Université Paris 13 **2020 / 2021**

L3 Computer Science **Databases**

Databases Project

The objective of this project is to model a problem in the form of a database, i.e. design the model, create the tables with all relevant constraints, fill these tables and finally use the database to retrieve information.

Your work on this project will be presented in the form of a detailed report and the corresponding SQL scripts.

I) The problem to model

We want to create a hospital management database.

The hospital is composed of different services known by a code and a name (pediatrics, cardiology, etc...), each of which has a telephone number allowing them to be contacted directly.

The services are composed of different rooms, known by their number. For each room, the volume and occupancy rate is known.

The hospital staff is composed of doctors, nurses and a director. We know their INSEE number, their first and last name, as well as the list of their telephone numbers and their address (number, street, postal code, city). Apart from the director, all are assigned to one or more services and have a single direct supérior to whom they can refer.

Patients are registered upon their arrival at a hospital with their INSEE number, their first and last names, as well as a list of their telephone numbers and address. At each visit, their date of arrival and departure, as well as their pathology, is noted. Each pathology, defined by a code and a name, is associated with a particular service. Note that a hospital staff member can also be a patient if he or she has an accident or falls ill.

The hospital provides a number of treatments, the name of which is known as well as the associated pathology. A medical treatment can be performed by a doctor on a patient in a particular room. The date of the procedure, its cost and the result (positive or negative) are kept. For each pathology, we want to know the number of treatments performed in the current year.

II) Modeling

1. Propose an entity-relation diagram (ERD) to model this problem.
2. Provide the corresponding relational model.
3. Explain and justify your choices.

III) Creation and insertion

1. Create a *creation.sql* script that creates the tables of the relational model.
2. Add to the tables all the constraints that you think are relevant for a good management of this database. Explain and justify your choices.
3. Create the *insertion.sql* script to insert enough data in the tables so that the queries in section V do not return empty answers.

IV) Queries

Answer the following questions using SQL queries in *queries.sql*:

[1] Give the first and last names of the doctors in the hospital.

[2] Display the number of nurses per service.

[3] List the names of patients with diabetes in order of arrival in the hospital.

[4] How many patients received treatments in the cardiology service in 2015?

[5] What is the maximum duration of a patient visit since 2017?

[6] Which doctors work in both the pediatrics and cardiology service?

[7] Which patients received treatments from Dr. Rachoul, sorted by order of arrival?

[8] Display the pediatric rooms sorted by number of treatments (decreasing) in 2020.

[9] Which doctor provided the most treatments in 2015?

[10] Does "kidney transplant" have more positive than negative results (YES, NO)?

[11] Display the treatments with an average cost of more than 1000 euros, sorted by cost.

[12] For each treatment, display the doctor with the most expensive procedure.

[13] Display patients who have an average length of stay of more than 15 days.

[14] Which doctors working in pediatrics received a kidney transplant in 2020?

[15] Which nurses work in all services in the hospital?