CS-499 Milestone Two

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The artifact I selected is a Kotlin-based mobile inventory application developed during my coursework in the Computer Science program. It was originally created in Java and later refactored to Kotlin to align with modern Android development standards. The app allows users to add inventory items with fields for item name, quantity, and date added. It also includes functionality of editing or deleting items directly from the inventory screen. The original version was functional but lacked modularity, centralized validation, and cloud integration.

I selected this artifact because it demonstrates my growth in software design and engineering, particularly in transitioning from procedural to modular, object-oriented design. The refactoring process showcases my ability to modernize legacy code, implement centralized input validation, and integrate cloud-based services using Firebase Firestore and Firebase Authentication. Enhancements include:

* Migrating from Java to Kotlin for improved readability and maintainability
* Modularizing activities and validation logic
* Implementing Firebase email/password authentication
* Replacing SQLite with Firestore for scalable cloud storage
* Adding item-level editing and deleting functionality within the inventory screen
* Planning unit tests for validation and repository logic
* Planning proper code commenting for clarity and maintainability

These improvements reflect my ability to apply industry-relevant tools and design principles to deliver maintainable, scalable solutions.

The enhancement aligns with several Computer Science program outcomes. I’ve demonstrated the ability to:

* Design and evaluate computing solutions using algorithmic principles and trade-off analysis
* Apply innovative techniques and tools in software engineering and database integration
* Communicate technical decisions through structured code and documentation

I have not yet written unit tests or finalized code commenting, but I plan to include both in the final enhancement phase. This will further support outcome coverage related to testing, documentation, and maintainability.

Enhancing this artifact taught me the importance of modular architecture and centralized validation. Refactoring the code into Kotlin improved readability and reduced redundancy. Integrating Firebase required careful handling of asynchronous operations and authentication flows. One challenge was resolving Gradle and Kotlin DSL build errors during migration, which I overcame through iterative debugging and documentation review. Another challenge was ensuring that input validation was both robust and user-friendly, which I addressed by creating a reusable utility class. Adding edit and delete functionality required careful UI wiring and database synchronization to ensure consistency.

The process reinforced my understanding of scalable design, cloud integration, and the importance of maintainable code. It also highlighted areas for future growth, such as writing comprehensive unit tests and adding clear, consistent code comments to improve readability and support future collaboration.