

Database Management Systems (DBMS)

Overview

A Database Management System (DBMS) is software that allows users to define, create, maintain, and control access to the database. It provides a systematic way to manage data, making it easier to store, retrieve, and manipulate information.

Database

A database is an organized collection of structured information, typically stored electronically. Databases allow for efficient data retrieval, insertion, updating, and deletion.

Data Table

A data table is a collection of related data entries that consists of rows and columns. Each row represents a unique record, and each column represents a field in the record.

Row and Column

- **Row:** A row, also known as a record or tuple, represents a single, implicitly structured data item in a table.
- **Column:** A column, also known as a field or attribute, represents a set of data values of a particular type, one for each row of the table.

Primary Key

A primary key is a column or a set of columns in a table that uniquely identifies each row in that table. It ensures that no duplicate data exists in the table and each row can be uniquely identified.

Multiple Primary Key

In relational databases, there cannot be multiple primary keys. However, you can create a composite key, which is a primary key consisting of more than one column to uniquely identify a row.

SQL Code Examples

StudentID	FirstName	LastName	Age	Department
011212090	Tashrif	Ahmed	20	CSE
011212091	Rashid	Khan	21	EEE
011212092	Sourav	Hossen	22	BBA

1.Create the Students Table

```
CREATE TABLE Students (
    StudentID VARCHAR(9) PRIMARY KEY,
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    Age INT,
    Department VARCHAR(50)
);
```

2. Insert Data into the Students Table

```
INSERT INTO Students (StudentID, FirstName, LastName, Age, Department)
```

VALUES

```
('011212090', 'Tashrif', 'Ahmed', 20, 'CSE'),  
( '011212091', 'Rashid', 'Khan', 21, 'EEE'),  
( '011212092', 'Sourav', 'Hossen', 22, 'BBA');
```

3.Add Primary Key Constraint to the Students Table

```
ALTER TABLE Students
```

```
ADD PRIMARY KEY (StudentID);
```

4. Drop the Students Table

```
DROP TABLE Students;
```

Summary

A DBMS helps in managing databases efficiently. Data tables organize data into rows and columns, where the primary key uniquely identifies each record. Composite keys can be used when a single column is not sufficient to uniquely identify records. Basic SQL commands allow us to create, insert, select, and drop tables.

This concise guide should provide a clear understanding of basic database concepts and operations using SQL.