

CPSC 304 Project Cover Page

Milestone #: __4__

Date: __November 30th, 2023__

Group Number: __155__

Name	Student Number	CS Alias (Userid)	Preferred E-mail Address
Armaan Sawhney	44616670	b6x2w	armaansawhney070903@gmail.com
Zaid Khan	23739394	w9f6u	zkhan1605@gmail.com

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

REPOSITORY LINK

https://github.students.cs.ubc.ca/CPSC304-2023W-T1/project_b6x2w_p9m7b_w9f6u

PROJECT DESCRIPTION

- The domain of an application is in sports. The application keeps track of a basketball league with player information, team information, game information, sponsors, owners, game locations, etc.

- In real-life situations, the database can be used to search up records of certain game(s), player stats, and team information, etc.

- The database for the basketball application will provide users with a range of functionalities and capabilities, allowing them to create, modify and delete team members.

- We decided to build up our project using the department provided Oracle servers as our relational database management system. We used Java (JFrame) along with Oracle as our application technology stack.

Description of Final Schema

- Our schema is relatively similar to the original one that we submitted, with basic changes such as:
 - added "ON DELETE CASCADE" constraints for TeamMember references.
 - Added foreign key constraints to Team
 - Added new field and foreign key constraint in Coach
 - Added foreign key constraints to Owner

Current Relation Schema

Location (arena, city)

- Primary Key: arena

	ARENA	CITY
1	Staples Center	Los Angeles
2	Chase Center	Golden State
3	TD Garden	Boston
4	United Center	Chicago
5	Toyota Center	Houston
6	Stadium A	New York
7	Arena B	L.A
8	Coliseum C	S.F
9	Field D	Miami
10	Center E	San Francisco

Team (tid, name, **arena**)

- Primary Key: tid
- Foreign Key: arena (references Location(arena))

	TID	NAME	ARENA
1	1	Lakers	Staples Center
2	2	Warriors	Chase Center
3	3	Celtics	TD Garden
4	4	Bulls	United Center
5	5	Rockets	Toyota Center

University of British Columbia, Vancouver

Department of Computer Science

Age (dob, age)

- Primary Key: age

	DOB	AGE
1	1990-05-15	32
2	1985-08-22	37
3	1995-02-10	27
4	1980-11-05	42
5	1992-06-18	30
6	1988-09-30	34
7	1998-04-25	24
8	1982-03-12	40
9	1993-07-08	29
10	1987-01-20	35
11	1960-01-04	62
12	1957-05-26	65
13	1959-04-21	63
14	1963-02-17	59
15	1956-07-29	71
16	1990-05-12	33
17	1995-04-05	28
18	1991-11-18	31
19	1974-02-15	49
20	1996-12-08	26
21	1972-03-30	51

TeamMember (tmid, name, **tid**, start_date, end_date, salary, **age**)

- Primary Key: tmid
- Foreign Keys:
 - o tid (references Team(tid) on delete cascade)
 - o age (references Age(age))

	TMID	NAME	TID	START_DATE	END_DATE	SALARY	AGE
1	1	LeBron James	1	2022-01-01	2023-12-31	40000000	37
2	2	Stephen Curry	1	2022-01-01	2023-12-31	43000000	33
3	3	Jayson Tatum	1	2017-01-01	2025-12-31	32000000	24
4	4	Zach LaVine	1	2022-01-01	2023-12-31	28000000	26
5	5	James Harden	1	2022-01-01	2023-12-31	38000000	32
6	6	Jimmy Butler	1	2022-01-01	2023-12-31	34000000	32
7	7	DeMar DeRozan	1	2022-01-01	2023-12-31	25000000	32
8	8	Pascal Siakam	1	2022-01-01	2023-12-31	29000000	28
9	9	Julius Randle	1	2022-01-01	2023-12-31	26000000	27
10	10	Gilgeous Alexander	1	2017-01-01	2025-12-31	22000000	23
11	11	Klay Thompson	2	2018-01-01	2025-12-31	38000000	32
12	12	Draymond Green	2	2018-01-01	2025-12-31	33000000	31
13	13	Andrew Wiggins	2	2018-01-01	2025-12-31	27000000	26
14	14	Kelly Dobre Jr.	2	2022-01-01	2023-12-31	22000000	25
15	15	James Wiseman	2	2017-01-01	2025-12-31	24000000	21
16	16	Jordan Poole	2	2017-01-01	2025-12-31	18000000	23
17	17	Juan Anderson	2	2018-01-01	2025-12-31	15000000	28
18	18	Nemanja Bjelica	2	2018-01-01	2025-12-31	12000000	33
19	19	Moses Moody	2	2017-01-01	2025-12-31	10000000	20
20	20	Andre Iguodala	2	2018-01-01	2025-12-31	12000000	38
21	21	Jaylen Brown	3	2022-01-01	2023-12-31	35000000	25
22	22	Marcus Smart	3	2018-01-01	2025-12-31	24000000	28
23	23	Al Horford	3	2018-01-01	2025-12-31	26000000	35
24	24	Robert Williams III	3	2022-01-01	2023-12-31	18000000	24
25	25	Dennis Schroder	3	2018-01-01	2025-12-31	15000000	28
26	26	Josh Richardson	3	2018-01-01	2025-12-31	12000000	28
27	27	Grant Williams	3	2022-01-01	2023-12-31	8000000	23
28	28	Romeo Langford	3	2022-01-01	2023-12-31	7000000	22
29	29	Aaron Nesmith	3	2022-01-01	2023-12-31	6000000	22
30	30	Payton Pritchard	3	2022-01-01	2023-12-31	5000000	23
31	31	DeMar DeRozan	4	2018-01-01	2025-12-31	33000000	32
32	32	Zach LaVine	4	2018-01-01	2025-12-31	28000000	26
33	33	Nikola Vucevic	4	2018-01-01	2025-12-31	26000000	31
34	34	Lonzo Ball	4	2022-01-01	2023-12-31	20000000	24

University of British Columbia, Vancouver
Department of Computer Science

35	35	Coby White	4	2022-01-01	2023-12-31	15000000	22
36	36	Patrick Williams	4	2022-01-01	2023-12-31	12000000	20
37	37	Alex Caruso	4	2018-01-01	2025-12-31	10000000	28
38	38	Javonte Green	4	2018-01-01	2025-12-31	8000000	28
39	39	Thaddeus Young	4	2018-01-01	2025-12-31	12000000	33
40	40	Troy Brown Jr.	4	2022-01-01	2023-12-31	7000000	22
41	41	Christian Wood	5	2018-01-01	2025-12-31	28000000	26
42	42	John Wall	5	2018-01-01	2025-12-31	41000000	31
43	43	Jalen Green	5	2022-01-01	2023-12-31	18000000	19
44	44	Kevin Porter Jr.	5	2022-01-01	2023-12-31	22000000	21
45	45	Daniel Theis	5	2018-01-01	2025-12-31	12000000	29
46	46	Eric Gordon	5	2018-01-01	2025-12-31	18000000	33
47	47	David Nwaba	5	2018-01-01	2025-12-31	8000000	28
48	48	Armoni Brooks	5	2022-01-01	2023-12-31	7000000	22
49	49	Khyri Thomas	5	2022-01-01	2023-12-31	6000000	25
50	50	John Carrington	5	2018-01-01	2025-12-31	6000000	33
51	51	Jane Watson	3	2018-01-01	2025-12-31	5500000	28
52	52	Michael Lock	4	2018-01-01	2025-12-31	5200000	31
53	53	Erick White	2	2018-01-01	2025-12-31	4800000	25
54	54	David Brownn	1	2018-01-01	2025-12-31	5100000	30
55	55	Micheal Gray	5	2018-01-01	2025-12-31	3900000	29

Player (pid, position)



- Primary Key: pid
- Foreign Key: pid (references Team Member(tmId))

	 PID ÷	 POSITION
1	1	Point Guard
2	2	Shooting Guard
3	3	Small Forward
4	4	Power Forward
5	5	Coach
6	6	Point Guard
7	7	Shooting Guard
8	8	Small Forward
9	9	Power Forward
10	10	Center
11	11	Point Guard
12	12	Shooting Guard
13	13	Small Forward
14	14	Power Forward
15	15	Center
16	16	Coach
17	17	Shooting Guard
18	18	Small Forward
19	19	Power Forward
20	20	Center
21	21	Point Guard
22	22	Shooting Guard
23	23	Coach
24	24	Power Forward
25	25	Center

26	26	Point Guard
27	27	Shooting Guard
28	28	Small Forward
29	29	Power Forward
30	30	Center
31	31	Point Guard
32	32	Coach
33	33	Small Forward
34	34	Power Forward
35	35	Center
36	36	Point Guard
37	37	Shooting Guard
38	38	Small Forward
39	39	Power Forward
40	40	Center
41	41	Point Guard
42	42	Shooting Guard
43	43	Small Forward
44	44	Power Forward
45	45	Center
46	46	Point Guard
47	47	Shooting Guard
48	48	Small Forward
49	49	Power Forward
50	50	Coach
51	51	Center
52	52	Point Guard
53	53	Shooting Guard
54	54	Small Forward
55	55	Center







Coach (tmid, tid)

- Primary Key: tmid
- Foreign Keys:
 - o tmid (references TeamMember(tmid) on delete cascade)
 - o tid (references Team(tid))

	 Tmid ÷	 Tid ÷
1	5	1
2	16	2
3	23	3
4	32	4
5	50	5







Season (year, start_date, end_date)

- Primary Key: year

	 YEAR 	 START_DATE 	 END_DATE 
1	2019	2019-01-01	2019-10-15
2	2020	2020-01-25	2020-10-12
3	2021	2021-01-17	2021-10-11
4	2022	2022-01-16	2022-10-10
5	2023	2023-01-22	2023-10-15





Owner (name, age, net_worth)

- Primary Key: name
- Foreign Key: age (references Age(age))

	 NAME 	 AGE 	 NET_WORTH 
1	Magic Johnson	62	7000000
2	Joe Lacob	65	5000000
3	Wyc Grousbeck	63	40000000
4	Jerry Reinsdorf	59	1500000
5	Robert Pera	71	1100000

Owns (oname, tid)

- Primary Key: (oname, tid)
- Foreign Keys:
 - o oname (references Owner(name) on delete cascade)
 - o tid (references Team(tid))

	 ONAME 	 TID 
1	Jerry Reinsdorf	4
2	Joe Lacob	2
3	Magic Johnson	1
4	Robert Pera	5
5	Wyc Grousbeck	3

University of British Columbia, Vancouver

Department of Computer Science

Sponsor (name, contribution)

- Primary Key: name

	NAME	CONTRIBUTION
1	Nike	5000000
2	Adidas	3000000
3	Coca-Cola	2000000
4	Verizon	1500000
5	IBM	1000000
6	AC Corporation	500000
7	X Corp	7500000
8	SportsTech Inc	1000000
9	City Bank	30006770
10	Global Motors	80066540

Sponsors (sname, tid)

- Primary Key: (sname, tid)
- Foreign Keys:
 - o sname (references Sponsor(name))
 - o tid (references Team(tid))

	SNAME	TID
1	Adidas	2
2	Coca-Cola	3
3	IBM	5
4	Nike	1
5	Verizon	4

HasPlayed (home_tid, away_tid)

- Primary Key: (home_tid, away_tid)
- Foreign Keys:
 - o home_tid (references Team(tid))
 - o away_tid (references Team(tid))

	HOME_TID	AWAY_TID
1	1	2
2	1	3
3	2	3
4	2	4
5	3	4
6	3	5
7	4	1
8	4	5
9	5	1
10	5	2

University of British Columbia, Vancouver
Department of Computer Science

Referee (rid, name, experience_years)

- Primary Key: rid

	RID	NAME	EXPERIENCE_YEARS
1	1	John Smith	5
2	2	Emily Johnson	8
3	3	Michael Davis	6
4	4	Sarah Wilson	10
5	5	David Brown	3
6	6	Jessica Miller	7
7	7	Brian Taylor	9
8	8	Amanda Clark	4
9	9	Christopher White	2
10	10	Ashley Harris	5

StatSheet (ssid, home_points, away_points, home_steals, away_steals, home_assists, away_assists, home_rebounds, away_rebounds)

- Primary Key: ssid

SSID	HOME_POINTS	AWAY_POINTS	HOME_STEALS	AWAY_STEALS	HOME_ASSISTS	AWAY_ASSISTS	HOME_REBOUNDS	AWAY_REBOUNDS
1	105	100	8	6	25	20	45	38
2	110	112	10	9	28	24	40	42
3	95	98	7	8	22	18	38	41
4	120	118	12	10	30	26	44	39
5	98	105	6	7	20	22	36	40
6	112	108	9	8	26	23	42	37
7	105	102	8	9	24	21	39	40
8	115	112	11	10	29	25	41	38
9	100	96	7	6	23	19	37	35
10	118	115	10	11	27	24	43	41
11	122	120	13	11	32	28	46	43
12	99	104	7	8	21	20	37	39
13	114	110	9	9	27	23	43	36
14	107	104	8	10	25	22	40	41
15	123	122	14	12	34	30	48	45
16	102	100	7	7	24	19	39	37
17	116	114	10	11	28	25	42	40
18	108	106	9	9	26	23	41	38
19	95	98	6	7	22	18	36	40
20	110	115	11	10	30	26	44	42

University of British Columbia, Vancouver

Department of Computer Science

Game (game_date, home_tid, away_tid, score, ssid, year, rid, arena)

- Primary Key: (game_date, home_tid, away_tid)
- Foreign Keys:
 - o home_tid (references Team(tid))
 - o away_tid (references Team(tid))
 - o ssid (references StatSheet(ssid))
 - o year (references Season(year))
 - o rid (references Referee(rid))
 - o arena (references Location(arena))

GAME_DATE	HOME_TID	AWAY_TID	SCORE	SSID	YEAR	RID	ARENA
2020-04-15	1	2	105-100	1	2020	1	Staples Center
2019-02-20	2	3	110-112	2	2019	2	Chase Center
2020-03-10	3	4	95-98	3	2020	3	TD Garden
2021-04-05	4	5	120-118	4	2021	4	United Center
2021-05-02	5	1	98-105	5	2021	5	Toyota Center
2023-06-18	2	4	112-108	6	2023	6	Chase Center
2022-07-12	3	5	105-102	7	2022	7	TD Garden
2022-08-28	1	3	115-112	8	2022	8	Staples Center
2023-09-14	4	1	100-96	9	2023	9	United Center
2020-05-30	5	2	118-115	10	2020	10	Toyota Center
2020-01-20	4	1	118-115	11	2020	3	Toyota Center
2020-02-10	3	4	118-115	12	2020	2	Toyota Center
2019-05-13	1	3	118-115	13	2019	1	TD Garden
2019-04-21	4	2	118-115	14	2019	4	United Center
2021-07-13	5	3	118-115	15	2021	5	Toyota Center
2021-08-16	1	5	118-115	16	2021	6	TD Garden
2022-02-25	3	2	118-115	17	2022	7	Toyota Center
2022-11-16	1	2	118-115	18	2022	8	United Center
2023-05-19	4	3	118-115	19	2023	9	Toyota Center
2023-12-21	3	1	118-115	20	2023	10	Staples Center

REQUIRED SQL QUERIES

All queries listed before are in class DatabaseConnectionHandler in package database. Screenshots for before / during / after executing the queries for each case is listed below.

1. INSERT QUERY

443. INSERT INTO TeamMember VALUES (?, ?, ?, ?, ?, ?, ?);

465. INSERT INTO Player VALUES (?, ?);

2. DELETE QUERY

210. DELETE FROM TeamMember WHERE tmid = ?;

3. UPDATE QUERY

230. UPDATE TeamMember
SET tid = ?, age = ?, salary = ?, start_date = ?, end_date = ?
WHERE tmid = ?;

4. SELECTION QUERY

86. SELECT t1.name as name1, t2.name as name2
FROM game g, team t1, team t2
WHERE g.home_tid = t1.tid AND g.AWAY_TID = t2.TID
AND (t1.name = ? OR t2.name = ?);

5. PROJECTION

370. SELECT ssid, home_points, home_steals, home_assists, home_rebounds
FROM Statsheet WHERE ssid = ?;

396. SELECT ssid, away_points, away_steals, away_assists, away_rebounds
FROM Statsheet WHERE ssid = ?;

6. JOIN QUERY

112. SELECT s.name as sponsor, s.CONTRIBUTION FROM Sponsors ss
 JOIN Sponsor s ON s.name = ss.sname
 JOIN Team t ON t.TID = ss.tid
 WHERE t.name = ?;

7. AGGREGATION WITH GROUP BY QUERY

485. SELECT SUM(salary) AS total
 FROM TeamMember WHERE tid = ?;

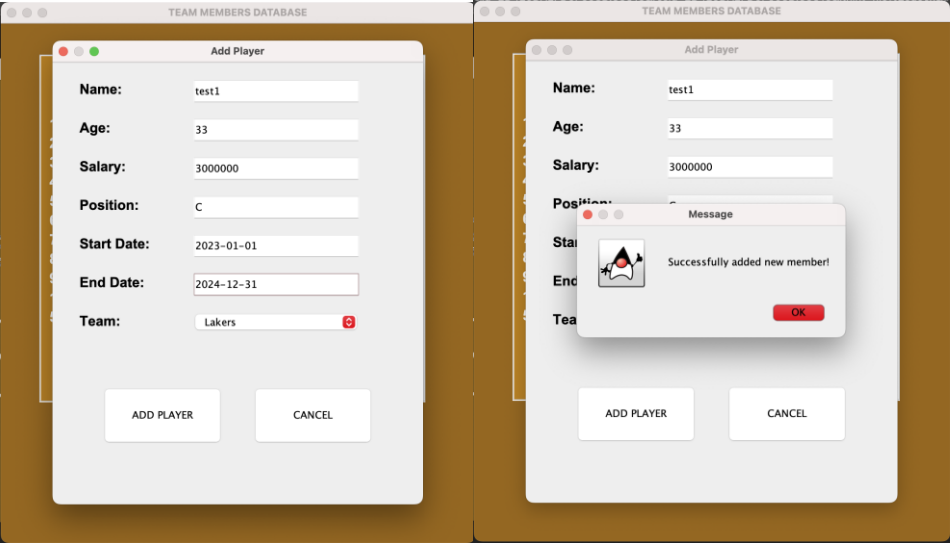
Insert Operation:

Before:



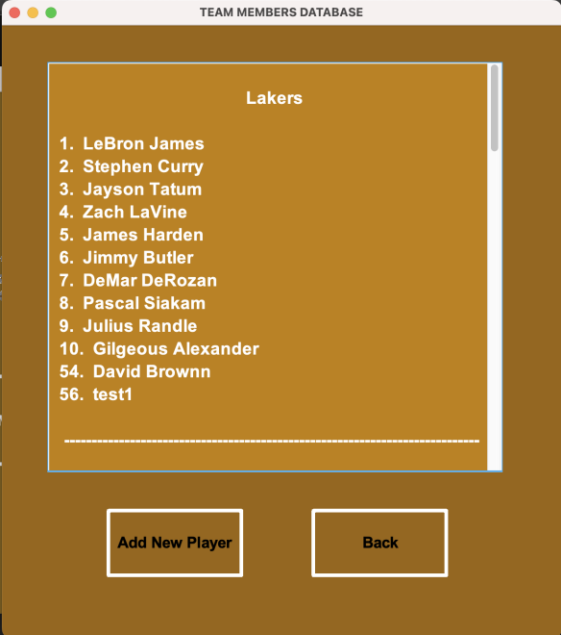
The user first clicks add new player.

During:



The user enters corresponding values of the new player and clicks add player, then the successful prompt shows the player is added to the database.

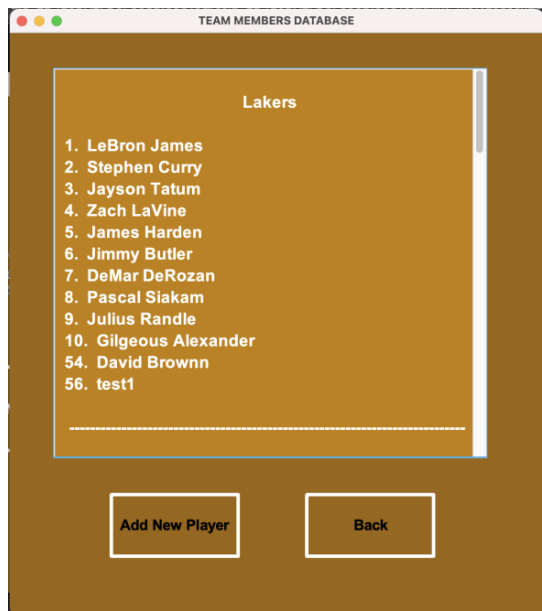
After:



We can see that test1 has been added to the Lakers roster.

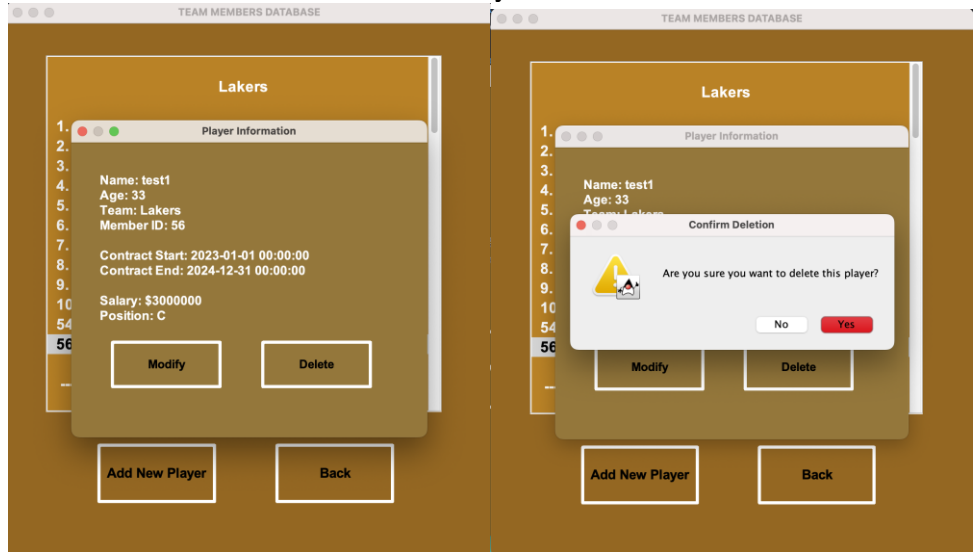
Delete Operation:

Before:



The user first clicks the team member they want to delete.

During:



Then the user clicks the delete button and is prompted with confirmation. If they click “Yes” the selected team member will be deleted from the database.

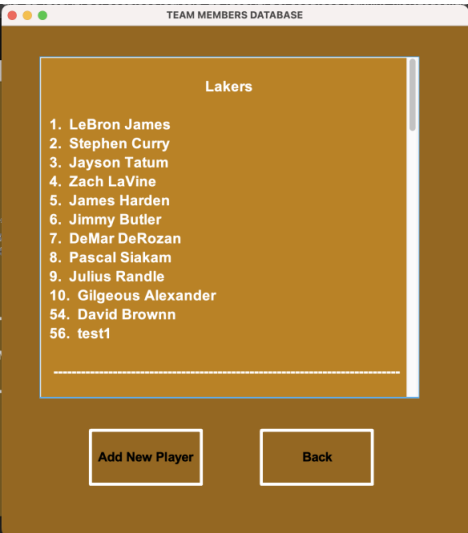
After:



We can see that test1 has been deleted from the Lakers roster.

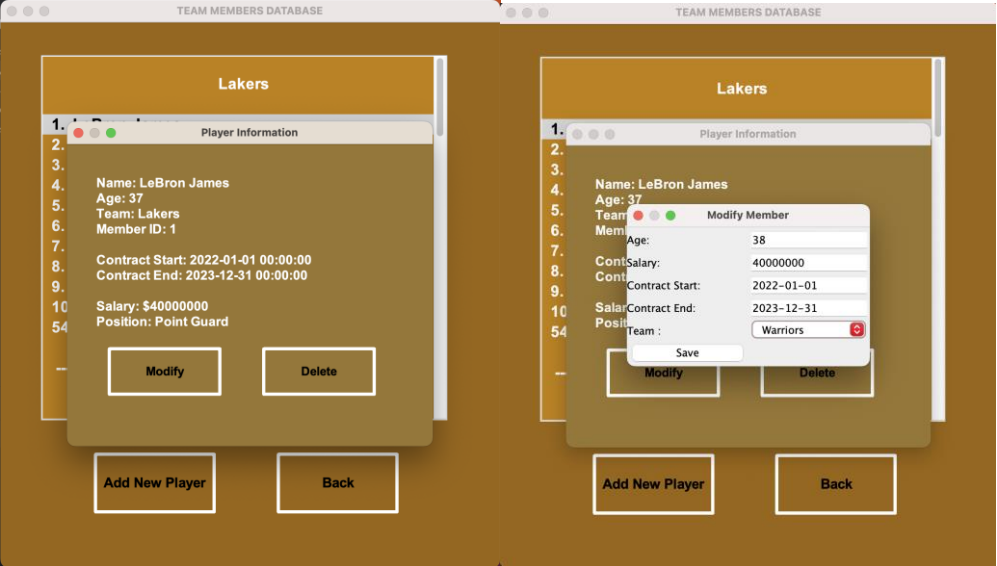
Update Operation:

Before:



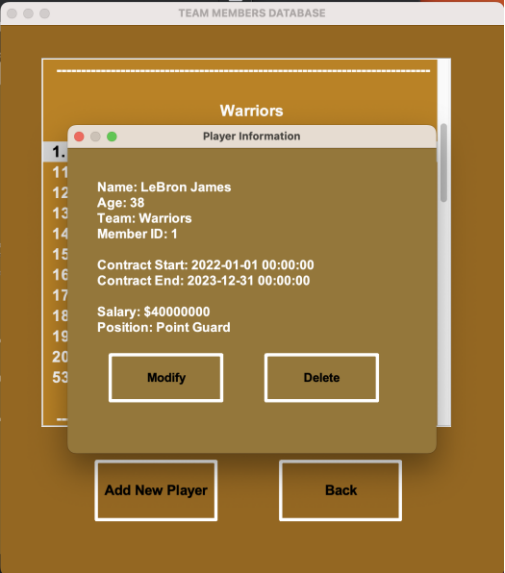
The user first clicks the team member they want to update.

During:



Then the user clicks the modify button and can modify attribute of that player, here we changed Lebron James's age to 37 and his team to the Warriors

After:



We can see that Lebron James's team and age have been updated to the given values.

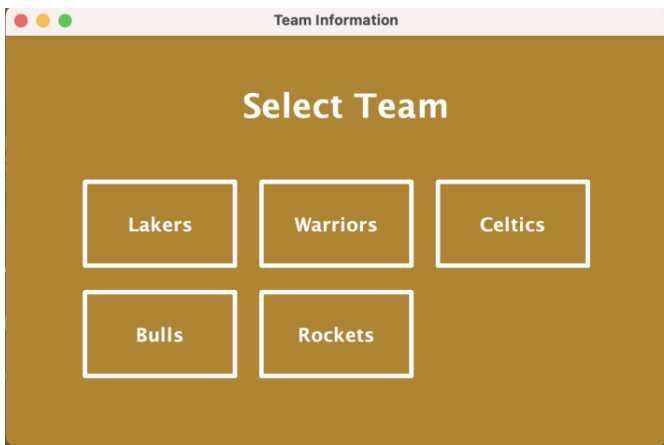
Selection Operation:

Before:



The user first clicks team information.

During:



Then the user clicks which team's information they would like to see.

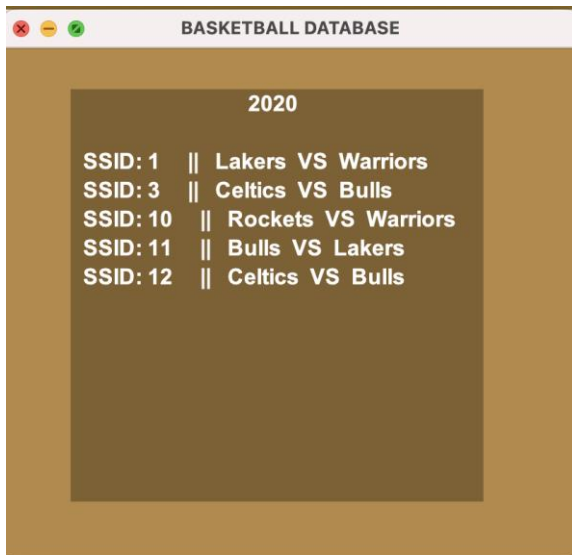
After:

Team Information		
Team Members	Team Name - Lakers	Games
- Stephen Curry	Team ID - 1	- Bulls VS Lakers
- Jayson Tatum	Arena - Staples Center	- Rockets VS Lakers
- Zach LaVine	Owner: - Magic Johnson	- Bulls VS Lakers
- James Harden	- Age: 62	- Celtics VS Lakers
- Jimmy Butler	- Net Worth: \$7000000	- Lakers VS Warriors
- DeMar DeRozan	Sponsors: - Nike	- Lakers VS Warriors
- Pascal Siakam	- \$5000000	- Lakers VS Celtics
- Julius Randle	- Global Motors	- Lakers VS Celtics
- Gilgeous Alexander	- \$80066540	- Lakers VS Rockets
- David Brownn	Total Salary: - \$282100000	

Here the user selects the Lakers and the team's information is displayed.

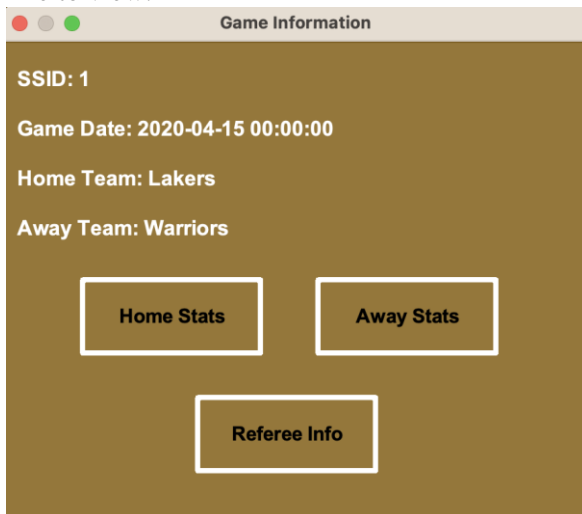
Projection Operation:

Before:



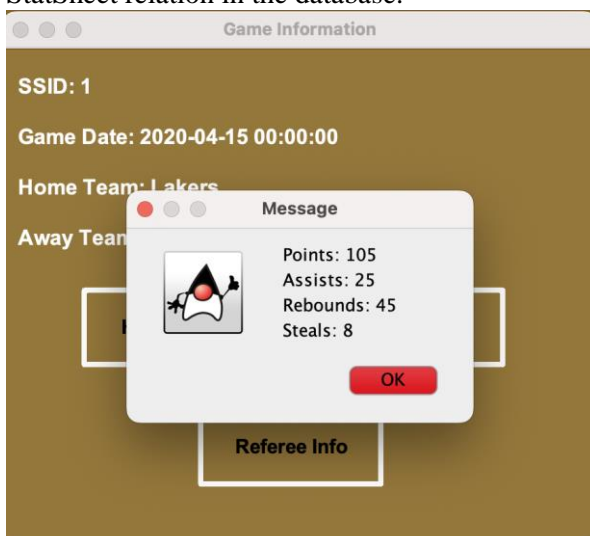
The user first navigates to game information and selects the team's game stats they would like to view.

During:



Then the user clicks the Home Stats or Away Stats to get those attributes from the StatSheet relation in the database.

After:



Here the user clicked the Home Stats button and only home stats are returned.

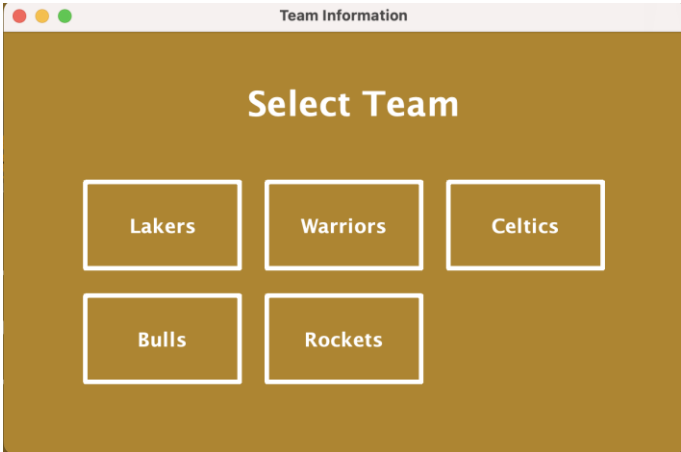
Join Operation:

Before:



The user first clicks the team information.

During:



Then the user clicks the teams information they would like to see.

After:

Team Information		
Team Members	Team Name - Lakers	Games
- Stephen Curry	Team ID - 1	- Bulls VS Lakers
- Jayson Tatum	Arena - Staples Center	- Rockets VS Lakers
- Zach LaVine	Owner: - Magic Johnson	- Bulls VS Lakers
- James Harden	- Age: 62	- Celtics VS Lakers
- Jimmy Butler	- Net Worth: \$7000000	- Lakers VS Warriors
- DeMar DeRozan	Sponsors: - Nike	- Lakers VS Warriors
- Pascal Siakam	- \$5000000	- Lakers VS Celtics
- Julius Randle	- Global Motors	- Lakers VS Celtics
- Gilgeous Alexander	- \$80066540	- Lakers VS Rockets
- David Brownn	Total Salary: - \$282100000	

Here we join the sponsors and team table to display the a given team’s sponsors name and contributions.

Aggregation with GROUPBY Operation:

Before:

Team Information		
Team Members	Team Name	Games
<ul style="list-style-type: none">- Stephen Curry- Jayson Tatum- Zach LaVine- James Harden- Jimmy Butler- DeMar DeRozan- Pascal Siakam- Julius Randle- Gilgeous Alexander- David Brownn	<p>- Lakers</p> <p>Team ID - 1</p> <p>Arena - Staples Center</p> <p>Owner: - Magic Johnson - Age: 62 - Net Worth: \$7000000</p> <p>Sponsors: - Nike - \$5000000 - Global Motors - \$80066540</p> <p>Total Salary: - \$282100000</p>	<ul style="list-style-type: none">- Bulls VS Lakers- Rockets VS Lakers- Bulls VS Lakers- Celtics VS Lakers- Lakers VS Warriors- Lakers VS Warriors- Lakers VS Celtics- Lakers VS Celtics- Lakers VS Rockets

The user first navigates to the Team information tab, here we note the total salary which is salaries for all players summed up.

During:

TEAM MEMBERS DATABASE

Add Player

Name:

Age:

Salary:

Position:

Start Date:

End Date:

Team:

ADD PLAYER

CANCEL

Then the user can add a new player, here we add a player “test1” with salary \$12345.

After:

Team Information		
Team Members	Team Name	Games
<ul style="list-style-type: none">- Stephen Curry- Jayson Tatum- Zach LaVine- James Harden- Jimmy Butler- DeMar DeRozan- Pascal Siakam- Julius Randle- Gilgeous Alexander- David Brownn- test1	<p>- Lakers</p> <p>Team ID - 1</p> <p>Arena - Staples Center</p> <p>Owner: - Magic Johnson - Age: 62 - Net Worth: \$7000000</p> <p>Sponsors: - Nike - \$5000000 - Global Motors - \$80066540</p> <p>Total Salary: - \$282112345</p>	<ul style="list-style-type: none">- Bulls VS Lakers- Rockets VS Lakers- Bulls VS Lakers- Celtics VS Lakers- Lakers VS Warriors- Lakers VS Warriors- Lakers VS Celtics- Lakers VS Celtics- Lakers VS Rockets

Here we can see the salary of the player we just added is added to the total salary.

ALL OTHER USED SQL QUERIES

All queries listed before are in class DatabaseConnectionHandler in package database.

#Line	Query
63.	SELECT * FROM Season;
140.	SELECT * FROM Game g WHERE g.year = ?;
170.	SELECT MAX(tm.tmid) as max_id FROM TeamMember;
188.	SELECT position FROM Player WHERE pid = ?;
258.	SELECT tm.*,t.name as teamname, t.arena FROM TeamMember tm, Team t WHERE t.tid = tm.tid AND tm.tmid = ?;
290.	SELECT tm.*, t.name as tname, t.arena FROM TeamMember tm, Team t WHERE t.tid = tm.tid AND t.TID = ?;
323.	SELECT tid, name, arena FROM Team;
346.	SELECT * FROM Referee WHERE rid = ?;
420	SELECT os.ename as ownername, o.age, o.net_worth FROM Owns os, Owner o WHERE os.ename = o.name AND os.tid = ?;