

# **CPSC 304 Project Cover Page**

Milestone #: 4

Date: Dec 1, 2023

Group Number: 143

Name	Student Number	CS Alias (Userid)	Preferred E-mail Address
Jerry Wan	41421553	l3d0g	jerrywan1215@gmail.com
Tyler Tao	54964465	y3d4w	tyler2021tao@gmail.com
Marcus Rodrigues	27493519	m8u4r	marcthreza@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

## **2. Single SQL Script**

The SQL Script is attached as part of this submission and also is available on our Project repo.

## **3. Project PDF**

### **a. Description of the Final Project**

Our final project successfully developed a comprehensive database system designed to manage and organize various aspects of the FIFA World Cup tournament. The system efficiently handles data related to stadiums, matches, teams, players (and different types of players), managers, sponsors, and goal details, offering a robust platform for tracking and updating tournament-related information.

### **b. How the Final Schema Differed**

The final schema of our project, while largely adhering to the originally planned structure, underwent a few modifications in terms of attribute naming. These changes were made to improve clarity, as well as adhere to the reserved keywords of SQL. These include teamSize instead of size in the Team table, matchDate instead of date, etc.

### **c. i. Copy of Schema**

**Stadium1(address, city)**

**Stadium2(name, address, capacity)**

**Match1(matchDate, phase)**

**Match2(matchID, stadiumName, result, matchDate, time)**

**Country(name, ranking)**

**Manager(managerID, name, age, nationality)**

**Team(teamID, teamSize, **countryName**, **managerID**)**

**Player(playerID, **teamID**, passes, assists, name, age)**

**Forward(playerID, shots, goals)**

**Midfield(playerID, tackles, shots, goals, interceptions)**

**Defender(playerID, tackles, shots, goals, interceptions)**

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**Goalkeeper(playerID, saves)**

**GoalDetails(goalNumber, matchID, playerID, time, type)**

**PlayIn(matchID, teamID)**

**Funds(sponsorID, teamID)**

**Sponsor(sponsorID, name)**

## c. ii. Screenshots of Data in Relation

### Stadium1

ADDRESS

---

CITY

---

Building Number: 125 Street: 393 Zone: 74

Al Khor

Building Number: 660 Street: 235 Zone: 69

Lusail

Building Number: 306 Street: 1700 Zone: 51

Al Rayyan

ADDRESS

---

CITY

---

Building Number: 71 Street: 2741 Zone: 52

Al Rayyan

Building Number: 51 Street: 725 Zone: 54

Al Rayyan

Building Number: 521 Street: 260 Zone: 46

Doha

ADDRESS

---

CITY

---

Building Number: 161 Street: 210 Zone: 29

Doha

Building Number: 1707 Street: 281 Zone: 91

Building Number: 1707 Street: 281 Zone: 91

Al Wakrah

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### **Stadium2**

NAME

ADDRESS

CAPACITY

Al Bayt Stadium  
Building Number: 125 Street: 393 Zone: 74  
68895

Lusail Stadium

Building Number: 660 Street: 235 Zone: 69  
88966

NAME

ADDRESS

CAPACITY

Ahmad bin Ali Stadium  
Building Number: 306 Street: 1700 Zone: 51  
45032

Education City Stadium

Building Number: 71 Street: 2741 Zone: 52

NAME

ADDRESS

CAPACITY

44667

Khalifa International Stadium

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---

Building Number: 51 Street: 725 Zone: 54  
45857

Al Thumama Stadium

NAME

---

ADDRESS

---

CAPACITY

---

Building Number: 521 Street: 260 Zone: 46  
44400

Stadium 974

Building Number: 161 Street: 210 Zone: 29  
44089

NAME

---

ADDRESS

---

CAPACITY

---

Al Janoub Stadium

Building Number: 1707 Street: 281 Zone: 91  
44325

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---

## **Match1**

MATCHDATE

---

PHASE

---

Dec 9 2022

Quarter-Finals

Nov 20 2022

Group Stage

Nov 21 2022

Group Stage

MATCHDATE

---

PHASE

---

Nov 22 2022

Group Stage

Nov 24 2022

Group Stage

Nov 25 2022

Group Stage

MATCHDATE

---

PHASE

---

Nov 26 2022

Group Stage

Dec 8 2022

Quarter-Finals

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```
Dec 7 2022
Quarter-Finals
```

```
MATCHDATE
```

```
-----
```

```
Dec 4 2022
Group Stage
```

```
Dec 3 2022
Group Stage
```

```
11 rows selected.
```

## Match2

```
    MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
1
Al Bayt Stadium
France against Uruguay
```

```
    MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
Nov 20 2022
14:00
```

```
    MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
```

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```
2
Khalifa International Stadium
F v U
```

```
    MATCHID
```

```
-----
```

```
STADIUMNAME
```

```
-----
```

```
RESULT
```

```
-----
```

```
MATCHDATE
```

```
-----
```

```
TIME
```

```
-----
```

```
Nov 21 2022
```

```
14:00
```

```
-----
```

```
    MATCHID
```

```
-----
```

```
STADIUMNAME
```

```
-----
```

```
RESULT
```

```
-----
```

```
MATCHDATE
```

```
-----
```

```
TIME
```

```
-----
```

```
3
```

```
Ahmad bin Ali Stadium
```

```
F v A
```

```
    MATCHID
```

```
-----
```

```
STADIUMNAME
```

```
-----
```

```
RESULT
```

```
-----
```

# University of British Columbia, Vancouver

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MATCHDATE

TIME

Nov 21 2022

14:00

MATCHID

STADIUMNAME

RESULT

MATCHDATE

TIME

4

Lusail Stadium

A v U

MATCHID

STADIUMNAME

RESULT

MATCHDATE

TIME

Nov 22 2022

14:00

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```
MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
      5
Education City Stadium
A v J

  MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
Dec 9 2022
14:00

  MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
```

```
      6
Lusail Stadium
A v G

  MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
Nov 24 2022
14:00

  MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
      7
Al Bayt Stadium
A v J

  MATCHID
-----
STADIUMNAME
-----
RESULT
```

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MATCHDATE

-----

TIME

-----

Dec 8 2022

14:00

-----

MATCHID

-----

STADIUMNAME

-----

RESULT

-----

MATCHDATE

-----

TIME

-----

8

Lusail Stadium

J v G

-----

MATCHID

-----

STADIUMNAME

-----

RESULT

-----

MATCHDATE

-----

TIME

-----

Nov 24 2022

14:00

-----

MATCHID

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```
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
9
Khalifa International Stadium
G v F

MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
Dec 7 2022
14:00

MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
```

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```
10
Lusail Stadium
G v J
```

```
    MATCHID
```

```
-----
```

```
STADIUMNAME
```

```
-----
```

```
RESULT
```

```
-----
```

```
MATCHDATE
```

```
-----
```

```
TIME
```

```
-----
```

```
Nov 25 2022
```

```
14:00
```

```
    MATCHID
```

```
-----
```

```
STADIUMNAME
```

```
-----
```

```
RESULT
```

```
-----
```

```
MATCHDATE
```

```
-----
```

```
TIME
```

```
-----
```

```
11
```

```
AL Bayt Stadium
```

```
F v J
```

```
    MATCHID
```

```
-----
```

```
STADIUMNAME
```

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```
RESULT
-----
MATCHDATE
-----
TIME
-----
Dec 4 2022
14:00

MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
12
Khalifa International Stadium
G v A

MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
Nov 26 2022
14:00
```

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```
MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
13
Education City Stadium
J v U
```

```
MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
Dec 4 2022
14:00
```

```
MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
```

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```
    14
Al Bayt Stadium
U v J

    MATCHID
-----
STADIUMNAME

RESULT

MATCHDATE

TIME

Nov 26 2022
14:00

    MATCHID
-----
STADIUMNAME

RESULT

MATCHDATE

TIME

    15
Khalifa International Stadium
U v F

    MATCHID
-----
STADIUMNAME

RESULT

MATCHDATE

TIME

Dec 3 2022
14:00

    MATCHID
-----
STADIUMNAME

RESULT

MATCHDATE

TIME

    16
Education City Stadium
F v J

    MATCHID
-----
STADIUMNAME

RESULT

MATCHDATE

TIME

Dec 7 2022
14:00
```

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```
MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
17
Lusail Stadium
F v A

MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
Nov 25 2022
14:00

MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
```

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```
TIME
-----
18
Education City Stadium
J v G
```

```
MATCHID
```

```
STADIUMNAME
```

```
RESULT
```

```
MATCHDATE
```

```
TIME
```

```
Dec 4 2022
14:00
```

```
MATCHID
```

```
STADIUMNAME
```

```
RESULT
```

```
MATCHDATE
```

```
TIME
```

```
-----
19
Lusail Stadium
A v G
```

```
MATCHID
```

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---

```
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
Nov 26 2022
14:00

MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
20
Khalifa International Stadium
G v J

MATCHID
-----
STADIUMNAME
-----
RESULT
-----
MATCHDATE
-----
TIME
-----
```

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```
Dec 4 2022  
14:00
```

```
-----  
MATCHID
```

```
-----  
STADIUMNAME
```

```
-----  
RESULT
```

```
-----  
MATCHDATE
```

```
-----  
TIME
```

```
-----  
21  
Al Bayt Stadium  
U v F
```

```
-----  
MATCHID
```

```
-----  
STADIUMNAME
```

```
-----  
RESULT
```

```
-----  
MATCHDATE
```

```
-----  
TIME
```

```
-----  
Nov 26 2022  
14:00
```

```
-----  
MATCHID
```

```
-----  
STADIUMNAME
```

```
-----  
RESULT
```

```
-----  
MATCHDATE
```

```
-----  
TIME
```

```
-----  
22  
Al Bayt Stadium  
A v U
```

```
-----  
MATCHID
```

```
-----  
STADIUMNAME
```

```
-----  
RESULT
```

```
-----  
MATCHDATE
```

```
-----  
TIME
```

```
-----  
Dec 3 2022  
14:00
```

```
22 rows selected.
```

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---

## **Country**

NAME

---

RANKING

---

Germany

15

Argentina

1

Uruguay

17

NAME

---

RANKING

---

Japan

19

France

2

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### Manager

MANAGERID

NAME

AGE

NATIONALITY

1

Hansi Flick

57

German

MANAGERID

NAME

AGE

NATIONALITY

2

Lionel SebastiAn Scaloni

44

Argentina

MANAGERID

NAME

AGE

NATIONALITY

3

Marcelo Bielsa

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```
67  
Argentina
```

```
MANAGERID
```

```
-----  
NAME
```

```
-----  
AGE
```

```
NATIONALITY
```

```
-----  
4
```

```
Hajime Moriyasu
```

```
54
```

```
Japan
```

```
MANAGERID
```

```
-----  
NAME
```

```
-----  
AGE
```

```
NATIONALITY
```

```
-----  
5
```

```
Didier Claude Deschamps
```

```
54
```

```
Japan
```

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---

### Team

```
TEAMID TEAMSIZE
```

```
-----
```

```
COUNTRYNAME
```

```
-----
```

```
MANAGERID
```

```
-----
```

```
15 27
```

```
Germany
```

```
-----
```

```
1
```

```
1 27
```

```
Argentina
```

```
-----
```

```
2
```

```
TEAMID TEAMSIZE
```

```
-----
```

```
COUNTRYNAME
```

```
-----
```

```
MANAGERID
```

```
-----
```

```
17 28
```

```
Uruguay
```

```
-----
```

```
3
```

```
19 27
```

```
Japan
```

```
-----
```

```
TEAMID TEAMSIZE
```

```
-----
```

```
COUNTRYNAME
```

```
-----
```

```
MANAGERID
```

```
-----
```

```
4
```

```
2
```

```
26
```

```
France
```

```
5
```

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---

## Player

PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
1	15	83	0
Antonio Rudiger			
30			
2	15	83	1
David Raum			
25			
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
3	15	83	0
Matthias Ginter			
29			
4	15	83	0
Thilo Kehrer			
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
27			
5	15	83	0

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---

Niklas Sule			
	28		
	6	15	83
			0
PLAYERID	TEAMID	PASSES	ASSISTS
-----	-----	-----	-----
NAME			
-----	-----	-----	-----
AGE			
-----	-----	-----	-----
Lukas Klostermann			
	27		
	7	15	83
			0
PLAYERID	TEAMID	PASSES	ASSISTS
-----	-----	-----	-----
NAME			
-----	-----	-----	-----
AGE			
-----	-----	-----	-----
8	15	83	0
Nico Schlotterbeck			
	24		
	9	15	83
			0
PLAYERID	TEAMID	PASSES	ASSISTS
-----	-----	-----	-----
NAME			

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AGE			
-----			
PLAYERID	TEAMID	PASSES	ASSISTS
NAME			
-----			
Joshua Kimmich	10	15	83 1
	28		
Kai Havertz	11	15	83 0
PLAYERID	TEAMID	PASSES	ASSISTS
NAME			
-----			
Leon Goretzka	12	15	83 0
	28		
	13	15	83 0
PLAYERID	TEAMID	PASSES	ASSISTS
NAME			
-----			
Mario Götze	14	15	83 0
	31		
Julian Brandt			

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27

PLAYERID	TEAMID	PASSES	ASSISTS
----------	--------	--------	---------

NAME

AGE

15	15	83	0
Jonas Hofmann			
26			

16	15	83	0
Ilkay Gundogan			
33			

PLAYERID	TEAMID	PASSES	ASSISTS
----------	--------	--------	---------

NAME

AGE

17	15	83	1
Niclas Fullkrug			
30			

18	15	83	2
Serge Gnabry			

PLAYERID	TEAMID	PASSES	ASSISTS
----------	--------	--------	---------

NAME

AGE

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PLAYERID	TEAMID	PASSES	ASSISTS
<hr/>			
NAME			
<hr/>			
AGE			
<hr/>			
Jamal Musiala			
20			
21	15	83	1
Leroy Sane			
27			
PLAYERID	TEAMID	PASSES	ASSISTS
<hr/>			
NAME			
<hr/>			
AGE			
<hr/>			
Karim Adeyemi			
21			
22	15	83	0
Youssoufa Moukoko			
29			

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PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
24	15	83	0
Manuel Neuer			
37			
25	15	83	0
Kevin Trapp			
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
33			
26	15	83	0
Marc-Andre ter Stegen			
31			
27	1	54	1
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
35			
28	1	54	0

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Julian Alvarez

23

PLAYERID	TEAMID	PASSES	ASSISTS
----------	--------	--------	---------

NAME

AGE

29	1	54	1
----	---	----	---

Enzo Fernandez

22

30	1	54	0
----	---	----	---

Alexis Mac Allister

24

PLAYERID	TEAMID	PASSES	ASSISTS
----------	--------	--------	---------

NAME

AGE

31	1	54	1
----	---	----	---

Nahuel Molina

25

32	1	54	1
----	---	----	---

Angel Di Mar??a

PLAYERID	TEAMID	PASSES	ASSISTS
----------	--------	--------	---------

NAME

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```
-----  
AGE  
-----  
35  
  
33      1      54      0  
Emiliano Mart??nez  
31  
  
34      17     54      3  
  
PLAYERID  TEAMID    PASSES    ASSISTS  
-----  
NAME  
-----  
AGE  
-----  
DARWIN NUNEZ  
24  
  
35      17      54      2  
NICOLAS DE LA CRUZ  
29  
  
PLAYERID  TEAMID    PASSES    ASSISTS  
-----  
NAME  
-----  
AGE  
-----  
36      17      54      0  
AGUSTIN CANOBBIO  
33  
  
37      17      54      0  
FEDERICO VALVERDE
```

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31			
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
AGE			
-----			
38	17	54	0
MATHIAS OLIVERA			
24			
39	17	54	1
RONALD ARAUJO			
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
AGE			
-----			
29			
40	17	54	1
MAXIMILIANO ARAUJO			
34			
41	17	54	0
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
AGE			
-----			

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SERGIO ROCHET

31

42 19 20 0

Ritsu Doan

25

PLAYERID	TEAMID	PASSES	ASSISTS
----------	--------	--------	---------

NAME

AGE

43 19 20 0

Takuma Asano

29

44 19 20 0

Ao Tanaka

25

PLAYERID	TEAMID	PASSES	ASSISTS
----------	--------	--------	---------

NAME

AGE

45 19 20 1

Junya Ito

30

46 19 20 1

Ko Itakura

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PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
	AGE		
-----			
	26		
47	19	20	1
Kaoru Mitoma			
26			
48	19	20	0
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
	AGE		
-----			
Shuichi Gonda			
34			
49	2	54	0
Kylian Mbappe			
38			
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
	AGE		
-----			
50	2	54	0
ADRIEN RABIOT			

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28			
51	2	54	0
KARIM BENZEMA			
38			
PLAYERID	TEAMID	PASSES	ASSISTS
-----			
NAME			
-----			
AGE			
-----			
52	2	54	1
Olivier Giroud			
39			
53	2	54	1
Antoine Griezmann			
PLAYERID	TEAMID	PASSES	ASSISTS
-----	-----	-----	-----
NAME			
-----	-----	-----	-----
AGE			
-----	-----	-----	-----
27			
54	2	54	2
Christopher Nkunku			
25			
55	2	54	1
PLAYERID	TEAMID	PASSES	ASSISTS
-----	-----	-----	-----

NAME			
-----			
AGE			
-----			
Wissam Ben Yedder			
26			
56	2	54	0
Mike Maignan			
27			
56 rows selected.			

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---

## Forward

PLAYERID	SHOTS	GOALS
17	4	2
18	4	1
19	4	0
20	4	0
21	4	0
22	4	0
23	4	0
27	12	2
28	4	1
34	8	5
43	3	1
PLAYERID	SHOTS	GOALS
45	2	0
49	5	2
51	3	1
52	3	1
53	2	0
54	1	0
55	4	0

18 rows selected.

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### Midfield

PLAYERID	TACKLES	SHOTS	GOALS	INTERCEPTIONS
10	12	3	0	10
11	12	3	2	10
12	12	3	0	10
13	12	3	0	10
14	12	3	0	10
15	12	3	0	10
16	12	3	1	10
29	12	3	1	10
30	12	2	1	10
32	12	2	0	10
35	17	5	3	12
PLAYERID	TACKLES	SHOTS	GOALS	INTERCEPTIONS
36	17	5	1	12
37	17	5	1	12
42	19	2	2	12
44	19	2	0	12
47	19	2	0	12
50	10	5	1	18

17 rows selected.

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---

### Defender

PLAYERID	TACKLES	SHOTS	GOALS	INTERCEPTIONS
1	12	3	0	10
2	12	3	0	10
3	12	3	0	10
4	12	3	0	10
5	12	3	0	10
6	12	3	0	10
7	12	3	0	10
8	12	3	0	10
9	12	3	0	10
31	12	2	0	10
38	17	5	1	12
PLAYERID	TACKLES	SHOTS	GOALS	INTERCEPTIONS
39	17	5	1	12
40	17	5	0	12
46	19	2	0	12

14 rows selected.

### Goalkeeper

PLAYERID	SAVES
24	8
25	0
26	0
33	1
41	0
48	3
56	3

7 rows selected.

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---

### GoalDetails

```
GOALNUMBER      MATCHID      PLAYERID
```

```
-----
```

```
TIME
```

```
-----
```

```
    1          1          1
```

```
45:34
```

```
Kick
```

```
    2          1          2
```

```
34:23
```

```
penalty kick
```

```
GOALNUMBER      MATCHID      PLAYERID
```

```
-----
```

```
TIME
```

```
-----
```

```
    3          1          3
```

```
76:23
```

```
headbutt
```

```
    1          2          1
```

```
80:23
```

```
GOALNUMBER      MATCHID      PLAYERID
```

```
-----
```

```
TIME
```

```
-----
```

```
TYPE
```

```
-----
```

```
Long kick
```

```
    2          2          4
```

```
12:12
```

```
Kick
```

### PlayIn

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---

MATCHID	TEAMID
1	2
1	17
2	2
2	17
3	1
3	2
4	1
4	17
5	1
5	19
6	1
MATCHID	TEAMID
6	15
7	1
7	19
8	15
8	19
9	2
9	15
10	15
10	19
11	2
11	19
MATCHID	TEAMID
12	1
12	15
13	17
13	19
14	17

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---

14	19
15	2
15	17
16	2
16	19
17	1

MATCHID	TEAMID
---------	--------

17	2
18	15
18	19
19	1
19	15
20	15
20	19
21	2
21	17
22	1
22	17

44 rows selected.

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---

### Funds

SPONSORID	TEAMID
-----------	--------

---

1	1
1	2
1	15
1	17
2	1
2	15
2	17
2	19
3	1
3	15
3	17

SPONSORID	TEAMID
-----------	--------

---

4	1
4	2
4	15
4	17
5	1
5	2
5	15
5	17
5	19
6	1
6	15

SPONSORID	TEAMID
-----------	--------

---

6	17
7	1
7	15
7	17

**Sponsor**

```
SPONSORID SP_NAME
-----
1 Coca-Cola
2 Adidas
3 Byju's
4 Budweiser
5 Wanda
6 SBI
7 Hisense

7 rows selected.
```

## d. Details of SQL Queries and Location

\*All SQL Queries can be found in the `appService.js` file.

**INSERT** operations are spread throughout multiple functions in `appService.js`. They include `insertStadiumTable`, `insertCountryTable`, etc. and can be found from line 283 - 815.

**DELETE** operation is implemented in one function called “`deleteFromDb`” and can be found on line 984.

**UPDATE** operation is implemented in one function called “`updateTable`” and can be found on line 827.

**SELECTION, PROJECTION, JOIN**, are all implemented in one function called “`selectTable`” and can be found on line 150.

**AGGREGATION with GROUP BY** is implemented in a function called “`aggregateGroupByTable`” and can be found on line 912.

**AGGREGATION with HAVING** is implemented in a function called “`aggregateHavingTable`” and can be found on line 927.

**NESTED AGGREGATION with GROUP BY** is implemented in a function called “`aggregateNestedTable`” and can be found on line 943.

---

**DIVISION** is implemented in a function called “divideTable” and can be found on line 895

## e. Screenshots of Query Using GUI

### Insert Operation:

#### Before

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:  
Country

---

**Display**

name	ranking
------	---------

---

**confirm**

#### During

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to insert element:  
Country

name  
germany

ranking  
1

**Confirm**

#### After

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Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Country

---

**Display**

name	ranking
germany	1

---

**confirm**

## Delete Operation

### Before

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Country

---

**Display**

name	ranking
argentina	2
Italy	3
germany	1

---

**confirm**

### During

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---

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to delete element, using primary identification:

Country

name

germany

**delete**

After

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Country

---

**Display**

name	ranking
argentina	2
Italy	3

---

**confirm**

## Update Operation

Before

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---

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Team

---

**Display**

teamID	teamSize	countryName	managerID
1	20	argentina	1
2	27	Italy	2

---

**confirm**

### During

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to update element, leave the field empty if no change is required for that attribute

**Make sure you include the primary identification, or it won't find the item to perform update!**

Team

teamID  
001

teamSize  
30

countryName

managerID

**Confirm**

Congratulations, it is successfully updated!!

### After

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Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Team

---

**Display**

teamID	teamSize	countryName	managerID
1	30	argentina	1
2	27	Italy	2

---

**confirm**

## Selection + Join Operation

We combined selection and join function together in our SJ page, however, these two functions can be performed together, but they can also be performed on their own.

Selection Operation:

before

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a few tables that you want to join, press shift then click to multiselect, then press chooseTable:

MatchTwo  
GoalDetails  
PlayIn  
**Team**

**ChooseTable**

For each attribute, in the first input field, enter a string that you want the attributes to be the same as for example, if you want to find a player whose name is "Bob", just enter Bob in the first input field

For the second input field for each attribute, input AND or OR if you want to apply multiple filters

teamID

AND or OR

teamSize

AND or OR

countryName

AND or OR

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---

Home Insert Delete Update SJ Projection Aggregation Division Display

AND or OR

teamSize

AND or OR

countryName

AND or OR

managerID

AND or OR

**ConfirmSJ**

---

**selectionJoin**

---

during

Home Insert Delete Update SJ Projection Aggregation Division Display

player whose name is "Bob", just enter Bob in the first input field

For the second input field for each attribute, input AND or OR if you want to apply multiple filters

teamID

001

AND

teamSize

20

AND or OR

countryName

AND or OR

managerID

AND or OR

**ConfirmSJ**

after

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---

Home Insert Delete Update SJ Projection Aggregation Division Display

AND or OR  
countryName

AND or OR  
managerID

AND or OR

ConfirmSJ

**selectionJoin**

teamID	teamSize	countryName	managerID
1	20	argentina	1

Join (with Selection) Operation  
before

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Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Team

---

**Display**

teamID	teamSize	countryName	managerID
1	20	argentina	1
2	30	Italy	2

confirm

---

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Manager

---

**Display**

managerID	name	age	nationality
1	20	argentina	1
2	30	Italy	2

confirm

---

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Country

---

**Display**

name	ranking
argentina	2
Italy	3

confirm

during

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---

Home Insert Delete Update SJ Projection Aggregation Division Display

teamID  
AND or OR  
teamSize  
20  
AND  
countryName  
argentina  
AND  
managerID  
AND or OR  
managerID  
001  
AND  
name

---

Home Insert Delete Update SJ Projection Aggregation Division Display

managerID  
AND or OR  
managerID  
001  
AND  
name  
AND or OR  
age  
40  
AND or OR  
nationality  
AND or OR

**ConfirmSJ**

after

**selectionJoin**

teamID	teamSize	countryName	managerID	managerID	name	age	nationality
1	20	argentina	1	1	Johnson	40	germany

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### Projection

#### Before

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Player

---

#### Display

playerID	teamID	passes	assists	name	age
1	1	20	20	Messi	30

**confirm**

#### During

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display with projected element:

Player

Select the attributes that you want to project

playerID  
teamID  
passes  
assists

**confirm**

---

#### Projection

#### After

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display with projected element:

Player

Select the attributes that you want to project

playerID  
teamID  
passes  
assists

**confirm**

---

#### Projection

playerID	teamID	passes	assists
1	1	20	20

### Aggregation with GROUP BY

# University of British Columbia, Vancouver

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### Before

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Player

---

**Display**

playerID	teamID	passes	assists	name	age
1	1	20	20	Messi	30
2	1	20	30	Romero	28
3	1	29	30	Otamendi	35
4	1	19	29	Paredes	35

---

confirm

### During

Aggregation with GROUP BY

---

confirm

### After

Aggregation with GROUP BY

countryName	passes
argentina	88

---

confirm

### Aggregation with HAVING

# University of British Columbia, Vancouver

## Department of Computer Science

### Before

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Player

---

**Display**

playerID	teamID	passes	assists	name	age
10	2	14	3	Immobile	30
1	1	20	20	Messi	30
12	2	19	3	Retegui	30
2	1	20	30	Romero	28
3	1	29	30	Otamendi	35
4	1	19	29	Paredes	35
11	2	9	3	Zaniolo	30

### During

Aggregation with HAVING

confirm

---

### After

Aggregation with HAVING

countryName	passes
Italy	42
argentina	88

confirm

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## Nested Aggregation with GROUP BY

Before

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:  
PlayIn

---

**Display**

matchID	teamID
1	1
1	2

---

**confirm**

During

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:  
PlayIn

---

**Display**

matchID	teamID
1	1
1	2

---

**confirm**

After

---

**Nested Aggregation with GROUP BY**

teamID	matchesPlayed
1	1
2	1

---

**confirm**

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---

### Division

#### Before

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Sponsor

---

#### Display

sponsorID	name
1	Cola
2	HUAWEI

confirm

Home Insert Delete Update SJ Projection Aggregation Division Display

Choose a table to display table element:

Funds

---

#### Display

sponsorID	teamID
1	1
1	2
2	1

confirm

#### During

Home Insert Delete Update SJ Projection Aggregation Division Display

Click the button to find which team has the sponsors!

confirm

---

#### Division Result

---

#### After

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Home Insert Delete Update SJ Projection Aggregation Division Display

Click the button to find which team has the sponsors1

confirm

### Division Result

teamID	teamSize	countryName	managerID
1	20	argentina	1

## Citation of Code

We used the starter code provided in the Tutorials as part of our project.