

BYTEWISE LIMITED

Data Engineering Track

Task: Week – 2 (First Month)

Task No: 6

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Tasks:

1. SQL Constraints:

- a. Not Null, Unique, Default, & Check Constraints
- b. Primary Key, Foreign key Constraints

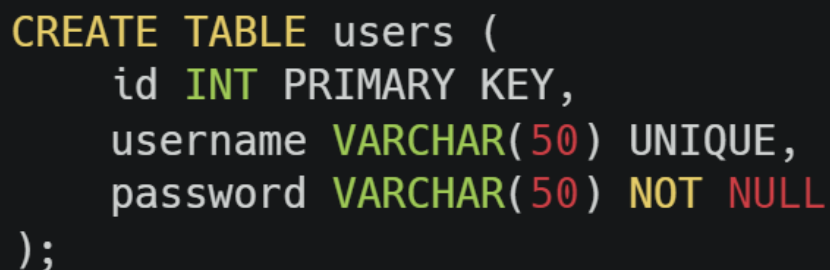
2. Tables:

- a. Creating
- b. Altering
- c. Deleting
- d. Truncating

1.SQL Constraints:

SQL constraints are rules that are **defined on a table column or a group of columns**, which restrict the type of data that can be inserted, updated or deleted in a table. **Constraints are used to maintain** the accuracy, consistency and integrity of the data in the database.

Example:



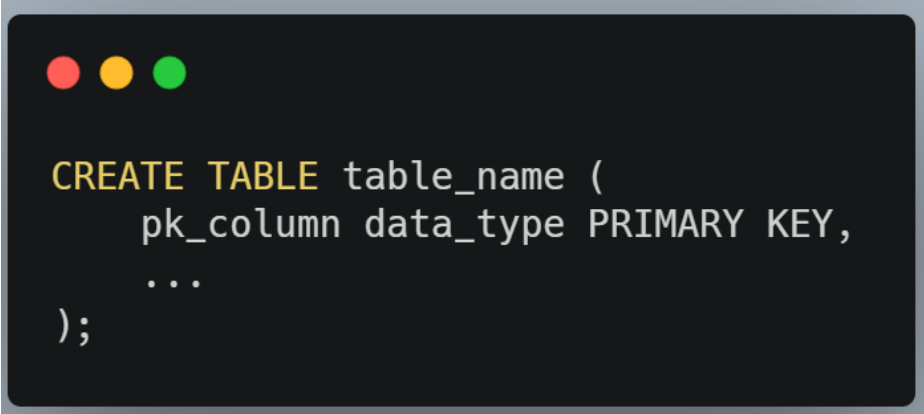
```
CREATE TABLE users (  
    id INT PRIMARY KEY,  
    username VARCHAR(50) UNIQUE,  
    password VARCHAR(50) NOT NULL  
);
```

This SQL code creates a table called "users" with three columns: "id", "username" and "password". **The "username" column has a UNIQUE constraint**, which ensures that each value in this column is unique. Therefore, **no two users can have the same username in the table.**

a. Primary Key:

- This constraint **uniquely identifies each row** in a table and ensures that there are no duplicate values.
- It is used to ensure that there are no duplicate values in a specific column or group of columns, and it helps to maintain the accuracy and integrity of the data in the table.

Syntax:



```
CREATE TABLE table_name (  
    pk_column data_type PRIMARY KEY,  
    ...  
);
```

Rules of Primary Key Constraints:

Here are some rules of Primary Key constraints that SQL developers should know:

- **Primary Key columns must have unique values:** Each value in the Primary Key column(s) must be unique, and cannot be duplicated in the table.
- **Primary Key columns cannot have NULL values:** A Primary Key column(s) cannot have NULL values, as it would not be able to uniquely identify each row in the table.
- **Primary Key constraints can be defined on one or more columns:** A Primary Key constraint can be defined on a single column or a combination of multiple columns in a table.
- **Primary Key constraints are automatically indexed:** When a Primary Key constraint is defined on a table, it is automatically indexed by the database management system (DBMS), which helps to improve the performance of the queries.
- **Primary Key constraints can be referenced by Foreign Key constraints:** Primary Key constraints can be referenced by Foreign Key constraints in other tables to create a relationship between them.

Note:

Each table can contain only one primary key. All columns that participate in the primary key must be defined as NOT NULL. **SQL Server automatically sets the NOT NULL constraint** for all the primary key columns if the NOT NULL constraint is not specified for these columns.

b. Foreign Key:

Foreign Key constraints are **used to establish a link between two tables in a relational database**. A Foreign Key is a column or set of columns in one table that refers to the Primary Key of another table.

The table that contains the foreign key is called the **referencing table or child table**. And the table referenced by the foreign key is called the **referenced table or parent table**.

Here are some rules that SQL developers should know about Foreign Key constraints:

- A Foreign Key must reference a Primary Key in another table.

- The data type of the Foreign Key **must match the data type of the Primary Key** it references.
- A Foreign Key can have NULL values, which indicates that no matching value exists in the referenced table.
- When a Primary Key value is updated or deleted, any Foreign Key values that reference it must also be updated or deleted. This is called **referential integrity**.

c. Not Null:

In SQL Server, the NOT NULL constraint is used to enforce a column to have a non-null value. This means that when a NOT NULL constraint is applied to a column, it will not accept any NULL values for that column. The NOT NULL constraint is usually applied to columns that are required to have values, such as primary keys, foreign keys, or columns used in calculations.

d. Default:

In SQL Server, a DEFAULT constraint is used to specify a default value for a column when a new row is inserted into a table. If a value is not provided for a column that has a DEFAULT constraint defined, SQL Server will use the default value specified by the constraint.

e. Unique:

In SQL SERVER, a unique constraint is a type of database constraint that ensures that the values in a specified column or combination of columns are unique across all the rows in a table. The unique constraint guarantees that no duplicate values are allowed in the column or columns specified in the constraint.

For example, suppose you have a table named "customers" with columns "customer_id" and "email". If you want to ensure that each customer has a unique email address, you can create a unique constraint on the "email" column as follows:

```
ALTER TABLE customers
```

```
ADD CONSTRAINT unique_email UNIQUE (email);
```

This constraint will prevent you from inserting or updating any rows in the "customers" table that have the same value in the "email" column.

A unique constraint can also be applied to multiple columns, in which case it ensures that the combination of values in those columns is unique. For example, suppose you have a table named "orders" with columns "order_id", "customer_id", and "order_date". If you want to ensure that each order is unique based on the combination of customer_id and order_date, you can create a unique constraint on those columns as follows:

```
ALTER TABLE orders
```

```
ADD CONSTRAINT unique_order UNIQUE (customer_id, order_date);
```

This constraint will prevent you from inserting or updating any rows in the "orders" table that have the same combination of values in the "customer_id" and "order_date" columns.

A unique constraint is similar to a primary key constraint in that it ensures uniqueness, but there are some differences. A primary key constraint is a unique constraint that also enforces the additional requirement that the column or columns specified in the constraint cannot contain null values. In addition, a table can have only one primary key constraint, whereas it can have multiple unique constraints.

In summary, a unique constraint in SQL SERVER is a database constraint that ensures that the values in a specified column or combination of columns are unique across all the rows in a table. While a unique constraint is similar to a primary key constraint, it does not require that the column or columns specified in the constraint be non-null, and a table can have multiple unique constraints.

f. Check:

A check constraint is a type of constraint in SQL Server that allows you to specify a condition that must be met for a row to be inserted or updated in a table. The condition can be any expression that returns a Boolean value.