

CPSC 304 Project Cover Page

Milestone #: 4

Date: 2022-11-25

Group Number: 08

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia.

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Project Overview

Our group successfully completed a full stack web project, where we designed and built an NBA Fan Page to bring maximum relevant information to user/fans from data available to us, using ORACLE Database and SQL. In detail, we:



- Conceptually model the database in ER Diagram
- Logically model the database in the relational model
- Normalize the database relations
- Generated tables and insert data in ORACLE Database using SQL statements
- Designed, tested, and implemented SQL queries on ORACLE Database based on user inputs
- Designed user-interface using HTML and PHP

Change of Schema

We did not change the overall schema for the project. However, we did fix the problem in SQL DDL that pointed out by our TA, Sharon He, in Milestone 2 feedbacks. These changes including adding NOT NULL constraints to teamID for Player, Fan, Boss, and Staff.

Schema and SQL Script

```
CREATE TABLE Certificate_Wage (  
    certificate CHAR(100) PRIMARY KEY,  
    minimumWage INT  
);
```

	 CERTIFICATE	 MINIMUMWAGE
1	Entry	100000
2	Intermediate	200000
3	Advanced	400000
4	Proficient	800000
5	Expert	1600000

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```
CREATE TABLE PostalCode_Location (
    postalCode CHAR(100) PRIMARY KEY,
    state CHAR(100),
    city CHAR(100),
    address CHAR(100)
);
```

	POSTALCODE	STATE	CITY	ADDRESS
1	02114	Massachusetts	Boston	100 Legends Way
2	11207	New York	Brooklyn	620 Atlantic Avenue
3	10001	New York	Manhattan	4 Pennsylvania Plaza
4	19148	Pennsylvania	Philadelphia	3601 South Broad Street
5	M5J 2X2	Ontario	Toronto	40 Bay Street
6	60612	Illinois	Chicago	1901 West Madison Street
7	44115	Ohio	Cleveland	1 Center Court
8	48201	Michigan	Detroit	2645 Woodland Avenue
9	46204	Indiana	Indianapolis	125 South Pennsylvania Street
10	53203	Wisconsin	Milwaukee	1111 Vel R. Phillips Avenue
11	30303	Georgia	Atlanta	1 State Farm Drive
12	28202	North Carolina	Charlotte	333 East Trade Street
13	33132	Florida	Miami	601 Biscayne Boulevard
14	32805	Florida	Orlando	400 West Church Street
15	20004	District of Columbia	Washington	601 F. Street Northwest
16	80204	Colorado	Denver	1000 Chopper Circle
17	55403	Minnesota	Minneapolis	600 First Avenue North
18	73102	Oklahoma	Oklahoma City	100 West Reno Avenue
19	97227	Oregon	Portland	1 Center Court
20	84101	Utah	Salt Lake City	301 South Temple
21	94158	California	San Francisco	1 Warriors Way
22	90015	California	Los Angeles	1111 South Figueroa Street
23	85004	Arizona	Phoenix	201 East Jefferson Street
24	95814	California	Sacramento	500 David J. Stern Walk
25	75219	Texas	Dallas	2500 Victory Avenue
26	77002	Texas	Houston	1510 Polk Street
27	38103	Tennessee	Memphis	191 Beale Street
28	70113	Louisiana	New Orleans	1501 Dave Dixon Drive
29	78219	Texas	San Antonio	1 AT&T Center Parkway

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```
CREATE TABLE Stadium_Location(
    stadiumName CHAR(100) PRIMARY KEY,
    postalCode CHAR(100),
    address CHAR(100),
    FOREIGN KEY (postalCode) REFERENCES PostalCode_Location(postalCode)
);
```

	STADIUMNAME	POSTALCODE	ADDRESS
1	TD Garden	02114	100 Legends Way
2	Barclays Center	11207	620 Atlantic Avenue
3	Madison Square Garden	10001	4 Pennsylvania Plaza
4	Wells Fargo Center	19148	3601 South Broad Street
5	Scotiabank Arena	M5J 2X2	40 Bay Street
6	United Center	60612	1901 West Madison Street
7	Rocket Mortgage FieldHouse	44115	1 Center Court
8	Little Caesars Arena	48201	2645 Woodland Avenue
9	Gainbridge Fieldhouse	46204	125 South Pennsylvania Street
10	Fiserv Forum	53203	1111 Vel R. Phillips Avenue
11	State Farm Arena	30303	1 State Farm Drive
12	Spectrum Center	28202	333 East Trade Street
13	FTX Arena	33132	601 Biscayne Boulevard
14	Amway Center	32805	400 West Church Street
15	Capital One Arena	20004	601 F. Street Northwest
16	Ball Arena	80204	1000 Chopper Circle
17	Target Center	55403	600 First Avenue North
18	Paycom Center	73102	100 West Reno Avenue
19	Moda Center	97227	1 Center Court
20	Vivint Arena	84101	301 South Temple
21	Chase Center	94158	1 Warriors Way
22	Crypto.com Arena	90015	1111 South Figueroa Street
23	Footprint Center	85004	201 East Jefferson Street
24	Golden 1 Center	95814	500 David J. Stern Walk
25	American Airlines Center	75219	2500 Victory Avenue
26	Toyota Center	77002	1510 Polk Street
27	FedEx Forum	38103	191 Beale Street
28	Smoothie King Center	70113	1501 Dave Dixon Drive
29	AT&T Center	78219	1 AT&T Center Parkway

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```
CREATE TABLE Team_Sponsors_Stadium (
    teamID INT PRIMARY KEY,
    stadiumName CHAR(100) NOT NULL,
    foundedYear INT,
    teamName CHAR(100),
    sponserName CHAR(100) NOT NULL,
    fundingPerYear INT,
    FOREIGN KEY (stadiumName) REFERENCES Stadium_Location(stadiumName)
);
```

	TEAMID	STADIUMNAME	FOUNDEDYEAR	TEAMNAME	SPONSERNAME	FUNDINGPERYEAR
1	1	TD Garden	1946	Boston Celtics	Vistaprint	1000
2	2	Barclays Center	1967	Brooklyn Nets	Webull	900
3	3	Madison Square Garden	1946	New York Knicks	Squarespace	800
4	4	Wells Fargo Center	1946	Philadelphia 76ers	Crypto.com	1000
5	5	Scotiabank Arena	1995	Toronto Raptors	Sun Life Financial	1100
6	6	United Center	1966	Chicago Bulls	Zenni Optical	1200
7	7	Rocket Mortgage FieldHouse	1970	Cleveland Cavaliers	Goodyear Tire and Rubber Company	1000
8	8	Little Caesars Arena	1941	Detroit Pistons	United Wholesale Mortgage	1300
9	9	Gainbridge Fieldhouse	1967	Indiana Pacers	Motorola	800
10	10	Fiserv Forum	1968	Milwaukee Bucks	Motorola	1000
11	11	State Farm Arena	1946	Atlanta Hawks	Sharecare	900
12	12	Spectrum Center	1988	Charlotte Hornets	LendingTree	1000
13	13	FTX Arena	1988	Miami Heat	Ultimate Kronos Group	1000
14	14	Amway Center	1989	Orlando Magic	Walt Disney World	900
15	15	Capital One Arena	1961	Washington Wizards	Calvin Klein	900
16	16	Ball Arena	1967	Denver Nuggets	Western Union	1000
17	17	Target Center	1989	Minnesota Timberwolves	Aura	900
18	18	Paycom Center	1967	Oklahoma City Thunder	Love's Travel Stops & Country Stores	1200
19	19	Moda Center	1970	Portland Trail Blazers	StormX	1100
20	20	Vivint Arena	1974	Utah Jazz	Qualtrics	1000
21	21	Chase Center	1946	Golden State Warriors	Rakuten	1000
22	22	Crypto.com Arena	1970	Los Angeles Clippers	Honey	1300
23	23	Crypto.com Arena	1947	Los Angeles Lakers	Bibigo	1000
24	24	Footprint Center	1968	Phoenix Suns	PayPal	1000
25	25	Golden 1 Center	1923	Sacramento Kings	Dialpad	800
26	26	American Airlines Center	1980	Dallas Mavericks	Chime	1000
27	27	Toyota Center	1967	Houston Rockets	Credit Karma	700
28	28	FedEx Forum	1995	Memphis Grizzlies	Bose	700
29	29	Smoothie King Center	2002	New Orleans Pelicans	Ibotta	1000
30	30	AT&T Center	1967	San Antonio Spurs	Frost Bank	1000

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```
CREATE TABLE Player (
    playerID INT PRIMARY KEY,
    teamID INT NOT NULL,
    playerName CHAR(100),
    birthdate DATE,
    jerseyNum INT NOT NULL,
    salary INT,
    appearance INT,
    threePointer INT,
    midRange INT,
    paint INT,
    UNIQUE (teamID, jerseyNum),
    FOREIGN KEY (teamID) REFERENCES Team_Sponsors_Stadium (teamID) ON DELETE
    CASCADE
);
```

	PLAYERID	TEAMID	PLAYERNAME	BIRTHDATE	JERSEYNUM	SALARY	APPEARANCE	THREEPTR	MIDRANGE	PAINT
1	1	1	Brown, Jaylen	1996-10-24	7	300	354	312	584	416
2	2	2	Curry, Seth	1990-08-23	30	400	324	310	684	326
3	3	3	Arcidiacono, Ryan	1994-03-26	51	250	302	410	664	356
4	4	4	Bassey, Charles	2000-10-28	23	300	224	240	689	346
5	5	5	Achiuwa, Precious	1999-09-19	5	200	214	350	604	325
6	6	6	Ball, Lonzo	1997-10-27	2	300	424	410	984	826
7	7	7	Allen, Jarrett	1998-04-21	31	300	344	262	562	572
8	8	8	Bey, Saddiq	1999-04-09	41	300	265	245	352	623
9	9	9	Bitadze, Goga	1999-07-20	88	200	345	245	532	435
10	10	10	Allen, Grayson	1995-10-08	7	250	865	856	747	1423
11	11	11	Bogdanovic, Bogdan	1992-08-18	13	300	332	234	345	456
12	12	12	Ball, LaMelo	2001-08-22	2	200	143	241	124	142
13	13	13	Adebayo, Bam	1997-07-18	13	300	345	345	635	365
14	14	14	Anthony, Cole	2000-05-15	50	200	135	234	134	242
15	15	15	Avdija, Deni	2001-01-03	9	250	124	213	231	323
16	16	16	Barton, Will	1991-01-06	5	400	532	635	763	735
17	17	17	Beasley, Malik	1996-11-26	5	500	578	735	746	855
18	18	18	Bazley, Darius	2000-06-12	7	300	351	521	345	452
19	19	19	Bledsoe, Eric	1989-12-09	5	400	525	645	473	746
20	20	20	Alexander-Walker, Nickell	1998-09-02	6	500	633	745	684	875
21	21	21	Bjelica, Nemanja	1988-05-09	8	600	653	780	805	709
22	22	22	Batum, Nicolas	1988-12-14	33	550	468	478	568	528
23	23	23	Davis, Anthony	1993-03-11	3	350	452	670	684	852
24	24	24	Ayton, Deandre	1998-07-23	22	200	342	562	489	379
25	25	25	Barnes, Harrison	1992-05-30	40	350	479	587	546	462
26	26	26	Bertans, Davis	1992-11-12	44	350	583	782	780	682
27	27	27	Christopher, Josh	2001-12-08	9	200	397	429	420	520
28	28	28	Adams, Steven	1993-07-20	4	450	502	689	518	593
29	29	29	Alvarado, Jose	1998-04-12	15	500	425	637	579	597
30	30	30	Bates-Diop, Keita	1996-01-23	31	300	426	489	509	542
31	31	1	Fitts, Malik	1997-07-04	8	200	300	582	341	481
32	32	2	Durant, Kevin	1988-09-29	7	1000	581	810	941	894
33	33	3	Barrett, RJ	2000-06-14	9	200	209	240	310	201
34	34	4	Embiid, Joel	1994-03-16	21	300	491	502	492	578
35	35	5	Anunoby, OG	1997-07-17	3	250	149	247	259	261
36	36	6	Bradley, Tony	1998-08-01	13	200	310	368	489	471
37	37	7	Garland, Darius	2000-01-26	10	200	204	287	276	280
38	38	8	Cunningham, Cade	2001-09-25	2	200	183	278	265	247
39	39	9	Brissett, Oshae	1998-06-20	12	250	268	280	289	324
40	40	10	Antetokounmpo, Giannis	1994-12-06	34	300	471	509	591	602
41	41	11	Capela, Clint	1994-05-18	15	350	462	489	598	562
42	42	12	Bouknight, James	2000-09-18	5	200	376	397	404	407
43	43	13	Dedmon, Dewayne	1989-08-12	21	350	587	698	764	762
44	44	14	Bamba, Mo	1998-05-12	5	250	185	284	283	254

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45	45	15 Beal, Bradley	1993-06-28	3	300	378	474	498	467
46	46	16 Jokic, Nikola	1995-02-19	15	1200	648	893	902	941
47	47	17 Beverley, Patrick	1988-07-12	22	350	395	497	502	505
48	48	18 Dort, Luguentz	1999-04-19	5	250	287	299	304	314
49	49	19 Brown, Greg	2001-09-01	4	200	135	178	191	167
50	50	20 Azubuike, Udoka	1999-09-17	20	200	120	145	178	176
51	51	21 Curry, Stephen	1988-03-14	30	1200	586	798	829	941
52	52	22 Coffey, Amir	1997-06-17	7	250	198	289	312	300
53	53	23 Gabriel, Wenyen	1997-03-26	35	250	295	386	378	391
54	54	24 Biyombo, Bismack	1992-08-28	18	350	359	462	398	472
55	55	25 Davis, Terence	1997-05-16	3	250	273	298	303	324
56	56	26 Brunson, Jalen	1996-08-31	13	300	358	423	453	476
57	57	27 Garuba, Usman	2002-03-09	16	200	125	157	187	168
58	58	28 Anderson, Kyle	1993-09-20	1	350	428	498	537	552
59	59	29 Graham, Devonte'	1995-02-22	4	300	419	498	503	531
60	60	30 Johnson, Keldon	1999-10-11	3	300	273	304	324	342
61	61	1 Hauser, Sam	1997-12-08	30	250	278	341	351	343
62	62	2 Harris, Joe	1991-09-07	12	700	572	724	703	698
63	63	3 Burks, Alec	1991-07-20	18	450	523	682	691	672
64	64	4 Green, Danny	1987-06-22	14	900	693	987	894	962
65	65	5 Banton, Dalano	1999-11-07	45	250	231	341	302	298
66	66	6 Caruso, Alex	1994-02-28	6	800	472	598	682	703
67	67	7 LeVert, Caris	1994-08-25	3	350	381	498	487	501
68	68	8 Diallo, Hamidou	1998-07-31	6	250	289	357	387	400
69	69	9 Brogdon, Malcolm	1992-12-11	7	500	472	598	604	614
70	70	10 Antetokounmpo, Thanasis	1992-07-18	43	600	572	698	732	743
71	71	11 Collins, John	1997-09-23	20	300	381	493	487	502
72	72	12 Hayward, Gordon	1990-03-23	20	550	413	498	572	563
73	73	13 Butler, Jimmy	1989-09-14	22	450	451	587	567	587
74	74	14 Bol, Bol	1999-11-16	10	200	250	213	289	342
75	75	15 Bryant, Thomas	1997-07-31	13	300	243	298	305	323
76	76	16 Gordon, Aaron	1995-09-16	50	350	387	498	513	543
77	77	17 Bolmaro, Leandro	2000-09-11	9	200	179	287	298	301
78	78	18 Favors, Derrick	1991-07-15	15	900	643	870	872	891
79	79	19 Dunn, Kris	1994-03-18	18	400	245	376	367	391
80	80	20 Bogdanovic, Bojan	1989-04-18	44	500	671	872	893	845
81	81	21 Green, Draymond	1990-03-04	23	950	503	798	803	746
82	82	22 Boston, Brandon	2001-11-28	4	200	143	183	198	204
83	83	23 Horton-Tucker, Talen	2000-11-25	5	250	174	304	298	333
84	84	24 Booker, Devin	1996-10-30	1	400	312	478	487	463
85	85	25 DiVincenzo, Donte	1997-01-31	0	300	259	304	351	326
86	86	26 Brown, Sterling	1995-02-10	0	300	288	375	380	401
87	87	27 Gordon, Eric	1988-12-25	10	750	694	798	873	903
88	88	28 Aldama, Santi	2001-01-10	7	200	113	156	176	147
89	89	29 Hayes, Jaxson	2000-05-23	10	250	181	245	275	253
90	90	30 Collins, Zach	1997-11-19	23	350	321	389	394	425

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```
CREATE TABLE AwardsAndHonors (  
    playerId INT,  
    awardName CHAR(100),  
    season CHAR(100),  
    PRIMARY KEY (playerID, awardName, season),  
    FOREIGN KEY (playerID) REFERENCES Player(playerID) ON DELETE CASCADE  
);
```

	PLAYERID	AWARDNAME	SEASON
1	1	Rookie of the Year	2020-2021
2	2	Most Improved	2020-2021
3	3	Sixth Man	2020-2021
4	4	Defensive Player of Year	2020-2021
5	5	Rookie of the Year	2019-2020
6	6	Most Improved	2019-2020
7	7	Sixth Man	2019-2020
8	8	Defensive Player of Year	2019-2020
9	46	Defensive Player of Year	2018-2019
10	46	MVP	2019-2020
11	46	MVP	2020-2021
12	46	Most Improved	2018-2019
13	46	Rookie of the Year	2018-2019
14	46	Sixth Man	2018-2019
15	51	MVP	2018-2019

```
CREATE TABLE Fan (  
    fanID INT PRIMARY KEY,  
    teamID INT NOT NULL,  
    fanName CHAR(100),  
    email CHAR(100) UNIQUE,  
    FOREIGN KEY (teamID) REFERENCES Team_Sponsors_Stadium (teamID) ON DELETE  
    CASCADE  
);
```

	FANID	TEAMID	FANNAME	EMAIL
1	1	1	Jia Lu	jialu@gmail.com
2	2	2	Yingquan Wang	yingquanwang@gmail.com
3	3	3	Qiyu Zhou	qiyuzhou@gmail.com

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```
CREATE TABLE Boss (
    bossID INT PRIMARY KEY,
    teamID INT NOT NULL,
    bossName CHAR(100),
    wealth INT,
    FOREIGN KEY (teamID) REFERENCES Team_Sponsors_Stadium (teamID) ON DELETE
    CASCADE
);
```

	BOSSID	TEAMID	BOSSNAME	WEALTH
1	1	1	Boston Basketball Partners	74000000
2	2	2	Joseph Tsai	37000000
3	3	3	Madison Square Garden Sports	83000000
4	4	4	Harris Blitzer Sports & Entertainment	216000000
5	5	5	Maple Leaf Sports & Entertainment	37000000
6	6	6	Jerry Reinsdorf	83000000
7	7	7	Dan Gilbert	27000000
8	8	8	Tom Gores	94000000
9	9	9	Herb Simon	83000000
10	10	10	Wes Edens	94000000
11	11	11	Tony Ressler	28000000
12	12	12	Michael Jordan	73000000
13	13	13	Micky Arison	73000000
14	14	14	RDV Sports, Inc.	261000000
15	15	15	Monumental Sports & Entertainment	32000000
16	16	16	Kroenke Sports & Entertainment	84000000
17	17	17	Marc Lore	83000000
18	18	18	Professional Basketball Club LLC	94000000
19	19	19	Paul G. Allen Trust	267000000
20	20	20	Jazz Basketball Investors, Inc.	37000000
21	21	21	Joe Lacob	84000000
22	22	22	Steve Ballmer	83000000
23	23	23	Buss Family Trusts	65000000
24	24	24	Robert Sarver	48000000
25	25	25	Vivek Ranadive	38000000
26	26	26	Mark Cuban	253000000
27	27	27	Tilman Fertitta	172000000
28	28	28	Memphis Basketball, LLC	201000000
29	29	29	Gayle Benson	457000000
30	30	30	Spurs Sports & Entertainment	281000000

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```
CREATE TABLE Staff (  
    staffID INT PRIMARY KEY,  
    teamID INT NOT NULL,  
    staffName CHAR(100),  
    FOREIGN KEY (teamID) REFERENCES Team_Sponsors_Stadium(teamID) ON DELETE  
    CASCADE  
);
```

	STAFFID	TEAMID	STAFFNAME
1	1	1	Joe Mazzulla
2	2	2	Jacque Vaughn
3	3	3	Tom Thibodeau
4	4	4	Doc Rivers
5	5	5	Nick Nurse
6	6	6	Billy Donovan
7	7	7	J. B. Bickerstaff
8	8	8	Dwane Casey
9	9	9	Rick Carlisle
10	10	10	Mike Budenholzer
11	11	11	Nate McMillan
12	12	12	Steve Clifford
13	13	13	Erik Spoelstra
14	14	14	Jamahl Mosley
15	15	15	Wes Unseld Jr.
16	16	16	Michael Malone
17	17	17	Chris Finch
18	18	18	Mark Daigneault
19	19	19	Chauncey Billups
20	20	20	Will Hardy
21	21	21	Steve Kerr
22	22	22	Tyronn Lue

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23	23	23	Darvin Ham
24	24	24	Monty Williams
25	25	25	Mike Brown
26	26	26	Jason Kidd
27	27	27	Stephen Silas
28	28	28	Taylor Jenkins
29	29	29	Willie Green
30	30	30	Gregg Popovich
31	31	1	Torin Hodson
32	32	2	Geoffrey Lloyd
33	33	3	Beau Conner
34	34	4	Aditya Kim
35	35	5	Rohan Whelan
36	36	6	Vincent Quintero
37	37	7	Kevin Andrade
38	38	8	Vlad Boyd
39	39	9	Jordanne Green
40	40	10	Taran Roth
41	41	11	Haleemah Callaghan
42	42	12	Daisy Brown
43	43	13	Nelly Bate
44	44	14	Alexandre Gross

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45	45	15	Daniyal Rose
46	46	16	Rizwan Lee
47	47	17	Jay-Jay Fox
48	48	18	Iga Knapp
49	49	19	Felicity Roth
50	50	20	Clarissa Henson
51	51	21	Christian Barrow
52	52	22	Tasmin Cousins
53	53	23	Rachael Cannon
54	54	24	Madihah Salter
55	55	25	Imogen Mackenzie
56	56	26	Koby Curtis
57	57	27	Gaia Arnold
58	58	28	Petra Lara
59	59	29	Darryl Middleton
60	60	30	Gene Bridges
61	61	1	Nuha Lloyd
62	62	2	Presley Barnard
63	63	3	Aryan Cain
64	64	4	Rhianne Clarkson
65	65	5	Hamish Rojas
66	66	6	Maverick Rice

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67	67	7	Dion Cortez
68	68	8	Kya Martins
69	69	9	Taylan Hood
70	70	10	Ava-Mai Tyler
71	71	11	Yasmin Gill
72	72	12	Felicia Ferrell
73	73	13	Lola-Rose Underwood
74	74	14	Leja Owens
75	75	15	Agata Pacheco
76	76	16	Jac Sosa
77	77	17	Lyndsey Lopez
78	78	18	Isis Phan
79	79	19	Agatha Goulding
80	80	20	Kole Gardner
81	81	21	Jocelyn Allan
82	82	22	Nikki Gilbert
83	83	23	Kathy O'Gallagher
84	84	24	Gia Wallis
85	85	25	Camille Redman
86	86	26	Charlene Craig
87	87	27	Momina Bevan
88	88	28	Zakaria Calderon
89	89	29	Tehya Spencer
90	90	30	Shannan Bray

```
CREATE TABLE Coach (  
    staffID INT PRIMARY KEY,  
    coachingYear INT,  
    FOREIGN KEY (staffID) REFERENCES Staff(staffID) ON DELETE CASCADE  
);
```

	STAFFID ↕	COACHINGYEAR ↕
1	1	2
2	2	5
3	3	9
4	4	16
5	5	26
6	6	23
7	7	36
8	8	14
9	9	6
10	10	9
11	11	26
12	12	29
13	13	21
14	14	4
15	15	6
16	16	30
17	17	16
18	18	3
19	19	13
20	20	27
21	21	12
22	22	4
23	23	8
24	24	10
25	25	11
26	26	16
27	27	24
28	28	21
29	29	6
30	30	9

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```
CREATE TABLE Analyst (  
    staffID INT PRIMARY KEY,  
    certificate CHAR(100),  
    FOREIGN KEY (staffID) REFERENCES Staff(staffID) ON DELETE CASCADE,  
    FOREIGN KEY (certificate) REFERENCES Certificate_Wage(certificate)  
);
```

	STAFFID	CERTIFICATE
1	31	Entry
2	32	Intermediate
3	33	Advanced
4	34	Proficient
5	35	Expert
6	36	Entry
7	37	Intermediate
8	38	Advanced
9	39	Proficient
10	40	Expert
11	41	Entry
12	42	Intermediate
13	43	Advanced
14	44	Proficient
15	45	Expert
16	46	Entry
17	47	Intermediate
18	48	Advanced
19	49	Proficient
20	50	Expert
21	51	Entry
22	52	Intermediate
23	53	Advanced
24	54	Proficient
25	55	Expert
26	56	Entry
27	57	Intermediate
28	58	Advanced
29	59	Proficient
30	60	Expert

```
CREATE TABLE TeamDoctor (
    staffID INT PRIMARY KEY,
    specialist CHAR(100),
    FOREIGN KEY (staffID) REFERENCES Staff(staffID) ON DELETE CASCADE
);
```

	STAFFID	SPECIALIST
1	61	Cardiology
2	62	Orthopedic Surgery
3	63	Psychiatry
4	64	Cardiology
5	65	Orthopedic Surgery
6	66	Psychiatry
7	67	Cardiology
8	68	Orthopedic Surgery
9	69	Psychiatry
10	70	Cardiology
11	71	Orthopedic Surgery
12	72	Psychiatry
13	73	Cardiology
14	74	Orthopedic Surgery
15	75	Psychiatry
16	76	Cardiology
17	77	Orthopedic Surgery
18	78	Psychiatry
19	79	Cardiology
20	80	Orthopedic Surgery
21	81	Psychiatry
22	82	Cardiology
23	83	Orthopedic Surgery
24	84	Psychiatry
25	85	Cardiology
26	86	Orthopedic Surgery
27	87	Psychiatry
28	88	Cardiology
29	89	Orthopedic Surgery
30	90	Psychiatry

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```
CREATE TABLE Match_Home_Guest (
    matchID INT PRIMARY KEY,
    homeTeamID INT NOT NULL,
    guestTeamID INT NOT NULL,
    winner CHAR(100),
    time TIMESTAMP,
    homeScore INT,
    guestScore INT,
    FOREIGN KEY (homeTeamID) REFERENCES Team_Sponsors_Stadium (teamID),
    FOREIGN KEY (guestTeamID) REFERENCES Team_Sponsors_Stadium (teamID),
    UNIQUE (time, homeTeamID, guestTeamID),
    UNIQUE (time, winner)
);
```

	🏆 MATCHID 🏆	🏆 HOMETEAMID 🏆	🏆 GUESTTEAMID 🏆	🏆 WINNER 🏆	🏆 TIME 🏆	🏆 HOMESCORE 🏆	🏆 GUESTSCORE 🏆
1	1	1	2	Boston Celtics	2022-10-01 17:00:00.000000	90	83
2	2	2	3	Brooklyn Nets	2022-10-02 17:00:00.000000	106	86
3	3	3	4	New York Knicks	2022-10-03 17:00:00.000000	82	70
4	4	4	5	Philadelphia 76ers	2022-10-04 17:00:00.000000	84	82
5	5	5	6	Toronto Raptors	2022-10-05 17:00:00.000000	112	89
6	6	6	7	Chicago Bulls	2022-10-06 17:00:00.000000	102	97
7	7	7	8	Cleveland Cavaliers	2022-10-07 17:00:00.000000	104	83
8	8	8	9	Detroit Pistons	2022-10-08 17:00:00.000000	83	81
9	9	9	10	Indiana Pacers	2022-10-09 17:00:00.000000	90	87
10	10	10	11	Milwaukee Bucks	2022-10-10 17:00:00.000000	121	90
11	11	11	12	Atlanta Hawks	2022-10-11 17:00:00.000000	98	87
12	12	12	13	Charlotte Hornets	2022-10-12 17:00:00.000000	97	79
13	13	13	14	Miami Heat	2022-10-13 17:00:00.000000	81	80
14	14	14	15	Orlando Magic	2022-10-14 17:00:00.000000	83	76
15	15	15	16	Washington Wizards	2022-10-15 17:00:00.000000	98	92
16	16	16	17	Denver Nuggets	2022-10-16 17:00:00.000000	90	79
17	17	17	18	Minnesota Timberwolves	2022-10-17 17:00:00.000000	91	73
18	18	18	19	Oklahoma City Thunder	2022-10-18 17:00:00.000000	83	80
19	19	19	20	Portland Trail Blazers	2022-10-19 17:00:00.000000	102	83
20	20	20	21	Utah Jazz	2022-10-20 17:00:00.000000	110	97
21	21	21	22	Golden State Warriors	2022-10-21 17:00:00.000000	98	81
22	22	22	23	Los Angeles Clippers	2022-10-22 17:00:00.000000	93	86
23	23	23	24	Los Angeles Lakers	2022-10-23 17:00:00.000000	109	80
24	24	24	25	Phoenix Suns	2022-10-24 17:00:00.000000	98	94
25	25	25	26	Sacramento Kings	2022-10-25 17:00:00.000000	81	72
26	26	26	27	Dallas Mavericks	2022-10-26 17:00:00.000000	91	89
27	27	27	28	Houston Rockets	2022-10-27 17:00:00.000000	82	80
28	28	28	29	Memphis Grizzlies	2022-10-28 17:00:00.000000	92	79
29	29	29	30	New Orleans Pelicans	2022-10-29 17:00:00.000000	121	92
30	30	30	1	San Antonio Spurs	2022-10-30 17:00:00.000000	94	89

SQL Query List

INSERT Operation

We first put data into a nested array:

```
$tuple = array (  
    ":bind1" => rand(100, 999),  
    ":bind2" => $_POST['teamID'],  
    ":bind3" => $_POST['name'],  
    ":bind4" => $_POST['email']  
);
```

```
$alltuples = array (  
    $tuple  
);
```

Then, we execute the query with:

```
executeBoundSQL(INSERT INTO Fan VALUES (:bind1, :bind2, :bind3, :bind4)", $alltuples);
```

DELETE Operation

```
DELETE FROM Staff  
WHERE staffID = $value
```

UPDATE Operation

```
UPDATE Fan SET fanName="" . $name . "", email="" . $email . "", teamID = "" . $teamID . ""  
WHERE fanID="" . $fanID . ""
```

Selection

```
SELECT playerName, jerseyNum  
FROM Player  
WHERE teamID = $teamID
```

Projection

Please see Join. We have 4 attributes in Join.

Join

```
SELECT playerName, jerseyNum, teamName, awardName  
FROM Player p, AwardsAndHonors a, Team_Sponsors_Stadium t  
WHERE p.playerID = a.playerID AND p.teamID = t.teamID AND a.season = $season
```

Aggregation with Group By

```
SELECT teamName, sum(salary)
FROM Player p, Team_Sponsors_Stadium t
WHERE p.teamID = t.teamID
GROUP BY teamName
```

Aggregation with Having

```
SELECT teamName, max(appearance)
FROM Player p, Team_Sponsors_Stadium t
WHERE p.teamID = t.teamID AND appearance > 200
GROUP BY teamName
HAVING COUNT(*) >= 2
```

Nested Aggregation with Group By

```
SELECT teamName, avg(salary)
FROM Player p, Team_Sponsors_Stadium t
WHERE p.teamID = t.teamID
GROUP BY teamName
HAVING avg(salary) >= all (SELECT avg(p.salary)
                           FROM Player p, Team_Sponsors_Stadium t
                           WHERE p.teamID = t.teamID
                           GROUP BY teamName)
```

Division

```
SELECT playerName
FROM Player p
WHERE NOT EXISTS ((SELECT a.awardName
                   FROM AwardsAndHonors a
                   GROUP BY a.awardName)
                  MINUS
                  (SELECT b.awardName
                   FROM AwardsAndHonors b
                   WHERE b.playerID = p.playerID))
```

Sample output of queries

INSERT Operation

Initially, there are 3 fans:

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Name	Email	Favorite Team	Update Button
Jia Lu	jialu@gmail.com	Boston Celtics	Update
Yingquan Wang	yingquanwang@gmail.com	Brooklyn Nets	Update
Qiyu Zhou	qiyuzhou@gmail.com	New York Knicks	Update

Then, users go to the fan registration page and input information of fans:

[Back to main page](#)

Fan Registration

Name:

Email:

Favorite Team:

Then, users click “Insert” button:

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[Back to main page](#)

Fan Registration

Name:

Email:

Favorite Team:

Registration succeeded!

Finally, users can see a new fan is added to the database:

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Name	Email	Favorite Team	Update Button
Jia Lu	jialu@gmail.com	Boston Celtics	Update
Yingquan Wang	yingquanwang@gmail.com	Brooklyn Nets	Update
Qiyu Zhou	qiyuzhou@gmail.com	New York Knicks	Update
Grover Meyer	grovermeyer@gmail.com	Philadelphia 76ers	Update

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DELETE Operation

Initially, there are a bunch of staff (there are more below the page, but it would be too many screenshots if capture all of them):

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Name	Team	Delete Button
Joe Mazzulla	Boston Celtics	Delete
Jacque Vaughn	Brooklyn Nets	Delete
Tom Thibodeau	New York Knicks	Delete
Doc Rivers	Philadelphia 76ers	Delete
Nick Nurse	Toronto Raptors	Delete
Billy Donovan	Chicago Bulls	Delete
J. B. Bickerstaff	Cleveland Cavaliers	Delete
Dwane Casey	Detroit Pistons	Delete
Rick Carlisle	Indiana Pacers	Delete
Mike Budenholzer	Milwaukee Bucks	Delete
Nate McMillan	Atlanta Hawks	Delete

Then, users click the “Delete” button after the first staff named “Joe Mazzulla”, this staff is deleted:

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Name	Team	Delete Button
Jacque Vaughn	Brooklyn Nets	Delete
Tom Thibodeau	New York Knicks	Delete
Doc Rivers	Philadelphia 76ers	Delete
Nick Nurse	Toronto Raptors	Delete
Billy Donovan	Chicago Bulls	Delete
J. B. Bickerstaff	Cleveland Cavaliers	Delete
Dwane Casey	Detroit Pistons	Delete
Rick Carlisle	Indiana Pacers	Delete
Mike Budenholzer	Milwaukee Bucks	Delete
Nate McMillan	Atlanta Hawks	Delete
Steve Clifford	Charlotte Hornets	Delete

UPDATE Operation

Initially, users can see there are 4 fans:

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Name	Email	Favorite Team	Update Button
Jia Lu	jialu@gmail.com	Boston Celtics	Update
Yingquan Wang	yingquanwang@gmail.com	Brooklyn Nets	Update
Qiyu Zhou	qiyuzhou@gmail.com	New York Knicks	Update
Grover Meyer	grovermeyer@gmail.com	Philadelphia 76ers	Update

Then, users click the “Update” button after the 4th fan, named “Grover Meyer”, the page jumps to the update page with prefilled data:

[Back fan list page](#)

Fan Information Update

Name:

Email:

Favorite Team:

Then, users update the email and favorite team of Grover Meyer:

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[Back fan list page](#)

Fan Information Update

Name:

Email:

Favorite Team:

Finally, users click “Update” button, the information of Grover Meyer is updated:

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Name	Email	Favorite Team	Update Button
Jia Lu	jialu@gmail.com	Boston Celtics	Update
Yingquan Wang	yingquanwang@gmail.com	Brooklyn Nets	Update
Qiyu Zhou	qiyuzhou@gmail.com	New York Knicks	Update
Grover Meyer	grovermeyer@outlook.com	Toronto Raptors	Update

Selection

Users can search which players are in a particular team, such as “Boston Celtics”:

[Back to main page](#)

Search Player

Team Name:

Users click “search” button, the players in Boston Celtics are displayed:

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Search Player

Team Name:

Name	jerseyNum
Brown, Jaylen	7
Fitts, Malik	8
Hauser, Sam	30

[Projection](#)

Please see Join. We have 4 attributes in Join.

[Join](#)

Users can search winners of awards and honors for a particular season, such as season “2019-2020”:

[Back to main page](#)

Awards and Honors

Season:

Then, users click “search” button, the winners of awards and honors in season “2019-2020” are displayed:

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Awards and Honors

Season:

Season: '2019-2020'

Player	Jersey Number	Team	Award
Achiuwa, Precious	5	Toronto Raptors	Rookie of the Year
Ball, Lonzo	2	Chicago Bulls	Most Improved
Allen, Jarrett	31	Cleveland Cavaliers	Sixth Man
Bey, Saddiq	41	Detroit Pistons	Defensive Player of Year
Jokic, Nikola	15	Denver Nuggets	MVP

Aggregation with Group By

Users can check the total money that each team expense on its players:

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Current total expense on players for each team

[get expense](#)

Then, users click “get expense” button, the total expense on players for each team is displayed:

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Current total expense on players for each team

[get expense](#)

Team Name	Total Salary
Detroit Pistons	750.00
San Antonio Spurs	950.00
Washington Wizards	850.00
Oklahoma City Thunder	1450.00
Sacramento Kings	900.00
Indiana Pacers	950.00
Memphis Grizzlies	1000.00
Toronto Raptors	700.00
Denver Nuggets	1950.00
Minnesota Timberwolves	1050.00
Dallas Mavericks	950.00
Houston Rockets	1150.00
New Orleans Pelicans	1050.00
Philadelphia 76ers	1500.00
Chicago Bulls	1200.00

Aggregation with Having

Users can check the highest appearance of each team:

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Highest Appearance in Each Team

[get](#)

Then, users click “get” button, the highest appearance of each team is displayed, excluding teams that are too young with not enough experienced players:

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Highest Appearance in Each Team

[get](#)

Result excludes young teams with less than 2 players who have more than 200 appearance.

Team	Highest Appearance
Detroit Pistons	289
San Antonio Spurs	426
Oklahoma City Thunder	643
Sacramento Kings	479
Washington Wizards	378
Indiana Pacers	472
Memphis Grizzlies	502
Toronto Raptors	231
Denver Nuggets	648
Minnesota Timberwolves	578
Dallas Mavericks	583
Houston Rockets	694
New Orleans Pelicans	425
Philadelphia 76ers	693

Nested Aggregation with Group By

Users can check which team has the highest average player salary:

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Team with highest average salary

[get](#)

Then, users click “get” button, the team with highest average salary is displayed:

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Team with highest average salary

[get](#)

Team Name	Average Salary
Golden State Warriors	916.67

Division

Users can check players who have won all possible awards and honors in their career:

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Player who have won all AwardsAndHonors

[get](#)

Users click “get” button, the players who have won all possible awards and honors are displayed:

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Player who have won all AwardsAndHonors

[get](#)

Player Name

Jokic, Nikola