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CS 499

Milestone 4 Narrative

Narrative: Database Enhancement for Corner Grocer Artifact

I am continuing with the Corner Grocer artifact; an inventory management system developed using Python and SQLite. Initially, this system was created with the goal of allowing users to manage and track grocery inventory, which includes functionalities like adding, displaying, and sorting items. The inventory items include key details such as item names, prices, and quantities. The original system relied on storing inventory data in JSON files, making it simple but limited in its capabilities, especially when dealing with larger datasets or ensuring persistent data across sessions.

For this milestone, the project was enhanced by replacing the file-based storage with a relational database using SQLite. This modification aimed to improve the reliability, scalability, and efficiency of the system, enabling it to handle a more robust inventory system with ease.

Justification for Inclusion in ePortfolio

I have included the Corner Grocer artifact in my ePortfolio because it demonstrates critical skills in database management, Python programming, and software development best practices. This project reflects my ability to integrate databases into applications, a core competency for developers in the field. The enhancement of this project to use SQLite for data persistence is particularly important, as it showcases my ability to transform a basic file-based system into one that leverages a relational database for scalability and efficiency.

The artifact is an example of how to:

- Use SQLite within a Python application to perform various database operations.
- Validate user input to ensure proper data handling and maintain data integrity.
- Provide a user-friendly experience by allowing users to interact with the inventory system via a text-based interface.
- Implement sorting and querying of data within a database.

By integrating SQLite, the project is now capable of handling more complex queries and data storage requirements, which makes it a stronger example of how databases are essential for managing real-world data in software systems.

Course Outcomes

This enhancement aligns closely with several course outcomes, especially those related to working with databases and applying software development practices. The addition of SQLite in the Corner Grocer artifact allows me to meet the following course objectives:

- **Database Design and Implementation**: This project required the design and creation of a relational database with a table to store inventory data. The integration of SQLite allowed me to practice structuring a database and applying SQL queries within a Python environment.
- **Software Development Using Databases**: By implementing CRUD operations (Create, Read, Update, and Delete) within the application, I demonstrated my ability to develop software that can manage and manipulate data efficiently.

- **User Input Validation**: The system includes robust validation checks for user inputs (such as price and quantity), ensuring that data entered into the system is both correct and reliable.
- **Sorting and Querying Data**: I implemented the functionality to sort inventory items by name, price, or quantity, demonstrating my ability to write SQL queries that modify and retrieve data from a relational database.

These outcomes were achieved by leveraging Python's `sqlite3` library to interact with an SQLite database. The project illustrates both my understanding of databases and my ability to create an interactive software application that handles real-world data management challenges.

Process of Enhancement and Reflection

The process of enhancing the Corner Grocer artifact involved several key steps. Initially, the project used a file-based storage method (JSON) to hold the inventory data. While this approach was functional for smaller datasets, it was not ideal for a growing system. Switching to SQLite presented several advantages, such as the ability to efficiently store and query large datasets and ensure data consistency even after the application is closed.

During the enhancement process, I faced some challenges, including issues with the initial database schema. The first attempt at creating the SQLite database did not include the necessary columns, resulting in errors when attempting to insert new items into the inventory. After troubleshooting and recreating the database schema with the correct structure, these issues were resolved, and the application began functioning as expected.

Additionally, I learned how to implement SQL queries directly into Python code, which allowed me to interact with the SQLite database more effectively. For instance, I wrote SQL queries to insert new items into the database, retrieve inventory data, and sort items based on different attributes such as price or quantity. These operations were critical in making the system more versatile and capable of handling more advanced inventory management tasks.

One of the most rewarding aspects of this enhancement was seeing the system transition from a simple, file-based approach to a more powerful, database-driven solution. This enhancement not only improved the functionality of the Corner Grocer artifact but also reinforced the importance of using databases in real-world software applications.

Conclusion

The enhancement of the Corner Grocer artifact demonstrates my ability to integrate databases into Python applications and improve data management practices. By replacing the original file-based system with an SQLite database, I have created a more scalable, reliable, and efficient inventory management system. This project has allowed me to develop key skills in working with relational databases, handling user inputs, and implementing data sorting and querying functionality.

The Corner Grocer artifact is now a more robust and versatile application that showcases my understanding of database integration and my ability to develop software that addresses real-world challenges. This project will continue to be a valuable addition to my ePortfolio, as it highlights my growth as a developer and my ability to apply technical skills to solve practical problems.