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CS 499

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Enhancement Three: Databases

**Briefly describe the artifact. What is it? When was it created?**

The artifact is a Python-based Animal Shelter Application that executes CRUD (Create, Read, Update, Delete) operations for managing records in a MongoDB database. The application, originally created for the CS 340 - Introduction to Databases course, includes methods for interfacing with MongoDB and is intended to manage animal records within a database. It highlights my essential understanding of MongoDB integration, Python programming, and CRUD operations, which are important for software development.

**Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in software development? How was the artifact improved?**

This artifact was selected for my ePortfolio as it demonstrates my proficiency in designing and improving secure, reliable database applications. By enhancing the artifact with data validation, error handling, and logging mechanisms, I aligned the application with best practices in software security and reliability. These improvements demonstrate my proficiency in creating solutions that avoid possible data integrity and security concerns. The application contains a validate\_data function to enforce requirements for mandatory fields and acceptable data types, a log\_event function to monitor operations at different severity levels, and try-except blocks to manage errors effectively and enhance system reliability. These skills demonstrate my proficiency in developing secure and reliable database solutions.

**Did you meet the course outcomes you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?**

The enhancement process focused on improving the AnimalShelter program by incorporating robust data validation, logging mechanisms, and enhanced error handling, elevating both the security and usability of the application. These changes ensured the processing of valid and complete data entries, provided detailed logs for monitoring operations, and effectively managed unforeseen issues to enhance overall reliability. The enhancements also introduced features like soft deletes to preserve historical data and pagination for efficient data retrieval, improving the program’s scalability and user experience. This process strengthened my understanding of Python error handling, logging, and MongoDB operations while emphasizing the importance of data security throughout the software lifecycle. Furthermore, by integrating these features with a focus on preserving original functionality, I gained insight into balancing new enhancements with existing design constraints. Notable challenges included designing minimally invasive logging mechanisms that maintained sufficient detail, creating a validation system compatible with the existing data structures, and ensuring that all updates aligned with modern coding standards. These enhancements highlight my ability to create secure, dependable applications, demonstrating both technical expertise and preparedness for roles in database management and cybersecurity.

In alignment with course outcomes, this artifact showcases my skills in database management, secure coding methodologies, and system analysis. By implementing strategies to address vulnerabilities, I demonstrated a security mindset that anticipates potential exploits and ensures the integrity of data and resources. Enhancements like input validation, optimized CRUD operations, and session-based logging illustrate the use of algorithmic principles and innovative tools to design computing solutions that are efficient, scalable, and user-friendly. Additionally, user-focused improvements, such as clear error messages and enhanced feedback, highlight my ability to communicate technical solutions effectively, ensuring accessibility for diverse audiences. These enhancements validate my strategic approach to risk mitigation and secure coding standards, essential for safeguarding data integrity and maintaining reliable system performance. The transition of the program toward modern, scalable solutions reinforces my capability to meet industry-specific goals and deliver value through well-founded computing practices.