Formula 1 Data Analysis Presentation

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Introduction

- This presentation explores key insights from the Formula 1 dataset.

- Covers data from 1950 to 2024.

- Focuses on drivers, constructors, circuits, and race performance.

- Each slide answers a business question using SQL queries.

All this information is based on the data in the document, it may not be 100% updated

Data Cleaning and Assumptions

- Removed null values from key fields to ensure data integrity.

- Standardized column names for uniformity.

- Loaded data into MySQL tables for efficient querying and analysis.

- Assumed 'position = 1' indicates a race win in the results table.

- Ensured foreign key relationships between tables were intact.

Top 10 Drivers with the Most Race Wins

```sql
1   SELECT d.forename, d.surname, COUNT(*) AS total_wins
2   FROM results r
3   JOIN drivers d ON r.driverId = d.driverId
4   WHERE r.position = 1
5   GROUP BY d.driverId, d.forename, d.surname
6   ORDER BY total_wins DESC
7   LIMIT 10;
8
```

forename	surname	total_wins
Lewis	Hamilton	104
Sebastian	Vettel	53
Fernando	Alonso	31
Nico	Rosberg	23
Michael	Schumacher	21
Kimi	RÃ¤ikkÃ¶nen	20
Jenson	Button	15
Felipe	Massa	11
Mark	Webber	9
Juan	Pablo Montoya	4

Constructor with the Most Race Wins

```sql
1 •    SELECT c.name AS constructor_name, COUNT(*) AS total_wins
2      FROM results r
3      JOIN constructors c ON r.constructorId = c.constructorId
4      WHERE r.position = 1
5      GROUP BY r.constructorId, c.name
6      ORDER BY total_wins DESC
7      LIMIT 10;
8
```

constructor_name	total_wins
Red Bull	119
Mercedes	118
Ferrari	77
McLaren	47
Renault	19
Brawn	8
Williams	2
Lotus F1	2
BMW Sauber	1
Toro Rosso	1

Top 5 Circuits with the Most Races

```sql
1   SELECT ci.name AS circuit_name, COUNT(*) AS race_count
2   FROM races r
3   JOIN circuits ci ON r.circuitId = ci.circuitId
4   GROUP BY r.circuitId, ci.name
5   ORDER BY race_count DESC
6   LIMIT 5;
7
```

circuit_name	race_count
Autodromo Nazionale di Monza	74
Circuit de Monaco	70
Silverstone Circuit	59
Circuit de Spa-Francorchamps	57
Circuit Gilles Villeneuve	43

Number of Races Per Year Over Time

```sql
1 ●    SELECT year, COUNT(*) AS total_races
2      FROM races
3      GROUP BY year
4      ORDER BY year ASC;
5
```

year	total_races
1950	7
1951	8
1952	8
1953	9
1954	9
1955	7
1956	8
1957	8
1958	11
1959	9
1960	10
1961	8
1962	9
1963	10
1964	10
1965	10
1966	9

year	total_races
1967	11
1968	12
1969	11
1970	13
1971	11
1972	12
1973	15
1974	15
1975	14
1976	16
1977	17
1978	16
1979	15
1980	14
1981	15
1982	16
1983	15

year	total_races
1984	16
1985	16
1986	16
1987	16
1988	16
1989	16
1990	16
1991	16
1992	16
1993	16
1994	16
1995	17
1996	16
1997	17
1998	16
1999	16
2000	17

year	total_races
2001	17
2002	17
2003	16
2004	18
2005	19
2006	18
2007	17
2008	18
2009	17
2010	19
2011	19
2012	20
2013	19
2014	19
2015	19
2016	21
2017	20

year	total_races
2018	21
2019	21
2020	17
2021	22
2022	22
2023	22
2024	24

Youngest Drivers to Win a Race

```sql
1 •    SELECT d.forename, d.surname, r.year, (YEAR(r.date) - YEAR(d.dob)) AS age_at_win
2      FROM results re
3      JOIN drivers d ON re.driverId = d.driverId
4      JOIN races r ON re.raceId = r.raceId
5      WHERE re.position = 1
6      ORDER BY age_at_win ASC
7      LIMIT 5;
8
```

forename	surname	year	age_at_win
Sebastian	Vettel	2008	21
Lewis	Hamilton	2007	22
Sebastian	Vettel	2009	22
Lewis	Hamilton	2007	22
Sebastian	Vettel	2009	22

Fastest Lap Times in Sprint Races

```sql
1 •    SELECT d.forename, d.surname, c.name AS constructor_name, sr.fastestLapTime
2      FROM sprint_results sr
3      JOIN drivers d ON sr.driverId = d.driverId
4      JOIN constructors c ON sr.constructorId = c.constructorId
5      WHERE sr.fastestLapTime IS NOT NULL
6      ORDER BY sr.fastestLapTime ASC
7      LIMIT 10;
8
```

forename	surname	constructor_name	fastestLapTime
Lewis	Hamilton	Mercedes	1:09.265
Lewis	Hamilton	Mercedes	1:09.516
Fernando	Alonso	Aston Martin	1:10.393
Lewis	Hamilton	Mercedes	1:10.775
Lewis	Hamilton	Mercedes	1:12.357
Fernando	Alonso	Alpine F1 Team	1:13.397
Sebastian	Vettel	Aston Martin	1:13.558
Kimi	RÃ¤ikkÃ¶nen	Alfa Romeo	1:13.900
Lewis	Hamilton	Mercedes	1:14.317
Fernando	Alonso	Alpine F1 Team	1:14.764

Driver with the Most Race Participations

```sql
1 ●    SELECT d.forename, d.surname, COUNT(DISTINCT r.raceId) AS total_races
2      FROM results r
3      JOIN drivers d ON r.driverId = d.driverId
4      GROUP BY r.driverId, d.forename, d.surname
5      ORDER BY total_races DESC
6      LIMIT 1;
7
```

	forename	surname	total_races
▶	Lewis	Hamilton	299

Constructors with the Most Championship Wins

```sql
SELECT c.name AS constructor_name, COUNT(*) AS total_championships
FROM constructor_standings cs
JOIN constructors c ON cs.constructorId = c.constructorId
WHERE cs.position = 1
GROUP BY cs.constructorId, c.name
ORDER BY total_championships DESC
LIMIT 10;
```

constructor_name	total_championships
Ferrari	234
McLaren	165
Mercedes	145
Red Bull	120
Williams	114
Renault	46
Team Lotus	44
Benetton	29
Lotus-Climax	23
Cooper-Climax	20

Average Number of Laps Completed Per Race Across Circuits

```sql
1  ● SELECT ci.name AS circuit_name, AVG(re.laps) AS avg_laps
2    FROM results re
3    JOIN races r ON re.raceId = r.raceId
4    JOIN circuits ci ON r.circuitId = ci.circuitId
5    GROUP BY ci.circuitId, ci.name
6    ORDER BY avg_laps DESC;
7
```

circuit_name	avg_laps
Circuit de Monaco	76.7384
Indianapolis Motor Speedway	73.0000
Circuit Park Zandvoort	72.0000
Autódromo Hermanos Rodríguez	71.0000
Red Bull Ring	71.0000
Autódromo José Carlos Pace	71.0000
Circuit de Nevers Magny-Cours	70.0000
Circuit Gilles Villeneuve	69.9264
Hungaroring	69.8261
Fuji Speedway	67.0000
Hockenheimring	66.5234
Autódromo Internacional do Algarve	66.0000
Circuit de Barcelona-Catalunya	65.9557
Autodromo Enzo e Dino Ferrari	62.6216
Marina Bay Street Circuit	60.4828
Buddh International Circuit	60.0000
Nürburgring	59.8824
Autodromo Internazionale del Mugello	59.0000
Bahrain International Circuit	58.7174

circuit_name	avg_laps
Istanbul Park	58.0000
Albert Park Grand Prix Circuit	57.7288
Valencia Street Circuit	57.0000
Losail International Circuit	57.0000
Miami International Autodrome	57.0000
Circuit of the Americas	56.0000
Shanghai International Circuit	55.9126
Yas Marina Circuit	55.6648
Korean International Circuit	55.0000
Sepang International Circuit	54.1407
Silverstone Circuit	53.5296
Circuit Paul Ricard	53.0000
Sochi Autodrom	52.8987
Autodromo Nazionale di Monza	52.8596
Baku City Circuit	51.0000
Suzuka Circuit	50.1489
Jeddah Corniche Circuit	50.0000
Las Vegas Strip Street Circuit	50.0000
Circuit de Spa-Francorchamps	43.9522

Drivers with the Most Pole Positions

```sql
SELECT d.forename, d.surname, COUNT(*) AS pole_positions
FROM qualifying q
JOIN drivers d ON q.driverId = d.driverId
WHERE q.position = 1
GROUP BY q.driverId, d.forename, d.surname
ORDER BY pole_positions DESC
LIMIT 10;
```

forename	surname	pole_positions
Lewis	Hamilton	107
Sebastian	Vettel	57
Michael	Schumacher	36
Nico	Rosberg	30
Fernando	Alonso	23
Kimi	RÃ¤ikkÃ¶nen	19
Felipe	Massa	16
Damon	Hill	13
Mark	Webber	12
Rubens	Barrichello	10