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SNHU

CS-499 Computer Science Capstone

Enhancement Two: Algorithms and Data Structure

The artifact I chose for this enhancement is my **CS 465 Full Stack web application**. I originally built this project earlier in the program when I was learning how to create a server-side application using Node.js and Express. At that time, the focus was mainly on getting the pages to load and the routes to work. For this milestone, I used the same project but improved how it handles data behind the scenes, especially in the rooms feature where users can search, filter, and sort results.

I picked this artifact because it gave me a good way to show how I work with data structures and algorithms in a real application, not just in small exercises. The rooms feature now uses an array of objects and runs through several steps of logic to produce results. I added searching based on keywords, filtering by price and rating, sorting with more than one condition, and basic pagination. I also created a Map-based search index, which shows I understand how different data structures can help organize and look up data more efficiently. Another important improvement was creating a standard way to validate input before it gets processed. All of these changes show that I can think about how data moves through a system and how to make that process more structured and reliable.

Yes, this enhancement helped me meet the outcomes I planned to focus on earlier. I demonstrated that I can design and evaluate a computing solution using algorithmic thinking by

building logic that handles multiple conditions and steps. I also showed that I can use practical tools and methods that are used in real applications, like structured validation and service-based logic. These improvements also connect to security because handling input carefully helps prevent bad data from causing problems. Overall, I feel like this milestone clearly shows progress in the algorithms and data structures category.

Working on this enhancement helped me understand that a lot of the work in software happens in how data is handled, not just what users see on the screen. I learned how small design decisions, like how to structure a dataset or how to sort information, can change how an application performs. One challenge was trying to improve the logic without making the project too complicated. I had to remind myself to keep the changes meaningful and not overdo it. I also ran into a few bugs while adjusting the search and sorting, but working through them helped me get more comfortable following the flow of data in the app. Overall, this experience helped me think more carefully about efficiency and structure, which is something I know will be important in future projects.