DBMS and MYSQL
Short Notes

Wednesday, March 6, 2024 3:10 PM

Agenda :

1. Introduction To RDBS and Relational Model
2. Introduction To SQL

Introduction to RDBMS And Relational Model

Issues with using files as a database

- **Inefficient** - For scale data set it becomes difficult to fetch data from File System.
- **Integrity** - There is no restriction in the way how data is stored in file system. Ex if a columns should only contain integer can have string value.
- **Concurrency** - For a concurrent system a lot of issues can arise with the use of file system.
- **Security -** In file system who so ever has access to file can see the important information as like password.

Types of Databases

1. **Relational Database -** Data stored in form of rows and columns.
2. **Non-Relational Database -** data stored in json or any other format.

Properties OF RDBMS

- Relational Databases represent a database as a collection of tables with each table storing information about something.
- Every row is unique.
- All of the values present in a column hold the same data type.
- Values are atomic. (Not divisible)
- The columns sequence is not guaranteed.
- The rows sequence is not guaranteed.
- The name of every column is unique.

Keys In RDBMS

- **Super key -** Combination of columns that uniquely defines the row. There can be multiple super keys.
- **Candidate key -** Minimal super key. There is single candidate key in a table
- **Primary Key -** Single column that uniquely defines a row. Its unique.
- **Foreign keys** - keys that help in creating relation with other table. Foreign keys are always primary key of other table.
- **Composite Key** - A composite key is a key with more than one column. Any key with multiple columns (a
  collection of columns) is a composite key.

Introduction To SQL

Types of SQL Commands

- **DDL(Data Definition Language)**: To make/perform changes to the physical structure of any table residing inside a database, DDL is used. These commands when executed are auto-commit in nature and all the changes in the table are reflected and saved immediately.

- **DML(Data Manipulation Language)**: Once the tables are created and the database is generated using DDL commands, manipulation inside those tables and databases is done using DML commands. The advantage of using DML commands is, that if in case any wrong changes or values are made, they can be changed and rolled back easily.

- **DQL(Data Query Language)**: Data query language consists of only one command upon which data selection in SQL relies. The SELECT command in combination with other SQL clauses is used to retrieve and fetch data from databases/tables based on certain conditions applied by the user.

- **DCL(Data Control Language)**: DCL commands as the name suggests manage the matters and issues related to the data controller in any database. DCL includes commands such as GRANT and REVOKE which mainly deal with the rights, permissions, and other controls of the database system.

- **TCL(Transaction Control Language)**: Transaction Control Language as the name suggests manages the issues and matters related to the transactions in any database. They are used to roll back or commit the changes in the database.

Privilege	Description
SELECT	*select statement on tables*
INSERT	*insert statement on the table*
DELETE	*delete statement on the table*
INDEX	*Create an index on an existing table*
CREATE	*Create table statements*
ALTER	*Ability to perform ALTER TABLE to change the table definition*
DROP	*Drop table statements*
ALL	*Grant all permissions except GRANT OPTION*
UPDATE	*Update statements on the table*
GRANT	*Allow to grant and manage privileges*

You can set 4 values for ON DELETE and ON UPDATE. They are:

1. CASCADE: If the referenced data is deleted or updated, all rows containing that foreign key are also deleted or updated.

2. SET NULL: If the referenced data is deleted or updated, the foreign key in all rows containing that foreign key is set to NULL. This assumes that the foreign key column is not set to NOT NULL.
3. NO ACTION: If the referenced data is deleted or updated, MySQL will not execute the delete or update operation for the parent table. This is the default action.
4. SET DEFAULT: If the referenced data is deleted or updated, the foreign key in all the referencing rows is set to its default values. This is only functional with tables that use the InnoDB engine and where the foreign key column(s) have not been defined to have a NOT NULL attribute.

Create table in MySQL

```
CREATE TABLE students (
    id INT AUTO_INCREMENT,
    firstName VARCHAR(50) NOT NULL,
    lastName VARCHAR(50) NOT NULL,
    email VARCHAR(100) UNIQUE NOT NULL,
    dateOfBirth DATE NOT NULL,
    enrollmentDate TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    psp DECIMAL(3, 2) CHECK (psp BETWEEN 0.00 AND 100.00),
    batchId INT,
    isActive BOOLEAN DEFAULT TRUE,
    PRIMARY KEY (id),
);
```