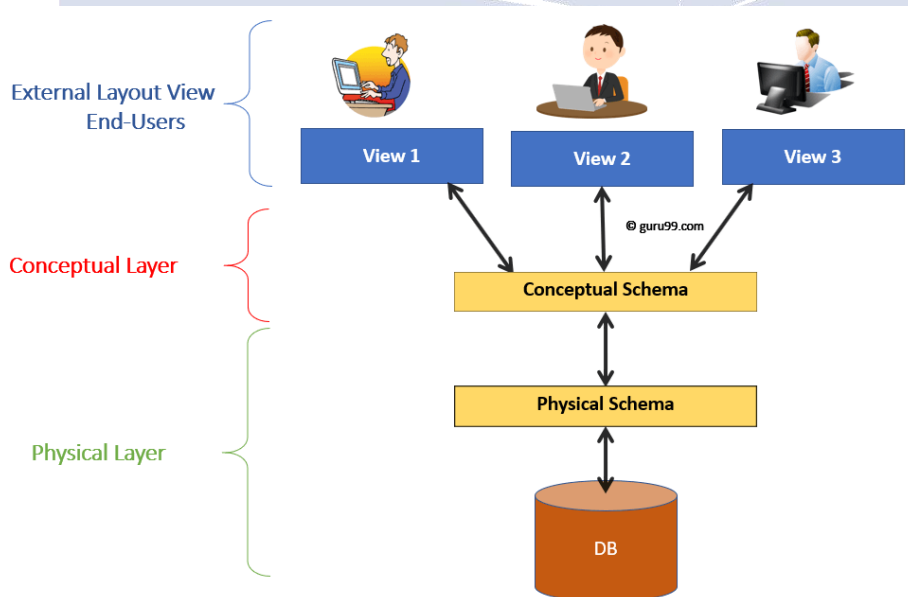


Data Base Management System (DBMS)

DBMS – Data Base Management System DBMS: DBMS is the acronym of Data Base Management System. DBMS is a collection of interrelated data and a set of programs to access this data in a convenient and efficient way. It controls the organization, storage, retrieval, security and integrity of data in a database.

Architecture of DBMS divided into three levels:

1. **External view or User view/View Level:** It is the highest level of data abstraction. This includes only those portions of database of concern to a user or Application program. Each user has a different external view and it is described by means of a scheme called external schema.
2. **Conceptual view/Logical Level:** All the database entities and the relationship among them are included. One conceptual view represents the entire database called conceptual schema.
3. **Internal view/Physical Level:** It is the lowest level of abstraction, closest to the physical storage method. It describes how the data is stored, what is the structure of data storage and the method of accessing these data. It is represented by internal schema.



Keys in DBMS:

A DBMS key is an attribute or set of attributes which helps to identify a row in a table. They establish the relation between two tables. Keys help uniquely identify a row in a table by a combination of one or more columns in that table.

Super key of an entity set is a set of one or more attributes whose values uniquely determine each entity.



Candidate key is a super key with no repeated attribute. It is an attribute or a set of attributes that can act as a primary key for a table to uniquely identify each record in a table.

Primary key is a candidate key that is most appropriate to become main key of the table. It is a key that uniquely identifies each record in the table. The Primary key should be selected from the candidate keys

Alternate key: All the keys which are not primary key are called an alternate key. It is a candidate key which is currently not the primary key.

Foreign key is a column which is added to create a relationship with another table. It helps us to maintain data integrity.

Compound key has many fields which allow to uniquely recognize a specific record. A column when combined with the other column or columns the combination of composite keys become unique.

Composite key is a key which has multiple attributes to uniquely identify rows in a table. The difference between compound and the composite key is that any part of the compound key can be a foreign key, but the composite key may or maybe not a part of the foreign key.

Surrogate key is an artificial key which aims to uniquely identify each record. They are created when you don't have any natural primary key.

SQL (Structured Query Language)

Structured Query Language (SQL) is a widely-used programming language for working with relational databases. SQL is specially designed programming language to regulate and manage the data stored in relational databases (RDBMS).

Sub division in SQL:

1. DDL (Data Definition Language): Defines structure of Database
2. DML (Data Manipulation Language): Data is been entered
3. DCL (Data Control Language): Data is been controlled
4. DQL (Data Query Language): Data is been retrieved/fetched
5. TCL (Transaction Control Language): About transactions Data Definition Language (DDL)

The commands of DDL are:-

1. Create: A commonly used CREATE command is the CREATE TABLE command.
2. Alter: The ALTER statement modifies an existing database object.
3. Drop: The DROP statement destroys an existing database, table, index, or view.
4. Rename: The RENAME statement is used to rename a database table.
5. Truncate: The TRUNCATE statement is used to delete all data from a table. It's much faster than DELETE.

Data Manipulation Language:



The commands of DML are:

1. SELECT: retrieve data from the database.
2. INSERT: insert data into a table.
3. UPDATE: update existing data within table.
4. DELETE: delete all records in the table,
5. MERGE: UPSERT operations (insert or update)

Data Control Language: DCL used to control privilege in database. To perform any operation in database, such as creating tables, sequences (or) views.

The commands of DCL are: 1

1. Grant: to allow specified users to perform specified tasks.
2. Revoke: to cancel previously granted or denied permissions.

ACID Properties in DBMS

A transaction is a single logical unit of work which accesses and possibly modifies the contents of a database. Transactions access data using read and write operations. In order to maintain consistency in a database, before and after transaction, certain properties are followed. These are called ACID properties.

A- Atomicity

C- Consistency

I- Isolation

D- Durability Important .sscexamguide.:

1. Atomicity: This update to the database is called a transaction and it either commits or aborts. This means that only a fragment of the update cannot be placed into the database, should a problem occur with either the hardware or the software involved.

Features to consider for atomicity:

a transaction is a unit of operation - either all the transaction's actions are completed or none are

- atomicity is maintained in the presence of deadlocks
- atomicity is maintained in the presence of database software failures
- atomicity is maintained in the presence of application software failures
- atomicity is maintained in the presence of CPU failures
- atomicity is maintained in the presence of disk failures



2. Consistency: Consistency is the ACID property that ensures that any changes to values in an instance are consistent with changes to other values in the same instance. A consistency constraint is a predicate on data which serves as a precondition, post-condition, and transformation condition on any transaction.

3. Isolation: The isolation portion of the ACID Properties is needed when there are concurrent transactions. Concurrent transactions are transactions that occur at the same time, such as shared multiple users accessing shared objects.

4. Durability: Maintaining updates of committed transactions is critical. These updates must never be lost. The ACID property of durability addresses this need. Durability refers to the ability of the system to recover committed transaction updates if either the system or the storage media fails.

Features to consider for durability: recovery to the most recent successful commit after a database software failure

- recovery to the most recent successful commit after an application software failure
- recovery to the most recent successful commit after a CPU failure
- recovery to the most recent successful backup after a disk failure
- recovery to the most recent successful commit after a data disk failure

LEARNIZY