**Bruce Gaudet**

**CS 499**

**7/17/25**

**CS 499 Milestone Two**

**Description of the Artifact**

For my software design and engineering artifact, I selected an Inventory Management application initially developed in the CS-360 Mobile Application Development course. This Android based mobile app was originally created in early 2025 to help manage inventory items within a warehouse environment. The app allowed users to perform essential CRUD operations on inventory items, but it initially lacked comprehensive input validation and user-friendly error handling.

**Justification for Artifact Inclusion**

I chose this artifact because it provides an excellent demonstration of software engineering fundamentals, especially regarding user input validation, user interface improvements, and secure coding practices. Specifically, the original code provided basic inventory management functionality but was prone to potential crashes if users entered invalid data or left essential fields blank. To enhance this artifact, I significantly improved input validation, implemented secure coding practices by adding checks against SQL injection and data leakage, and refined the user interface for clearer error messages. These improvements showcase my abilities in robust software design, secure implementation, and clear communication through software interfaces.

**Course Outcomes Achieved**

This artifact aligns closely with multiple computer science program outcomes, particularly outcome number four, which involves implementing computing solutions using sound software engineering principles. In Module One, I initially aimed to enhance my artifact by improving the robustness of the system through better data validation and enhancing the user experience through clearer communication of errors. These goals were fully met. In addition, I managed to strengthen the application’s security by adding comprehensive validation logic and safeguards against typical injection attacks. As a result, I exceeded my original goals for this enhancement.

**Reflection on the Enhancement Process**

Throughout this enhancement process, I gained valuable insights into effective software engineering practices, particularly the importance of rigorous input validation, secure coding methods, and the necessity for clear, user friendly communication. Initially, I underestimated how extensive data validation can become, especially when handling user input from multiple interfaces. One challenge was ensuring that the validation was comprehensive without compromising the application's performance or usability. Additionally, safeguarding the app from injection based attacks required careful thought about user input handling, forcing me to reconsider some of my initial assumptions about database interactions. Ultimately, this process reinforced my skills in secure coding, efficient debugging, and effective UI design, preparing me better for professional software development roles.