicely-Kyle/CPE301-Final-Project---Group-Awesome

Note: We did most of the work in-person with our whole group so the number of github commits doesn't necessarily reflect each person's participation. We all worked together equally.