



Department of Computer Science & Engineering

DBMS Report

Men's Football League's Club Management
System

SUBMITTED TO

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Men's Football League's Club Management System

Project Area Major : Sports

Project Area Minor : Information about a League's total management system ranging from interconnecting clubs to managing every matches

Brief Description

The Men's Football League Club Management System is a comprehensive and integrated database designed to streamline the complexities of professional football administration. This robust system encompasses key facets such as club details, league dynamics, player and staff management, match events, financial transactions, and performance analytics. From capturing club specifics and league intricacies to managing player transfers, matchday events, and financial transactions, the system serves as a centralized hub for football club operations. It facilitates efficient league administration, ensures precision in match officiating roles, and offers tools for financial management and performance analysis. With a user-friendly interface and meticulous data organization, the system enhances overall operational efficiency, supporting clubs, administrators, coaching staff, and enthusiasts in fostering a data-driven and streamlined footballing experience. Its intuitive interface ensures accessibility for clubs, administrators, and coaching staff, offering a unified platform for strategic decision-making and performance analysis. By promoting data-driven insights, this system contributes to the evolution of football administration, providing a robust foundation for league organizers, clubs, and enthusiasts to elevate the standards of the sport.

Detailed Description

The Men's Football League Club Management System is a sophisticated and comprehensive database meticulously crafted to encompass the entire spectrum of professional football administration. At its core, the database focuses on the intricate details of football clubs, leagues, players, officials, and match-related events, providing a centralized and efficient platform for the management of various football-related activities.

1. Club Management:

Club Information:

Captures essential club details, including name, country, city, net worth, and key personnel.

League Participation:

Tracks a club's involvement in different leagues across seasons, managing entries and exits.

Financial Transactions:

Records financial transactions such as player transfers, salaries, and operational expenses.

2. League Dynamics:

League Information:

Stores data about different football leagues, including season, name, country, prize money, and division.

Fixture Management:

Manages fixtures for each league season, linking matches to specific clubs and ensuring scheduling integrity.

3. Player and Staff Management:

Player Details:

Records comprehensive player information, including name, date of birth, preferred position, nationality, and contractual details.

Staff Information:

Manages club officials, personal trainers, and their roles, facilitating efficient workforce management.

4. Match and Event Tracking:

Match Details:

Captures match-specific information such as date, time, participating teams, spectators, ticket prices, and match status.

Match Events:

Records detailed match events, including goals, assists, and other notable occurrences, linked to specific players.

5. Stadium and Infrastructure:

Stadium Ownership:

Tracks clubs' ownership of stadiums, including details such as stadium name, location, built date, and capacity.

6. Officiating and Referees:

Referee Information:

Records details about referees, including name and nationality.

Officiating Roles:

Manages referee roles in matches, ensuring fair play and adherence to regulations.

7. Performance Analytics:

Ranking System:

Computes and maintains club rankings based on performance metrics, including matches played, wins, losses, draws, goals for, and goals against.

8. Historical Data and Trend Analysis:

Historical Statistics:

Archives historical data, enabling trend analysis and strategic decision-making based on past performances.

9. Player Transfers and Contracts:

Transfer Records:

Logs player transfers between clubs, capturing transfer fees, contract durations, and relevant details.

Contractual Agreements:

Manages player contracts, including release clauses, ensuring clarity in player-club relationships.

10. Personal Trainer Assignments:**Trainer Deployments:**

Tracks the assignment of personal trainers to players, recording start and end dates for each collaboration.

11. Fixture Integrity and Clash Prevention:**Fixture Validation:**

Implements a robust constraint to prevent scheduling conflicts, ensuring that no two matches occur simultaneously on the same date. This constraint also considers the 90-minute duration of matches, preventing overlapping events.

12. Fan Engagement and Ticketing:**Spectator Information:**

Records data on match attendance, allowing clubs to analyze fan engagement and plan promotional activities.

Ticket Price Management:

Manages ticket prices for matches, considering factors such as team popularity, match importance, and venue capacity.

13. Scouting and Recruitment:**Scouting Reports:**

Stores scouting reports on potential players, facilitating data-driven recruitment decisions.

Youth Development:

Tracks the progress of young talents within the club, promoting a robust youth development system.

14. International Representation:**National Team Affiliation:**

Records instances where players from a club represent their respective national teams.

International Matches:

Tracks international matches involving club players, fostering a connection between club and country.

This comprehensive database aims to streamline football administration processes, providing stakeholders with a powerful tool to enhance decision-making, improve transparency, and elevate the overall management of men's football leagues.

Expected Queries

The Men's Football League Club Management database has been meticulously designed to support a myriad of queries, providing a robust foundation for comprehensive data analysis. Its normalized structure and interlinked tables enable users to extract diverse and intricate information about clubs, leagues, players, matches, and more. The versatility of the database is exemplified by its ability to accommodate various types of queries, such as:

Financial Analysis:

Example Query:

- Retrieve the total revenue generated by each club in a specific year by combining ticket sales data.

Performance Metrics:

Example Query:

- Obtain the league ranking of clubs for a particular season, including the number of wins, draws, losses, goals for, and goals against.
- Obtain the relegated clubs from a specific league in a particular season.

Personnel Management:

Example Query:

- Identify officials working for a specific club and their respective roles within the organization.

Disciplinary Statistics:

Example Query:

- Calculate the number of red cards received by players from each club in a given year.
- Calculate number of penalties gotten in a season.
- Identify which club got the most number of cards in a season.

The database's flexibility arises from its well-defined relationships and adherence to relational database principles. As the database expands with additional leagues, seasons, and teams, users can effortlessly adapt and extend queries to extract meaningful insights. This adaptability positions the football club management database as a valuable tool for stakeholders ranging from club managers to sports analysts, facilitating informed decision-making and strategic planning within the realm of football management.

List of Tables

Here is the list of tables with schema:

1. tbl_club = (club_id ,club_name,country,city,net_worth)
2. tbl_league = (league_id ,season ,league_name, country ,prize_money ,division)
3. tbl_plays_in_league = (league_id , club_id , season)
4. tbl_club_officials = (official_id , official_name , role_in_club , nationality , salary , release_clause)
5. tbl_works_for = (club_id , official_id , start_date , end_date)
6. tbl_players = (player_id , player_name , date_of_birth,age , fav_position , nationality , weekly_wage , release_clause)
7. tbl_personal_trainers = (player_id , official_id , start_date , end_date)
8. tbl_plays_for =(player_id , club_id , start_date , jersey_no , end_date , prev_club_id)
9. tbl_own_stadium = (club_id , stadium_id , stadium_name , location , built_date , capacity)
10. tbl_referee = (referee_id , referee_name , nationality)
11. tbl_match = (match_id , match_date , match_time , home_team , away_team , spectators , ticket_price , home_score , away_score , match_status)
12. tbl_match_events = (match_id , player_id , type_of_events , min)
13. tbl_fixture = (league_id , match_id , season)
14. tbl_employs = (league_id , season , referee_id)
15. tbl_officiates = (referee_id , match_id , role_in_match)
16. tbl_ranking = (ranking_id , league_id , season , club_id , match_played , wins , losses , draws , goals_for , goals_against)

ER Diagram :

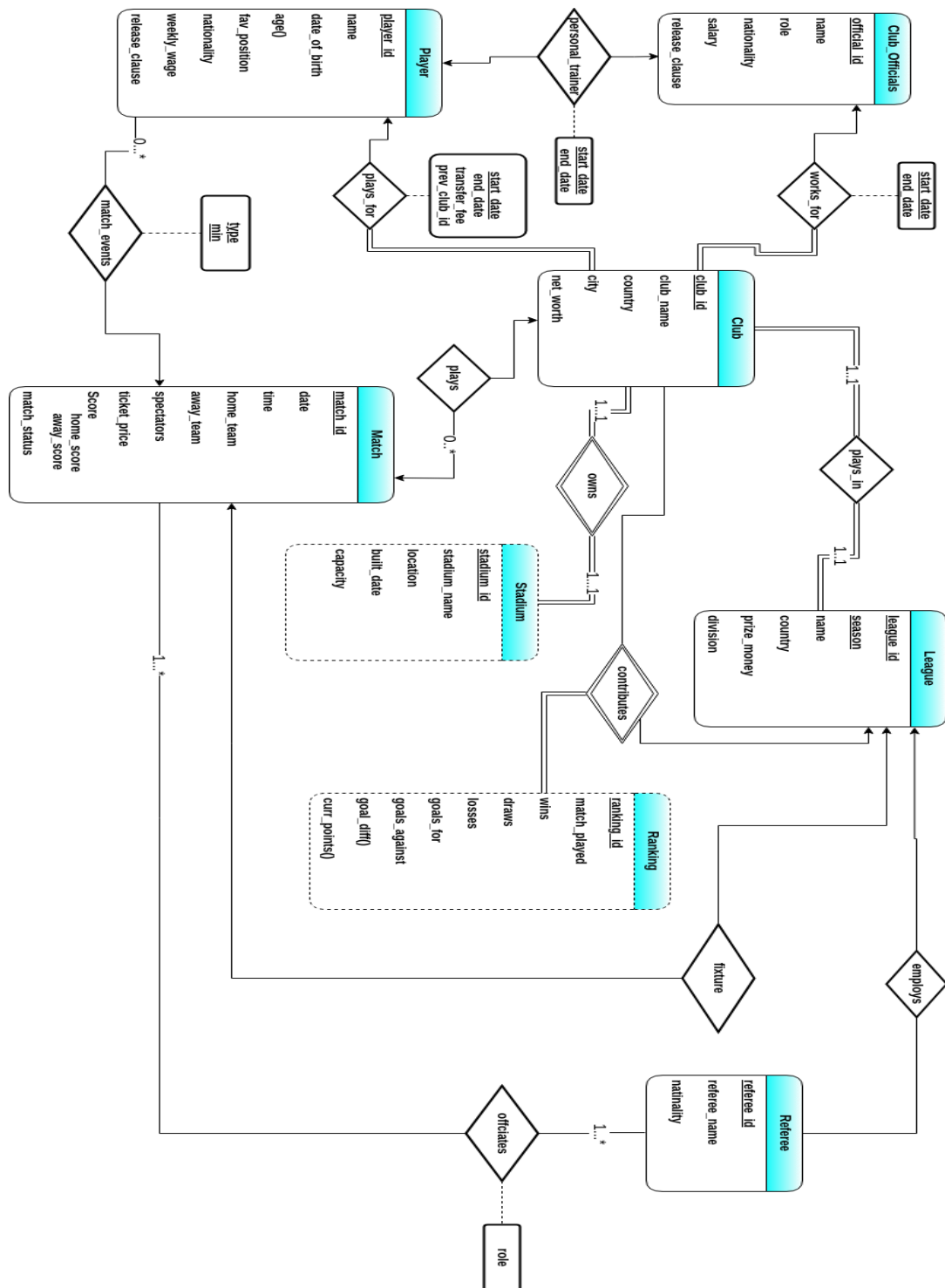


Figure: ER Diagram of Men's Football League's Club Management System

List of Functional Dependencies

The database incorporates a set of functional dependencies among its tables, serving to maintain data consistency and prevent redundancy. Below is a comprehensive breakdown of these dependencies organized by individual tables:

Table: tbl_club

- club_id -> {club_name , country , city , net_worth}

Table: tbl_league

- {league_id , season} -> {league_name , prize_money, division}
- League_id -> country

Table: tbl_plays_in_league

- {league_id, season} -> club_id

Table: tbl_club_officials

- official_id -> {official_name, nationality, role_in_club}

Table: tbl_works_for

- { club_id, official_id, start_date } -> end_date

Table: tbl_players

- player_id -> {player_name , date_of_birth, age, fav_position, nationality, weekly_wage, release_clause}

Table: tbl_personal_trainers

- {player_id, official_id, start_date} -> end_date

Table: tbl_plays_for

- {player_id, club_id, jersey_no, start_date} -> {end_date}
- player_id -> prev_club_id

Table: tbl_referee

- referee_id -> {referee_name, nationality}

Table: tbl_match

- match_id -> {match_date, match_time, home_team, away_team, spectators, ticket_price, home_score, away_score, match_status}
- {match_id, home_team} -> home_score
- {match_id, away_team} -> away_score

Table: tbl_match_events

- {match_id, player_id, type_of_events, min} -> {match_id, player_id, type_of_events, min}

Table: tbl_fixture

- match_id -> {league_id, season}

Table: tbl_employs

- {referee_id, match_id, role_in_match} -> {referee_id, match_id, role_in_match}

Table: tbl_ranking

- {ranking_id, league_id, season, club_id} -> {match_played, wins, losses, draws, goals_for, goals_against}

Table Schema :

Table : tbl_club

S/N	Attributes	Datatype	Constraints	Comments
1	club_id	INT	PK	Unique identifier for each club
2	club_name	VARCHAR(200)		Name of the football club
3	country	VARCHAR(200)		Country where the football club is based
4	city	VARCHAR(200)		City where the football club is located.
5	net_worth	INT		Financial value or net worth of the football club
<p>The tbl_club table serves as a fundamental repository for key information about football clubs in the Men's Football League Club Management System. This table acts as a foundational reference point, facilitating relationships with other tables to provide additional insights and maintain consistency across the system. Its primary purpose is to offer a centralized and standardized source of basic club information, supporting various functionalities within the system, including fixture planning, player association, and overall club management.</p>				

Table : tbl_league

S/N	Attributes	Datatype	Constraints	Comments
1	league_id	INT	PK	Unique identifier for each league
2	season	YEAR	PK	The specific year of the league season
3	league_name	VARCHAR(200)		The name or title of the league
4	country	VARCHAR(200)		The country where the league is based
5	prize_money	VARCHAR(200)		Records the monetary

				reward or prize for the league.
6	division	INT		Represents the division or tier of the league
The primary key, consisting of league_id and season, ensures each entry is uniquely identified by the combination of league and season. This table provides a consolidated view of essential league information, facilitating effective organization, planning, and management of football leagues within the system.				

Table : tbl_plays_in_league

S/N	Attributes	Datatype	Constraint s	Comments
1	league_id	INT	PK,FK	Represents the unique identifier for the league
2	club_id	INT	PK,FK	Identifies the football club participating in the league.
3	season	YEAR	PK,FK	Denotes the specific year of the league season.
The primary key, consisting of league_id , club_id , and season , ensures each entry uniquely identifies a club's participation in a specific league on a specific season. The foreign key constraints link this table to the tbl_league table, ensuring that the referenced league and season exist, and to the tbl_club table, ensuring that the referenced club exists. This table serves as a pivotal point for tracking club participation in different league seasons, facilitating efficient management and organization of league-related data. The existence of this club has lessened the costly Join operation between the two tables for finding a club's affiliation to a league , which is a sign of dependency preservation .				

Table : tbl_club_officials

S/N	Attributes	Datatype	Constraint s	Comments
1	official_id	INT	PK	Serves as the unique identifier for each club

				official
2	official_name	VARCHAR(200)		Represents the name of the club official
3	role_in_club	VARCHAR(200)		Describes the specific role or position held by the official within the club
4	nationality	VARCHAR(200)		Indicates the nationality of the club official
5	salary	INT		Reflects the official's salary, contributing to financial management
6	release_clause	INT		Represents the contractual release clause, specifying the compensation for early contract termination
This table is vital for managing and organizing information about club officials, including their roles, nationalities, and contractual details. The primary key constraint guarantees the integrity of the identification system for club officials.				

Table : tbl_works_for

S/N	Attributes	Datatype	Constraints	Comments
1	club_id	INT	PK,FK	This field represents the unique identifier for the football club where the official works, establishing a connection to the tbl_club table
2	official_id	INT	PK,FK	Serves as a foreign key referencing the unique identifier of the club official in the tbl_club_officials table
3	start_date	DATE	PK	Indicates the date when the official began working for

				the club
4	end_date	DATE		Represents the date when the official's tenure with the club concluded
<p>The primary key, composed of club_id, official_id, and start_date, ensures that each record is unique based on the combination of these attributes. The start_date attribute is considered as part of the primary key because an official can be hired again into the club after losing the job and renew their contracts, so the beginning and ending time of their contracts are important. Foreign key constraints (fk_works_ref_club and fk_works_ref_officials) link this table to the tbl_club and tbl_club_officials tables, facilitating data consistency and integrity. This table is crucial for tracking the employment history of club officials, including their start and end dates with specific clubs.</p>				

Table : tbl_players

S/N	Attributes	Datatype	Constraint s	Comments
1	player_id	INT	PK	This field serves as the unique identifier for each player in the system, acting as the primary key for the table
2	player_name	VARCHAR(200)		Represents the name of the football player
3	date_of_birth	DATE		Indicates the player's date of birth, providing essential information about their age
4	age	INT		Uses trigger , determined from date of birth
5	fav_position	VARCHAR(200)		Denotes the player's preferred or favorite playing position on the field
6	nationality	VARCHAR(200)		Represents the nationality of the player, signifying their home country
7	weekly_wage	INT		Specifies the weekly wage of the player, reflecting their financial

				compensation for playing
8	release_clause	INT		Indicates the release clause amount, which is the predetermined amount a club must pay to release the player from their contract
This table plays a central role in managing player-related information within the system, including personal details, playing preferences, and contractual aspects such as weekly wage and release clauses.				

Table : tbl_personal_trainers

S/N	Attributes	Datatype	Constraint s	Comments
1	player_id	INT	PK,FK	This field serves as a foreign key referencing the unique identifier of a player in the tbl_players table.
2	official_id	INT	PK,FK	Represents the unique identifier for the official or personal trainer in the system. This field is a foreign key referencing the official_id in the tbl_club_officials table, ensuring that only valid club officials can be assigned as personal trainers.
3	start_date	DATE	PK	Indicates the date when the association between the player and the personal trainer begins.
4	end_date	DATE		Represents the date when the association between the player and the personal trainer

				concludes
<p>The primary key constraint ensures that each combination of player_id, official_id, and start_date is unique, preventing duplicate entries for the same player and personal trainer during the same time period. The foreign key constraints establish referential integrity, linking this table to the player and club officials' information. This table is crucial for managing the relationships between players and their assigned personal trainers over specific time periods.</p>				

Table : tbl_plays_for

S/N	Attributes	Datatype	Constraint s	Comments
1	player_id	INT	PK,FK	Represents the unique identifier for a player. This field serves as a foreign key referencing the player_id in the tbl_players table, ensuring that only valid players can be associated with clubs.
2	club_id	INT	PK,FK	Represents the unique identifier for a football club. This field is a foreign key referencing the club_id in the tbl_club table, ensuring that only valid clubs can be associated with players.
3	jersey_no	INT	PK	Indicates the jersey number assigned to the player while playing for the club.
4	start_date	DATE	PK	Represents the date when the player starts playing for the club i.e, when his contract starts.
45	end_date	DATE		Represents the date when the player's association with the club concludes i.e, when his contract

				terminates.
6	prev_club_id	INT		Represents the previous club's unique identifier where the player was associated before joining the current club. This field is a foreign key referencing the club_id in the tbl_club table, allowing for a historical record of a player's club transitions. The field can be NULL if the player was not playing in any club previously.
<p>The primary key constraint ensures that each combination of player_id, club_id, jersey_no, and start_date is unique, preventing duplicate entries for the same player joining the same club with the same jersey number on the same start date. The foreign key constraints establish referential integrity, linking this table to the player and club information. This table is essential for tracking a player's history of club associations and jersey numbers over time.</p>				

Table : tbl_own_stadium

S/N	Attributes	Datatype	Constraint s	Comments
1	club_id	INT	PK,FK	Represents the unique identifier for a football club. This field is a foreign key referencing the club_id in the tbl_club table, ensuring that only valid clubs can own stadiums.

2	stadium_id	INT	PK	Represents the unique identifier for a stadium owned by a football club.
3	stadium_name	VARCHAR(200)		Indicates the name of the stadium.
4	location	VARCHAR(200)		Represents the location or city where the stadium is situated.
5	built_date	DATE		Represents the date when the stadium was built.
6	capacity	INT		Indicates the seating capacity of the stadium, specifying the maximum number of spectators it can accommodate.
<p>The primary key constraint on (club_id, stadium_id) ensures that each combination of a club and stadium is unique, preventing duplicate entries for the same club owning the same stadium. The foreign key constraint on club_id establishes referential integrity, linking this table to the club information. This table is crucial for associating stadiums with football clubs, providing details about the club's home ground, and enabling efficient management of stadium-related information.<i>In the eyes of a league, a stadium does not exist if it is not associated with a club. So, an club is needed to identify a stadium, hence this table is considered an weak entity set in the ER Diagram.</i></p>				

Table : tbl_referee

S/N	Attributes	Datatype	Constraint s	Comments
1	referee_Id	INT	PK	Represents the unique identifier for a referee.
2	referee_name	VARCHAR(200)		Indicates the name of the referee.
3	nationality	VARCHAR(200)		Represents the nationality of the referee.
<p>This table is essential for maintaining a list of referees, their names, and nationalities, providing a reference for match officiating personnel.</p>				

Table : tbl_match

S/N	Attributes	Datatype	Constraint s	Comments
1	match_id	INT	PK	Represents the unique identifier for a match.
2	match_date	DATE	NOT NULL	Indicates the date when the match is scheduled to take place.
3	match_time	TIME	NOT NULL	Represents the time at which the match is scheduled to start.
4	home_team	INT	NOT NULL	Foreign key referencing the home team's club ID from the tbl_club table
5	away_team	INT	NOT NULL	Foreign key referencing the away team's club ID from the tbl_club table
6	spectators	INT		Represents the number of spectators attending the match.
7	ticket_price	INT		Indicates the price of tickets for the match.
8	home_score	INT		Represents the score of the home team in the match.
9	away_score	INT		Represents the score of the away team in the match.
10	match_status	ENUM('finished', 'disrupted', 'upcoming')		Determines if the match is already happened, disrupted or scheduled to happen.

The **tbl_match** table serves as a pivotal repository for comprehensive information about football matches. It plays a crucial role in uniquely identifying each match through the primary key **match_id**. This table is extensively utilized to establish relationships with other tables, providing vital connections to teams through foreign key constraints (**fk_match_ref_home_club** and **fk_match_ref_away_club**). The table is employed when retrieving detailed data about specific matches, including essential details such as match date, time, participating teams (home and away), spectators, ticket prices, and the match status (whether it's finished, disrupted, or upcoming). This information is invaluable for various stakeholders, including fans, clubs, and league organizers, offering insights into the scheduling, outcomes, and overall management of football matches within the league system.

Table : tbl_match_events

S/N	Attributes	Datatype	Constraint s	Comments
1	match_id	INT	PK,FK	identifies the match to which the event belongs.
2	player_id	INT	PK,FK	Specifies the player involved in the event.
3	type_of_events	VARCHAR(200)	PK	Describes the nature of the event (e.g., goal,foul, assist).
4	min	INT	PK	Represents the minute in which the event occurred.
<p>The primary key constraint ensures the uniqueness of each event entry. Foreign key constraints establish relationships with other tables , linking events to specific players and the corresponding matches. This table is used when retrieving detailed information about specific events, supporting analysis, performance evaluation, and historical record-keeping within the football league management system.</p>				

Table : tbl_fixture

S/N	Attributes	Datatype	Constraint s	Comments
1	league_id	INT	PK,FK	Identifies the league to which the fixture belongs.
2	season	YEAR	PK,FK	Represents the specific season for which the fixture is scheduled.
3	match_id	INT	PK,FK	Points to the unique identifier of the match within the system.
<p>The primary key constraint ensures the uniqueness of each fixture entry, and foreign key constraints establish relationships with other tables (tbl_league and tbl_match). These relationships link fixtures to specific leagues, seasons, and matches, maintaining data integrity. The table is used to manage and retrieve fixture details, facilitating the organization and scheduling of matches within the football league management system.</p>				

Table : tbl_employs

S/N	Attributes	Datatype	Constraint s	Comments
1	league_id	INT	PK,FK	Identifies the football league in which the referee is employed.
2	season	YEAR	PK,FK	Represents the specific season during which the referee's employment is valid.
3	referee_id	INT	PK,FK	Points to the unique identifier of the referee within the system.
The table is used to keep track of referee assignments and contracts within the football league management system.				

Table : tbl_officiates

S/N	Attributes	Datatype	Constraint s	Comments
1	refree_id	INT	PK,FK	Identifies the referee officiating in the match.
2	match_id	INT	PK,FK	Represents the unique identifier for the football match.
3	role_in_match	ENUM('Referee', 'Assistant Referee', 'Linesman', 'VAR')	PK	Specifies the role of the referee in the match, which can be one of the following: 'Referee', 'Assistant Referee', 'Linesman', or 'VAR'.

This table is used to keep track of which referees are assigned to officiate in which roles for each football match within the system. The **chk_role_referee_officiates** constraint ensures that the role specified is one of the valid options.

Table : tbl_ranking

S/N	Attributes	Datatype	Constraints	Comments
1	ranking_id	INT	PK	A unique identifier for each ranking entry.
2	league_id	INT	PK,FK	Identifies the football league to which the ranking belongs.
3	season	ENUM('Referee', 'Assistant Referee', 'Linesman', 'VAR')	PK,FK	Represents the specific season for which the ranking is calculated.
4	club_id	INT	PK,FK	Identifies the football club for which the ranking is recorded.
5	match_played	INT		Indicates the total number of matches played by the club in the specified season.
6	wins	INT		Represents the number of matches won by the club.
7	losses	INT		Represents the number of matches lost by the club.
8	draws	INT		Represents the number of matches drawn by the club.
9	goals_for	INT		Indicates the total number of goals scored by the club in the season.
10	goals_against	INT		Indicates the total number of goals conceded by the club in the season.

This table is used to keep track of the performance and ranking of football clubs in different leagues across seasons.

Constraints :

tbl_club

- CONSTRAINT pk_club PRIMARY KEY(club_id)

tbl_league

- CONSTRAINT pk_league PRIMARY KEY(league_id, season)

tbl_plays_in_league

- CONSTRAINT pk_plays_in_league PRIMARY KEY(league_id, club_id, season)
- CONSTRAINT fk_plays_in_ref_league FOREIGN KEY (league_id, season) REFERENCES tbl_league(league_id, season)
- CONSTRAINT fk_plays_in_ref_club FOREIGN KEY(club_id) REFERENCES tbl_club(club_id)

tbl_club_officials

- CONSTRAINT pk_club_officials PRIMARY KEY(official_id)

tbl_works_for

- CONSTRAINT pk_works_for PRIMARY KEY(club_id, official_id, start_date)
- CONSTRAINT fk_works_ref_club FOREIGN KEY(club_id) REFERENCES tbl_club(club_id)
- CONSTRAINT fk_works_ref_officials FOREIGN KEY(official_id) REFERENCES tbl_club_officials(official_id)

tbl_players

- CONSTRAINT pk_players PRIMARY KEY(player_id)

tbl_personal_trainers

- CONSTRAINT pk_personal_trainer PRIMARY KEY (player_id, official_id, start_date)
- CONSTRAINT fk_per_trainer_ref_player FOREIGN KEY(player_id) REFERENCES tbl_players(player_id)
- CONSTRAINT fk_per_trainer_ref_officials FOREIGN KEY(official_id) REFERENCES tbl_club_officials(official_id)

tbl_plays_for

- CONSTRAINT pk_plays_for PRIMARY KEY(player_id,club_id,jersey_no,start_date)
- CONSTRAINT fk_plays_for_ref_players FOREIGN KEY(player_id) REFERENCES tbl_players(player_id)
- CONSTRAINT fk_plays_for_ref_club FOREIGN KEY(club_id) REFERENCES tbl_club(club_id)

tbl_own_stadium

- CONSTRAINT pk_own_stadium PRIMARY KEY(club_id,stadium_id)
- CONSTRAINT fk_ownstadium_ref_club FOREIGN KEY(club_id) REFERENCES tbl_club(club_id)

tbl_referee

- CONSTRAINT pk_match PRIMARY KEY(match_id)
- CONSTRAINT fk_match_ref_home_club FOREIGN KEY(home_team) REFERENCES tbl_club(club_id)
- CONSTRAINT fk_match_ref_away_club FOREIGN KEY(away_team) REFERENCES tbl_club(club_id)
- CONSTRAINT chk_match_status CHECK (match_status IN ('finished', 'disrupted', 'upcoming'))

- CONSTRAINT unique_match_date_time UNIQUE (match_date, match_time)

tbl_match_events

- CONSTRAINT pk_match_events PRIMARY KEY(match_id , player_id , type_of_events,min)
- CONSTRAINT fk_match_events_ref_player FOREIGN KEY(player_id) REFERENCES tbl_players(player_id)
- CONSTRAINT fk_match_events_ref_match FOREIGN KEY(match_id) REFERENCES tbl_match(match_id)

tbl_fixture

- CONSTRAINT pk_fixture PRIMARY KEY(league_id, match_id,season)
- CONSTRAINT fk_fixture_ref_league FOREIGN KEY(league_id,season) REFERENCES tbl_league(league_id,season)
- CONSTRAINT fk_fixture_ref_match FOREIGN KEY(match_id) REFERENCES tbl_match(match_id)

tbl_employs

- CONSTRAINT pk_employs PRIMARY KEY (league_id,season,referee_id)
- CONSTRAINT fk_employs_ref_league FOREIGN KEY(league_id,season) REFERENCES tbl_league(league_id,season)
- CONSTRAINT fk_employs_ref_referee FOREIGN KEY(referee_id) REFERENCES tbl_referee(referee_id)

tbl_officiates

- CONSTRAINT pk_officiates PRIMARY KEY(referee_id,match_id, role_in_match)
- CONSTRAINT fk_officiates_ref_referee FOREIGN KEY(referee_id) REFERENCES tbl_referee(referee_id)

- CONSTRAINT fk_officiates_ref_match FOREIGN KEY(match_id) REFERENCES tbl_match(match_id)
- CONSTRAINT chk_role_referee_officiates CHECK(role_in_match in ('Referee', 'Assistant Referee', 'Linesman', 'VAR'))

tbl_ranking

- CONSTRAINT pk_ranking PRIMARY KEY(ranking_id,league_id,season,club_id)
- CONSTRAINT fk_ranking_ref_league FOREIGN KEY(league_id,season) REFERENCES tbl_league(league_id,season)
- CONSTRAINT fk_ranking_ref_club FOREIGN KEY(club_id) REFERENCES tbl_club(club_id)

SQL Implementation

Create Tables

```
create database db_Mens_Football_Leagues_Club_Management_System;

use db_Mens_Football_Leagues_Club_Management_System;

create table tbl_club
(
    club_id INT,
    club_name VARCHAR(200),
    country VARCHAR(200),
    city VARCHAR(200),
    net_worth INT,

    CONSTRAINT pk_club PRIMARY KEY(club_id)
);

create table tbl_league
(
    league_id INT,
    season YEAR,
```

```

league_name VARCHAR(200),
country VARCHAR(200),
prize_money INT,
division VARCHAR(200),

CONSTRAINT pk_league PRIMARY KEY(league_id, season)

);

create table tbl_plays_in_league
(
    league_id INT,
    club_id INT,
    season YEAR,

    CONSTRAINT pk_plays_in_league PRIMARY KEY(league_id,club_id,season),
    CONSTRAINT fk_plays_in_ref_league FOREIGN KEY (league_id,season)
REFERENCES tbl_league(league_id,season),
    CONSTRAINT fk_plays_in_ref_club FOREIGN KEY(club_id) REFERENCES
tbl_club(club_id)
);

create table tbl_club_officials
(
    official_id INT,
    official_name VARCHAR(200),
    role_in_club VARCHAR(200),
    nationality VARCHAR(200),
    salary INT,
    release_clause INT,

    CONSTRAINT pk_club_offcials PRIMARY KEY(official_id)
);

create table tbl_works_for
(
    club_id INT,
    official_id INT,
    start_date DATE,
    end_date DATE,

    CONSTRAINT pk_works_for PRIMARY KEY(club_id, official_id,start_date),
    CONSTRAINT fk_works_ref_club FOREIGN KEY(club_id) REFERENCES
tbl_club(club_id),

```

```

        CONSTRAINT fk_works_ref_officials FOREIGN KEY(official_id) REFERENCES
tbl_club_officials(official_id)

);

create table tbl_players
(
    player_id INT,
    player_name VARCHAR(200),
    date_of_birth DATE,
    age int,
    fav_position VARCHAR(200),
    nationality VARCHAR(200),
    weekly_wage INT,
    release_clause INT,

    CONSTRAINT pk_players PRIMARY KEY(player_id)

);

create table tbl_personal_trainers
(
    player_id INT,
    official_id INT,
    start_date DATE,
    end_date DATE,

    CONSTRAINT pk_personal_trainer PRIMARY KEY (player_id, official_id,
start_date),
    CONSTRAINT fk_per_trainer_ref_player FOREIGN KEY(player_id) REFERENCES
tbl_players(player_id),
    CONSTRAINT fk_per_trainer_ref_officials FOREIGN KEY(official_id)
REFERENCES tbl_club_officials(official_id)
);

create table tbl_plays_for
(
    player_id INT,
    club_id INT,
    jersey_no INT,
    start_date DATE,
    end_date DATE,
    prev_club_id INT,

```

```
        CONSTRAINT pk_plays_for PRIMARY
KEY(player_id,club_id,jersey_no,start_date),
        CONSTRAINT fk_plays_for_ref_players FOREIGN KEY(player_id) REFERENCES
tbl_players(player_id),
        CONSTRAINT fk_plays_for_ref_club FOREIGN KEY(club_id) REFERENCES
tbl_club(club_id)
);
```

```
create table tbl_own_stadium
(
    club_id INT,
    stadium_id INT,
    stadium_name VARCHAR(200),
    location VARCHAR(200),
    built_date DATE,
    capacity INT,

    CONSTRAINT pk_own_stadium PRIMARY KEY(club_id,stadium_id),
    CONSTRAINT fk_ownstadium_ref_club FOREIGN KEY(club_id) REFERENCES
tbl_club(club_id)

);
```

```
create table tbl_referee
(
    referee_id INT,
    referee_name VARCHAR(200),
    nationality VARCHAR(200),

    CONSTRAINT pk_referee PRIMARY KEY(referee_id)

);
```

```
create table tbl_match
(
    match_id INT,
    match_date DATE NOT NULL,
    match_time TIME NOT NULL,
    home_team INT NOT NULL,
    away_team INT NOT NULL,
    spectators INT,
    ticket_price INT,
    home_score INT,
```

```

away_score INT,
match_status ENUM('finished', 'disrupted', 'upcoming'),

CONSTRAINT pk_match PRIMARY KEY(match_id),
CONSTRAINT fk_match_ref_home_club FOREIGN KEY(home_team) REFERENCES
tbl_club(club_id),
CONSTRAINT fk_match_ref_away_club FOREIGN KEY(away_team) REFERENCES
tbl_club(club_id),
CONSTRAINT chk_match_status CHECK (match_status IN ('finished',
'disrupted', 'upcoming')),
CONSTRAINT unique_match_date_time UNIQUE (match_date, match_time)

);

```

```

create table tbl_match_events
(
    match_id INT,
    player_id INT,
    type_of_events VARCHAR(200),
    min INT,

    CONSTRAINT pk_match_events PRIMARY
KEY(match_id,player_id,type_of_events,min),
    CONSTRAINT fk_match_events_ref_player FOREIGN KEY(player_id) REFERENCES
tbl_players(player_id),
    CONSTRAINT fk_match_events_ref_match FOREIGN KEY(match_id) REFERENCES
tbl_match(match_id)

);

```

```

create table tbl_fixture
(
    league_id INT,
    season YEAR,
    match_id INT,

    CONSTRAINT pk_fixture PRIMARY KEY(league_id, match_id,season),
    CONSTRAINT fk_fixture_ref_league FOREIGN KEY(league_id,season) REFERENCES
tbl_league(league_id,season),
    CONSTRAINT fk_fixture_ref_match FOREIGN KEY(match_id) REFERENCES
tbl_match(match_id)

```

```

);

create table tbl_employs
(
    league_id INT,
    season YEAR,
    referee_id INT,

    CONSTRAINT pk_employs PRIMARY KEY (league_id,season,referee_id),
    CONSTRAINT fk_employs_ref_league FOREIGN KEY(league_id,season) REFERENCES
tbl_league(league_id,season),
    CONSTRAINT fk_employs_ref_referee FOREIGN KEY(referee_id) REFERENCES
tbl_referee(referee_id)

);

create table tbl_officiates
(
    referee_id INT,
    match_id INT,
    role_in_match ENUM('Referee', 'Assistant Referee', 'Linesman', 'VAR'),

    CONSTRAINT pk_offciates PRIMARY KEY(referee_id,match_id, role_in_match),
    CONSTRAINT fk_officiates_ref_referee FOREIGN KEY(referee_id) REFERENCES
tbl_referee(referee_id),
    CONSTRAINT fk_officiates_ref_match FOREIGN KEY(match_id) REFERENCES
tbl_match(match_id),
    CONSTRAINT chk_role_referee_officiates CHECK(role_in_match in ('Referee',
'Assistant Referee', 'Linesman', 'VAR'))
);

create table tbl_ranking
(
    ranking_id INT,
    league_id INT,
    season YEAR,
    club_id INT,

    match_played INT,
    wins INT,
    losses INT,
    draws INT,
    goals_for INT,
    goals_against INT,

```

```

CONSTRAINT pk_ranking PRIMARY KEY(ranking_id,league_id,season,club_id),
CONSTRAINT fk_ranking_ref_league FOREIGN KEY(league_id,season) REFERENCES
tbl_league(league_id,season),
CONSTRAINT fk_ranking_ref_club FOREIGN KEY(club_id) REFERENCES
tbl_club(club_id)
);

```

Queries

- Retrieve total revenue generated by each club in a particular year (Ex. 2018) by selling tickets in a particular league (Ex. Premier League)

```

with club_rev as
(select home_team as club_id, spectators*ticket_price as revenue
from tbl_match
where spectators is not NULL and ticket_price is not NULL),
total_sale as
(
select club_id, sum(revenue) as total_reveue
from club_rev
group by club_id
)
select c.club_name, t.total_reveue
from total_sale as t join tbl_club as c
on t.club_id = c.club_id;

```

Output

club_name	total_reveue
Liverpool FC	9305000
Manchester City	8636000
Manchester United	10220000
Arsenal	11152000

- the ranking of the table for a particular league (Ex. Premier League) in a season (Ex. 2018)

```
with premier_league as(
    select c.club_name, match_played, wins, losses, draws, goals_for,
    goals_against , (goals_for-goals_against) as goal_diff
    ,(wins*3 + draws*1) as points, (wins*3 + draws*1) +
    (goals_for-goals_against) as hidden_pts
    from tbl_ranking as r, tbl_club as c
    where r.league_id = (select distinct league_id from tbl_league where
    league_name="Premier League" and season = '2018')
    and r.club_id = c.club_id
)
select club_name, match_played, wins, losses, draws, goals_for,
goals_against , goal_diff
, points
from premier_league
order by points desc, goal_diff asc;
```

Output

club_name	match_played	wins	losses	draws	goals_for	goals_against	goal_diff	points
Liverpool FC	6	4	0	2	12	3	9	14
Manchester City	6	3	1	2	10	5	5	11
Manchester United	6	2	0	4	5	12	-7	10
Arsenal	6	2	2	2	7	4	3	8

- Retrieve Officials Working for a Club and Their Role

```
select c.club_name, o.official_name, o.role_in_club
from tbl_club as c
join tbl_works_for as w on c.club_id = w.club_id
join tbl_club_officials as o on w.official_id = o.official_id
where c.club_name = 'Liverpool FC';
```

Output

club_name	official_name	role_in_club
Liverpool FC	Jürgen Klopp	Manager
Liverpool FC	Pepijn Lijnders	Assistant Manager
Liverpool FC	Peter Krawietz	Assistant Manager
Liverpool FC	Andreas Kornmayer	Head of Fitness and Conditioning
Liverpool FC	John Achterberg	Goalkeeping Coach
Liverpool FC	Mona Nemmer	Nutritionist
Liverpool FC	Vitor Matos	Elite Development Coach

- Obtain number of goals by penalties in a season (Ex. in 2018)

```
select count(distinct concat(match_id,player_id,min) ) as pernalties_count
from tbl_match_events
where match_id in (select distinct match_id from fixture where season =
'2018')
and type_of_events like "%Penalty%" and type_of_events not like "%miss%";
```

Output

pernalties_count
3

- Retrieve number of red cards from every club in a particular season

```
with red_table as (
  select player_id, count(concat(match_id,player_id)) as red_card_count
  from tbl_match_events as me
  where type_of_events like '%Penalty%' and match_id in (select
distinct match_id from tbl_match where
match_date between '2018-01-01' and '2018-12-31')
  group by player_id
),
red_clubs as (
  select c.club_id, sum(red_card_count) as total_red_cnt
```

```

    from tbl_plays_for as c, red_table as r
    where c.player_id = r.player_id
    group by c.club_id
)
select club_name, COALESCE(total_red_cnt, 0) as total_red_cnt
from tbl_club as c
left outer join
red_clubs as r
on c.club_id = r.club_id;

```

Output

club_name	total_red_cnt
Liverpool FC	2
Manchester City	0
Manchester United	0
Arsenal	1

- Learn which clubs are going to get relegated in the next season

```

with premier_league as(
    select c.club_name, match_played, wins, losses, draws, goals_for,
    goals_against , (goals_for-goals_against) as goal_diff
    ,(wins*3 + draws*1) as points, (wins*3 + draws*1) +
    (goals_for-goals_against) as hidden_pts
    from tbl_ranking as r, tbl_club as c
    where r.league_id = (select distinct league_id from tbl_league where
    league_name="Premier League" and season = '2018')
    and r.club_id = c.club_id
),
reversed_ranked_premier_league as(
    select club_name, match_played, wins, losses, draws, goals_for,
    goals_against, goal_diff, points
    from premier_league

```

```

        order by points asc, goal_diff desc
    )
select * from
revered_ranked_premier_league
order by points asc
limit 2;

```

Output

club_name	match_played	wins	losses	draws	goals_for	goals_against	goal_diff	points
Arsenal	6	2	2	2	7	4	3	8
Manchester United	6	2	0	4	5	12	-7	10

- Top 2 scorers from a season

```

with candidates as (
    select player_id , count( player_id) as goals
    from tbl_match_events
    where type_of_events like "%Goal%" and match_id in (select distinct
match_id from tbl_fixture
                                                    where season
= '2018')
    group by player_id
    order by goals desc
)
select player_name , goals
from tbl_players p
right outer join
candidates c
on p.player_id = c.player_id
limit 2;

```

Output

player_name	goals
Mohamed Salah	4
Roberto Firmino	3

Functions & Procedures

- Procedure to insert player info to the database where id is allocated automatically

```
DELIMITER $$
DROP PROCEDURE IF EXISTS setPlayer $$
create PROCEDURE setPlayer(IN name VARCHAR(200),
                           IN dob DATE,
                           IN position VARCHAR(200),
                           IN nation VARCHAR(200),
                           IN wage INT,
                           IN rc INT)

BEGIN
    DECLARE id INT ;

    select max(player_id) into id from tbl_players ;

    if id is NULL
        then set id := 1 ;
    else
        set id := id + 1;
    end if;

    insert into tbl_players values
    (id, name, dob, position, nation, wage, rc);

    select concat('player ', name , ' inserted') as insert_status;
```

```
END $$  
DELIMITER ;
```

Triggers

- Trigger to automatically calculate age from date of birth

```
DELIMITER $$  
DROP FUNCTION IF EXISTS players_age $$  
CREATE FUNCTION players_age(DOB DATE)  
RETURNS int DETERMINISTIC  
  
BEGIN  
    RETURN year(CURDATE()) - year(DOB);  
END $$  
  
DELIMITER ;
```

Finding Normal Form

Table: tbl_club

- club_id -> {club_name , country , city , net_worth}

Here is only one dependency where club_id determines the whole attribute set of the relation, hence it is a superkey. So, the normal form of the table is **BCNF**.

Table: tbl_league

- {league_id , season} -> {league_name , prize_money, division}
- league_id -> country

league_id and season forms a superkey as well as a candidate key for the relation schema. As league_id is contained within a candidate key, this condition satisfies 3NF conditions. So, the table is in **3NF**.

Table: tbl_plays_in_league

- {league_id, season} -> club_id

Table: tbl_club_officials

- official_id -> {official_name, nationality, role_in_club, salary, release_clause}

As it can be seen, we can prove that official_id -> R; which means official_id is a superkey as well as a candidate key. So the relation is in **BCNF**.

Table: tbl_works_for

- { club_id, official_id, start_date } -> end_date

The functional dependency implies that the normal form of the relation in **BCNF**; because { club_id, official_id, start_date } is a superkey.

Table: tbl_players

- player_id -> {player_name, date_of_birth, age, fav_position, nationality, weekly_wage, release_clause}

player_id is a superkey for the table tbl_players; hence it is in **BCNF**.

Table: tbl_personal_trainers

- {player_id, official_id, start_date} -> end_date

The relation is in **BCNF**.

Table: tbl_plays_for

- {player_id, club_id, start_date} -> {end_date, jersey_no, prev_club_id}

{player_id, club_id, start_date} is a superkey. Hence the table is in **BCNF**.

Table: tbl_referee

- referee_id -> {referee_name, nationality}

{referee_id} -> R, hence it is in **BCNF**.

Table: **tbl_match**

- match_id -> {match_date, match_time, home_team, away_team, spectators, ticket_price, home_score, away_score, match_status}
- {match_id ,home_team } -> home_score
- {match_id ,away_team } -> away_score

Here, {match_id} is a super_key. The others contain match_id, hence they are also superkeys. Hence the relation is in **BCNF**.

Table: **tbl_match_events**

- {match_id,player_id,type_of_events,min} -> {match_id,player_id,type_of_events,min}

The relation is in **BCNF**.

Table: **tbl_fixture**

- match_id -> {league_id, season}

match_id is a superkey and candidate key. Hence the table is in **BCNF**.

Table: **tbl_employs**

- {referee_id , match_id, role_in_match} -> {referee_id , match_id, role_in_match}

The table is in **BCNF**, because it is a trivial functional dependency.

Table: **tbl_ranking**

- {ranking_id,league_id,season,club_id} -> {match_played, wins, losses, draws, goals_for, goals_against}
- {ranking_id,league_id,season,club_id}->R, the relation schema is in **BCNF**.

Future Works & Conclusions

The primary aim of this football club management database project is to consolidate and present detailed information about football clubs, leagues, players, matches, and related entities. The goal is to provide a comprehensive resource for football enthusiasts, administrators, and analysts, fostering a deeper understanding of the dynamics within the footballing world. Additionally, the database incorporates details about club officials, stadiums, referees, and match events, creating a holistic view of the football ecosystem.

However, it's important to note that the current version of the database is focused on a singular football league, and the scope is limited to a specific set of clubs, players, and matches. The dataset is a starting point, and there is vast potential for expansion. To enhance the project's utility, future work will prioritize the inclusion of data from multiple football leagues, broadening the scope and providing a more diverse and representative dataset.

The project acknowledges certain limitations, such as the absence of historical data, and plans to address these by incorporating past seasons' statistics and additional event details. Furthermore, the development of a user-friendly interface is a crucial aspect of future work. This interface will enable users, including those unfamiliar with SQL, to interact with and extract information from the database seamlessly.

In conclusion, this football club management database project lays the groundwork for a comprehensive system that captures the essence of football management. By addressing current limitations and expanding the dataset to encompass multiple leagues, the project aims to be a valuable resource for football enthusiasts, researchers, and stakeholders, contributing to a deeper appreciation and understanding of the global football landscape.