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 database management system which uses a relational model for organising its data. The data are organised in the form of relations, where it is a set of tuples or rows in a table with each tuple sharing a set of attributes or columns. RDMS has a flexibility of connecting individual record with more than on table. (“many-to-many”).

   Advantages:
   - Data redundancy and inconsistency
   - Data sharing
   - Data concurrency
   - Data searching
   - Data integrity
   - System crashing
   - Data security

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

   To maintain consistency in a database before and after the transaction, certain properties are followed. These are ACID properties.

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

3. Explain the concept of normalization.

   Normalization is a method to remove the anomalies and bring the database to a consistent state. (Anomalies – Insert, update & delete)

   Types of normalizations

   - First Normal Form (1F)
   - Second Normal Form (2F)
   - Third Normal Form (3F)
   - Boyce-Codd Normal Form (BCNF)

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

DDL (Data Definition Language)
- For defining the database structure or schema
- Commands: Create, Drop, Alter, Truncate

DML (Data Manipulation Language)
- For data modification in a database
- Commands: Insert, Update, Delete

DCL (Data Control Language)
- For permission control parameters of a database system
- Commands: Grant, Revoke

TCL (Transaction Control Language)
- For dealing with the transaction within the database
- Commands: Commit, Rollback, Savepoint

DQL (Data Query Language)
- For fetching data from the database
- Command: Select

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

Main Key or Primary Key – A column in a table must contain Unique and no Null values
Composite Key – In a table if any single column cannot be assigned as Primary key, a set of columns are selected and used as a Primary key.

Example – Primary Key

Table (Emp_ID, Emp_Name, Emp_DOB, etc) – In this table Emp_ID which is a mandatory column which can be consider or should be created as Primary Key.

Primary Key (Emp_ID)

Example – Composite Key

Table (Name, DOB, Blood_Group, etc) – In this table no single column can be used a Primary Key because Name can contain same names similarly in other columns. So, if we need to create a Primary key from this table, we can use Composite Key. A set of columns can be selected and used as a Primary key using the Composite Key constrain.

Composite Key (Name, DOB, Blood_Group)

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

   Create database <database_name> or Use database <database_name>

   Create table Employee_Details
   (
   Employee_ID varchar (10) primary key,
   Employee_Name varchar (50));

   Attached SQL file in the github.