

What is meant by DBMS ?

DBMS stands for database management system. It is a set of applications or programs that enable users to create and maintain database. DBMS provides a tool or an interface for performing various operations such as inserting, deleting and updation, etc.

It is a software that enables that storage of data more compactly and securely as compared to files based systems.

It also helps user to overcome problems like data inconsistency, data redundancy, etc. in a database and makes it more convenient and organized to use it.

What is RDBMS ?

Stands for relational database management systems. It stores the data in the form of tables as compared to DBMS which stores data as files. Storing data as rows and columns makes it easier to locate specific values in the database and make it more efficient and compared to DBMS.

Ex. MySQL, Oracle DB, etc.

What is Database ?

A database is organized, consistent, and logical collection of data that can easily be updated, accessed and managed. Database mostly contains sets of tables or objects which consists of records and fields.

A tuple or rows represents a single entry in a table. An attribute or column represents that basic units of data storage, which contain information about a particular aspect of the table.

Issues of traditional file based systems ?

Data redundancy

Data inconsistency.

Difficulty in accessing the data

Data isolation

Security problem.

Atomicity problem

Different languages present in DBMS.

DDL (data definition language) : Contains the commands which are required to define the database.

ex. create, alter, drop, truncate, rename, etc.

DML (Data manipulation language) : It contains commands which are required to manipulate the data present in the database.

ex. select, update, insert, delete, etc.

DCL (Data control language) : Contains commands which are required to deal with the user permissions and control of the database system.

ex. grant, revoke ,etc.

TCL (Transaction control language) : Contains the commands which are required to deal with the transaction of the database.

Ex. commit, rollback, savepoint.

ACID properties in DBMS :

A =>

Atomic (All changes to the data must be performed successfully or not at all)

C =>

Consistent (Data must be in consistent state before and after the transaction)

I =>

Isolated (No other process can change the data while the transaction is running)

D =>

Durable (The changes made by a transaction must persist.)

What is data warehousing ?

The process of collecting, extracting, transforming and loading data from multiple sources and storing them into one database is known as data warehousing.

A data warehouse comprises a wide variety of organization historical data that supports the decision making process in an organization.

Explain the different levels of data abstraction in a DBMS.

Physical Level : Lowest level and is managed by the DBMS. This level consists of data storage descriptions and the details of this level are typically hidden from system admins, developer and users.

Conceptual or Logical level : It is the level on which developers and systems admins work and it determines what data is stored in the database and what is the relationship between the datapoints.

External or View level : It is the level that describes only part of the database and hides the details of the table schema and physical storage from the users.

What is meant by entity relationship.

An entity relationship model is a diagrammatic approach to a database design where real-world objects are represented as entities and relationships between them are mentioned.

Entity : it is defined as real-world object having attributes that represents the characteristics of the particular object. Ex. student, employee, or teacher.

Entity type : It is defined as the collection of entities that have same attributes

Entity set : An entity set can be defined as a set of all the entities present in specific entity type in database.

What is normalization ?

It is a process of reducing the redundancy by organizing the data into multiple tables. It leads to better usage of disk spaces and makes it easier to maintain the integrity of the database.

1NF : It is a simplest type of normalization that you can implement into a database. A table to be in first normal form should satisfy the following conditions :

- Every column must have singular value and should be atomic.
- Duplicate columns from the same table should be removed.

2NF : A table to be in second normal form should satisfy following conditions.

Every non-prime attribute of the table should be fully functionally dependent on the primary key i.e. every non-key attribute should be dependent on the primary key in such a way that if any key element is deleted then even the non-key element will be saved in the database.

3NF : A table to be in its second normal form should satisfy the following conditions :

=> The table should be in its 2NF.

=> There should not be any functional dependency of one attribute on any attribute in the same table.

BCNF : stands for BoyceCodd normal form. It is an advanced form of 3NF.

=> The table should be in 3nf

=> For every functional dependency of any attribute A on B ($A \rightarrow B$). A should be the super key of the table. It simply implies that A can't be a non-prime attribute if B is a prime attribute.

Explain different types of keys :

Candidate key : Represents the set of properties that can uniquely identify the table. Each table may have multiple candidate keys. One key among all candidate keys can be chosen as **primary key**.

Super key : It defines the set of attributes that can uniquely identify a tuple. Candidate key and primary key are subsets of the super key, in other words the super key is their superset.

Unique Key : It is very similar to the primary key except that primary keys don't allow NULL values in the column but the unique keys allow them.

Alternate Keys : All candidate keys which are not selected as primary keys are considered as alternate keys.

Foreign Key : It defines an attribute that can only take the values present in one table common to the attribute present in another table.

Composite key : refers to a combination of two or more columns that can uniquely identify each tuple in a table.

Explain 2-tier and 3-tier arch :

The 2-tier architecture refers to the client-server in which applications at the client end directly communicate with the database at the server end without any middleware involved.

The 3-tier arch contains another layer between the client and server to provide GUI to the users and make system much more secure and accessible.