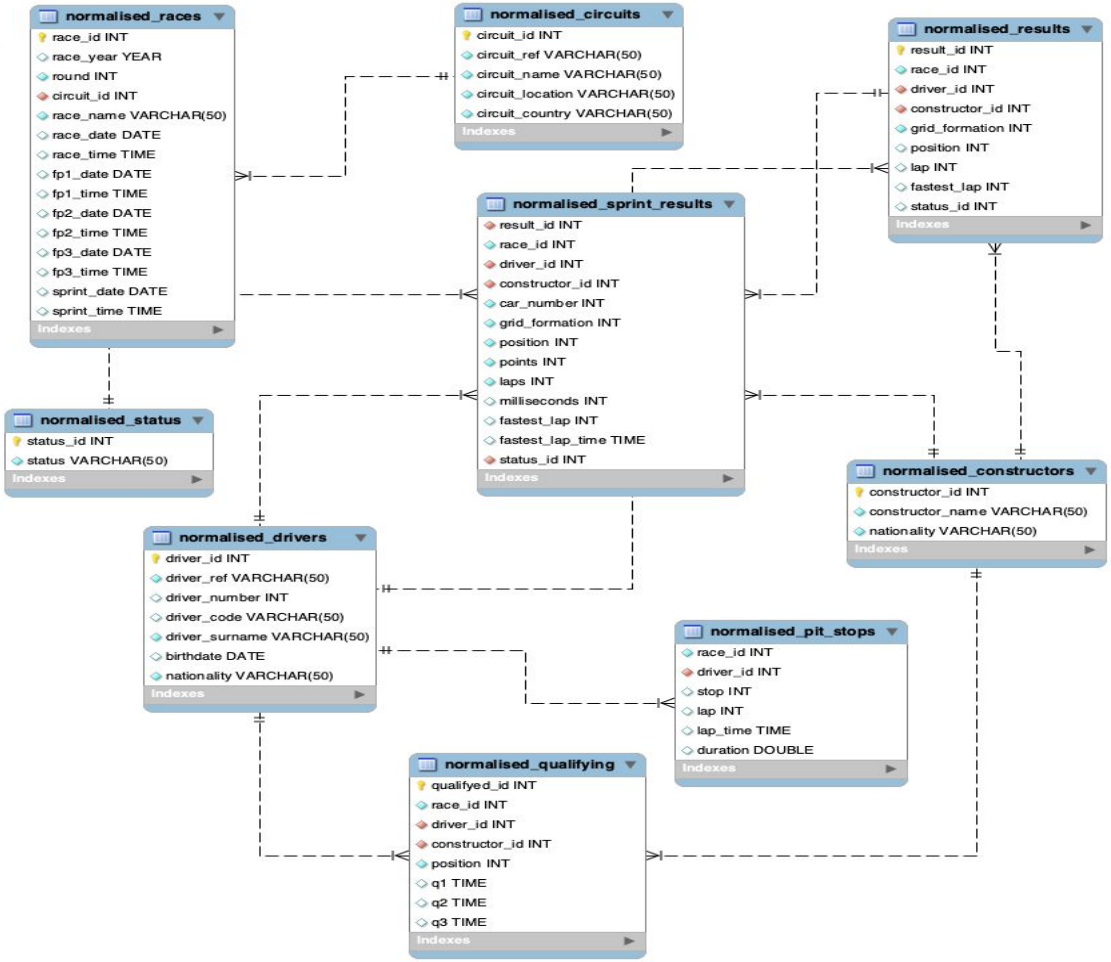
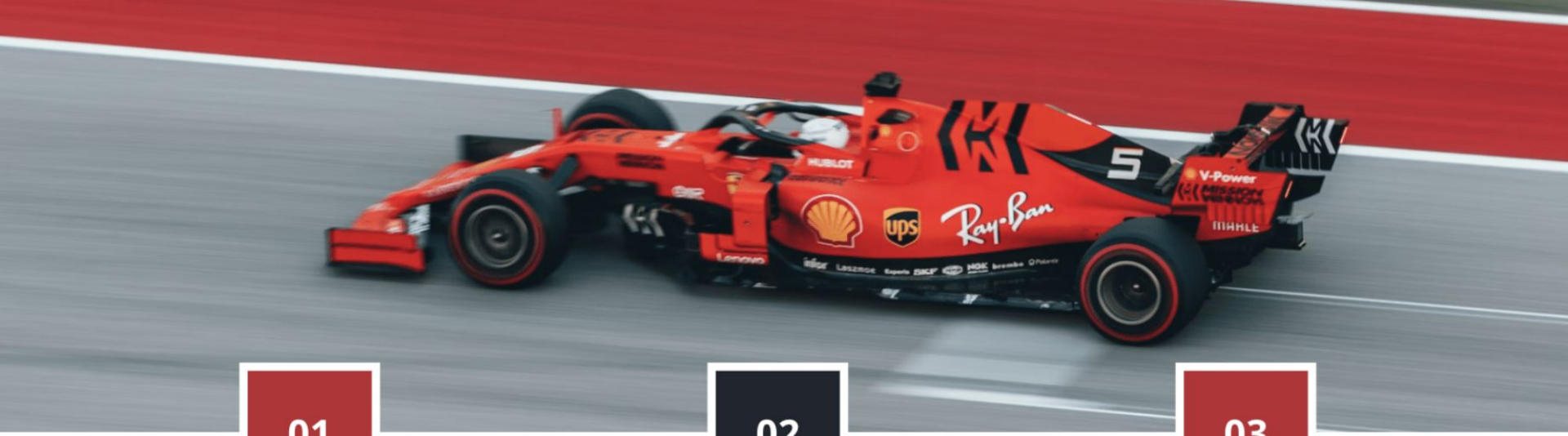
F1 SQL MOOC

TEAM WHITE

Normalisation of datasets, PK and FK





01

F1 BACKGROUND

- Country that hosted F1 races
- Circuit that hosted races and which countries joined them

02

ABOUT THE RACER

- Avg/max/min time difference between the 1st, 2nd and 3rd drivers
- Most constructor wins
- Driver that has won most races and the respective constructor
- Fastest stop in history

.... And the curse of number 13

03

INVESTIGATE RELATIONSHIPS

- Compare nationality of the champion and host country
- F1 top speed record, its correlated circuit and constructor
- Avg/sum/count of pole position and winners
- Correlation between duration of pit stops and time to reach and line
- Avg. pit stop duration by constructor and circuit

01 F1 BACKGROUND

Country that hosted F1 races

```
SELECT circuit_country
FROM normalised_circuits;
```

```
circuit_country
Australia
Malaysia
Bahrain
Spain
Turkey
Monaco
Canada
France
UK
Germany
Hungary
Spain
Belgium
Italy
Singapore
Japan
```

Circuits that hosted races and countries that joined

```
SELECT circuit_ref, circuit_country
FROM normalised_circuits;
```

```
circuit_ref,circuit_country
albert_park,Australia
sepang,Malaysia
bahrain,Bahrain
catalunya,Spain
istanbul,Turkey
monaco,Monaco
villeneuve,Canada
magny_cours,France
silverstone,UK
hockenheimring,Germany
hungaroring,Hungary
valencia,Spain
spa,Belgium
monza,Italy
marina_bay,Singapore
```

Fastest driver amongst first 3 positions

```
SELECT driver_id, position,
MIN(milliseconds) AS difference
FROM normalised_sprint_results
WHERE position BETWEEN 1 and 3
GROUP BY driver_id, position
ORDER BY MIN(milliseconds) ASC;
```

```
driver_id,position,difference
830,1,1538426
1,2,1539856
```

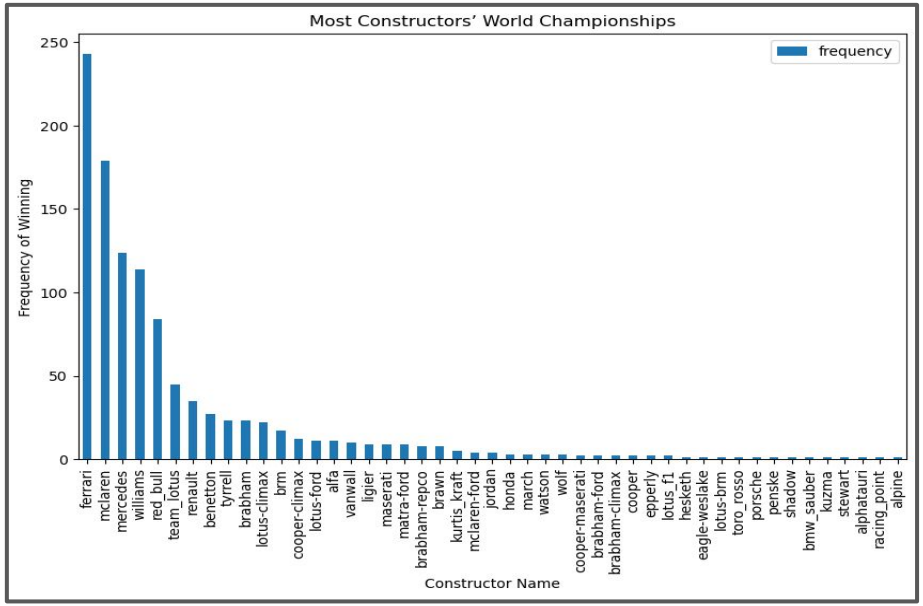
Slowest driver amongst first 3 positions

```
SELECT driver_id, position,
MAX(milliseconds) AS difference
FROM normalised_sprint_results
WHERE position BETWEEN 1 and 3
GROUP BY driver_id, position
ORDER BY MAX(milliseconds) DESC;
```

```
driver_id,position,difference
815,3,1844288
844,2,1842542
```

Constructor that has won the most races

```
SELECT c.constructor_id, c.constructor_name
FROM normalised_constructors AS c
INNER JOIN(SELECT constructor_id,
COUNT(constructor_id)FROM normalised_results
WHERE position = 1 GROUP BY constructor_id ORDER
BY COUNT(constructor_id) DESC LIMIT 1) AS v
ON c.constructor_id = v.constructor_id;
```



02 ABOUT THE RACER

Driver that has won the most races and respective constructor

```
SELECT d.driver_surname, c.constructor_name,
r.race_year
FROM normalised_sprint_results AS sr
LEFT JOIN normalised_drivers AS d on sr.driver_id
= d.driver_id
LEFT JOIN normalised_constructors AS c on
sr.constructor_id = c.constructor_id
LEFT JOIN normalised_races AS r on sr.race_id =
r.race_id
WHERE sr.position = 1
ORDER BY r.race_year;
```

driver_surname	constructor_name	race_year
Verstappen	red_bull	2021
Bottas	mercedes	2021
Bottas	mercedes	2021
Verstappen	red_bull	2022
Verstappen	red_bull	2022

Fastest pit stop ever

```
SELECT d.driver_surname, ps.duration, r.race_id,
r.race_date, r.round, r.race_name
FROM normalised_pit_stops ps
LEFT JOIN normalised_drivers d ON ps.driver_id =
d.driver_id
LEFT JOIN normalised_races r ON ps.race_id =
r.race_id
WHERE ps.duration = (SELECT MIN(duration) FROM
normalised_pit_stops);
```

driver_surname	duration	race_id	race_date	round	race_name
Maldonado	12.897	858	2011-11-13	18	Abu Dhabi Grand Prix

03 INVESTIGATE RELATIONSHIPS

Compare the nationality of the 1st racers and the hosting country

```
SELECT d.nationality, r.race_name, r.race_id
FROM normalised_sprint_results AS sr
LEFT JOIN normalised_drivers AS d
ON sr.driver_id = d.driver_id
LEFT JOIN normalised_races AS r ON sr.race_id =
r.race_id
WHERE sr.position =1
ORDER BY d.driver_surname;
```

nationality	race_name	race_id
Finnish	Italian Grand Prix	1065
Finnish	Sao Paulo Grand Prix	1071
Dutch	British Grand Prix	1061
Dutch	Emilia Romagna Grand Prix	1077
Dutch	Austrian Grand Prix	1084

F1 top fastest lap, its correlated circuit and its constructor

```
SELECT ns.fastest_lap_time, ns.milliseconds,
c.circuit_name, co.constructor_name, ns.driver_id
FROM normalised_sprint_results AS ns
INNER JOIN normalised_circuits AS c
      ON ns.driver_id = c.circuit_id
LEFT JOIN normalised_constructors AS co
      USING (constructor_id)
WHERE ns.fastest_lap_time IS NOT NULL
      AND ns.milliseconds IS NOT NULL
ORDER BY ns.fastest_lap_time LIMIT 1;
```

fastest_lap_time	milliseconds	circuit_name	constructor_name	driver_id
01:09:01	1625506	Albert Park Grand Prix Circuit	mercedes	1

03 INVESTIGATE RELATIONSHIPS

The avg of the pole position (q1, q2, q3) and the winners

```
SELECT sec_to_time(AVG(TIME_TO_SEC(q1))) AS average_q1,
sec_to_time(STD(TIME_TO_SEC(q1))) AS std_q1,
sec_to_time(AVG(TIME_TO_SEC(q2))) AS average_q2,
sec_to_time(STD(TIME_TO_SEC(q2))) AS std_q2,
sec_to_time(AVG(TIME_TO_SEC(q3))) AS average_q3,
sec_to_time(STD(TIME_TO_SEC(q3))) AS std_q3
FROM normalised_qualifying;
```

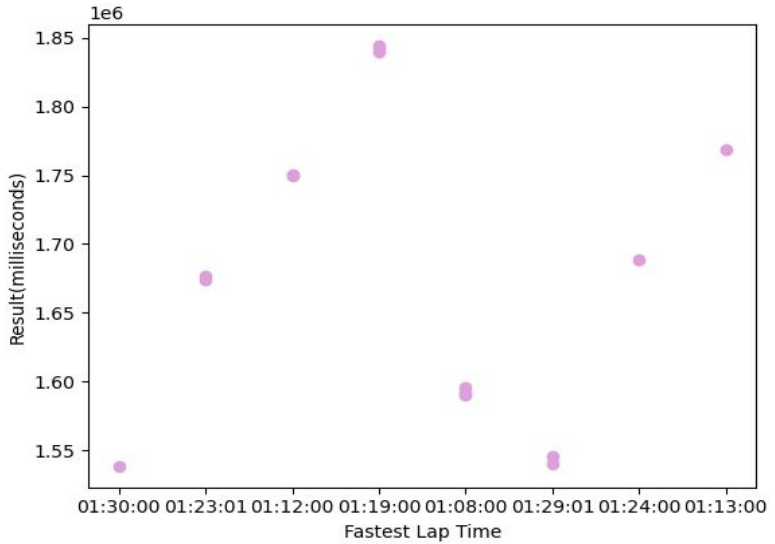
average_q1	std_q1	average_q2	std_q2	average_q3	std_q3
01:28:14.7588	00:15:55.999012	01:25:08.3090	00:18:59.345005	01:25:08.3090	00:18:59.345005

```
--Find the average and the std of the winners' pole positions — -
SELECT sec_to_time(AVG(TIME_TO_SEC(q1))) AS average_q1,
sec_to_time(STD(TIME_TO_SEC(q1))) AS std_q1,
sec_to_time(AVG(TIME_TO_SEC(q2))) AS average_q2,
sec_to_time(STD(TIME_TO_SEC(q2))) AS std_q2,
sec_to_time(AVG(TIME_TO_SEC(q3))) AS average_q3,
sec_to_time(STD(TIME_TO_SEC(q3))) AS std_q3
FROM normalised_qualifying
WHERE position = 1;
```

average_q1	std_q1	average_q2	std_q2	average_q3	std_q3
01:28:14.7588	00:15:55.999012	01:25:08.3090	00:18:59.345005	01:25:08.3090	00:18:59.345005

Correlation between duration of pit stops and tie to win race/reach the end line

```
SELECT position,laps AS no_laps,
    fastest_lap_time,
    milliseconds AS result_milliseconds,
     driver_id, constructor_id, race_id
FROM normalised_sprint_results
WHERE position BETWEEN 1 AND 3
ORDER BY position ASC;
```



03 INVESTIGATE RELATIONSHIPS

The average pit stop duration by each constructor in each year

```
SELECT ROUND(AVG(duration), 2) AS
avg_pit_stop_duration, c.constructor_name,
races.race_year
FROM normalised_pit_stops AS ps
INNER JOIN normalised_constructors AS c
      ON ps.driver_id = c.constructor_id
LEFT JOIN normalised_races AS races
      ON ps.race_id = races.race_id
GROUP BY  c.constructor_name,races.race_year
ORDER BY c.constructor_name ASC LIMIT 6;
```

avg_pit_stop_duration	constructor_name	race_year
26.86	ags	2011
25.08	ags	2012
23.02	bar	2011
23.91	bar	2013
25.79	bar	2014
24.62	benetton	2011

The average pit stop by circuit

```
SELECT ROUND(AVG(ps.duration),2) AS avg_pit_stop,
c.circuit_id AS circuit_id, c.circuit_name,
c.circuit_location, c.circuit_country, races.race_name
FROM normalised_pit_stops AS ps
INNER JOIN normalised_circuits AS c
      ON ps.driver_id = c.circuit_id
LEFT JOIN normalised_races AS races
      ON ps.driver_id = races.race_id
GROUP BY c.circuit_id, races.circuit_id, c.circuit_name,
c.circuit_location, c.circuit_country, races.race_name
ORDER BY c.circuit_country ASC
LIMIT 3;
```

avg_pit_stop	circuit_id	circuit_name	circuit_location	circuit_country	race_name
23.48	1	Albert Park Grand Prix Circuit	Melbourne	Australia	Australian Grand Prix
23.27	3	Bahrain International Circuit	Sakhir	Bahrain	Chinese Grand Prix
23.72	13	Circuit de Spa-Francorchamps	Spa	Belgium	Italian Grand Prix

03 The curse of number 13*

-- >Does number 13 lost the most races?

```
SELECT *
FROM normalised_sprint_results
WHERE car_number = 13; -- Nobody use car number 13 in
this dataset
```

```
SELECT car_number
FROM normalised_sprint_results
WHERE position = 20;
```

car_number
11
10
9
24
14

***Formula 1** has banned the number **13.** There is also no garage with the number 13 and, previously, when numbers were assigned based on constructors' position in the standings, teams avoided that number.

Why? Because historically, whoever has used 13 in F1 has finished badly. This number records two deaths in a row in 1925 (Paul Torchy) and 1926 (Giulio Masetti).

In recent history, four riders have tried this number and it hasn't gone well: fires, dropouts, failures to qualify for races...

The closest case is that of Pastor Maldonado. The Venezuelan used the 13 in his Lotus during the 2014 and 2015 seasons, and retired from F1 with almost more DNFs/dropouts than points in those two seasons.

-- >Does number 13 have more accidents/disqualify than other racers?

```
SELECT sr.car_number, sr.constructor_id,
sr.driver_id, s.status
FROM normalised_sprint_results sr
RIGHT JOIN normalised_status s
ON sr.status_id = s.status_id
WHERE s.status_id = 2
OR s.status_id = 3
OR s.status_id = 4
OR s.status_id = 73
OR s.status_id = 82;
```

car_number	constructor_id	driver_id	status
NULL	NULL	NULL	Disqualified
10	213	842	Accident
NULL	NULL	NULL	Collision
NULL	NULL	NULL	Injured
NULL	NULL	NULL	Injury