

Q D.B.M.S = Data Base Management System

1. DATA :- ✓

Data is anyrow facts feegure which we Refer to get some information that is Data.

2. Information :-

The Colection of Meaningful Data which gives us some information

3. Database.

Colection of diffrent Records to get some information its called database.

4. Management :-

Management Says planning Organising and Controlling that data base.

5. System :-

the Colection of diffrent Componads which Comes to gather to achive a Single.

db. Types of Data.

→ There are three types of Data.

1. Operational Data :-

Operational Data is the Data which we generate Regularly on the activity on Regular Bases.

Exa. attendends, ivently, Sells figure

2.

2. Derived Data :-

Derived Data which we derived Based on Operational and Recounside for example.

Example: Age of person, aggregation of Data for decision of Supports.

db. Metadata → Data about Data

A Metadata data about data which store in the form of some data structure

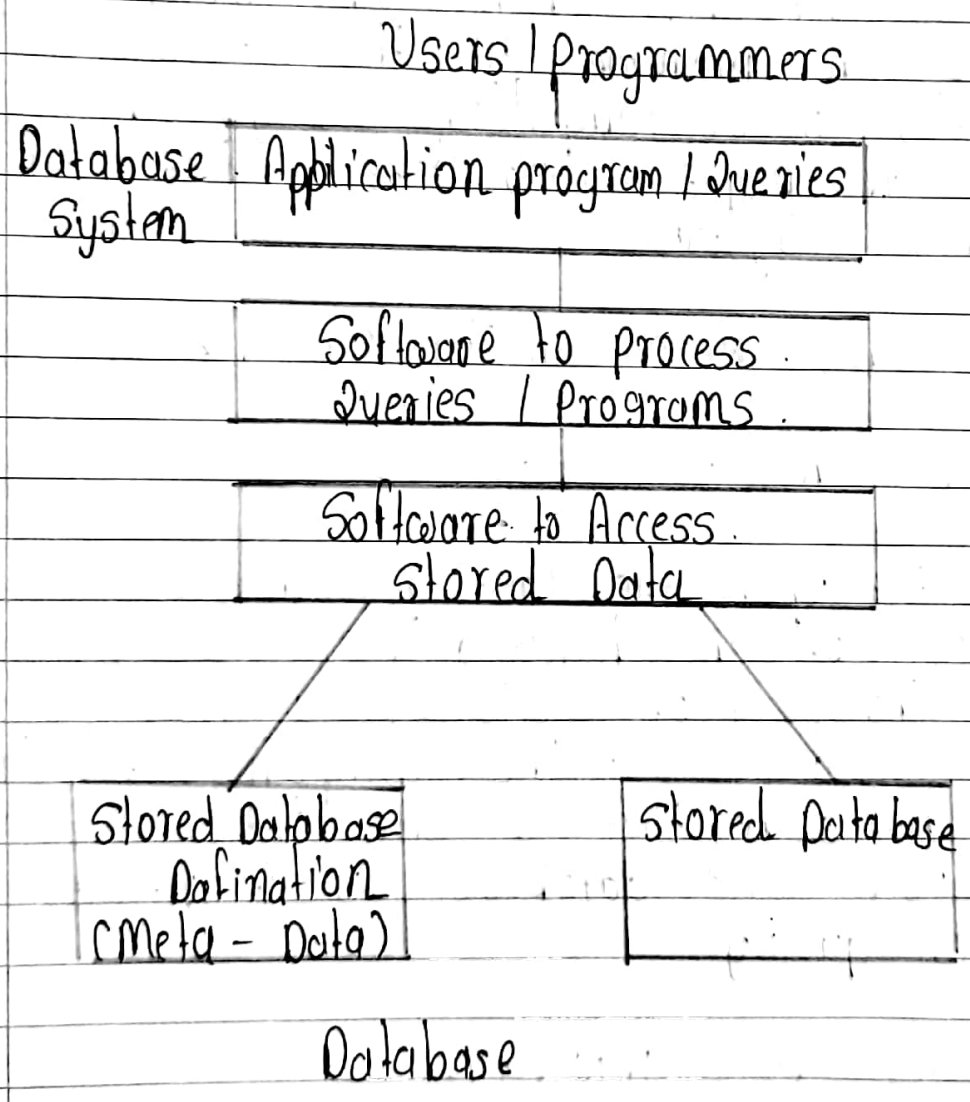
db. Data Wear house :-

Storing historical Data on Server so that whenever you require any information you can retrieve from the server is called the data wear house.

Q. What is Database Environment

→ A database environment is a collective system of components that comprise and regulate the group of data, management, and use of data which consist of software, hardware, people, techniques of handling database and data also.

Q. What is Database environment ?



Who is DBA ?

- A Database Administrator is a person or a group of person who are ~~peep~~ responsible for managing all the activities related to database system.
- This job requires a high level of expertise by a person.
- There are very rare chances that only a single person can manage all the database system activities. So companies always have a group of people who take care of database system.

Roles and Responsibility of DBA

Deciding hardware device.

- Depending upon the cost, performance and efficiency of the hardware, it is DBA who have the duty of deciding which hardware device will suit the company requirements. It is hardware that is an interface between users and database so it needed to be of best quality.

Managing Data integrity.

Data integrity should be managed accurately because it protects the data from unauthorized use. DBA managers relationship between the data.

Maintain data Consistency.

do Decides data Recovery and back up Method.

If any company is having a big database. Then it is likely to happen the database may fail at any instance. It is require that a DBA takes backup of entire database in regular time span. DBA has to decide that how much data should be backed up and how frequently the back should be taken. Also the Recovery of data is done by DBA if they have lost the database.

↳ Tuning Database performance

Database performance plays an important Role for any business. If user is not able to fetch data Speedily then it may loss company business. So by modifying Sql Commands a DBA can improves the performance of database.

do Capacity Issues.

All the databases have their limits of storing data in it and the physical memory also has some limitations. DBA has to decide the limit and Capacity of database and all the issues Related to it.

Database design.

The logical design of the database by the DBA. Also a DBA is responsible for physical design external model design, and integrity control.

Database accessibility

DBA writes Subschema to decide the accessibility of database. He decides the users of the database and also which data is to be used by which user. No user has to pass to access the entire database without the permission of DBA.

Roles and Responsibility of DBA

Decides Validation checks on data

→ DBA has to decide which should be used and what kind of data is accurate for the company. So he always puts validation checks on data to make it more accurate and consistent.

* Monitoring performance

→ if database is working properly then it doesn't mean that there is no task for the DBA. Of course he has to monitor the performance of the database. A DBA monitors the CPU and memory usage.

* Decides Content of the database:-

A database system has many kinds of content information in it. DBA decides fields, types of fields and range of values of the content in the database system. One can say that DBA decides the structure by database files.

* Provides help and support to user :-

If any user needs help at any time then it is the duty DBA to help him. Complete support is given to the users who are new to database by the DBA.

* Database implementation.

Database has to be implemented before anyone can start using it. So DBA implement the database system. DBA has to supervise the database loading at the time of its implementation.

* Improve query processing performance :-

Queries made by the users should be processed speedily. As we have discussed that users need just retrieval of answers. So DBA improve query process by improving their performance.

✓ File based System	Database System
1. The data and programme inter development.	The data and programme are independent of each other.
2. File-based System caused data Redundancy. the data may be duplicated in different files.	2. Database System control data Redundancy. the data appeared only once in the System.
3. File-based System caused data inconsistency. the data in different file may be different that cause data inconsistency.	3. in database System data always consistent. Because data appeared only once.
4. The data cannot be shared because data is distributed in different files.	4. in database data is easily shared because data is stored at one place.
5. In file based System data is widely spread. Due to this Reason file based System provides poor Security.	5. It provides many methods to maintain data Security in the database.
6. file based System does not provide consistency constraints.	6. Database System provides a different consistency constraints to maintain data integrity in the System.

7	file based System is less complex System	7	Database System is very complex System
8	The cost of file processing System is less database System	8	The cost of Database System is much more than a file processing System
9	file based System takes much space in the System, and memory is wasted in the approach	9	Database approach stores data more efficiently it takes less space in the System and memory is not wasted
10	To generate different report to take a crucial decision is very difficult in file based System	10	The Report can be generated very easily in required format in database System. Because data in database is stored in an organized manner. And easily retrieve to generate different Report
11	file based System does not provide concurrency facility	11	Database System provides concurrency facility
12	file based System does not provide data atomicity functionality	12	Database System provides data atomicity functionality
13	The cost of file processing System is less database System	13	The cost of database System is more than file processing System

(db) Transaction Management

- A transaction is logical unit of sequence of operations perform on Database
- the transaction can be consider as insert, update, delete or select statement in SQL
- The transaction can be Rollback (Reverse the operation)

→ the transaction which is committed is permanent available in Data base System

→ The transaction Manager is Responsible to Manage each and every transaction

→ There are four property's of transaction which is manage T.M.S.

(1) Atomicity : (Either all or none)

Whenever any transaction is performed → the Atomicity property will check whether 100% of the transaction is completed is operation or none the op. is performed

(2) Consistency :-

→ In this property a transaction Manager check the state of DBS whether it is stable or not

→ if any failure in the db then the transaction must be

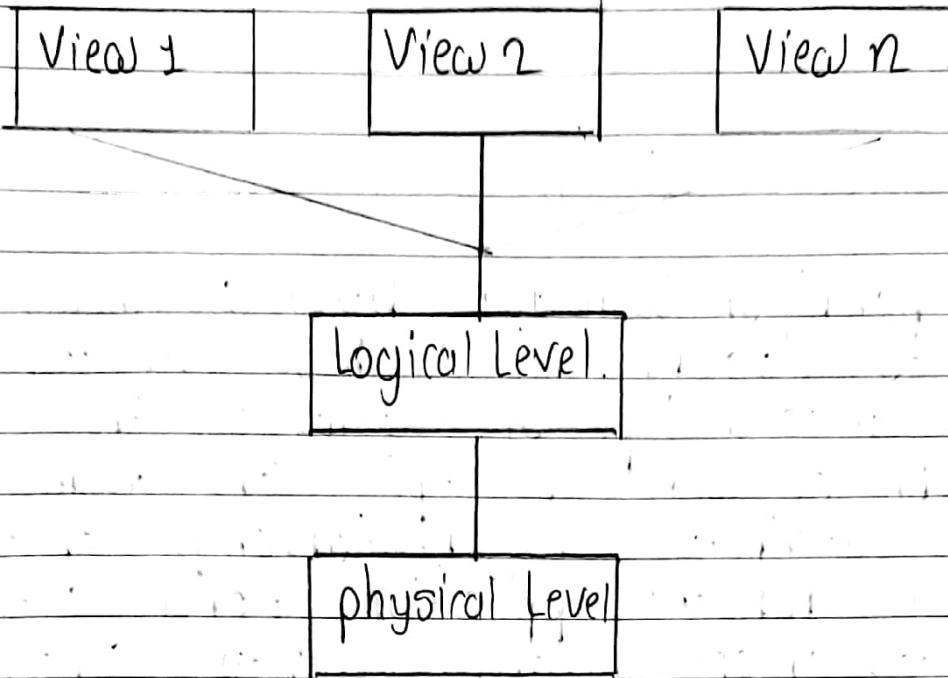
→ it is the Responsibility of Application programmer who write the code for executing of DBS.

3 Isolation :-

- Each and every transaction is ~~Execu~~ Executed in independently (without any dependency of Data)
- This property check's that two transaction are isolated and if they are using the same data then both the transaction performe there operation Seprately

4 Durability :-

- This property indicate the performance of dbs after execution of transaction which is completed ~~at~~ or it is fail.
- Each transaction is a unit of acid



→ Three level of Data

→ A physical schema can be defined as the design of a database at its physical level. In this level, it is expressed how data is stored in blocks of storage.

→ A logical schema can be defined as the design of the database at its logical level. In this level, the programmers as well as the database administrator (DBA) work. At this level, data can be described as certain types of data records which can be stored in the form of data structures. However, the internal details (such as an implementation of data structure) will be remaining hidden at this level.

→ View schema can be defined as the design of the database at view level which generally describes end user interaction which DBS.

Database Language

1 Database Definition Language

Data Definition Language (DDL) statements used to classify the database structure schema. It is a type of language that the DBA or user to depict and name entities, attributes, and relationship that required for the application along with associated integrity and security constraints. Here are the lists of tasks that come DDL:

CREATE: used to create objects the data

ALTER: used to alter the structure of database

TRUNCATE: used to remove all records from a table, including all spaces allocated. The records are removed.

COMMENT: used to comments to the data dictionary.

RENAME: used to rename an object.

b. Data Manipulation Language :-

A language that offers a set of operations to support the fundamental data manipulation operations language on the data held in the database. Data Manipulation Language (DML) statements are used to manage data within schema objects. Here are the lists of tasks that come under DML.

SELECT : It retrieves data from a database.

INSERT : It inserts data into a table.

UPDATE : It updates existing data within a table. The space for the records remains.

MERGE : Upsert operation (insert or update).

CALL : It calls a PL/SQL or Java subprogram.

EXPLAIN PLAN : It explains access path to data.

LOCK TABLE : It controls concurrency.

DBMS Data Independence :-

A major objective for the three level architecture is to provide data independence, which means that upper levels are unaffected by changes to lower levels. There are two kinds of independence: logical and physical.

Logical

Data Control Language :-

There are another two forms of database sub-languages. The data control language (DCL) is used to control privilege in database. To perform any operation in database such as for creating tables, sequences or views we need privileges. Privileges are of two types.

System: Creating a session, table etc. are types of system privilege.

Object: any command or query to work on tables comes under object privilege. DCL is used to define two commands. There are :-

Grant: It gives user access privileges to database.

Revoke: It takes back permission from the user.

Transaction Control Language :-

Transaction control statements are used to manage the changes by DML statements. It allows statements to be grouped into logical transaction.

COMMIT: It Save the work done.

Save point: It identifies a point in a transaction to which you can later roll back.

Roll Back: It Restores the database to original since the last Commit.

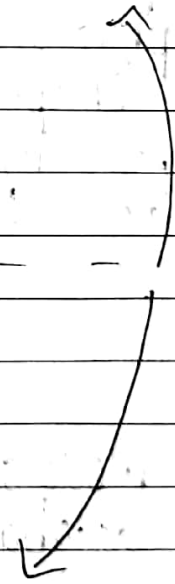
SET Transaction: It changes the transaction options like isolation level and what rollback Segment to use.

Logical Data Independence

Logical Schema

physical Schema

physical Data Independence



do Logical Data independence :

Logical data independence is the ability to modify the logical schema without causing application program to be rewritten. Modification at the logical level are necessary whenever the logical structure of the database is altered.

do physical Data independence

physical data independence is the ability to modify the physical schema without causing application programs to be rewritten. Modifications at the physical level are occasionally necessary to improve performance. It means we change the physical storage level without affecting the conceptual or external view of the data. The new how change are absorbed by mapping techniques.

do What do you mean by Data Models ?

Data Models define how the logical structure of a database is modeled. Data Models are fundamental entities to introduce abstraction in DBMS. Data models define how data is connected to each other and how they are processed and stored inside the system.

The very first data model could be flat data models, where all the data used are to be kept in the same plane. Earlier data models were not so scientific, hence they were prone to

introduce lots of duplication and update anomalies.

Types of Data Models:

1. Record Based

- do Hierarchical Data Model.
- do Network Data Model.
- do Relational Data Model.

2. Object Based

- do entity Relational Model.
- do Semantic
- do functional
- do Object Oriented

3. Physical Data Model.

- do Unifying Model.
- do Frame Memory Model.

Hierarchical Data Model.

→ was developed in the 1960s. the Hierarchical Model was essentially born from the first mainframe database management system. it uses an upside-down tree to structure data. the top of the tree is the parent and the branches are children. each child can only have one parent but a parent can have many children.

Advantages

- do Have many different structures and form
- do structure data in an upside-down tree (simplifies Overview)
- do Manages large amounts of data
- do Express the Relationships between information
- do Many children per parent
- do Distribute data in terms of Relationships
- do improve data sharing.

Disadvantages

- do One parent per child.
- do Complex (users require physical Representation of database)
- do Navigation System is Complex.
- do Data must be organized in a hierarchical way without compromising the information
- do Lack

Network Data Model

- do In 1965 C.W. Bachman developed the first network data model to present complex data relationships more effectively than the hierarchical model. He tried to impose a database standard with his model and also wanted to improve database performance.
- do It was in 1971 that the Conference on Data System Languages or CODASYL officially or formally defined the Network model. The network databases arrange its data as a directed graph and have a standard navigational languages.

Advantages

- do Multi-parent support
- do Somewhat same simplicity as the hierarchical model.
- do More useful than the hierarchical data model.
- do Deals with even larger amounts of information than the hierarchical model.
- do promotes data integrity.
- do Many to many Relationship Support.
- do Data independence
- do improved data access.

Disadvantages.

- do Data Relationships must be predefined.
- do Much more complex than the hierarchical data model.
- do Users are still require to know the physical representation of the database.
- do information can be related in various and complicated ways.
- do Lack Structural independence.

Relational Data Model

- do The Relational data model was introduced in 1970 by Edgar F. Codd. He worked for IBM. All data is represented as simple tabular data structures which the user can access through a high-level non procedural language.
- do in 1974 IBM proposed a New high-level non-procedural language: Sequel (Renamed Renamed into Sql in 1990).

attributes	Column				
	SID	SName	SAge	Sclass	SSection
↳	1101	Alex	14	9	A
	1102	Maria	15	9	A
	1103	Maya	14	10	B
→	1104	Bob	14	9	A
tuple	1105	Newton	15	10	B



table (Relation)

Advantages

- ↳ structured independence is promoted
- ↳ Users do not have to know the physical representation of the database
- ↳ Use of SQL language to access data
- ↳ Easier database design
- ↳ Tabular view improves simplicity
- ↳ Support large amounts of data
- ↳ Data independence

- do Multi-level Relationships between data
- do No need to predefined data Relationships.

Disadvantages

- do Data anomalies
- do people need training if they want to use the system effectively and efficiently.

ER Model

- do Entity-Relationship (ER) Model is based on the notion of real-world entities and Relationships among them) while formulating real-world system into the database model, the ER Model (entity Set, Relationship Set, general attributes and constraints)
- do ER Model is best used for the conceptual design of database.
- do ER Model based on of nation of real world
- do entities and their attributes.
- do Relationship among entities.