CPE 301

Group: Johan Ramirez

Due: 12/15/2024

Final Project Report

The objective of the project was to design, build, and code a miniature swamp cooler. The swamp cooler consisted of several components, including the arduino, a DC motor, a stepper motor, a LCD display, several LED's and buttons, a RTC controller, a water sensor along with a few peripheral helping devices, along with many cables, wires, and resistors. To do this, several states were assigned to the swamp cooler, each with their individual use cases and purposes. The first state, the disabled state, is indicated with a yellow LED light. This is the state that the swamp cooler initially launches in. All that is done in this state is wait for the start button ISR to be pressed, so that it can then switch into the IDLE state.. The IDLE state was shown with a green LED. This state is shown when the cooler is not running, and is not in an error state either. When in this state, the fan is not functional, however the vent is controllable. Additionally, it waits until the conditions are met for the fan to reach the running state. The running state is indicated with a blue light. In this state, the fan is running from entry to exit, the vent is controllable, and the sensors are still continuing as well. However, if the conditions should fall out of the operating range, then the error state appears. In this state, nothing is functional. The only functionality that the state serves is to bring the user of the cooler back to the idle state.

The LED screen is used to display information about the swam cooler such as humidity, temperature, moisture content, the current state of the cooler etc.. However, the provided LCD was broken, so the Arduino serial monitor was used in its place instead.

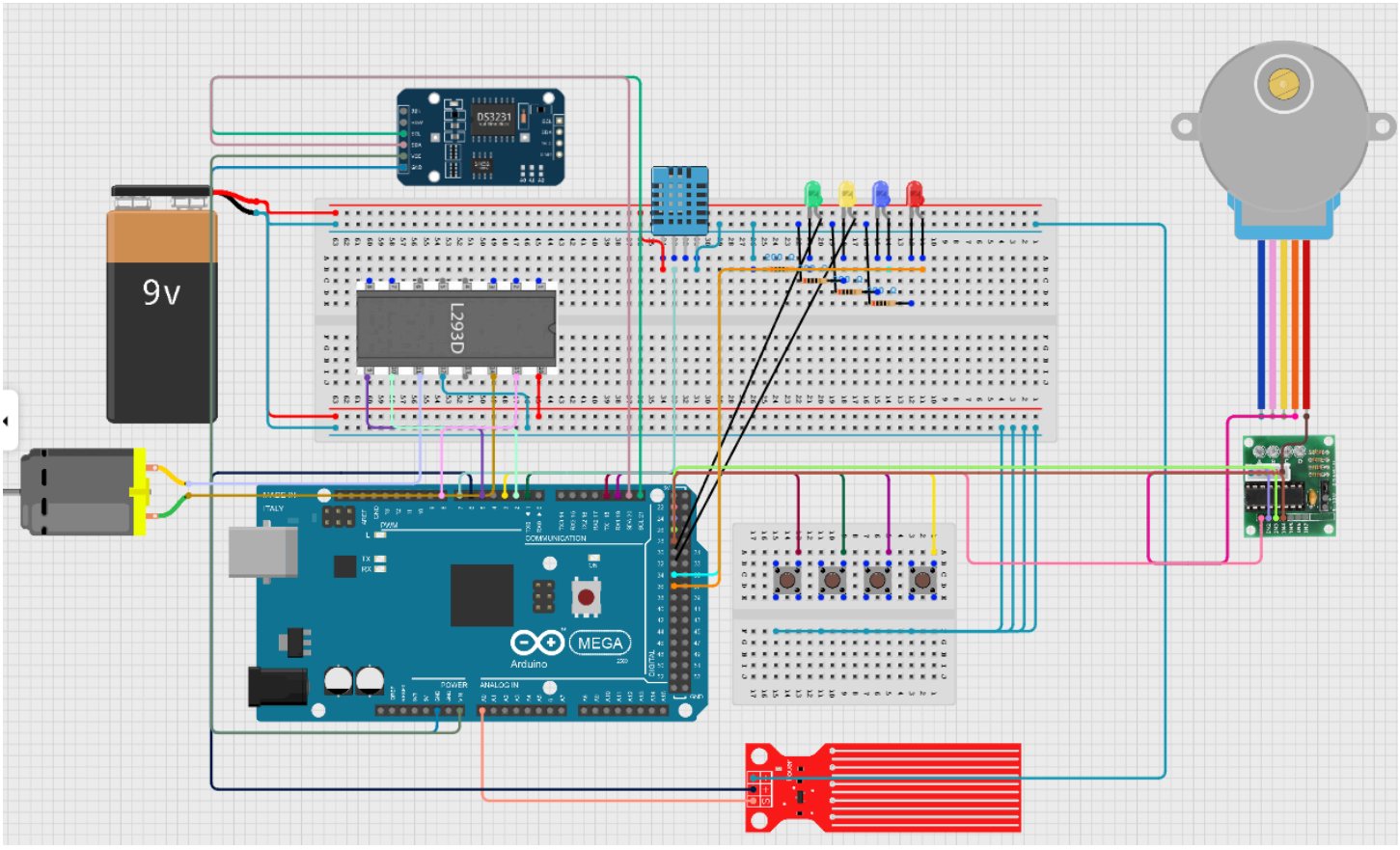
The RTC controller is meant to keep track of the date and time in **real time**, to display the timestamps for the state transitions of the swamp cooler. The moisture sensor applies a voltage,

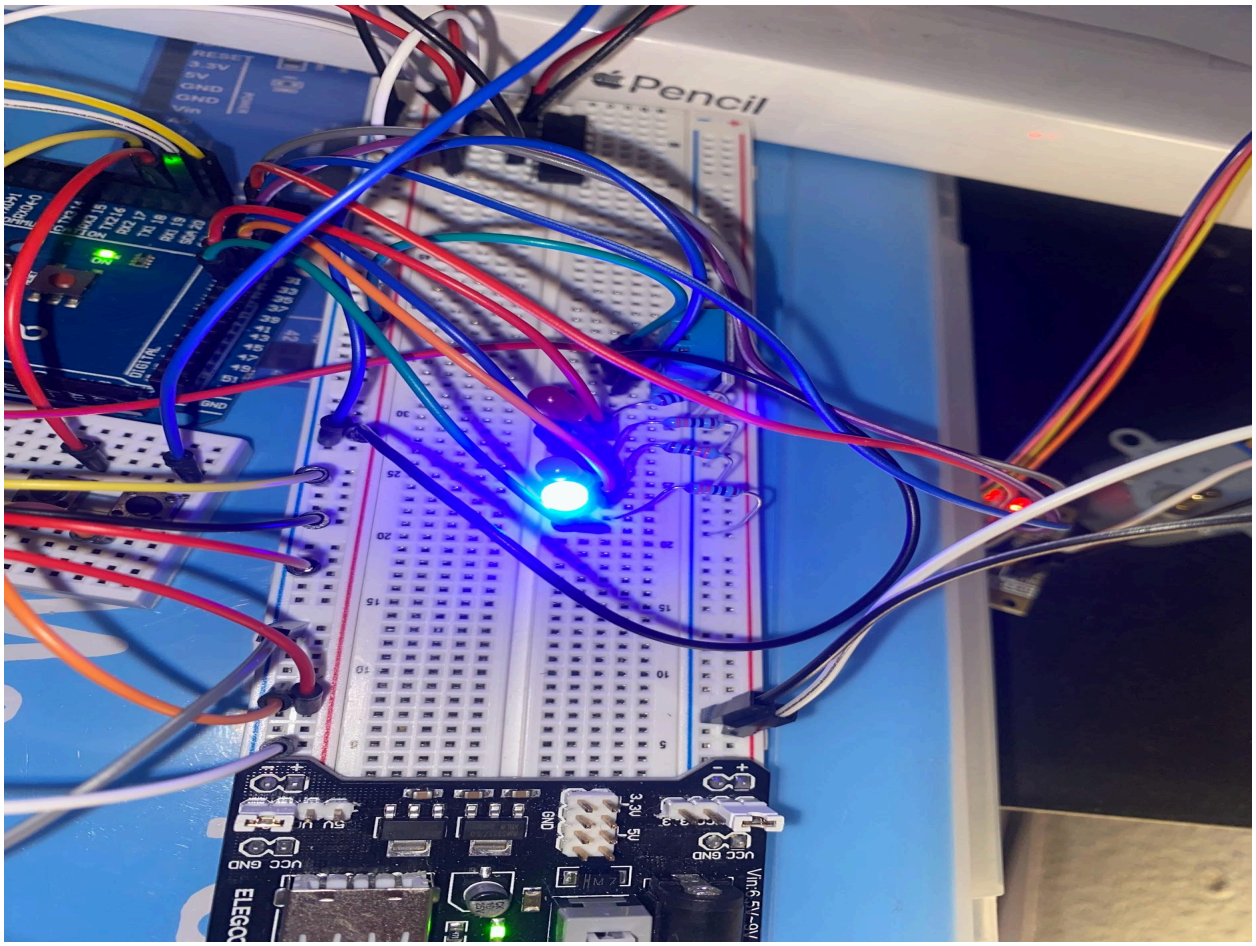
proportional to the volume of water that the sensor has been submerged in. The more water that the sensor picks up, the higher the reading the sensor will return.

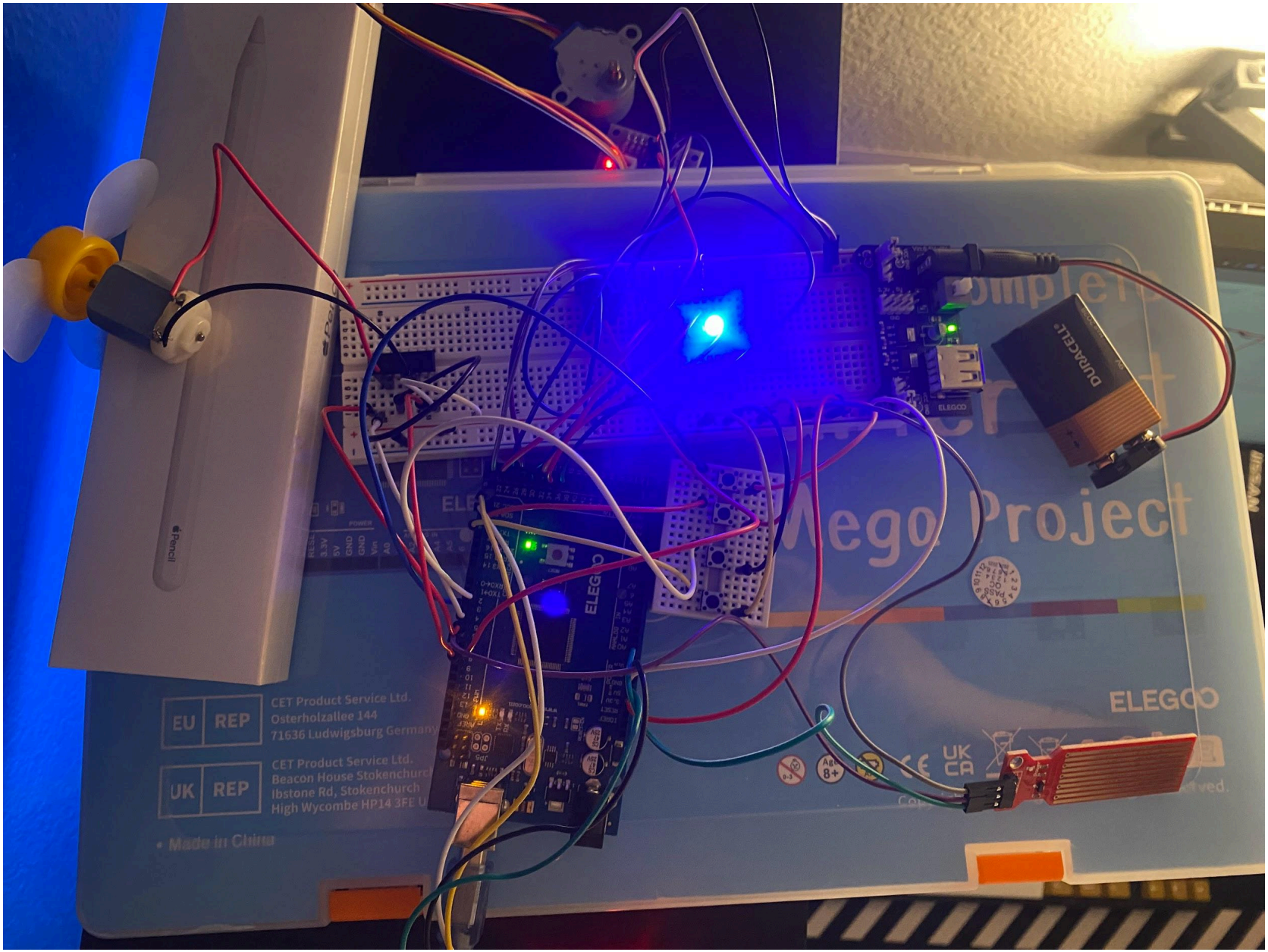
The DC motor is attached to an IC, which outputs a specific speed and direction of the fan that is attached to it. This is then attached to several pins on the arduino to handle the logic for when the fan and DC motor should spin. The stepper motor is also used to act as a vent control system. A small circuit is attached to the DC motor, in order to provide precision and power to the system, as a button is used to indicate how much the vent should move. Lastly a separate power supply is attached to the breadboard which ties all the components together., This is because the power supply would supply more power than is needed for the entire system, ensuring that the power draw wouldn't damage the arduino.

Below are photos of the system, along with links to the github repository.

https://github.com/JohanRamirez2022/CPE-301-final-project-group-38.git




Pencil


ELEGOO
DURACELL
EU REP
CET Product Service Ltd.
Osterholzallee 144
71636 Ludwigsburg Germany
UK REP
CET Product Service Ltd.
Beacon House Stokenchurch
Ibstone Rd, Stokenchurch
High Wycombe HP14 3FE
Made in China