Final Report

Introduction

My final project focuses on creating a database to support the development of fantasy football analysis that a friend and I began this past summer. The first step was revisiting and exploring the data requirements from our initial analysis to understand what needed to be implemented in the database. I determined that I would need data for all fantasy-relevant players from 2021 to 2023, specifically covering every game they participated in during those years. With these requirements in mind, I set my project goals. At a minimum, I aimed to create a database that my friend and I could use to continue our fantasy football analysis. Optimistically, I hoped to complete the database and explore Oracle Apex as a potential tool for creating a web or mobile app to provide a user-friendly interface for accessing the database.

Exploring

Once I established my topic and goals, I began exploring how to structure the database. Using Oracle Data Modeler, I created initial designs and iterated through several concepts. I also researched sports-related databases online, finding multiple examples that provided inspiration and valuable insights for refining my approach. By combining these new ideas with my initial concepts, I developed what I believed to be a solid starting point for the database. This iterative process involved drafting, revising, and redesigning tables in Oracle Data Modeler until I arrived at a final design.

Building

After finalizing the table designs, I focused on selecting variables and identifying keys necessary for normalizing the database. With the design complete, I exported the model and implemented it in SQL Developer. I then concentrated on finding, manipulating, and importing data into the database. I sourced raw data from multiple Kaggle competitions featuring NFL data, additionally R packages nflverse and nflfastR were used. The raw data required significant manipulation to align with the database structure. To address this, I used R to clean and prepare the data for import.

While preparing the first batch of CSV files for import, I explored the use of triggers discussed in class. I identified specific columns and tables where triggers could be used to automate calculations within the database. Through research and experimentation, I refined my understanding of triggers and successfully implemented them to streamline parts of the data import process. With these automations in place, I imported the data into the database.

Discovering

Throughout this project, I learned many lessons, the most important being the necessity of setting realistic expectations. My initial design included nearly 14 tables, which proved unrealistic due to time constraints and the realization that some data was unnecessary for the project’s goals. This experience emphasized the value of adapting designs to practical limitations while maintaining focus on essential objectives.

Hands-on experience with database elements such as keys, triggers, and staging tables deepened my understanding of their significance in database design. Challenges such as code errors, data import issues, and data manipulation difficulties highlighted the complexities of working with real-world data. While my database meets its initial goals, I identified additional data values and potential new tables that could enhance its analytical capabilities in future iterations.

Class Topics

This project incorporated several key topics covered in class:

1. **Entity Relationship Modeling**: Designing the relationships between different entities in the database.
2. **Primary and Foreign Keys**: Structuring tables with appropriate keys for normalization and efficient querying.
3. **Data Manipulation**: Cleaning and preparing raw data for compatibility with the database structure.
4. **Query Design**: Writing effective queries to extract meaningful insights from the database.
5. **Triggers**: Automating calculations and improving data integrity during the import process.

Conclusion

This project has been a significant step toward creating a functional and scalable fantasy football analysis database. Revisiting the goals and challenges provided valuable insights into the intricacies of database design, data manipulation, and advanced features like triggers. The hands-on experience reinforced critical database management concepts while highlighting the importance of setting realistic expectations and adapting designs based on practical constraints.

While the current iteration of the database achieves its initial objectives, there is ample room for expansion and refinement to further enhance its analytical capabilities. This project has laid a strong foundation for future exploration, offering practical insights and opportunities for growth in database and application development.