**CS 499 Professional Self-Assessment**

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I have been in SNHU’s B.S. of Computer Science program since the summer of 2019. During this time, I’ve participated in courses and projects that range from CS 310 Collaboration and Team Project, where we worked together as a class to use versioning, group repositories, and code reviews to work on a software application as a group, to CS 250 Software Development Lifecycle, where I participated in each stage of the SDLC. I have learned how to design affective software for specific purposes, construct algorithms and deploy data structures that complete complex tasks with a relatively short amount of code, and create, read, update, and delete items from databases. To showcase these skills, I enhanced three of my past projects, or *artifacts*, which are a bank application, a program that stores and sorts bid data, and a database with three tables where a full gamut of CRUD commands were used.

To justify why I chose these projects, I should first discuss what the course requirements are and where my interests and career plans lie. First, we were to select one artifact from each of three categories: software design/engineering, algorithms and data structure, and databases. Also, we needed to demonstrate our ability to collaborate in a team environment, affectively communicate to stake holders, and develop a security mindset. During my experiences as a computer science major, and after some of my own research, I’ve determined that I would focus my career plans on data analysis and data science. Data analysis requires skills related to database querying, an understanding of certain programming languages, such as SQL and Python, and the skills required to report findings, such as an ability to perform statistical analysis and create visual representations of data (Grupman, C., 2022). The skills required of data scientists are similar, yet often require more advanced knowledge of mathematics, SQL as well as NoSQL languages (such as MongoDB), and an understanding of machine learning algorithms (Berkeley Extension, 2022). There are other projects that I have worked on that demonstrate skills related to data analysis and data science, such as my final project for MAT 243 Applied Statistics for STEM, where I used Python to perform statistical analysis on the NBA basketball team, the “Wizards”, team performance data set. However, for this ePortoflio, I chose the three projects that I thought would best highlight my skills in the three computer science areas mentioned, as well as skills related to data science and data analysis.

The first artifact enhancement that I chose was the source code for a bank application, where I reconstructed the C++ program using Python. This enhancement allowed me to 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. This includes creating user-defined functions for modularity, using exception handling to decrease the presents of bugs and secure the software, in-line code comments that are descriptive of the functionality of each module, and running and testing the code on a Python 3.6.6 Shell. This enhancement, as it was written in Python, has also highlighted my skills in a programming language that is used in data analysis and data science.

The second artifact enhancement that I chose was the storing and sorting bids program, which was written in C++. The original program used chaining and a hash table data structure to store bids. To demonstrate my skills in constructing adequate algorithms and data structures, I increased the functionality of the program by adding vector sorting to sort the bids in ascending order. Working on this enhancement has also allowed me to demonstrate an ability to 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, as I was able to add two different working sorting algorithms and resolve a data structure related issue by adding a second vector and allowing the user to decide when to use the second data structure. While I have not had the opportunity to learn machine learning algorithms yet, I plan on continuing my education in the future, and am hoping that I can apply what I’ve learned about data structures and algorithms to work on more advanced algorithms, such as machine learning algorithms, as such knowledge is important to the field of data science.

The third artifact enhancement that I chose was the QuantigrationUpdates Database enhancement. The original project consisted of creating a three tabled database with MySQL, querying that database, updating it, deleting records from it, and downloading a table from it. My enhancement of this was to achieve the same functionality using MongoDB, a popular NoSQL language, along with adding user authentication. Working on this artifact has allowed me to 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, as I was able to create a database with three collections, query the database for information, update fields in the database, delete items from the database, and download a collection from the database while using a local MongoDB Enterprise Server 6.0 and a MongoDB shell. Working on this artifact enhancement has also shown my ability to apply CRUD capable commands and queries in both SQL and NoSQL based languages to databases, which is a useful skill in both data analysis and data science.

While working on these artifact enhancements and constructing my ePortfolio, I was also able to demonstrate the ability to work in a way conducive to a collaborative environment, communicate with stakeholders, and ensure software security. My ePortfolio webpage gives access to my public GitHub page, where one can find, access, download, and, potentially, contribute to the page. I’ve also included explanations, code comments, and data sets for the benefit of any visitors. I’ve also developed oral, visual, written communication in the form of a screencast video of my artifacts’ code review, flowcharts and UML diagrams of my artifacts and their enhancements, narratives accompanying the artifact enhancements, and readme documentation where appropriate. I’ve also worked on exception handling to reduce the affects of bugs in the first two artifacts’ software, as well as password-secured user authentication for my QuantigrationUpdates Database, both of which demonstrate a security mindset when it comes to working with code.

**References:**

Grupman, C. (2022). 8 Data Analyst Skills Employers Need to See in 2022. *Dataquest.* <https://www.dataquest.io/blog/data-analyst-skills/>

Berkely Extension. (2022). 11 Data Scientist Skills Employers Want to See in 2022. *Berkely Extension.* <https://bootcamp.berkeley.edu/blog/data-scientist-skills/>