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02/06/2025

CS499

Enhancement: Databases

The selected artifact for this enhancement is the StockSense mobile application, originally developed in CS360 for inventory management. Initially, the application relied on a local SQLite database, limiting its scalability and usability in a multi-user environment. To improve its real-world applicability, I enhanced the project by integrating an online Supabase database, transforming it into a cloud-based, multi-user system. This enhancement enables remote database access, allowing organizations to manage inventory collaboratively and securely.

I chose this artifact for my ePortfolio because it demonstrates my ability to work with modern database technologies and secure authentication mechanisms. Transitioning from a local SQLite database to Supabase showcases my ability to design and implement scalable cloud-based solutions. Additionally, I incorporated user authentication with hashed passwords, demonstrating secure data management practices. This enhancement highlights my ability to develop robust backend architectures, utilize APIs for database interactions, and handle real-world database constraints such as indexing, query optimization, and user role management.

Through this enhancement, I successfully met several course outcomes. The transition to a hosted multi-user database supports organizational decision-making by enabling multiple users to interact with shared inventory data. By implementing structured documentation and API integration, I demonstrated professional technical communication skills. The adoption of

Supabase and Retrofit for API calls reflects my ability to design computing solutions that address real-world needs, ensuring scalability and performance. Additionally, I implemented hashed passwords for user authentication, reinforcing security principles and mitigating risks associated with credential storage.

The process of enhancing this application provided valuable learning experiences. Before this project, I had never connected an online database to a mobile application. Setting up Supabase and integrating it with the Android application using Retrofit presented challenges, particularly in managing API calls and debugging connectivity issues. To resolve these issues, I utilized Postman to test endpoints and troubleshoot API responses. Additionally, I refined database queries to ensure efficient data retrieval and sorting mechanisms, exploring solutions such as server-side sorting versus client-side management. This experience strengthened my understanding of database architecture, API debugging, and mobile to backend integration.

One of the key challenges I faced was determining how and where to sort the inventory data. Initially, I considered handling sorting on the client-side using a DataManager, but later explored database triggers to perform sorting upon retrieval. Due to the complexity of trigger-based sorting, I am inclined to maintain client-side sorting, optimizing performance based on application needs. This decision reflects my ability to assess trade-offs between database and application logic, balancing efficiency and maintainability.

This enhancement represents a significant step in professionalizing the StockSense application, making it viable for real-world deployment. By integrating Supabase for database hosting, Retrofit for API communication, and secure authentication, I have enhanced the project's scalability, security, and usability. Future improvements could include real-time updates, data synchronization strategies, and role based access control to further enhance

functionality. The knowledge gained from this enhancement will be instrumental in future software development projects, particularly those requiring backend integration, cloud databases, and mobile application security.