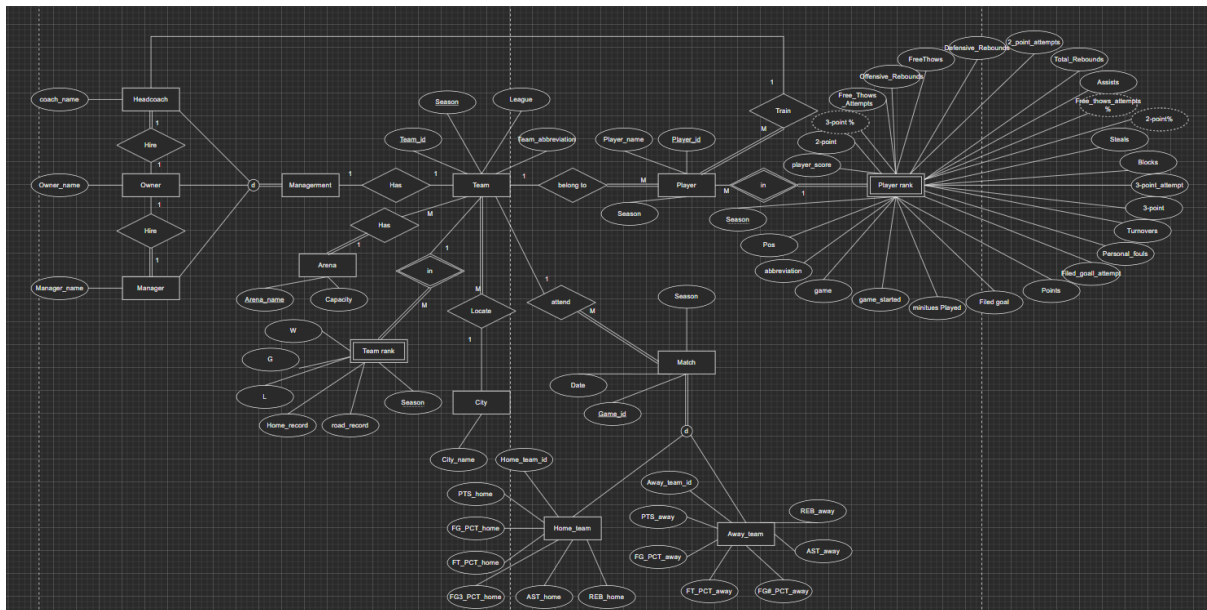


COMP 3380 Project - NBA

Part 1 Summary

Group 66

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Description:

Our database is used to record the match data of NBA games. The dataset includes daily match results, team performance, player performance, daily team ranking, list of teams, team staff, and players.

Justification for constraints:

- **Belong to**
 - Many basketball players belong to the same team. NBA players must have a team to play for.
- **Attend**
 - One team has many games to play in a season. A match must have two teams to hold.
- **In (player in player rank)**
 - Many players are in the ranks. PlayerRank is a weak entity, it needs player_id and season (partial key) to identify a player's rank.
- **In (team in team rank)**
 - Many teams are in the ranks. TeamRank is a weak entity, it needs team_id and season (partial key) to identify a team's rank.
- **Locate**
 - A team must be located in a city, a city does not necessarily have a team. One city may have more than one team.
- **Has (a team has arena)**
 - A team must play the game in an arena, an arena must be owned or rented by a team. Multiple teams may share the same arena.
- **Has (a team has coach)**
 - One team has only one coach.

- **Has (a team has owner)**
 - **One team has only one owner.**
- **Has (a team has manager)**
 - **A team has only one general manager.**
- **Hire(an owner hire manager)**
 - **An owner hire one manager, a manager can only be hired by one owner/team.**
- **Hire(an owner hire coach)**
 - **An owner hire one head coach, a head coach can only be hired by one owner/team.**
- **Train**
 - **A team members must be trained by the head coach, one head coach trains all team members.**

Schema:

Team(team_id,season,team_name,team_abbreviation)

Player(player_id,season,player_name)

FOREIGN KEY (season) REFERENCES Team(season)

PlayerRank(player_id,season, position, team_abbreviation, game, game_started, minutes_played, field_goal, points, field_goal_attempts, personal_fouls, turnovers, 3_point, 3_point_attempts, blocks, steals, free_throws_attempts, assists, total_rebounds, 2_point_attempts, defensive_rebounds, free_throws, free_throw, offensive Rebounds, free_throws_attempts, 3_point %, 2_point%, player_score)

FOREIGN KEY(season) REFERENCE Team(season)

FOREIGN KEY(player_id) REFERENCE Player(player_id)

FOREIGN KEY(team_abbreviation) REFERENCE Team(team_abbreviation)

Match(game_id,date,season)

FOREIGN KEY(season) REFERENCE Team(season)

Home_team(game_id, home_team_id, PTS_home, FG_PCT_home, FT_PCT_home, FG3_PCT_home, AST_home, REB_home)

FOREGIN KEY(game_id) REFERENCE Match(game_id)

Away_team(game_id, away_team_id, PTS_away, FG_PCT_away, FT_PCT_away, FT_PCT_away, FG3_PCT_away, AST_away, REB_away)

FOREGIN KEY(game_id) REFERENCE Match(game_id)

City(city_id,city_name)

City_id uniquely autoincrement.

Teamrank(team_id,season,G,W,L,home_record,road_record)

FOREIGN KEY(team_id) REFERENCE Team(team_id)

FOREIGN KEY(season) REFERENCE Team(season)

Arena(arena_name,capacity)

Headcoach(coach_id,coach_name)

coach_id uniquely autoincrement.

Owner(owner_id,owner_name)

Owner_id uniquely autoincrement.

Manager(manager_id,manager_name)

manager_id uniquely autoincrement.

TeamHasManager(team_id,manager_id)

FOREIGN KEY(team_id) REFERENCES Team(team_id)

FOREIGN KEY(manager_id) REFERENCES Manager(manager_id)

TeamHasOwner(team_id,owner_id)

FOREIGN KEY(team_id) REFERENCE Team(team_id)

FOREIGN KEY(owner_id) REFERENCE Owner(owner_id)

TeamHasCoach(team_id,coach_id)

FOREIGN KEY(team_id) REFERENCE Team(team_id)

FOREIGN KEY(coach_id) REFERENCE Owner(coach_id)

BelongsTo(player_id,team_id)

FOREIGN KEY(team_id) REFERENCE Team(team_id)

FOREIGN KEY(player_id) REFERENCE Player(player_id)

Attend(game_id,team_id)

FOREIGN KEY(game) REFERENCE HomeTeam(game_id)

FOREIGN KEY(team_id) REFERENCE Team(team_id)

Locate(team_id,city_id)

FOREIGN KEY(team_id) REFERENCE Team(team_id)

FOREIGN KEY(city_id) REFERENCE City(city_id)

Train(player_id, coach_id)

FOREIGN KEY(player_id) REFERENCE Player(player_id)

FOREIGN KEY(coach_id) REFERENCE Coach(coach_id)

HasArena(team_id, Arena_name)

FOREIGN KEY(arena_name) REFERENCE Arena(arena_name)

FOREIGN KEY(team_id) REFERENCE Team(team_id)

HireCoach(Owner_id,coach_id)

FOREIGN KEY(Owner_id) REFERENCE Owner(owner_id)

FOREIGN KEY(coach_id) REFERENCE HeadCoach(coach_id)

HireManager(Owner_id,manager_id)

FOREIGN KEY(Owner_id) REFERENCE Owner(owner_id)

FOREIGN KEY(manager_id) REFERENCE Manager(manager_id)

Post Merge:

Player(player_id,season,player_name, team_id,coach_id)

PlayerRank(player_id,season, position, team_abbreviation, game, game_started, minutes_played, field_goal, points, field_goal_attempts, personal_fouls, turnovers, 3_point, 3_point_attempts, blocks, steals, free_throws_attempts, assists, total_rebounds, 2_point_attempts, defensive_rebounds, free_throws, free_throw, offensive Rebounds, free_throws_attempts, 3_point %, 2_point%, player_score)

Match(game_id,date,season,home_team_id, PTS_home, FG_PCT_home, FT_PCT_home, FG3_PCT_home, AST_home, REB_home,away_team_id, PTS_away, FG_PCT_away, FT_PCT_away, FT_PCT_away, FG3_PCT_away, AST_away, REB_away,team_id)

City(city_id,city_name)

Teamrank(team_id,season,team_name,abbreviation,G,W,L,home_record,road_record)

Arena(arena_name,capacity)

Headcoach(coach_id,coach_name)

Owner(owner_id,owner_name,coach_id, manager_id)

Manager(manager_id,manager_name)

TeamProperty(team_id, manager_id, owner_id, coach_id, arena_name, city_id)

Functional dependency:

- player_id-> season,player_name, team_id,coach_id
- player_id,season -> position, team_abbreviation, game, game_started, minutes_played, field_goal, points, field_goal_attempts, personal_fouls, turnovers, 3_point, 3_point_attempts, blocks, steals, free_throws_attempts, assists, total_rebounds, 2_point_attempts, defensive_rebounds, free_throws, free_throw, offensive Rebounds, free_throws_attempts, 3_point %, 2_point%, player_score
- Game_id -> date,season,home_team_id, PTS_home, FG_PCT_home, FT_PCT_home, FG3_PCT_home, AST_home, REB_home,away_team_id, PTS_away, FG_PCT_away, FT_PCT_away, FT_PCT_away, FG3_PCT_away, AST_away, REB_away,team_id
- city_id -> city_name
- team_id,season->team_name,abbreviation,G,W,L,home_record,road_record
- arena_name -> capacity
- coach_id -> coach_name
- owner_id -> owner_name,coach_id, manager_id
- manager_id -> manager_name

- team_id -> manager_id, owner_id, coach_id, arena_name, city_id

Normalization:

- 1NF: No change since no multi-value
- 2NF: No change since no partial dependency
- 3NF: team_id -> owner_id, arena_name, city_id
Owner_id -> manager_id, coach_id
- BCNF: No change since all determinants are super key

Post-normalization:

- player_id -> season, player_name, team_id, coach_id
- player_id, season -> position, team_abbreviation, game, game_started, minutes_played, field_goal, points, field_goal_attempts, personal_fouls, turnovers, 3_point, 3_point_attempts, blocks, steals, free_throws_attempts %, assists, total_rebounds, 2_point_attempts, defensive_rebounds, free_throws, offensive_rebounds, free_throws_attempts, 3_point %, 2_point, player_score
- Game_id -> date, season, home_team_id, PTS_home, FG_PCT_home, FT_PCT_home, FG3_PCT_home, AST_home, REB_home, away_team_id, PTS_away, FG_PCT_away, FT_PCT_away, FT_PCT_away, FG3_PCT_away, AST_away, REB_away, team_id
- city_id -> city_name
- team_id, season -> team_name, abbreviation, G, W, L, home_record, road_record
- arena_name -> capacity
- coach_id -> coach_name
- owner_id -> owner_name, coach_id, manager_id
- manager_id -> manager_name
- team_id -> owner_id, arena_name, city_id

Final Relational Model:

- **Player**(player_id,season,player_name, team_id,coach_id)
- **PlayerRank**(player_id,season, position, team_abbreviation, game, game_started, minutes_played, field_goal, points, field_goal_attempts, personal_fouls, turnovers, 3_point, 3_point_attempts, blocks, steals, free_throws_attempts, assists, total_rebounds, 2_point_attempts, defensive_rebounds, free_throws, free_throw, offensive Rebounds, free_throws_attempts, 3_point %, 2_point%, player_score)
- **Match**(game_id,date,season,home_team_id, PTS_home, FG_PCT_home, FT_PCT_home, FG3_PCT_home, AST_home, REB_home,away_team_id, PTS_away, FG_PCT_away, FT_PCT_away, FT_PCT_away, FG3_PCT_away, AST_away, REB_away,team_id)
- **City**(city_id,city_name)
-
- **Teamrank**(team_id,season,team_name,abbreviation,G,W,L,home_record, road_record)
-
- **Arena**(arena_name,capacity)
-
- **Headcoach**(coach_id,coach_name)
- **Owner**(owner_id,owner_name,coach_id, manager_id)
- **Manager**(manager_id,manager_name)
- **TeamProperty**(team_id, owner_id, arena_name, city_id)