Business Requirement:

We need to track NBA basketball players for a basketball season. Some of the attributes needed will be a player's name, team they are on, position they play, their jersey numbers, height, and weight. The basketball teams will have one head coach and we'll need to show their years of experience. The teams can compete in a basketball game against each other and will have a winner/loser on a specified date. Teams cannot play more than 41 games away and 41 games at home. Each team will represent a city that currently has an NBA team. A team's roster can vary from all sizes, but to play in a game, the player roster should be at least 5 and at most 15. Lastly, teams will need to be able to trade coaches and players from different teams to different teams.

(In memory database feature update for project 3)

- There will be real time stat tracking **based on TEAMS**.
    - The stats tracked will be points, rebounds, assists, steals, blocks, and turnovers. You can track the stats real time for each game, while the game is being played.
    - The game stats can be sorted to show which team is leading in each category at any time.
    - When the game is finished the stats can then be saved into a hard database for persistence and historical use.
- There will be real time stat tracking **based on PLAYERS**.
    - The stats tracked will be points, rebounds, and steals. You can track the stats real time for each game, while the game is being played.
    - During the game, the players will be sorted from highest scorer to lowest score. The top scorer for each team will also be displayed in the header.
    - When the game is finished the score for the game can be saved into a hard database for persistence and historical use.
    - If you make a mistake, all contents can be deleted (this will also clear data from that is stored into the hard database).

***Please note that since the stats for players and teams are tracked individually, therefore stat totals may not reconcile.

- Need to track players in the NBA for the 2021-2022 season
- The players will have name, team, position(s), jersey numbers
- Players play on basketball teams
- A team has 15 players maximum roster and 5 minimum to play in a game
- Each player has attributes such as height, weight, date of birth.
- Each team has one head coach and each coach has years of experience
- Teams can compete against other teams in a game.
- A game will only have one winner and one loser
- Teams need to have home or away team in a game
- Each team has a city, state and abbreviation (i.e. Golden State is GSW).

- Games will be scheduled on a date
- The home/away team cannot have two games scheduled on the same day
- Teams execute in trades on different dates for players or coaches
- Teams will be associated with a location
- Teams will play 41 games away and 41 games at home

Nouns:

~~NBA~~

~~Season~~

~~Day~~

Players
- Name
- Team
- Date of Birth
- Position
- Jersey Numbers
- Height
- Weight

Game
- Winner
- Loser
- Home Team
- Away Team
- Date

Team
- Roster
- City
- State
- Abbreviation

Coach
- Name
- Date of Birth
- Years of Experience
- Team

Trade
- Original Team
- New Tem
- Trade Date
- Player/Coach

Verbs

Tracks
Has
Have

Play
Competes
Scheduled

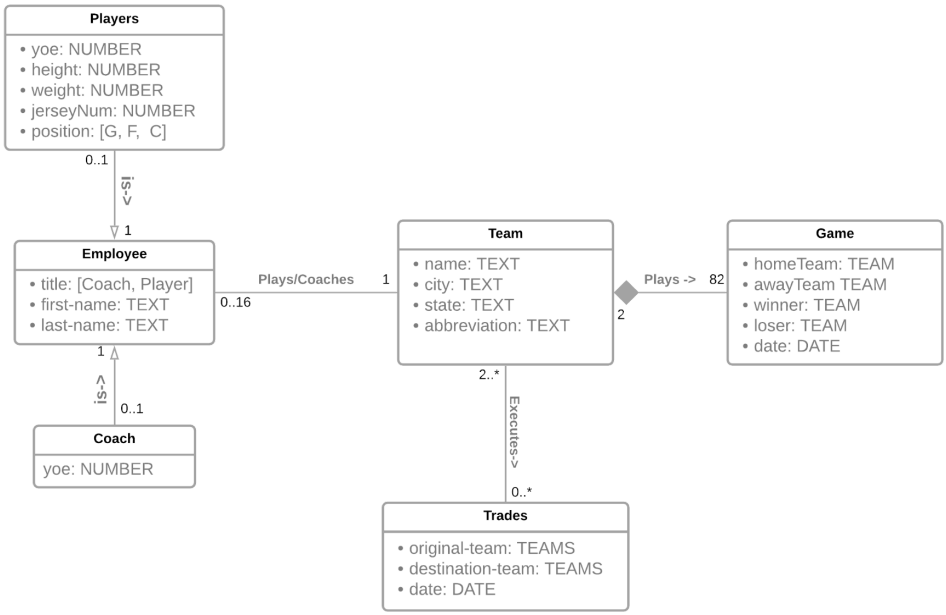
Execute
Associated

SCHEMA is BCNF

employeeID -> (firstName, lastName, birthDate, teamID, employeeTypeID)
coachID -> (yearsOfExp, employeeID)
playerID ->(height, weight, jerseyNum, employeeID)
employeeTypeID -> employeeType
tradeID -> (employeeID, teamFrom, teamTo, tradeDate)
teamID -> (name, abbreviation, locationID)
gameID -> (homeTeam, awayTeam, winTeam, loseTeam, date)
locationID -> (city, state)
positionID, playerID -> positionID, playerID #positionID, playerID is a composite primary key.
positionID -> positionDesc

Conceptual Model

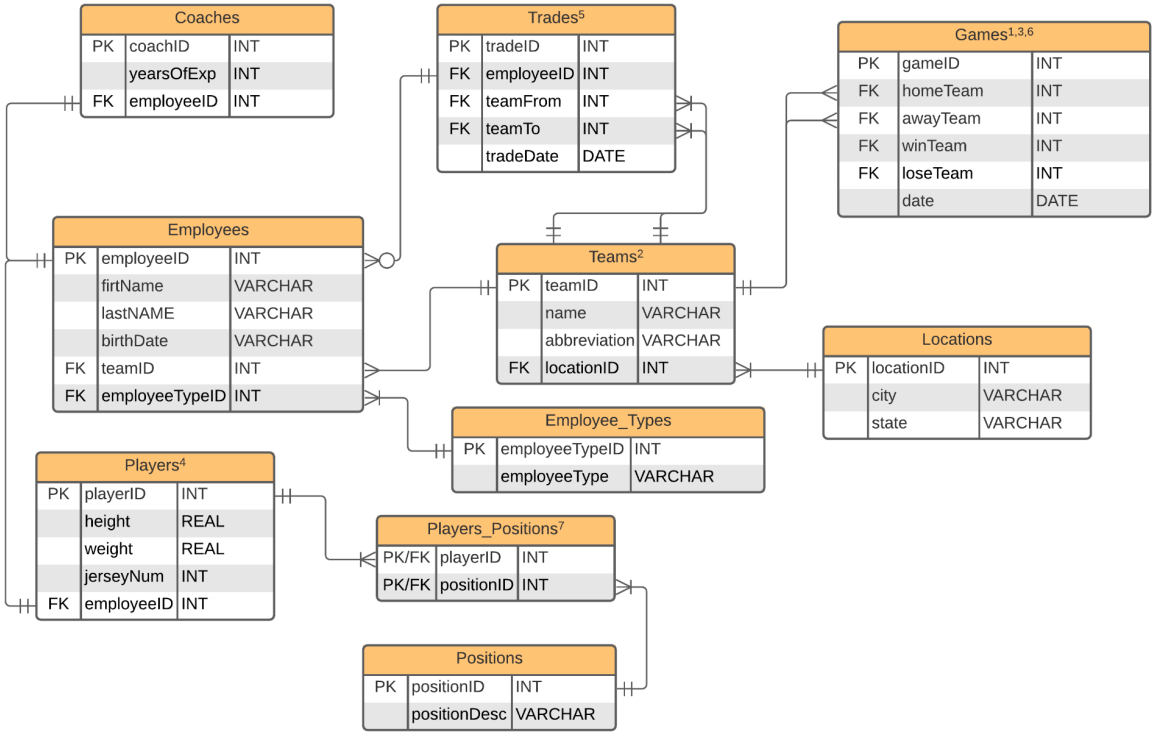
https://lucid.app/lucidchart/728904b6-3eac-41ee-9c80-cc89d811dc4c/edit?viewport_loc=-449%2C-71%2C3131%2C1496%2C0_0&invitationId=inv_bc674f57-3cb0-483b-8c06-247711741271



- Employee plays/coaches team is One to Many Relationship
- Teams to Trades is Many to Many Relationship

Logical Model

https://lucid.app/lucidchart/f8b731fe-7480-4e96-b786-84ca747ef028/edit?viewport_loc=-303%2C16%2C2219%2C1012%2C0_0&invitationId=inv_b1efe1a2-5c17-497c-80c0-568e9ae0d801



Relations Schema

Employees (employeeID, firstName, lastName, bithDate, teamID, employeeTypeID)
Players (playerID, height, weight, jerseyNum, employeeID)
Coaches (coachID, yearsOfExp, employeeID)
Employee_Types (employeeTypeID, employeeType)
Teams (teamID, name, abbreviation, locationID)
Players_Positions (playerID, positionID)
Positions (positionID, positionDesc)
Locations (locationID, city, state)
Games (gameID, homeTeam, awayTeam, winTeam, loseTeam, date)
Trades (tradeID, employeeID, teamFrom, teamTo, tradeDate)

Notes

1. home_team != away_team
2. teamID/employeeID relationship is 5 to 15 players and 1 coach per team before recording a winning/losing result
3. No team can play twice on same day
4. Players can play multiple positions
5. Team can not trade with them selves
6. Home team can not be the away team
7. PK/FK represent composite keys

Hierarchical Model

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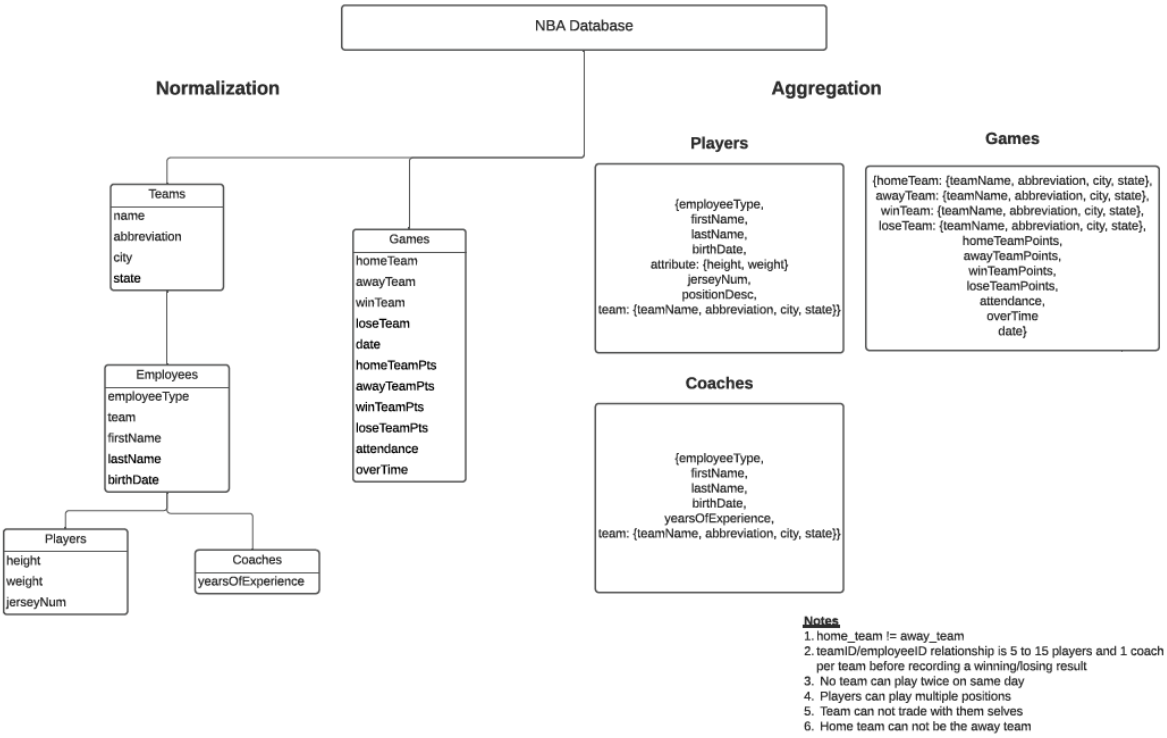
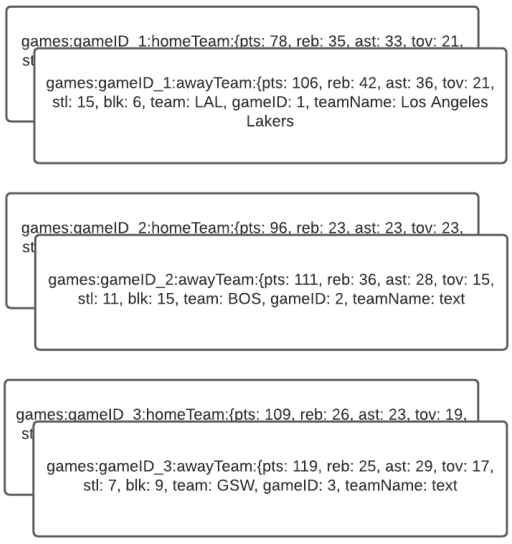


In Memory Real Time Stats Data Structure

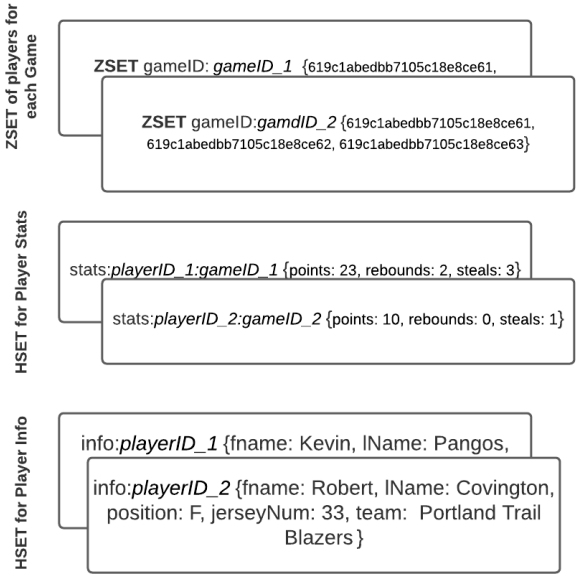
https://lucid.app/lucidchart/38269d65-a1f8-4014-9d74-8b90e225a611/edit?viewport_loc=-183%2C-221%2C2219%2C1075%2C0_0&invitationId=inv_4ccc9d73-d882-4d47-81a1-9a3ba49941f4

Real time - Team Stats by Game - Data strcutre



- I will use **games** as my "primary" key to group/track all games
- I will use **gameID** to track which game I am keeping team stats for.
- I will then use **homeTeam/awayTeam** to represent the two teams playing in the game
- I will then use a **hash set** in **Redis** to keep track of the different stats (pts, reb, etc.) for each team in real time (mimicing a real life game tracking system)

Player Stats



- I will use **gameID** as a key to get a list of all the players in a game.
- I will use **stats** to keep track of a single players stats, for a particular game that they played in
  - This **hash set in Redis** will be used to update/track players stats for a game in real time to simulate a game.
- **info** will be used to grab info about a player.