Jean Agnus – Professional Self-Assessment
CS 499: Computer Science Capstone

As I complete my Bachelor of Science in Computer Science at Southern New Hampshire University, this capstone portfolio reflects my progress and growth in the field. It highlights the enhancements I made to my original dashboard project from **CS 340: Advanced Programming Concepts**, demonstrating the skills I've developed in software engineering, algorithm design, and database integration.

Growth Through the Program

When I began CS 340, I had limited experience in full-stack application development. By the end of the course, I had built a functional dashboard using Python, Dash, and MongoDB. This was a major turning point in my learning journey. Through this experience, I gained confidence in building user-facing features, designing backend logic, and integrating everything into a cohesive and maintainable system. I also learned the importance of code organization, documentation, and user-centered design.

Collaborating and Communicating

Although the project was individual, I practiced self-review, documented my code clearly, and shared ideas with peers through discussion boards. Creating my code review video for this capstone helped sharpen my communication skills, as I had to explain my code and improvement strategies clearly and professionally. These skills will benefit me when collaborating with teams or presenting technical work in the workplace.

Technical Mastery and Enhancements

My CS 499 enhancements focused on refining and extending my original CS 340 artifact. The three areas of improvement were:

> **Software Design & Engineering**: I restructured the codebase to improve modularity and maintainability. Components were separated into reusable functions and clearer files.
> **Algorithms & Data Structures**: I introduced a Binary Search Tree (BST) feature to allow fast lookup of animal records by name, demonstrating algorithmic thinking and data structuring.
> **Databases**: I added full CRUD (Create, Read, Update, Delete) functionality, allowing users to dynamically manage data from the dashboard interface using MongoDB.

Each enhancement aligns with one or more CS 499 course outcomes, showing my ability to apply design patterns, implement efficient algorithms, and handle backend integration securely.

Security Mindset

Even though CS 340 didn't emphasize security, my capstone enhancements reflect a security-aware approach. I added input validation, error handling, and checks to prevent crashes or unintended behavior. I also avoided hardcoding sensitive data and considered how to design for future scalability and secure data access.

Final Reflection

This capstone experience gave me the opportunity to revisit my work from CS 340 and elevate it to a professional standard. I now feel prepared to enter the workforce as a software engineer with confidence in my skills, a portfolio to showcase my work, and an understanding of what it takes to build real-world applications. My goal is to continue growing in this field, especially in backend development, data systems, and AI-enhanced software tools.

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