CIS 451/551 Final Project

Fall 2019

Name: Ryan Moll

Project Title: NBA Data 2018-19

Connection Information:

port number: 3602
guest account login/password: guest/guest
database name: nba

Project URL: https://ix.cs.uoregon.edu/~rmoll/nbaIndex.html

Highlights:

- Top Tens: Choose a stat of interest and see the top ten players for that stat
- Compare Players: Choose two players and compare their performance from the 2018-19 season head to head
- Compare Teams: Choose two teams and see who had a better record during the 2018-19 season
- Coach Performance: Choose your favorite team and see if their coach underperformed or overperformed during the season based on their career record
- Player Contract Evaluation: Choose a player and see if they are being paid too much relative to other players who performed similarly

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URLs

Main Page: *https://ix.cs.uoregon.edu/~rmoll/nbaIndex.html*

Application 1*: *https://ix.cs.uoregon.edu/~rmoll/nbaTopTens.html*

Application 2*: *https://ix.cs.uoregon.edu/~rmoll/nbaPlayerComp.html*

Application 3*: *https://ix.cs.uoregon.edu/~rmoll/nbaTeamCompare.html*

Application 4*: *https://ix.cs.uoregon.edu/~rmoll/nbaCoachPerformance.html*

Application 5*: *https://ix.cs.uoregon.edu/~rmoll/nbaContractEval.html*

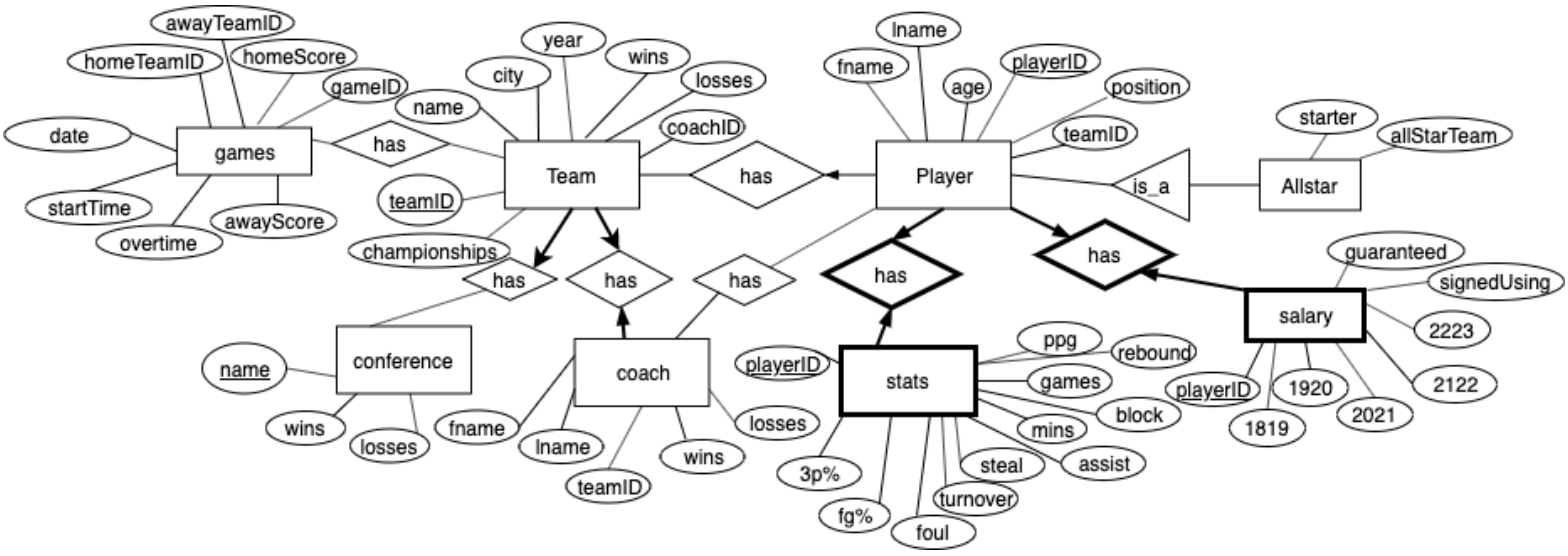
Repository: https://github.com/ryan-moll/DatabasesFinal

*All applications can be navigated to from the "main page" using the nav bar

Summary

The world I chose to model is that of the NBA from the 2018-2019 regular season. Sports is a common source of data so it was a convenient choice. I stored a wide variety of data in my database that I used for a variety of things, and still has room to be used for many more. First, I stored player data such as what team they play for or how many points they score. Because it would have been too much data for this scale of project, I did not include individual game data for players. Rather, I stored per-game season averages for common metrics such as points scored, minutes played, or turnovers committed. I used this data for evaluations such as comparing the performance of two different players, or seeing whether a player is worth how much they are being paid. I also stored NBA data such as data on coaches, who have a lot to do with the performances of NBA players and teams. One of my applications looks at how well a coach performed during the 2018-19 season and compares it to how well that coach has performed throughout their whole career. Along with that I stored game data, conference data, and data about the All Star Game. I added more data than I needed so that I could expand on this project if I wanted too.

Logical Design



Physical Design

games- Table of games played (Only contains Trailblazers data in actual db)

- gameID (primary): A unique id to identify each game played. Takes the format <homeTeamID><awayTeamID><gamePlayed> so for the second game the Lakers played at the Moda Center (Portland's arena), the game id would be PORLAL1 (index at 0 for game played)
- homeTeamID: Team ID for the team that hosted the game
- awayTeamID: Team ID for the team that was visiting
- homeScore: Amount of points the home team scored
- awayScore: Amount of points the visiting team scored
- date: The date of the game
- startTime: The time of day the game started (EST)
- overtime: Binary value to indicate if the game went into overtime

player- Table of all players in the nba

- playerID (primary): A unique id to identify each player. Takes the format <first 5 letters of last name><first 2 letters of first name><incrementer for duplicates> so for the Damian Lillard his player id would be lillada01 (assuming he is the first lillada)(which he is).
- teamID: The id of the team the player is on
- fname: The player's first name
- lname: The player's last name
- age: How old the player is
- position: What position the player plays

playerSalary- Table of all players salary information

- playerID (primary): Unique playerID to indicate whose salary it is
- salary1819-salary2223: Integers to represent the amount of money they will be making for the corresponding season
- signedUsing: How the player signed their current contract (e.g. draft pick, temp contract, etc.)
- guaranteed: How much money the player is guaranteed through the end of their contract

playerStat- Table of per-game season averages for player statistics

- playerID (primary): The player ID of the player who the stats belong to
- threePct: Three point shooting percentage for the player over the whole season
- fgPct: Field goal shooting percentage for the player over the whole season
- ppg: Average points scored by the player every game for the season
- rebounds: Average rebounds by the player every game for the season
- games: Games played in by the player for the season
- minutes: Average minutes played per game by the player for the season
- assists: Average assists per game by the player for the season
- steals: Average steals per game by the player for the season
- turnovers: Average turnovers per game by the player for the season
- fouls: Average fouls per game by the player for the season

teams- Table of team information for every NBA team

- teamID (primary): Common team abbreviation (e.g. POR, BOS, CHI)
- teamName: The team's name (e.g. Trailblazers, Celtics, Bulls)
- city: The city where the team is located in
- wins: How many wins the team tallied in the 2018-19 season
- losses: How many wins the team tallied in the 2018-19 season
- championships: Number of championships ever won by the franchise
- year: Year in which the franchise was established

allStar- Table of All-Star game information

- playerID (primary): Unique player ID for the All-Star Game player
- allStarTeam: There were two teams in the 2019 All-Star Game: Team Lebron and Team Giannis and this field indicates which team the player was on
- starter: Only five all star players are selected to be starters in the All-Star Game and this boolean value indicates whether or not this player was one

coach- Table of coach information for every NBA coach

- teamID (primary): Unique team abbreviation for the coach's team
- fname: The coach's first name
- lname: The coach's last name
- wins: How many games this coach has won in their lifetime

- losses: How many games this coach has lost in their lifetime

conference- Table of information on the two NBA conferences

- name (primary): Name of each conference (East and West)
- wins: Total wins between all teams in the conference
- losses: Total losses between all teams in the conference

List of Applications

- *Top Tens*: Select one of the listed player statistics. A query will be executed to return the top ten highest performing NBA players for that stat in 2018-19. Utilizes the ‘player’ and ‘playerStats’ tables.

- *Compare Players*: Enter two players in the NBA. A query will be executed to compare statistical data between those two players. Based on that data, an assertion will be made about which player is better. Utilizes the ‘player’ and ‘playerStats’ tables.

- *Compare Teams*: Enter two NBA teams. A query will be executed to retrieve the win/loss data for both of those teams and a quick comparison will tell you which team performed better in 2018-19. Utilizes the ‘teams’ table.

- *Coach Performance*: Enter the name of any NBA team. A query will be executed to pull information on that coach’s lifetime NBA record. Comparing that record to that coach’s team record for the 2018-19 NBA season will tell you whether or not that coach overperformed for the season. Utilizes the ‘coach’ and ‘teams’ tables.

- *Player Contract Evaluation*: Enter any NBA player. A query will be executed to retrieve the five closest players in performance above and below the selected player using the same metric as the Compare Players application. The contract data for all of those other players will be averaged and compared to the contract data for the provided player to determine if that player if being overpaid or underpaid. Utilizes the ‘player’, ‘playerStats’, and ‘playerSalary’ tables.

All of these applications can be run using the suggested placeholder text or with whatever other inputs you want to try.

User's Guide

1. Begin by navigating to https://ix.cs.uoregon.edu/~rmoll/nbaIndex.html
2. Use the nav bar to switch between the applications
3. After running an application, use the back button to return to the main pages

The database should be accessible with the USR: 'guest' PASS: 'guest' credentials.

Contents of Tables

allstar:

playerID	allStarTeam	starter
aldrila01	LeBron	0
antetgi01	Giannis	1
bealbr01	LeBron	0
curryst01	Giannis	1
davisan02	LeBron	0
duranke01	LeBron	1
embiijo01	Giannis	1
georgpa01	Giannis	1
griffbl01	Giannis	0

coach:

teamID	fname	lname	wins	losses
ATL	Lloyd	Pierce	29	53
BOS	Brad	Stevens	270	222
BRK	Kenny	Atkinson	90	156
CHI	Jim	Boylen	17	41
CHO	James	Borrego	49	63
CLE	Larry	Drew	162	226
DAL	Rick	Carlisle	751	627
DEN	Mike	Malone	212	222
DET	Dwane	Casey	414	348
GSW	Steve	Kerr	322	88

player:

playerID	teamID	fname	lname	age	position
abrinal01	OKC	Alex	Abrines	25	SG
acyqu01	PHO	Quincy	Acy	28	PF
adamsja01	ATL	Jaylen	Adams	22	PG
adamsst01	OKC	Steven	Adams	25	C
adebaba01	MIA	Bam	Adebayo	21	C
adelde01	CLE	Deng	Adel	21	SF
akoonde01	DEN	DeVaughn	Akoon-Purcell	25	SG
aldrila01	SAS	LaMarcus	Aldridge	33	C
alkinra01	CHI	Rawle	Alkins	21	SG

games:

gameID	homeTeamID	awayTeamID	homeScore	awayScore	date	startTime	overtime
PORORL0	POR	ORL	115	112	Wed Nov 28 2018	10:00p	0
MILPOR0	MIL	POR	143	100	Wed Nov 21 2018	8:00p	0
LALPOR0	LAL	POR	126	117	Wed Nov 14 2018	10:30p	0
CHIPOR0	CHI	POR	98	118	Wed Mar 27 2019	8:00p	0
PORDAL1	POR	DAL	126	118	Wed Mar 20 2019	10:00p	0
PORCHI0	POR	CHI	124	112	Wed Jan 9 2019	10:00p	0
PORUTA1	POR	UTA	132	105	Wed Jan 30 2019	10:30p	0
PORCLE0	POR	CLE	129	112	Wed Jan 16 2019	10:00p	0
BOSPOR0	BOS	POR	92	97	Wed Feb 27 2019	8:00p	0
PORGSW1	POR	GSW	129	107	Wed Feb 13 2019	10:30p	0

conference:

name	wins	losses
East	588	642
West	642	588

playerSalary:

playerID	salary1819	salary1920	salary2021	salary2122	salary2223	signedUsing	guaranteed
ballilo01	7461960	8719320	11003782	NULL	NULL	1st Round Pick	16181280
bambamo01	4865040	5697600	5969040	7568742	NULL	1st Round Pick	24100422
bareajo01	3710850	NULL	NULL	NULL	NULL	Cap Space	3710850
barneha02	24107258	25102512	NULL	NULL	NULL	Cap Space	24107258
barnema02	2133542	2133541	NULL	NULL	NULL	NULL	4267083
bartowi01	11830358	12960000	13920000	14880000	NULL	NULL	38710358
bateske01	838464	1416852	1663861	NULL	NULL	MLE	2255316
batumni01	24000000	25565217	27130434	NULL	NULL	Cap Space	49565217
bayleja01	857596	NULL	NULL	NULL	NULL	Cap Space	857596

teams:

teamID	teamName	city	wins	losses	championships	conference	year
ATL	Hawks	Atlanta	29	53	1	East	1949
BOS	Celtics	Boston	49	33	17	East	1946
BRK	Nets	Brooklyn	42	40	2	East	1967
CHI	Bulls	Chicago	22	60	6	East	1966
CHO	Hornets	Charlotte	39	43	0	East	1988
CLE	Cavaliers	Cleveland	19	63	1	East	1970
DAL	Mavericks	Dallas	33	49	1	West	1980
DEN	Nuggets	Denver	54	28	0	West	1967
DET	Postons	Detroit	41	41	3	East	1948
GSW	Warriors	Golden State	57	25	6	West	1946

playerStat:

playerID	threePct	fgPct	ppg	rebounds	games	blocks	minutes	assists	steals	turnovers	fouls
abrinal01	0.323	0.357	5.3	1.5	31	0.2	19	0.6	0.5	0.5	1.7
acyqu01	0.133	0.222	1.7	2.5	10	0.4	12.3	0.8	0.1	0.4	2.4
adamsja01	0.338	0.345	3.2	1.8	34	0.1	12.6	1.9	0.4	0.8	1.3
adamsst01	0.000	0.595	13.9	9.5	80	1	33.4	1.6	1.5	1.7	2.6
adebaba01	0.200	0.576	8.9	7.3	82	0.8	23.3	2.2	0.9	1.5	2.5
adelde01	0.261	0.306	1.7	1	19	0.2	10.2	0.3	0.1	0.3	0.7
akoonde01	0.000	0.300	1	0.6	7	0	3.1	0.9	0.3	0.3	0.6
aldrila01	0.238	0.519	21.3	9.2	81	1.3	33.2	2.4	0.5	1.8	2.2

Implementation Code

Please see my GitHub repository for the full code: https://github.com/ryan-moll/DatabasesFinal

PHP Code based on a skeleton provided by Chris Wilson.

Conclusion

For this project, I created a database that contains a ton of data about the 2018-19 NBA basketball season. I am satisfied with the work I did given how busy I have been, but in the future I would like to continue to work on this and hopefully turn into something I could put on my resume. Given more time, I would improve the PHP code significantly. I was not really sure what I was doing with PHP so it leans heavily on the skeleton code. I would also like to look into more sophisticated mathematical models for modeling what makes a good NBA player. Finally, I would like to improve the HTML webpage and make everything look and feel nice. Ultimately, I like a lot of the ideas I had but I would like to implement them in a more impressive way.

Credit:
Chris Wilson- Skeleton code
Basketball-reference.com- NBA data