

DATABASE MANAGEMENT SYSTEM

LECTURE - 1

WHAT IS DATABASE

A database is just a way of storing and organizing data and processed to get information.

It is organized in such a way that it can be easily accessed, managed, and updated.



APPLICATIONS OF DATABASE

Some Applications that actually use DBMS



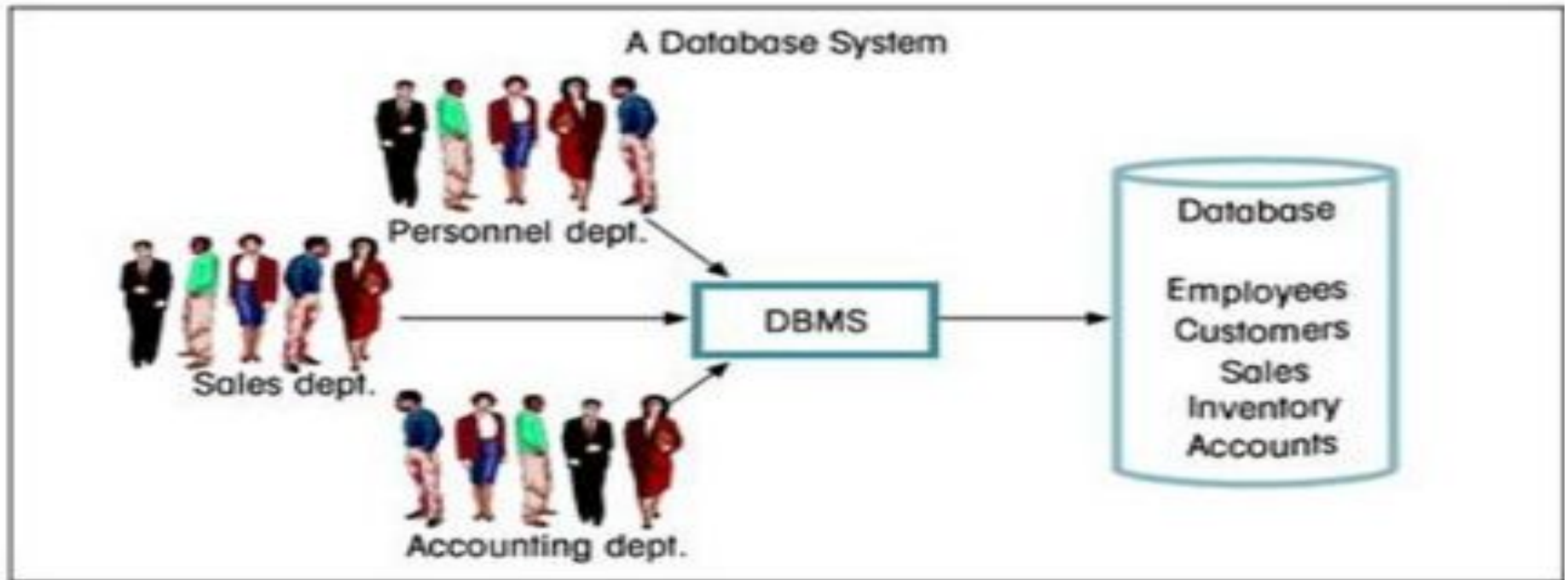
GROUP ACTIVITY – DESIGN DATABASE

- 1. Reservation of tables in a restaurant**
- 2. Reservation of Books in a library**
- 3. Managing your mobile phone address book with categories (friends, family, business, etc.)**
- 4. Managing your family tree with all details**
- 5. Reservation of seats for a reality show**
- 6. Managing advertisements for your friends music performance**
- 7. Managing exam time table**
- 8. Managing your expenses with categories (academic, sports, entertainment, travel, etc.)**
- 9. Managing your appointments (your calendar)**
- 10. Managing your documents (digi locker)**
- 11. Managing Important Events in your calendar (friends birthday, parents wedding anniversary, renewal of vehicle insurance, etc.)**
- 12. Managing guests for an event (Ex: Inter Collegiate competition special guests)**
- 13. Managing participants for a competition**
- 14. Managing menu in a restaurant**
- 15. Managing your workout schedules**
- 16. Managing your mobile usage**

TERMINOLOGIES

- **Data ?** -- Raw facts represented with alphabets, digits, special characters
 - No meaning to this
- Ex: 10 – What it means is not clear unless associated with a unit as Rs. 10 or 10 AM etc – Associated with meaning data becomes information
- **Database ? (DB)**– Organized way of storing the data – collection of **inter related data** stored together with **controlled redundancy**
 - Inter related data – data pertaining to one context or domain
 - Ex: Student DB need not have information on his property details, gadgets available, etc
 - Controlled redundancy – do not repeatedly store same data
 - Ex: Store only Reg. no and not name, class etc in all locations
- **Database Management ? (DBM)** – Manage DB such add new details, modify details, delete, retrieve etc,
- **Database Management System ?** – A software or a set of programs to perform DBM
- **Why ?** – Ease of use for all actors involved (service provider, customer, administrator etc).

FILE VS DBMS

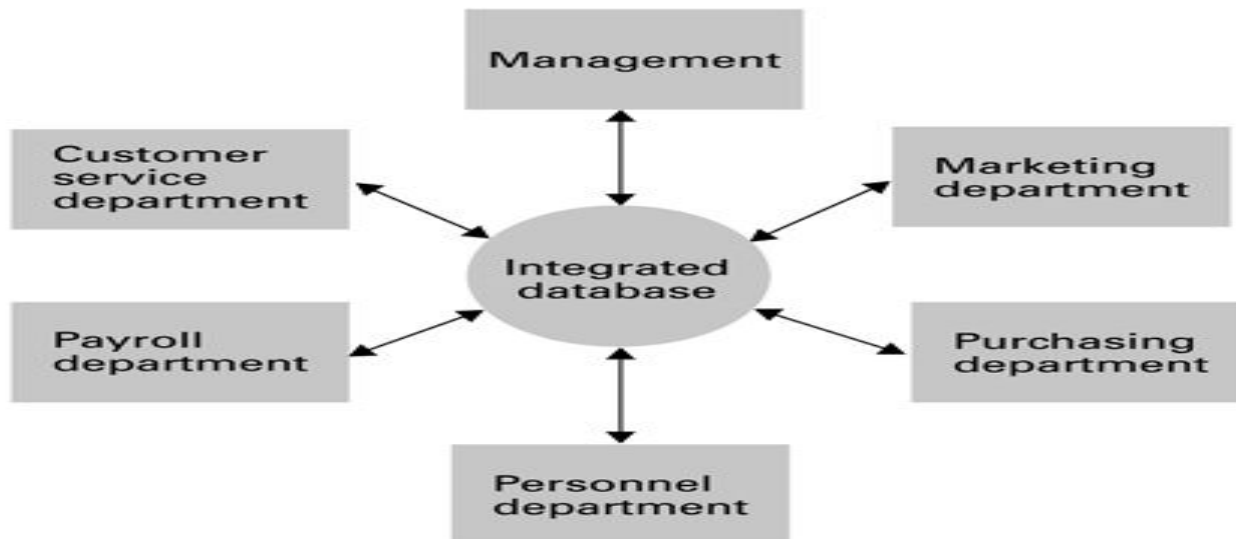


A FILE VERSUS A DATABASE ORGANIZATION

a. File-oriented information system



b. Database-oriented information system



FILE VS DATABASE

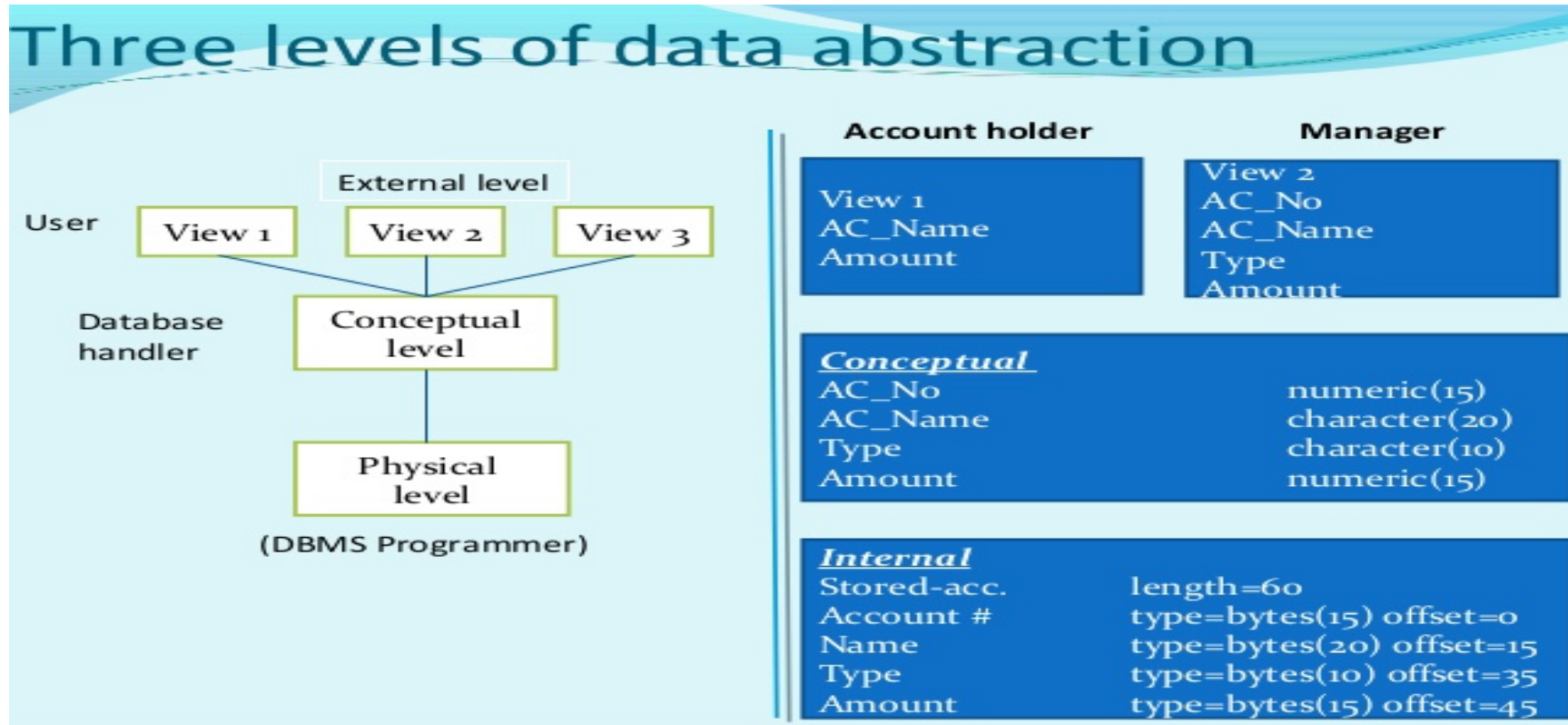
Bases	DBMS	Flat file system
Definition	DBMS is a collection of interrelated data and software programs to access those data.	Flat file system stores data in a plain text file. Here, the records are specified in a single line.
Data redundancy	There is no problem of data redundancy.	There is main problem of data redundancy.
Cost	DBMS software are very costly and also regular update makes it costly.	Flat file are cost effective.
Use	Mostly, large organizations use DBMS who can afford it and have a large number of client and employees to be managed.	Small organizations use it as it is cost effective and who have to deal with small number of clients and employees.
Views	Views are created and an employees can't see all information available, hence there is security.	Any information can be seen by anyone, hence there is no security.

DATA ABSTRACTION

View level: What data users see

Conceptual level: What data is stored

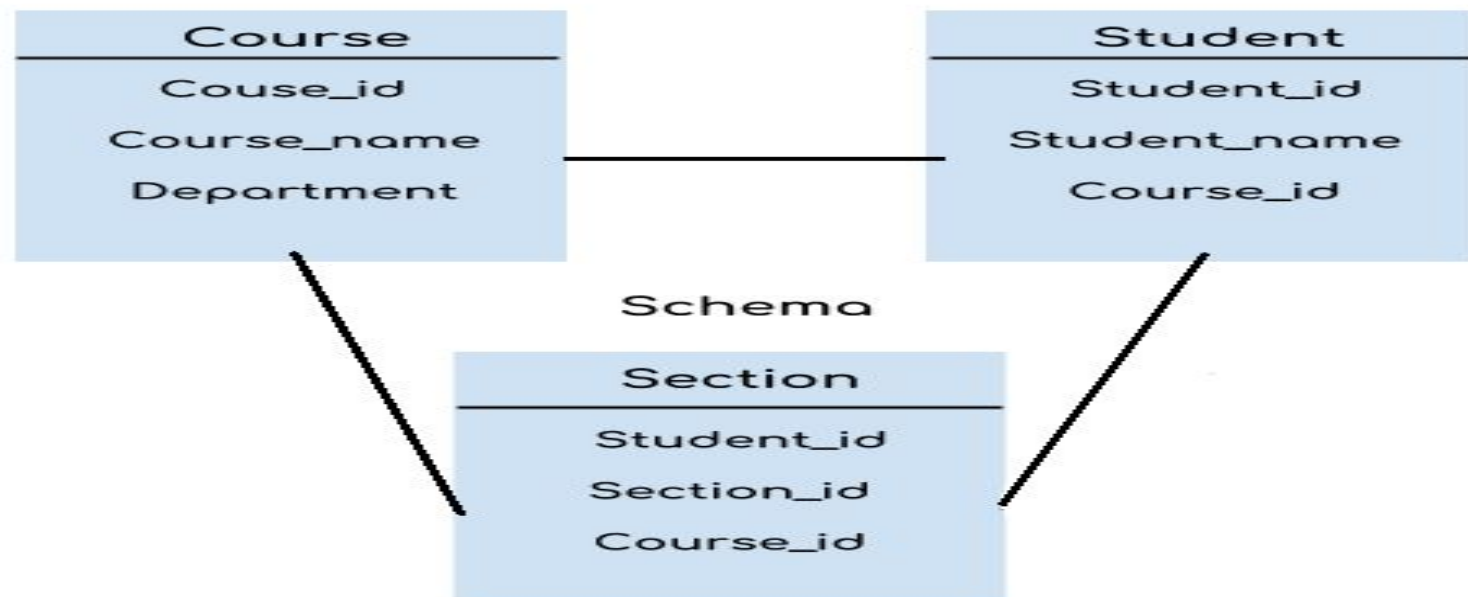
Physical level: How data is actually stored



SCHEMA AND SUB SCHEMA

A **schema** is a **description** of the entire database structure that is used by the database software to maintain the database.

A **subschema** is a **description** of only that portion of the database pertinent to a particular user's needs.



INSTANCES

Course_id	Course_name	department
19CSE101	COMPUTER SYSTEM ESSENTIAL	CSE
15CSE302	DBMS	CSE
15CSE180	C PROGRAMMING	CSE
15MAT121	LINEAR ALGEBRA	MATHS

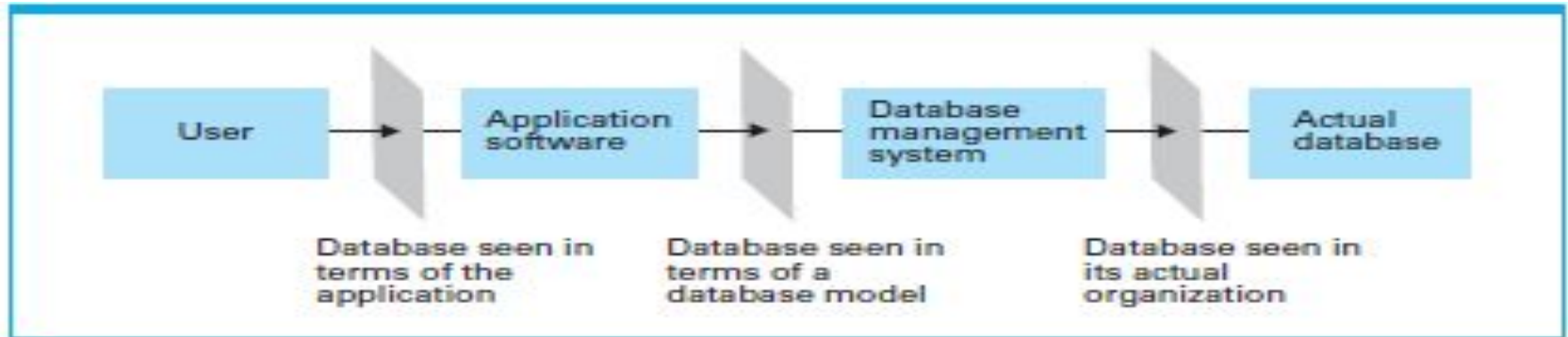
→ INSTANCE

- The data stored in database at a particular moment of time is called instance.
- For example, lets say we have student table ,today the table has 100 records, so today the instance of the database has 100 records.
- Tomorrow we add another 100 records ,so the instance of database tomorrow will have 200 records in table
- How many instances are there in the course table given above? – One instance with 4 records

THE CONCEPTUAL LEVEL

A typical database application involves multiple software layers, categorized into two major layers—an application layer and a database management layer.

The application layer handles the communication with the user and the database.



Mobile User ---

WhatsApp --

(Application S/w)

Manage groups –

(DBMS)

Actual DB (in phone)

(Phone DB)

THE CONCEPTUAL LAYER

Once the application software has determined what action the user is requesting, it uses the DBMS as an abstract tool to obtain the results.

If the request is to add or delete data, it is the DBMS that actually alters the database.

If the request is to retrieve information, it is the DBMS that performs the required searches.

THE CONCEPTUAL LAYER – ADVANTAGES

DBMS and application software are separated

Abstraction : Need not know all details of the database the details of how the database is actually stored are isolated within the DBMS, the design of the application software can be greatly simplified.

Security: Access to the DB is controlled

Data independence: The ability to change the organization of the database itself without changing the application software. (Move from one Phone to another without loss of any data or anything new)

ADVANTAGES OF DBMS

Minimize Data Redundancy

For example: A student record in college has to be accessed by exam cell, Department, hostel, library etc can contain duplicate values, but when they are converted into a single database, all the duplicate values are removed. Data can be accessed from database

ADVANTAGES OF DBMS

Sharing Of Data

Data can be shared between authorized user of database. All the users have their own right to access the database up to a level. Database Administration has complete access of database.

Eg: Read access- can only view the database

Students cannot access profile of teaching faculty for any updation in AUMS

Write access – can view as well as make changes

Faculty can do updation of student mark in AUMS

ADVANTAGES OF DBMS

Data consistency

By reducing data redundancy ensures, all copies of the data are kept consistent. Reduce updating errors

Eg: Any changes made in student A address should be same where ever Student A address is stored

ADVANTAGES OF DBMS

Security

The data stored in DBMS is more secure as everyone don't have permission to access the database. Some are given only to view data where as some are given privilege to manipulate the data base. So its more secure.

Eg: customers don't have privilage to manipulate items listed out in online shopping website, while manipulation can be done in the items selected by the customer.

DISADVANTAGES OF DBMS

Database systems are complex, difficult, and time-consuming to design

Substantial hardware and software start-up costs

Damage to database affects virtually all applications programs

Extensive conversion costs in moving from a file-based system to a database system.