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CS-499 Computer Science Capstone

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Module 7: Professional Self-Assessment

Introduction

Completing the Computer Science program at Southern New Hampshire University and building my CS 499 ePortfolio have helped me understand who I am as a developing computer science professional. When I began this program, I primarily envisioned myself as a future information security specialist. Through my coursework, projects, and capstone, my perspective expanded into a broader identity as a software professional with strengths in secure software engineering, algorithms and data structures, and database design.

This professional self-assessment introduces my skills, values, and goals and explains how my artifacts work together to meet the Computer Science program outcomes. It also connects my academic experience to my work as a United States Navy Hospital Corpsman, where I manage sensitive medical and radiation health data on a daily basis. Combining these two sides of my life prepared me to pursue secure software development and information security roles.

Growth Through Coursework and the Capstone

The Computer Science program provided a strong foundation in both theory and practical implementation. Courses such as CS 260, CS 320, CS 340, CS 360, CS 370, CS 405, and CS 465 helped me develop skills in software development, testing, secure coding, artificial intelligence, and full-stack application design.

The CS 499 capstone required me to revisit and enhance three major artifacts:

- CS 465 – Travlr Getaways Full-Stack Web Application

  Represents software engineering and design.

- CS 370 – Deep Q-Learning Treasure Hunt

  Represents algorithms and data structures.

- CS 360 – Android Weight Tracking App

  Represents database design.

Enhancing these projects helped me understand how to transform student coursework into industry-aligned portfolio pieces. It strengthened my professional identity and helped me prepare for secure software roles.

Collaborating in a Team Environment

While many capstone tasks were individual, the program as a whole taught me how to function in collaborative environments. Through discussions, peer feedback, and shared problem-solving, I learned how to adjust my work based on suggestions and explain technical decisions clearly.

My Navy experience also shaped my collaboration skills. As a Hospital Corpsman and Radiation Health Technician, I regularly coordinate with medical staff, ship leadership, and junior sailors. These responsibilities strengthened my ability to communicate professionally, track requirements, and support team decisions-skills that translate directly to software development workflows such as code reviews, sprint meetings, and stakeholder updates.

Throughout the capstone, I treated my instructor as a stakeholder. I interpreted feedback from milestones and refined my artifacts accordingly, similar to responding to guidance from a supervisor during a project cycle.

Communicating With Stakeholders

Professional communication was a major component of the capstone. My code review video required me to walk through existing code, explain functionality, and justify planned enhancements in a simple, structured, and understandable manner. This exercise mirrored real-world developer duties, where clarity and accuracy are essential during presentations and design reviews.

My enhancement narratives and this self-assessment further strengthened my technical writing. I learned how to adapt my communication for non-technical audiences and decision-makers. These skills will be essential as I move into secure software development or information security roles, where explaining risks and design decisions is a core responsibility.

Data Structures and Algorithms

My enhanced Deep Q-Learning Treasure Hunt project represents the algorithms and data structures category. In this project, a reinforcement learning agent navigates an 8×8 maze to reach a treasure. I enhanced key algorithmic components, including:

- Epsilon-greedy exploration strategy
- Experience replay buffer using queue-like behavior
- Batch training loop
- Time complexity and training trade-off analysis

These enhancements demonstrate my ability to apply algorithmic principles, reason about performance, and evaluate solution design choices using computer science standards. The project also deepened my understanding of reinforcement learning and neural network-based decision-making.

Software Engineering and Databases

1. Software Engineering – Travlr Getaways (CS 465)

For the software engineering and design category, I enhanced my Travlr Getaways full-stack web application. Improvements included:

- JSON Web Token (JWT) authentication
- Refactored architecture, separating routes, controllers, and services
- Better user experience and consistent UI patterns
- Enhanced maintainability and security
- Cleaner API structure

This project demonstrates my ability to plan, design, and implement full-stack solutions using modern tools such as Node.js, Express, Angular, and MongoDB.

2. Databases – Android Weight Tracking App (CS 360)

For the databases category, I enhanced my Android Weight Tracking App by:

• Implementing AES encryption for sensitive weight entries

• Applying SHA-256 hashing for account passwords

• Redesigning the SQLite schema for clarity and future scalability

• Adding CSV export functionality

• Integrating a graphical progress chart for improved user experience

These enhancements show that I can design secure, efficient, and user-centered data systems while applying industry-aligned practices.

Security Mindset

Security is a defining theme in my career goals. Across all artifacts, I demonstrated a security-first approach:

• Travlr Getaways: Secure authentication, protected routes, input validation, token handling

• Weight Tracking App: AES encryption, password hashing, safe queries, secure local storage

• AI Project: Understanding of stable decision-making systems, relevant to automation and cyber defense

My Navy background reinforces this mindset, as I work with sensitive medical and radiation health information that requires absolute integrity and confidentiality. I apply the same seriousness to software security.

How the Artifacts Fit Together

These three artifacts form a complete picture of my skills:

- Travlr Getaways Full-Stack Web Application - Software engineering and design
- Deep Q-Learning Treasure Hunt - Algorithms and data structures
- Android Weight Tracking App - Databases and secure mobile storage

Together, they demonstrate that I:

- Can collaborate and respond to feedback
- Communicate technical information professionally
- Apply algorithmic thinking to real problems
- Use modern development tools and architectures
- Build systems with security as a core requirement

Conclusion

My CS 499 capstone and ePortfolio represent the culmination of my academic journey at Southern New Hampshire University. I grew from someone interested only in cybersecurity into a complete computer science professional who understands how secure software design, algorithms, databases, and communication work together.

As I move forward, I will use my ePortfolio to pursue positions in secure software development, information security, or related fields. I also plan to strengthen my professional credentials by pursuing certifications such as CompTIA Security+. Most importantly, I will continue applying the habits of secure design, clear communication, and lifelong learning that I developed throughout this program and in my Navy career.