**SQL Assignment 1**

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

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

Advantages of DBMS over file system:

* **Data redundancy and inconsistency:**Redundancy is the concept of repetition of data. The file system cannot control the redundancy of data as each user defines and maintains the needed files for a specific application to run. DBMS controls redundancy by maintaining a single repository of data that is defined once and is accessed by many users.
* **Data sharing:**The file system does not allow sharing of data or sharing is too complex. Whereas in DBMS, data can be shared easily due to a centralized system.
* **Data concurrency:**Concurrent access to data means more than one user is accessing the same data at the same time. Anomalies occur when changes made by one user get lost because of changes made by another user. The file system does not provide any procedure to stop anomalies. Whereas DBMS provides a locking system to stop anomalies to occur.
* **Data searching:**For every search operation performed on the file system, a different application program has to be written. While DBMS provides inbuilt searching operations. The user only has to write a small query to retrieve data from the database.
* **Data integrity:**There may be cases when some constraints need to be applied to the data before inserting it into the database. The file system does not provide any procedure to check these constraints automatically. Whereas DBMS maintains data integrity by enforcing user-defined constraints on data by itself.
* **System crashing:**In some cases, systems might have crashed due to various reasons. It is a bane in the case of file systems because once the system crashes, there will be no recovery of the data that’s been lost. A DBMS will have the recovery manager which retrieves the data making it another advantage over file systems.
* **Data security:**A file system provides a password mechanism to protect the database but how long can the password be protected? No one can guarantee that. This doesn’t happen in the case of DBMS. DBMS has specialized features that help provide shielding to its data.
* **Backup:**It creates a backup subsystem to restore the data if required.
* **Interfaces**: It provides different multiple user interfaces like graphical user interface and application program interface.

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

Ans.

* Atomicity : The entire transaction takes place at once or does not happen at all.
* Consistency : The database must be consistent before and after the transaction.
* Isolation : Multiple transactions occur independently without interference.
* Durability : The changes of a successful transaction occurs even if the system failure occurs.

1. Explain the concept of normalization.

Ans.

Normalization is the process of organizing data in a database. This includes creating tables and establishing relationships between those tables according to rules designed both to protect the data and to make the database more flexible by eliminating redundancy and inconsistent dependency

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

Ans.

1. DQL - Data Query Language

* **DQL**statements are used for performing queries on the data within schema objects. The purpose of the DQL Command is get some schema relation based on the query passed to it.  It includes the SELECT statement.

List of DQL:

* [**SELECT**](https://www.geeksforgeeks.org/sql-select-clause/)**:**It is used to retrieve data from the database

1. DML – Data Manipulation Language

The SQL commands that deals with the manipulation of data present in the database belong to DML or Data Manipulation Language and this includes most of the SQL statements. It is the component of the SQL statement that controls access to data and to the database.

List of DML commands:

* [**INSERT**](https://www.geeksforgeeks.org/sql-insert-statement/) : It is used to insert data into a table.
* [**UPDATE**](https://www.geeksforgeeks.org/sql-update-statement/)**:** It is used to update existing data within a table.
* [**DELETE**](https://www.geeksforgeeks.org/sql-delete-statement/) : It is used to delete records from a database table.

1. DCL – Data Control Language

DCL includes commands such as GRANT and REVOKE which mainly deal with the rights, permissions, and other controls of the database system.

List of  DCL commands:

* [**GRANT:**](https://www.geeksforgeeks.org/mysql-grant-revoke-privileges/)This commandgives users access privileges to the database.
* [**REVOKE:**](https://www.geeksforgeeks.org/difference-between-grant-and-revoke/)This command withdraws the user’s access privileges given by using the GRANT command.

1. DDL - Data Definition Language

[DDL](https://www.geeksforgeeks.org/features-of-structured-query-language-sql/) consists of the SQL commands that can be used to define the database schema. It simply deals with descriptions of the database schema and is used to create and modify the structure of database objects in the database. DDL is a set of SQL commands used to create, modify, and delete database structures but not data.

List of DDL commands:

* [**CREATE**](https://www.geeksforgeeks.org/sql-create/): This command is used to create the database or its objects (like table, index, function, views, store procedure, and triggers).
* [**DROP**](https://www.geeksforgeeks.org/sql-drop-truncate/): This command is used to delete objects from the database.
* [**ALTER**](https://www.geeksforgeeks.org/sql-alter-add-drop-modify/)**:**This is used to alter the structure of the database.

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

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.

Example:

Creating a database:

CREATE School;

Using database:

USE School;

Creating table with a composite key:

CREATE TABLE student

(rollNumber INT,

name VARCHAR(30),

class VARCHAR(30),

section VARCHAR(1),

mobile VARCHAR(10),

PRIMARY KEY (rollNumber, mobile));

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

Ans.

CREATE TABLE TABLE\_NAME

( eno NUMBER

,ename VARCHAR2(100)

,address VARCHAR2(2000)

,mobileno NUMBER NOT NULL

,constraint table\_name\_mobile\_UK UNIQUE (mobileno)

);