

Formula 1 Database

Group 73 – SQL ULTRALites

Kishan Patel(kpatel39)

Geethika Bedadhala(gbedadha)

Problem statement:

To design relational database management system related to Formula1. The system should allow for efficient querying and analysis of data to generate insights and statistics related to F1 races. The overall goal of the database is to provide a comprehensive and accurate representation of F1 race data for analysis and decision-making purposes.

Why do you need a database instead of an excel file?

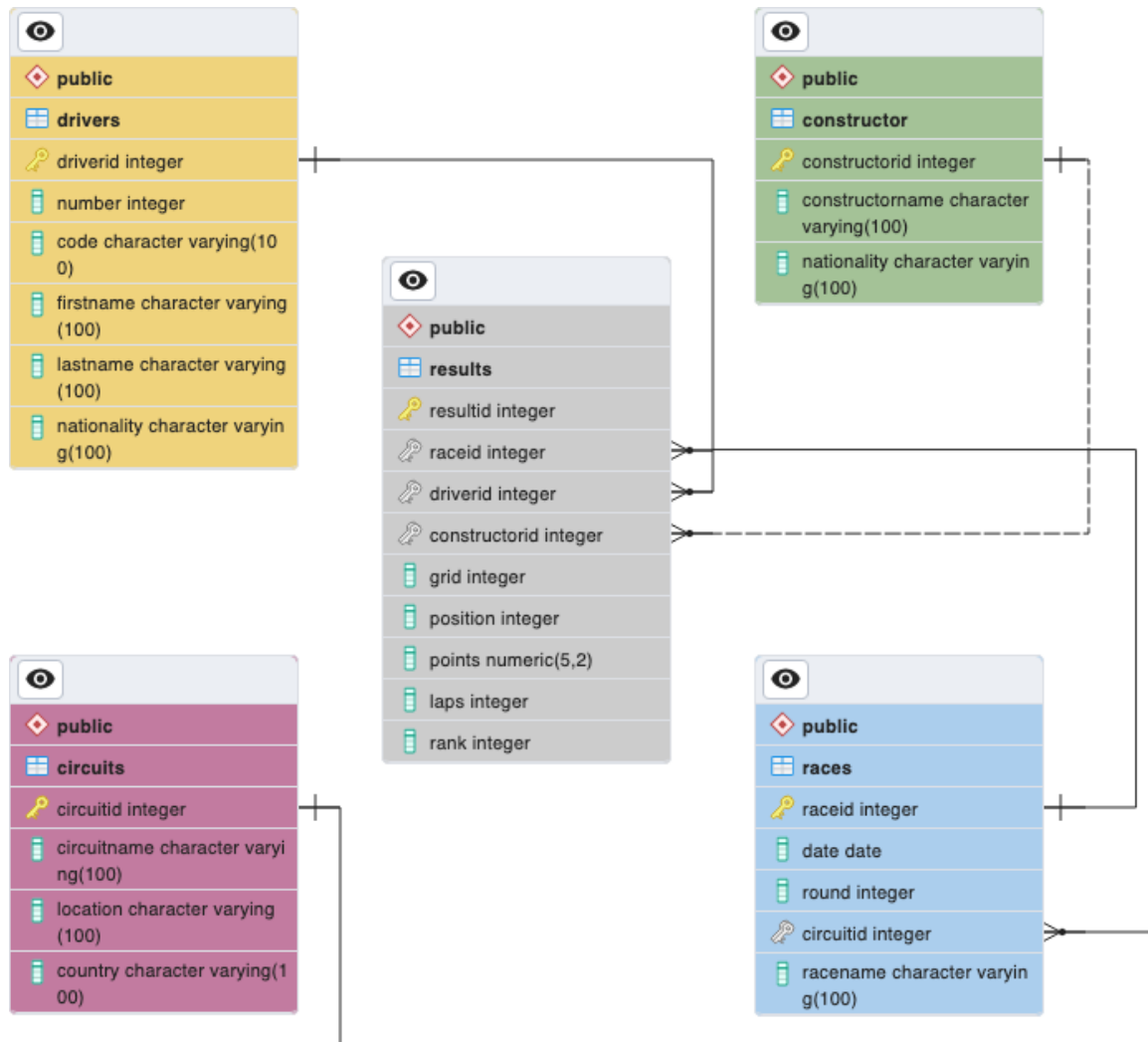
Formula 1 data has large amount of data (more than 1000 - 25000 rows) and multiple excel sheets which are interrelated and excel might be slow and difficult to manage and database can handle large volumes efficiently. Not only that database can provide robust security features than excel and multiple people can access and update the data at the same time easily. Moreover, we can also do effective querying in database than Excel using SQL.

Target Users:

The target users of this database system would include F1 fans, race organizers, and media companies. F1 fans can use the database to get information about past and upcoming races, teams, drivers, and circuits. Race organizers can use the database to manage and plan races, track performance metrics, and analyze trends. Media companies can use the database to report on race events, create content, and provide accurate insights to their audiences.

Database Administer: Data Analysts who work for Stake holders.

Database Schema: ER Diagram



Relations:

1. Constructor (ConstructorID, constructorname, nationality)

The above table gives the team details who have participated in Formula 1 from 1950-2023.

Attributes	Description
ConstructorID	Primary key
ConstructorName	Name of the constructor participating in F1
Nationality	Nationality of the constructor

2. Drivers (DriverID, number, code, firstname, lastname, nationality)

The above table gives information of the drivers who have participated in Formula 1 between 1950-2023.

Attributes	Description
DriverID	Primary Key
Number	Driver personal car number
Code	Driver name code
FirstName	Driver first name
LastName	Driver last name
Nationality	Driver nationality

3. Races (raceID, date, round, circuitID, racename)

The above table contains all the race details that have been hosted between 1950-2023.

Attributes	Description
RaceID	Primary key
Date	Date of the grand prix race
Round	Round/Race of Formula 1 season
CircuitID	Foreign key from Circuits table
RaceName	Grand Prix name

4. Circuits (circuitID, circuitname, location, country)

The above table contains the track details where all the races are hosted.

Attributes	Description
CircuitID	Primary key
CircuitName	Name of the circuit
Location	Location where circuit is located
Country	Country where the circuit is located

- Results (resultID, raceID, driverID, constructorID, grid, position, points, laps, rank)
The above table contains the results of all the races hosted between 1950-2023 with every detail possible and is connected to all the tables through foreign keys.

Attributes	Description
ResultID	Primary Key
RaceID	Foreign key from Races table
DriverID	Foreign key from Drivers table
ConstructorID	Foreign key from Constructors table
Grid	Grid position the driver started the race in
Position	Position of the driver after the race
Points	Points awarded to the driver according to the position he finished
Laps	Laps finished by the driver after the race
Rank	Rank of the driver in the respective season

4. SQL queries

Query
Query History

```

1  -- Drivers with highest number of race wins.
2
3  SELECT drivers.firstname, drivers.lastname, drivers.nationality, COUNT(*) as RaceWins
4  FROM results
5  INNER JOIN drivers on results.driverid = drivers.driverid
6  WHERE results.position = 1
7  GROUP BY drivers.driverid
8  ORDER BY COUNT(*) DESC
9  LIMIT 10;

```

Data Output
Messages
Notifications

	firstname character varying (100)	lastname character varying (100)	nationality character varying (100)	racewins bigint
1	Lewis	Hamilton	British	103
2	Michael	Schumacher	German	91
3	Sebastian	Vettel	German	53
4	Alain	Prost	French	51
5	Ayrton	Senna	Brazilian	41
6	Max	Verstappen	Dutch	35
7	Fernando	Alonso	Spanish	32
8	Nigel	Mansell	British	31
9	Jackie	Stewart	British	27
10	Jim	Clark	British	25

Query		Query History	
1	-- Drivers with race wins.		
2			
3	SELECT drivers.firstname, drivers.lastname, drivers.nationality		
4	FROM drivers		
5	WHERE drivers.driverid in (SELECT drivers.driverid		
6	FROM results		
7	INNER JOIN drivers on results.driverid = drivers.driverid		
8	WHERE results.position = 1);		
Data Output			
Messages			
Notifications			
	firstname character varying (100)	lastname character varying (100)	nationality character varying (100)
1	Lewis	Hamilton	British
2	Nico	Rosberg	German
3	Fernando	Alonso	Spanish
4	Heikki	Kovalainen	Finnish
5	Kimi	Räikkönen	Finnish
6	Robert	Kubica	Polish
7	Felipe	Massa	Brazilian
8	David	Coulthard	British
9	Jarno	Trulli	Italian
10	Mark	Webber	Australian
11	Jenson	Button	British
12	Sebastian	Vettel	German
13	Giancarlo	Fisichella	Italian
14	Rubens	Barrichello	Brazilian
15	Ralf	Schumacher	German
16	Michael	Schumacher	German
17	Juan	Pablo Montoya	Colombian
18	Jacques	Villeneuve	Canadian
19	Olivier	Panis	French
20	Heinz-Harald	Frentzen	German
21	Jean	Alesi	French
22	Eddie	Irvine	British
23	Mika	Häkkinen	Finnish
24	Johnny	Herbert	British
25	Damon	Hill	British
26	Gerhard	Berger	Austrian
Total rows: 113 of 113		Query complete 00:00:00.106	

Query		Query History
1	-- Constructors with race wins.	
2	SELECT constructor.constructorname as Constructor, constructor.Nationality	
3	FROM constructor	
4	WHERE constructor.constructorid in (SELECT constructor.constructorid	
5	FROM results	
6	INNER JOIN constructor on results.constructorid = constructor.constructorid	
7	WHERE results.position = 1);	
Data Output		Messages
		Notifications
	constructor character varying (100)	nationality character varying (100)
1	McLaren	British
2	BMW Sauber	German
3	Williams	British
4	Renault	French
5	Toro Rosso	Italian
6	Ferrari	Italian
7	Red Bull	Austrian
8	Honda	Japanese
9	Jordan	Irish
10	Benetton	Italian
11	Brawn	British
12	Stewart	British
13	Tyrrell	British
14	Ligier	French
15	Team Lotus	British
16	Brabham	British
17	March	British
18	Alfa Romeo	Swiss
19	Shadow	British
20	Wolf	Canadian
21	Hesketh	British
22	BRM	British
23	Penske	American
24	Cooper	British
25	Porsche	German
26	Maserati	Italian
27	Watson	American
Total rows: 47 of 47		Query complete 00:00:00.057

Query

Query History

```
1  -- Fernando Alonso's race wins.
2  SELECT races.racename, circuits.circuitname, races.date, results.grid as StartPosition, constructor.constructorname
3  FROM results
4  INNER JOIN drivers on results.driverid = drivers.driverid
5  INNER JOIN constructor on results.constructorid = constructor.constructorid
6  INNER JOIN races on results.raceid = races.raceid
7  INNER JOIN circuits on races.circuitid = circuits.circuitid
8  WHERE results.position = 1 and drivers.firstname = 'Fernando' and drivers.lastname = 'Alonso'
9  ORDER BY races.date;
```

Data Output

Messages

Notifications

	racename character varying (100)	circuitname character varying (100)	date date	startposition integer	constructorname character varying (100)
1	Hungarian Grand Prix	Hungaroring	2003-08-24	1	Renault
2	Malaysian Grand Prix	Sepang International Circuit	2005-03-20	1	Renault
3	Bahrain Grand Prix	Bahrain International Circuit	2005-04-03	1	Renault
4	San Marino Grand Prix	Autodromo Enzo e Dino Ferrari	2005-04-24	2	Renault
5	European Grand Prix	Nürburgring	2005-05-29	6	Renault
6	French Grand Prix	Circuit de Nevers Magny-Cours	2005-07-03	1	Renault
7	German Grand Prix	Hockenheimring	2005-07-24	3	Renault
8	Chinese Grand Prix	Shanghai International Circuit	2005-10-16	1	Renault
9	Bahrain Grand Prix	Bahrain International Circuit	2006-03-12	4	Renault
10	Australian Grand Prix	Albert Park Grand Prix Circuit	2006-04-02	3	Renault
11	Spanish Grand Prix	Circuit de Barcelona-Catalunya	2006-05-14	1	Renault
12	Monaco Grand Prix	Circuit de Monaco	2006-05-28	1	Renault
13	British Grand Prix	Silverstone Circuit	2006-06-11	1	Renault
14	Canadian Grand Prix	Circuit Gilles Villeneuve	2006-06-25	1	Renault
15	Japanese Grand Prix	Suzuka Circuit	2006-10-08	5	Renault
16	Malaysian Grand Prix	Sepang International Circuit	2007-04-08	2	McLaren
17	Monaco Grand Prix	Circuit de Monaco	2007-05-27	1	McLaren
18	European Grand Prix	Nürburgring	2007-07-22	2	McLaren
19	Italian Grand Prix	Autodromo Nazionale di Mon...	2007-09-09	1	McLaren
20	Singapore Grand Prix	Marina Bay Street Circuit	2008-09-28	15	Renault
21	Japanese Grand Prix	Fuji Speedway	2008-10-12	4	Renault
22	Bahrain Grand Prix	Bahrain International Circuit	2010-03-14	3	Ferrari
23	German Grand Prix	Hockenheimring	2010-07-25	2	Ferrari
24	Italian Grand Prix	Autodromo Nazionale di Mon...	2010-09-12	1	Ferrari
25	Singapore Grand Prix	Marina Bay Street Circuit	2010-09-26	1	Ferrari
26	Korean Grand Prix	Korean International Circuit	2010-10-24	3	Ferrari

Total rows: 32 of 32

Query complete 00:00:00.053