## INSERT. UPDATE. DELETE. TRANSACTIONS, CONSTRAINTS, AND REFERENTIAL INTEGRITY

### TODAY'S OBJECTIVES

- Inserts
- Deletes
- Updates
- Constraints and referential integrity
- Transactions

### INSERT

```
INSERT INTO table_name (column1, column2,
..., column_n) VALUES (value1, value2,
... value_n);
```

```
INSERT INTO client (client_id, first_name, last_name,
active) VALUES (1, 'Molly', 'McButter', true);
```

### INSERT

```
INSERT INTO table_name VALUES (value1,
value2, ... value_n);
```

```
INSERT INTO client VALUES (2, 'Johnny',
'McMargarine', false);
```

### INSERT USING SELECT

```
INSERT INTO table_name (column1, column2,
..., column_n) [SELECT STATEMENT]
```

```
INSERT INTO countrylanguage (countrycode, language, isofficial,
percentage)
SELECT countrycode, 'Klingon', false, .1 FROM countrylanguage
WHERE language='English';
```

### UPDATE

```
UPDATE table_name
SET column1 = value1, column2 = value2,
...
WHERE condition;
```

```
UPDATE client SET last_name = 'Butters' WHERE
client_id=2;
```

### UPDATE

### Can use subquery in WHERE clause.

```
UPDATE client SET last_name = 'Butters' WHERE client_id =
(SELECT client_id FROM client WHERE first_name='Johnny');
```

### DELETE

```
DELETE FROM table_name
WHERE column=value;
```

Example:

DELETE FROM client WHERE client id=2;

### DELETE

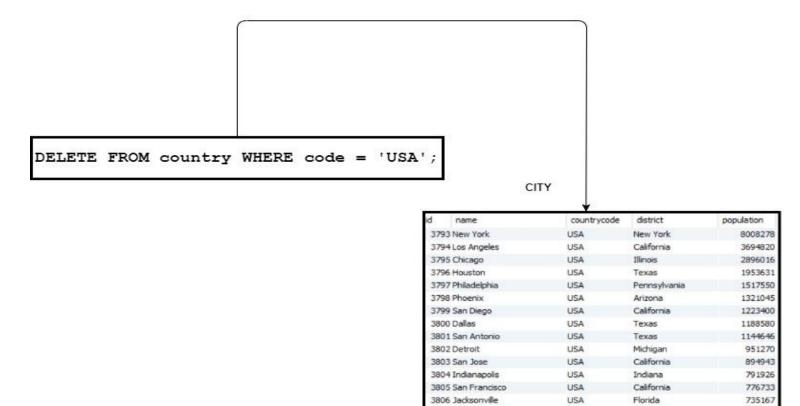
Don't forget the WHERE clause!!!

Doing so can have *disastrous* consequences.

### REFERENTIAL INTEGRITY

## What the heck is Referential Integrity?

### REFERENTIAL INTEGRITY



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### REFERENTIAL INTEGRITY

**Referential integrity** ensures that relationships between tables remain consistent.

 We enforce referential integrity and other rules by applying constraints to our tables.

### TABLE CONSTRAINTS

A constraint is associated with a table and defines properties that the column data must comply with.

NOT NULL	Requires data in column.
UNIQUE	Requires data in column to be unique.
PRIMARY KEY	Allows FKs to establish a relationship, and enforces NOT NULL and UNIQUE.
FOREIGN KEY	Enforces valid PK values, and limits deletion of the PK row if FK row exists.
CHECK	Specifies acceptable values that can be entered in the column.
DEFAULT	Provides a default value for the column.

# INTRODUCING TRANSACTIONS

### TRANSACTIONS

If we transfer money from one bank account to another and there's a failure depositing it after it withdraws, we wouldn't want our account to be out the money too and we would want the withdrawal from the original account to be reverted.

Even though there are two steps to the process (withdrawing and depositing), the process functions as a whole and must either complete successfully or be undone. In database-speak, this would be a **transaction**.

### THE ACID TEST

The ACID test can be used to determine whether a series of actions should be written as a transaction. A scenario implemented as a transaction should have the following characteristics:

- Atomicity: Within a transaction, a series of database operations all occur or none occur.
- **Consistency**: The completed transaction leaves things remaining in a consistent state at the end. Any rules in place before the transaction still pass after the transaction.
- <u>I</u>solation: Ensures that the concurrent execution of a transaction results as if the operations were executed serially.
- <u>Durability</u>: Once a transaction has been committed it will remain so, even during a power loss, crash, or an error.

### TRANSACTIONS IN POSTGRES

- We can start a transaction by using START TRANSACTION before a set of SQL statements.
- Once we have completed all the statements successfully, we can COMMIT the transaction.
- If something goes wrong or we change our mind BEFORE committing, we can ROLLBACK the transaction.

### TRANSACTIONS IN POSTGRES

#### Example:

```
SELECT * FROM client; // Before we start we have 2 rows
START TRANSACTION; // Initiate transaction
INSERT INTO client VALUES (3, 'Howdy', 'Doodey', true); // Insert data
SELECT * FROM client; // We now have 3 rows but they have not been permanently saved
ROLLBACK; // If we use ROLLBACK, any changes from start of transaction will be reverted
SELECT * FROM client; // We now have 2 rows as we did before we inserted.
```

If we had used **COMMIT** rather than **ROLLBACK**, the data would have permanently saved. Once we use either COMMIT or ROLLBACK, the transaction is closed, so if we want to be able to **ROLLBACK** again, we must start a new transaction.

READING POSTGRES DATABASE METADATA