# DataBases
# TUTORIAL 3
## Relational Schema

**Exercise 1**

Let's go back to the statement of exercise 2 of the serie 1 that deals with the management of borrowings in a library.

Q1: Propose a logical schema from the data dictionary verifying the management rules already defined.
Q2: Can we find more than two authors with the same occurrences (same values of the characteristics)
Q3: If yes, what are the problems encountered?
Q4: What is the solution to overcome the problems?
Q5: Same question for each relation (table).
Q6: How can we find the authors of a book as well as the books written by an author?
Q7: How can we find the borrowers of an item with the dates of borrowing and the deadline, the items borrowed by a borrower with the date and deadline of borrowing.

**Exercise 2: Travel**

A travel agency has computerized the management of the trips. It offers itineraries, visited monuments, reservations, etc.. The database was built from the following description:

A circuit is identified by a number, it is described by a departure city, an arrival city and a sequence of stages. A stage takes place over a given number of days, in a given city. During each stage, all the monuments of the City, where there are any, are visited. The departure and arrival cities are not considered as stages, their monuments are not visited.

The same circuit never passes through the same stage stopover several times, but it may happen that a departure (or arrival) of a circuit is also one of the stopover cities of this circuit. This makes it possible to take into account situations where the cities of departure and/or arrival are the subject of a visit.
Cities are identified by name.

The monuments are identified by their name and the city where are located. Each monument has a visit price. A circuit can be scheduled several times, on different dates. Each of these programs is associated with a number of places. Two programs of the same circuit can have different numbers of places. On the other hand, the price of a circuit is fixed, always the same whatever its programming. A circuit lasts a number of days equal to the sum of the durations of each of its stages.

A reservation, identified by a number, is made on behalf of a customer (identified by name) and concerns the programming of a circuit. The date on which the client booked is considered to be the departure date of the tour. Several places for the same programming of the same circuit can be reserved.
A reservation for a given circuit program is possible if and only if the number of seats to be reserved is less than or equal to the number of available seats for the program; if scheduling is possible, the number of places available is then reduced by the number of reserved places.

**Q1:** Propose a relational schema of this system.