CS 499 Milestone Four - Narrative

**Briefly describe the artifact. What is it? When was it created?**

This is my CS 360 Inventory Management app. It was a basic Android app where users could add inventory items, check quantities, and get SMS alerts for low stock. The original version just used simple SQLite with shared inventory between all users.

**Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in software development? How was the artifact improved?**

I picked this because inventory management is perfect for showing data analysis and prediction skills. But honestly, figuring out exactly what enhancements to add was tough. I had to research what makes a database "enhanced" versus just functional, and it took a while to understand that I needed things like materialized views, SQL triggers, and predictive analytics - not just better CRUD operations.

The planning process was challenging because I had to think beyond just making the database work better and figure out how to demonstrate advanced computer science concepts. I eventually transformed it from one basic screen into a four-tab analytics dashboard:

* **Inventory Tab:** Now has user-specific data and real-time stats
* **Analytics Tab:** Shows trends and patterns using statistical algorithms
* **Predictions Tab:** Makes smart recommendations using math algorithms
* **Reports Tab:** Shows database performance and lets you refresh data views

The main improvements are an analytics engine with complex algorithms, materialized views that make queries super-fast (0ms), SQL triggers that automatically create recommendations, data mining for finding patterns, and Firebase cloud integration for data syncing. Basically, it turned a simple tracker into a smart business tool that can sync data across devices.

**Did you meet the course outcomes you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?**

Yeah, I met what I planned. I was targeting Course Outcome 4 (innovative techniques) with predictive analytics, performance optimization, and Firebase integration. Also hit Course Outcome 3 with complex algorithms and Course Outcome 5 with better security like password hashing. I think all three of my projects together cover all five outcomes now.

**Reflect on the process of enhancing and modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?**

This was way harder than I thought it would be. The biggest challenge wasn't even the coding - it was understanding what enhancements would demonstrate advanced database skills. I spent a lot of time researching what features materialized views and SQL triggers do and why they matter for real database systems.

Learning to implement statistical algorithms in Kotlin was tough - stuff like Economic Order Quantity calculations required understanding the math.I had to figure out which algorithms would be meaningful for inventory management and how to make them work with my database structure.

Getting the database performance right took forever. I had to figure out indexing and query optimization mostly through trial and error. Building the four-tab interface was also tricky because I had to make complex data useful to users.

The SQL triggers for auto-recommendations were challenging because they work at the database level. I also had to learn about caching and memory management, which we don't really cover much in class. Setting up Firebase integration was another learning curve - figuring out how to sync local SQLite data with cloud storage and handling authentication took some research. The whole process of deciding what to enhance and then actually implementing it was much more complex than I expected.