

1. What is a relational database management system (RDBMS)? What are the advantages of a database management system over a file system?

Ans : An RDBMS is a type of database management system (DBMS) that stores data in a row-based table structure which connects related data elements. An RDBMS includes functions that maintain the security, accuracy, integrity and consistency of the data. This is different than the file storage used in a DBMS.

- No redundant data: Redundancy removed by data normalization. No data duplication saves storage and improves access time.
- Data Consistency and Integrity: As we discussed earlier the root cause of data inconsistency is data redundancy, since data normalization takes care of the data redundancy, data inconsistency also been taken care of as part of it
- Data Security: It is easier to apply access constraints in database systems so that only authorized user is able to access the data. Each user has a different set of access thus data is secured from the issues such as identity theft, data leaks and misuse of data.
- Privacy: Limited access means privacy of data. DBMS can grant and revoke access to the database on user level that ensures who is accessing which data. It also helps user to manage the constraints on database, this ensures which type of data can be entered into the table.
- Easy access to data – Database systems manages data in such a way so that the data is easily accessible with fast response times. Even if the database size is huge, the DBMS can still provide faster access and updation of data.
- Easy recovery: Since database systems keeps the backup of data, it is easier to do a full recovery of data in case of a failure. This is very useful especially for almost all the organizations, as the data maintained over time should not be lost during a system crash or failure.

2. In a database management system, explain the ACID properties.

Atomicity:

By this, we mean that either the entire transaction takes place at once or doesn't happen at all. There is no midway i.e. transactions do not occur partially. Each transaction is considered as one unit and either runs to completion or is not executed at all. It involves the following two operations.

Consistency:

This means that integrity constraints must be maintained so that the database is consistent before and after the transaction. It refers to the correctness of a database.

Isolation:

This property ensures that multiple transactions can occur concurrently without leading to the inconsistency of the database state. Transactions occur independently without interference.

Durability:

This property ensures that once the transaction has completed execution, the updates and modifications to the database are stored in and written to disk and they persist even if a system failure occurs.

3. Explain the concept of normalization.

Normalization is the process to eliminate data redundancy and enhance data integrity in the table. Normalization also helps to organize the data in the database. It is a multi-step process that sets the data into tabular form and removes the duplicated data from the relational tables.

4. Explain the many types of query languages used in relational databases. DQL, DML, DCL, and DDL are some examples.

DDL:

CREATE, ALTER, DROP, TRUNCATE

DML:

INSERT, UPDATE, DELETE

DQL:

SELECT

DCL:

GRANT, REVOKE

5. What is the difference between the main key and a composite key?
Give instances of how primary key and composite are used.

Primary key is that column of the table whose every row data is uniquely identified. Every row in the table must have a primary key and no two

rows can have the same primary key. Primary key value can never be null nor can be modified or updated.

Composite Key is a form of the candidate key where a set of columns will uniquely identify every row in the table.

6. Create a table with a primary key, a column default value, and a column unique constraint in SQL.

```
create table emp
(
empid int,
empname varchar(20),
empadd varchar(50),
depid int,
primary key(empid),
foreign key(depid) references dep(depid)
);
```