Specification / Scope:
The system to be designed will be a relational database management system that is capable of storing information required for multiple formula 1 championships. It will contain the following entities:

1. Driver
2. Team
3. Race Record
4. Race
5. Competition (ie,championship)
6. Circuit

The system must be able to allow access to the following information:

1. Driver
   a) Name.
   b) DOB.
   c) Team.
   d) Race times.
   e) Competitions entered.

2. Team
   a) Team name.
   b) Location.
   c) Team Members.

3. Race
   a) Date of race.
   b) Time of race.
   c) Race Circuit.
   d) Competition the race is a part of.

4. Circuit
   a) Circuit name.
   b) Location.

5. Competition
   a) Competition name.
   b) Circuits in competition.
   c) Race results for competition.

The system must be able to perform the following functions:

1. Add / Remove a driver.
2. Add / Remove a Team.
3. Add / Remove a circuit.
4. Add / Remove a competition.
5. Record the results of a race.
6. Display competition results / Calculate winner.
7. Display any information stored in the database as stated above.

Assumptions:

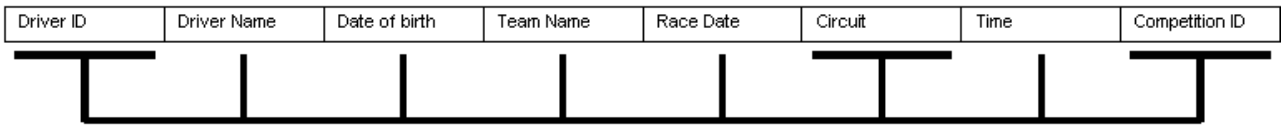
I have assumed the following:

1. A driver may only belong to one team.
2. A team may have multiple drivers.
3. A driver may not enter more than one race on a given day.
4. A competition may not have more than one race on a given day.
5. A competition may have any number of races.
6. No two circuits have the same name.
7. No two teams have the same name.

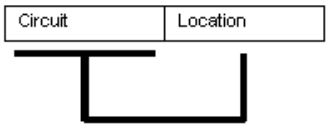
Table Normalisation:

From the initial description I deduced the following structure with the following functional dependencies:

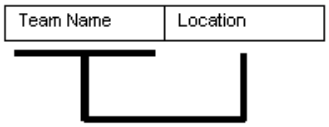
Entity 1:



Entity 2:

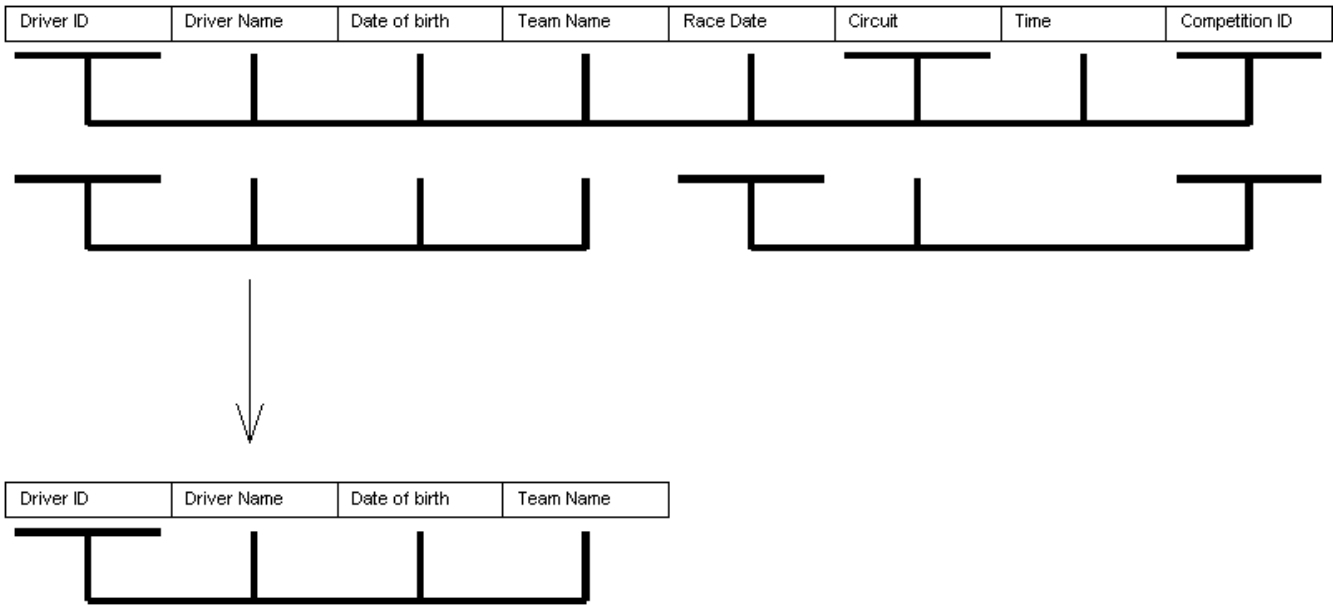


Entity 3:



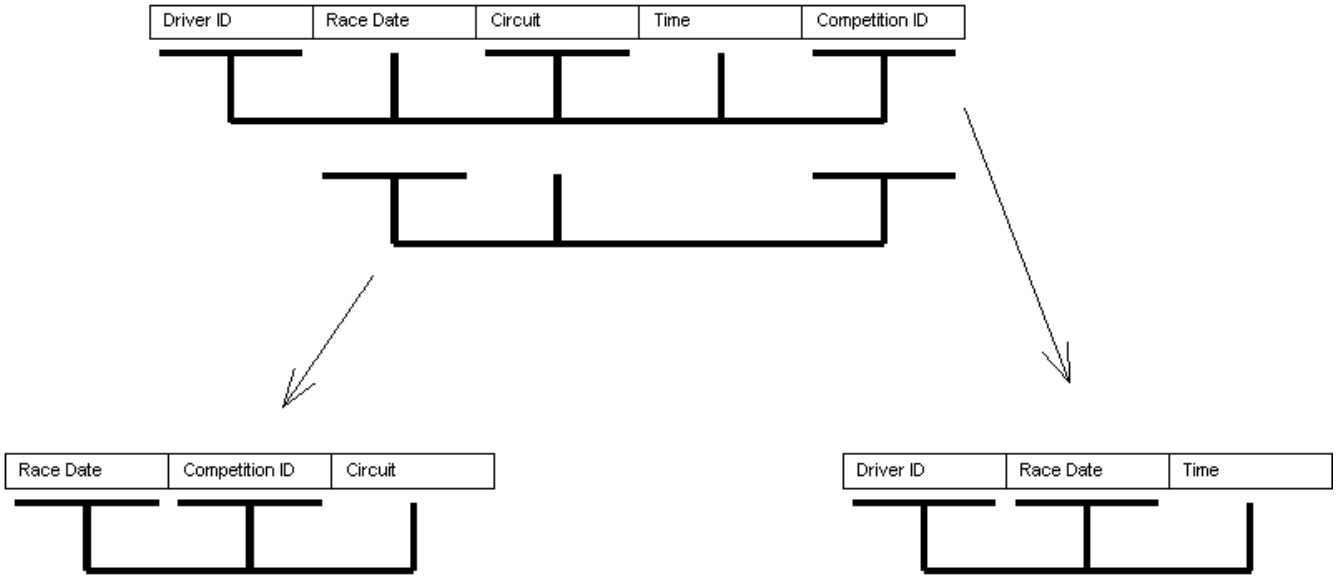
Entity 1. From the driver ID, the circuit and the competition ID you can determine all other attributes.

Entities 2 and 3 are already in BCNF so require no more work. These entities will be the “Circuit” and “Team” entities. Entity 1 is in need of normalisation:

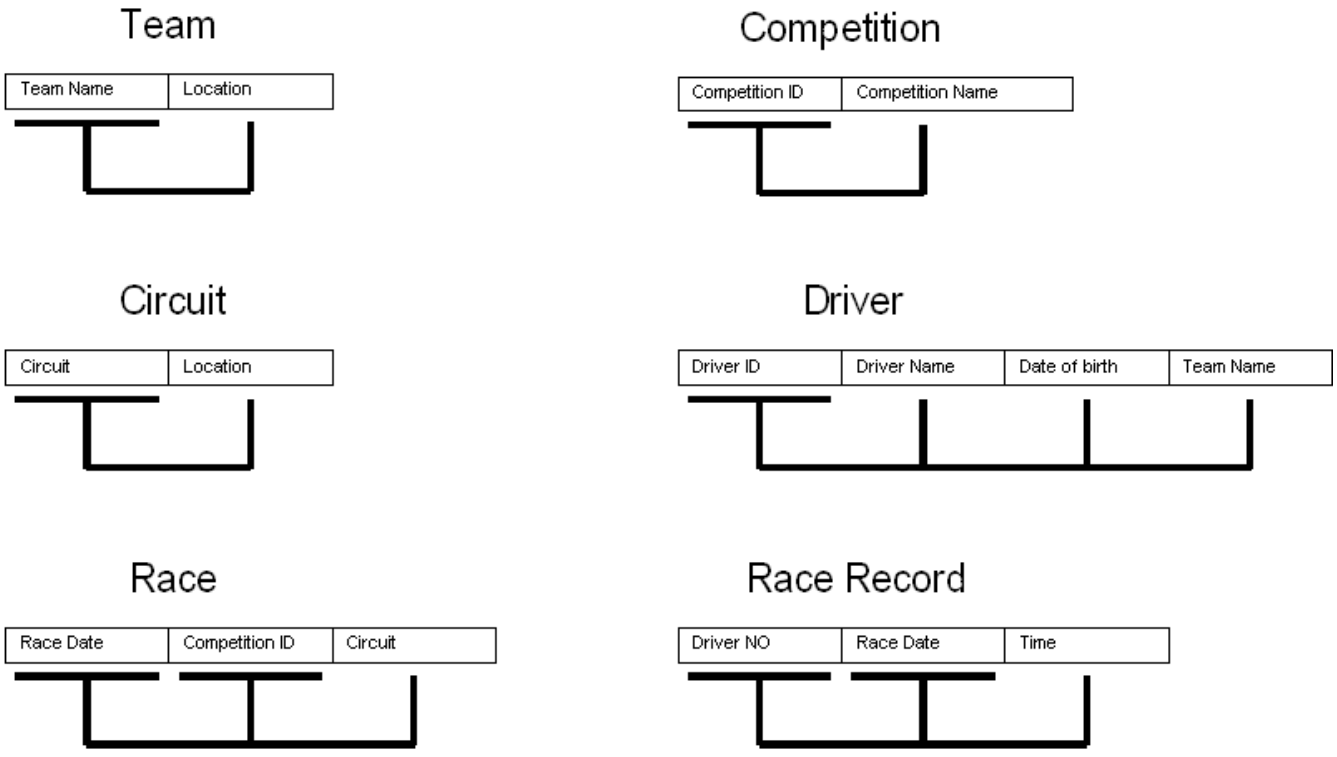


From this initial normalisation we now have another entity in BCNF. This will be the “Driver” entity.

The remaining table still needs further normalisation:



By normalising to this point we now have two entities that are in BCNF. These entities are the "Race" and "Race Record" entity. So the result is 6 BCNF entities:



With the above structure we are able to avoid all update, insert and delete anomalies. The only issue I can see with this is that you may want to add a competition without assigning a race to it. That is why I have decided to add an additional entity called "Competition" and have it referenced to in "Race". With this in mind the final entities and their attributes are as follows:

Final Entities:

Entity: Driver

Attribute Name	Description	Data Type
Driver ID	Unique number to identify the driver	INT
Driver Name	Name of the driver	String
Date of birth	Date of birth of the driver	String
Team Name	Name of the team the driver belongs to	String

Entity: Circuit

Attribute Name	Description	Data Type
Circuit	Name of the Circuit	String
Location	Location of the circuit	String

Entity: Team

Attribute Name	Description	Data Type
Team Name	Name of the team	String
Location	Location of the teams head office	String

Entity: Race Record

Attribute Name	Description	Data Type
Driver ID	ID number for the driver in question	INT
Race Date	Date the race took place	String
Time	Time the driver finished the race (seconds)	INT

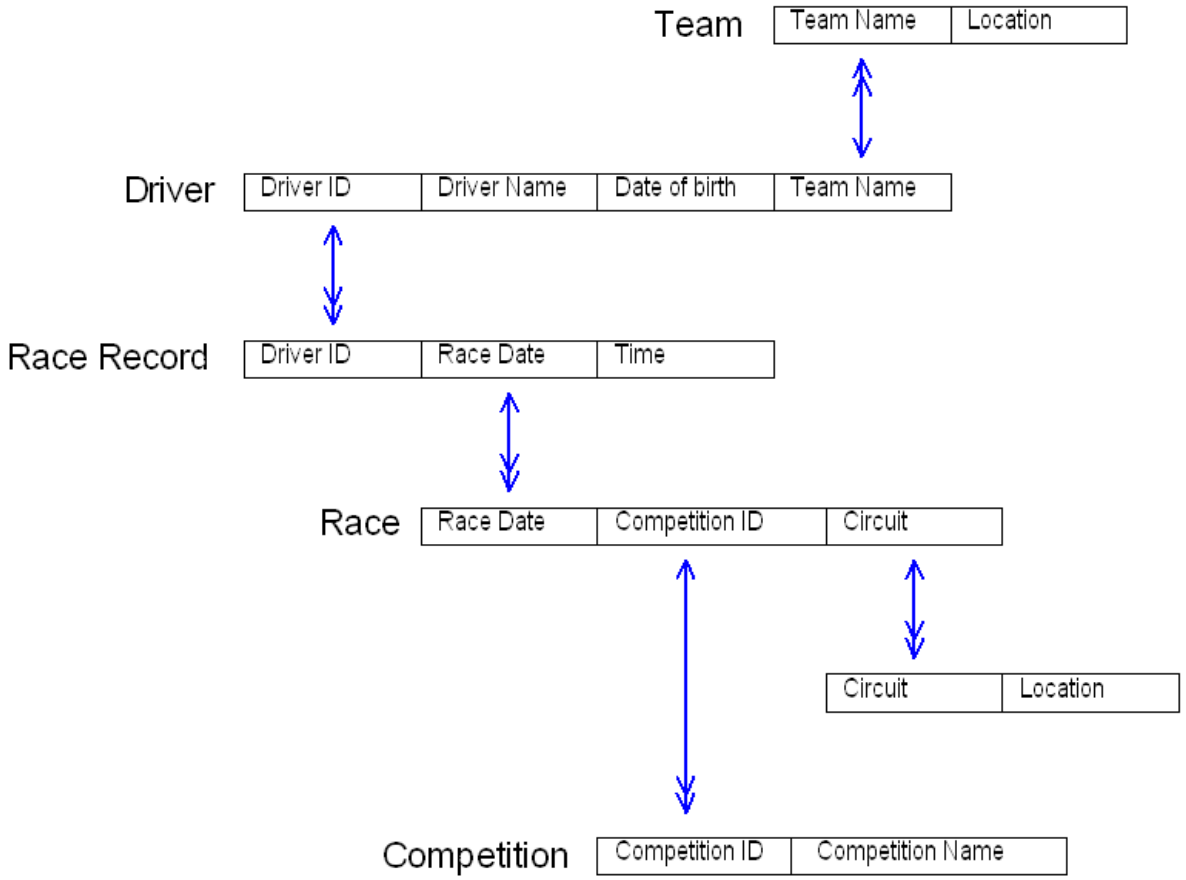
Entity: Race

Attribute Name	Description	Data Type
Race Date	Date the race took place	String
Competition ID	ID number for the competition it was part of	INT
Circuit	Name of the circuit the race took place on	String

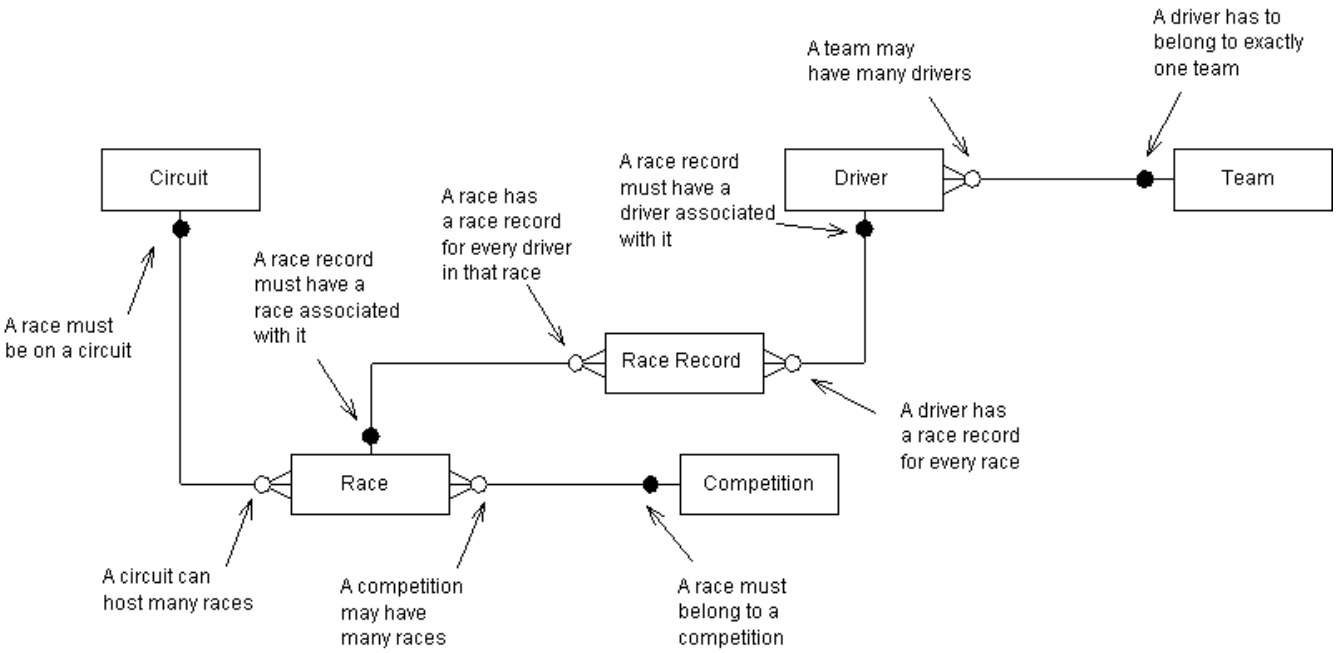
Entity: Competition

Attribute Name	Description	Data Type
Competition ID	ID number for the competition	INT
Competition Name	Name of the competition	String

RI Diagram:



EAR Diagram:



NOTE: Attributes have been omitted for clarity, please see the following page.

Details of entity attributes :

Driver(Driver ID,Driver Name, Date of birth,Team Name)
Race Record(Driver ID, Race Date, Time)
Race(Race Date, Competition ID,Circuit)
Circuit(Circuit Name, Location)
Competition(Competition ID,Competition name)
Team(Team Name, Location)