

Different Types of Constraints

Let us understand details about different types of constraints used in RDBMS databases.

- Supported constraints:
 - NOT NULL constraint
 - CHECK constraint
 - UNIQUE constraint
 - PRIMARY KEY constraint
 - FOREIGN KEY constraint
- All constraints can be added while creating the table or on pre-created tables using **ALTER**.
- Typically we define **NOT NULL**, **CHECK** constraints while creating the tables. However, we can also specify **not null constraints** as well as **check constraints** to the columns while adding columns using **ALTER TABLE**.
- **FOREIGN KEY** constraints are created after the tables are created. It is primarily used to define relationship between 2 tables - example: users is parent table and user_login_details is child table with one to many relationship between them.
- **PRIMARY KEY** and **UNIQUE** constraints might be added as part of CREATE table statements or ALTER table statements. Both are commonly used practices.
- Let us compare and contrast **PRIMARY KEY** and **UNIQUE** constraints.
 - There can be only one **PRIMARY KEY** in a table where as there can be any number of **UNIQUE** constraints.
 - **UNIQUE** columns can have null values unless **NOT NULL** is also enforced. In case of **PRIMARY KEY**, both uniqueness as well as not null are strictly enforced. In other words a primary key column cannot be null where as unique column can be null.
 - **FOREIGN KEY** from a child table can be defined against **PRIMARY KEY** column or **UNIQUE** column.
 - Typically **PRIMARY KEY** columns are surrogate keys which are supported by sequence.
 - **PRIMARY KEY** or **UNIQUE** can be composite. It means there can be more than one column to define **PRIMARY KEY** or **UNIQUE** constraint.
- Let's take an example of LMS (Learning Management System).
 - **USERS** - it contains columns such as user_id, user_email_id, user_first_name etc. We can enforce primary key constraint on user_id and unique constraint on user_email_id.
 - **COURSES** - it contains columns such as course_id, course_name, course_price etc. Primary key constraint will be enforced on course_id.
 - **STUDENTS** - A student is nothing but a user who is enrolled for one or more courses. But he can enroll for one course only once.
 - It contains fields such as student_id, user_id, course_id, amount_paid, enrolled_dt etc.
 - Primary key constraint will be enforced on student_id.
 - A foreign key constraint can be enforced on students.user_id against users.user_id.
 - Another foreign key constraint can be enforced on students.course_id against courses.course_id.
 - Also we can have unique constraint enforced on students.user_id and students.course_id. It will be composite key as it have more than one column.