// SNHU

// CS: 499 – Computer Science Capstone

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// MOD 4: Artifact Enhancement Narrative

// This is the narrative for the second artifact enhancement (Algorithms and Data Structures)

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

The artifact in question Project Two from the “Data Structures and Algorithms” course taken during my 6th term here at SNHU. It is a program written in C++, designed to be a course planner made for ABCU Computer Science department advisors.

This program organizes and prints various course information including course numbers, titles and their prerequisites. It utilizes a structure object to contain course information, and an unordered map as a hash table to store a course's number as its key. It allows users various menu options, including the ability to load course information from either a hardcoded array or a file, print a list of courses, and display the details of a course, including its prerequisites.

* **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 algorithms and data structure? How was the artifact improved?**

I selected this item primarily because it fit the criteria which determined what was allowed for the second category of artifact enhancements: Algorithms and Data Structures. Also, at the time of taking the course, I didn’t fully complete this project according to its rubric standards, so I wanted to not only complete it in its totality, but also go above and beyond what was expected to improve and enhance it.

As far as the specific skills and abilities in this category showcased by this artifact, I believe this enhancement demonstrates an ability to understand and improve not only the efficiency and time complexity of a specific algorithm, but also the program as a whole and how said algorithm works with the rest of the program.

The primary artifact enhancement consisted of a restructuring of the “loadDataFromFile” function to pull course information (number, title, prerequisites) from lines in a file and put them into a structure object using substring operations, instead of a vector. Consequently, the algorithm pulled course information in a single pass instead of multiple passes, which will reduce RAM usage.

In addition to this primary artifact enhancement, comments, function names and variables were made more descriptive where possible.

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

With the completion of this category’s artifact enhancement, I believe I did meet the third expected course outcome, which focuses on designing and evaluating computing solutions that solve a problem using algorithmic principles and computer science practices appropriate to its solution, while managing the trade-offs involved in design choices.

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

In the process of planning this artifact enhancement, I learned more in-depth about substring operations and how implementing them in a program can be more memory efficient when using large sets of data. In the case of this program, the use of substring operations instead of a vector to put data into a structure object means that large data sets can be used without slowing the user’s device down unnecessarily when loading data from a file.

As far as challenges go, every function of this program other than the main menu was difficult to build, and probably the most difficult aspect was figuring out how to find each comma in each line and assign parts of those lines to substring located between and after each comma.