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CS499-17487-Computer Science Capstone

3-2 Milestone: Enhancement 1-Software Design & Engineering Narrative

Professor Krupa

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3-2 Milestone: Enhancement 1 Narrative

The artifact I am presenting is the revised version of my Animal Shelter Dashboard. My app is a web-based application built for managing animal rescue data. Originally I developed the application as part of my CS340 course. My enhanced version features significant updates focused on software design and engineering. The enhancements I implemented include improvements to the user interface (UI), the addition of unit testing, and the integration of logging to verify transparency and maintainability of the system. I also adjusted the code to be more professional with an added header and structured comments.

I chose to include my Animal Shelter artifact in my ePortfolio because it serves as a clear representation of my skills and abilities in software development, specifically focusing on software engineering principles. By showcasing my ability to effectively update and enhance a working software product, I can demonstrate my competence in both building and refining solutions that meet real-world needs. The specific enhancements made to the artifact highlight my expertise in three important areas: user interface design, testing, and debugging. For instance, the updated UI leverages many Dash Bootstrap components to create a more modern, intuitive interface that caters to a broad audience of end users. I also added search functionality in the navigation bar, a "Refresh Data" button, a download feature, as well as About Us and Contact Us sections. Together, these changes provide a more engaging, user-friendly experience.

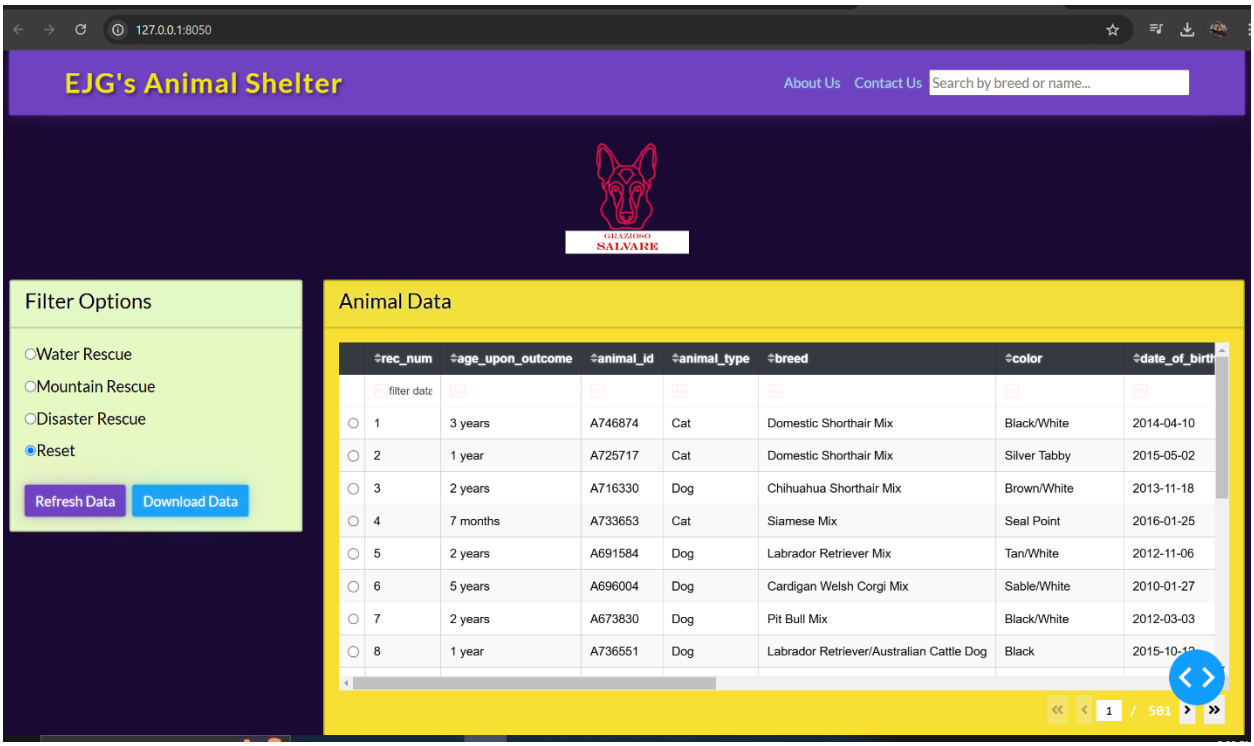
Unit testing was an important enhancement for me so that I can verify software reliability. I created comprehensive unit tests in a newly created file called (test_animal_shelter.py) to verify CRUD operations and I also covered edge cases such as invalid input and non-existent records. This testing strategy reflects my commitment to producing professional-grade software that is strong and dependable. My addition of logging further helps

maintain software quality by allowing easier monitoring and troubleshooting of events, making it simpler to track user actions and diagnose issues as they occur.

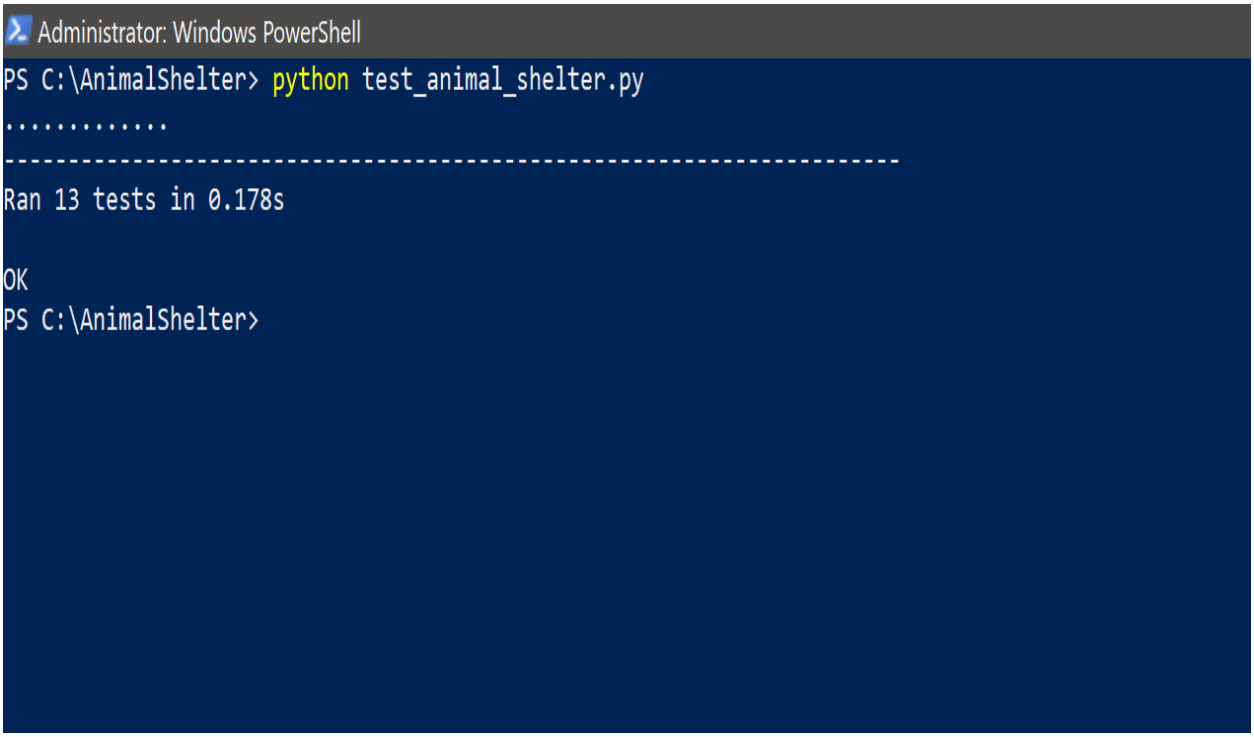
The enhancements I made align strongly with the course outcomes and showcase a range of essential skills in computer science. The redesign of the UI aligns with Outcome 2, demonstrating my ability to create professional-quality, user-centered visual communications tailored to diverse audiences, incorporating elements like a search bar and refresh button for enhanced usability. Additionally, these UI/UX updates align with Outcome 1 by fostering a collaborative environment that enables diverse audiences to interact with the system effectively, improving accessibility and supporting decision-making through features like an intuitive interface and clear navigation. The integration of unit testing and logging aligns with Outcome 4, highlighting my use of innovative tools and techniques to ensure reliable and maintainable software solutions. These features validate data integrity and enable effective monitoring, reflecting industry standards. Furthermore, the enhancements address Outcome 5, showcasing a security mindset by implementing data validation and error handling to mitigate vulnerabilities and ensure the application's integrity and reliability. Together, these updates demonstrate my commitment to delivering scalable, secure, and user-friendly software solutions.

Below is a screenshot of my Animal Shelter app in its original form:

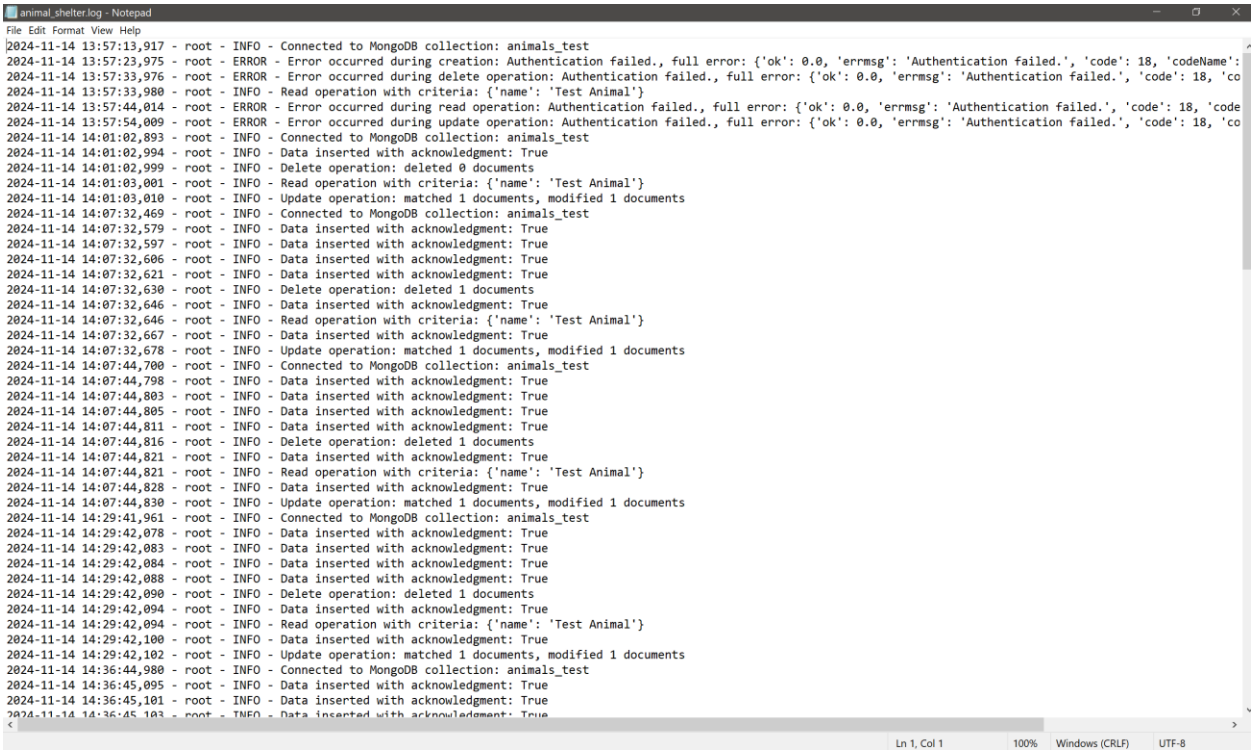
Below are screenshots of my Revised Animal Shelter app with added enhancements:



Below is a photo of the added unit testing passing 13 tests I created.



Below is a photo of the enhanced logging I implemented:



Reflecting on my enhancement process, I learned the importance of continuous iteration when it comes to software design. Designing a user-friendly UI required understanding the point of view of the end-user. Unit testing pushed me to think critically about how my software could fail and how to handle those scenarios efficiently. The major challenge I faced was making sure that the new components, such as the search functionality, integrated seamlessly with the existing elements without introducing bugs or disrupting the flow of the application. However, through some trial and error and a disciplined approach to testing, I was able to overcome these challenges and deliver an enhanced version of the software that is now reliable and scalable.

This experience has strengthened my ability to take a more general approach to software engineering by focusing on feature development, usability, maintainability, and efficiency. The inclusion of the artifact in my ePortfolio will demonstrate my growth as a software engineer and will reflect my commitment to delivering successful software solutions that provide real value to users.