Southern New Hampshire University

CS-499 Computer Science Capstone

Prof. Brooke

Module Three: Milestone Two

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03/20/2022

1. Briefly describe the artifact. What is it? When was it created?

The artifact I’ve selected is a project where I used an off-the-shelf microcontroller to design a thermostat. The project was completed in the C programming language and involved using the device’s drivers to achieve the desired functionality using the hardware on the microcontroller. I completed this project for course CS-350: Emerging Systems Architecture and Technology here at SNHU. It was completed and submitted in August of 2021.

1. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in software development? How was the artifact improved?

I selected this artifact to include in my ePortfolio because this assignment required me to design a state machine with time-based events with limitations on the number of resources available as a microcontroller board was used. I felt as though this demonstrated my ability to design software that I’ve acquired here at SNHU. In addition, this assignment required me to learn to use the device drivers and adapt the code to my needs. This demonstrates my ability to work with code developed by others and integrate my own code into it. To improve this artifact, I opted to extend the functionality beyond the thermostat for heating and add support for cooling too. Modern HVAC systems have functionality for both heating and cooling and I thought it best to extend the functionality to match this. I also improved the commenting on the code, increasing its readability and usability.

1. Did you meet the course objectives you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?

The course objective I originally intended to meet in this enhancement of this artifact was course objective four, “Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals,” specifically the software engineering and design portion of this course outcome. I feel as though I am meeting the course objective that I set out to meet with this enhancement. In modern day, IoT devices have grown to be a massive industry and many of these use state machines as they have limited resources and only need a limited number of states to exist in. Demonstrating my ability to design a state machine constrained by limited resources of a microcontroller represents a real-world application of software design and engineering. I don’t believe I have any updates to my outcome coverage plans described in my initial refinement and enhancement plan document.

1. Reflect on the process of enhancing and/or modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?

When I first opened this project again, I realized just how much I had forgotten it. Although it was less than a year ago since I created this, I did not need to reference it at all so it’s functionality was a bit confusing for me to understand. This is when I learned how important commenting really is. Although it was my own code, my comments were brief and vague. I had to run through it all little by little before my code review so I could understand what was going on again. In addition to my own code, I also had to re-learn how the drivers are used in this software. Adding detailed but concise comments was where I started before making any changes to the actual code. This was truly the only major challenge I needed to overcome for this enhancement. It took some time to relearn how the program worked and update the comments but without doing so, I would not have been able to make the enhancements I did. The lesson I learned here I must remember when working on the other enhancements I have planned for my ePortfolio and in my future professional career.