### SNHU

### CS - 499

### Milestone 3 Narrative

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**Artifact Description**

The artifact I chose to enhance is the Rescue Animal System, originally developed in IT 145 and expanded in later courses. It began as a simple command-line program for intaking, reserving, and viewing animals in training. For this milestone, I focused on the algorithms and data structures within the program by restructuring it to use HashMaps instead of arrays. This change made searching, adding, and removing animals more efficient by allowing direct lookups through unique IDs.

**Justification for Inclusion**

This artifact demonstrates my ability to apply appropriate data structures to real problems. Moving from arrays to HashMaps improved performance and scalability as the system grew. I also refined filtering and searching logic with Java streams to improve readability. These changes highlight my ability to balance efficiency and maintainability while choosing the right tools for the task.

**Course Outcomes**

This enhancement aligns with my plan to demonstrate algorithmic principles and the use of efficient data structures. Replacing arrays with HashMaps reduced lookup complexity, and streams made filtering easier to read while still effective. The improvements show progress toward the outcome of designing and evaluating computing solutions that apply data structure and algorithm knowledge.

**Reflection on the Process**

Through this enhancement, I learned how much impact the right data structure has on performance and scalability. Arrays were functional in the original version but inefficient for larger datasets. Using HashMaps allowed faster lookups and cleaner management. A challenge I faced was keeping unique IDs consistent, which I solved by resetting the counter based on the highest existing ID. Overall, the process reinforced the importance of designing with growth in mind and gave me valuable practice applying data structures in a professional way.