

Database Fundamentals & Design



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October 2012



Agenda

- Data & Information.
- File Based System.
- What is Database, Database System?
- DBMS & its functions.
- Database Properties.
- Advantages and Disadvantages of Database Systems.
- DB Architecture.
- Who Deals with Database.
- Data Models.



Data & Information

- Data is the raw input (numbers, characters, images...) which when processed or arranged makes **meaningful output** (Information)
- Data is the lowest level of knowledge and information is the second level.
- Data by itself alone is not significant. Information is significant by itself.
- Observations and recordings are done to obtain data, while analysis and processing are done to obtain information.



File Based System

- It is a collection of programs that perform services for the end user.
- Each Program defines and manages its own data.
- **Limitations:**
 - ✓ Isolation of data
 - ✓ Duplication of data
 - ✓ Program Data Dependence
 - ✓ Incompatible File Formats



What is a database?

- “A database is an organized collection of **related data**.”
- The data is typically organized to model relevant aspects of reality in a way that supports processes requiring this information

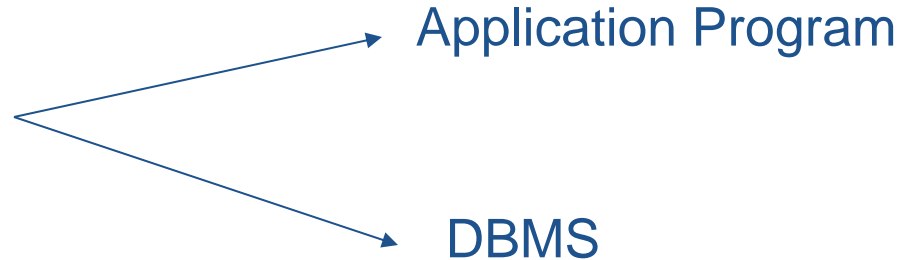


Database System

- A database system is composed of :

- ✓ The database.

- ✓ The Software.





Database Management System (DBMS)

- It is the **intermediate layer** between the database and the programs that access the data.
- It is **collection of programs** that enables users to create and maintain a database.



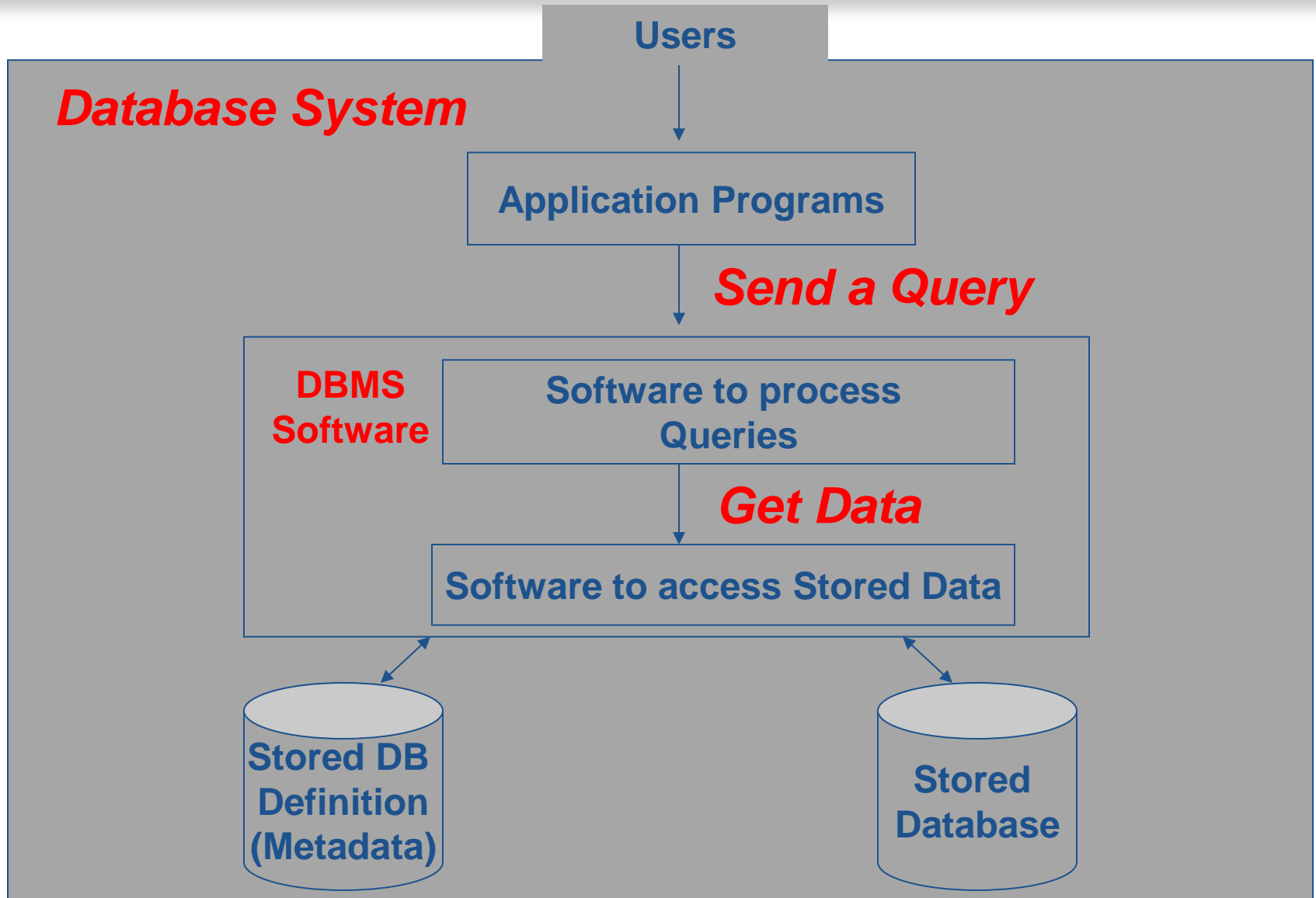


DBMS Functions

- Defining Database.
- Constructing Database.
- Manipulating Database.
- Data Independence.
- Data Security & Integrity.
- Concurrency.
- Backup & Recovery.
- Data Dictionary (Meta Data).
- Performance.



Database System (cont.)





Database Properties

- Self-describing nature.
- Insulation between program and data.
- Sharing of data and multi-user transaction processing.



Advantages of Database

- Redundancy can be reduced.
- Inconsistency can be avoided.
- Data can be shared.
- Security restrictions can be applied.
- Enforcing Integrity Constraints.
- Providing Backup and Recovery.



Disadvantages of Database

- It needs expertise to use (which is expensive).
- DBMS itself is expensive.
- DBMS may be incompatible with any other available DBMS.

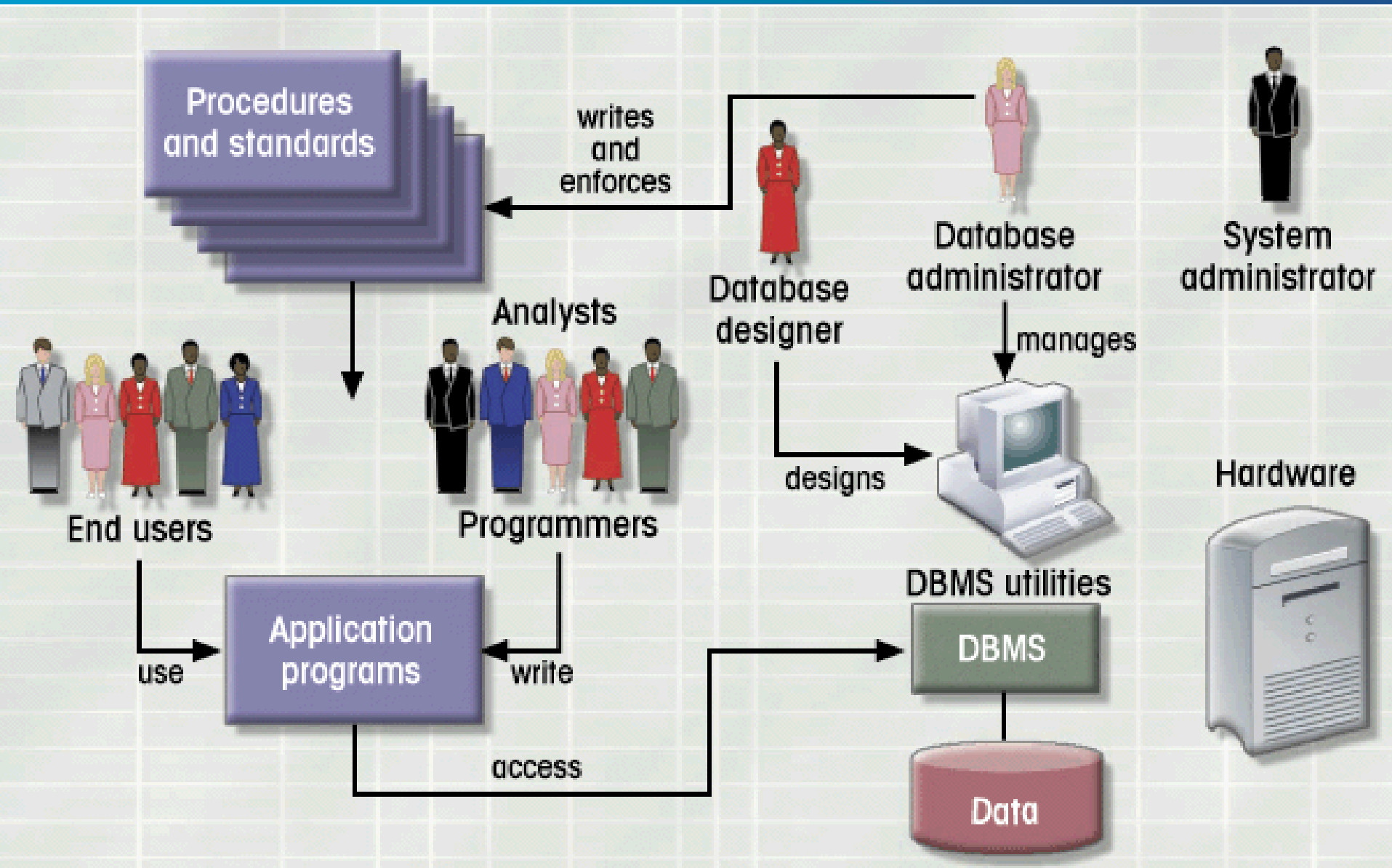


Database Architecture

- The Three Levels of the Architecture.
 - Mapping.
 - Advantages of the Architecture.
 - How does the Application Program Access the Database.



Who deals with a database?





Data Models

- **Conceptual data model:**
provides logical representation of the structure of a database.
- **Physical data model :**
describes how data is stored in the computer and the access path needed to access and search for data.



Database Model

- Relational.
- Network.
- Hierarchical.



Summary

- Define DB & DB System.
- DB Properties.
- Advantages and Disadvantages of Database Systems.
- DBMS & its functions.
- DB Architecture.
- Who Deals with Database.

Thank You...

