**Milestone Two Narrative**

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CS 499: Computer Science Capstone

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The artifact that I selected for the Software Engineering and Design category is from the CS 360: Mobile Architecture and Programming course that I attended in September 2024. I chose this project from a list of projects and developed it into a simple weight tracking app in an Android environment using Java. This app is designed to take manual inputs from the user for the date, their height, and their weight, and calculate their BMI. Users can track their weight and BMI over time and can update or delete entries as they choose, using an SQLite database.

This artifact was chosen for the Software Engineering and Design category because it represents my understanding of software development and design. I also wanted to showcase my ability to improve a piece of software with these planned enhancements. For this category, I chose to focus on improving and expanding the original code to clearly demonstrate my knowledge of software engineering principles. The enhancements chosen not only improve the user experience but also clean up the original code and make it more secure and reliable. I implemented password hashing using SHA-256 to address security concerns, added validation for user input before entries were sent to the database to prevent data corruption, removed the full reloads that were occurring to entries to increase performance, added confirmation to entry deletions for user experience, and documented the code more thoroughly using JavaDoc and in-line comments for readability.

For the purpose of answering this question, I have included the course outcomes listed in the module 1 assignment:

1. Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.
2. Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.
3. 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.
4. 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.
5. 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.

I met course outcome 2 by improving the documentation within my code with JavaDoc and in-line comments. Course outcome 3 was supported by evaluating and improving the input validation prior to sending data into the database. Course outcome 4 was demonstrated through my use of RecyclerView.Adapter, AlertDialog, and MessageDigest by delivering value and implementing solutions. Course outcome 5 was fulfilled when I hashed passwords with SHA-256 by enhancing the security of user data. Course outcome 1 focuses on collaboration, which is not currently relevant to my project. I will meet course outcome 1 once my ePortfolio is complete and ready for others to view.

I found enhancing code to be incredibly humbling as well as informative. I embrace criticism and see it as a tool to improve myself and my skills. Working through this artifact to find strengths and weaknesses showed me how important it is to perform code reviews. Small design decisions make a bigger difference than I thought, for example, using notifyItemInsterted() rather than reloading a whole list of entries and validating user input before sending it to the database. Such small changes have a huge impact on reliability and performance, and providing clear documentation to these changes make the code easier to read and understand. The biggest challenge I faced was making these changes without affecting the ability for my code to run without error. A great example of one challenge is when I updated the logic for hashing passwords. I had to upgrade the registration logic as well as the login logic and debug to ensure everything was running smoothly. This assignment provided me with an exciting new interest in improving my code and strengthening the knowledge I already had.