

CS 499

Narrative

The artifact selected for Milestone Four is my Event Tracker Android Application, originally developed during my Android development coursework. The purpose of the application is to allow users to create, update, store, and manage scheduled events using a mobile interface supported by a local SQLite database. The application includes user authentication, event entry forms, CRUD (Create, Read, Update, Delete) functionality, and dynamic data display through a RecyclerView component. While the original version demonstrated functional database connectivity, this milestone focused on strengthening the database design, improving data validation, optimizing queries, and enhancing security controls.

I selected this artifact for my ePortfolio because it demonstrates practical implementation of database concepts within a real-world mobile application. The application integrates structured relational storage using SQLite, schema design through a database helper class, and SQL queries to manage persistent event data. These components showcase my ability to design and implement database-backed systems that support application logic. During the enhancement phase, I refined the schema design to improve data integrity, implemented stronger input validation before database insertion, and optimized query execution to reduce unnecessary database calls. I also improved exception handling to prevent application crashes due to malformed input or failed transactions. These improvements demonstrate my ability to program solutions for storing, manipulating, and retrieving structured data efficiently.

One significant enhancement involved strengthening data validation and enforcing consistency before executing SQL insert and update operations. In the original implementation, certain fields could potentially accept incomplete or improperly formatted data, which could lead to inconsistent database states. I implemented validation checks at both the UI and database layers to enforce constraints prior to committing transactions. Additionally, I reviewed query structure to eliminate redundant calls and ensure that data retrieval was performed using efficient selection conditions. I also implemented defensive programming techniques to check database availability and handle potential null cursor returns safely. These modifications illustrate my understanding of secure database interaction and the importance of preventing structural and logical vulnerabilities.

Through this milestone, I demonstrated progress toward several program outcomes. I strengthened my ability to use well-founded techniques and tools in computing practices by improving relational database implementation and integrating secure coding standards into database operations. I also advanced in designing computing solutions that manage trade-offs between performance, maintainability, and data integrity. Furthermore, by incorporating stronger validation and structured error handling, I reinforced the program outcome of developing a security mindset that anticipates vulnerabilities in software architecture. Although this milestone primarily addresses database competencies, it also supports software engineering and algorithmic design outcomes by reinforcing structured data flow and logical organization.

Reflecting on the enhancement process, I learned that effective database design extends beyond simply writing SQL queries. It requires anticipating how data will evolve over time, protecting against invalid states, and ensuring consistent relationships between application layers. One challenge I encountered was balancing performance optimization with code readability. While

consolidating queries improved efficiency, it required careful restructuring to maintain clarity. I also recognized the importance of testing edge cases, such as empty datasets, failed transactions, and unexpected user input. Addressing these cases improved both reliability and security.

Enhancing the database functionality of the Event Tracker Android Application deepened my understanding of relational database integration within mobile environments. This artifact demonstrates my ability not only to build a functioning application but also to critically evaluate and improve database architecture, data integrity, and secure data handling practices. These competencies directly support my long-term goal of developing secure and reliable software systems and contribute meaningfully to my professional ePortfolio.