CS 499 Milestone 3

The artifact that I selected was my inventory app that I created in CS 360 Mobile Architecture and Programing. The app was initially developed to provide a simple inventory management system that allowed users to log in, add items to a database, and view those items in a list. I selected this artifact for my portfolio because it is a great example of my ability to apply algorithms and data structures. The enhancements I made showcase my skills in optimizing data access, validating user input, and improving usability with efficient search and sort operations.

I made several enhancements to my inventory app in the category of Software Design and Engineering. My improvements included:

* O(1) lookup– implement an in-memory HashMap cache to allow constant-time lookups
* Search Function– added a real-time search capability using string filtering
* Sort Function- sorting algorithms for both name and quantity, with ascending and descending toggles
* Adding multiple items- developed a form that allows multiple inventory items to be added at once
* Validation Utilities- created a utility class that applies consistent input validation across the app
* UI design improvements- resolved layout issues where items were displaying behind the action bar and redesigned the button interface using a Gridlayout.

My enhancements aligned with several course outcomes. It aligned with course outcome 3: Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution, while managing the trade-offs involved in design choices. This is demonstrated through the implementation of in-memory caching for fast lookup, search and sort logic, and low-stock detection. It aligned with course outcome 4: Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals. This is demonstrated by the use of modular design, adapter patterns, error handling, and Android UI/UX conventions. It aligned with course outcome 2: Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts. This is demonstrated by my documentation of changes through code comments, a video walkthrough, and written user guide that communicates the system’s design to both technical and non-technical users. It aligned with course outcome 1: Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision making in the field of computer science. This is demonstrated by my designing the UI and functionality of the app with end-users in mind, prioritizing simplicity, accessibility, and clarity. Features like search, sort, and multi item input enable different types of users to interact with the system efficiently

This milestone helped to grow my technical skills in many ways. I learned how small structural changes can have a big impact on performance. I also grew my skills in Android specific architecture patterns like using adapters and RecylerView efficiently. I faced challenges in debugging runtime exceptions when integrating new feature like caching and UI behavior. This strengthened my problem-solving skills.

I identified other enhancements that I will add my Databases category. In my Database category I will improve the account creation and adding users to the database. This will align with course outcome 4. I will also add item validation to check for duplicate items before saving.