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**DBMS Lab Assignment#2**

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**Simplified Database System Organization:**

The term database system refers to an organization of components that define and regulate the collection, storage, management, and use of data within a database environment. In a high level view the database system is composed of the following five major parts.

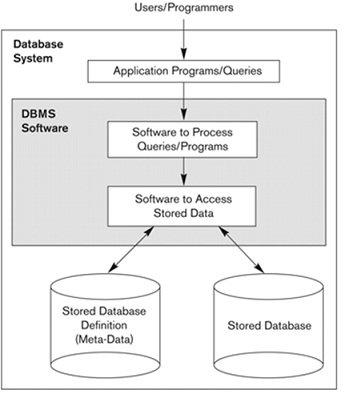
* Hardware
* Software
* People
* Procedures
* Data

Hardware Components in a Database System Environment

Hardware identifies all the system's physical devices. It includes computers, computer peripherals, network components etc.

Software Components in a Database System Environment

Software refers to the collection of programs used within the database system. It includes the operating system, DBMS Software, and application programs and utilities.



**Approaches to Management of data**

* **File system Approach:**
* Programming with files or file-processing
* Files linked to a specific application
* Structure of data files is embedded in the application programs

**Drawbacks**

* + File structure changes usually result in program changes
  + Data redundancy or duplication
    - Wasted space
    - Naming problems
    - Inconsistency because of lack of synchronization in updating the duplicated data
* **Database Approach:**
* A single repository of data which is accessed by various users
* Database system contains the database and a complete description of the database called meta-data

**Advantages**

* Program - data independence
* Ability to change data structure without making changes to the programs
* User is not constrained by the physical organization of data

**Disadvantages**

* Need for DBMS software which could be expensive
* Larger hardware configuration may be needed
* Dedicated staff

**Database Vs File system**

In the database approach, a single repository of data is maintained that is defined once then accessed by various users. The major differences between database and File are:

* Self-describing of a database
* Insulation between programs and data
* Support of multiple views of the data
* Sharing of data and multiuser transaction processing

**Three level architecture in DBMS**

An early proposal for a standard terminology and general architecture database a system was produced in 1971 by the DBTG (Data Base Task Group) appointed by the Conference on data Systems and Languages. The DBTG recognized the need for a two level approach with a system view called the schema and user view called subschema. The American National Standard Institute terminology and architecture in 1975.ANSI-SPARC recognized the need for a three level approach with a system catalog.

**There are following three levels or layers of DBMS architecture:**

1. Extenal Level

2. Conceptual Level

3. Internal Level

**1. External Level**: - External Level is described by a schema i.e. it consists of definition of logical records and relationship in the external view. It also contains the method of deriving the objects in the external view from the objects in the conceptual view.

**2.** **Conceptual Level**: - Conceptual Level represents the entire database. Conceptual schema describes the records and relationship included in the Conceptual view. It also contains the method of deriving the objects in the conceptual view from the objects in the internal view.

**3. Internal Level: -**Internal level indicates hoe the data will be stored and described the data structures and access method to be used by the database. It contains the definition of stored record and method of representing the data fields and access aid used.

A mapping between external and conceptual views gives the correspondence among the records and relationship of the conceptual and external view. The external view is the abstraction of conceptual view which in turns is the abstraction of internal view. It describes the contents of the database as perceived by the user or application program of that view.

A mapping between conceptual records from the physical database.

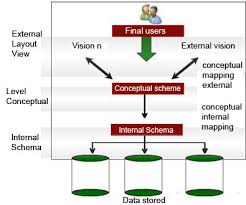


Fig: Three layer architecture of DBMS

**Advantages And Disadvantages of DBMS**

**Advantages:**  
The DBMS serves as the intermediary between the user and the database. The database structure itself is stored as a collection of files, and the only way to access the data in those files is through the DBMS. The DBMS receives all application requests and translates them into the complex operations required to fulfill those requests. The DBMS hides much of the database’s internal complexity from the application programs and users.  
**The different advantages of DBMS are as follows.**  
1. **Improved data sharing.**  
The DBMS helps create an environment in which end users have better access to more and better-managed data. Such access makes it possible for end users to respond quickly to changes in their environment.  
**2. Improved data security.**  
The more users access the data, the greater the risks of data security breaches. Corporations invest considerable amounts of time, effort, and money to ensure that corporate data are used properly. A DBMS provides a framework for better enforcement of data privacy and security policies.  
**3. Better data integration.**  
 Wider access to well-managed data promotes an integrated view of the organization’s operations and a clearer view of the big picture. It becomes much easier to see how actions in one segment of the company affect other segments.  
**4. Minimized data inconsistency.**  
 Data inconsistency exists when different versions of the same data appear in different places. For example, data inconsistency exists when a company’s sales department stores a sales representative’s name as “Bill Brown” and the company’s personnel department stores that same person’s name as “William G. Brown,” or when the company’s regional sales office shows the price of a product as $45.95 and its national sales office shows the same product’s price as $43.95. The probability of data inconsistency is greatly reduced in a properly designed database.  
**5. Improved data access.**  
The DBMS makes it possible to produce quick answers to ad hoc queries. From a database perspective, a query is a specific request issued to the DBMS for data manipulation—for example, to read or update the data. Simply put, a query is a question, and an ad hoc query is a spur-of-the-moment question. The DBMS sends back an answer (called the query result set) to the application. For example, end users, when dealing with large amounts of sales data, might want quick answers to questions (ad hoc queries) such as:  
- What was the dollar volume of sales by product during the past six months?  
- What is the sales bonus figure for each of our salespeople during the past three months?  
- How many of our customers have credit balances of $3,000 or more?  
**6. Improved decision making.**  
Better-managed data and improved data access make it possible to generate better-quality information, on which better decisions are based. The quality of the information generated depends on the quality of the underlying data. Data quality is a comprehensive approach to promoting the accuracy, validity, and timeliness of the data. While the DBMS does not guarantee data quality, it provides a framework to facilitate data quality initiatives.  
**7. Increased end-user productivity.**  
The availability of data, combined with the tools that transform data into usable information, empowers end users to make quick, informed decisions that can make the difference between success and failure in the global economy.  
  
**Disadvantages**   
  
Although the database system yields considerable advantages over previous data management approaches, database systems do carry significant disadvantages. For example:  
**1. Increased costs.**  
Database systems require sophisticated hardware and software and highly skilled personnel. The cost of maintaining the hardware, software, and personnel required to operate and manage a database system can be substantial. Training, licensing, and regulation compliance costs are often overlooked when database systems are implemented.  
**2. Management complexity.**  
Database systems interface with many different technologies and have a significant impact on a company’s resources and culture. The changes introduced by the adoption of a database system must be properly managed to ensure that they help advance the company’s objectives. Given the fact that database systems hold crucial company data that are accessed from multiple sources, security issues must be assessed constantly.  
**3. Maintaining currency.**  
To maximize the efficiency of the database system, you must keep your system current. Therefore, you must perform frequent updates and apply the latest patches and security measures to all components. Because database technology advances rapidly, personnel training costs tend to be significant. Vendor dependence. Given the heavy investment in technology and personnel training, companies might be reluctant to change database vendors. As a consequence, vendors are less likely to offer pricing point advantages to existing customers, and those customers might be limited in their choice of database system components.  
**4. Frequent upgrade/replacement cycles.**  
DBMS vendors frequently upgrade their products by adding new functionality. Such new features often come bundled in new upgrade versions of the software. Some of these versions require hardware upgrades. Not only do the upgrades themselves cost money, but it also costs money to train database users and administrators to properly use and manage the new features.

Drawback of file system to store data

File structure changes usually result in program changes

Data redundancy or duplication

Wasted space

Naming problems

Inconsistency because of lack of synchronization in updating the duplicated data