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Computer Science Capstone

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4-2 Milestone

Enhancement Two: Algorithms and Data Structure

In Category Two: Algorithms and Data Structure, I have chosen to update the user input security features for the Data Structure and Algorithms- Analysis and Design final project. This project was originally developed in April 2023 as a Binary Search Tree access program where the user will load a local .dat or .txt file with course object data and then the user may search for a specific course object as well as list all course objects loaded into the Binary Search Tree. This software package was selected since it shares an excellent example of data structures and algorithms along with opportunities to implement improvements to input security; The improvements that I’ve included in the updated software package are buffer overflow security for main menu selection input and course object search input. The final project of Data Structure and Algorithms- Analysis and Design allows for two opportunities to improve user input security for Category Two: Algorithms and Data Structure.

This series of updates met the anticipated course outcomes and presented a great learning opportunity. In this artifact’s updates, course outcomes #2, #4, and #5 are satisfied since the program’s comments have been updated to allow for a clear understanding of the programs operations, the implementation of updates was non-disruptive to the existing system along with robust and concise, and these updated focused upon buffer overflow control structures to help mitigate security flaws in the original software. Throughout the implementation process I was required to consider the expected algorithmic behaviors and functional limitations of the C++ language; further the design for these security algorithms needed to allow the software to examine each individual char input by the user through the keyboard to ensure that corrupt data will not be passed to the menu’s switch statement or the Binary Search Tree’s print/search course function. This assignment presented an excellent learning experience, and the anticipated course outcomes were fulfilled by the updates to this artifact.