1 Database management systems

Databases are developed in a way to grant data independence, integrity and security, efficient and concurrent access and reduced application development time.

1.1 Data models

A data model are the concepts used to describe data. A schema is the description of a particular collection of data.

The most used model today is the relational model. It bases its self on the concept of relations, and every relation has a schema

1.1.1 Abstraction

Data is defined in different schemas. The physical schema represents how the data is stored on the disk, the conceptual schema defines the logical structure, and a view is how users see the data.

Schemas are defined using DDL (Data Definition Language) and the data is modified using DML (Data Manipulation Language)

1.2 ACID

ACID is the list of properties that a database must ensure. To explaine them we use the example of a bank transaction

1.2.1 Atomicity

Atomicity is a property caracterized by the all-or-nothing policy. It is applied through a log who keeps

1.2.2 Consistency

The databse must be consistent before and after the transaction

1.2.3 Isolation

multiple transactions occur independently without interference

1.2.4 Durability

THe changes of a successful transaction occurs even if the system failure occurs

2 E/R Model

2.1 Entity

an entity is a real world object which is described using a set of attributes. A collection of similar entities is a entity set

2.2 Relations

It is a connetion between two or more entity sets.
The relation can use different multiplicity, which are many to many, many to one and one to one.
We use the wisconsin representation system, which is structured like this:
we use an arrow to point to "one", a think arrow to represent "exactly one", a line to represent "mmany to many" and a thick line for "at least one"

2.2.1 Aggregation

is used when we have to model a relationship involving entity sets and a relationship set