Project Proposal

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We are planning to implement a Python application that operates the NBA database through a simple web front end. The database is designed to serve NBA fans, scouts, data analysts, etc., to help them compare players and analyze games throughout multiple seasons. Users can achieve the statistics of all NBA players and teams. Records can also be inquired by sorting certain domains, such as points, rebounds, assists, etc. The whole design includes seven entities: season, team, player, game, coach, player stats, team stats and contract. Details can be found in E-R diagram. The featured function of the application is to help users achieve data views in a more intuitive way – users can get the "radar chart" of a player, a team, or a coach that they inquiry. On top of that, users can choose specific perspectives to generate the radar chart they need and do the comparison.

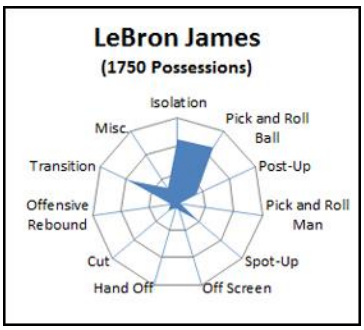
Data Source: we plan to combine these two Kaggle dataset and form our own database.

https://www.kaggle.com/wyattowalsh/basketball

https://www.kaggle.com/nathanlauga/nba-games?select=ranking.csv

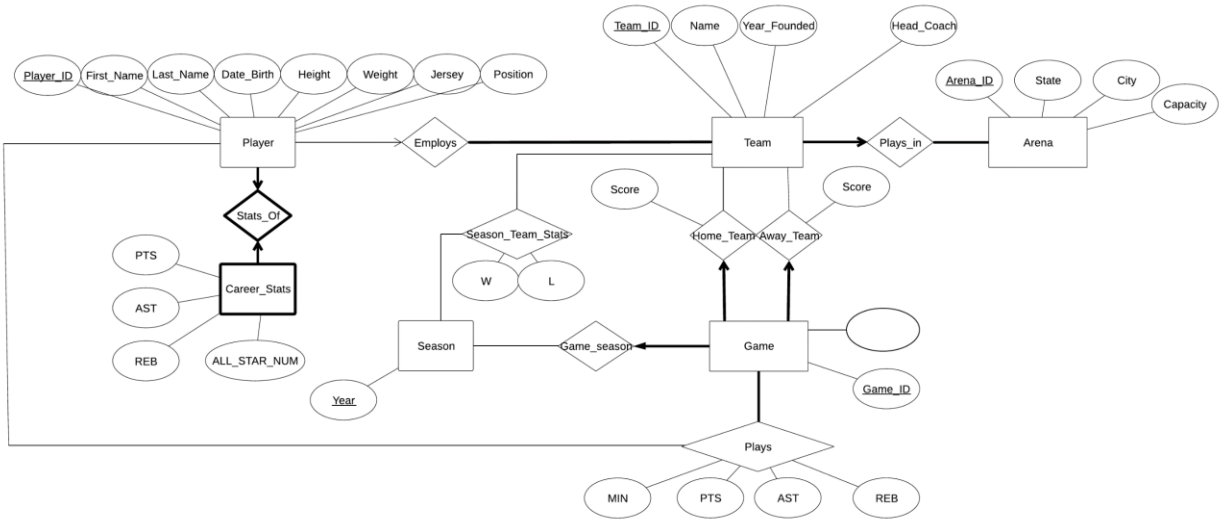
Part 3 Choice: A. Web Front-End Option

Radar Chart Sample:



Contingency Plan: If anyone of us dropped the class, the other one should finish the project but with fewer attributes per entity (for example, the entity *team* could delete *Year_Founded*, *Arena, City,* etc).

ER Diagram


Team_ID
Name
Year_Founded
Head_Coach
Player_ID
First_Name
Last_Name
Date_Birth
Height
Weight
Jersey
Position
Arena_ID
State
City
Capacity
Player
Employs
Team
Plays_in
Arena
Stats_Of
Score
Score
Season_Team_Stats
Home_Team
Away_Team
PTS
W
L
Career_Stats
AST
REB
ALL_STAR_NUM
Season
Game_season
Game
Year
Game_ID
Plays
MIN
PTS
AST
REB

Relational Schema

Project 1 Part 1 (For Part 2 see next page)

Player (Player_ID, First_Name, Last_Name, Date_Birth, Height, Weight, Jersey, Position, Team_ID NOT NULL,

PK(Player_ID), FK(Team_ID) -> Team)

Team (Team_ID, Name, Year_Founded, State, City, Arena,

PK(Team_ID))

Career_Stats (Player_ID, PTS, AST, REB, ALL_STAR_NUM,

PK(Player_ID) -> Player(Player_ID) ON DELETE CASCADE)

Season_Team_Stats (Year, Team ID, W, L,

PK(Year Team_ID), FK(Team_ID) -> Team)

Game (Year, Game_ID, Home_Team NOT NULL, Home_Team_Score NOT NULL, Home_Team_W/L NOT NULL,

Away_Team NOT NULL, Away_Team_Score NOT NULL, Away_Team_W/L NOT NULL,

PK(Game_ID), FK(Home_Team, Away_Team) -> Team)

Plays (Game_ID, Player_ID, MIN, PTS, AST, REB,

PK(Game_ID, Player_ID), FK(Game_ID) -> Game, FK(Player_ID) -> Player)

Relational Schema

Updated Oct 11 for Part 2

```
CREATE TABLE Player (
        Player_ID INTEGER,
        First_Name VARCHAR(30),
        Last_Name VARCHAR(30),
        Date_Birth DATE,
        Height INTEGER,
        Weight INTEGER,
        Jersey INTEGER,
        Position CHARACTER(30),
        Team_ID INTEGER,
        CAREER_PTS DECIMAL(1,2),
        CAREER_AST DECIMAL(1,2),
        CAREER_REB DECIMAL(1,2),
        ALL_STAR_NUM INTEGER,
        PRIMARY KEY (Player_ID),
        FOREIGN KEY (Team_ID) REFERENCES Team
);

CREATE TABLE Plays (
        Game_ID INTEGER,
        Player_ID INTEGER,
        MIN INTEGER,
        PTS INTEGER,
        AST INTEGER,
        REB INTEGER,
        PRIMARY KEY (Player_ID, Game_ID),
```

```
        FOREIGN KEY (Player_ID) REFERENCES Player,
        FOREIGN KEY (Game_ID) REFERENCES Game
);

CREATE TABLE Game (
        Game_ID INTEGER,
        Home_Team_Win BOOLEAN,
        Year INTEGER NOT NULL,
        Home_Team_Score INTEGER NOT NULL,
        Away_Team_Score INTEGER NOT NULL,
        Home_Team_ID INTEGER NOT NULL,
        Away_Team_ID INTEGER NOT NULL,
        PRIMARY KEY (Game_ID),
        FOREIGN KEY (Home_Team_ID) REFERENCES Team,
        FOREIGN KEY (Away_Team_ID) REFERENCES Team,
        CONSTRAINT Team_Check
        CHECK (Home_Team_ID <> Away_Team_ID)
);

CREATE TABLE Season_Team_Stats (
        Team_ID INTEGER,
        Year INTEGER,
        W INTEGER,
        L INTEGER,
        PRIMARY KEY (Team_ID, Year),
        FOREIGN KEY (Team_ID) REFERENCES Team
);
```

```
CREATE TABLE Team (
        Team_ID INTEGER,
        Name VARCHAR(30),
        Year_Founded INTEGER,
        Head_Coach VARCHAR(30),
        Arena_ID INTEGER NOT NULL,
        PRIMARY KEY (Team_ID),
        FOREIGN KEY (Arena_ID) REFERENCES Arena
);

CREATE TABLE Arena (
        Arena_ID INTEGER,
        State CHARACTER(30),
        City VARCHAR(30),
        Capacity INTEGER,
        Areana_Name VARCHAR(30),
        PRIMARY KEY (Arena_ID)
);
```

Below part is used to constrain >= 1 relations, yet doesn't supported by PostgreSQL:

```
CREATE ASSERTION Arena_Team
CHECK (
        NOT EXISTS (
                SELECT Arena_ID FROM Arena
                EXCEPT
                SELECT DISTINCT Arena_ID FROM Team)
);
```

```
CREATE ASSERTION Player_Team
CHECK (
        NOT EXISTS (
                SELECT Team_ID FROM Team
                EXCEPT
                SELECT DISTINCT Team_ID FROM Player)
)

CREATE ASSERTION Player_Game
CHECK(
        NOT EXISTS (
                SELECT Game_ID FROM Game
                EXCEPT
                SELECT DISTINCT Game_ID FROM Plays)
)
```

Project 2

```
CREATE TYPE Full_Name AS (
        First_Name VARCHAR(30),
        Last_Name VARCHAR(30)
);

CREATE TABLE New_Player (
        Player_ID INTEGER,
        Name Full_Name,
        Date_Birth DATE,
```

```
        Height INTEGER,
        Weight INTEGER,
        Jersey INTEGER,
        Position CHARACTER(30),
        Team_ID INTEGER,
        CAREER_STATS DECIMAL [3],
        ALL_STAR_NUM INTEGER,
        PRIMARY KEY (Player_ID),
        FOREIGN KEY (Team_ID) REFERENCES Team
);

CREATE TRIGGER check_player_del
BEFORE DELETE ON new_player
FOR EACH ROW
EXECUTE FUNCTION if_roll_back();

CREATE OR REPLACE FUNCTION if_roll_back() RETURNS TRIGGER AS $example_table$
  BEGIN
    IF (SELECT COUNT(*) FROM new_player WHERE team_id = old.team_id) <= 1 THEN
    RETURN NULL;
    ELSE
    RETURN OLD;
    END IF;
  END;
$example_table$ LANGUAGE plpgsql;
```