Milestone 4

University of British Columbia, Vancouver Department of Computer Science CPSC 304 Project - The Formula for Success

Milestone #: 4

Date: December 1, 2023 Group Number: 51

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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 email 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

Description of Project:

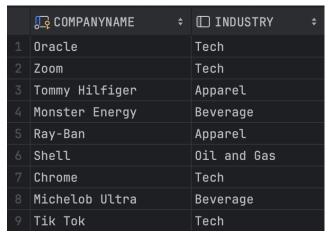
Our final application is in the domain of sports data management that focuses on Formula One (F1), a form of international motorsport. The application is able to store statistics and results for fans to reference and explore. Our webapp shows the parts of the database that model important components of the F1 system including Drivers, Constructors (i.e. "teams"), Circuits, Races, Standings and additional ones to accurately represent the intricacies of F1's structure. In addition, the application also shows relationships such as which races drivers compete in, the results of those races, the overall performance of a team in a given season, and many more. Our project focuses on these core components of F1 as the database is intended to support fan engagement and activities, such as F1 betting and fantasy leagues.

Description of Project Schema:

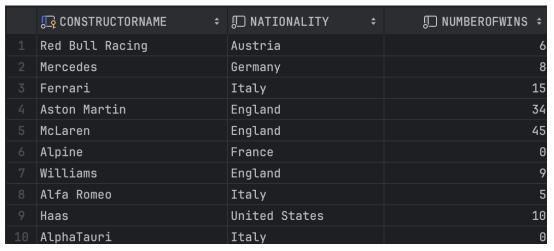
Nothing was changed from the initial schema that we submitted post normalization in milestone 2 and what we ended up implementing in our final application.

Schema and its Data:

1. Sponsor(companyName, industry)



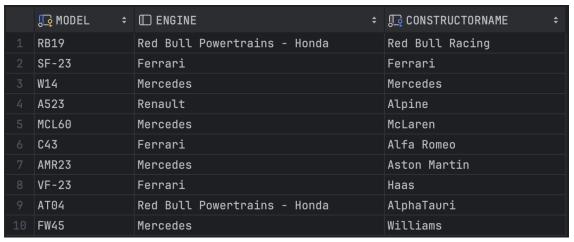
2. Constructor(constructorName, nationality, numberOfWins)



3. TeamMember(employeeld, firstName, lastName, nationality,, dateOfBirth, salary, job)

	☐ EMPLOYEEID ÷	∏ FIRSTNAME ÷	□ LASTNAME ÷	□ NATIONALITY	<pre> Dateofbirth</pre>	☐ SALARY ÷	"□ JOB ÷
1	1	Toto	Wolff	Austria	1972-01-12	26000000	Team Principal
2	2	Christian	Horner	England	1973-11-16	10000000	Team Principal
3	3	Zak	Brown	United States	1971-11-07	5000000	CE0
4	4	Hannah	Schmitz	England	1985-05-01	154000	Principal Strategy Engineer
5	5	Peter	Bonnington	England	1975-02-12	450000	Senior Race Engineer
6	6	Oscar	Piastri	Australia	2001-04-06	2000000	Driver
7	7	Logan	Sargeant	United States of America	2000-12-31	1000000	Driver
8	8	Yuki	Tsunoda	Japan	2000-05-11	1000000	Driver
9	9	Lando	Norris	England	1999-11-13	20000000	Driver
10	10	Zhou	Guanyu	China	1999-05-30	2000000	Driver
11	11	Lance	Stroll	Canada	1998-10-29	2800000	Driver
12	12	George	Russell	England	1998-02-15	8000000	Driver
13	13	Charles	Leclerc	Monaco	1997-10-16	24000000	Driver
14	14	Esteban	0con	France	1996-09-17	6000000	Driver
15	15	Alex	Albon	Thailand	1996-03-23	3000000	Driver
16	16	Pierre	Gasly	France	1996-02-07	5000000	Driver
17	17	Carlos	Sainz	Spain	1994-09-01	12000000	Driver
18	18	Kevin	Magnussen	Denmark	1992-10-05	5000000	Driver
19	19	Sergio	Perez	Mexico	1990-01-26	10000000	Driver
20	20	Valtteri	Bottas	Finland	1989-08-28	10000000	Driver
21	21	Nico	Hulkenberg	Germany	1987-08-19	2000000	Driver
22	22	Lewis	Hamilton	England	1985-01-07	37000000	Driver
23	23	Max	Verstappen	Netherlands	1997-09-30	50000000	Driver
24	24	Fernando	Alonso	Spain	1981-07-29	20000000	Driver

4. Car(model, engine, constructorName)



5. Partner_Ref(<u>partnerId</u>, partnerName, instagramHandle).

	☐ PARTNERID ÷	□ PARTNERNAME	☐ INSTAGRAMHANDLE
1	1	Kelly Piquet	kellypiquet
2	2	Kika Gomes	francisca.cgomes
3	3	Carmen Montero Mundt	carmenmmundt
4	4	Lily Zneimer	lilyzneimer
5	5	Tiffany Cromwell	tiffanycromwell
6	6	Lily Muni He	lilymhe

6. Partner_2(<u>instagramHandle</u>, instagramFollowers)

	ুন INSTAGRAMHANDLE	☐ INSTAGRAMFOLLOWERS ÷
1	kellypiquet	1300000
2	francisca.cgomes	537000
3	carmenmmundt	309000
4	lilyzneimer	800
5	tiffanycromwell	195000
6	lilymhe	688000

7. GrandPrix_2(<u>year</u>, <u>circuitName</u>, viewership)

	<u></u> YEAR ≑	ুচ্ন CIRCUITNAME \$	<pre> □ VIEWERSHIP</pre>
1	2023	Bahrain International Circuit	1300000
2	2023	Albert Park Circuit	2950000
3	2023	Monaco	1790000
4	2023	Silverstone Circuit	2350000
5	2023	Marina Bay Street Circuit	1300000

8. GrandPrix_Ref(circuitName, city)

	ূচ্ CIRCUITNAME \$	☐ CITY ÷
1	Bahrain International Circuit	Sakhir
2	Albert Park Circuit	Melbourne
3	Monaco	Monte Carlo
4	Silverstone Circuit	Towcester
5	Marina Bay Street Circuit	Marina Bay

9. GrandPrix_3(circuitName, country)

	ু CIRCUITNAME	}	□ COUNTRY	‡
1	Bahrain International Circuit		Bahrain	
2	Albert Park Circuit		Australia	
3	Monaco		Monaco	
4	Silverstone Circuit		England	
5	Marina Bay Street Circuit		Singapore	

10. GrandPrix_4(<u>year, circuitName</u>, attendance)

	ু YEAR ÷	চুকু CIRCUITNAME ÷	☐ ATTENDANCE ÷
1	2023	Bahrain International Circuit	36000
2	2023	Albert Park Circuit	444600
3	2023	Monaco	200000
4	2023	Silverstone Circuit	480000
5	2023	Marina Bay Street Circuit	264000

11. GrandPrix_5(<u>year</u>, gpName, circuitName)

	ু YEAR ÷	GPNAME	☐ CIRCUITNAME ÷
1	2023	Bahrain Grand Prix	Bahrain International Circuit
2	2023	Australian Grand Prix	Albert Park Circuit
3	2023	Monaco Grand Prix	Monaco
4	2023	British Grand Prix	Silverstone Circuit
5	2023	Singapore Grand Prix	Marina Bay Street Circuit

12. Circuit_Ref(<u>numberOfLaps</u>, length)

	📭 NUMBEROFLAPS 🕏	□ LENGTH ÷
1	57	308
2	58	307
3	78	260
4	52	306
5	61	308

13. Circuit_2(<u>circuitName</u>, **numberOfLaps**, type)

	CIRCUITNAME	‡	□ NUMBEROFLAPS ÷ □ T	YPE ÷
1	Bahrain International Circuit		57 race	:
2	Albert Park Circuit		58 stre	et
3	Monaco		78 stre	et
4	Silverstone Circuit		52 race	:
5	Marina Bay Street Circuit		61 stre	et

14. GrandPrix_ConstructorStanding_Ref(position, points)

	📭 POSITION	‡	□ POINTS ÷
		1	37
		2	30
3		3	25

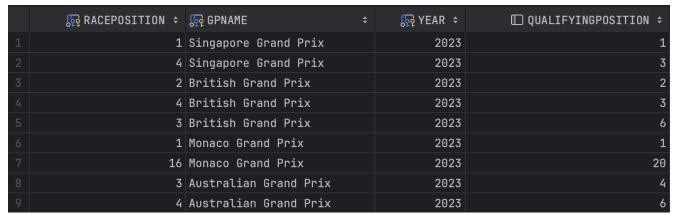
15. GrandPrix_ConstructorStanding_2(position, gpName, year)

	্দু POSITION ÷	ূচ্ GPNAME ÷	্দৃ YEAR ‡
1	1	Singapore Grand Prix	2023
2	2	British Grand Prix	2023
3	3	British Grand Prix	2023

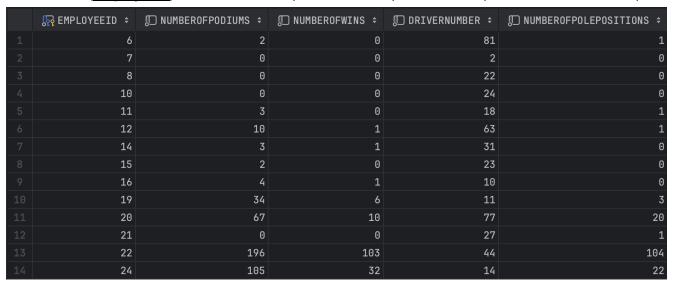
16. GrandPrix_DriverStanding_Ref(<u>racePosition</u>, points)

	RACEPOSITION ≎	∏ POINTS ÷
1	1	25
2	4	12
3	2	18
4	3	15
5	16	0

17. GrandPrix_DriverStanding_2(<u>racePosition</u>, <u>gpName</u>, <u>year</u>, qualifyingPosition)



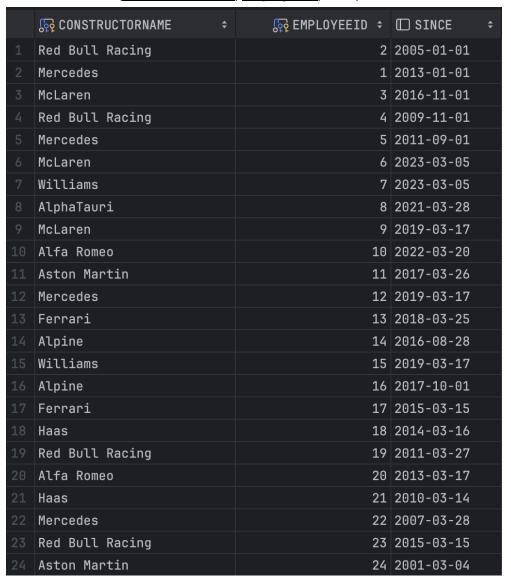
18. Driver(**employeeId**, numberOfPodiums, numberOfWins, driverNumber, numberOfPolePositions)



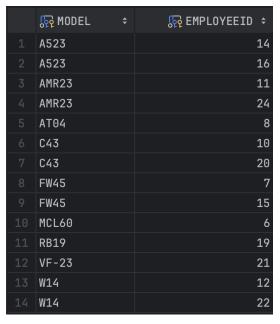
19. Sponsors(companyName, constructorName, sponsorshipAmount)

	ুচ্ছ COMPANYNAME \$	ুচ্ছ CONSTRUCTORNAME \$	☐ SPONSORSHIPAMOUNT ÷
1	Oracle	Red Bull Racing	500000000
2	Zoom	Red Bull Racing	150000000
3	Tommy Hilfiger	Mercedes	50000000
4	Monster Energy	Mercedes	85000000
5	Ray-Ban	Ferrari	290000000
6	Shell	Ferrari	350000000
7	Chrome	McLaren	420000000
8	Michelob Ultra	Williams	41000000
9	Tik Tok	Aston Martin	<null></null>

20. WorksWith(constructorName, employeeId, since)



21. Drives(model, employeeld)



22. InRelationshipWith(partnerId, employeeId, since)

	ু PARTNERID ‡	্দৃ EMPLOYEEID ÷	□ SINCE ÷
1	2	16	2022-09-13
2	3	12	2020-06-20
3	4	6	2019-01-16
4	5	20	2020-03-29
5	6	15	2019-04-12

23. ConstructorHolds(position, gpName, year, constructorName)

	ু POSITION ÷	ুচ্ GPNAME ÷	্দৃ YEAR ‡	ুচ্চ CONSTRUCTORNAME \$
1	1	Singapore Grand Prix	2023	Ferrari
2	2	British Grand Prix	2023	McLaren
3	3	British Grand Prix	2023	Mercedes

24. DriverHolds(<u>racePosition</u>, <u>gpName</u>, <u>year</u>, <u>employeeld</u>)

	ু RACEPOSITION ≎	ূন্ন GPNAME	‡	্ফ়ি YEAR ≑	ু EMPLOYEEID ÷
1	3	Australian Grand Prix		2023	24
2	3	British Grand Prix		2023	22
3	4	Australian Grand Prix		2023	11
4	4	British Grand Prix		2023	6
5	16	Monaco Grand Prix		2023	19

SQL Queries:

Insert:

driver.php, lines 78-82

Delete:

driver.php, line 144

Update:
 constructor.php, line 46

Selection:
 grandprix.php, lines 49-88

Projection:
 home.php, lines 46-91

Join:
 driver.php, lines 112-128

Aggregation with Group By:
 constructor.php, lines 58-61

Aggregation with Having:
 constructor.php, lines 70-80

Nested Aggregation with Group By:

grandprix.php, lines 105-113

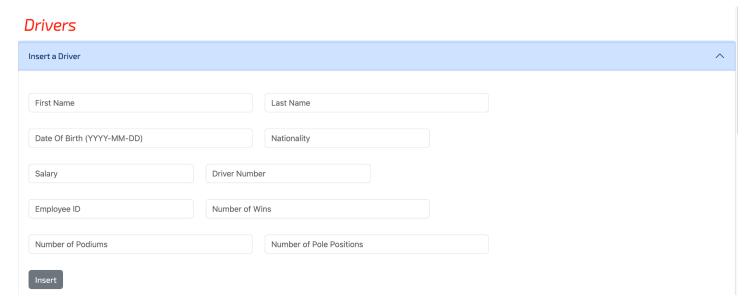
Division:

constructor.php, lines 91-106

Query Functionalities:

Insert:

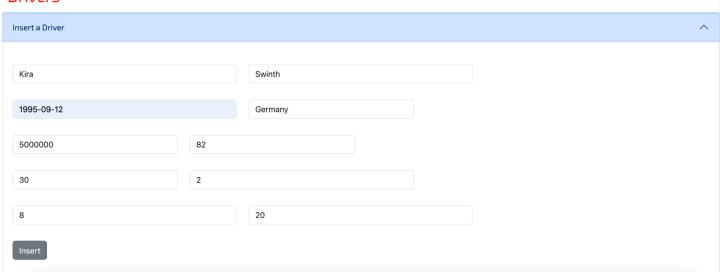
Before:



EMPLOYEEID	FIRSTNAME	LASTNAME	NATIONALITY	DATEOFBIRTH	SALARY	JOB	DRIVERNUMBER	NUMBEROFWINS	NUMBEROFPODIUMS	NUMBEROFPOLEPOSITIONS
9	Lando	Norris	England	13-NOV-99	20000000	Driver	4	0	11	1
17	Carlos	Sainz	Spain	01-SEP-94	12000000	Driver	55	2	17	5
19	Sergio	Perez	Mexico	26-JAN-90	10000000	Driver	11	6	34	3
22	Lewis	Hamilton	England	07-JAN-85	37000000	Driver	44	103	196	104
24	Fernando	Alonso	Spain	29-JUL-81	20000000	Driver	14	32	105	22
11	Lance	Stroll	Canada	29-OCT-98	2800000	Driver	18	0	3	1
12	George	Russell	England	15-FEB-98	8000000	Driver	63	1	10	1
16	Pierre	Gasly	France	07-FEB-96	5000000	Driver	10	1	4	0
6	Oscar	Piastri	Australia	06-APR-01	2000000	Driver	81	0	2	1
7	Logan	Sargeant	United States of America	31-DEC-00	1000000	Driver	2	0	0	0
13	Charles	Leclerc	Monaco	16-0CT-97	24000000	Driver	16	5	27	19
20	Valtteri	Bottas	Finland	28-AUG-89	10000000	Driver	77	10	67	20
15	Alex	Albon	Thailand	23-MAR-96	3000000	Driver	23	0	2	0
27	Sebastian	Vettel	Germany	03-JUL-87	2000000	Driver	6	50	100	30
18	Kevin	Magnussen	Denmark	05-0CT-92	5000000	Driver	20	0	1	1
8	Yuki	Tsunoda	Japan	11-MAY-00	1000000	Driver	22	0	0	0
14	Esteban	Ocon	France	17-SEP-96	6000000	Driver	31	1	3	0
10	Zhou	Guanyu	China	30-MAY-99	2000000	Driver	24	0	0	0
21	Nico	Hulkenberg	Germany	19-AUG-87	2000000	Driver	27	0	0	1
23	Max	Verstappen	Netherlands	30-SEP-97	50000000	Driver	1	49	93	30

During:

Drivers

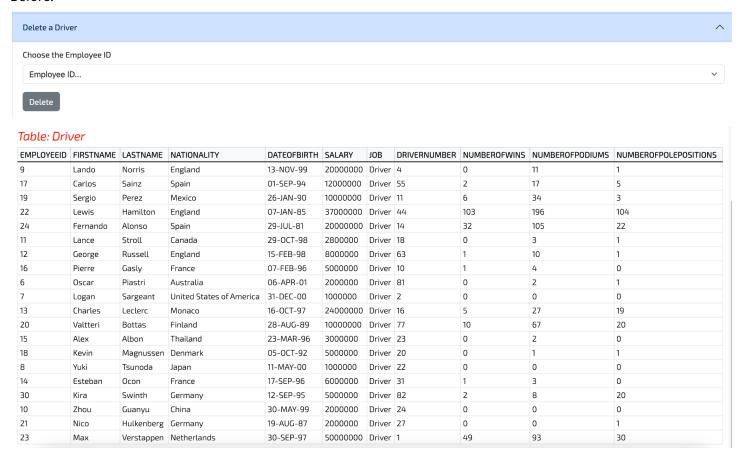


After:

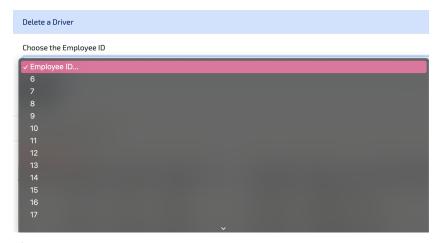
CNADI OVECID	CIDCTALANAC	LASTALANAS	NATIONIAL ITY	DATEGERIPTU	CALADY	IOD	DDIV/CDAU MADCD	AULINADEDOCIAUNIE	AU IMADEDOEDODU IMAE	NUMBEROS DOLUTIONS
EMPLOYEEID	FIRSTNAME	LASTNAME	NATIONALITY	DATEOFBIRTH	SALARY	JOB	DRIVERNUMBER	NUMBEROFWINS	NUMBEROFPODIUMS	NUMBEROFPOLEPOSITIONS
9	Lando	Norris	England	13-NOV-99	20000000	Driver	4	0	11	1
17	Carlos	Sainz	Spain	01-SEP-94	12000000	Driver	55	2	17	5
19	Sergio	Perez	Mexico	26-JAN-90	10000000	Driver	11	6	34	3
22	Lewis	Hamilton	England	07-JAN-85	37000000	Driver	44	103	196	104
24	Fernando	Alonso	Spain	29-JUL-81	20000000	Driver	14	32	105	22
11	Lance	Stroll	Canada	29-OCT-98	2800000	Driver	18	0	3	1
12	George	Russell	England	15-FEB-98	8000000	Driver	63	1	10	1
16	Pierre	Gasly	France	07-FEB-96	5000000	Driver	10	1	4	0
6	Oscar	Piastri	Australia	06-APR-01	2000000	Driver	81	0	2	1
7	Logan	Sargeant	United States of America	31-DEC-00	1000000	Driver	2	0	0	0
13	Charles	Leclerc	Monaco	16-OCT-97	24000000	Driver	16	5	27	19
20	Valtteri	Bottas	Finland	28-AUG-89	10000000	Driver	77	10	67	20
15	Alex	Albon	Thailand	23-MAR-96	3000000	Driver	23	0	2	0
18	Kevin	Magnussen	Denmark	05-0CT-92	5000000	Driver	20	0	1	1
8	Yuki	Tsunoda	Japan	11-MAY-00	1000000	Driver	22	0	0	0
14	Esteban	Ocon	France	17-SEP-96	6000000	Driver	31	1	3	0
30	Kira	Swinth	Germany	12-SEP-95	5000000	Driver	82	2	8	20
10	Zhou	Guanyu	China	30-MAY-99	2000000	Driver	24	0	0	0
21	Nico	Hulkenberg	Germany	19-AUG-87	2000000	Driver	27	0	0	1
23	Max	Verstappen	Netherlands	30-SEP-97	50000000	Driver	1	49	93	30

Delete:

Before:



During: Delete EmployeeID = 6



After:

Table: Driver

EMPLOYEEID	FIRSTNAME	LASTNAME	NATIONALITY	DATEOFBIRTH	SALARY	JOB	DRIVERNUMBER	NUMBEROFWINS	NUMBEROFPODIUMS	NUMBEROFPOLEPOSITIONS
9	Lando	Norris	England	13-NOV-99	20000000	Driver	4	0	11	1
17	Carlos	Sainz	Spain	01-SEP-94	12000000	Driver	55	2	17	5
19	Sergio	Perez	Mexico	26-JAN-90	10000000	Driver	11	6	34	3
22	Lewis	Hamilton	England	07-JAN-85	37000000	Driver	44	103	196	104
24	Fernando	Alonso	Spain	29-JUL-81	20000000	Driver	14	32	105	22
11	Lance	Stroll	Canada	29-0CT-98	2800000	Driver	18	0	3	1
12	George	Russell	England	15-FEB-98	8000000	Driver	63	1	10	1
16	Pierre	Gasly	France	07-FEB-96	5000000	Driver	10	1	4	0
7	Logan	Sargeant	United States of America	31-DEC-00	1000000	Driver	2	0	0	0
13	Charles	Leclerc	Monaco	16-OCT-97	24000000	Driver	16	5	27	19
20	Valtteri	Bottas	Finland	28-AUG-89	10000000	Driver	77	10	67	20
15	Alex	Albon	Thailand	23-MAR-96	3000000	Driver	23	0	2	0
18	Kevin	Magnussen	Denmark	05-0CT-92	5000000	Driver	20	0	1	1
8	Yuki	Tsunoda	Japan	11-MAY-00	1000000	Driver	22	0	0	0
14	Esteban	Ocon	France	17-SEP-96	6000000	Driver	31	1	3	0
10	Zhou	Guanyu	China	30-MAY-99	2000000	Driver	24	0	0	0
21	Nico	Hulkenberg	Germany	19-AUG-87	2000000	Driver	27	0	0	1
23	Max	Verstappen	Netherlands	30-SEP-97	50000000	Driver	1	49	93	30

Update:

Before:

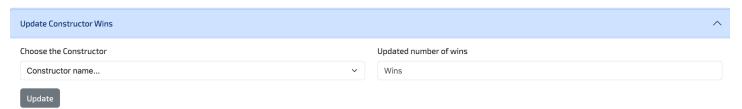


Table: Constructor

CONSTRUCTORNAME	NATIONALITY	NUMBEROFWINS
Red Bull Racing	Austria	6
Mercedes	Germany	8
Ferrari	Italy	15
Aston Martin	England	0
McLaren	England	20
Alpine	France	0
Williams	England	9
Alfa Romeo	Italy	5
Haas	United States	0
AlphaTauri	Italy	0

During:



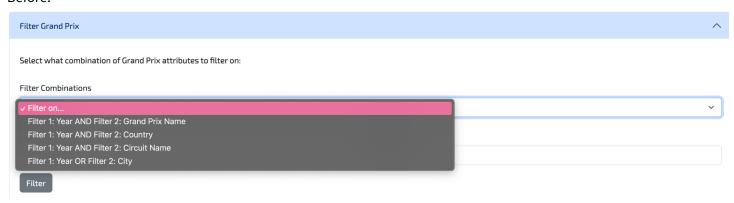
After:

Table: Constructor

CONSTRUCTORNAME	NATIONALITY	NUMBEROFWINS
Red Bull Racing	Austria	6
Mercedes	Germany	8
Ferrari	Italy	15
Aston Martin	England	239
McLaren	England	20
Alpine	France	0
Williams	England	9
Alfa Romeo	Italy	5
Haas	United States	0
AlphaTauri	Italy	0

Selection:

Before:



During:

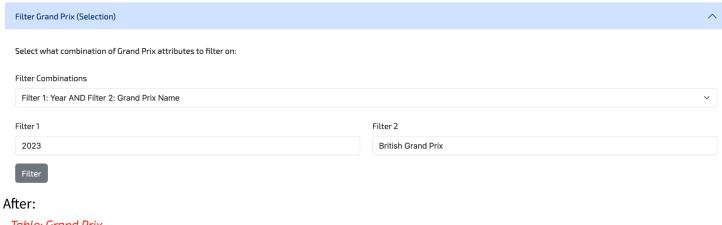


Table: Grand Prix

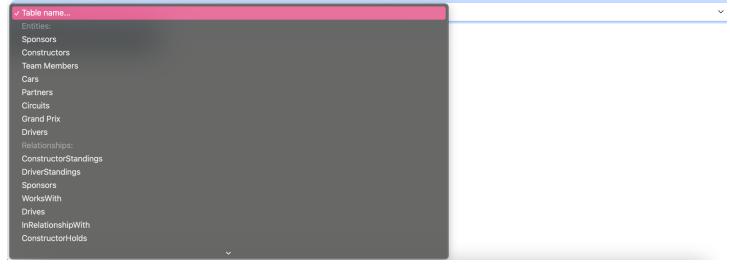
CIRCUITNAME	CITY	YEAR	VIEWERSHIP	COUNTRY	ATTENDANCE
Silverstone Circuit	Towcester	2023	2350000	England	480000

Projection:

Before:

Explore the Database

Select a table to view:



During:

Explore the Database

Select a table to view: DriverStandings Select which attributes to view: ✓ POINTS GPNAME YEAR ✓ QUALIFYINGPOSITION RACEPOSITION

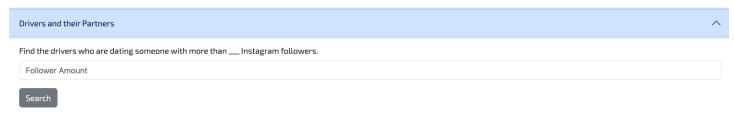
After:

Table: DRIVERSTANDING

POINTS	YEAR	QUALIFYINGPOSITION
25	2023	1
12	2023	3
18	2023	2
12	2023	3
15	2023	6
25	2023	1
0	2023	20
15	2023	4
12	2023	6

Join:

Before:



After:

With Follower Amount = 1000:

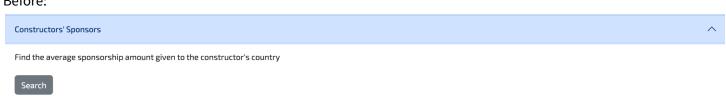
Table: Driver

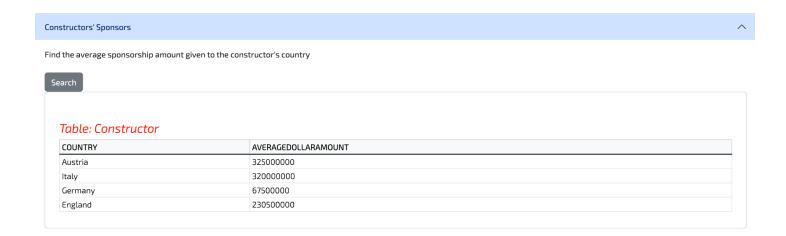
INSTAGRAMFOLLOWERS	FIRSTNAME	LASTNAME	PARTNERNAME
309000	George	Russell	Carmen Montero Mundt
688000	Alex	Albon	Lily Muni He
537000	Pierre	Gasly	Kika Gomes
195000	Valtteri	Bottas	Tiffany Cromwell
1300000	Max	Verstappen	Kelly Piquet

Aggregation with Group By:

Before:

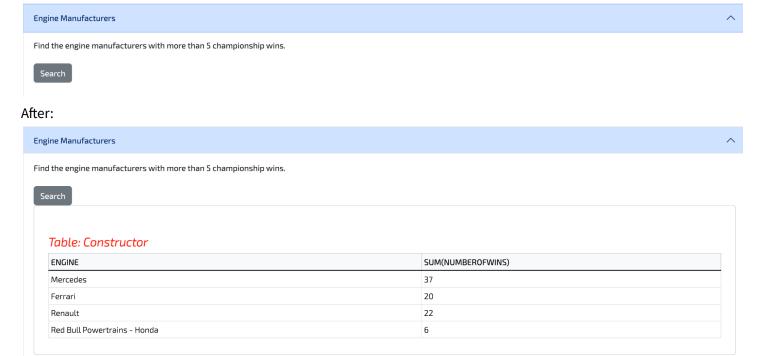
After:





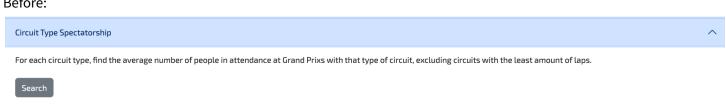
Aggregation with Having:

Before:



Nested Aggregation with Group By:

Before:



After:

Table: Grand Prix

TYPE	AVERAGEATTENDANCE
street	302866.6666666666666666666666666666
race	36000

Division:

