Jorge Argueta

Southern New Hampshire University

CS-499 Computer Science Capstone 24EW4

Professor Brooke Goggin

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Pet Management System Project

The Pet Management System was designed and developed as part of the capstone project for my CS 499 class. This system allows users to manage pet stays at a care facility, handling everything from inputting pet details to calculating costs based on various factors such as the type of pet, duration of stay, and special care needs. The system is also designed to apply discounts and handle coupon codes, enhancing the functionality and user experience.

**Project Goals and Objectives:**

The main goal of this project was to design, develop, and deliver a comprehensive system that aligns with the Computer Science program outcomes. Below, I detail how this project meets each of these outcomes:

**Employ strategies for building collaborative environments:**

The project was developed on GitHub, a platform that supports collaboration. By using Git, I was able to manage the source code effectively and share updates, enabling potential collaborative opportunities with other students and the professor for continuous improvement of the project.

**Professional-quality communications:**

Throughout the development process, I maintained clear and consistent documentation both within the code (through comments) and in external communications (via GitHub README files). This ensures that anyone reviewing the codebase can understand the functionality and the purpose of different segments of the code, which is essential for professional communication.

**Design and evaluate computing solutions using algorithmic principles:**

The system’s core functionality, such as determining peak rate periods, applying discounts, and calculating the final charges, relies on algorithmic logic to solve the problem of cost calculation based on dynamic inputs. This not only demonstrates the use of basic control structures but also the application of more complex conditional and computational algorithms.

**Use of well-founded and innovative techniques in computing:**

This project incorporates various programming practices such as object-oriented programming, encapsulation, and exception handling, which are foundational yet innovative techniques for robust software development. For instance, handling user input errors gracefully contributes to the robustness of the application.

**Develop a security mindset:**

Although this project primarily focuses on functional requirements, considerations were made to avoid common security pitfalls such as SQL injection (not directly applicable here but kept in mind for data handling practices) and ensuring that all user inputs are validated to prevent errors that could be exploited maliciously.

**Challenges and Learnings:**

One of the significant challenges I faced was implementing the feature for peak and off-peak pricing. It required thoughtful consideration of how to structure the code to not only function correctly but also extend easily, perhaps if more seasons or pricing tiers need to be added in the future. Through this challenge, I learned the importance of designing with scalability in mind, which is a critical aspect of software development.

**Conclusion:**

The Pet Management System project has been a comprehensive exercise in applying the wide array of skills and techniques learned throughout my computer science program. It not only tested my technical abilities but also helped hone my project management and documentation skills, preparing me for future professional software development projects where these skills will be indispensable. This project exemplifies how academic concepts can be translated into practical, real-world applications, fulfilling the educational goals set forth by the CS 499 course.