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### Enhancement Two: Algorithms and Data Structure Narrative

The artifact I am using for this milestone is the Thermostat project from CS-350, Emerging Systems Architecture and Technology. This program was assembled as the final project for that class, and was designed to work as the controlling software for a thermostat which uses an embedded system and gives the user control over its functions.

I chose this artifact for my ePortfolio mainly because it was a program I knew well and which I had worked on recently. The Thermostat program doesn't use many algorithms or handle much data during its operation, so the enhancements I made were mostly disjointed from the program's original code. It does send status updates to the 'temperature server' through a serial connection every thirty seconds, though, which could be used as a database for training a machine learning algorithm. The enhancement I made for this computer science category was to implement a linear regression machine learning algorithm which could be used to predict the set point temperature the user would choose, based on their past choices and the recorded temperature at the time they made those choices. I also reorganized the functions in the original two classes by shifting the function for operating the LCD display from the manageMyDisplay function in the TemperatureStateMachine class to the setupDisplay function in the ManagedDisplay class.

While making the planned enhancement to the program, I initially wanted to store the data from the temperature server in a linked list while it was being used for the machine learning algorithm. However, it turned out to be much simpler and more efficient to read the stored information into a normal list instead. A linked list might have been useful for gathering data in the correct order if the program didn't already record the state, temperature, and set point temperature of the program at intervals of thirty seconds, but using the already existing function for gathering data worked much better. The data was stored as strings, so it took some string manipulation to get numerical data to plug into the machine learning algorithm, but storing each variable into a distinct list made it easy enough to use the data to train and test the linear regression machine learning model. I believe my work on enhancing this artifact has met my personal goals for the project, as well as the course outcome for the algorithms and data structures category of computer science.