

DAMG6210 – Database Management & Database Design

P2. Database Design, Conceptual Model

Title:- Sports Information & Analytics System

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Group- 12

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Introduction

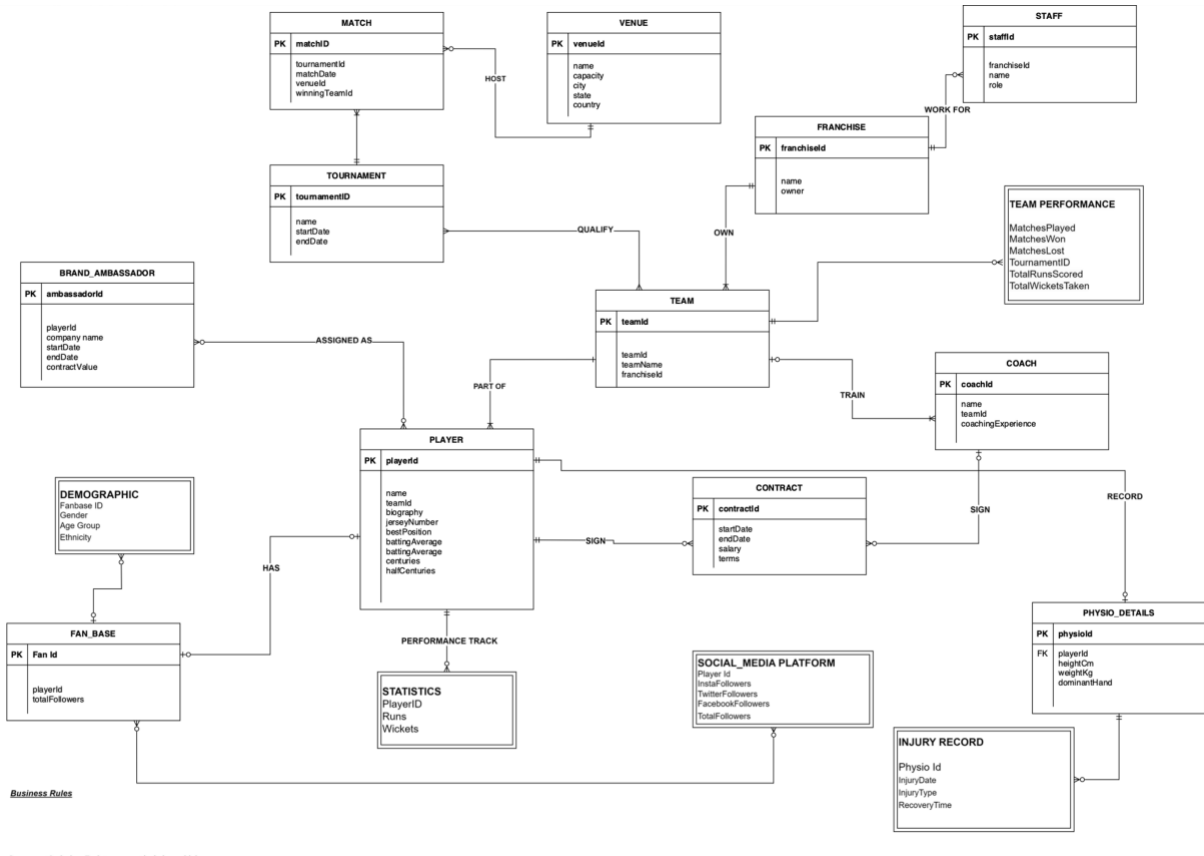
Description:

The Sports Analytics Database System aims at building the management and analysis of player statistics and performance data for sports (cricket) tournaments. The system provides tools for collecting, storing, and analyzing data related to player performance, team participation, match hosting, and fan engagement. The primary goal is to enable sports analysts to derive insights, make predictions, and enhance decision-making processes in the realm of sports management.

Business Rules

- **Analyze Performance Data:** Player statistics can be retrieved from the database system through which player performance trends can be analysed, identifying strengths and weaknesses, and evaluating overall team performance.
- **Monitor Fan Engagement:** The system tracks fan engagement metrics, including social media followers, fan demographics, and brand ambassadorship agreements. It analyzes fan engagement data to understand fan behavior, target specific demographic segments, and optimize marketing strategies to enhance fan loyalty and brand visibility.
- **Performance Analysis by Position:** The system allows for performance analysis based on player positions, enabling coaches and analysts to evaluate player performance within specific positions.
- **Injury Tracking and Management:** The database system aims to track and manages player injuries, recording details such as injury type, severity, treatment received, and recovery status.
- **Contract Management:** The system manages player contracts, including details such as contract duration, salary, bonuses, and contract termination clauses.
- **Performance metrics and analysis reports** can be segmented by position, providing insights into positional strengths and weaknesses and informing player deployment strategies during matches.
- **Collaborate with Stakeholders:** The system collaborates with coaches, team and franchise owners to share analytical findings and insights derived from the database system.

ER-Diagram



Relationships/Business Rules:

- **Tournament Inclusion:** Each tournament includes multiple matches, but each match is associated with exactly one tournament.
- **Team Participation:** Teams are qualified for tournaments in which they can play, and each team can get qualified for multiple tournaments.
- **Franchise Ownership:** Franchises own one or more teams, but each team is owned by exactly one franchise.
- **Player Membership:** Teams consist of multiple players, but each player must be a part of exactly one team.
- **Contractual Agreements:** Players and coaches sign contracts, with each contract being associated with exactly one individual. This agreement specifies terms including duration and salary.

- **Player Statistics:** Players have multiple performance records in order to keep track of the player statistics history for prediction and analysis, but each performance entry is associated with one player.
- **Brand Ambassadorship:** Players can be the brand ambassadors for multiple brands, but each ambassadorship agreement is associated with one player.
- **Fan Base:** Players can have a presence on multiple social media platforms, with each social media presence entry associated with one player and potentially one social media platform.
- **Physical Records:** Each player has a set of physio details associated with them for tracking their fitness, which includes information on injury history, last checkup date, and fitness level.
- **Match Hosting:** Matches are hosted at venues, with each venue capable of hosting multiple matches, but each match can be held in only 1 venue.
- **Social Media Platform Utilization:** Social media presence is quantified by followers across different platforms, indicating a one-to-many relationship between players and their presences on these platforms.
- **Fan Base Demographics:** The fan base of a player can be categorized into various demographic segments, allowing for a detailed analysis of the composition of their followers for further analysis and insights.
- **Staff Employment:** Staff members can work for one, indicating a one-to-many relationship between franchises and their staff.

Entity Justification

Player: A cricket player is an athlete who participates in the sport of cricket. Each player has a unique player ID(*primary key*). The attributes of the entity player are name, teamId, biography, jersey Number, best Position, batting Average, batting Average ,centuries,halfCenturies

Team: Team is an entity where a group of players join together to play matches and tournaments. Each team has a unique team Id. The attributes of the entity team are team name, franchise Id.

Coach: A coach is an individual who provides guidance, instruction, and support to athletes or sports teams to help them improve their skills, performance, and overall success in their cricket career. Each coach has a unique coach ID(*Primary Key*). The attributes of a coach are name, team ID, experience.

Contract: A sports contract is a legally binding agreement between a professional athlete and a sports team, league, or organization. Each contract has a unique contract ID (*Primary Key*). The attributes of the entity contract are start date, end date, salary and term.

Match: Match typically refers to a competitive event(cricket) between two teams. Each match has a unique matchID(*Primary Key*). The attributes of match are tournament Id, match Date, venue Id winning Team Id.

Tournament: A cricket tournament is a series of matches or games played between multiple teams in the sport of cricket, organized within a specific timeframe and under a set of rules and regulations. Tournaments are a common format for cricket competitions at various levels,

ranging from local and domestic tournaments to international events. Each tournament has a unique tournament Id. The attributes of tournaments are name, start date and end date.

Venue: A cricket venue is a location where cricket matches are played, typically consisting of a cricket ground and associated facilities. Each venue has a unique venue Id. The attributes of venue are name, capacity, city, state and country

Franchise: A sports franchise refers to a professional cricket team or organization that is owned and operated by a private entity or group of individuals. Each franchise has a unique franchise Id. The attributes of a franchise are name and owner.

Staff: Each franchise has many staff working for them. Each staff member has a unique staff ID (*Primary Key*). The attributes of staff are franchise ID (*Foreign key referencing Franchise relation*), name and role.

Team Performance: In this entity we can find the performance of the team. The attributes of Team performance are Matches Played, Matches Won, Matches Lost, Tournament ID, Total Runs Scored and Total Wickets Taken.

Statistics: This entity has the statistical performance of individual players. The attributes of statistics are player Id, name, no of Matches, etc. It is a weak entity as it is dependent on Player.

FANBASE: Fanbase is the entity consisting of total number of fans for each player. Each fan has a unique fan ID. The attributes are player id and total followers

Social Media Platform: This entity shows the number of followers from each social media platform. The attributes of this entity are Player ID, Instagram Followers, Twitter Followers, Facebook Followers and Total Followers.

Demographic: This entity shows the information about the fans of players. The attributes of this entity are Fanbase ID, Gender, Age Group and Ethnicity.

Brand Ambassador: This entity shows the information about the players who are brand ambassadors for various companies and brands. The attributes of this entity are player ID, company name, start Date, end Date and contract Value.

Physio Details: This entity shows the information about various physios assigned to various players. Each physio has a unique physio ID. The attributes of this entity are player Id, height Cm, weight Kg and dominant Hand

Injury Record: This entity shows the information about various injuries that have happened to the player. We will retrieve this information from the physio records. The attributes of this entity are Physio Id, Injury Date, Injury Type and Recovery Time.