PROJECT PHASE-3

TEAM 27

Kapil Rajesh Kavitha – 2021101028

Harshavardhan P – 2021111003

Sarthak Chittawar – 2021111010

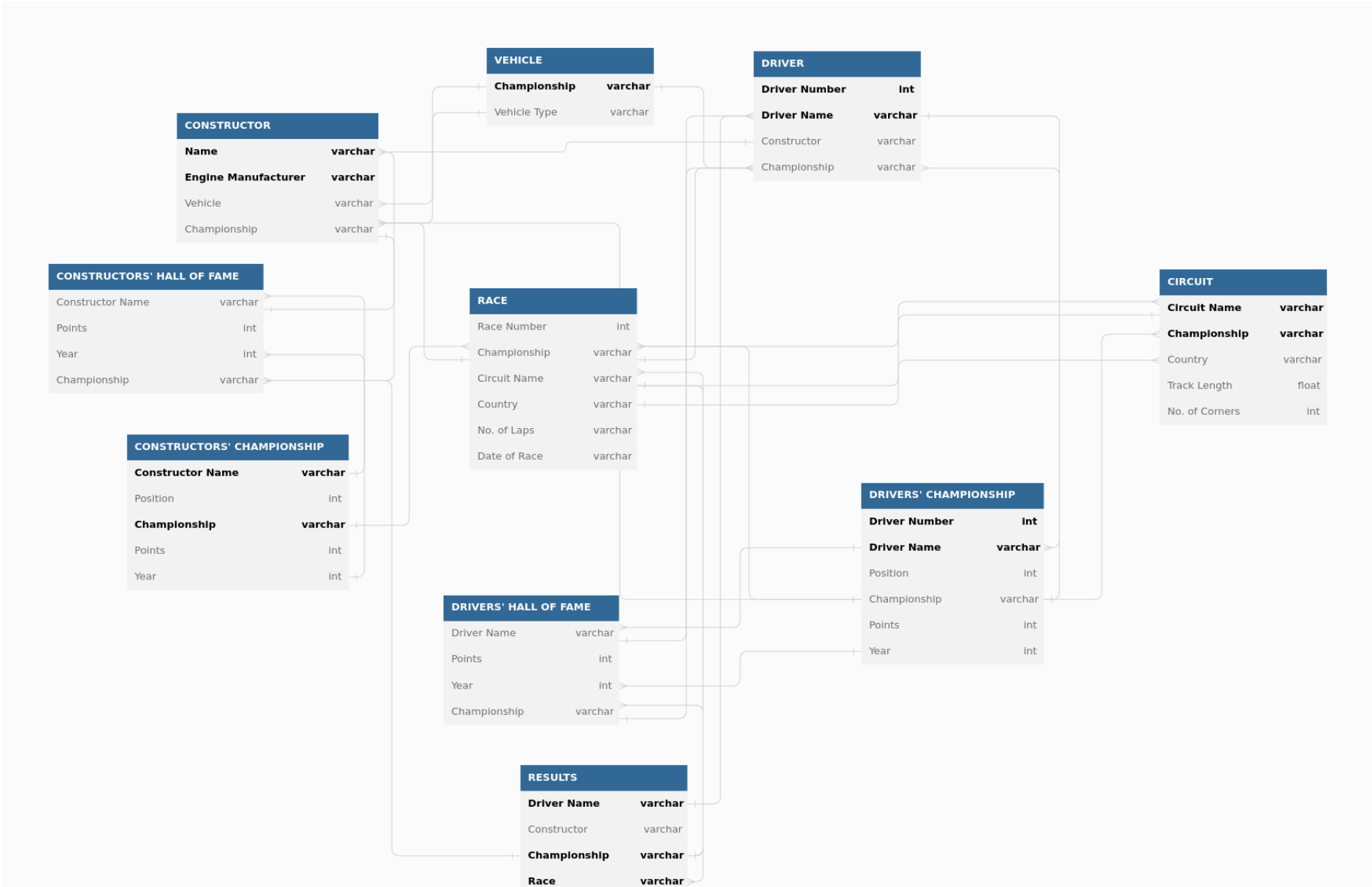
Note: Please refer to the diagram links given as well

Changes made to the model:

- The CHAMPIONSHIP attribute has been added to the “CONSTRUCTOR” and the “DRIVERS’ CHAMPIONSHIP” relation (upon realizing its requirement for these relations)
- “CHAMPIONSHIP” was made the primary key of VEHICLE.

<Relational Model in next page>

Link to Diagram: https://dbdiagram.io/d/636e6fe0c9abfc61117201ab

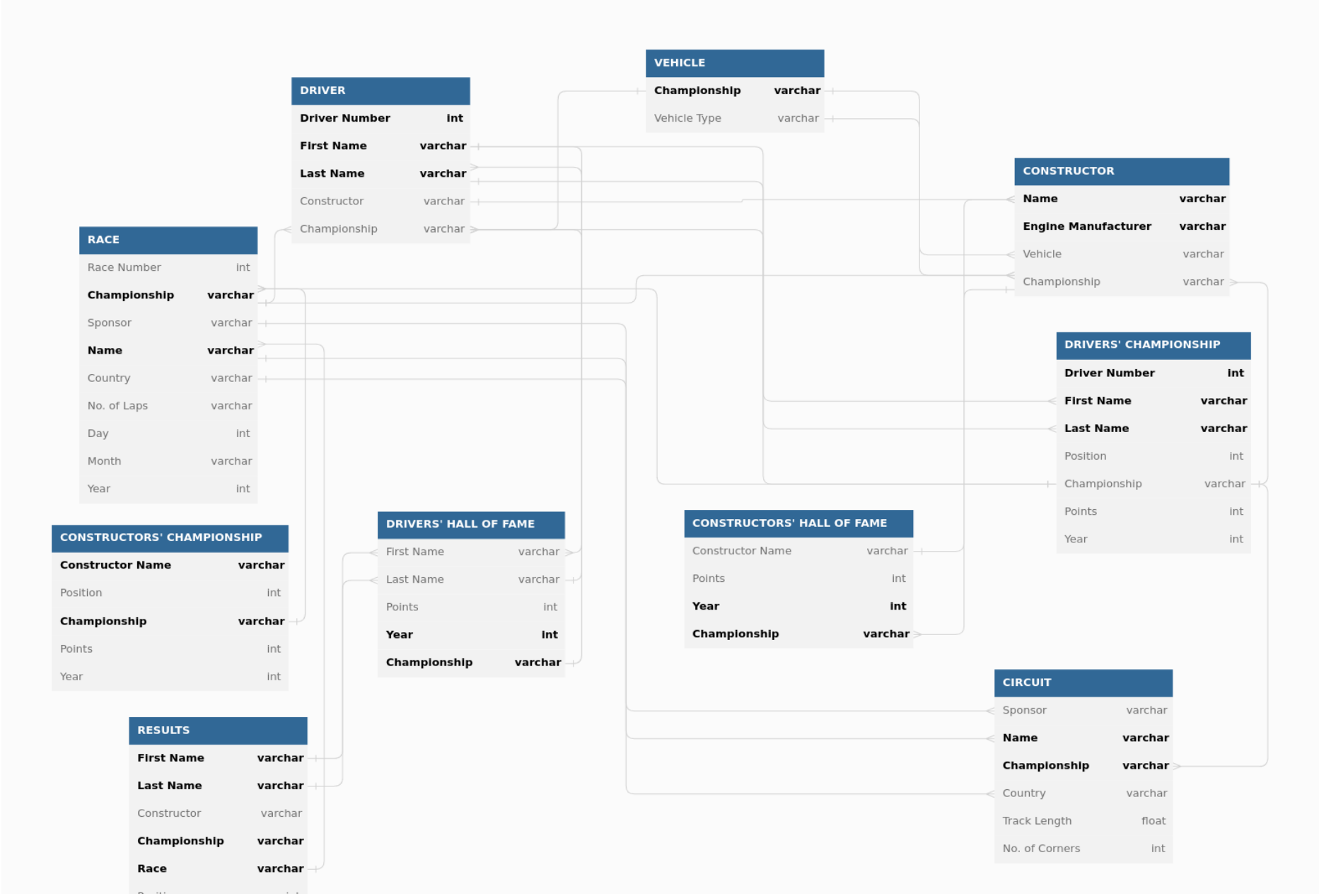

VEHICLE
Championship varchar
Vehicle Type varchar
DRIVER
Driver Number int
Driver Name varchar
Constructor varchar
Championship varchar
CONSTRUCTOR
Name varchar
Engine Manufacturer varchar
Vehicle varchar
Championship varchar
CONSTRUCTORS' HALL OF FAME
Constructor Name varchar
Points int
Year int
Championship varchar
RACE
Race Number int
Championship varchar
Circuit Name varchar
Country varchar
No. of Laps varchar
Date of Race varchar
CIRCUIT
Circuit Name varchar
Championship varchar
Country varchar
Track Length float
No. of Corners int
CONSTRUCTORS' CHAMPIONSHIP
Constructor Name varchar
Position int
Championship varchar
Points int
Year int
DRIVERS' CHAMPIONSHIP
Driver Number int
Driver Name varchar
Position int
Championship varchar
Points int
Year int
DRIVERS' HALL OF FAME
Driver Name varchar
Points int
Year int
Championship varchar
RESULTS
Driver Name varchar
Constructor varchar
Championship varchar
Race varchar

1NF

- Composite attributes were reduced to their lowest atomic attributes. The affected relations were
    - DRIVER: (DRIVER NAME → FIRST NAME, LAST NAME)
    - DRIVER'S CHAMPIONSHIP: (DRIVER NAME → FIRST NAME, LAST NAME)
    - DRIVER'S HALL OF FAME: (DRIVER NAME → FIRST NAME, LAST NAME)
    - RACE:
        - (CIRCUIT NAME → SPONSOR, NAME) => NAME is the new primary key
        - (DATE OF RACE → DAY, MONTH, YEAR)
    - CIRCUIT: (CIRCUIT NAME → SPONSOR, NAME)
    - RESULT: (DRIVER NAME → FIRST NAME, LAST NAME)
- There were 2 instances of multi-valued attributes, in DRIVERS' HALL OF FAME and CONSTRUCTORS' HALL OF FAME. These attributes can be safely converted to single-valued attributes while keeping the rest of the relation schema same. A new tuple with one value for YEAR can be inserted for each value of YEAR in the multi-valued attribute.

<1NF Model in next page>

Link to Diagram: https://dbdiagram.io/d/636e93fac9abfc611172089c


VEHICLE
Championship varchar
Vehicle Type varchar
DRIVER
Driver Number int
First Name varchar
Last Name varchar
Constructor varchar
Championship varchar
CONSTRUCTOR
Name varchar
Engine Manufacturer varchar
Vehicle varchar
Championship varchar
RACE
Race Number int
Championship varchar
Sponsor varchar
Name varchar
Country varchar
No. of Laps varchar
Day int
Month varchar
Year int
DRIVERS' CHAMPIONSHIP
Driver Number int
First Name varchar
Last Name varchar
Position int
Championship varchar
Points int
Year int
CONSTRUCTORS' CHAMPIONSHIP
Constructor Name varchar
Position int
Championship varchar
Points int
Year int
DRIVERS' HALL OF FAME
First Name varchar
Last Name varchar
Points int
Year int
Championship varchar
CONSTRUCTORS' HALL OF FAME
Constructor Name varchar
Points int
Year int
Championship varchar
CIRCUIT
Sponsor varchar
Name varchar
Championship varchar
Country varchar
Track Length float
No. of Corners int
RESULTS
First Name varchar
Last Name varchar
Constructor varchar
Championship varchar
Race varchar

2NF

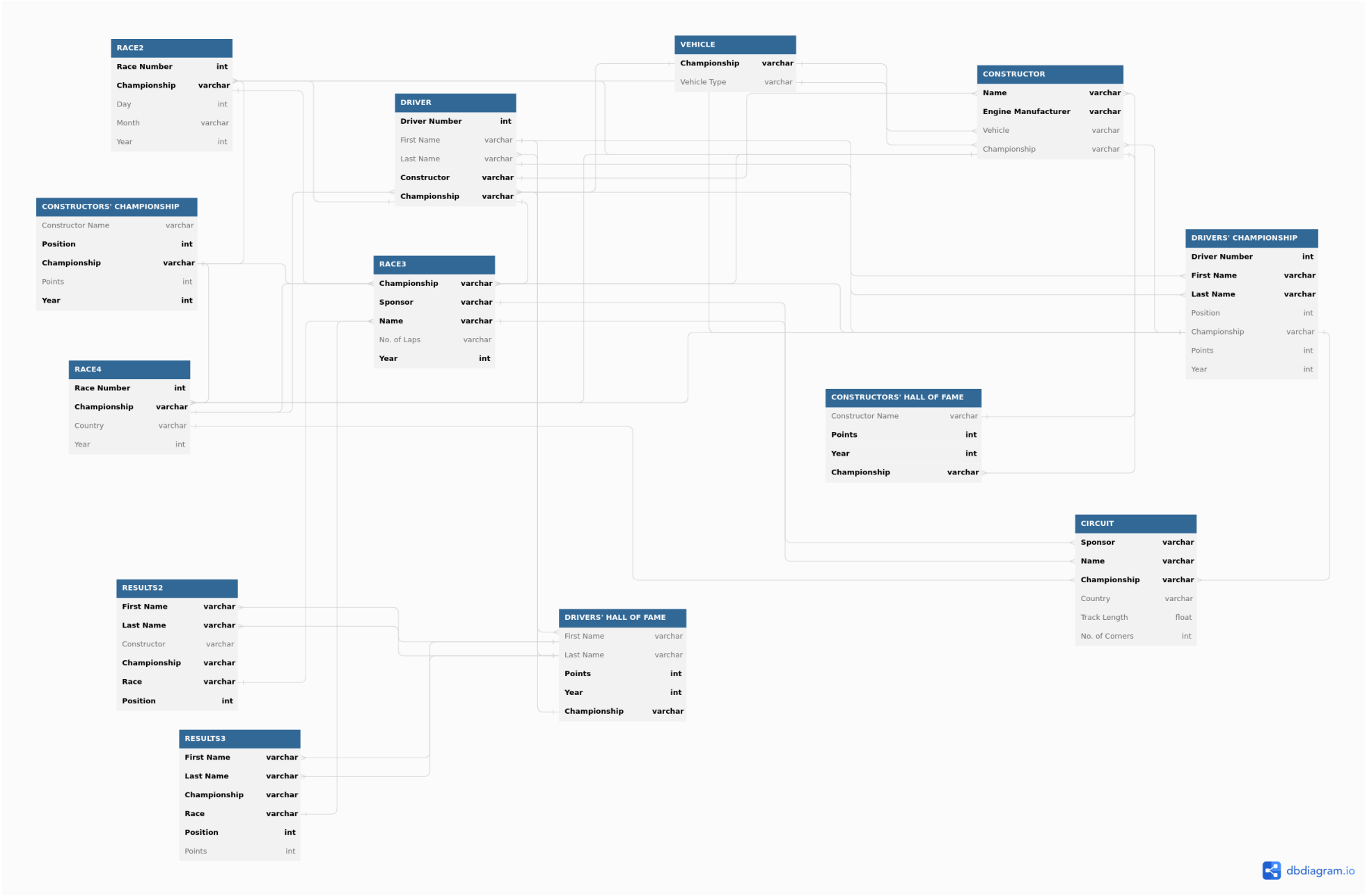
- Some relations were split into multiple relations because they violated 2NF:
    - RESULTS:
        - RESULT1(DRIVER NAME, CHAMPIONSHIP, RACE, POSITION , POINTS)
        - RESULT2(DRIVER NAME, POSITION, RACE, CHAMPIONSHIP, CONSTRUCTOR)
    - RACE:
        - RACE2(CHAMPIONSHIP, RACE NUMBER, DAY, MONTH, YEAR)
        - RACE3(SPONSOR, NAME, CHAMPIONSHIP, YEARS, NUMBER OF LAPS)
        - RACE4(CHAMPIONSHIP, RACE NUMBER, YEAR, COUNTRY)
- Furthermore, changes were made to the primary keys of some relations to ensure that they satisfied 2NF.
    - DRIVER – (DRIVER NUMBER, CONSTRUCTOR, DRIVER NUMBER)
    - CONSTRUCTOR – (NAME, ENGINE MANUFACTURER, CHAMPIONSHIP)
    - CONSTRUCTORS' CHAMPIONSHIP – (CHAMPIONSHIP, POSITION, YEAR)
    - DRIVERS' HALL OF FAME – (CHAMPIONSHIP, YEAR, POINTS) *[**Assumption:** uniqueness in the value of POINTS as there is a low probability of teams finishing on the same number of points – this can be handled while populating the database too]*
    - CONSTRUCTORS' HALL OF FAME – (CHAMPIONSHIP, YEAR, POINTS) *[Similar to DRIVERS' HALL OF FAME]*

<2NF Model in next page>

Link to Diagram: https://dbdiagram.io/d/636f9f9dc9abfc61117222a4

3NF

No transitive dependencies were observed among the relations in 2NF. For this reason, it can be stated that the 2NF schema does not violate 3NF. Hence the 2NF relational schema is suitable for 3NF as well.


RACE2
Race Number int
Championship varchar
Day int
Month varchar
Year int
VEHICLE
Championship varchar
Vehicle Type varchar
CONSTRUCTOR
Name varchar
Engine Manufacturer varchar
Vehicle varchar
Championship varchar
DRIVER
Driver Number int
First Name varchar
Last Name varchar
Constructor varchar
Championship varchar
CONSTRUCTORS' CHAMPIONSHIP
Constructor Name varchar
Position int
Championship varchar
Points int
Year int
RACE3
Championship varchar
Sponsor varchar
Name varchar
No. of Laps varchar
Year int
DRIVERS' CHAMPIONSHIP
Driver Number int
First Name varchar
Last Name varchar
Position int
Championship varchar
Points int
Year int
RACE4
Race Number int
Championship varchar
Country varchar
Year int
CONSTRUCTORS' HALL OF FAME
Constructor Name varchar
Points int
Year int
Championship varchar
CIRCUIT
Sponsor varchar
Name varchar
Championship varchar
Country varchar
Track Length float
No. of Corners int
RESULTS2
First Name varchar
Last Name varchar
Constructor varchar
Championship varchar
Race varchar
Position int
DRIVERS' HALL OF FAME
First Name varchar
Last Name varchar
Points int
Year int
Championship varchar
RESULTS3
First Name varchar
Last Name varchar
Championship varchar
Race varchar
Position int
Points int
dbdiagram.io