Database: Teoria

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5.1 Page

- Every time a Hard Drive is instructed to **read** or **write** something on the disk, it does so by **reading** or **writing units of specific size**.
- This **size** is called a **Page** and has always a **fixed size**.
- The **size of a page** on the disk will be denoted as P.

5.2 Size of a Record

- **Records** of a relation have the **same size**.
- The **size of a record**:
  - indicates how much space, in **bytes**, a **record occupies** when stored on the disk.
  - will be typically **given** or it would be possible to **compute** from the **size of the individual attributes**.
- The **size of a record** of a **relation R** will be denoted as t_R.
- Example:
  - Student(ssn:**int**, credits:**int**, age:**int**, name:**varchar(25)**, surname:**varchar(25)**
  - Knowing that an **int** variable occupies 4 bytes and a **varchar** variable occupies 1 byte, we have that:

$$t_{Student} = (3 \cdot 4) + (2 \cdot 25) = 62 \text{ bytes}$$

  - So the size of each record of Student occupies 62 bytes on the disk.

5.3 Pages of Relation

- When a **page contains** some **data of a relation**, **no records from other relations are allowed** in that page.
- The database try to **fill a page with as many records of the same relations as it can**, and if no more records can fit, then it start saving them in another page.
- All the **pages** that a **relation occupies** on the disk are **full**.
- The **number of pages** that a **relation R occupies** on the disk will be denoted as P_R.

5.4 Cardinality of a Relation

- A relation is a set of records.
- The **cardinality** of a **relation R** will be denoted as $|R|$ (**number of records** a relation has).

5.5 Cardinality of an Attribute

- The **cardinality** of:
  - an **attribute** is the **number of different distinct values** that the attribute has.
  - **two or more attributes** is the **number of different distinct combinations** of the values of these attributes.
- The **cardinality** of:
  - of an attribute A of a relation R, will be denoted as $|R.A|$.
  - of two or more attributes of a **relation** R, will be denoted as $|R.A_1, R.A_2, \ldots, R.A_n|$.
- If the attribute is a **key**, the **cardinality** of the attribute is the **same** as the cardinality of the **relation**:
  - If the attribute A is key, then $|R| = |R.A|$, otherwise $|R.A| \leq |R|$.

5.6 Records per Page

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5.7 Relation size

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