Nicholas Pellegrini

CS-499 Computer Science Capstone

4-2: Algorithms and Data Structure Enhancement Narrative

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The improvements I made show my growing skills with algorithms and data structures in practical ways. I implemented sorting that lets users view their weight entries by date or by value, which required me to really understand how to efficiently organize data. The averaging features were trickier than I expected because I had to account for days when users didn't log anything, making sure the app wouldn't show misleading information. Creating the text-based visualization using simple bars taught me how to represent data proportions without needing complex chart libraries.

When I started this enhancement, I mainly wanted to demonstrate I could work with algorithms and innovative techniques. I definitely achieved that, but the process taught me so much more. I hit a major roadblock when the app kept crashing because of database issues, which forced me to learn about proper database migrations - something I hadn't even considered when planning this enhancement. Working through those problems gave me much deeper appreciation for how important it is to structure data correctly from the beginning.

The most valuable lesson came from seeing how small algorithmic decisions impact the user experience. Things like choosing to calculate averages directly in SQLite rather than in Java made a noticeable difference in performance. I also learned how to handle edge cases, like what happens when someone first starts using the app and doesn't have much data yet. These practical challenges were different from the theoretical problems I'd solved in class, and working through them helped me understand how to write code that's both efficient and robust.

This project changed how I think about data in apps. It's not enough to just store and display numbers - the real value comes from processing that information in ways that help users understand their progress. The skills I developed here, especially around data analysis and visualization, will be incredibly useful as I work on more complex applications in the future. What began as a simple enhancement to demonstrate course competencies ended up being one of my most valuable learning experiences in practical algorithm design.