Database Management System (DBMS)

DBMS is a set of computer programs that controls the

- Creation of the database

- The storing and organization of the data in the database

- Maintenance the database

- Searching, data retrieval and the use of a database.

Functions of a DBMS

- Indexing

- Views

- Security

- Integrity

- Concurrency

- Backup/Recovery

- Design

- Documentation

- Update

- Query

Data Definition Language

A data definition language or data description language (DDL) : used for defining data structures, especially database schemas.

Data Manipulation Language

A data manipulation language (DML) : used for selecting, inserting, deleting and updating data in a database. Performing read-only queries of data is sometimes also considered a component of DML.

Data Control Language

A data control language (DCL) : used to control access to data stored in a database.

ADVANTAGES OF A DBMS

1-Database Development: It allows organizations to place control of database development in the hands of database administrators (DBAs) and other specialists.

2-Data independence: Application programs should be as independent as possible from details of data representation and storage. The DBMS can provide an abstract view of the data to insulate application code from such details.

3-Efficient data access: A DBMS utilizes a variety of sophisticated techniques to store and retrieve data efficiently. It allows different user application programs to easily access the same database. Instead of having to write computer programs to extract information, user can ask simple questions in a query language.

4-Data integrity and security: If data is always accessed through the DBMS, the DBMS can enforce :
- integrity constraints on the data. For example, before inserting salary information for an employee, the DBMS can check that

the department budget is not exceeded.

• Also, the DBMS can enforce access controls that govern what data is visible to different classes of users.

5-Crash recovery: the DBMS protects users from the effects of system failures.

6- Data administration and Concurrent access: When several users share the data(more than one user access the database at the same time), DBMS schedules concurrent accesses to the data in such a manner that users can think of the data as being accessed by only one user at a time.
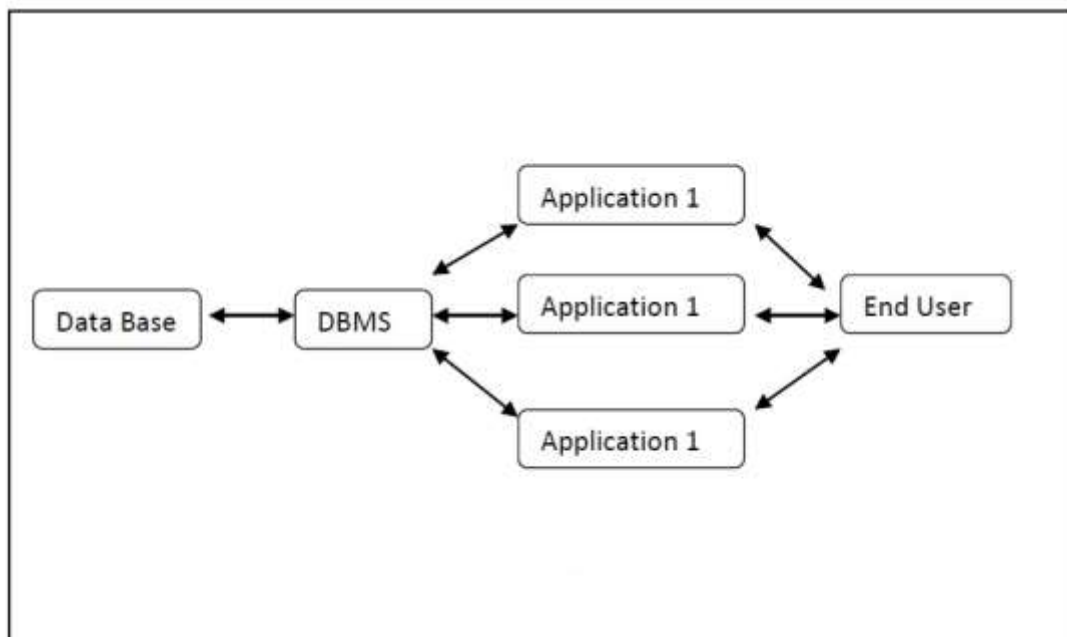
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Data independence

Refers to the separation of data from the programs that use the data. Nearly all modern applications are based on the principle of data independence. The whole concept of a database management system (DBMS) supports the notion of data independence since it represents a system for managing data separately from the programs that use the data.
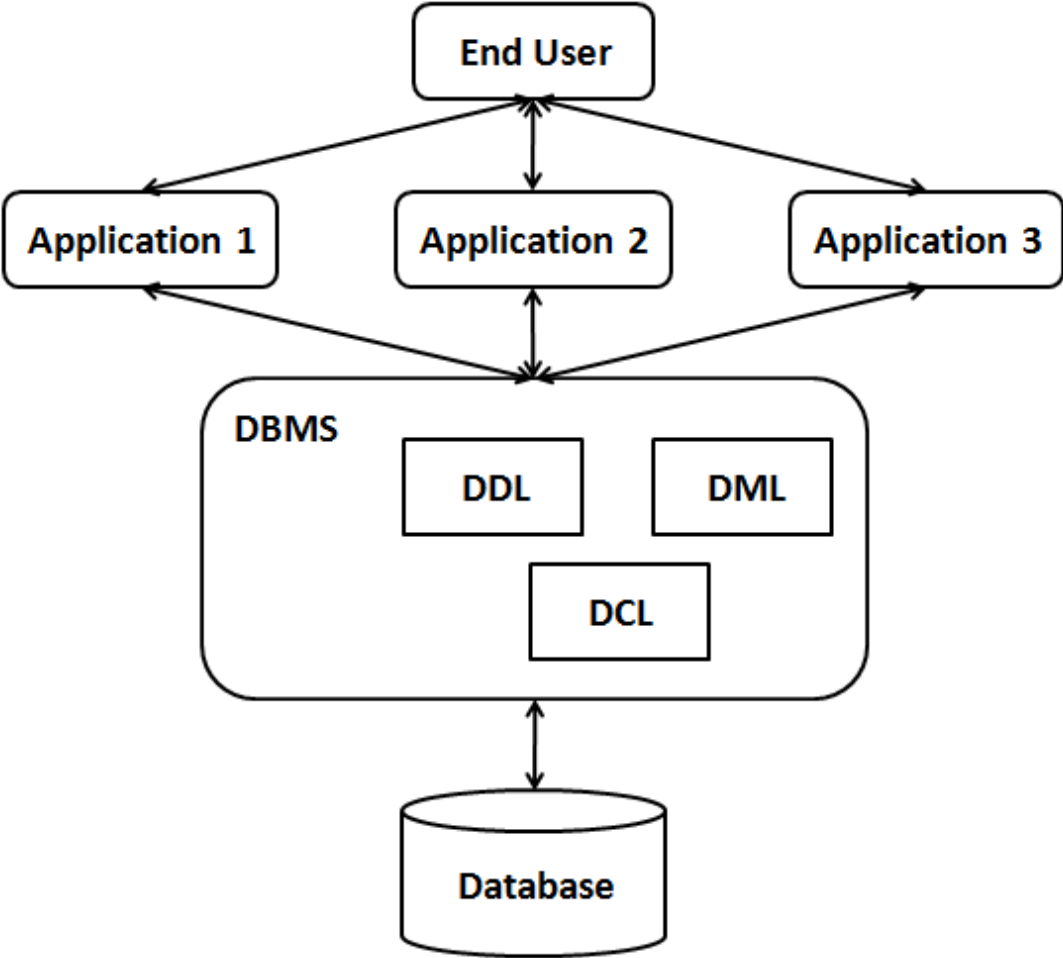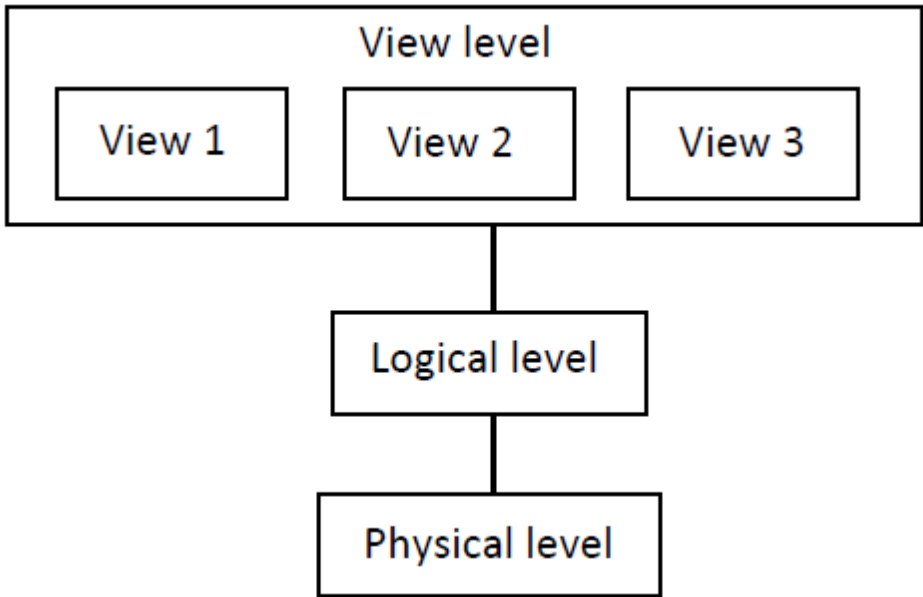

Database Systems

Level Database Architecture (Levels of Abstraction)

The major purpose of a database system is to provide users with an abstract view of the data. That is , the system hides certain details of how the data are stored and maintained. For the system to be usable, it must retrieve data efficiently. This had led to the design of complex data structure to represent the data in the data base. Since many database-user are not computer trained , data base developers hide the complexity from users through several levels of abstraction as shown in figure below

physical level : This level describe how the data are actually stored. At the physical level , complex low level data structure are described in detail. In this level storage locations used to specify where the data are and the data been described by words and bytes.

Logical level : This level describe what data are stored in the database and what relationship exist among those data. The entire database is describe in terms of small number of relatively simple structure. The logical level is used by the database administrator, who must decide what information is to be kept in the database.

View level : This level describes only part of the entire database. Many users of the database system will not be concern with all the information. Instead the user needs to access only part of the database, so a view level is defined.

Level Database Architecture