CS499 Module 5 Project Update

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The artifact selected for the database category is the CS145 Animal Shelter project, which originally stored rescue animal data in Java using in-memory data structures. This artifact was significantly enhanced by integrating a persistent SQLite database into the refactored Python version. The purpose of this enhancement was to add real-world functionality that allows animal records to be saved, retrieved, updated, and deleted even after the program exits, addressing a major limitation of the original program.

I selected this artifact because it offered a solid foundation and allowed me to meaningfully demonstrate a transition from basic procedural programming to a more scalable, modular, and secure application. By enhancing the artifact with SQLite, I was able to showcase multiple core software development skills. These include creating and initializing a database, implementing full CRUD functionality, and using parameterized SQL queries to protect against injection attacks. This also required refactoring portions of the code to handle input validation, error handling, and database logic cleanly and securely, reinforcing best practices for software engineering.

The enhancement successfully met all the database-related course outcomes I had planned. Overall, I demonstrated an ability to use well-founded and innovative techniques, tools, and practices that implement computing solutions aligned with real-world goals. I also achieved the outcome of developing a security mindset by anticipating adversarial input and mitigating SQL injection risks through the use of safe, parameterized queries. I plan to run more extensive tests to ensure edge cases are accounted for and all functionality works as intended, but the main meat of the program has been constructed and works as intended. I will also ensure the menu and output looks nice and clean in a user-friendly way!

Reflecting on this enhancement process, I learned a great deal about integrating database logic into existing applications and managing data across multiple modules. One of the biggest challenges was navigating how to connect class objects, such as Dog and Monkey with SQL tables while maintaining a clean architecture. Another was ensuring input validation was strict enough to prevent errors, but not so rigid that it hindered usability. Ultimately, this enhancement not only improved the functionality of my application but also deepened my understanding of full-stack software development. Overall, I’m proud of how persistent storage brought the project to life, and this phase of the capstone felt like a defining moment in tying everything I’ve learned together!