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CS-499 Computer Science Capstone

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**5-2 Milestone Four: Narrative - Databases**

The artifact I selected for the Databases category is a Java-based Spring Boot secure server application initially developed in CS-305. It was created to demonstrate secure data transmission over HTTPS and SHA-256 hashing of input data. In its initial state, the application generated checksums and returned them to the user via an HTTPS endpoint but lacked persistence of any kind. As part of my enhancement for the CS-499 Capstone, I integrated a SQLite database to persist the original input, its corresponding hash, and a timestamp. This transformation turned a stateless demo into a functional data-driven backend system.

I included this artifact in my ePortfolio because it showcases my ability to integrate core database functionality into a secure Java application—something highly relevant to full-stack and backend development roles. Specifically, this artifact demonstrates skills in JDBC, SQL schema design, DAO (Data Access Object) pattern implementation, and secure software development practices. The enhancement included creating a robust database schema, implementing DAO logic for record insertion and retrieval, and validating the results through Maven build success and endpoint behavior.

Yes, I believe I’ve met the course outcome I targeted for this enhancement. My original plan was to enhance the application with local storage, and I successfully executed that by adding the ability to log hash records for traceability and future retrieval. No updates are needed to my outcome-coverage plans.

Through the process of enhancing this artifact, I deepened my understanding of database connectivity in Java, particularly the nuances of working with embedded databases, such as SQLite. One of the main challenges I faced was handling logging and error tracing during database connection and insertion events—something that became more manageable once I modularized the logic and implemented proper error handling and logging. I also had to troubleshoot compatibility issues with Java 17 and Spring Boot’s dependencies, which provided hands-on experience in resolving Maven build failures and test execution errors.

This enhancement not only improved the usability and realism of the application but also allowed me to practice secure coding principles while working with persistent storage, reinforcing the real-world development process of refining and maintaining existing codebases.