CPE 301 Final Report
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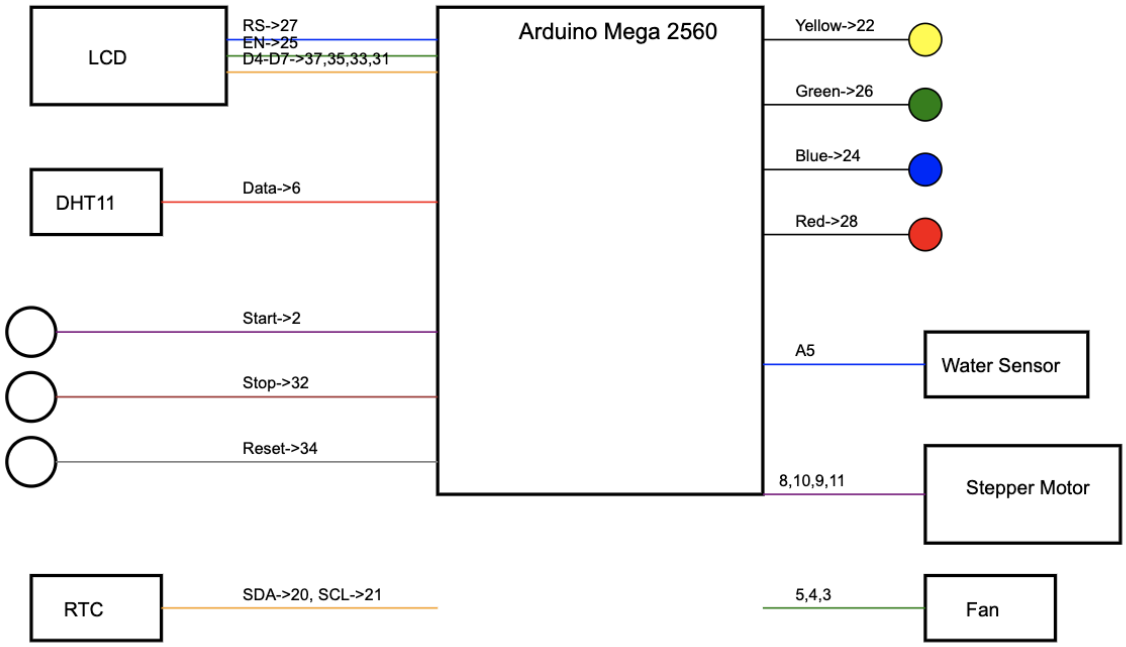
Building the circuit:

We began by connecting the Arduino Board to our bread board to give it initial power using 5v and Ground. We then connected each of the buttons: Start, Stop, and Reset. The buttons are each connected to power and ground, and have a 10kΩ pull-up resistor attached to the ground of each. Start button goes to port 2, Stop goes to port 32, and Reset goes to port 34. Next, we connected the Potentiometers. The first is connected to port A0 and the second connects to the LCD screen. These both also have connections to 5v and Ground. Next, the Temperature and Humidity Gauge is connected to the power and ground, and its output goes to port 6. We then connected the RTC Module which has power and ground connections as well as connects its SDA to the board's SDA which is at port 20. It also has its SCL connected to the board's SCL which is at port 21. Next, we connected the Fan Motor Control (the L293D), which is connected to our fan to control speed and direction. The next item we attached was the LCD Screen, which has power and ground, then has RS at pin 27, EN at pin 25, D4 at pin 37, D5 at pin 35, and D6 at pin 33. The next connections were the LEDs. The Yellow LED goes to Pin 22, Green LED goes to Pin 26, Blue LED goes to Pin 24, Red LED goes to Pin 28. Next, we have the Stepper Motor with the Stepper Motor Driver Module, where the stepper motor pins connect to pins 8-11 on the Arduino Board. Lastly, the Water Level Detection Module is connected to power and ground, and output going to A5.

Legend:

- All resistors: 220Ω-330Ω for LEDs
- Pull-up resistors: 10kΩ for buttons
- Power connections (5V and GND) not shown for clarity



In this schematic we decided to only include connections that display external devices and their pin connections. We decided to leave out power and ground connections for each device, as to keep our schematic more organized and easy to follow. We included an in depth video of each connection, where you can see the input and output ports as well as all the ground and power connections.

Code:

We began by looking at our labs from this semester to see what we could incorporate. We then included the allowed libraries. The next few sections of the code are defining our ports and devices. While we began defining our devices, we were connecting our circuit along with it. We then declare our functions and go on to write each function below. Our setup function initializes our speed and ports for the devices and begins the program. Our next function is a big loop which measures the water level and sets our LEDs to the appropriate high and low values. The next function is our serial output which is the same as previous labs. We then have our other function definitions for pressStart, pressStop, and pressReset. These functions all include functionality which will listen for the button to be pressed, and trigger the appropriate LED. We then have our acd_init and acd_read functions which set and enable these.

Our switchState function sets and clears the appropriate LED. The updateTemp function tests all the cases of different temperatures, and adjusts the LEDs settings to be high or low and adjust to be idle or running. The motorControl function uses the potentiometer value and adjusts its speed to match. When the system is disabled it should stop the motor completely.

We were able to get our code to compile and display that it is running through the serial monitor, however, something is wrong with our circuit, so we were not able to test all parts together. While working to build the circuit and write the code, we tested individual parts, but did not record them.