

Business Intelligence Technologies

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General Information

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- **Learning Material**

- Slides
- Databases essentials – Antonio Albano (pdf)
- A First Course in Database Systems, Jeffery D. Ullman and Jennifer Widom
- Decision Support Database – Antonio Albano (pdf)

Mailing List

- Send an email to anna.monreale@unipi.it with
 - Subject: **MAINS-BI 2018**
 - Text: name, surname, Mains BI course
- You should be included in a mailing list useful for urgent communications!

Overview of the course topics

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Topics

- **Databases**
 - What is a DBMS
 - Designing a DB
 - Querying a DB
- **Business intelligence**
 - Decision Support Databases
 - Data warehouses
 - Designing a data warehouse
 - Querying a data warehouse

Information as a Resource

- **Information** is one of the most important resources of any **organization**
- An intelligent management of the information can help organization to generate **new knowledge**
- It becomes more and more important learning how to represent, organize, manage and use information

Organization

- **Organizations**
 - es: companies, banks, public administrations,
- An organic collection of **resources** (people, materials, **information**), **tools** and **procedures**, which are finalized to create and offer a product or a service
 - a bank provides financial services
 - a hospital supplies medical services

Information System

- Component of an organization finalized to the **information management** for supporting the organization activities
 - Collects, stores, processes and communicates the information
- Any organization has an Information System

Information System & Computerization

- **Information system** is independent on the computerization
- Organizations as Libraries, Banks, etc ... existed before the computerization and managed information

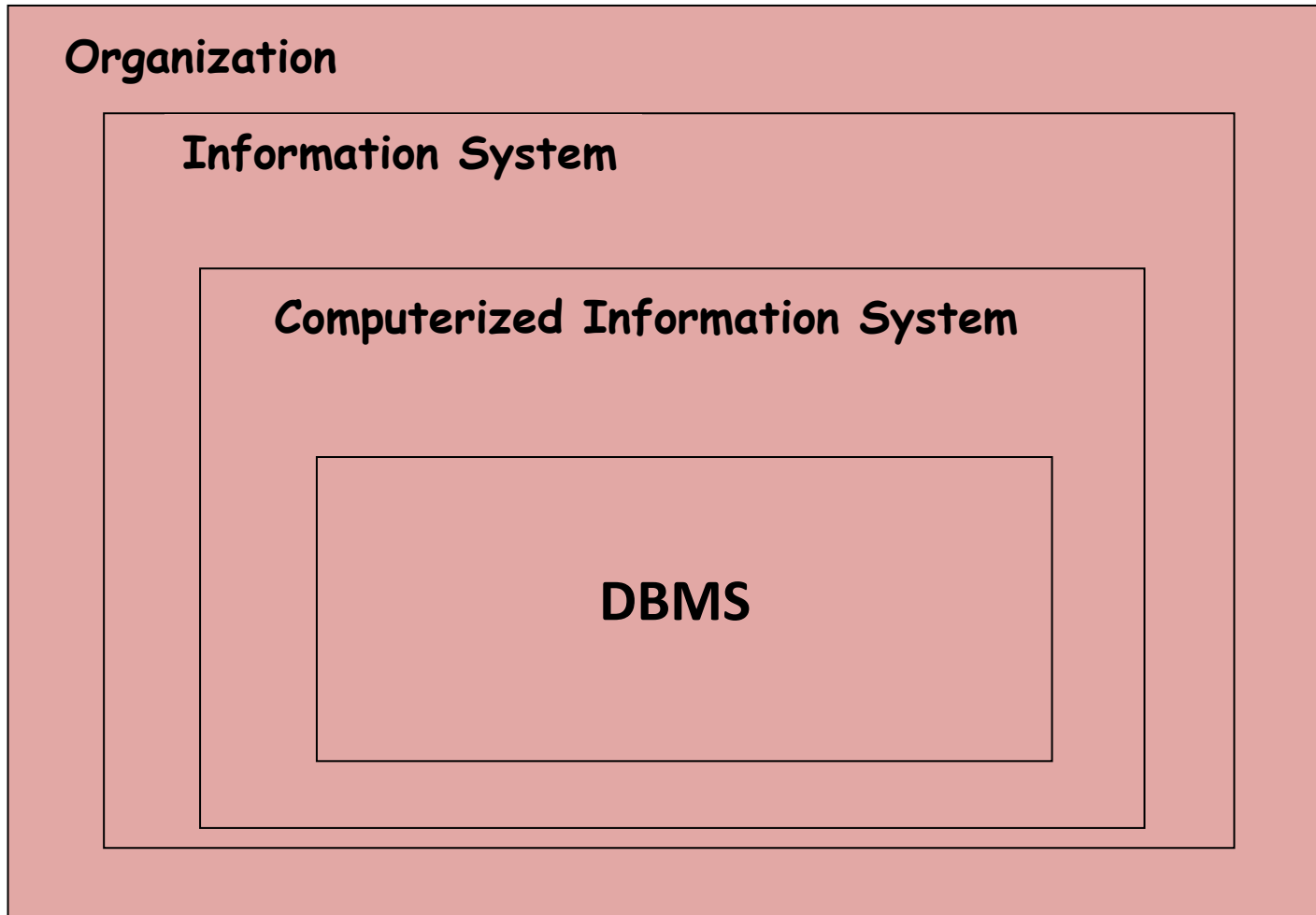


Real Library of Alexandria d'Egypt

Computerized Information System

- The hardware and software used for storing, retrieving, and processing the information which supports the functions of an organization
- In practice, in many cases:
 - **information system** is used as synonym of **computerized information system**
 - But it is not always true
- Implemented by **database technology**
 - operational database and a collection of application programs used to access and update the data quickly and efficiently

Computerized Information System



Goal of DBMS: processing data for getting information

Data vs Information

- In information systems **information** is represented by **data**
- **Information** (def): news, or element enabling knowledge about facts and situations
- **Datum** (def): element of an information composed of symbols to be processed

Without interpretation datum is useless

FERRARI, 8



Database

- Collection of permanent data representing facts interesting for an organization (*data or instances*) and facts related to the data organization (*metadata or schema*)

STUDENTS

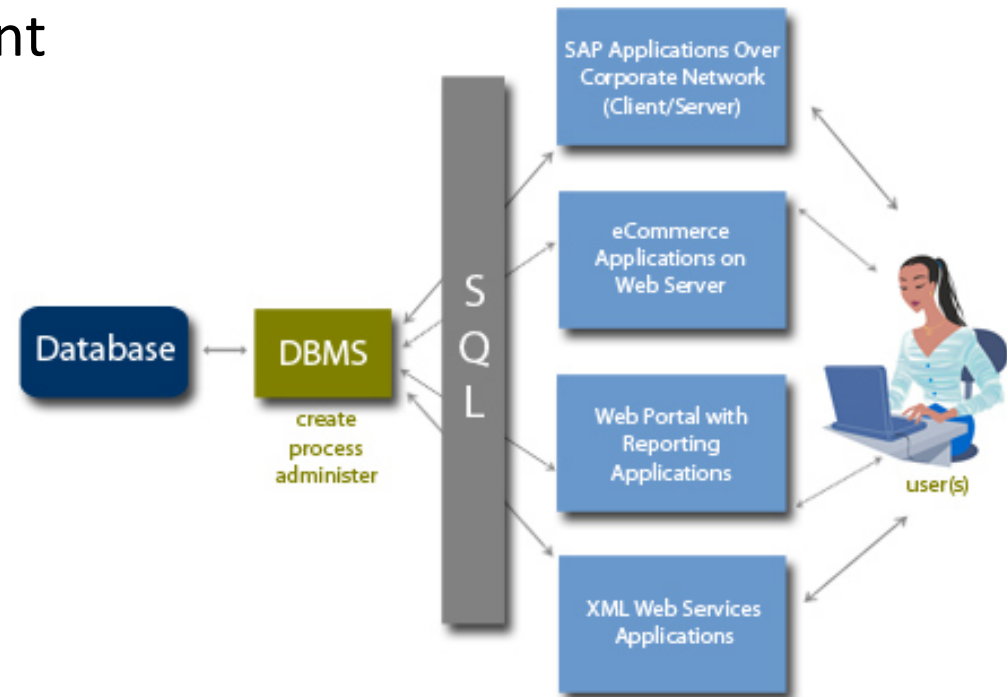
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485745	Neri	Anna	23/04/1992
200768	Verdi	Fabio	12/02/1992
587614	Rossi	Luca	10/10/1991
937653	Bruni	Mario	01/12/1991

Database Management Systems

- A set of tools, to manage homogeneous sets of structured data
- Able to deal with
 - Huge amounts of data
 - Mission critical data
 - Shared data
 - Queries and updates

Architecture based on DBMS

- DBMS manages huge amount of data shared
 - **Efficiently:** optimization, parallelization
 - **effectively**
- And guaranteeing:
 - **Sharing:** concurrency control
 - **Reliability:** Failure resilience, data replication
 - **Security:** authorizations, access control



Some DBMS

- **Commercial**

- IBM DB2, Oracle, Microsoft SQL Server, Sybase
- Microsoft Access, FileMaker

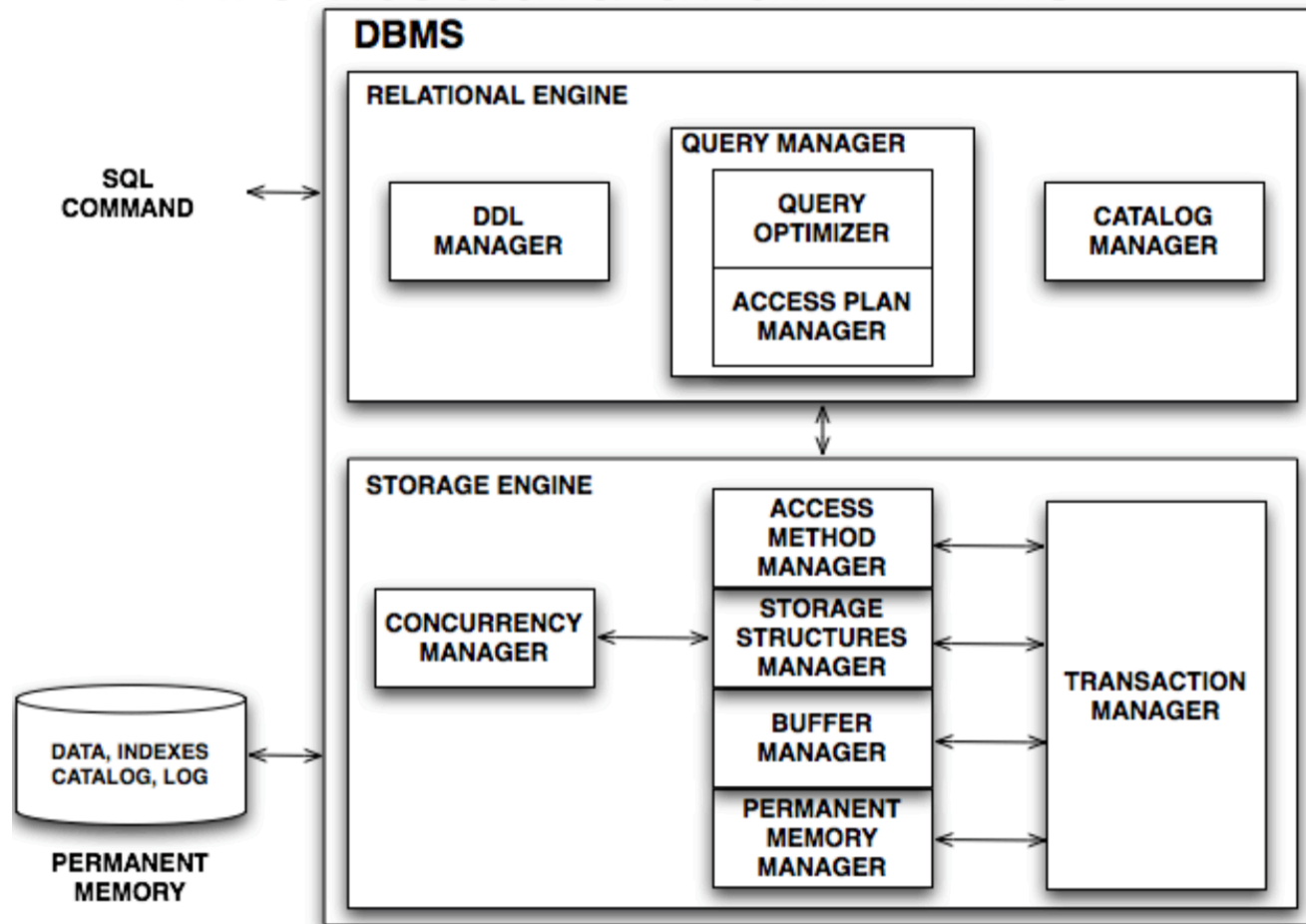
- **Open Source**

- MySQL (www.mysql.com)
- PostgreSQL (www.postgresql.org)

Users of DBMSs

- **Analyst**
 - defines a schema
- **Programmer**
 - Writes applications
- **Data Base Administrator (DBA):**
 - Manages data structures
 - Manages user rights
- **Operator (final user):**
 - Uses applications
 - Uses query tools

DBMS Architecture



Transactions

- Transactional execution of a piece of code:
- **Atomicity** in presence of failures (all or nothing)
- **Durability**: transaction effects can be recovered after a failure
- **Serializability**: no interference by concurrent transactions