DATABASE MANAGEMENT SYSTEMS

Associate Professor Dr. Raed Ibraheem Hamed

University of Human Development, College of Science and Technology
Computer Science Department

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Points to Cover

- Phases of Database Design
- Models
- Conceptual model: Entity-Relationship
- Critical Success Factors in Database
- Design Goals
- Database Dictionary
- Benefits of a Data Dictionary System
- Creating the Data Dictionary
- Logical and Physical Access Paths
- Distributed Databases

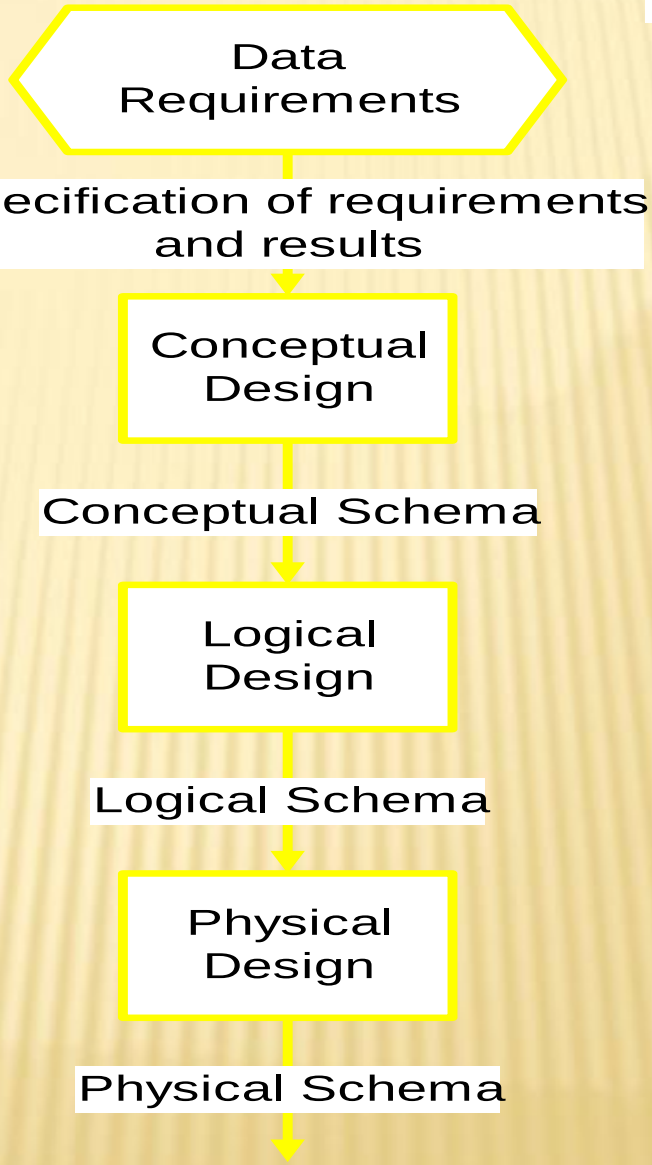
What is a design methodology?

A structured approach that uses procedures, techniques, tools, and documentation aids to support and facilitate the process of design.

Phases of Database Design

- **Conceptual design** begins with the collection of requirements and results needed from the database (ER Diag.)
- **Logical schema** is a description of the structure of the database (Relational, Network, etc.)
- **Physical schema** is a description of the implementation (programs, tables, dictionaries, catalogs

Phases of Database Design



Critical Success Factors in Database Design

- Work interactively with the users as much as possible.
- Follow a structured methodology throughout the data modelling process.
- Employ a good documentation .
- Incorporate structural and integrity considerations into the data models.
- Combine conceptualization, normalization, and transaction validation techniques into the data modelling methodology.

Why is it important to know the design method

As an information technology professional you should know:

- ✓ **the basic elements of the database**
- ✓ **how to design and to build the database**
- ✓ **how to design systematically and formally**
- ✓ **how to document the design for future maintenance**

Design Goals

There are many goals for the design of a database.

- The database is comprehensive: it includes all the needed data and connections.
- The database is understandable: there is a clear structure which leads to easy,
- The database is expandable: it is possible to change the structure of the database
- The database can be used in many organizations: the database can be adapted to different kinds of environments

Database Dictionary

Database about a database. data dictionary defines the structure of the database itself (not that of the data held in the database) and is used in control and maintenance of large databases.

Among other items of information, it records

1) what data is stored,
2) name, description, and characteristics of each data element,
3) types of relationships between data elements,
4) access rights and frequency of access.

Database Dictionary Example

Field Name	Field size	Data type	Description
Person ID No.	6	Number	Person ID No. of persons
First name	20	Text	First name of person
Address	40	Text	Address of person
Gender	1	Boolean	Gender of person

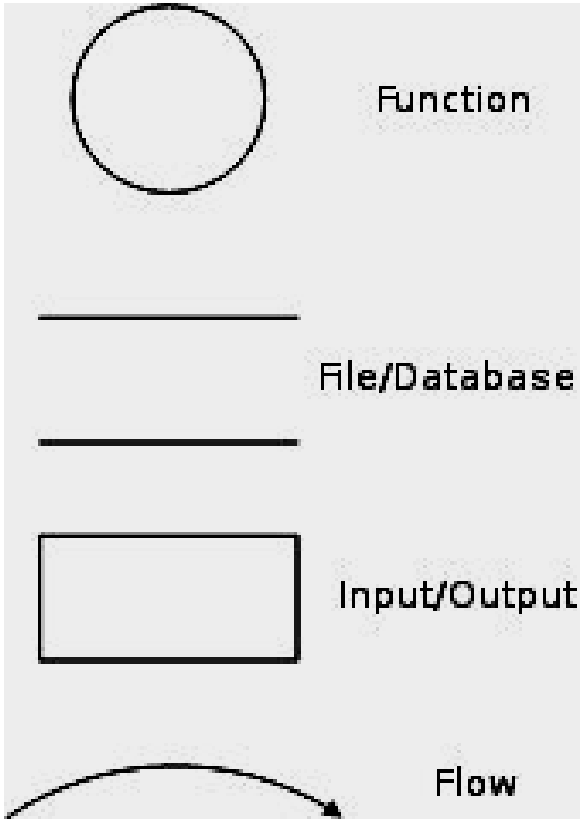
Benefits of a Data Dictionary System

Benefits of a DDS are mainly due to the fact that it is a central store of information about the database. Benefits include –

- improved documentation and control
- consistency in data use
- easier data analysis
- reduced data redundancy
- simpler programming
- the enforcement of standards
- better means of estimating the effect of change.

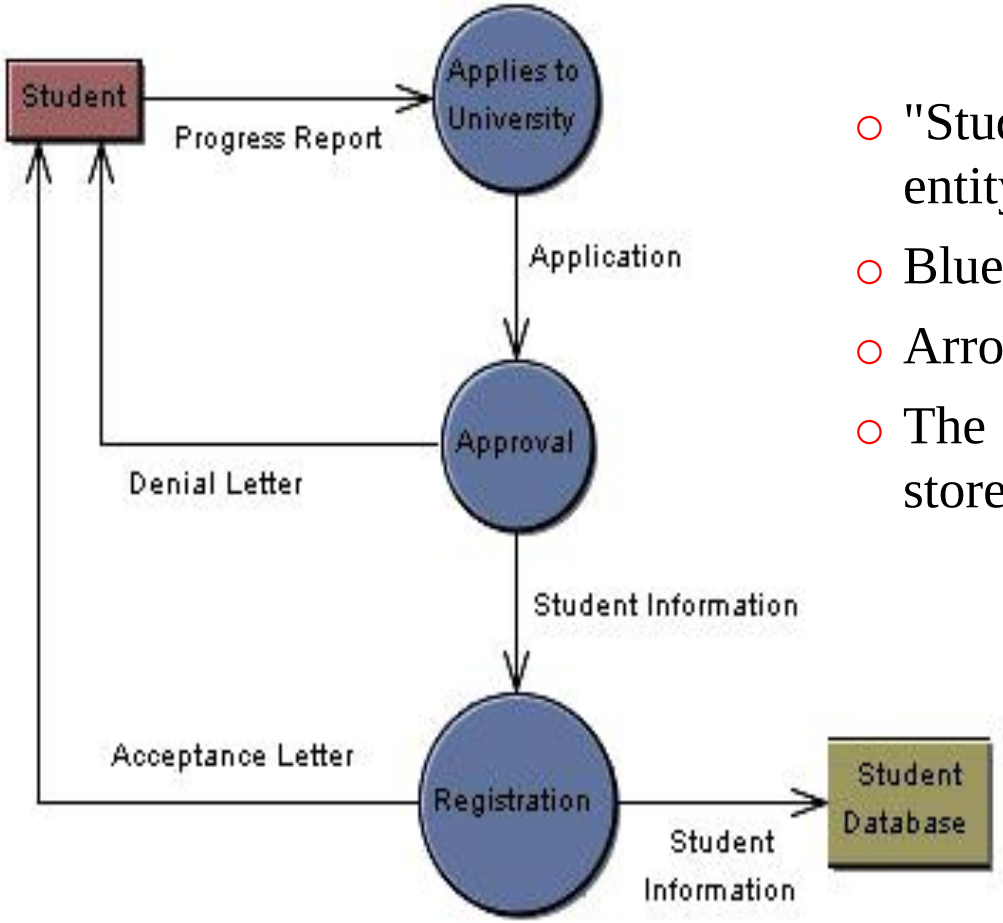
Data Flow Diagram

A **data flow diagram** (**DFD**) is a design tool to represent the flow of data through an information system.



Here are the basic DFD shapes

Data Flow Diagram Example

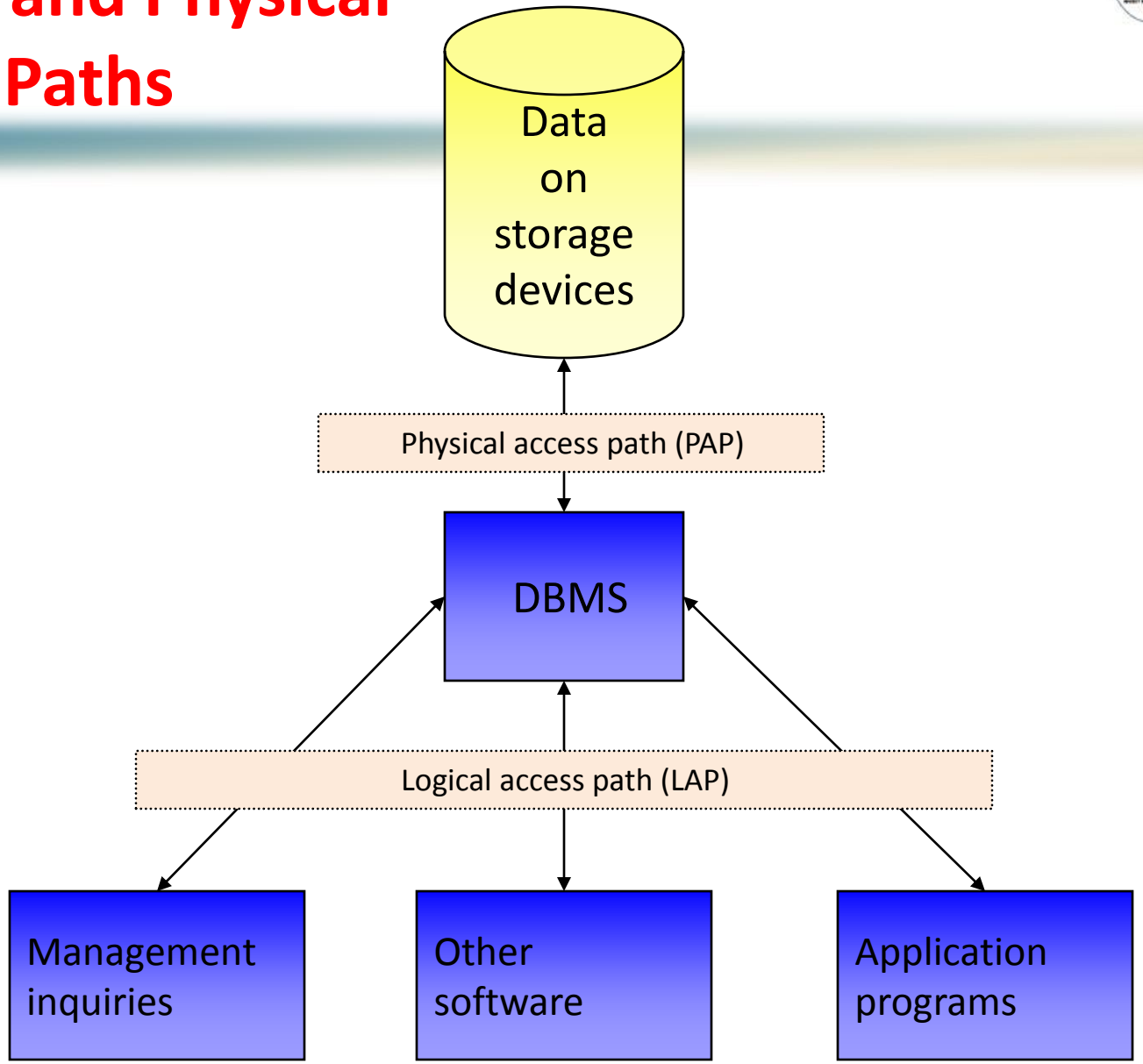


- "Student" box is an external entity.
- Blue circles are data processing.
- Arrows are data flows.
- The "Student database" is a data store.

Logical and Physical Access Paths

- **Logical access path (LAP)**
  - Application requires information from the DBMS
- **Physical access path (PAP)**
  - DBMS accesses a storage device to retrieve data

Logical and Physical Access Paths



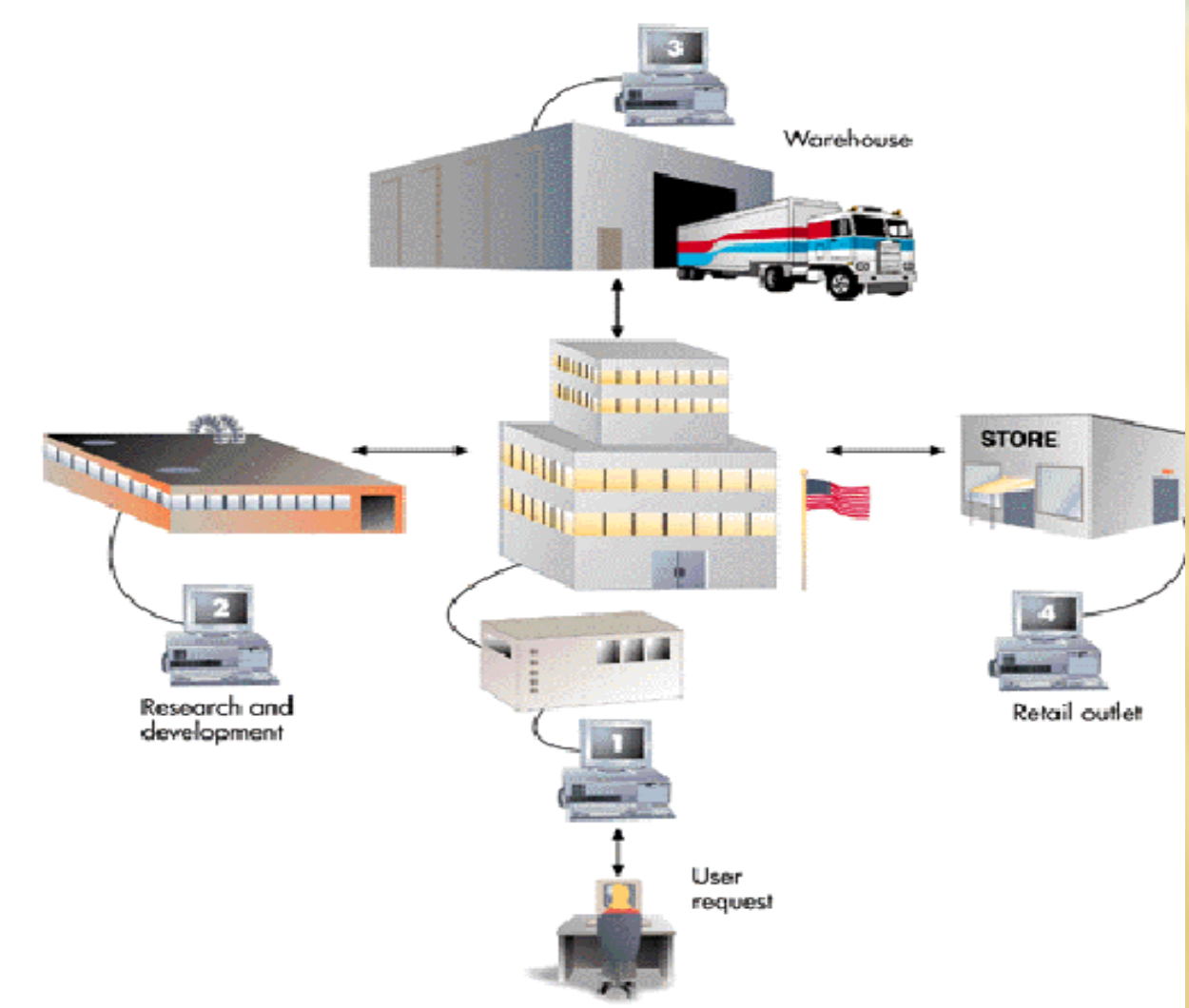
Distributed Database Definition

A distributed database is a database in which portions of the database are stored on multiple computers within a network. Users have access to the portion of the database at their location so that they can access the data relevant to their tasks without interfering with the work of others.

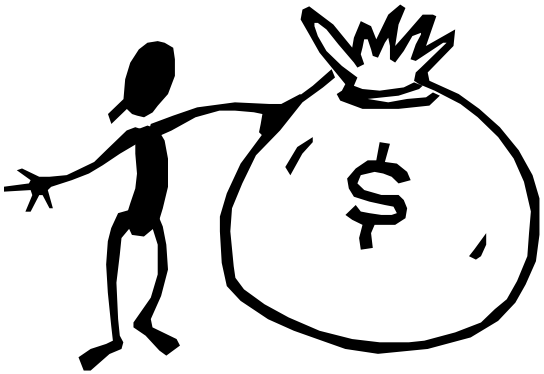
Advantages of Distributed Database

1. Hardware, operating-system, network, DBMS, and location independence
2. Systems can be modified easily
3. Cost less
4. Protection of valuable data
5. Easier expansion
6. Single-site failure does not affect performance of system.

Distributed Databases



Thank you



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