

Lab_6A

In addition to the key constraints, you should also be familiar with UNIQUE, NOT NULL, CHECK and CASCADE. Cascade is the constraint most associated with referential integrity (if you haven't already watched the video, please do, now.). Cascades control how changes ripple through a database. For example, if a student is removed from the classes table, they probably shouldn't be removed from the enrollment table but if they are removed from the table of enrolled students, they should be removed from the classes table.

Here is an example of a CHECK constraint:

```
CREATE TABLE check_constraint_example (  
  user_id bigserial,  
  user_role varchar(50),  
  salary integer,  
  CONSTRAINT user_id_key PRIMARY KEY (user_id)  
  CONSTRAINT check_role_in_list CHECK (user_role IN ('Admin', 'Staff')),  
  CONSTRAINT check_salary_nonzero CHECK (salary)
```

1. write some code to test this out. See what happens if your attempt to insert violates either CHECK constraint.

```
18  
Data Output Messages Notifications  
ERROR: Failing row contains (1, Guest, 1000).new row for relation "check_constraint_example1" violates check constraint "check_role_in_list1"  
  
ERROR: new row for relation "check_constraint_example1" violates check constraint "check_role_in_list1"  
SQL state: 23514  
Detail: Failing row contains (1, Guest, 1000).
```

```
Data Output Messages Notifications  
ERROR: Failing row contains (2, Admin, 0).new row for relation "check_constraint_example1" violates check constraint "check_salary_nonzero1"  
  
ERROR: new row for relation "check_constraint_example1" violates check constraint "check_salary_nonzero1"  
SQL state: 23514  
Detail: Failing row contains (2, Admin, 0).
```

2. create some code to construct a CHECK constraint that uses a logical operator such as AND or OR.

```
Data Output Messages Notifications  
ERROR: Failing row contains (1, -1, 10).new row for relation "check_constraint_logical" violates check constraint "check_values_logical"  
  
ERROR: new row for relation "check_constraint_logical" violates check constraint "check_values_logical"  
SQL state: 23514  
Detail: Failing row contains (1, -1, 10).
```

Data Output Messages Notifications

ERROR: Failing row contains (2, 5, -5).new row for relation "check_constraint_logical" violates check constraint "check_values_logical"

ERROR: new row for relation "check_constraint_logical" violates check constraint "check_values_logical"

SQL state: 23514

Detail: Failing row contains (2, 5, -5).

3. now that you know how to create CONSTRAINTS, write some code that creates a NOT NULL and a UNIQUE constraint.

Data Output Messages Notifications

ERROR: Failing row contains (1, null, null).null value in column "username" of relation "constraints_example" violates not-null constraint

ERROR: null value in column "username" of relation "constraints_example" violates not-null constraint

SQL state: 23502

Detail: Failing row contains (1, null, null).

Data Output Messages Notifications

ERROR: Key (email)=(user1@example.com) already exists.duplicate key value violates unique constraint "constraints_example_email_key"

ERROR: duplicate key value violates unique constraint "constraints_example_email_key"

SQL state: 23505

Detail: Key (email)=(user1@example.com) already exists.

4. write some code that uses ALTER TABLE to remove a constraint

Data Output Messages Notifications

ALTER TABLE

Query returned successfully in 247 msec.

5. write some code that adds a constraint

Data Output Messages Notifications

ALTER TABLE

Query returned successfully in 77 msec.

```
Data Output Messages Notifications
ALTER TABLE

Query returned successfully in 325 msec.
```

6. write some code that changes the salary constraint to greater than 1,000

NOTE: if you attempt to add or alter a constraint that would be violated by data already in the table, you will be prevented from performing the modification.

You can use EXPLAIN to compare the execution time of two queries.

The screenshot shows a PostgreSQL IDE interface. At the top, the connection is 'lab6/postgres@PostgreSQL 16'. Below the connection bar is a toolbar with icons for file operations, query execution, and other database functions. The main area is divided into two tabs: 'Query' and 'Query History'. The 'Query' tab is active, displaying a list of SQL queries numbered 16 to 24. The queries are as follows:

```
16 ALTER TABLE constraints_example DROP CONSTRAINT constraints_example_email_key;
17
18 ALTER TABLE constraints_example ADD CONSTRAINT check_username_length CHECK (char_leng
19
20 ALTER TABLE constraints_example ADD CONSTRAINT constraints_example_email_key CHECK (
21
22 ALTER TABLE check_constraint_example DROP CONSTRAINT check_salary_nonzero;
23
24 ALTER TABLE check_constraint_example ADD CONSTRAINT check_salary_min CHECK (salary >
```

Below the query editor, there are tabs for 'Data Output', 'Messages', and 'Notifications'. The 'Data Output' tab is active, showing a table schema for a table with three columns: 'id' (type: bigint, primary key), 'username' (type: character varying (50)), and 'email' (type: character varying (100)).

```
Data Output Messages Notifications
ALTER TABLE

Query returned successfully in 325 msec.
```

7. Use explain to compare the processing speed of a query using * and a query enumerating each column. Cascade, as described above, controls how changes propagate through a database.

```

25
26 SELECT * FROM constraints_example;
27
28 EXPLAIN SELECT * FROM check_constraint_example;
29 EXPLAIN SELECT user_id, user_role, salary FROM check_constraint_example;
30

```

Data Output Messages Notifications



QUERY PLAN

text

1	Seq Scan on check_constraint_example (cost=0.00..15.10 rows=510 width=1...
---	--

8. Using two related tables that you create here or that you've already created, write some code (ON DELETE CASCADE) that, when you delete the row containing the foreign key in one table, it also deletes the row in the related table containing the primary key.

```

50
51 -- Delete from primary_table and observe cascading delete in related_table
52 DELETE FROM primary_table WHERE id = 1;
53 -- This should also delete the related row in related_table
54

```

Data Output Messages Notifications

DELETE 1

Query returned successfully in 220 msec.