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CS-499 Computer Science Capstone

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Southern New Hampshire University

October 19, 2024

**Professional Self-Assessment**

**Introduction**

Completing the Bachelor of Science in Computer Science program at Southern New Hampshire University has been both a technical and personal journey of growth. When I entered the program, my experience was limited to basic coding assignments. Now, I am confident in planning, developing, and documenting complete software solutions. Through the creation of my ePortfolio, I have been able to demonstrate the skills I have gained in software design and engineering, algorithms and data structures, and database management. Three areas that represent the core of my professional capability as an aspiring software or backend developer.

**Growth Through the Program**

Throughout the degree, I learned how to analyze complex problems and translate them into maintainable, secure, and efficient software. Courses like CS-260 (Data Structures and Algorithms), CS-360 (Mobile Architecture and Programming), and CS-405 (Secure Coding) challenged me to think beyond simple functionality and focus on scalability, readability, and security.

The Weight Tracker App and Course Planner artifacts show this. Early in the program, I could build small applications that worked but were not optimized. By the capstone, I had refactored those projects using design patterns, encapsulation, and structured data management techniques. This improvement shows my ability to revisit, critique, and enhance existing work which is an essential habit for any professional developer.

**Collaboration and Communication**

Another thing I took away from the program was learning to collaborate effectively and communicate technical concepts clearly. Instructor feedback and the code review required me to explain design choices, document functionality, and provide constructive feedback. These skills directly relate to professional work, where developers interact with teammates, clients, and sometimes non-technical audiences. Like in CS-320 (Software Testing and QA), I collaborated on test cases and presented results using technical documentation that mimicked real-world QA reports. Those experiences improved my ability to write coherent and professional documentation which is an ability I now apply within my ePortfolio narratives and GitHub Pages presentation.

**Algorithms and Data Structures**

The Course Planner artifact from CS-300 shows my competency in algorithmic thinking. I implemented a data structure to efficiently store and search course information, demonstrating understanding of vectors, sorting algorithms, and search functions in C++. For my enhancement, I focused on improving algorithmic efficiency and input validation. This required critical thinking about computational complexity and user interaction, which aligns with Course Outcome 3, designing and evaluating computing solutions using algorithmic principles while managing trade-offs in design choices.

By optimizing data loading and applying structured parsing logic, I learned how algorithmic improvements can directly influence usability and performance, skills that will support my future backend development work, where data throughput and response times are critical.

**Software Engineering and Databases**

My Weight Tracker App, developed in Android Studio using Java, shows my ability to design structured and scalable mobile software. For the enhancement, I integrated a DataRepository layer to follow the Model-View-Controller (MVC) pattern and improved the DatabaseHelper class to include validation, error handling, and data persistence. These improvements show my understanding of separation of concerns, encapsulation, and reusability.

In the database category, I enhanced the SQLite implementation by introducing goal-tracking logic and shared preferences to store user goals locally. This provided hands-on experience with persistent data storage, queries, and CRUD operations which are all essential backend skills. These enhancements align with Course Outcome 4, demonstrating innovative techniques, tools, and practices that deliver value and meet real-world software goals.

**Security Mindset**

A consistent theme across my coursework and enhancements was security. Through CS-405 (Secure Coding), I learned how to identify vulnerabilities like SQL injection, improper input validation, and insecure data handling. When enhancing the Weight Tracker App, I applied those lessons by sanitizing inputs, enforcing validation rules, and preventing unsafe data storage. These changes align Course Outcome 5, which emphasizes designing software that anticipates adversarial exploits and ensures privacy of data and resources.

I now consider potential security flaws early in the design process instead of after development.

**Integration of Artifacts**

My artifacts complement each other to show my technical ability.

* The Weight Tracker App demonstrates front-end design, database integration, and software architecture.
* The Course Planner shows algorithmic logic, data structures, and efficient computation.  
  They both show how I can move between layers of software, from user interaction to data persistence, while applying structured, secure, and maintainable design principles.

**Professional Goals and Future Direction**

My short-term goal is to secure a backend or software developer position with Kohl’s, where I currently work in retail operations. My long-term goal is to specialize in cloud-based backend systems using technologies such as AWS Lambda, Spring Boot, and SQL/NoSQL databases. The skills developed through this program, particularly in data handling, algorithms, and secure coding, align directly with those responsibilities.

I also plan to pursue professional certifications in AWS Cloud Practitioner and Java Programming to strengthen my credentials and stay competitive. I would also like to strengthen my skillset further to be able to create fully developed applications that I can publish to the app stores like a workout app.

**Conclusion**

The ePortfolio is both a reflection of my academic journey and a bridge to my professional career. Each enhancement required me to think critically, solve problems, and apply industry standards to real software. These artifacts show my mastery of the five program outcomes and that I am prepared to enter the field of computer science as a thoughtful, capable, and security-minded developer. The process of building this portfolio has reinforced my confidence that I can contribute meaningfully to a professional development team.