Liverpool FC Performance Database

Nathan Farinha | Huntington University | CS 415 Database Management – Fall 2025 - Final Project
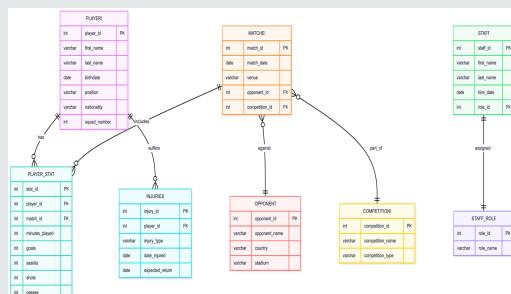
Overview

- Liverpool Football Club is a globally recognized professional football organization competing in the English Premier League and European competitions.
- The club manages extensive data related to players, matches, performance statistics, injuries, and staff.
- This database centralizes that information into a relational design, allowing coaches, analysts, medical staff, and administrators to efficiently access, update, and analyze key operational data.
- From a user perspective, the database supports player performance tracking, injury monitoring, roster management, and match analysis through structured SQL queries and reports.

Design

- The database was designed using a fully normalized relational structure to reduce redundancy and ensure data integrity. Core entities include Players, Matches, Player Stats, Injuries, and Staff, each stored in its own table.
- Normalization decisions ensured that player details are stored once, while match-specific performance and injury history are linked using foreign keys. One-to-many relationships allow players to appear in multiple matches and injury records without duplicating data. This design improves consistency, scalability, and query efficiency.

ER Model
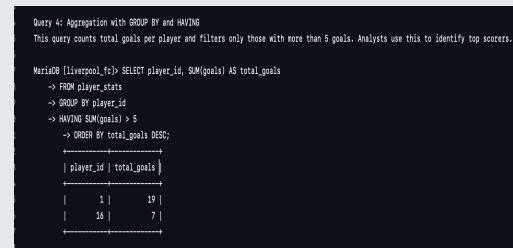
Data

- Sample data includes professional Liverpool FC players, staff members, opponents, competitions, match records, and player performance statistics.
- Each player record contains identifying information such as name, position, nationality, and squad number. Match data includes dates, venues, opponents, and competition types.
- Player Stats records capture match-level performance metrics including minutes played, goals, assists, shots, and passes. Injury data tracks injury type, injury date, and expected recovery timeline.
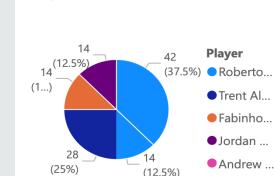
Queries

- The database supports a wide range of SQL queries, including multi-column sorting, calculated fields, aggregate functions, and multi-table joins.
- Key queries demonstrate:
- Ordering players by position and squad number
- Calculating derived values such as hours played
- Aggregating total goals by player
- Joining player, match, and performance data
- Using transactions with COMMIT and ROLLBACK
- Performing UPDATE and DELETE operations safely
- Query 4: Aggregation with GROUP BY and HAVING
- This query counts total goals per player and filters only those with more than 5 goals. Analysts use this to identify top scorers.

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MariaDB [liverpool_fc]> SELECT player_id, SUM(goals) AS total_goals
    -> FROM player_stats
    -> GROUP BY player_id
    -> HAVING SUM(goals) > 5
    -> ORDER BY total_goals DESC;

| player_id | total_goals |

|        1 |          19 |
|       16 |           7 |
```

Reports

Sum of Shots and Sum of Goals by Player

- Player performance reports were created using Microsoft Power BI. A total goals by player bar chart highlights key contributors, while a goals-per-match table provides game-by-game insights.
- These reports demonstrate how relational database data can be transformed into visual analytics for decision-making.

Future Work

- Future improvements could include tracking training sessions, contracts, and player fitness metrics.
- Integrating a front-end application or live data feeds would further enhance usability and real-time analysis.

Works Cited

- Premier League. https://www.premierleague.com
- Liverpool FC Official Website. https://www.liverpoolfc.com
- Microsoft Power BI Documentation. https://learn.microsoft.com/power-bi