- Simplicity
- Data Security
- Data Integrity
- Efficiency.

Disadvantages:

- Implementation complexity
- Database Management problems
- Lack of structural independence
- Programming complexity
- Implementation Limitation

4. Physical Data Models :—

Physical data Models are used to describe data at the lowest level. In contrast to logical data models, there are few physical data models in use. Two of the widely known ones are the unifying model and the frame-memory model. Here, the data is stored in Transperancy.

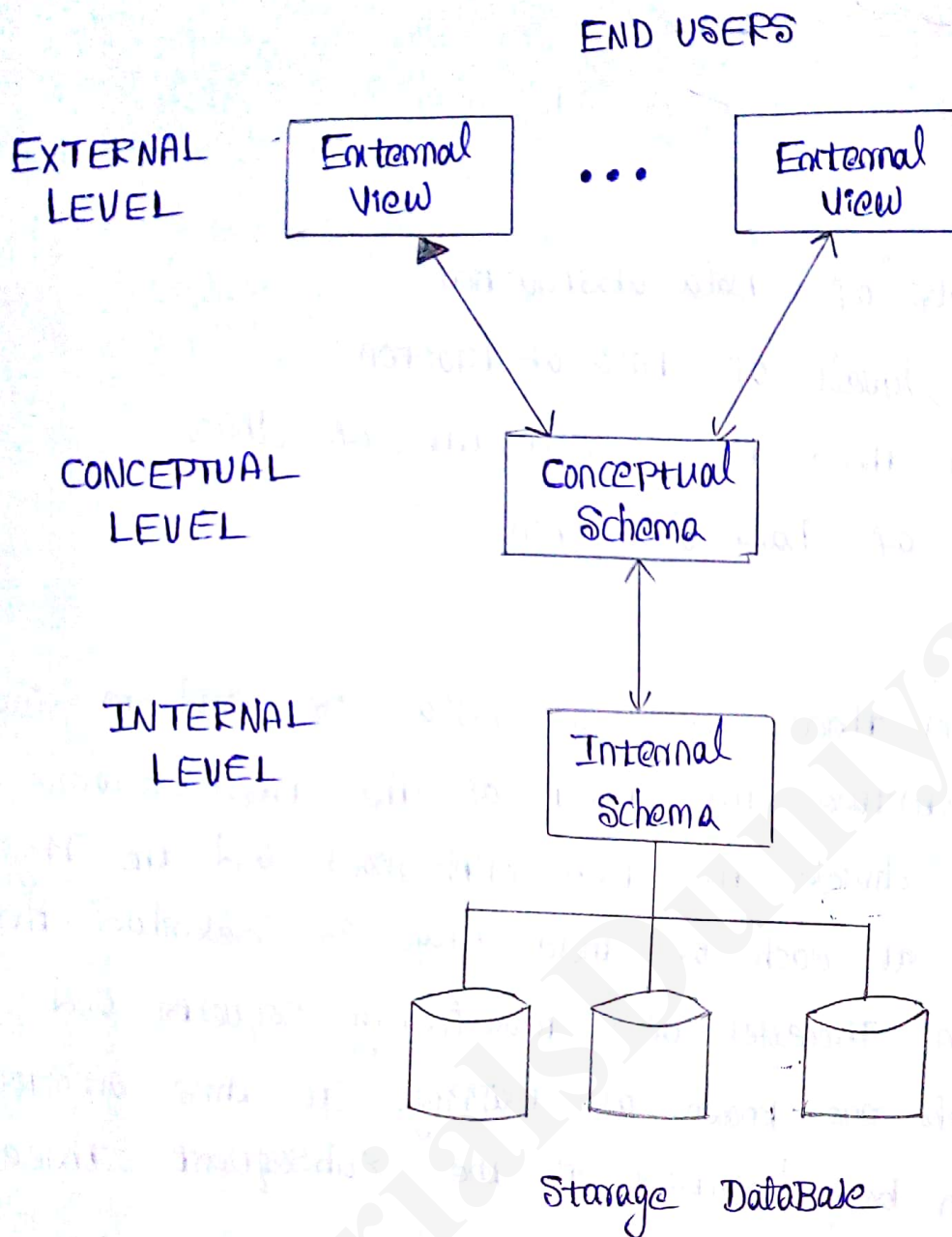**Concept :-** Three tier schema Architecture

FAQ's :-

1. Give the levels of Data abstraction.
2. What are the levels of Data abstraction
3. Draw & explain three tier Architecture of dbms.
4. Different ways of Data abstraction.

Theory :-

A DBMS gives three levels of data is said to follow three -level architecture. The target of the three - schema architecture is to divide the user applications and the Physical database. The view at each of these Stages is described through a schema. The Process of transforming requests and results among levels are known as mappings. In this architecture, schemas can be described at the subsequent three Stages.

External level or Subschema :-

It is the highest level of database abstraction whereas only those Portions of the database of concern to a user or application Program are involved. Any number of user views (some of which may be identical) might exist for a given global or conceptual view Each external view is described through means of a schema known as external or sub schema.

END USERS

EXTERNAL LEVEL — External View ... External View

CONCEPTUAL LEVEL — Conceptual Schema

INTERNAL LEVEL — Internal Schema

Storage DataBase

Conceptual Level or conceptual Schema :-

At these stages of database abstraction all the database entities and the relationships between them are included. One conceptual view represents the whole database. This conceptual view is described through the conceptual. Schema. There is only one conceptual Schema Per database. The description of data at that levels in a format indepedent of its physical representation. It is also involves

features which specify the checks to retain data consistency and Integrity.

Internal level or Physical Schema:—

It is closest to the Physical Storage technique used. It denotes how the data will be stored and elaborates the data structures and access techniques to be used through the database. The internal view is empowered through the internal schema.

Data Base Environment:-

One of the main aims of database is to supply users with an abstract view of data, hiding certain element of how data is stored and manipulated. so, the starting point for the design of a database must be an abstract and general description of the information requirements of the organisation that is to be represented in database. And hence you will require an environment to store data and make it work like a database. Now we are going to know about database environment and architecture.

What is a database Environment?:-

- A database environment is a collective system of components that comprises and regulates the group of data, management and use of data which consists of

(i) software

(ii) hardware

(iii) people

(iv) Techniques of handling database (procedures)

(v) data.

fig:-1.
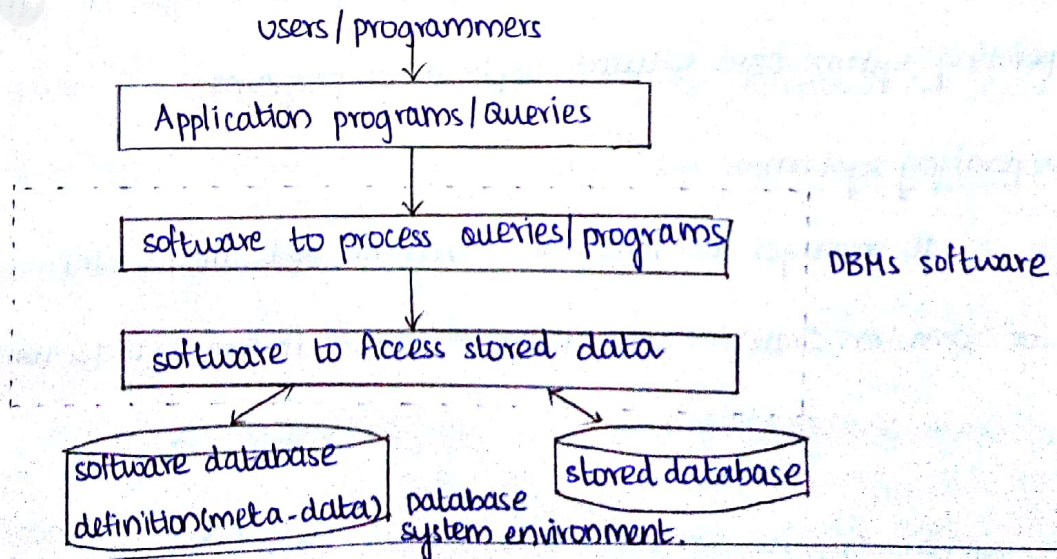
```
                    users / programmers
                           │
                           ▼
            ┌─────────────────────────────────┐
            │  Application programs / Queries   │
            └─────────────────────────────────┘
                           │
        ┌─ ─ ─ ─ ─ ─ ─ ─ ─ ┼ ─ ─ ─ ─ ─ ─ ─ ─ ┐
        │  ┌─────────────────────────────────┐ │
        │  │ software to process queries/programs│  DBMs software
        │  └─────────────────────────────────┘ │
        │                 │                   │
        │  ┌─────────────────────────────────┐ │
        │  │  software to Access stored data  │ │
        │  └─────────────────────────────────┘ │
        └ ─ ─ ─ ─╱─ ─ ─ ─ ─ ─ ─ ─ ╲─ ─ ─ ─ ─ ┘
              ╱                      ╲
      ┌──────────────┐         ┌──────────────┐
      │software database│       │stored database│
      │definition(meta-data)│   └──────────────┘
      └──────────────┘
                    Database
                    system environment.
```
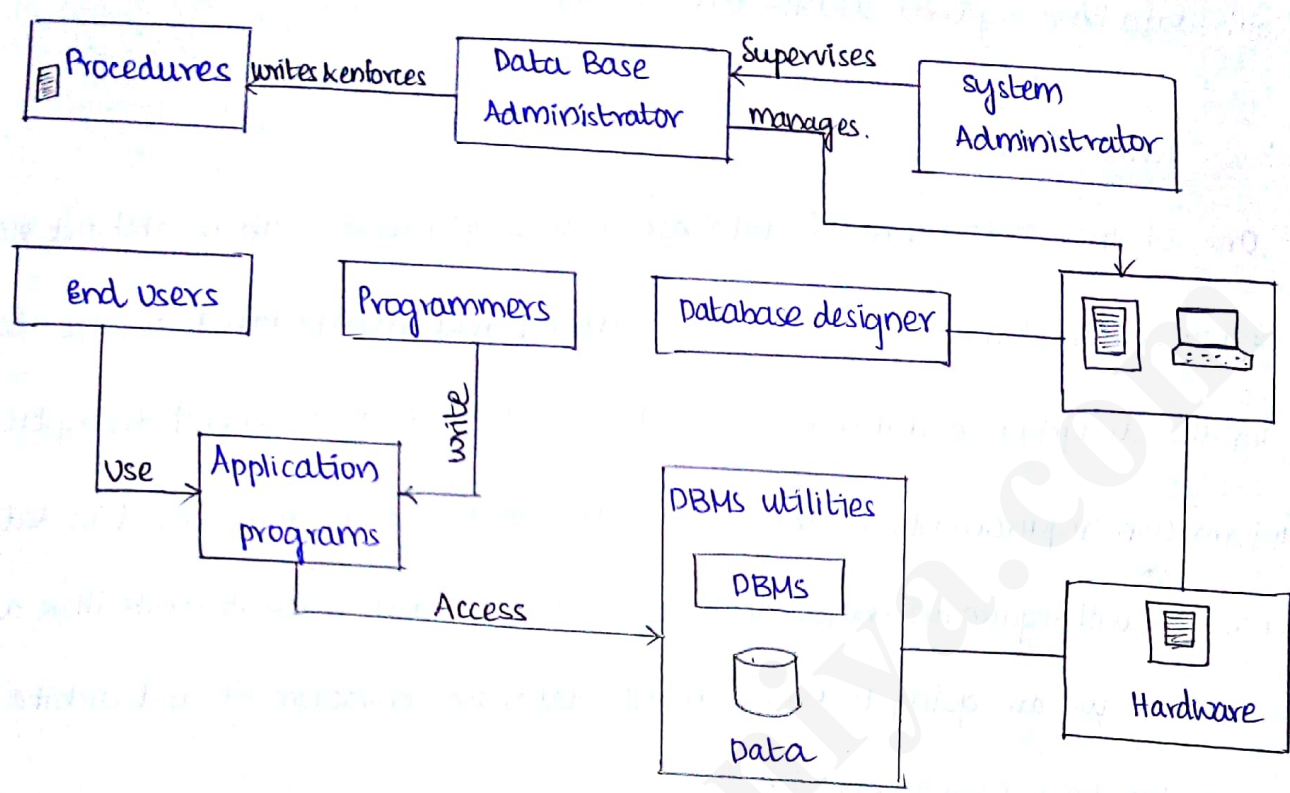
Fig2: Detailed View of Database Environment.

1. Hardware:-

Hardware refers to all system's peripheral devices; for example, computers storage devices, printers, network devices and etc.

2. software:-

To make database system work properly, three types of software are needed: operating systems, DBMs software, application programs.

a) operating systems:-

It manages all hardware components and allows other software to run on computers. Examples of operating systems software include windows, Linux etc.

It manages database within the database system. some examples of DBMs software include Oracle, Access, Mysql and dele.

c) Application programs:-

These are used to access and manipulate data in DBMS and to manage the computer environment in which data acess and manipulation takes place. Application programs are most commonly used to access data to generate reports. Host of the application programs provide GUI.

3. People:-

This component includes all users of database system. According to job nature, five types of users can be identified: system administrators, database administrators, database designers, system analysts and programmers, and end users.

a) system Administrators:-

They supervise the database system's general operations.

b) Database Administrators:-

They are also known as DBAs. They manage the DBMs and ensure that database is functioning properly.

c) DataBase Designers:-

They design the database structure. They are the database architects. As this is very critical, the designer's job responsibilities are increased.

d) System Analysts and programmers:-

They design and implement the application programs. They design & create data entry screens, reports and procedures through which end users can access & manipulate data.

They are the people who use the application programs to run the organisation's daily operations. For example, sales-clerks, supervisors, managers are classified as end users.

4. Procedures:-

Procedures are the instructions and rules that supervise the design and use of database system. procedures are a critical component of the system. procedures play an important role in a company because they enfore the standards by which business is conducted in an organisation.

5. Data:-

Data refers to collection of facts stored in database. Because data are the raw material from which information is generated, no database can exist without data.

Additional Questions:-

1. Explain history of database systems. (4M)

A. Ancient Times:-

RAM was expensive and limited. programmer productivity Low. Programmer defined both logical and physical structure, such as storage structure, access methods, I/o modes etc.

1950 - 1960's :-

Data maintained in flat file. processing characteristics determined by common use of magnetic tape medium.

1960 - 1970's :-

First DBMS, hierarchical DBMS introduced by IBM. This type of DBMS based on binary trees, where the shape was like a tree and relations were only limited between parent and child records.

Benefits:- less redundant data, data independence, security and integrity.

Drawback:- Complex implementation

Next, network DBMS introduced by charles Bachmann at Honeywell. In this model, each record can have multiple parents in comparision with one in hierarchical DBMS.

Drawback:- Difficulty in design and maintenance.

1970 - 1990's :-

Relational DBMS, introduced by edger codd. This was a new system for entering data and working with big databases, where the idea was to use a table of records. All the tables will be linked by one to one, one to many, many to many relationships.

Benifit:- High performance in transaction processing.

2. Define different characteristics of database systems. (3M con 8M)

A. characteristics :-

1. **Real-world Entity**

DBMS uses real world entities to design its architecture. It uses behaviour & attributes too.

Eg: school database use students as entity & age as an attribute.

2. **Relation-based Tables:-**

DBMS allows entities and relations among them to form tables. User can understand architecture just by looking at table names.

Database is different from data. Database is an active activity whereas data is said to be passive. DBMS uses metadata, to ease its own process.

4. **Less Redundancy**

By following the rules of normalization, redundancy is reduced.

5. Consistency

6. Query Language.

7. ACID properties.

8. Multiuser and concurrent Access.

9. Multiple views.

10. security.

3. List different types of database users and activities of all different database users.(4M)

A. There are four different types of database users based on how they interact with the system.

(i) Application programmers.

(ii) sophisticated users.

(iii) specialized users.   } End Users.

(iv) Native Users.

(i) <u>Application Programmers</u>:-

They are computer professionals who interact with the system through DML calls, which are embedded in a program written in a host language (for eg- COBOL, C). Since DML syntax is different from host language syntax, DML calls are usually prefaced by a special character so that appropriate code can be generated.