Christopher Anderson

Prof. Bermudez

Computer Science Capstone 2025

7/19/2025

3-2 Milestone Two

Enhancement One: Software Design and Engineering

In this update for Software Design and Engineering of an artifact, I have improved the final project of the Emerging System Architecture course. This artifact is a heating only thermostat program that utilizes the two-button interface and thermopile sensor of a Texas Instruments CC3220S; this software package was originally developed in June of 2024 as the culmination of my learning for embedded systems development. Through the integration of the CC3220S board’s left button and right button the original project allowed a user to increase and decrease a preferred temperature that would activate or deactivate a red LED on the board based upon a comparison with the temperature reading from the board’s integrated thermopile. The final project of Emerging System Architecture originally included exclusively heating thermostat components though it has been improved with a cooling mode algorithm in this update for Enhancement One: Software Design and Engineering of the Computer Science Capstone.

The inclusion of this Embedded Systems artifact to my ePortfolio shares my competency in engineering for restrictive environments. This artifact showcases an appreciation for device activity timing, and embedded system development practices; in the updated version of this software, the code has been modalized for additional efficiency, new if-else branches for cooling mode behaviors, and an innovative solution to the CC3220S board’s two-button interface in which the board will cycle to the next system mode when both buttons are pressed simultaneously that will effectively allow the software to behave as though there is a three-button interface. As anticipated, the Enhancement One: Software Design and Engineering artifact improvements have satisfied course outcomes #3, and #4 as the process of updating this Embedded Systems software focused upon the design and implementation of the AC/cooling mode feature without consideration for presenting to peers, coordinating updates with peers, or improving upon the security of the existing software. This software package displays competency in restrictive hardware environments making this program a perfect addition to my ePortfolio as an example of my Software Design and Engineering skillset.

Throughout the process of integrating the cooling mode update to the Emerging System Architecture artifact, I have been reminded of the importance of programming best practices. When initially developing this program in June 2024, I recall, learning how the CC3220S board’s thermopile stores temperature readings at three potential memory addresses along with how to retrieve and convert this data into degrees Fahrenheit. During the implementation of the update code to integrate a cooling mode, I learned that the simultaneous activation of the left and right board buttons could be coded as a separate trigger allowing for the system mode to be altered without compromising the individual functionality of the left button or right button that increase/decrease the set point temperature. Further, I sought to apply greater modulization and commenting of the code in this updated version of the thermostat program to increase efficiency, readability, and scalability. Development best practices took a core role in my designs for the cooling mode update to the Embedded Systems software artifact.