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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 used an embedded system to give the user control over its functionality.

I chose this artifact for my ePortfolio mainly because it was a program I knew well and which I had worked on recently. Unfortunately, the economical design of the program, while ideal for an embedded system, doesn't make it the best choice for enhancements that could increase the data and storage requirements. The Thermostat program uses few algorithms and doesn't handle much data during its operation, so the enhancements I made were disjointed from the program's original code. 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.

While making the planned enhancement to the program, I initially wanted to use the data which the program writes to the serial connection during operation and store it in a linked list while it was being used for the machine learning algorithm. However, a linked list is apparently not ideal as a data set for a machine learning algorithm, and 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 if the program didn't already record the state, temperature, and set point temperature of the program every thirty seconds, but using the already existing function for gathering data worked much better, with simpler and more efficient code. The data was stored as strings, so it took a little bit of string manipulation to get numerical data to plug into the machine learning algorithm, but storing each variable into a distinct list made it simple 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.