**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?

A-A relational database management system (RDBMS) is a collection of programs and capabilities that enable IT teams and others to create, update, administer and interact with a [relational database](https://searchdatamanagement.techtarget.com/definition/relational-database). RDBMS store data in the form of tables, with most commercial relational database management systems using [Structured Query Language](https://searchsqlserver.techtarget.com/definition/SQL) (SQL) to access the database.

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

A-In order to maintain consistency in a database, before and after the transaction, certain properties are followed. These are called ACID properties. The acronym ACID refers to the four key properties: atomicity, consistency, isolation, and durability.

* Atomicity-The entire transaction takes place at once or does not happen at all. The transaction must be executed in entirety in order to ensure correctness of database state.
* Consistency-The database must be consistent before and after the transaction. This implies that the total number/amount before and after the transaction must remain the same.
* Isolation-Multiple transactions occur independently without interference. Changes occurring in a particular transaction will not be visible to any other transaction until that particular change in that transaction is written to memory or has been committed.
* Durability-This property ensures that the changes made to the successful transaction remain so even in the case of a system failure. These updates now become permanent and are stored in non-volatile memory. The effects of the transaction, thus, are never lost.

1. Explain the concept of normalization.

A-Database normalization is the process of organizing the attributes of the database to reduce or eliminate data redundancy and improve data integrity.

Normalization entails organizing the columns (attributes) and tables (relations) of a database to ensure that their dependencies are properly enforced by database integrity constraints.

The process of taking a database design, and apply a set of formal criteria and rules, is called Normal Forms.

The database normalization process is further categorized into the following types:

1. First Normal Form (1 NF)
2. Second Normal Form (2 NF)
3. Third Normal Form (3 NF)
4. Boyce Codd Normal Form or Fourth Normal Form ( BCNF or 4 NF)
5. Fifth Normal Form (5 NF)
6. Sixth Normal Form (6 NF)
7. Explain the many types of query languages used in relational databases. DQL, DML, DCL, and DDL are some examples.

A-There are five categories of query languages:

1. DDL-Data Definition Language- Its common uses include the creation and alteration of tables, files, indexes and columns within the database. This language also allows users to rename or drop the existing database or its components. The DDL components include: CREATE,ALTER,DROP,RENAME, COMMENT, TRUNCATE
2. DML-Data Manipulation Language- It provides operations that handle user requests, offering a way to access and manipulate the data that users store within a database. Its common functions include inserting, updating and retrieving data from the database.

The DML components include: INSERT, UPDATE, DELETE, LOCK

1. DCL-Data Control Language- It controls access to the data that users store within a database. Essentially, this language controls the rights and permissions of the database system. It allows users to grant or revoke privileges to the database.

The DCL components include: GRANT, REVOKE

1. DQL-Data Query Language- It is a component of SQL statement that allows getting/retrieving data from the database and imposing order upon it. The DQL components include: SELECT
2. TCL- Transaction Control Language- It manages the transactions within a database. Transactions group a set of related tasks into a single, executable task.

The TCL components include: COMMIT, ROLLBACK

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

Main Key/Primary Key-

* It uniquely identifies each record in a table.
* A Primary keys column must contain unique values and cannot have null values.
* A table can have only one primary key, which may consist of single or multiple columns.

Ex:

CREATE TABLE student

(rollNumber INT,

name VARCHAR(30),

class VARCHAR(30),

section VARCHAR(1),

mobile VARCHAR(10),

PRIMARY KEY (rollNumber);

Composite Key/Composite Primary Key-

* It is a combination of two or more columns in a table that can be used to uniquely identify each row in the table when the columns are combined uniqueness is guaranteed, but when it taken individually it does not guarantee uniqueness. A composite key can act both as a primary key or a foreign key.
* Composite primary key solves the problem of data uniqueness by creating a combined unique key.
* If no non-unique or non-null columns are present, then a combination of columns can be used to represent the primary key as a composite primary key.
* They are typically seen in Associative Entity tables (Many-to-Many Relationships), or Weak Entity tables.

Ex:

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.

A-

Method 1-

create table employee(

emp\_id int not null,

emp\_status varchar(50) default 'Hired',

age int,

constraint un\_age unique(age),

primary key(emp\_id)

);

Method 2-

create table employee(

emp\_id int not null,

emp\_status varchar(50) default 'Hired',

age int unique,

primary key(emp\_id)

);