DATABASES

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# Persistence:

Persistence is said to be the property of maintaining the data stored after the computer shuts down. For that reason, we must make use of slower but static storage units to save the data, usually in the form of files or databases.

You just read that data can be stored in a database or in a file, but what are the differences?

A file will store all the data in string format in an unorganized way or in a way that the computer will not read anything but plain text.

Databases on the other hand are capable of storing more additional information than regular files by making use not only of the data but of the **metadata**, storing the values in an organized **and organizable** way. This **metadata** or **Integrity Constraints** will allow to execute orders for filtering or sorting specified data.

## How do we modify the data in a database?

We, as users, will access (query) the data in order to retrieve it or modify it through a **Data Base Management System** or (DBMS).

This DBMS will interpret what the user wants to achieve by making use of a **data language**.

The use of a DBMS will make the task convenient (easy to use) and efficient (a lot of results could be got from a few lines of code). All of this is achieved by making use of **very high-level languages**. Note that this data language is **Domain languages**.

# Types of databases

## Relational Model Databases:

Is the most widely used one, for example oracle uses it along with the most famous data language: **SQL**. In order to interact with this type of database we will be making use of **Relational Data Base Management System (RDBMS)**. These databases are those that make use of different keys, defining keys such:

A variable, known as ‘**primary key’** will be in each table. Said variable will work as a **unique identifier** for each piece of data. It will not be possible to repeat that data. One example could be the **DNI in Spain** or the **Number of the credit card.**

When this key is used in another table, a **linking table**, it will be known as a ‘**foreign key’**. This linking table will be **named** after a **verb** and will link at least two tables.­­

## Graph Model Databases:

Bla bla bla

# Abstraction database levels

* Physical: Is the layer of abstraction where the raw data is physically stored as files. This is the lowest level of abstraction in a DBMS. An administrator is the one in charge of deciding how the data is stored in this physical level.
* Conceptual: It is a blueprint of the data. It has no information on how the user will see the data. Is the one in charge of processing the different connections with each table.
* Visual: It is what the end user gets to see after applying filters. It can be in the form of a graph, table, or pie chart. It makes use of the PoLP[[1]](#footnote-1).

# Data Independence:

You can change the data in one level without affecting other levels.

* Physical data Independence: can change things in the Physical level without affecting the Conceptual. (Change the storing algorithm from a linear database to a B-Tree)
* Logic data Independence: ???

# MODELLING / Universe of discourse:

## Entity-Relationship model:

An entity is an abstraction of a real-life object or entity that is storing particular attributes that distinguish them, having one attribute to be defined as the most unique and for that purpose, will be the **primary key** of the data set. The attributes that will be defined characterizing said entity, will depend on the universe of discourse[[2]](#footnote-2).

Things to consider:

* Entities are usually represented with a **noun** name.
* Repeated attributes in different data tables shall be slightly modified for clarity.

This model provides the user with a graphical representation, making it easy to distinguish everything.

Relationships:

The relationship between two (or more) relationships will make use of a different data table, a **relationship set**. This relationship set will have as attributes the **primary keys** of each element that is wanted to be related.

1. Principle of Least Privilege. In databases it works by allowing only accesses to as minimum number of attributes as possible from a relationship set. [↑](#footnote-ref-1)
2. Collection of objects being discussed in a specific discourse. In model-theoretical semantics, a universe of discourse is the set of entities that a model is based on. [↑](#footnote-ref-2)