Day 3: SQL NOTES FROM BASICS TO ADVANCED

TODAYS TOPICS: SQL CONSTRAINTS

SQL Constraints:

- NOT NULL
- UNIQUE
- PRIMARY KEY
- FOREIGN KEY
- CHECK
- DEFAULT
- AUTO_INCREMENT / IDENTITY

3. SQL Constraints:

- Constraints are rules applied to database columns to ensure the accuracy and reliability of the data stored. They help maintain the integrity of the data in the database.
- Constraints are like rules for the columns in a database. They make sure that the data stored is accurate and trustworthy.

• When you add data to the database, SQL constraints check if it meets certain rules. Only data that fits these rules is allowed in.

3.1 NOT NULL

- Ensures that a column cannot have a NULL value. It is used when you want to enforce that a column must always have a value and cannot be left empty.
- NULL represents an absence of value, indicating that no data is present.
- When a column in a table is defined with a NOT NULL constraint, it means that every record in that column must contain a value; it cannot be left empty.
- In other words, a value is required for any column where the NOT NULL constraint is enforced.

Example:



3.2 UNIQUE

- Ensures that all values in a column or a set of columns are unique across the table. This constraint prevents duplicate values in the specified column(s).
- Columns with a UNIQUE constraint cannot have duplicate values. This means every value in the column must be different.
- You can apply this constraint to one or more columns in a table, allowing for multiple UNIQUE constraints on a single table. You can also use the UNIQUE constraint to modify existing tables.

Example:



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3.3 PRIMARY KEY

- A combination of NOT NULL and UNIQUE. It uniquely identifies each row in a table and ensures that the column cannot contain NULL values. Each table can have only one primary key.
- PRIMARY KEY Constraint is a combination of NOT NULL and Unique constraints.
- NOT NULL constraint and a UNIQUE constraint together forms a PRIMARY constraint.
- The column to which we have applied the primary constraint will always contain a unique value and will not allow null values.

Example:



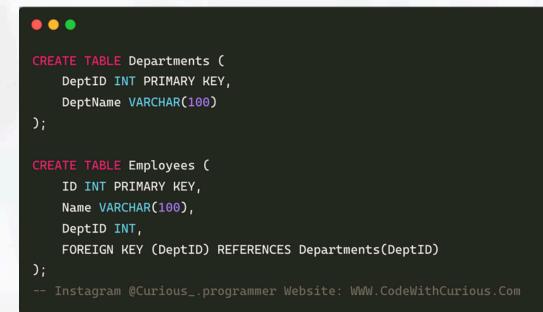
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3.4 FOREIGN KEY:

- Creates a link between two tables. It ensures that the value in one table must match a value in another table's primary key or unique column. It maintains referential integrity.
- A foreign key is used to maintain referential integrity between two tables.
- When one table references another, a column in the first table corresponds to a column in the second table.
- In this setup, the column in the second table acts as a primary key, while the same column in the first table serves as a Copyrighted By : Instagram: Curious _.Programmer CodeWithCurious.com
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Example:



3.5 CHECK:

- Ensures that the value in a column meets a specified condition. It's used to enforce domain integrity by restricting the values that can be inserted into a column.
- When a CHECK constraint is applied to a column in a table, any value being inserted into that column must meet specified conditions.
- For instance, consider an 'age' column with a CHECK constraint that requires the age to be greater than 18. If a user tries to insert a value such as 0 or any number less than 18, the CHECK constraint will prevent the insertion of this invalid value, ensuring that only valid data is entered into the

column.

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Example:

•••

```
CREATE TABLE Employees (
    ID INT PRIMARY KEY,
    Age INT CHECK (Age ≥ 18)
);
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```

3.6 DEFAULT:

- Provides a default value for a column when no value is specified during an insert operation. It's used to assign a standard value to a column.
- When a default constraint is set on a column in a table and no specific value is provided for that column, the system will automatically insert the default value defined in the constraint.

Example:

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3.6 AUTO_INCREMENT / IDENTITY:

Automatically generates a unique number for each row in a column. It's often used for primary keys to ensure a unique identifier for each row.

AUTO_INCREMENT (MySQL and MariaDB):

- What it Does: Automatically generates a unique number for a column each time a new row is added. This number starts from 1 and increases by 1 for each new row.
- When to Use: Typically used for the primary key column to ensure each row has a unique identifier.
- How it Works: You don't need to insert a value for the AUTO_INCREMENT column; it will automatically get the next number in the sequence. Copyrighted By : Instagram: Curious_.Programmer CodeWithCurious.com

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Example:



Here, every time you insert a new row, MySQL will automatically assign the next available number to the ID column.

IDENTITY (SQL Server):

What it Does: Similar to AUTO_INCREMENT, it automatically generates a unique number for a column each time a new row is inserted. The number starts from a seed value (usually 1) and increases by a specified increment (usually 1).

When to Use: Also commonly used for primary key columns to ensure uniqueness.

How it Works: Just like with AUTO_INCREMENT, you don't need to provide a value for the IDENTITY column when inserting new rows; SQL Server handles it for you.

Example:

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In this example, the ID column starts at 1 and increments by 1 for each new row inserted.

Quick Summry:

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- NOT NULL: Ensures a column cannot have NULL values.
- UNIQUE: Ensures all values in a column are distinct.
- PRIMARY KEY: Combines NOT NULL and UNIQUE; uniquely identifies each row.
- FOREIGN KEY: Ensures a column's value matches a value in another table.
- CHECK: Ensures values in a column meet specific conditions.
- DEFAULT: Sets a default value for a column if none is provided.
- AUTO_INCREMENT / IDENTITY: Automatically generates a unique number for a column, typically used for primary keys.
 Ensures a column cannot have NULL values.

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