**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?

=>RDBMS is a software used to store, access, manage, and manipulate data from a relational database.

=>Advantages: **Redundancy & inconsistency**: Redundancy is a repetition of data. The file system can not control the repetition of data as each user defines and maintains the needed file as per the specific application to run. It may happen that two users are maintaining the same data file for different applications so the changes made by any user does not reflect the in file used by another user so it leads to data inconsistency.

=>**Data sharing** becomes easy in DBMS systems because of its centralized nature whereas in file systems it is not allowed and becomes a complex task.

=>**Data searching** operations become easy by writing small queries to retrieve data.

=>DBMS provides a **data security and recovery** facility using which one can provide access privileges to the different user as per their requirement and it provides backup subsystem so data can be easily restored and recovered.

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

=>**Atomicity**: The atomicity principle states that a database transaction must be successful or fail. it transaction fails then entire transaction is rolled back.so it prevents partial and incomplete transactions.

=>**Consistency**: it states data should be consistent while entering data into the database. it provides integrity constraints that maintain the accuracy and correctness of data.

=>**Isolation**: means changes in one transaction will not affect another transaction until committed. it maintains data integrity across all concurrent transactions.

=>**Durability**: means that all successful transactions should permanently recorded in database after failure of system.

1. Explain the concept of normalization.

=>Normalisation is the process of eliminating data redundancy and enhance data integrity in the table. it helps to organize data in the database.it is a multi step of process that sets data into tabular form and removes duplicate data from tables. There are different types of normalization forms such as 1NF,2NF,3 NF..

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

=>**DQL**: Data query Language: used for retrieving data from a database using a query language. i.e.: the SELECT command is used to get data from the database.

=>**DDL**: Data Definition Language: used for defining the database schema and performing different operations on database schema such as create, alter, drop, truncate, comment, rename, etc.

=>**DML**: Data manipulation language: used for manipulation of data such as inserting, deleting, and updating data from and to the database.

=>**DCL**: Data control language: used to deal with system rights, and permissions such as grant, and revoke.

=>**TCL**: Transaction control language: used to deal with transactions like commit, rollback, savepoint, set transaction, etc.

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

=>Composite key is a combination of two or more columns in a table that can be used to uniquely identify each row whereas primary key is a single column. each column in the composite key is allowed to contain duplicate values whereas the primary key does not allow duplicate values.

Example: created student table with primary key StudentID ensuring that each student uniquely identifies.

CREATE TABLE Students (

StudentID INT PRIMARY KEY,

FirstName VARCHAR(100),

LastName VARCHAR(100),

DateOfBirth DATE

);

Composite key example : Courseregistrations table StudentID + CourseID is a composite key ensures each student can register in course only once.

CREATE TABLE CourseRegistrations (

StudentID INT,

CourseID INT,

RegistrationDate DATE,

PRIMARY KEY (StudentID, CourseID)

);

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

CREATE TABLE Employees (

EmployeeID INT PRIMARY KEY,

Name VARCHAR(100) NOT NULL,

Department VARCHAR(50) DEFAULT 'HR',

Email VARCHAR(100) UNIQUE

);