[CS-499-19912-M01 Computer Science Capstone 2025](https://learn.snhu.edu/d2l/home/2019781)

Professional Self-Assessment  
Eddy Kwon

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Throughout my Computer Science program at Southern New Hampshire University, I have developed both the technical foundation and professional mindset needed to succeed in modern software development. The process of building my ePortfolio allowed me to revisit previous projects, reflect on my growth, and refine my skills in software design, algorithms, and databases. This experience gave me the opportunity to see how far I have come as a developer and to transform my coursework into a representation of my professional readiness.

My capstone project, the Advising Assistance Program, is a C++ console application that helps students plan their course sequences using a structured, menu-driven interface. Over the course of the capstone, I enhanced this program through improvements in design, algorithmic logic, and database integration. These enhancements demonstrated my ability to approach a problem systematically and apply multiple areas of computer science knowledge to create an efficient, real-world solution.

One of my major improvements focused on software design and engineering. I refactored the original code to use class encapsulation, input validation, and structured error handling. This created a safer and more modular program that can be easily extended in the future. Designing with maintainability in mind taught me the importance of separation of concerns and reusable components, which are essential in professional software development.

In the area of algorithms and data structures, I implemented Kahn’s topological sort algorithm to generate a recommended course order based on prerequisites. This change significantly improved the logic and efficiency of the program, transforming what was once a simple data-reading project into an algorithm-driven application. Working through this process deepened my understanding of how algorithmic efficiency and proper data management can influence the overall performance of software systems.

For the database enhancement, I integrated an SQLite database into the program. This addition allowed the system to store, retrieve, and manage course information dynamically instead of relying solely on static CSV files. Through this process, I gained valuable experience connecting C++ programs with database layers, using SQL commands, and ensuring data integrity and security. It also taught me the importance of considering scalability and data persistence when designing real-world applications.

Completing this project required effective communication, organization, and problem-solving. The code review portion helped me practice explaining complex technical details in a way that would make sense to a team or supervisor, an essential skill in collaborative software environments. Managing my enhancements through GitHub and testing each improvement strengthened my ability to plan, document, and iterate like a professional developer.

Security awareness was also a key focus throughout the enhancement process. I learned to write code that anticipates possible vulnerabilities, validates user input, and manages files and database connections responsibly. This mindset has shaped the way I think about every line of code I write—ensuring reliability, safety, and trust in the systems I create.

Looking back, this capstone experience symbolizes the culmination of everything I have learned in the Computer Science program. It showcases my ability to design efficient software, implement algorithms, and manage data securely while maintaining professionalism and clarity in communication. Through this process, I have gained the confidence to contribute to real projects, collaborate effectively with others, and continue growing as a software engineer.