**Category Three Enhancement Narrative**

**Brief Description of the Artifact**

The artifact is an unpublished mobile application called "Atomic Mass Calculator," initially created as a simple Python script during my high school years and used as my Category One artifact. This script was later converted to Java and further enhanced to become a functional Android Studio application. The enhanced version utilizes databases to store atomic mass values and sort based on different criteria.

**Justification for Inclusion in ePortfolio**

The Atomic Mass Calculator mobile app is an excellent artifact to include in my ePortfolio because it shows my ability to transform a complex scientific tool into a user-friendly mobile application utilizing databases. This project showcases several key aspects of my software development skills and demonstrates my proficiency in a variety of technical and design areas. I chose this project because it combines a range of skills necessary for a modern software developer, including front-end design, back-end database management, JSON parsing, user interface (UI) design, and Android application development. The complexity and comprehensiveness of this project make it an ideal showcase of my capabilities and knowledge.

**Specific Components Showcasing My Skills**

1. **User Interface Design**: The app features a clean and intuitive interface for inputting elements and displaying calculations, demonstrating my ability to design user-friendly interfaces.
2. **Database Management**: Integration with SQLite to save and retrieve calculations highlights my skills in database management and persistence of data.
3. **JSON Parsing**: The ability to read and parse JSON files to populate the app with data showcases my proficiency in handling data interchange formats.
4. **Android Development**: The overall structure of the app, including activity lifecycle management, user interactions, and UI updates, demonstrates my competence in Android app development.

**Enhancements and Their Impact**

1. **Dynamic Element Loading**: By loading element data from a JSON file instead of hardcoding it, I enhanced the flexibility and maintainability of the app. This approach also demonstrates my ability to work with external data sources.
2. **Input Validation and User Feedback**: Enhancing the app to provide immediate feedback for invalid inputs and clear input fields after adding elements improved the user experience, showcasing my attention to detail and user-centric design principles.
3. **Database Enhancements**: Adding functionality to save user comments and favorite calculations, and to clear the database, highlights my ability to implement complex features that enhance the functionality and usability of the app.
4. **Sorting and Filtering**: Implementing sorting and filtering features for displaying calculations shows my capability to handle data presentation and improve user interaction with stored data.

**Specific Skills Demonstrated**

* **Android Development**: Proficiency in using Android Studio, managing activity lifecycles, and handling user interactions.
* **UI/UX Design**: Skills in designing intuitive and aesthetically pleasing user interfaces.
* **Data Management**: Ability to use SQLite for storing, retrieving, and manipulating data.
* **JSON Handling**: Competence in reading and parsing JSON data to dynamically populate the app.
* **Problem Solving**: Debugging and refining the app to ensure smooth and efficient operation.

**Meeting Course Objectives**

The enhancements made to this artifact align with the following course objectives:

* **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 enhancement aligns with the course outcome of designing and evaluating computing solutions by integrating SQLite as a robust and efficient local storage solution for the atomic mass calculator app. SQLite allows for effective data management and retrieval, which is a critical aspect of computing solutions.

* **Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources.**

Implementing SQLite also aligns with the course outcome of developing a security mindset. SQLite databases are secure by default and can be encrypted to protect sensitive user data. By choosing SQLite as the database solution, I ensure that user data is securely stored and accessed within the app.

* **Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.**

While this enhancement does not directly involve significant collaboration, the skills acquired and demonstrated through the implementation of SQLite can be applied in collaborative development environments. Efficient database management is essential in team-based app development to ensure that all team members can work on the same codebase without conflicts. I did have a peer from a former university assist in peer reviewing and testing the code for its intuitiveness, which shows collaboration efforts.

**Reflection on the Enhancement Process**

Developing the Android application expanded my skills in mobile development, particularly in creating intuitive user interfaces and handling user interactions. Integrating SQLite taught me how to efficiently manage and manipulate data within an application. Implementing database functionalities and ensuring data integrity and performance required significant effort and troubleshooting. Designing a user-friendly interface that is both functional and visually appealing was challenging and required multiple iterations and user testing.