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CPE 301.1001  
May 12, 2024  
Final Project

## Evaporation Cooling System

### Abstract:

The goal of this project is to create an evaporation cooling system. The cooler is built using the Arduino ATmega 2560 and the tools and sensors provided with the kit. Creating the cooler system requires one to utilize the knowledge gained from all the lectures and labs throughout the semester. A video and description of the system is provided.

### Overview:

The evaporating cooler system consists of the Arduino ATmega 2560, 16-pin LCD display, push buttons, DHT11 humidity and temperature sensor, a water level sensor, and real time clock (RTC) sensor, resistors, stepper motor and a fan motor, LEDs, and a breadboard. The system is meant to detect and monitor the water level using the water level sensor. It should state the temperature and humidity of the water or display an error if the water level becomes too low. If it reads the temperature and humidity, it reads that onto an LCD display. A fan motor will also activate with a push of a button and when it is able to read the temperature and humidity. When the motor is on or the system changes states, it should display on the serial monitor the time and date in real time.

The system should be in either one of these four states. When the cooler is in IDLE state, a green LED should be lit up and the sensor should read the temperature and humidity and display it accordingly. The fan motor is turned off in this state. When pressing the On/Off button, the system enters a DISABLED state. When it is in this state, a yellow LED should light up and many of the system's functions should be disabled. The LCD should not be displaying the temperature and humidity read by the water level sensor and the fan motor is turned off. Pressing the On/Off button once more will change the system to a RUNNING state. In this state, the water level sensor reads the properties of the water and it displays the temperature and humidity onto the LCD. A blue LED lights up and the fan motor should function. The current date and time should display onto the serial monitor. Finally, if the water level is low or the sensor does not detect any water, the cooler is in an ERROR state. A red LED light should light up, the fan motor is turned off, and it is unable to read the temperature and humidity of the system.

Specifications:

Arduino ATmega 2560

<https://docs.arduino.cc/resources/datasheets/A000067-datasheet.pdf>

DS3231 RTC Module

<https://www.analog.com/media/en/technical-documentation/data-sheets/DS3231.pdf>

DHT11 Sensor

<https://www.adafruit.com/product/386>

5V DC Hobby Motor

<https://automationroboticsarduino.com/products/5v-dc-hobby-motor>

5V DC Stepper Motor

<https://docs.arduino.cc/learn/electronics/stepper-motors/>

16-Pin Liquid Crystal Display

<https://docs.arduino.cc/learn/electronics/lcd-displays/>

Water Level Sensor

<https://lastminuteengineers.com/water-level-sensor-arduino-tutorial>

Video & Demonstration:

<https://youtu.be/qYPC6NphNf4>

Schematic and Images:







