

## CPSC 304 Project

Milestone #: 2

Date: October 21, 2023

Group Number: 16

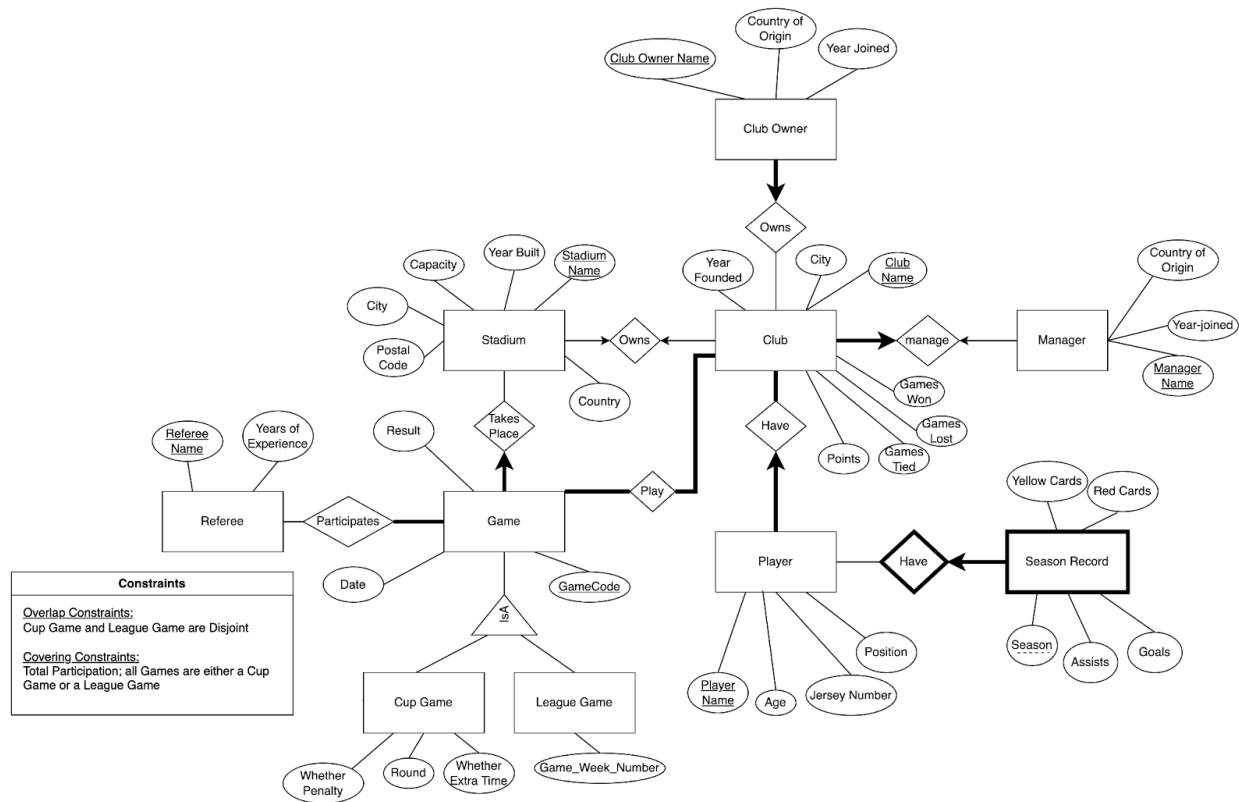
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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your email address, and then let us assign you to a TA for your project supervisor.) In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

## Project Summary

In this project we made schemas to represent how data relates to each other within a soccer team. In this project we mapped out the relationships between club owners, clubs, managers, players, stadiums, games, and referees to properly represent how these entities of a soccer team interact with each other.

## ER Diagram



Assumptions
Players can be uniquely identified by their name. We are assuming that 2 players can not have the same name
All clubs have their own (only one) stadium and vice versa.
<b>League Game vs. Cup Game Explanation:</b> A Game is categorized into 2 types:
- A league game is based on ranking and winning points. For example, in La Liga, a win gets 3 points, a draw gets 1, and a loss gets 0.
- The league usually lasts for a season, with 36 games weekly. The attribute week means which week the game took place.
- A cup game is a knockout game, they need to select one winner. Only a win allows a team to play the next round.
- Cup and League games also have a different amount of extra time
<b>Game_Week_Number:</b> There are 36 weeks throughout the regular season Game_Week_Number represents what week of regular season the game was played in

## Schemas

- Game(Game\_Code: varchar[20], Result: varchar[20], Date: date, **Stadium\_Name**: varchar[20] NOT NULL)
- ClubOwner(Club\_Owner\_Name: varchar[20], Country\_of\_Origin: varchar[20], Year\_Joined: int, **Club\_Name**: varchar[20] NOT NULL)
- CupGame(Game\_Code: varchar[20], Round: varchar[20], Whether\_Extra\_Time: boolean, Whether\_Penalty: boolean, Result: varchar[20], Date: date, **Stadium\_Name**: varchar[20] NOT NULL)
- LeagueGame(Game\_Code: varchar[20], Game\_Week\_Number: int, Result: varchar[20], Date: date, **Stadium\_Name**: varchar[20] NOT NULL)
- Referee(Referee\_Name: varchar[20], Years\_of\_Experience: int)
- Participate(**Referee\_Name**: varchar[20], **Game\_Code**: varchar[20])
- Manager(Manager\_Name: varchar[20], Country\_of\_Origin: varchar[20], Year-joined: int)
- Player(Player\_Name: varchar[20], Age: int, Jersey\_Number: int, **Season**: varchar[20], **Club\_Name**: varchar[20] NOT NULL, Position: varchar[20])
- Stadium(Stadium\_Name: varchar[20], City: varchar[20], Postal\_Code: varchar[20], Capacity: int, Year\_Built: int, Country: varchar[20])
- Club(Club\_Name: varchar[20], City: varchar[20], Year\_Founded: int, Games\_Won: int, Games\_Lost: int, Games\_Tied: int, Points: int, **Stadium\_Name**: varchar[20] UNIQUE, **Manager\_Name**: varchar[20], UNIQUE)
- Play(**Club\_Name**: varchar[20], **Game\_code**: varchar[20])
- SeasonRecord(**Player\_Name**: varchar[20], Season: varchar[20], Yellow\_Cards: int, Red\_Cards: int, Assists: int, Goals: int)
  - Season should be dotted

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## Functional Dependencies

Game(Game\_Code, Result, Date, **Stadium\_Name**)

- $\text{Game\_Code} \rightarrow \text{Result, Date, Stadium\_Name}$
- $\text{Stadium\_Name, Date} \rightarrow \text{Result}$

NORMALIZATION TO BCNF

Stadium\_Name, Date  $\rightarrow$  Result VIOLATES BCNF

Decompose:

Game(Game\_Code, Date, **Stadium\_Name**)

Game(Date, Stadium\_Name, Result)

ClubOwner(Club\_Owner\_Name, Country\_of\_Origin, Year\_Joined, **Club\_Name**)

- $\text{Club\_Owner\_Name} \rightarrow \text{Country\_of\_Origin, Year\_Joined, Club\_Name}$

CupGame(Game\_Code, Round, Whether\_Extra\_Time, Whether\_Penalty, Result, Date, **Stadium\_Name**)

- $\text{Game\_Code} \rightarrow \text{Round, Whether\_Extra\_Time, Whether\_Penalty, Result, Date, Stadium\_Name}$

LeagueGame(Game\_Code, Game\_Week\_Number, Result, Date, **Stadium\_Name**)

- $\text{Game\_Code} \rightarrow \text{Game\_Week\_Number, Result, Date, Stadium\_Name}$

Referee(Referee\_Name, Years\_of\_Experience)

- $\text{Referee\_Name} \rightarrow \text{Years\_of\_Experience}$

Participate(**Referee\_Name**, **Game\_Code**)

- $\text{Game\_Code} \rightarrow \text{Referee\_Name}$

Manager(Manager\_Name, Country\_of\_Origin, Year-joined)

- $\text{Manager\_Name} \rightarrow \text{Country\_of\_Origin, Year-joined}$

Player(Player\_Name, Age, Jersey\_Number, **Season**, **Club\_Name**, Position)

- $\text{Player\_Name} \rightarrow \text{Age, Jersey\_Number, Club\_Name, Position}$

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Stadium(Stadium\_Name, City, Postal\_Code, Capacity, Year\_Built, Country)

- Stadium\_Name → Postal\_Code, Capacity, Year-Built
- Postal\_Code → Country, City

NORMALIZATION TO BCNF

Postal\_Code → Country, City VIOLATES BCNF

Decompose:

Stadium(Stadium\_Name, Postal\_Code, Capacity, Year\_Built)

Stadium(Postal\_Code, Country, City)

Club(Club\_Name, City, Year\_Founded, Games Won, Games Lost, Games Tied, Points, **Stadium\_Name**, **Manager\_Name**)

- Club\_Name → City, Year\_Founded, Manager\_Name, Stadium\_Name
- Games Won, Games Lost, Games Tied → Points

NORMALIZATION TO BCNF

Games Won, Games Lost, Games Tied → Points VIOLATES BCNF

Decompose:

Club(Club\_Name, City, Year\_Founded, Games Won, Games Lost, Games Tied, **Stadium\_Name**, **Manager\_Name**)

Club(Games Won, Games Lost, Games Tied, Points)

SeasonRecord(**Player\_Name**, Season, Yellow\_Card, Red\_Cards, Assists, Goals)

- Player\_Name, Season → Yellow\_Card, Red\_Cards, Assists, Goals

Play(**Club\_Name**, Game\_Code)

Participate(**Referee\_Name**, Game\_Code)

- Game\_Code → Referee\_Name

## SQL DDL Statements

```
CREATE TABLE Game (  
    Game_Code VARCHAR(20) PRIMARY KEY,  
    Result VARCHAR(20),  
    Date DATE,  
    Stadium_Name VARCHAR(20) NOT NULL,  
    FOREIGN KEY (Stadium_Name) REFERENCES Stadium(Stadium_Name)  
    ON DELETE NO ACTION  
    ON UPDATE CASCADE  
);
```

```
CREATE TABLE CupGame (  
    Game_Code VARCHAR(20) PRIMARY KEY,  
    Round VARCHAR(20),  
    Whether_Extra_Time BOOLEAN,  
    Whether_Penalty BOOLEAN,  
    Result VARCHAR(20),  
    Date DATE,  
    Stadium_Name VARCHAR(20) NOT NULL,  
    FOREIGN KEY (Game_Code) REFERENCES Game(Game_Code),  
    FOREIGN KEY (Stadium_Name) REFERENCES Stadium(Stadium_Name)  
);
```

```
CREATE TABLE LeagueGame (  
    Game_Code VARCHAR(20) PRIMARY KEY,  
    Game_Week_Number INT,  
    Result VARCHAR(20),  
    Date DATE,  
    Stadium_Name VARCHAR(20) NOT NULL,  
    FOREIGN KEY (Game_Code) REFERENCES Game(Game_Code),  
    FOREIGN KEY (Stadium_Name) REFERENCES Stadium(Stadium_Name)  
);
```

```
CREATE TABLE Referee (  
    Referee_Name VARCHAR(20) PRIMARY KEY,  
    Years_of_Experience INT  
);
```

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```
CREATE TABLE Participate (  
    Referee_Name VARCHAR(20),  
    Game_Code VARCHAR(20),  
    PRIMARY KEY (Referee_Name, Game_Code),  
    FOREIGN KEY (Referee_Name) REFERENCES Referee(Referee_Name),  
    FOREIGN KEY (Game_Code) REFERENCES Game(Game_Code)  
);
```

```
CREATE TABLE Manager (  
    Manager_Name VARCHAR(20) PRIMARY KEY,  
    Country_of_Origin VARCHAR(20),  
    Year_Joined INT  
);
```

```
CREATE TABLE Player (  
    Player_Name VARCHAR(20) PRIMARY KEY,  
    Age INT,  
    Jersey_Number INT,  
    Season VARCHAR(20),  
    Position VARCHAR(20),  
    Club_Name VARCHAR(20) NOT NULL,  
    FOREIGN KEY (Club_Name) REFERENCES Club(Club_Name),  
    ON DELETE NO ACTION,  
    ON UPDATE CASCADE  
);
```

```
CREATE TABLE Stadium (  
    Stadium_Name VARCHAR(20),  
    Postal_Code VARCHAR(50) NOT NULL,  
    Capacity INT,  
    Year_Built INT,  
    PRIMARY KEY (Stadium_Name)  
    FOREIGN KEY(Postal_Code) REFERENCES Stadium_Location(Postal_Code)  
);
```

```
CREATE TABLE Stadium_Location (  
    Postal_Code VARCHAR(50),  
    Country VARCHAR(20),  
    City VARCHAR(20),  
    PRIMARY KEY (Postal_Code )  
);
```

```
CREATE TABLE Club (  
    Club_Name VARCHAR(20),  
    City VARCHAR(20),  
    Year_Founded INT,  
    Games_Won INT,  
    Games_Lost INT,  
    Games_Tied INT,  
    Stadium_Name VARCHAR(20),  
    Manager_Name VARCHAR(20),  
    PRIMARY KEY (Club_Name),  
    FOREIGN KEY (Games_Won, Games_Lost, Games_Tied) REFERENCES  
Club_Statistics(Games_Won, Games_Lost, Games_Tied),  
);
```

```
CREATE TABLE Club_Statistics (  
    Games_Won INT,  
    Games_Lost INT,  
    Games_Tied INT,  
    Points INT,  
    PRIMARY KEY (Games_Won, Games_Lost, Games_Tied)  
);
```

```
CREATE TABLE ClubOwner (  
    Club_Owner_Name VARCHAR(20),  
    Country_of_Origin VARCHAR(20),  
    Year_Joined INT,  
    Club_Name VARCHAR(20) NOT NULL,  
    PRIMARY KEY (Club_Owner_Name),  
    FOREIGN KEY (Club_Name) REFERENCES Stadium(Stadium_Name)  
);
```

```
CREATE TABLE Play (  
    Club_Name VARCHAR(20),  
    Game_Code VARCHAR(20),  
    PRIMARY KEY (Club_Name, Game_Code),  
    FOREIGN KEY (Club_Name) REFERENCES Club(Club_Name),  
    FOREIGN KEY (Game_Code) REFERENCES Game(Game_Code)  
);
```

```
CREATE TABLE SeasonRecord (  
    Player_Name VARCHAR(20),  
    Season VARCHAR(20),  
    Yellow_Cards INT,
```



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```
    Red_Cards INT,  
    Assists INT,  
    Goals INT,  
    PRIMARY KEY (Player_Name, Season),  
    FOREIGN KEY (Player_Name) REFERENCES Player(Player_Name),  
    ON DELETE CASCADE  
);
```

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## Inserting Data:

```
INSERT INTO Game (Game_Code, Result, Date, Stadium_Name)
VALUES ('G001', 'Liverpool 2-0 Manchester United', '2019-10-22', 'Anfield');
      ('G002', 'Arsenal 2-1 Chelsea', '2019-10-23', 'Emirates Stadium');
      ('G003', 'Real Madrid 1-1 Manchester City', '2020-3-24', 'Bernabeu');
      ('G004', 'Manchester City 1-1 Tottenham Hotspur', '2021-4-24', 'Etihad Stadium');
      ('G005', 'Manchester City 3-0 Chelsea', '2021-5-2', 'Etihad Stadium');
```

```
INSERT INTO CupGame (Game_Code, Round, Whether_Extra_Time, Whether_Penalty, Result, Date,
Stadium_Name)
VALUES ('C001', 'Quarterfinal', FALSE, FALSE, 'Manchester United 2-1 Arsenal', '2010-10-15', 'Old
Trafford');
      ('C002', 'Semifinal', TRUE, FALSE, 'Chelsea 2-2 Manchester United', '2018-10-20', 'Old
Trafford');
      ('C003', 'Final', TRUE, FALSE, 'Barcelona 2-0 Manchester United ', '2010-5-27', 'Wembley');
      ('C004', 'Quarterfinal', TRUE, TRUE, 'Liverpool 2-2 Manchester United', '2013-11-27',
'Anfield');
      ('C005', 'Semifinal', TRUE, FALSE, 'Manchester United 2-1 Manchester City', '2017-1-28',
'Etihad Stadium');
```

```
INSERT INTO LeagueGame (Game_Code, Game_Week_Number, Result, Date, Stadium_Name)
VALUES ('L001', 1, 'Liverpool 3-1 Manchester United', '2013-08-15', 'Anfield');
      ('L002', 1, 'Manchester City 2-0 Arsenal', '2014-08-15', 'Etihad Stadium');
      ('L003', 2, 'Arsenal 2-2 Manchester United', '2016-08-22', 'Emirates Stadium');
      ('L004', 2, 'Arsenal 1-2 Liverpool', '2020-08-23', 'Emirates Stadium');
      ('L005', 3, 'Manchester United 2-1 Manchester City', '2023-08-30', 'Old Trafford');
```

```
INSERT INTO Referee (Referee_Name, Years_of_Experience)
VALUES ('John Smith', 1);
      ('Emily Johnson', 3);
      ('Michael Davis', 2);
      ('Sarah Wilson', 5);
      ('David Brown', 6);
```

```
INSERT INTO Manager (Manager_Name, Country_of_Origin, Year-joined)
VALUES ('Jurgen Klopp', 'Germany', 2015);
      ('Pep Guardiola', 'Spain', 2016);
      ('Mikel Arteta', 'Spain', 2019);
      ('Erik ten Hag', 'Netherland', 2022);
```

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('Mauricio Pochettino', 'Argentina', 2023);

INSERT INTO Player (Player\_Name, Age, Jersey\_Number, Season, Club\_Name, Position)

VALUES ('Mohamed Salah', 29, 11, '2023-2024', 'Liverpool', 'Forward');

('Kevin De Bruyne', 30, 17, '2023-2024', 'Manchester City', 'Midfielder');

('Bukayo Saka', 20, 7, '2023-2024', 'Arsenal', 'Midfielder');

('Virgil van Dijk', 31, 4, '2023-2024', 'Liverpool', 'Defender');

('Alisson Becker', 29, 1, '2023-2024', 'Liverpool', 'Goalkeeper');

INSERT INTO Stadium (Stadium\_Name, Location, Capacity, Year\_Built)

VALUES ('Wembley Stadium', 'London HA9 0WS, UK', 90000, 1923);

('Camp Nou', 'C/ d'Aristides Maillol, 12, 08028 Barcelona, Spain', 99354, 1957);

('Old Trafford', 'Manchester M16 0RA, UK', 74879, 1910);

('Etihad Stadium', 'Ashton New Rd, Manchester M11 3FF, UK', 54251, 2009);

('Anfield', 'Anfield Rd, Anfield, Liverpool L4 0TH, UK', 54,074, 1884);

('Bernabeu', 'Av. de Concha Espina, 1, 28036 Madrid, Spain', 81,044, 1947);

('Emirates Stadium', 'Hornsey Rd, London N7 7AJ, UK', 60,704, 2004);

INSERT INTO Stadium\_Location (Postal\_Code, Country, City)

VALUES ('London HA9 0WS, UK', 'UK', 'London');

('C/ d'Aristides Maillol, 12, 08028 Barcelona, Spain', 'Spain', 'Barcelona');

('Manchester M16 0RA, UK', 'UK', 'Manchester');

('Ashton New Rd, Manchester M11 3FF, UK', 'UK', 'Manchester');

('Anfield Rd, Anfield, Liverpool L4 0TH, UK', 'UK', 'Liverpool');

('Av. de Concha Espina, 1, 28036 Madrid, Spain', 'Spain', 'Barcelona');

('Hornsey Rd, London N7 7AJ, UK', 'UK', 'London');

INSERT INTO Club (Club\_Name, City, Year\_Founded, Games\_Won, Games\_Lost, Games\_Tied, Stadium\_Name, Manager\_Name)

VALUES ('FC Barcelona', 'Barcelona', 1899, 15, 5, 3, 'Camp Nou', 'Xavi Hernandez');

('Real Madrid CF', 'Madrid', 1902, 20, 3, 66, 'Santiago Bernabeu', 'Carlo Ancelotti');

('Manchester United', 'Manchester', 1878, 12, 8, 2, 'Old Trafford', 'Ralf Rangnick');

('Bayern Munich', 'Munich', 1900, 10, 12, 4, 'Allianz Arena', 'Julian Nagelsmann');

('AC Milan', 'Milan', 1899, 18, 6, 2, 'San Siro', 'Stefano Pioli');

INSERT INTO Club\_Statistics (Games\_Won, Games\_Lost, Games\_Tied, Points)

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```
VALUES (15, 5, 3, 48);
        (20, 3, 6, 66);
        (12, 8, 2, 38);
        (10, 12, 4, 34);
        (18, 6, 2, 56);
```

```
INSERT INTO ClubOwner (Club_Owner_Name, Country_of_Origin, Year_Joined, Club_Name)
VALUES ('Stanley Kroenke', 'USA', 2010, 'Arsenal');
        ('Sheikh Mansour', 'Spain', 2008, 'Manchester City');
        ('Todd Boehly', 'USA', 2022, 'Chelsea');
        ('Glazer Family', 'USA', 2005, 'Manchester United');
        ('John W. Henry', 'USA', 2010, 'Liverpool');
```

```
INSERT INTO SeasonRecord (Player_Name, Season, Yellow_Cards, Red_Cards, Assists, Goals)
VALUES ('Mohamed Salah', '2023-2024', 2, 0, 5, 20);
        ('Kevin De Bruyne', '2023-2024', 1, 0, 17, 9);
        ('Bukayo Saka', '2023-2024', 1, 0, 14, 6);
        ('Virgil van Dijk', '2023-2024', 15, 1, 4, 8);
        ('Alisson Becker', '2023-2024', 0, 0, 0, 0);
```

```
INSERT INTO Play (Club_Name, Game_Code)
VALUES ('Liverpool', 'G001');
        ('Arsenal', 'G002');
        ('Real Madrid', 'G003');
        ('Manchester City', 'G004');
        ('Manchester City', 'G005');
```

```
INSERT INTO Participate (Referee_Name, Game_Code)
VALUES ('John Smith', 'G001');
        ('Emily Johnson', 'G002');
        ('Michael Davis', 'G003');
        ('Sarah Wilson', 'G004');
        ('David Brown', 'G005');
```