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May 29, 2025

CS – 499

Milestone Three

The selected artifact is a Python-based application originally developed during my CS 340 Client/Server Development course. Designed to interface with a MongoDB database, the application enables users to filter and retrieve animal shelter data based on specific criteria such as breed or rescue type. This artifact was chosen for inclusion in my ePortfolio because it exemplifies the application of algorithmic logic and efficient data manipulation in a practical, real-world context. It demonstrates my ability to implement structured programming techniques and utilize appropriate data structures to enhance the functionality of a client-facing system.

The enhancement specifically focused on improving the search algorithm to increase both speed and relevance of results. I refined the data filtering logic, optimized data access methods, and introduced more efficient control structures to streamline performance. These changes directly align with Course Outcomes 3 and 4, which emphasize the implementation of efficient algorithms and the use of structured problem-solving techniques. I was able to meet these outcomes by analyzing and refactoring the existing search functionality, demonstrating proficiency in Python, and using an integrated development environment (IDE) to support iterative testing and performance improvement.

Through this enhancement process, I gained a deeper appreciation for identifying performance bottlenecks and the importance of incremental refactoring to maintain system functionality while enhancing efficiency. I also improved my understanding of how data access patterns and control flow influence runtime behavior. One of the key challenges I encountered was balancing improved performance with code readability and modularity. I addressed this by using PyCharm’s debugging tools and maintaining structured, testable logic throughout the enhancement. This experience strengthened my skills in debugging, optimization, and aligning technical solutions with user and system needs—core competencies essential for data-intensive roles in defense or analytics-driven environments.