DATABASES / DATABASES I

2024/2025 – Fall Semester

Practical Classes Introduction

Data Modelling

The first step to create a database is to understand the data that needs to be stored, its context and how the multiple pieces of data relate to one another. After this understanding, it is necessary to put this knowledge into a visual representation. To do this we will use a Conceptual Diagram as a visual representation of a Conceptual Data Model – aka Entity Relationship Model – which will be the basis for the derivation of the Physical Data Model – aka Relational Model. These are the two types of models we will cover in this course. The tool used to create these models will be Power Designer.

To go from a visual representation of the data model to the actual database where data can be stored and queried, we will use Structured query language (SQL). This is a programming language used to structure, store and manipulate data in a relational database.

Once the Physical Model is created, it will be used to generate an SQL DDL script (Data Definition Language) which, when executed, will create database objects where data can be inserted and stored. When the database objects are created, it is necessary to use DML (Data Manipulation Language) to select, insert, update, and delete data.

In the next chapters, we will go through the two types of Models mentioned above but before, let's start with a first example just to warm up. It does not need any previous theoretical knowledge.

Warm-Up Exercise

Imagine you want to create a platform of house rentals and need to have a database to store the required information for the platform to work. **Create an Excel file** and design it in a way that you can use it dynamically (insert, update, and delete records) to feed the mentioned platform. The requirements are the following:

Any person can create a profile in the platform by inserting their name, date of birth, NIF number and email. If the person only wants to be a landlord this is all that is needed, if the person wants to be a renter, she/he must also indicate their monthly income.

A house must be registered by a landlord and a landlord can register multiple houses. To register each house, the landlord must input its number of rooms, number of WC's and if the house is furnished or not. Once a house is in the platform, to make it available for the renters, the landlord must create an announcement. For each announcement it needs to be stored the date when it was created, the monthly rent asked by the landlord and the date from which the house is available. An announcement only concerns one house, and a house can only have one open announcement at a time but can have many throughout the time.

To rent a house, the renters must answer to a specific announcement with the date they intend to start the rental and the period they expect to stay (number of months). The landlord can then give the "ok" to an answer and the announcement is set as closed or can reject the renter proposal. A renter can answer to multiple announcements. Assume a renter can only submit an answer to each announcement.