

# Practice Class 2

## Objectives

Conceptual Design of Database  
Use of Entity-Relationship Diagrams

Note: You must follow the response template provided and only legible diagram submissions in PDF or image format (PNG, BMP, JPG and SVG) are accepted.

## Assignment 2.1

Consider a Stock Management System of a company. This exercise proposes to model the part of the orders of this information system according to the following premises:

- The company commercializes various products that are characterized by a code, name, price and VAT rate;
  - At every moment the number of units of each product in warehouse should be known;
  - One order is characterized by the order number, the date it was placed, and a single supplier. An order contains one or more items (i.e. products) and correspondent units;
  - Each supplier is characterized by a name, tax information number, address, fax number, payment terms (ready, 30 days, 60 days, etc.) and an internal code of the type of supplier (this code is associated with a designation);
- a) Identify the entities, attributes, and relationships of the database;
  - b) Specify the relationships regarding the degree, cardinality and instances mandatory participation of the entities in the relationship;
  - c) Develop the conceptual design of the database using an entity-relationship diagram. In a first phase, use pencil and paper to get the task complete. Once the paper drawing is complete, transpose the diagram into an electronic format using a graphical tool such as Microsoft Visio, Omnigraffle, or Visual Paradigm.

## Assignment 2.2

Use an Electronic Medicines Prescription System with the following characteristics:

- A prescription is performed by a doctor of the National Health System (SNS) for a patient, involving one or more drugs. Each prescription has associated a unique number of prescriptions and a date.
- A doctor is characterized by an identification number assigned by the NHS, a name and a medical speciality;
- A patient is characterized by a user number, name, date of birth and address;
- A drug is characterized by a trading name (which may not be unique) and a formula. A drug is produced by a pharmaceutical company and its name is unique among all products of this pharmaceutical;
- A pharmacist is characterized by a number of national registration, name, address and telephone number;

- The drugs are sold in pharmacies. A prescription is processed by a single pharmacy, i.e. it is not possible to purchase part of the drugs of the same prescription in different pharmacies;
  - It is intended to keep the date on which a prescription was processed at the pharmacy. However, there are situations in which patients do not make use of the prescription;
  - A pharmacy is featured by a NIF, name, address and telephone number (NIF is a Portuguese fiscal number).
- a) Develop the conceptual design of the basis of the Electronic Medicines Prescription System using an entity-related diagram.

### Assignment 2.3

Consider a Conference Management System with the following features:

- A number of scientific articles are presented at a conference, each characterized by a title and a registration number;
  - An article has one or more authors characterized by a name, email address, and institution;
  - A person can be the author of several articles;
  - An institution is characterized by a name and address;
  - In one conference we also have the participants for whom we want to register the name, address, email address, institution and registration date;
  - There are two types of participants: students and non-students;
  - Student participants require a proof issued by the educational institution to be exempt from the cost of registration. The information system shall record the location of that evidence;
  - For non-student participants it is necessary to record the reference of the bank transaction that supported the registration fee.
- a) Develop the conceptual design of the Conference Management System database using an entity-related diagram.

### Assignment 2.4

Consider an Kindergarten Management System with the following characteristics:

- The Kindergarten is organized by classes with a certain level of education and there are 5 classes: 0 (preschool), 1, 2, 3 and 4;
- A class is characterized by an identifier, school year, assignment, teacher, and maximum number of students;
- There is a set of activities available for one or more classes. Each activity has an identifier, designation, and associated cost (financial value). The attendance of an activity by a student in a class is optional;
- A student is characterized by name, citizen card number, address and date of birth;

- A teacher is characterized by an employee number, name, citizen card number, address, date of birth, telephone contact and email;
  - A student has a guardian characterized by name, citizen card number, address, date of birth, telephone contact, email and a relationship with the student (father, mother, grandfather, grandmother, etc.);
  - There is a list of people with permission to deliver or pick up the student. These people have a similar type of record to the parent.
- a) Develop the conceptual design of the University Information System database using an entity-related diagram.
  - b) *[Optional]* Continue to model the problem to record the financial processes (monthly fees, activities, payments, family discount, etc.). Define requirements freely;