Database Systems I

VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE | DEPARTMENT OF COMPUTER SCIENCE

Project F1 Database

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Project Specification

Motivation

We need an information system for the storage of the results in F1 races. The main purpose of the system will be to keep track of the F1 results and allow to check of different statistics of these results.

Roles

The role with the highest privileges will be the database manager, who will be in charge of designing the database and setting it up. He will also give permission to certain users to be able to add new information and will make sure that it is always operational.

The users of the database will be divided into data managers and users. Data managers will add new registers to the database with the info about a new race, the results of the race after it finishes, or different changes in teams/circuits. Users will be able to check all the data from the database.

Inputs

Firstly, we need to keep track of the drivers. We will record his name, country, and birth date. Each driver would be a part of a team. The teams will record his name, nationality, and foundation year. We also need to keep track of the possible changes in the drivers of a team in different seasons.

We need to know about the different circuits where a race could be realized. We will save the name, location, and laps/distance of the circuits.

For each race, we will record the name (usually the location + Grand Prix), the season, and the date.

Finally, we need to record the positions, times, and fastest lap times of drivers in each race.

All the data stored in the database would be uploaded by the data managers.

Outputs

- Show how many races have been executed in each circuit (Not all races of different seasons are in the same circuits).
- Numbers of DNF(did not finish) per season/all careers of each driver/team.
- Show how the best time has changed in each circuit among seasons.

Functions

The main goal of our system is to keep track of Formula 1, so the most important thing is the classification of the seasons by drivers/teams. That is what we will implement as our main function. Example:

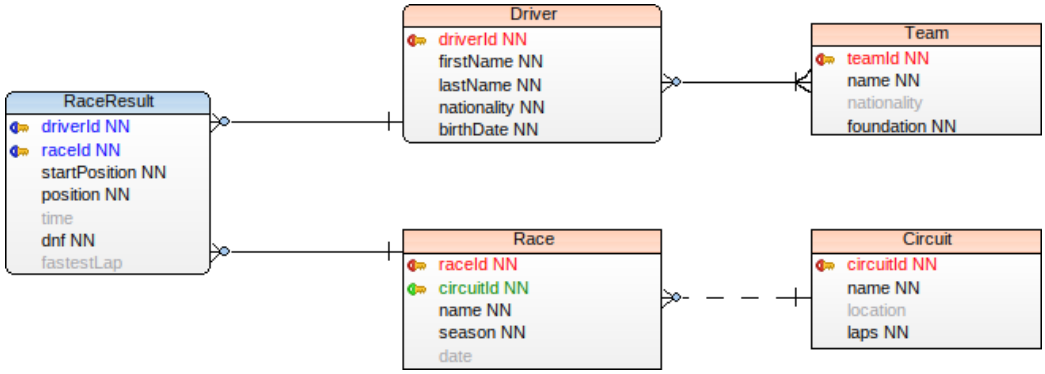
Season 2017

Driver	Points
driver1	447
driver2	304
driver3	280
driver4	244
driver5	221
driver6	187
driver7	122
driver18	101
driver9	70
driver10	51
driver11	29
...	...

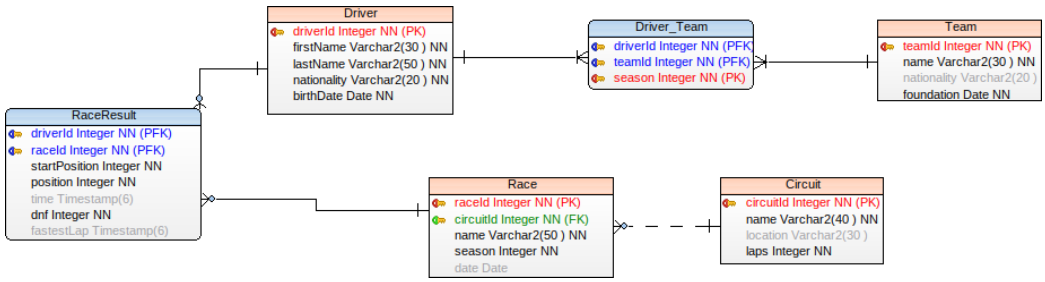
Team	Points
team1	697
team2	458
team3	349
team4	209
team5	175
team6	106
team7	40
team8	27
team9	18
team10	12

Data Analysis

Conceptual Data Model



Relational Data Model



Data Dictionary

The description of individual tables is given in the following data dictionary

Table Driver

Attribute Name	Data type	Length	Key	Null	IR	Description
driverId	INTEGER		Primary	No		Driver identifier
firstName	VARCHAR	30		No		First name of the driver
lastName	VARCHAR	50		No		Last name of the driver
nationality	VARCHAR	20		No		Nationality of the driver
birthdate	DATETIME			No		Birthdate of the driver

Table Team

Attribute Name	Data type	Length	Key	Null	IR	Description
teamId	INTEGER		Primary	No		Team identifier
name	VARCHAR	30		No		Name of the team
nationality	VARCHAR	20				Nationality of the team
foundation	DATETIME			No		Foundation date of the team

Table Driver_Team

Attribute Name	Data type	Length	Key	Null	IR	Description
driverId	INTEGER		Primary, Foreign(Driver)	No		Driver identifier
teamId	VARCHAR	30	Primary, Foreign(Team)	No		Team identifier
season	INTEGER		Primary	No	3	Season where driverId in teamId

Table Circuit

Attribute Name	Data type	Length	Key	Null	IR	Description
circuitId	INTEGER		Primary	No		Circuit identifier
name	VARCHAR	40		No		Name of the circuit
location	VARCHAR	30				Location of the circuits
laps	INTEGER			No	4	Number of laps in a race

Table Race

Attribute Name	Data type	Length	Key	Null	IR	Description
raceId	INTEGER		Primary	No		Race identifier
circuitId	INTEGER		Foreign(Circuit)	No		Circuit identifier where the race is held
name	VARCHAR	50		No		Name of the race
season	INTEGER			No	3	Season of the race
date	DATETIME					Date of the race

Table RaceResult

Attribute Name	Data type	Length	Key	Null	IR	Description
driverId	INTEGER		Primary, Foreign(Driver)	No		Driver identifier
raceId	INTEGER		Primary, Foreign(Race)	No		Race identifier
startPosition	INTEGER			No	2	Start position of the driver
position	INTEGER			No	2	Position of the driver
time	TIME					Time of the driver
dnf	INTEGER			No	1	Indicate if the driver did not finish the race
fastestLap	TIME				5	Time of the best lap

Integrity restrictions

1. RaceResult.dnf must be 0 (finish the race) or 1 (did not finish the race)

2. RaceResult.startPosition and RaceResult.position must be <= 20 and >= 1

3. Race.season and Team_Driver.season should be >= 1950 (first year of the competition) and <= current year

4. Circuit.laps should be >= 1 and <= 100

5. RaceResult.fastestLap should be > 00 : 00