CS 499

Narrative

The artifact selected for this milestone is my Event Tracker Android Application, originally developed during my Android development coursework. The application allows users to create, edit, store, and manage scheduled events using a structured interface and persistent storage. It includes user authentication, event input validation, and dynamic data display using a RecyclerView. While the application was initially designed to demonstrate full-stack Android functionality, including SQLite database integration and UI design, for this milestone I focused specifically on enhancing the algorithmic logic and data structure implementation within the application.

I selected this artifact for my ePortfolio because it demonstrates practical implementation of data structures and algorithmic problem-solving within a real-world mobile application. The application relies heavily on structured data management, including the use of lists to store and manipulate event objects, adapter patterns for dynamic UI rendering, and database-backed retrieval algorithms to manage persistent data. In its original form, the application successfully stored and retrieved event data but lacked optimized data handling and advanced logical structuring. During my enhancement phase, I improved the efficiency of event retrieval and sorting mechanisms, refined the logic used in filtering event records, and restructured portions of the code to reduce redundancy and improve time complexity where possible.

One key enhancement involved improving how event data is loaded and displayed in the RecyclerView. Initially, the application performed repetitive database calls and inefficient list

traversals. I refactored this logic to reduce unnecessary iteration and ensure that data retrieval occurs in a more structured, predictable manner. I also improved conditional logic handling within event validation processes to prevent inconsistent data states. These improvements demonstrate my ability to evaluate algorithmic trade-offs, such as balancing readability with efficiency and deciding when to shift logic from the UI layer to structured backend processing. Additionally, I reviewed and strengthened loop termination conditions and boundary checks to reduce potential logical flaws or runtime exceptions.

Through these enhancements, I demonstrated progress toward the program outcome of designing and evaluating computing solutions using algorithmic principles and computer science practices. I applied structured problem-solving techniques to analyze inefficiencies, improve list traversal logic, and refine data manipulation processes. Furthermore, I strengthened my understanding of how data structures directly impact application performance and maintainability. While this milestone primarily supports the algorithms and data structures outcome, it also contributes to software engineering and security outcomes by reinforcing structured design principles and defensive programming practices.

Reflecting on the enhancement process, I learned that algorithmic improvements are not always about introducing complex data structures but often about refining existing logic and eliminating inefficiencies. One challenge I faced was ensuring that performance improvements did not negatively affect readability or maintainability. In mobile development especially, balancing responsiveness with clean architecture is critical. I also recognized the importance of anticipating edge cases, such as empty datasets, invalid user inputs, and unexpected state transitions. Addressing these issues strengthened my ability to think critically about how data flows through an application.

Overall, enhancing the Event Tracker Android Application deepened my understanding of how algorithmic design influences user experience, maintainability, and system reliability. This artifact demonstrates not only my ability to build functional applications but also my ability to analyze, evaluate, and improve algorithmic logic using established computer science principles. These skills directly support my long-term professional goal of developing secure, efficient, and well-structured software systems.