**Professional Self-Assessment**

Brandon Stallons

Professor Bryant

CS-499-13403-M01 Computer Science Capstone 2024 C-5 (Sep-Oct)

October 9, 2024

**Introduction**

I first enrolled at Southern New Hampshire University (SNHU) in the fall of 2020 after previously stepping away from college twice due to the challenges of balancing work, in-person courses, and life in general. SNHU's online computer science program provided me with the opportunity to pursue a college degree without making any major sacrifices on any other obligation. Over the past few years, I have gained more knowledge than I initially expected, and I have found a career that I truly enjoy. The computer science program covered many different topics, starting with the fundamental programming best practices all the way to advanced subjects like machine learning and artificial intelligence. I was also able to work with multiple programming languages, such as Python, C++, Java, and CSS. Completing my ePortfolio as part of my final course at SNHU is the culmination of a goal that once seemed so far away, and now that it is almost over, it feels both surreal and extremely rewarding.

**Showcasing Strengths and Professional Development**

I believe the computer science program at SNHU is structured to better simulate real-world scenarios, which allows students to demonstrate their skills and strengths much more effectively. The coursework was not just about coding assignments but involved full-fledged projects that simulated professional environments. This approach has been instrumental in shaping my professional goals and values and has prepared me to enter the computer science field or any other field with much more confidence.

**Collaborating in a Team Environment and Communicating with Stakeholders**

Many of the computer science program courses relied on scenarios to emulate collaboration in a team environment. Personally, I did not have courses involving real-world collaboration beyond the basic discussion posts. In light of this, by combining the given scenarios with my work experience in technical team settings, I was able to further refine my collaboration skills. For example, I was a part of a team that performed laboratory testing for oil field companies. These tests could run for many days and collaboration was essential for meeting requirements and gathering accurate data. Similarly to collaboration, the courses provided scripts and scenarios to simulate stakeholder communication. The course work always highlighted the importance of conveying and gathering technical information clearly and effectively. Based on experience communicating with stakeholders on various work projects and across different jobs, I was able to actually apply these lessons in a real-world setting. One example of this was when I was tasked with presenting a series of test results to a major client and their partners. I had to take highly technical information and arrange it in a way that allowed the presentation to be understood by individuals with different levels of technical knowledge.

The blending of my professional experience with the various scenarios presented in the courses reinforced the significance of efficient collaboration and communication while polishing the skills and abilities I had already started to develop. The computer science program highlighted how these abilities contribute to project success, preparing me to work efficiently in team environments and communicate accurately with stakeholders in my future career.

**Data Structures and Algorithms**

Throughout my time at SNHU, particularly in CS-300 Data Structures and Algorithms: Analysis and Design, I developed strong analytical and problem-solving skills in data structures and algorithms. I became capable of working with vectors, hash tables, and trees to design solutions to complex problems. For example, for the final project of this course, I was tasked with creating an advising assistant program for students to view courses and their prerequisites, I used complex data structures and advanced algorithmic designs to meet all client requirements. This experience also enhanced my ability to perform run-time analyses and select optimal algorithms, which ensures that software applications operate efficiently and effectively.

**Software Engineering, Database and Security**

I have gained skills in software engineering, database management, and security throughout the computer science program, specifically in courses like CS-360 Mobile Architecture and Programming. For instance, I developed a mobile application, from the ground up, that allows users to register, login, set a goal weight, and add daily weights. In this project, I employed secure database practices to securely store user data. I employed bcrypt for password hashing to safeguard user data and developed secure query techniques through parameterized queries and user input validation to help prevent any SQL injection attacks. I concentrated on preserving user privacy by only requesting permissions that are needed for the application to function as it should. For this project, the user has the ability to refuse the request, and I only require permission for SMS messaging. This stops inappropriate access to user device functions including camera and audio. This demonstrates my ability to integrate essential security measures throughout the development process, which resulted in a user-friendly applications that prioritize both functionality and the protection of user data.

**Preparation for the Industry**

Finishing the courses in the computer science program and creating my ePortfolio has greatly enhanced my employability within the computer science field. The experience gained from the real-world mimicking projects has prepared me to tackle the issues of this field effectively. Managing online coursework alongside personal obligations has significantly improved my time management and self-discipline, which are traits that are essential for any working environment. My ePortfolio not only demonstrates my technical skills and abilities but also illustrates my journey of growth, perseverance, and commitment to lifelong learning.

**Artifacts and Portfolio Integration**

The artifacts in my ePortfolio collectively demonstrate a wide range of skills and abilities across three core categories: software design and engineering, algorithms and data structures, and databases with a focus on security.

* **Artifact One:** The first artifact shows my skills and abilities in software design and engineering. I transformed a basic script into an intricate text-based game by enhancing its complexity to demonstrate software design and engineering skills. This project required a complete refactoring and the addition of new features, which accurately shows my ability to expand a project's scope and functionality in a way that greatly improves every aspect of an existing project.
* **Artifact Two:** The second artifact demonstrates my proficiency in algorithms and data structures. By enhancing an Android application that allows users to set and track personal weight goals, I implemented a singleton pattern to keep data access consistent and incorporated caching to reduce database queries, which improves the application's efficiency by storing frequently accessed data.
* **Artifact Three:** The third artifact highlights my skills in database integration and security. Building upon the first artifact, I integrated a MySQL database to manage user information securely, including usernames, hashed passwords, and win/loss statistics. I used bcrypt for password hashing in order to reinforce the application's security. I also used safe query practices by using parameterized queries and validating user inputs. Additional features like a leaderboard and difficulty levels were added to enhance user engagement and to demonstrate my ability to implement complex functionalities.