CS-499 Computer Science Capstone

Module 4-1 Journal: Career Choice and Artifact Update

Southern New Hampshire University

Stephen Owusu-Agyekum

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**PART ONE**

I started the SNHU computer science program in 2021 to become either a software engineer or cybersecurity professional. These career plans are listed in order of priority. I chose the BS in computer science program because it is versatile, which gives us different career options after getting the degree. These two career plans were my main goals of pursuing the Computer Science program, and I remain committed to pursuing one of them in my master's degree level.

For now, my original career plans have not changed, and since I cannot combine all two career plans simultaneously but consider one, my current goal is to focus on the software engineering field and push forward and make it my career. Numerous factors have influenced my decision, including this CS-499 course, which has enlightened me about being a software engineer. Also, the increasing reliance on software in various industries has led to a high demand for software engineers. The abundance of job opportunities and the prospect of a stable and lucrative career have attracted me to pursue software engineering. Applying the knowledge and skills I have acquired throughout the computer science programs has helped me solve real-world problems. It has offered me a valuable opportunity to develop technical and professional skills further, gain practical experience, and prepare me for successful careers in software engineering and related fields. According to one article I read titled "How Software Practitioners Perceive Work-Related Barriers and Benefits Based on Their Educational Backgrounds," "Software engineering (SE) discipline is considered to be one of the most critical computing disciplines whose global demand continues to reach new levels" (Ünlü et al., 2023).

A career in software engineering is a fast-evolving discipline that offers professionals possibilities and challenges. Constant learning, upgrading skills, and a readiness to adopt new methods and technology are necessary to adjust to these changes. Software engineering is

constantly changing due to the speed at which new technologies are developed. “As upcoming software engineers, we have had to adjust to new tools, languages, frameworks, and concepts since the introduction of object-oriented programming, the development of the internet, and the advent of cloud computing, big data, and artificial intelligence” (Dorin et al., 2019). The combination of my interests, career prospects, intellectual stimulation, creativity, flexibility, and the opportunity to make a positive impact has influenced me to pursue a career in software engineering. I must continuously adjust to the current and future advanced technologies by taking additional professional courses and participating in on-the-job training.

I have conducted several research studies in my career in software engineering. Software engineering research has shaped and informed me of the practices, tools, and principles that software engineers rely on to develop high-quality software solutions. When I stay current and informed about the latest research findings and innovations, I can enhance my skills, improve my practices, and advance the field. The research focused on new tools, frameworks, libraries, and platforms that enable software engineers to build more efficient, reliable, and scalable systems.

It's clear to me that a successful career in software engineering requires a strong foundation in programming languages such as Python, Java, C++, HTML, CSS, and others. Recognizing this, I am committed to enhancing my programming skills. I plan to take additional courses and classes to learn and upgrade myself in these programming languages. My ultimate goal is to pursue a master's degree in computer science with a concentration in Software engineering, which will further solidify my skills and knowledge in this field.

With a master's in computer science, I will have a solid foundation in knowledge and abilities that I may use in various software engineering professions and sectors. A master's in computer science focusing on Software Engineering can benefit my professional development

since it will provide me with the knowledge, abilities, and credentials I need to thrive in this quickly developing and in-demand industry. The master's program in computer science will provide me with advanced coursework and practical projects that will aid in developing technical skills relevant to software engineering. These skills include familiarity with software development tools and frameworks, mastery of programming languages, and experience working on complex software projects.

The course outcomes I have achieved so far would include the following:

- “Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.”
- “Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.”
- “Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution while managing the trade-offs involved in design choices.”

There are two more course outcomes that I have not met yet. I hope to meet these two remaining course outcomes as we proceed through the remaining modules.

These include:

- “Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.”

- "Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources."

**PART TWO**

***Category One Artifact:*** **CS-370 Current and Emerging Trends in Computer Science**

Based on my feedback, I have improved my code for this category, Software Design and Engineering. I have added comments to each line of code to make it easier for me and other developers to grasp the functionality, purpose, and implementation details of each line of code in the future. I have also addressed the issue of inconsistent names of variables. I have also refactored the code by breaking it into smaller functions to enhance code readability, maintainability, and scalability. I have performed the final review, and it is ready to submit or upload it to my ePortfolio.

***Category Two Artifact:*** **CS-360 Mobile Architecture and Programming**

I have improved the error handling for the category two artifacts, algorithms, and data structures but still need more room for improvement, which I am working on. I have improved user authentication functionality by creating a login interface with username and password buttons. I have also addressed the inconsistency in the name of my package. I have enhanced the commenting style and documented comments in each line of code where necessary. I have fixed the errors I found in the code initially; now, when I compiled and ran the code, I found no errors. It runs and produces the expected inventory mobile app with the user interface and login button. It needs some additional polishing, which I am still working on before I submit it to my ePortfolio.

***Category Three Artifact:*** **CS-465 Full Stack Development I**

For this category, Databases, I have enhanced the user interface of the travel website, and we can now clearly see the homepage and the website logo. I have created user authentication that includes login and logout interfaces. I am almost done creating user account registration features where users can create an account with a username, email address, and password and use it to access the website. I have been doing a lot of work on this artifact and needed to add some additional features to make it function well. I have also added an **"Edit, Add, and Delete"** button on the website where users can change their account information. I aim to improve the website's security features so guests who access the website cannot access other users' accounts to make any updates.

I have built the back-end express web app and have completed the Single-Page Application (SPA) setup, a different approach to web-based applications that help users deliver the web page, images style sheet, and the application code to the client. I also built RESTFUL API on the server side to receive and send data from the SPA to the back end. To make things easier for other developers to follow, I have added comments to some of the code components. I have also refactored the code to make it more readable and organized. I have also finished most of the improvements I wanted to make to this artifact. I look forward to working on the remaining last sections to fulfill the artifact requirement by module five before transferring it to an ePortfolio.

## Checkpoint Table

| Checkpoint | Software Design and Engineering | Algorithms and Data Structures | Databases |
|---|---|---|---|
| **Name of Artifact Used** | **Artifact name:** Treasure Hunt Game: Human Brain and Artificial Neural Network<br>**Origin:** CS 370: Current/Emerging Trends in Computer Science | **Artifact name:** Android Mobile App – Inventory App<br><br>**Origin:** CS360 Mobile Architect and Programming | **Artifact name:** Traveler Website<br><br>**Origin:** CS465: Full Stack Development I |
| **Status of Initial Enhancement** | Enhancements completed | Enhancements completed | Working on enhancement but on track for the submission deadline with a day to spare for issues |
| **Submission Status** | Submitted with feedback from the instructor | Submitted with feedback from the instructor | Planned but not yet completed |
| **Status of Final Enhancement** | Feedback was applied, and the final polish was applied | Feedback was applied, and the final polish was applied | Planned but not yet completed |
| **Uploaded to ePortfolio** | Completed with polished narrative and confirmed navigation on GitHub Pages site | Planned but not yet completed | Planned but not yet completed |
| **Status of Finalized ePortfolio** | Ready for review in Module Seven | Planned but not yet completed | Planned but not yet completed |

References:

Unlu, H., Yurum, O. R., Ozcan-Top, O., & Demirors, O. (2023). How Software Practitioners Perceive Work-Related Barriers and Benefits Based on Their Educational Backgrounds: Insights From a Survey Study. IEEE Software, Software, IEEE, IEEE Software, 40(5), 66–75. https://doi-org.ezproxy.snhu.edu/10.1109/MS.2023.3270959

Dzerzhinskiy, F., & Raykov, L. D. (2015). What Is Software Engineering?

Dorin, M., Machuca, J. M., & Montenegro, S. (2019). Teaching Software Engineering to Career-Changers. 2019 IEEE World Conference on Engineering Education (EDUNINE), Engineering Education (EDUNINE), 2019 IEEE World Conference On, 1–5. https://doi-org.ezproxy.snhu.edu/10.1109/EDUNINE.2019.8875781

Institute of Data. (2024, March 20). Is software engineering the right career path for me? | Institute of Data. *Institute of Data*. https://www.institutedata.com/us/blog/software-engineering-career-pathways/

Writers, S. (2024, March 26). What is a software engineer? | Skills and career paths. *ComputerScience.org*. https://www.computerscience.org/careers/software-engineer/