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CS 499 Milestone Four Narrative – Databases (Event Tracking App)

**Artifact Description**

The item I have chosen for the database category is my Mobile Event Tracking App, which I developed during CS 360: Mobile Architecture and Programming. This Android application enables users to create, view, and manage events via an intuitive interface. The main functionality is supported by a database backend comprising tables for users, events, and metadata. The app performs essential database operations —inserting, updating, and querying records — to efficiently manage user-generated event data.

**Justification for Inclusion**

I selected this artifact for my ePortfolio because it illustrates my comprehension and hands-on experience with database integration in a mobile application context. It showcases my capability to design relational database structures, implement CRUD (Create, Read, Update, Delete) operations, and maintain data consistency across various app components. The database integration reflects fundamental software engineering principles, such as the separation of logic layers and the creation of maintainable code.

For this milestone, I improved the project by adding input validation to prevent invalid event data, introducing an offline synchronization system that allows users to create or modify events without an internet connection, and adding indexes to enhance database query performance. These improvements have boosted the application's reliability, efficiency, and scalability, aligning it more closely with industry standards.

**Outcome Coverage**

These enhancements correspond to the following Computer Science program outcomes:

1. Design and assess computing solutions utilizing algorithmic principles and computer science practices and standards pertinent to their solutions, while navigating the trade-offs involved in design decisions.

2. Exhibit the capability to employ well-established and inventive techniques, skills, and tools in computing practices to implement solutions that deliver value and achieve industry-specific objectives.

These outcomes were achieved through the implementation of optimized database queries, indexing, and synchronization techniques that enhance usability and data reliability. I successfully met my planned outcomes from Module One, and no modifications to the original coverage plan were needed.

**Reflection on the Enhancement Process**

Enhancing the Event Tracking App deepened my understanding of mobile database management and the importance of data integrity in practical applications. Implementing offline synchronization involved designing a queue system to locally store pending changes and apply them once connectivity was restored. This experience enhanced my knowledge of transaction handling and concurrency management.

The most significant challenge I encountered was ensuring accurate synchronization without introducing data conflicts, which I resolved through timestamp-based updates and record versioning. Overall, this enhancement strengthened my ability to implement efficient, reliable database operations in mobile applications. It also emphasized the importance of optimizing queries and validating user input to uphold data quality. This experience demonstrates my ability to apply database design principles within software engineering contexts to develop robust, user-centric solutions.