# **Assignment 1**

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

RDBMS is a relational database management system. It’s a software which used to create, update, delete a relational database.

Relational database is a database system which stores and retrieves data in a tabular format organized in the form of rows and columns

**Advantage of a DBMS:**

1. **Data redundancy and inconsistency**
2. **Data sharing**
3. **Data concurrency**
4. **Data searching**
5. **Data integrity**
6. **System crashing**
7. **Data security**
8. **Backup**
9. **Interfaces**
10. **Easy Maintenance**
11. In a database management system, explain the ACID properties

In a database management system (DBMS), the ACID properties are a set of principles that guarantee reliable and consistent transaction processing. ACID stands for Atomicity, Consistency, Isolation, and Durability. These properties ensure that database transactions are executed reliably and maintain data integrity

1. Atomicity
2. Consistency
3. Isolation
4. Durability
5. Explain the concept of normalization.

Normalization is the process of organizing data in a database. It 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.

## First normal form

* Eliminate repeating groups in individual tables.
* Create a separate table for each set of related data.
* Identify each set of related data with a primary key.

## Second normal form

* Create separate tables for sets of values that apply to multiple records.
* Relate these tables with a foreign key.

## Third normal form

* Eliminate fields that don't depend on the key.

There are additional normal forms beyond 3NF, such as Boyce-Codd Normal Form (BCNF) and Fourth Normal Form (4NF), which address specific types of dependencies and further refine the table structures.

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

These SQL commands are mainly categorized into five categories:

1. DDL – Data Definition Language
2. DQL – Data Query Language
3. DML – Data Manipulation Language
4. DCL – Data Control Language
5. TCL – Transaction Control Language

**DDL – Data Definition Language:**

**DDL** or Data Definition Language actually 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 are create, alter, rename, drop, truncate, comment

**DQL – Data Query Language:**

**DQL**statements are used for performing queries on the data within schema objects. It’s used to retrieve the data from the database. SQL provides various commands like select, from, where and join to query and retrieve the data from one or more tables in the database,

**DML – Data Manipulation Language:**

The SQL commands that deal with the manipulation of data present in the database belong to DML or Data Manipulation Language and this includes most of the SQL statements. SQL commands includes Insert, Update, Delete and Lock.

**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.

DCL commands are Grand, Revoke, Deny which are used to mange access rights and permissions.

**TCL – Transaction Control Language:**

It’s used to manage transaction in the database. It includes commands like commit, rollback and savepoint which control the processing and integirity of transaction.

TCL helps ensures the (ACID properity) of transaction.

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

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

