CS 499 Milestone Two – Enhancement One: Software Design/Engineering

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**Narrative**

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

The artifact is the Grazioso Salvare Animal Rescue Dashboard, built originally in CS 340. It consists of a Python Dash notebook that provides the UI and controller logic, and a separate Python CRUD module (animal\_shelter.py) that connects to a remote MongoDB database. The dashboard lets users filter shelter-animal data to identify dogs suited for specific search‑and‑rescue profiles, and renders an interactive table, charts, and a map.

Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? Which components showcase skills and how was it improved?

I selected this artifact because it demonstrates end‑to‑end software design: a modular MVC‑style structure, a real database backend, and an interactive, data‑driven UI. The separation between the Dash UI and the MongoDB data layer showcases maintainability and testability. For this milestone, I performed planned enhancements focused on software engineering quality: refactoring the code into clear layers, strengthening input validation and error handling, and preparing the data layer for index‑aware queries and server‑side aggregation. I also improved documentation and added run instructions to support professional reuse.

Did you meet the course outcomes you planned to meet with this enhancement in Module One? Any updates to outcome coverage?

Yes. The enhancement advances multiple outcomes: (a) designing and evaluating computing solutions by refactoring architecture and improving data‑access patterns; (b) using well‑founded techniques and tools by standardizing configuration, improving code structure, and preparing for automated tests; and (c) developing a security mindset by removing hard‑coded values, validating inputs, and isolating database roles. Going forward, I will add automated unit tests and CI to further strengthen professional‑quality practice.

Reflect on the process of enhancing and modifying the artifact. What did you learn? What challenges did you face?

Refactoring around a live database reinforced the value of clean boundaries and predictable contracts between layers. I learned to translate business filters into index‑friendly query shapes and to reserve client‑side work for presentation only. Challenges included stabilizing connections to the remote database, handling incomplete records without breaking the UI, and keeping the interactive server reliable across sessions. Systematically isolating configuration, centralizing error handling, and designing for graceful fallbacks made the application more robust and easier to reason about.

**What to Submit**

Submit a zip containing all original and enhanced code files (Dash notebook, CRUD module, assets, and any new scripts) and this narrative document. Ensure your README includes environment requirements and precise run steps.