UNIT-1

UTS

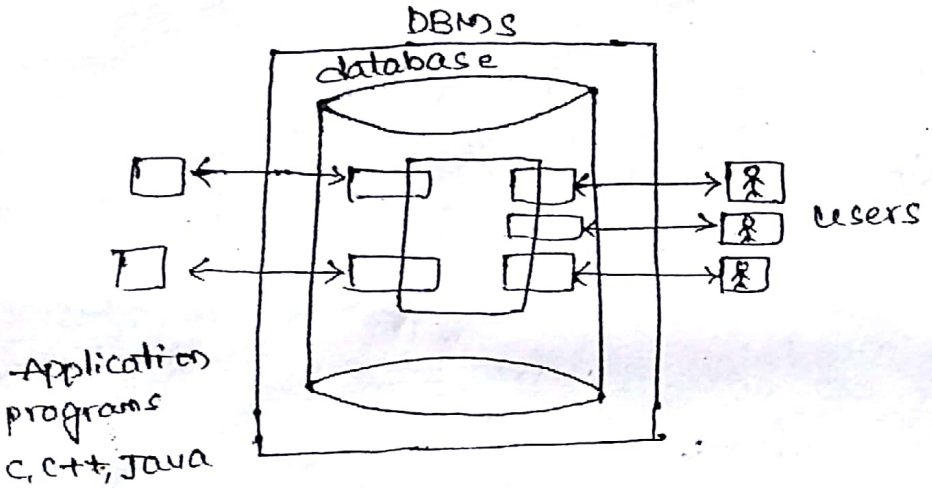
- What is Database system :-

Database :- Database is a collection of related data.

DBMS :- It is a slw which is used to manage the data base.

Eg :- Oracle, mySQL, SQL, PLSQL etc..;

The endusers can access the data with the help of Application programs and DBMS slw, the end users can access the database directly by using DBMS slw at the same time the Application programs cannot directly access the database.



Ex :- 1. Banking :-

customer information, accounts, loans and Banking transactions.

2. Airlines :-

Reservations, and scheduled information.

3. universities :-

student information, Course Registrations, Grades.

4. Sales :-

customer, product, and purchase information.

Database characteristics :-

(1) Structured and described data :- It is a fundamental feature of database approach is that the database

System doesn't only contain the data. But, also contains the complete definition and description of these data that means structure, type, format, and relationships between the data. This kind of data is called "meta data". (Data about data).

(2) Seperation of data and application :-
The application slw doesn't need any knowledge about physical storage like encoding, format, storage place. It only communicates through the DBMS slw.

(3) Data Integrity :-
It maintains the quality and reliability of the data of a database system. It also also provides protection from unauthorized users.

(4) Transaction :-
A transaction is a bundle of actions which are done within a database to bring it from one consistent state to a new consistent state.

Ex:- Transfer an amount from one account to another account.

(5) Data persistence :-
In a DBMS maintain all the data as long as long period of time. The data is stored once that they can't be lost.

Components of Database :-

Data :- It is a very important component of the database system. The data acts as a bridge b/w the machine parts (hardware, slw) and users which directly acess it (or) access it through some application program.

Types of data :-

1.) user data :- It consists of a table of data called relation where columns are called fields of attributes and rows are called records.

Metadata :- A description of the structure of data base is known as metadata (data about data).

Ex :- no. of tables and table names.
no. of fields and field names.

Application :- It stores the structure and format of queries, reports and other application components.

Hardware :- The hardware consists of secondary storage devices such as magnetic disk (hard disk, zip disk, floppy disk) optical disk (CD-ROM, magnetic tapes) these data can be store with the help of ilp devices (Keyboard, mouse, printer).

Software :- the software act as a bridge b/w the user and the database. the operations like insert, delete, update perform this DBMS s/w (SQL).

Users :- users, are those persons who need the information from the database. Those persons are :- 1. DBA (Data base Administrator)
2. Data base designers, end users,
3. Application programmers.

• What is database?

⇒ A database is a shared collection of related data used to support the activities of a particular organization. A database is a depository of data that can be accked by various users.

Properties :-

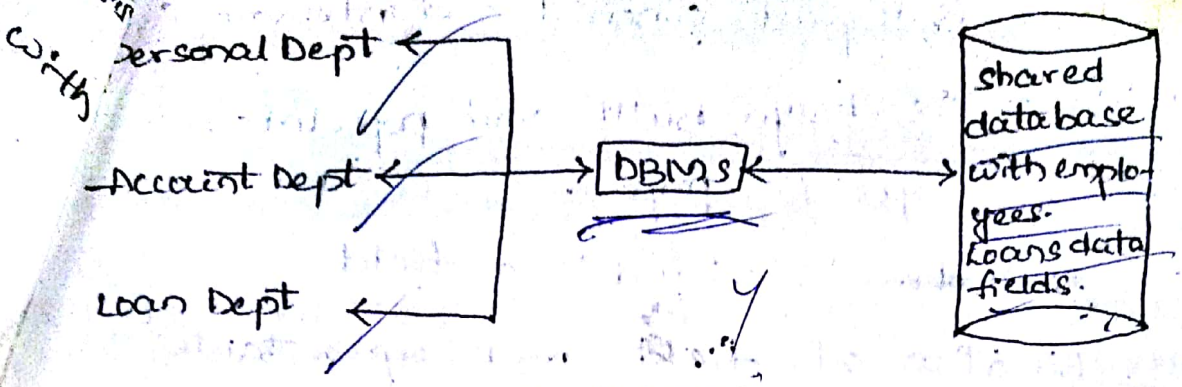
* It is a representation of some aspects like real word information.

* Data base is logical, coherent and internally Consi
* A Data base is design, built and populated with data for a specific purpose.
* Each data item is stored in a field.
* A combination of fields make up a table.

- Data base benefits :- (Why data base).
  * self describing nature of a database system.
  * support for multiple views of data.
  * sharing of data and multiuser system.
  * Control of data redundancy.
  * Data sharing.
  * Data integrity (Data Integrity)
  * Restriction of unauthorized actions
  * Data independence.
  * Backup and recovery factilities.

- DBMS :-
  - Data base management system is a Collection of related data and set of programs which is used to store data and acess the data into the database.
  - DBMS is a general purpose s/w that facilitates the process of defining, constructing and manipulating data bases for various Applications.

goals :-
* manage large bodies of information.
* provide convinent and efficient way to store and Access the information.
* To secure information against system failures.
* permit data to be shared among multiple users.



Bank DBMS

Advantages of DBMS:-

Data independence:- meta data itself follows a layered architecture, so that when we change the data at one layer, it doesn't effect the data at another layer. this data is independent. This ability is called Data independence.

Efficient data access:-

DBMS utilizes a variety of techniques to store and retrieve data efficiently.

Data integrity and security:-

If the data is always accessed through the DBMS slw and protects the data from unauthorized users.

Concurrent access and crash recovery:-

Data base allow multiple users to access the data concurrently. Any difficulties are occurred we get easily retrieve data by using backup and recovery facilities.

Data administration:-

share

Experienced person is needed to access and store the data to multiple users that person is called as data base administration.

Reduce application data time:-

It takes the limited period of time to develop slw Applications.

Disadvantages of DBMS :-

Danger of a overkill :- Small and simple applica for single user of a Database system is often not advisable.

Complexity :- A Database system creates additional complexity and requirements. Several users access the DBMS for data that's why it is quite costly and demanding.

Qualified person :- The profesional of a Database system requires trained staff. Without qualified Database Administrator nothing will work for a long time.

lower efficiency :- It contains lower efficiency. DBMS is a continuous multiuse s/w which is often less efficient than specialized s/w.

DBMS functions :-

Data definition :- The DBMS accepts Data definitions (external, conceptual, internal, associated mapping) in source form and convert appropriate object form (tables).

Data manipulation :- The DBMS must be able to ~~bad~~ handle requests to retrieve, ~~obtained~~ updated (or) delete the existing data in the database.

Data optimization and execution :- The DML requests planned (or) unplanned must be processed by the optimizer.

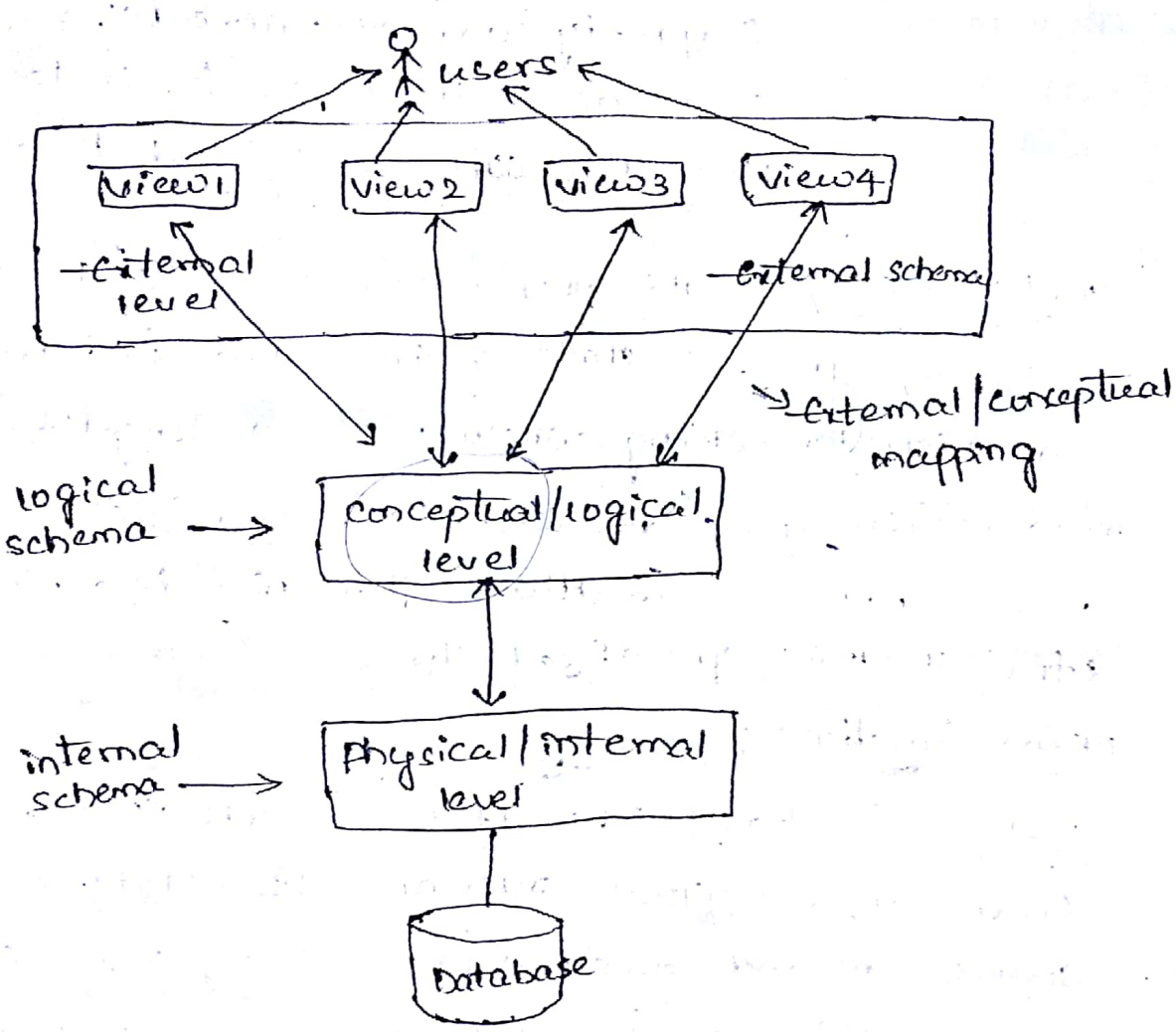
Data security and integrity :-
If the data is always accessed through the DBMS s/w and protects the data from unauthorized users.

Data recovery and Concurrency :-
Data base allow multiple users to access the data concurrently. Any difficulties are occured we get

easily retrieve data by using backup and recovery facilities.

Data dictionary :- The DBMS provide a data dictionary function the Dictionary can be regarded as a database (meta data)

- Architecture of data base :- (3 level Architecture)



Mapping :- The above diagram shows the Architecture of database system.

- Mapping is the process of transforming request, response b/w various database levels of architecture
- Mapping is not good for small database because it takes more time.
- In external/conceptual mapping, DBMS transforms a request on an external schema against the conceptual schema.

- In Conceptual / internal mapping to transform the request from conceptual to internal levels.

physical level :- It describes the storage structure in a database.

- It is also known as internal level.
- This level is very close to physical storage of data
- At lowest level, it is stored in the form of bits with physical Address on the secondary storage devices.
- At highest level, it can be viewed in the form of files.
- Internal schema defines various stored data types. it uses physical database model.

Conceptual level :- It describes the structure of whole database for a group of users.

- It is also called as the 'data model.
- conceptual schema is 'representation' of the entire content of the database.
- These schema contains all the information to build relevant external records.
- It hides the internal details of physical storage.

3. External level :-

- External level is related to the data which is viewed by individual end users.
- This level includes a no. of users views (or) external schemas.
- this level is closest to the user.
- External view describes the segment of

ie database that is required for a particular user group and hides the rest of the database from that user group.

- Relational systems and others :-

The Relational system is a system in which

1. The data is collected by the user as tables
2. present we have to create new applications, the users/operators collected data from old tables. i.e; derive new tables from olden tables.

Difference b/w relational and non-relational :-

- In a relational system the users cease the data as tables.
- In a relational system the user cease other data structures.
- The relational products begin from 1970's to 1980's.

Ex:- oracle 9i from oracle corporation

DB_2 version from IBM.

- The object / relational products begin from late 1980's- early 1990's

Ex:- SQL products, DB_2, informix.

facultyname	salary	Telephone
Anand	45000	3340
Raja	33000	3372
uma	18000	3342
Hari	28000	3341

select * faculty

where salary > 3300

facultyname	salary	Telephone
Anand	45000	3340

- client server system:-

The purpose of database system is to support the development and execution of database applications. The database system having simple two parts structure consisting of server also called Backend, and set of clients also called as frontend.

Server:- The server is nothing but DBMS s/w. It supports all of the basic functions of DBMS. like (data definition, manipulation, security, integrity

client:- The clients are various applications are run on the top of the DBMS (both user written application & building functions)

user written applications:-

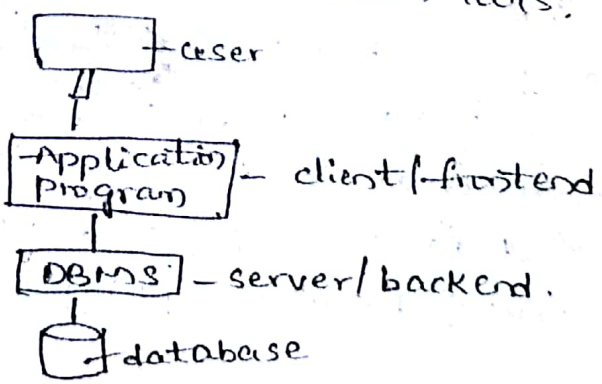
The user written applications are C, CPP, Java.

vendor provided applications:-

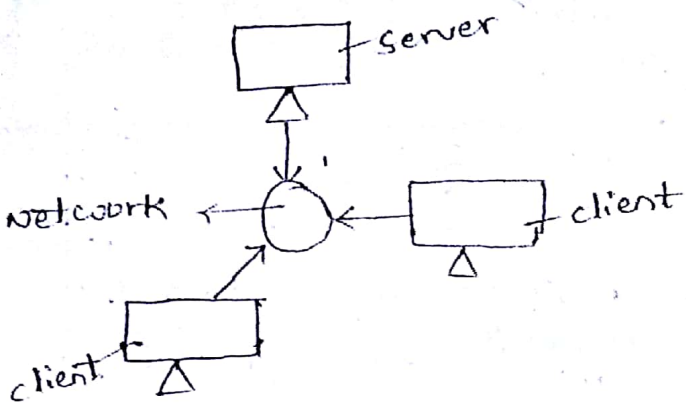
These are often called tools the purpose of the applications is creation and execution of their Applications.

Ex:- Data mining and visualisation tools.

case tools



cess :- The client Applications and server can executed on the single same computer. The client server system also follows distributed processing. The distributed processing is the distinct machines can be connected into communication network.



single data processing task can share multiple (or) several machines in the network (parallel processing).

- DBA and its roles :-

The main reason for using DBMS is to have central control of the both data and the programs that access those data.

A person who has search central control over the system is called a database Administrator.

Roles :-

i) schema definition :- The DBA creates the original data base schema by writing set of definitions i.e; translated by the DDL compiler to a set of tables. i.e; stored permanently in the data dictionaries

ii) storage structure and access method definition :- the programers contain, rare modifications either to a database schema (or) to the description of the physical storage organization by writing set of definition that is used by either the DDL compiler (or) the data storage and DDL compiler generate modifications to the appropriate internal system tables.

iii) Granting of Authorization for data access:-

* Granting different types of authorization allow the database administration for to regulate which parts of the database various users can ac the authorization information is kept in a special syst structure that is consulted by the database system whenever access to the data is attempted in the system.

iv) monitoring performance and responding requirements:-

DBA is responsible for organizing the system. If we want change any requirement about storage we can easily changed through data independence concept.

v) Defining security & integrity constraints:-

security and integrity constraints can be regarded as a part of the conceptual schema the conceptual ddl must include facilities for specifying such constraints.

DBMS functions:-

Data Definition
Data manipulation DML
Data security & Integrity
Data recovery and concurrency
Data Dictionary.
performance.

Dataindependence:-

A database system normally, contain layered architecture to store the data into the database if follow the self describes nature nothing but metadata. so, that when we changed the data at one layer it doesn't effect the data at another level, this data is independent but mapped to each other. this is called data independence, logical data independence.

Logical schema → logical data independence

Physical schema → physical data independence.

The data independence divided into two ways.

1. logical data independence
2. physical data independence.

logical data independence :-

This level describes which data is stored in database and relationship among the data in database.

Ex:- All entities, attributes and their relationship security and integrity information.

* ability to change logical schema without changing the external-physical schemas.

physical data independence :-

This level describes how the data is stored in the database, it covers the data structure and the organization.

* ability to change the physical data without effecting the logical data - external schema.

Ex:- If you want to change different file organization storage devices, structure, indexes should be possible without effecting the conceptual external schema.

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