Dennis Ward

CS499

02/10/2025

Self-Assessment

Introduction

Before enrolling in my Computer Science program, I was already well-versed in programming, understanding how to structure applications and solve complex problems efficiently. My academic journey has reinforced my knowledge by exposing me to structured processes, industry-standard methodologies, and professional development tools. While I have always had strong problem-solving skills, my coursework introduced me to systematic software development practices and security principles that were new to me. The creation of my ePortfolio has allowed me to refine my technical skills and demonstrate my growth in software engineering, security, and database management. This professional self-assessment reflects on my experiences, key learning moments, and projects that illustrate my readiness for the industry.

Academic and Professional Growth

My coursework has expanded my perspective on software development by introducing structured development cycles, secure coding principles, and industry best practices. Courses such as **CS240 (Software Development Processes)** helped me understand systematic approaches to software engineering, while **CS320 and CS405 (Secure Coding and Unit Testing)** emphasized writing secure and maintainable code. My ongoing **CS465 MEAN project** has further enhanced my knowledge of full-stack web development, applying JavaScript frameworks and database interactions in a structured manner. Additionally, my **OpenGL project** required optimizing rendering calculations to maintain high frame rates, reinforcing my understanding of efficient computation.

Collaboration in a Team Environment

Collaboration was not a significant aspect of my academic experience due to the nature of the program. However, my professional background has provided ample experience working in team-based environments. As a **Process Technician at Quantum Plastics**, I was responsible for troubleshooting manufacturing processes and ensuring efficiency, which required constant collaboration with engineering teams and leadership. Additionally, I gained experience working with stakeholders while freelancing as a **DayZ mod developer**, where I engaged with users to understand requirements and improve functionality. My **StockSense** project illustrates my awareness of the importance of collaborative environments—while currently developed as a standalone application, its real potential lies in being a multi-user system, requiring a team-based approach to fully scale.

Communication with Stakeholders

Effective communication is essential in software development, and I have refined my ability to document and articulate technical solutions. My coursework in **CS240 (Software Development Processes)** emphasized working with stakeholders, product owners, and team members throughout a software development lifecycle. In **CS320 and CS405**, I learned the importance of clear documentation for secure coding and unit tests. In **Enhancement Two of StockSense**, I documented search optimization techniques, transitioning from **O(n) linear search** to **O(1) HashMap retrieval**, ensuring that technical decisions were clearly conveyed. Similarly, my **CS465 MEAN project** requires consistent documentation to ensure smooth API development and database integration. These experiences have reinforced my ability to communicate effectively with developers and non-technical stakeholders alike.

Data Structures and Algorithms

My ability to design efficient data structures and algorithms has been a key focus throughout my projects. In **Enhancement Two of StockSense**, I replaced inefficient list-based searching with **dual HashMaps**, significantly improving search performance. Additionally, my **OpenGL project** required implementing optimized data handling for rendering 3D objects, managing memory efficiently, and applying transformations in a structured manner. My **Pong and Snake** applications further refined my ability to write optimized code, as frame rate considerations required efficient calculations and streamlined logic. These experiences have solidified my ability to apply algorithmic principles in practical applications, balancing performance considerations with usability.

Software Engineering and Database Management

My academic journey has deepened my understanding of scalable software architectures and database management. Courses such as **CS240** introduced me to systematic development methodologies, while **CS465** provided hands-on experience with the MEAN stack, integrating MongoDB with front-end frameworks. In **Enhancement Three of StockSense**, I transitioned from **local SQLite storage** to a **Supabase cloud-based backend**, allowing multi-user access and secure authentication. This project required API integration, query optimization, and database security enhancements, all of which are critical to designing robust applications.

Security Considerations

Security has been one of the most valuable areas of learning for me, as I had little prior experience in this domain before my coursework. In **CS320 and CS405**, I learned best practices for secure coding and unit testing, ensuring applications are resistant to vulnerabilities. These principles were applied in **Enhancement Three of StockSense**, where I replaced insecure credential storage with **hashed password authentication** in Supabase. Additionally, I have implemented secure API interactions in my **CS465 MEAN project**, ensuring that data transfers follow industry security standards. Security remains an area of ongoing learning for me, and I am eager to continue expanding my expertise in this field.

Integration of Artifacts in the Portfolio

StockSense serves as the cornerstone of my ePortfolio, demonstrating my growth in software engineering, database management, and security. Originally developed as an inventory management application, it has undergone multiple enhancements to improve performance, scalability, and security. The first major improvement focused on modular UI design, introducing DbSelectionView and SearchViewActivity to separate concerns and improve maintainability. The second enhancement optimized search functionality, replacing inefficient list-based searching with **dual HashMaps**, allowing constant-time ID lookups and more efficient name-based searches. The final enhancement transitioned StockSense from a local SQLite database to **Supabase**, enabling multi-user access, authentication, and secure data management. These improvements showcase my ability to develop scalable applications, apply best practices in software architecture, and integrate security features to create robust and efficient software solutions.

Conclusion

My Computer Science program and the development of my ePortfolio have strengthened my problem-solving skills and exposed me to professional methodologies. While I entered the program with programming experience, formal education has refined my approach to software engineering, database management, security, and algorithmic problem-solving. Security, in particular, has been a major area of growth for me, and I look forward to continuing my learning in this field. These skills, along with my ability to communicate effectively and develop scalable applications, position me for success in the industry. I look forward to leveraging my experience and technical knowledge in future professional endeavors.