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FACULTY OF SCIENCE AND TECHNOLOGY

CISC3000: Database Design Project

Premier League Database

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A. Domain Overview

The Premier League, with its vast popularity, requires a system to manage the vast array of information associated with players, teams, and matches. Our database aims to capture the intricacies of the league's operations, ranging from detailed player profiles, team statistics, and match outcomes to the logistics of stadium allocation and the administrative roles of referees and coaches.

Players. Players form the core entities, with detailed records of their performance statistics like goals, assists, disciplinary actions, as well as their nationalities and playing positions.

Teams and Stadiums. Teams are crucial entities linked to their home stadiums, which is also the foundation of the clubs' culture. Stadium details like capacity and city are also captured.

Matches. Match fixtures involving the playing time, home and away teams, referees, and final scores are recorded to provide historical performance data and determine league standings.

Human resources. The human element is represented by coaches and referees. Coaches are associated with their teams, while referees are tied to specific matches. Their personal details like nationalities are stored.

The proposed database aims to efficiently manage these interconnected aspects, ensuring stakeholders have access to structured, up-to-date information regarding players, teams, matches, venues, and administrators.

B. Database Design Description

B-I. Descriptions of entities

B-I-(a). Stadiums

stadiums

stadium_id
name
capacity
city

Stadiums is an entity that represents sports stadiums of each teams and where games are held.

stadium_id: Primary key, automatically incremented, uniquely identifies a stadium

name: Name of the stadium, must not be null.

capacity: Maximum number of spectators the stadium can hold.

city: The city where the stadium is located.

B-I-(b). Nationalities

nationalities
nationality_id
nationality_name

Nationalities is an entity that represents the nationalities of various individuals involved in sports, such as players and coaches.

nationality_id: Primary key, a three-letter code that uniquely identifies a nationality.

nationality_name: The name of the nationality, must be unique and not null.

B-I-(c). Teams

teams
team_id
team_name
rank
stadium_id

Teams is an entity that represents the information of each sports team.

team_id: Primary key, uniquely identifies a team.

team_name: Name of the team, must not be null.

rank: International rank of the team.

stadium_id: Foreign key referencing stadiums, indicates the home stadium of the team.

B-I-(d). Coaches

coaches
coach_id
coach_name
team
nationality_id

Coaches is an entity that represents coaches of sports teams.

coach_id: Primary key, automatically incremented, uniquely identifies a coach.

coach_name: Name of the coach, must not be null.

team: Foreign key referencing teams, indicates the team coached.

nationality_id: Foreign key referencing nationalities, indicates the nationality of the coach.

B-I-(e). Positions

positions
position_id
position_name

Positions is an entity that represents positions that can be played in sports.

position_id: Primary key, a three-letter code uniquely identifying a position.

position_name: Name of the position, must not be null.

B-I-(f). Players

players
id
name
birthday

nationality_id *team*

Players is an entity that represents personal information for each player.

id: Primary key, automatically incremented, uniquely identifies a player.

name: Name of the player, must not be null.

birthday: Birthdate of the player.

nationality_id: Foreign key referencing nationalities, indicates the nationality of the player.

team: Foreign key referencing teams, indicates the team the player plays for.

B-I-(g). Player_position

player_positions
player_id *position_id*

Player_positions is an entity that represents the positions that a player can play in.

player_id: Foreign key referencing players, part of the composite primary key.

position_id: Foreign key referencing positions, part of the composite primary key.

B-I-(h). Referees

referees
referee_id *referee_name* *nationality_id*

Referees is an entity that represents referees who officiate matches.

referee_id: Primary key, automatically incremented, uniquely identifies a referee.

referee_name: Name of the referee, must not be null.

nationality_id: Foreign key referencing nationalities, indicates the nationality of the referee.

B-I-(i). Matches

matches
match_id
date
home_team_id
away_team_id
referee_id
stadium_id
result

Matches is an entity that represents sports matches between teams.

match_id: Primary key, automatically incremented, uniquely identifies a match.

date: Date the match is played.

home_team_id: Foreign key referencing teams, indicates the home team.

away_team_id: Foreign key referencing teams, indicates the away team.

referee_id: Foreign key referencing referees, indicates the referee for the match.

stadium_id: Foreign key referencing stadiums, indicates where the match is played.

result: Outcome of the match, stored as a string.

B-I-(j). Matches_participation

matches_participation
match_id
player_id
goals
assists
saves
yellow_cards
red_cards

Matches_participation is an entity that records the participation and performance of players in matches.

match_id: Foreign key referencing matches, part of the composite primary key.

player_id: Foreign key referencing players, part of the composite primary key.

goals: Number of goals scored by the player in the match.

assists: Number of assists made by the player.

saves: Number of saves by the player if applicable.

yellow_cards: Number of yellow cards received.

red_cards: Number of red cards received.

B-II. Relationships & Requirements

B-III-(a). player_positions & positions

player_positions represents a Many-To-Many relationship between ***players*** and ***positions***. Each player can occupy multiple positions, and each position can be filled by different players. The composite primary keys are ***player_id*** & ***position_id***, where ***player_id*** is a foreign key referencing ***players*** and ***position_id*** is a foreign key referencing ***positions***. This design accommodates the flexibility in player roles within a team.

B-III-(b). matches & teams

matches have a Many-To-One relationship with teams via ***home_team_id*** and ***away_team_id***. Each match is associated with one home team and one away team, reflecting the structure of a typical soccer game setup. The ***team_id*** in teams serves as a foreign key that is referenced twice in ***matches***: once for the home team and once for the away team. This setup ensures clarity in scheduling and recording the outcomes of matches.

B-III-(c). matches_participation & players

matches_participation is a Many-To-Many relationship capturing individual player performances in matches. Each record combines a ***match_id*** and a ***player_id*** with performance metrics like goals, assists, and cards. This table allows for detailed tracking of player contributions during games, with ***match_id*** and ***player_id*** serving as composite primary keys linking back to their respective matches and players tables.

B-III-(d). coaches & teams

coaches have a Many-To-One relationship with teams. Each team can have one or more coaches, but typically, a head coach is associated with a single team at any given time. ***team*** in ***coaches*** is a foreign key referencing the ***team_id*** in teams. This relationship helps in managing team coaching staff assignments and responsibilities.

B-III-(e). stadiums & teams

stadiums have a One-To-Many relationship with ***teams*** through ***stadium_id***. Each team is associated with one primary stadium, though multiple teams might share the same stadium for their home games. This arrangement is vital for organizing matches and managing stadium resources effectively.

B-III-(f). referees & matches

referees have a Many-To-One relationship with ***matches*** through ***referee_id***. Each match is managed by one referee, whose details are stored in the **referees** table and linked to matches, ensuring accountability and the proper conduct of games.

C. Entity-Relationship (ER) Diagram

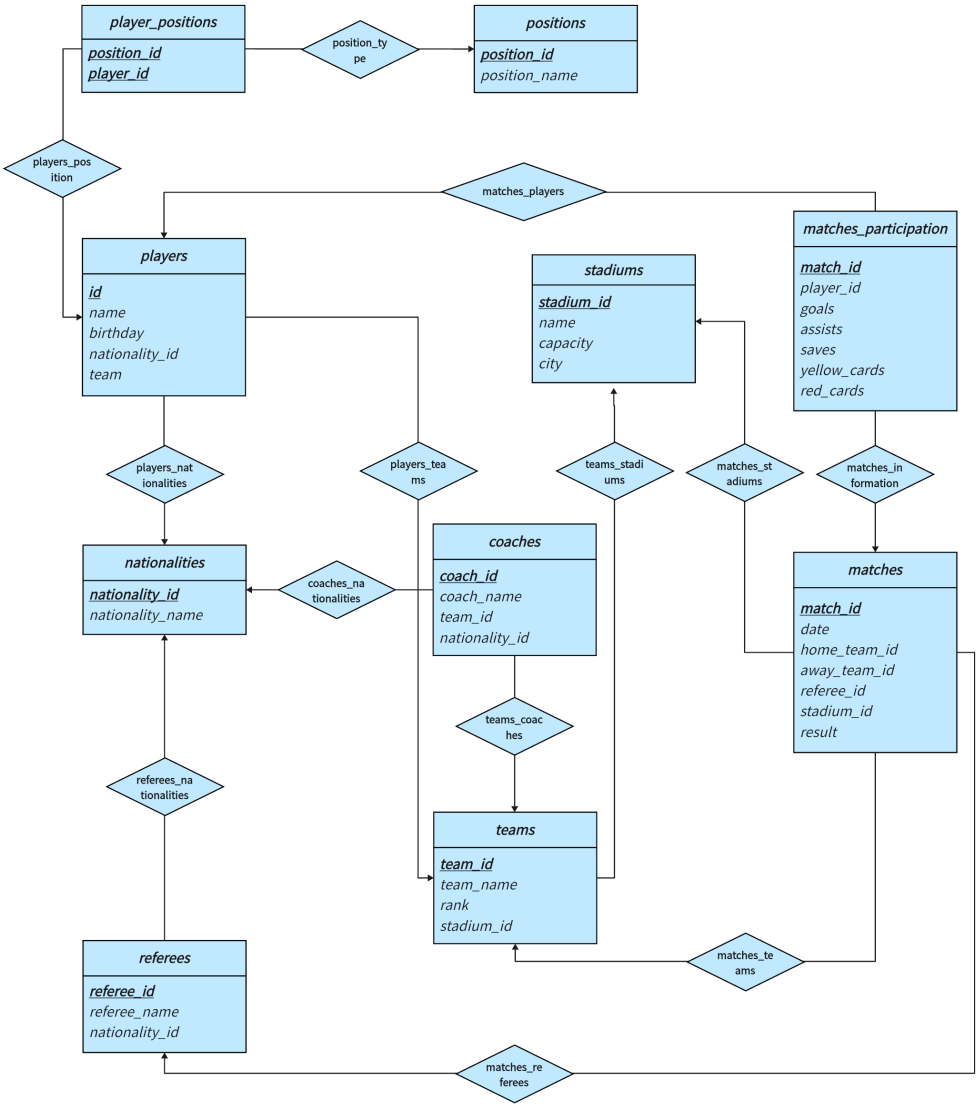

Figure 1 ER Diagram

D. Extended Entity-Relationship (EER) Diagram

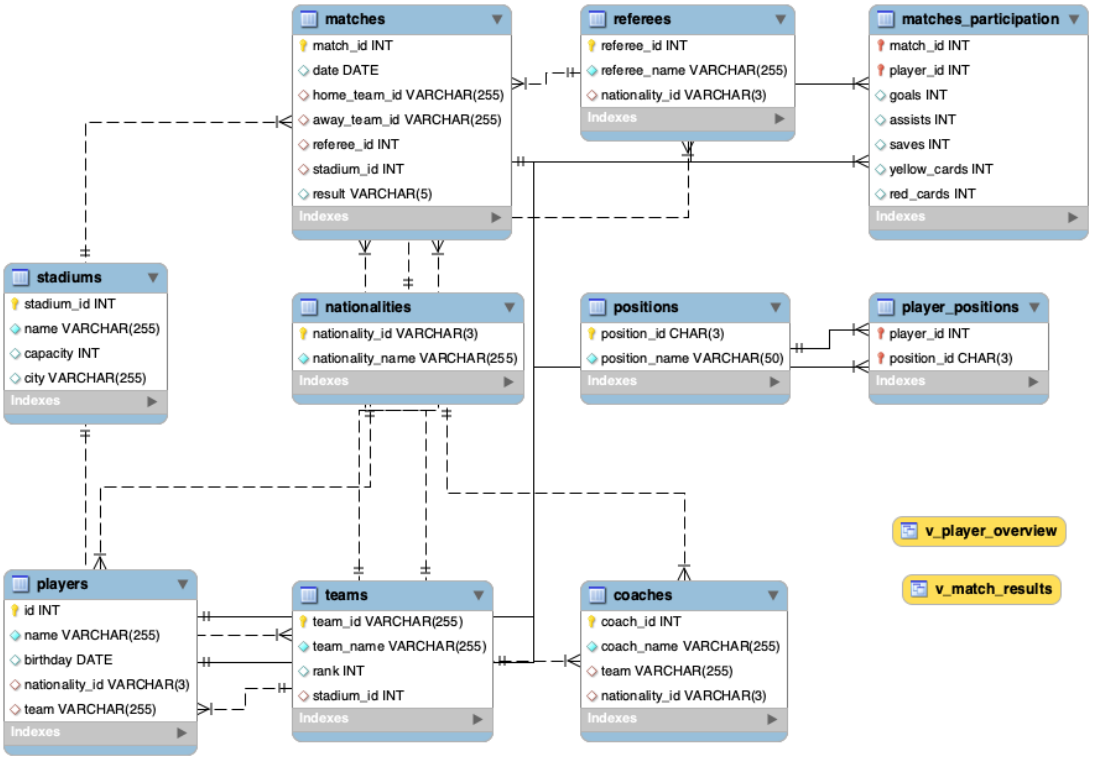

Figure 2 EER Diagram

E. Data Definition Language (DDL) Specifications

E-I. Create Tables

```
-- 1. Stadiums
CREATE TABLE stadiums (
    stadium_id INT PRIMARY KEY AUTO_INCREMENT,
    name VARCHAR(255) NOT NULL,
    capacity INT,
    city VARCHAR(255)
);

-- 2. Nationalities
CREATE TABLE nationalities (
    nationality_id VARCHAR(3) PRIMARY KEY,
    nationality_name VARCHAR(255) UNIQUE NOT NULL
);
```

```sql
-- 3. Teams
CREATE TABLE teams (
    team_id VARCHAR(255) PRIMARY KEY,
    team_name VARCHAR(255) NOT NULL,
    `rank` INT,
    stadium_id INT,
    FOREIGN KEY (stadium_id) REFERENCES stadiums(stadium_id)
);

-- 4. Coaches
CREATE TABLE coaches (
    coach_id INT PRIMARY KEY AUTO_INCREMENT,
    coach_name VARCHAR(255) NOT NULL,
    team VARCHAR(255),
    nationality_id VARCHAR(3),
    FOREIGN KEY (team) REFERENCES teams(team_id),
    FOREIGN KEY (nationality_id) REFERENCES
nationalities(nationality_id)
);

-- 5. Positions
CREATE TABLE positions (
    position_id CHAR(3) PRIMARY KEY,
    position_name VARCHAR(50) NOT NULL
);

-- 6. Players
CREATE TABLE players (
    id INT PRIMARY KEY AUTO_INCREMENT,
    name VARCHAR(255) NOT NULL,
    birthday DATE,
    nationality_id VARCHAR(3),
    team VARCHAR(255),
    FOREIGN KEY (nationality_id) REFERENCES
nationalities(nationality_id),
    FOREIGN KEY (team) REFERENCES teams(team_id)
);

-- 7. Player_positions
CREATE TABLE player_positions (
    player_id INT,
    position_id CHAR(3),
    PRIMARY KEY (player_id, position_id),
    FOREIGN KEY (player_id) REFERENCES players(id),
```

```
    FOREIGN KEY (position_id) REFERENCES positions(position_id)
);

-- 8. Referees
CREATE TABLE referees (
    referee_id INT PRIMARY KEY AUTO_INCREMENT,
    referee_name VARCHAR(255) NOT NULL,
    nationality_id VARCHAR(3),
    FOREIGN KEY (nationality_id) REFERENCES
nationalities(nationality_id)
);

-- 9. Matches
CREATE TABLE matches (
    match_id INT PRIMARY KEY AUTO_INCREMENT,
    date DATE,
    home_team_id VARCHAR(255),
    away_team_id VARCHAR(255),
    referee_id INT,
    stadium_id INT,
    result VARCHAR(5),
    FOREIGN KEY (home_team_id) REFERENCES teams(team_id),
    FOREIGN KEY (away_team_id) REFERENCES teams(team_id),
    FOREIGN KEY (referee_id) REFERENCES referees(referee_id),
    FOREIGN KEY (stadium_id) REFERENCES stadiums(stadium_id)
);

-- 10. Matches_participation
CREATE TABLE matches_participation (
    match_id INT,
    player_id INT,
    goals INT,
    assists INT,
    saves INT,
    yellow_cards INT,
    red_cards INT,
    PRIMARY KEY (match_id, player_id),
    FOREIGN KEY (match_id) REFERENCES matches(match_id),
    FOREIGN KEY (player_id) REFERENCES players(id)
);
```

E-II. Views

E-II-(a). Player_overview

```
-- This view displays basic information about the player, including
their name, age, nationality, position and team.
CREATE VIEW v_player_overview AS
SELECT
    p.id AS player_id,
    p.name AS player_name,
    p.birthday AS player_birthday,
    n.nationality_name,
    GROUP_CONCAT(pos.position_name ORDER BY pos.position_name
SEPARATOR ', ') AS positions,
    t.team_name
FROM players p
JOIN teams t ON p.team = t.team_id
JOIN player_positions pp ON p.id = pp.player_id
JOIN positions pos ON pp.position_id = pos.position_id
JOIN nationalities n ON p.nationality_id = n.nationality_id
GROUP BY p.id, p.name, t.team_name, n.nationality_name;
```

player_id	player_name	player_birthd...	nationality_name	positions	team_name
1	Bruno Fernandes	1994-09-08	Portugal	Forwards, Midfielders	Manchester United
2	Son Heung-min	1992-07-08	South Korea	Forwards, Midfielders	Tottenham Hotspur
3	Aaron Ramsdale	1998-05-14	England	Goalkeepers	Arsenal
4	Kevin De Bruyne	1991-06-28	Belgium	Midfielders	Manchester City
5	Enzo Fernández	2001-01-17	Argentina	Midfielders	Chelsea
6	Tomáš Souček	1995-02-27	Czech Republic	Midfielders	West Ham United
7	Mohamed Salah	1992-06-15	Egypt	Forwards	Liverpool
8	Ollie Watkins	1995-12-30	England	Forwards	Aston Villa
9	Kaoru Mitoma	1997-05-20	Japan	Forwards, Midfielders	Brighton & Hove Albion
10	Jordan Pickford	1994-03-07	England	Goalkeepers	Everton
11	Hwang Hee-chan	1996-01-26	South Korea	Forwards, Midfielders	Wolverhampton Wan…
12	Alexander Isak	1999-09-21	Sweden	Forwards	Newcastle United
13	Bernd Leno	1992-03-04	Germany	Goalkeepers	Fulham
14	Jaïro Riedewald	1996-09-09	Netherlands	Defenders, Midfielders	Crystal Palace

Figure 3 Result Player_overview

E-II.(b). Match_results

```
-- This view provides detailed information about each match,
including the date of the match, the teams involved, and the final
result.
CREATE VIEW v_match_results AS
SELECT
    m.match_id,
    m.date AS match_date,
    ht.team_name AS home_team,
    at.team_name AS away_team,
```

```
    m.result
FROM matches m
JOIN teams ht ON m.home_team_id = ht.team_id
JOIN teams at ON m.away_team_id = at.team_id;
```

match_id	match_date	home_team	away_team	result
1	2022-08-05	Crystal Palace	Arsenal	0:2
2	2022-08-13	Aston Villa	Everton	2:1
3	2022-08-20	Tottenham Hotspur	Wolverhampton Wanderers	1:0
4	2022-08-27	Manchester City	Crystal Palace	4:2
5	2022-08-30	Fulham	Brighton & Hove Albion	2:1
6	2022-09-04	Manchester United	Arsenal	3:1
7	2022-09-17	Wolverhampton Wanderers	Manchester City	0:3
8	2022-10-01	Liverpool	Brighton & Hove Albion	3:3
9	2022-10-08	Brighton & Hove Albion	Tottenham Hotspur	0:1
10	2022-10-19	Manchester United	Tottenham Hotspur	2:0

Figure 4 Result of Match_results

E-III. Functions

E-III-(a). CalculateAge

```
-- 1. Enter the player ID and calculate the age.
USE Permier_league

DELIMITER $$

CREATE FUNCTION CalculateAge(birthday DATE) RETURNS INT
DETERMINISTIC
BEGIN
    DECLARE today DATE;
    DECLARE bornYear INT;
    DECLARE thisYear INT;
    DECLARE age INT;

    -- Get today's date
    SET today = CURDATE();
    -- Extract the year from the birth date and today's date
    SET bornYear = YEAR(birthday);
    SET thisYear = YEAR(today);

    -- Calculate preliminary age
    SET age = thisYear - bornYear;

    -- Adjust the age if the current date is before the birth date
```

```
    IF DATE_FORMAT(today, '%m%d') < DATE_FORMAT(birthday, '%m%d')
THEN
        SET age = age - 1;
    END IF;

    RETURN age;
END $$

DELIMITER ;
```

E-III-(b). GetTeamWins

```
-- 2. Enter the team ID and get the total wins.
USE Permier_league

DELIMITER $$

CREATE FUNCTION GetTeamWins(teamId VARCHAR(255)) RETURNS INT
DETERMINISTIC
BEGIN
    DECLARE wins INT;
    SELECT COUNT(*) INTO wins FROM matches WHERE home_team_id =
teamId AND SUBSTRING_INDEX(result, ':', 1) > SUBSTRING_INDEX(result,
':', -1);
    RETURN wins;
END $$

DELIMITER ;
```

E-IV. Procedures

E-IV-(a). AddMatchParticipation

```
-- 1. This procedure can be used to add a new record to the
matches_participation table.
USE Permier_league

DELIMITER $$

CREATE PROCEDURE AddMatchParticipation(IN match_id INT, IN player_id
INT, IN goals_scored INT, IN assists_made INT, IN saves_done INT, IN
yellow_cards_given INT, IN red_cards_given INT)
BEGIN
```

```
    INSERT INTO matches_participation (match_id, player_id, goals,
assists, saves, yellow_cards, red_cards)
    VALUES (match_id, player_id, goals_scored, assists_made,
saves_done, yellow_cards_given, red_cards_given);
END $$

DELIMITER ;
```

E-IV-(b). InsertNewMatch

```
-- 2. This procedure is used to create a new match record that
accepts the date of the match, home team ID, away team ID, referee
ID, stadium ID, and match result.
USE Permier_league

DELIMITER $$

CREATE PROCEDURE InsertNewMatch(IN matchDate DATE, IN homeTeam
VARCHAR(255), IN awayTeam VARCHAR(255), IN matchReferee INT, IN
matchStadium INT, IN matchResult VARCHAR(5))
BEGIN
    INSERT INTO matches(date, home_team_id, away_team_id, referee_id,
stadium_id, result)
    VALUES (matchDate, homeTeam, awayTeam, matchReferee,
matchStadium, matchResult);
END $$

DELIMITER ;
```

F. Table Contents Display

F-I. *Stadiums*

stadium_id	name	capacity	city
1	Old Trafford	74879	Manchester
2	Tottenham Hotspur Stadium	62850	London
3	London Stadium	62500	London
4	Anfield	60725	Liverpool
5	Emirates Stadium	60704	London
6	Etihad Stadium	55017	Manchester
7	St James' Park	52338	Newcastle upon Tyne
8	Villa Park	42682	Birmingham
9	Stamford Bridge	40853	London
10	Goodison Park	39571	Liverpool
11	Molineux Stadium	32050	Wolverhampton
12	AMEX Stadium	31800	Brighton
13	Selhurst Park	26047	London
14	Craven Cottage	25700	London
NULL	NULL	NULL	NULL

Figure 5 Contents of Stadiums

F-II. *Nationalities*

nationality_id	nationality_name
ARG	Argentina
BEL	Belgium
BRA	Brazil
CZE	Czech Republic
EGY	Egypt
ENG	England
GER	Germany
ITA	Italy
JPN	Japan
NED	Netherlands
POR	Portugal
SEN	Senegal
KOR	South Korea
ESP	Spain
SWE	Sweden
NULL	NULL

Figure 6 Contents of Nationalities

F-III. *Teams*

team_id	team_name	rank	stadium_id
ARS	Arsenal	2	5
AVA	Aston Villa	7	8
BRH	Brighton & Hove Albion	6	12
CHE	Chelsea	12	9
CRY	Crystal Palace	11	13
EVE	Everton	17	10
FUL	Fulham	10	14
LIV	Liverpool	5	4
MCI	Manchester City	1	6
MUN	Manchester United	3	1
NEW	Newcastle United	4	7
TOT	Tottenham Hotspur	8	2
WHU	West Ham United	14	3
WLV	Wolverhampton Wan…	13	11
NULL	NULL	NULL	NULL

Figure 7 Contents of Teams

F-IV. *Coaches*

coach_id	coach_name	team	nationality_id
1	Erik ten Hag	MUN	NED
2	Ryan Mason	TOT	ENG
3	Mikel Arteta	ARS	ESP
4	Pep Guardiola	MCI	ESP
5	Mauricio Pochettino	CHE	ARG
6	David Moyes	WHU	ENG
7	Jürgen Klopp	LIV	GER
8	Unai Emery	AVA	ESP
9	Roberto De Zerbi	BRH	ITA
10	Sean Dyche	EVE	ENG
11	Julen Lopetegui	WLV	ESP
12	Eddie Howe	NEW	ENG
13	Marco Alexandre…	FUL	POR
14	Roy Hodgson	CRY	ENG
NULL	NULL	NULL	NULL

Figure 8 Content of Coaches

F-V. *Positions*

position_id	position_name
AM	Attacking Midfielders
CB	Center Backs
CM	Central Midfielders
DF	Defenders
DM	Defensive Midfielders
FB	Fullbacks
FW	Forwards
GK	Goalkeepers
LB	Left Backs
LM	Left Midfielders
LW	Left Wingers
MF	Midfielders
RB	Right Backs
RM	Right Midfielders
RW	Right Wingers
WM	Wide Midfielders
NULL	NULL

Figure 9 Contents of Positions

F-VI. *Players*

id	name	birthday	nationality_id	team
1	Bruno Fernandes	1994-09-08	POR	MUN
2	Son Heung-min	1992-07-08	KOR	TOT
3	Aaron Ramsdale	1998-05-14	ENG	ARS
4	Kevin De Bruyne	1991-06-28	BEL	MCI
5	Enzo Fernández	2001-01-17	ARG	CHE
6	Tomáš Souček	1995-02-27	CZE	WHU
7	Mohamed Salah	1992-06-15	EGY	LIV
8	Ollie Watkins	1995-12-30	ENG	AVA
9	Kaoru Mitoma	1997-05-20	JPN	BRH
10	Jordan Pickford	1994-03-07	ENG	EVE
11	Hwang Hee-chan	1996-01-26	KOR	WLV
12	Alexander Isak	1999-09-21	SWE	NEW
13	Bernd Leno	1992-03-04	GER	FUL
14	Jaïro Riedewald	1996-09-09	NED	CRY
NULL	NULL	NULL	NULL	NULL

Figure 10 Contents of Players

F-VII. *Player_positions*

player_id	position_id
14	DF
1	FW
2	FW
7	FW
8	FW
9	FW
11	FW
12	FW
3	GK
10	GK
13	GK
1	MF
2	MF
4	MF
5	MF
6	MF
9	MF
11	MF
14	MF
NULL	NULL

Figure 11 Content of Player_positions

F-VIII. *Referees*

referee_id	referee_name	nationality_id
1	Anthony Taylor	ENG
2	Michael Oliver	ENG
3	Simon Hooper	ENG
4	Darren England	ENG
5	Thomas Bramall	ENG
6	Paul Tierney	ENG
7	Andy Madley	ENG
8	Tony Harrington	ENG
9	John Brooks	ENG
10	Darren Bond	ENG
NULL	NULL	NULL

Figure 12 Contents of Referees

F-IX. *Matches*

match_id	date	home_team_id	away_team_id	referee_id	stadium_id	result
1	2022-08-05	CRY	ARS	1	13	0:2
2	2022-08-13	AVA	EVE	2	8	2:1
3	2022-08-20	TOT	WLV	3	2	1:0
4	2022-08-27	MCI	CRY	4	6	4:2
5	2022-08-30	FUL	BRH	5	14	2:1
6	2022-09-04	MUN	ARS	6	1	3:1
7	2022-09-17	WLV	MCI	1	11	0:3
8	2022-10-01	LIV	BRH	7	4	3:3
9	2022-10-08	BRH	TOT	8	12	0:1
10	2022-10-19	MUN	TOT	3	1	2:0
NULL	NULL	NULL	NULL	NULL	NULL	NULL

Figure 13 Contents of Matches

F-X. *Matches_participation*

match_id	player_id	goals	assists	saves	yellow_cards	red_cards
1	3	0	0	2	0	0
1	14	0	0	0	0	0
2	8	0	2	0	0	0
2	10	0	0	1	0	0
3	2	0	0	0	0	0
3	11	0	0	0	0	0
4	4	4	0	0	0	0
4	14	0	0	0	0	0
5	9	0	0	0	0	0
5	13	0	0	0	0	0
6	1	0	1	0	0	0
6	3	0	0	3	0	0
7	4	0	2	0	0	0
7	11	0	0	0	0	0
8	7	0	1	0	0	0
8	9	0	0	0	0	0
9	2	0	1	0	0	0
9	9	0	0	0	0	0
10	1	1	0	0	0	0
10	2	0	0	0	0	0
NULL	NULL	NULL	NULL	NULL	NULL	NULL

Figure 14 Contents of Matches_participation

G. SQL Queries and Results

```sql
-- 1. (JOIN) List all players with their team names and positions.
SELECT
    p.name AS Player,
    t.team_name AS team
    Pos.position_name AS position
FROM players p
JOIN teams t ON p.team = t.team_id
JOIN player.positions pp ON p.id = pp.player_id
JOIN positions pos ON pp.position_id = pos.position_id
```

Player	Team	Position
Bruno Fernandes	Manchester United	Forwards
Bruno Fernandes	Manchester United	Midfielders
Son Heung-min	Tottenham Hotspur	Forwards
Son Heung-min	Tottenham Hotspur	Midfielders
Aaron Ramsdale	Arsenal	Goalkeepers
Kevin De Bruyne	Manchester City	Midfielders
Enzo Fernández	Chelsea	Midfielders
Tomáš Souček	West Ham United	Midfielders
Mohamed Salah	Liverpool	Forwards
Ollie Watkins	Aston Villa	Forwards
Kaoru Mitoma	Brighton & Hove Al...	Forwards
Kaoru Mitoma	Brighton & Hove Al...	Midfielders
Jordan Pickford	Everton	Goalkeepers
Hwang Hee-chan	Wolverhampton W...	Forwards
Hwang Hee-chan	Wolverhampton W...	Midfielders
Alexander Isak	Newcastle United	Forwards
Bernd Leno	Fulham	Goalkeepers
Jairo Riedewald	Crystal Palace	Defenders
Jaïro Riedewald	Crystal Palace	Midfielders

Figure 15 Results of SQL Queries 1

```sql
-- 2. (JOIN, WHERE) Get all matches played in a specific city
('London') and the teams involved:
SELECT
    m.date,
    t1.team name AS home_team,
    t2.team name AS away_team,
    s.name AS Stadium
FROM matches m
JOIN stadiums s ON m.stadium_id = s.stadium_id
JOIN teams t2 ON m.home_team_id = t1.team_id
JOIN teams t2 ON m.away_team_id = t2.team_id
WHERE s.city = 'London';
```

date	Home_Team	Away_Team	Stadium
2022-08-05	Crystal Palace	Arsenal	Selhurst Park
2022-08-20	Tottenham Hotspur	Wolverhampton Wanderers	Tottenham Hotspur Stadium
2022-08-30	Fulham	Brighton & Hove Albion	Craven Cottage

Figure 16 Results of SQL Queries 2

```sql
-- 3. (LEFT JOIN, GROUP BY, COUNT) List all referees and the number
of matches they have officiated:
SELECT
    r.referee name,
    COUNT(m.match_id) AS matches_officiated
    FROM referees r
LEFT JOIN matches m ON r.referee = m.referee_id
GROUP BY r.referee_id;
```

	referee_name	Matches_Officiated
▶	Anthony Taylor	2
	Michael Oliver	1
	Simon Hooper	2
	Darren England	1
	Thomas Bramall	1
	Paul Tierney	1
	Andy Madley	1
	Tony Harrington	1
	John Brooks	0
	Darren Bond	0

Figure 17 Results of SQL Queries 3

```sql
-- 4. (EXISTS, GROUP BY, COUNT) Find the players who have played in
multiple positions:
SELECT
    p.name
FROM players p
WHERE EXISTS (
    SELECT 1
FROM player_positions pp
WHERE pp.player_id = p.id
GROUP BY pp.player_id
HAVING COUNT (DISTINCT pp.position_id) > 1
);
```

	name
▶	Bruno Fernandes
	Son Heung-min
	Kaoru Mitoma
	Hwang Hee-chan
	Jaïro Riedewald

Figure 18 Results of SQL Queries 4

```sql
-- 5. (NOT EXISTS) Teams that have not won any matches:
SELECT
team_name
FROM teams t
WHERE NOT EXISTS (
    SELECT 1
    FROM matches
    WHERE (home_team_id = t.team_id AND result = 'win')
    OR (away_team_id = t.team_id AND result = 'lose')
);
```

team_name
Arsenal
Aston Villa
Brighton & Hove Albion
Chelsea
Crystal Palace
Everton
Fulham
Liverpool
Manchester City
Manchester United
Newcastle United
Tottenham Hotspur
West Ham United
Wolverhampton Wa...

Figure 19 Results of SQL Queries 5

```
-- 6. (CONCAT, TIMESTAMPDIFF, FLOOR& MOD) List of players with their
age formatted as years and months
SELECT
    name, CONCAT (
      FLOOR (TIMESTAMPDIFF (MONTH, birthday, CURDATE ()) / 12), '
years ',
      MOD (TIMESTAMPDIFF (MONTH, birthday, CURDATE ()), 12), '
months')
    AS age
FROM players;
```

name	age
Bruno Fernandes	29 years 7 months
Son Heung-min	31 years 9 months
Aaron Ramsdale	25 years 11 months
Kevin De Bruyne	32 years 10 months
Enzo Fernández	23 years 3 months
Tomáš Souček	29 years 2 months
Mohamed Salah	31 years 10 months
Ollie Watkins	28 years 4 months
Kaoru Mitoma	26 years 11 months
Jordan Pickford	30 years 1 months
Hwang Hee-chan	28 years 3 months
Alexander Isak	24 years 7 months
Bernd Leno	32 years 1 months
Jaïro Riedewald	27 years 7 months

Figure 20 Results of SQL Queries 6

```
-- 7. (IN, AND) Find the referees who have officiated matches for
both teams ' Manchester United ' and ' Arsenal ':
SELECT
    r.referee_name
    FROM referees r
```

```
    WHERE r.referee_id FROM (
        SELECT m1.referee_id
        FROM matches m1
        WHERE m1.home_team_id = 'MUN' OR m1.away_team_id =
        'Manchester United'
    )
    AND r.referee_id IN (
        SELECT m2.referee_id
        Cmatches m2
        WHERE m2.home_team_id = 'TOT' OR m2.away_team_id = 'Arsenal'
    );
```

	referee_name
▶	Simon Hooper

Figure 21 Results of SQL Queries 7

```
-- 8. (COUNT, AVG) Find the number and average age of players for
each nationality:
SELECT
    n.nationality_name,
    COUNT (*) AS player_count,
    ROUND (AVG (YEAR (CURDATE ()) - YEAR(p.birthday)), 1) AS avg_age
FROM players p
JOIN nationalities n ON p.nationality_id = n.nationality_id
GROUP BY n.nationality_name;
```

	nationality_name	player_count	avg_age
▶	Netherlands	1	28.0
	Argentina	1	23.0
	Belgium	1	33.0
	Czech Republic	1	29.0
	Egypt	1	32.0
	England	3	28.3
	Germany	1	32.0
	Japan	1	27.0
	Portugal	1	30.0
	South Korea	2	30.0
	Sweden	1	25.0

Figure 22 Results of SQL Queries 8

```
-- 9. (JOIN, CASE, SUM) Find the team that scored more goals at home
than away:
SELECT
    t.team_name,
```

```
    SUM (CASE WHEN m.home_team_id = t.team_id THEN mp.goals ELSE 0
END) AS home_goals,
    SUM (CASE WHEN m.away_team_id = t.team_id THEN mp.goals ELSE 0
END) AS away_goals
FROM teams t
JOIN players p ON t.team_id = p.team
JOIN matches_participation mp ON p.id = mp.player_id
JOIN matches m ON mp.match_id = m.match_id
GROUP BY t.team_name
HAVING home_goals > away_goals;
```

team_name	home_goals	away_goals
Manchester City	4	0
Manchester United	1	0

Figure 23 Results of SQL Queries 9

```
-- 10. (WHERE) List of Players Born After 1990 with Their
Nationalities:
SELECT
    p.name,
    n.nationality_name,
    p.birthday
FROM players p
JOIN nationalities n ON p.nationality_id = n.nationality_id
WHERE p.birthday > '1990-01-01'
ORDER BY p.birthday;
```

name	nationality_name	birthday
Kevin De Bruyne	Belgium	1991-06-28
Bernd Leno	Germany	1992-03-04
Mohamed Salah	Egypt	1992-06-15
Son Heung-min	South Korea	1992-07-08
Jordan Pickford	England	1994-03-07
Bruno Fernandes	Portugal	1994-09-08
Tomáš Souček	Czech Republic	1995-02-27
Ollie Watkins	England	1995-12-30
Hwang Hee-chan	South Korea	1996-01-26
Jaïro Riedewald	Netherlands	1996-09-09
Kaoru Mitoma	Japan	1997-05-20
Aaron Ramsdale	England	1998-05-14
Alexander Isak	Sweden	1999-09-21
Enzo Fernández	Argentina	2001-01-17

Figure 24 Results of SQL Queries 10

```
-- 11. (NOT EXISTS, WHERE) Find Players Who Have Never Received a
Yellow Card:
SELECT
    p.name
```

```
FROM players p
WHERE NOT EXISTS (
    SELECT 1 FROM matches_participation mp WHERE mp.player_id = p.id
    AND mp.yellow_cards > 0
);
```

name
Bruno Fernandes
Son Heung-min
Aaron Ramsdale
Kevin De Bruyne
Enzo Fernández
Tomáš Souček
Mohamed Salah
Ollie Watkins
Kaoru Mitoma
Jordan Pickford
Hwang Hee-chan
Alexander Isak
Bernd Leno
Jaïro Riedewald

Figure 25 Results of SQL Queries 11

```
-- 12. (WHERE) List of Teams Playing in a Specific City:
SELECT
    t.team_name
FROM teams t
JOIN stadiums s ON t.stadium_id = s.stadium_id
WHERE s.city = 'London';
```

team_name
Arsenal
Chelsea
Crystal Palace
Fulham
Tottenham Hotspur
West Ham United

Figure 26 Results of SQL Queries 12