5-2 Milestone Four: Enhancement Three: Databases

Narrative

CS-499-Computer Science Capstone

Randy Ramos

June 8, 2025

1. Briefly describe the artifact. What is it? When was it created?

The NuMe app is a straightforward weight-tracking mobile application designed for users seeking an easy way to monitor their weight goals. The concept was developed during the September/October term of 2024. The app features a simple UI that allows users to interact with the following:

- Log daily weights
- Set and monitor a goal weight
- Be notified when they reach their target via SMS

2. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in software development? How was the artifact improved?

I chose the project from CS-360 Mobile Architecture and Programming as my artifact because it was a project I was very excited about. I was intrigued by what was involved in creating a usable application, even though it was Android-based. From the UI setup, using XML for layout design, to the various Java files that separate the UI logic, it was a fun and valuable learning experience. I also enjoyed using Android Studio, as it resembles other IDEs, such as Eclipse and NetBeans, which added a nice level of familiarity to the process. The NuMe mobile application was developed as part of a project during the September and October 2024 term. Although it met all the assignment criteria, it was, of course, incomplete, and I felt it needed lots of improvements. Additionally, there were plenty of user issues that needed to be addressed. This has provided an excellent opportunity to address some of those issues and implement the planned enhancements. For milestone four, I had the opportunity to enhance the user experience through enhancements to the SQLite database.

This was achieved by enhancing some of the issue the database had, for instance, there was no user historical tracking of goals, the old goal weight was lost if user changes their goal. Additionally, there was no auditing or logging mechanism that existed for user goal attempts or when they reach their goals. Therefore, the enhancement was to create a new goal_history table. The enhancement would allow the database to log every new goal set, and track when that goal is achieved. This adds data integrity and traceability, which are important database best practices.

3. Did you meet the course outcomes you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?

   With this addition, I have achieved the outcomes initially planned in my enhancement plan for, Databases. I did a good job in Module One, recognizing enhancements needed to databased to achieve this goal. Therefore, no update has been made to the outcome coverage plan. For example:

Course outcome:

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.

   Outcome met by:
   Implementing advanced database techniques

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.

   Outcome met by:
   Provided secure data storage and integrity by adding traceability

6. **Reflect on the process of enhancing and modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?**

Reflecting on the enhancement, when touching on SQLight databases I increased my understanding of avoiding SQL injection, for example I was reminded how databased can be susceptible to SQL injection attacks. Therefore, an example of a good practice is to use the WHERE clause substitution arguments in all SQLiteDatabase methods. Additionally I was also reminded of difference when using rawQuery() and execSQL(). Overall the enhancement was for my database was not to challenging, because I think it had a good foundation from my previous work. However, upon evaluation, it became evident that there were missing features. For example, the app had no historical tracking of goals existed therefore is the users changes the goal weight the old one was lost, leaving the app with no auditing or logging mechanism. Over all there were not many challenges with this enchantment. What I liked about this enhancement is that now when the user reaches their goal, the system will automatically update the goal_history table to set the achieved date. Additionally, this introduces historical tracking and opens the door to potential future enhancements like a screen for goal history view."