SW N°1: E/R MODEL AND RELATIONAL MODEL

Exercise 1 :

The infoplus company creates websites for its clients. When creating a website, several IT professionals can work at the same time. Every customer is identified by a unique number and an address. A customer can order multiple websites. Computer scientists are identified by a number, name and nationality. In order to better assign its IT specialists to different website projects, Infoplus wants to know the diplomas obtained and prepared by its employed IT specialists.

1. Create the corresponding Entity-Relationship diagram, in order to know the number of hours worked per day by an IT specialist on a project
2. Certain diplomas provide equivalences for obtaining other diplomas. Modify the diagram to consider this constraint.

Exercise 2 :

An insurance company wants to automate its management of customer contracts. It is organized into regional centers which manage policyholders and their contracts as well as claims. A regional center is characterized by its number and address. Each center has its policyholders who are of two types:

• Active policyholders for whom contracts are in progress

• Canceled policyholders: we keep an image of canceled policyholders in the database to be able to carry out checks when new policyholders are added.

Each active insured person is described by the following elements: insured number, surname, first name, address, year of birth, gender, marital status, profession code and center number which manages their contracts.

For canceled policyholders, we limit ourselves to the following information: insured number, surname, first name, address, number of the center which manages their file, date and reason for termination. The company insures two types of contracts: vehicle contracts and real estate insurance contracts.

A vehicle contract contains the following information: contract number, insured number, vehicle make, registration number, contract guarantees and effective date. A real estate insurance contract contains the following information: contract number, insured number, real estate value, contract guarantees and effective date. A guarantee is characterized by a code and a wording. An insured person can take out several contracts.

Each contract corresponds to claims. A claim is described by the following information: contract number, insured number, claim number (unique for a claim), and the date of the claim.

1. Develop the Entity Relationship diagram
2. Transform into a relational model

Exercise 3 :

For the purposes of managing an airport, we wish to store in a database the information necessary to describe the following facts: Each managed aircraft is identified by a registration number. It is owned either by a company or by an individual: in both cases we must know the name, address and telephone number of the owner, as well as the date of purchase of the aircraft.

Each plane is of a certain type, this being characterized by its name, the name of the manufacturer, the engine power and the number of seats. Aircraft maintenance is carried out by airport mechanics. The same mechanic can, depending on the interventions, carry out the repair or check. For any intervention carried out, we keep the purpose of the intervention, the date and the duration. For each mechanic we know his number, name, address, telephone number and the types of aircraft on which he is authorized to work.

A number of pilots are registered with the airport. For each pilot we know his name, his address, his telephone number, his pilot's license number and the types of aircraft he is authorized to pilot with the total number of flight hours he has completed on each of these types.

1. Establish the Entity- Relationship model that would meet the needs proposed above.

Exercise 4 :

We want to represent all the information on trade between countries through a database. For this we have the following information:

A country is described by its code (Country_Code), its name (Country_Name), the number of its inhabitants (Nb_hab) and its gross domestic product (GDP).

The products exchanged are each described by their code (Prod_Code) and their name (Prod_Name); a product belongs to a category described by its code (Code_cat) and its label (Libellé_cat). A product is manufactured in several countries, for each of them the database keeps information concerning the quantity manufactured per year for each country.

Trade exchanges are each described by the countries concerned (the importing country and the exporting country), the product and the amount of the exchange expressed in monetary units for each month of the year.

1. Develop the Entity Relationship diagram
2. Transform into a relational model