# Entities

1. Player: This entity represents individual players in the NFL.

Attributes: player\_id (key), player\_name, position, team\_id

1. Team: This entity represents the NFL teams.

Attributes: team\_id (key), team\_name, team\_city

1. Game: This entity represents the games played between two teams.

Attributes: game\_id (key), home\_team\_id, away\_team\_id, game\_date

1. Play: This entity represents individual plays within a game.

Attributes: play\_id (key), game\_id, player\_id, yards\_gained, touchdown, fumble

1. Position: This entity represents the different positions played by players in the NFL.

Attributes: position\_id (key), position\_name

1. Statistic: This entity represents the different types of statistics tracked for each player.

Attributes: statistic\_id (key), statistic\_name, statistic\_description

# Relationships

1. **Player - Team**: Many players belong to one team.

Cardinality: Many-to-one

Participation: Mandatory for player, mandatory for team.

1. **Game - Team**: One game involves two teams.

Cardinality: One-to-many

Participation: Mandatory for game, mandatory for both teams.

1. **Plays - Game**: One play belongs to one game.

Cardinality: One-to-one

Participation: Mandatory for play, mandatory for game.

1. **Plays - Player**: One play involves many players.

Cardinality: One-to-many

Participation: Mandatory for play, mandatory for player.

1. **Player - Position**: One player can play multiple positions.

Cardinality: One-to-many

Participation: Mandatory for player, mandatory for position.

1. **Plays - Statistic**: One play can have multiple statistics.

Cardinality: One-to-many

Participation: Mandatory for play, mandatory for statistic.

# Attributes

player\_id: Key attribute that uniquely identifies a player. It cannot be null.

team\_id: Key attribute that uniquely identifies a team. It cannot be null.

game\_id: Key attribute that uniquely identifies a game. It cannot be null.

play\_id: Key attribute that uniquely identifies a play. It cannot be null.

position\_id: Key attribute that uniquely identifies a position. It cannot be null.

statistic\_id: Key attribute that uniquely identifies a statistic. It cannot be null.

player\_name: The name of the player. It cannot be null.

position\_name: The name of the position. It cannot be null.

team\_name: The name of the team. It cannot be null.

team\_city: The city where the team is located. It cannot be null.

game\_date: The date when the game was played. It cannot be null.

yards\_gained: The number of yards gained on a particular play. It can be null.

touchdown: Whether or not a touchdown was scored on a particular play. It can be null.

fumble: Whether or not a fumble occurred on a particular play. It can be null.

statistic\_name: The name of the statistic being tracked. It cannot be null.

statistic\_description: A brief description of the statistic being tracked. It can be null.

The composite attributes from the original data on the website have been separated into appropriate sub-attributes where necessary. For example, player\_name is a composite attribute consisting of first name and last name sub-attributes. These sub-attributes may need to be accessed separately in queries that require more detailed player information.

A few exanokes of multivalued attributes are:

Player.Teams: A player can have played for multiple teams throughout their career.

Player.Games\_Played\_by\_Position: A player can play multiple games at different positions.

Game.Teams: A game involves two teams.

Team.Games: A team can play multiple games in a season.