

**The doohickey has uncoupled from
the thingamabob.**



Bring me the duct tape.

Module 2-4

INSERT, UPDATE, DELETE

Objectives

- INSERT
- DELETE
- UPDATE
- Constraints and referential integrity
- Transactions



Changing data

The row data for each table in a database can be changed or deleted. New rows of data can also be added. There are 3 types of statements we will cover today:

- **INSERT**: Adds a new row to the table.
- **UPDATE**: Changes the column value for an existing row or rows.
- **DELETE**: Permanently removes a row from the table.

INSERT statements

You can use the INSERT statement to insert 1 row into the database. The following pattern is used:

```
INSERT INTO [Name of Table] ([name of col 1], [name of col 2])
```

```
VALUES ([value for col 1], [value for col2]);
```

INSERT statements example

Consider the following example:

```
INSERT INTO actor (first_name, last_name) VALUES ('SHIA','LEBOUF');
```



In English, this translates to insert a new row in the table actor, on this new row the value for first_name is going to be “SHIA” and the value for the last_name is going to be “LEBOUF”.

| * | actor_id | first_name | last_name | |
|---|----------|------------|-----------|--|
| 1 | 1 | PENELOPE | GUINESS | |
| 2 | 2 | NICK | WAHLBERG | |
| 3 | 3 | ED | CHASE | |

INSERT statements example

Note that in the previous example, we only specified two out of three columns and did not specify that a value be inserted for actor_id.

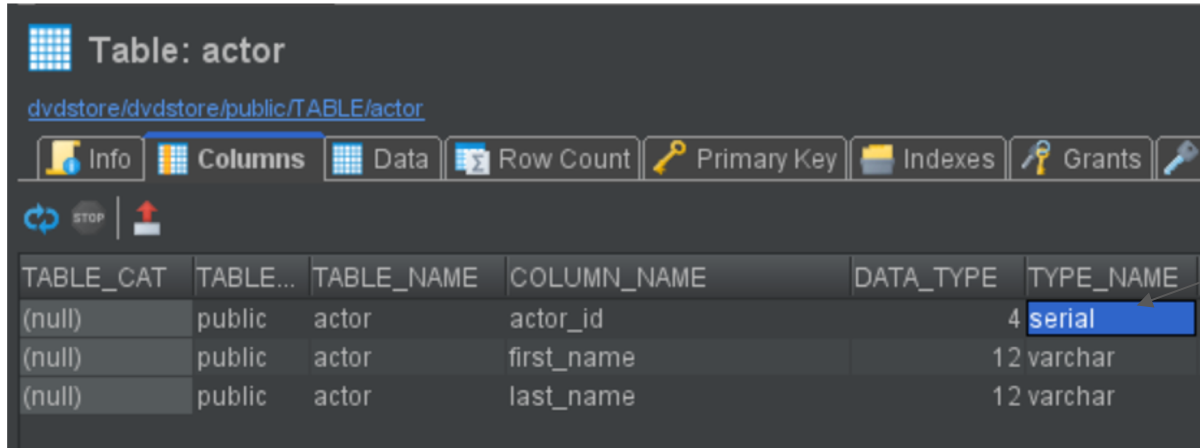


Table: actor

[dvdstore/dvdstore/public/TABLE/actor](#)

Info Columns Data Row Count Primary Key Indexes Grants

| TABLE_CAT | TABLE... | TABLE_NAME | COLUMN_NAME | DATA_TYPE | TYPE_NAME |
|-----------|----------|------------|-------------|-----------|-----------|
| (null) | public | actor | actor_id | 4 | serial |
| (null) | public | actor | first_name | 12 | varchar |
| (null) | public | actor | last_name | 12 | varchar |

- actor_id is of a special data type called **serial**.
- A column marked as serial will automatically increase in value with each new row.
- Columns marked as serial should not be included in the INSERT.

UPDATE statements

An update statement changes the column values for one or more existing rows.

UPDATE **[table name]**

SET **[col 1 name] = [col 1 value]**

WHERE ...



UPDATE statements example

Consider the following example:

```
UPDATE actor
SET
  first_name = 'NICHOLAS',
  last_name = 'WAHLBERG'
WHERE
  actor_id = 2;
```

In here, we have changed the value for 2 columns (first_name and last_name) but only for the row with an actor_id of 2.

We can separate multiple columns that need updating with a comma.

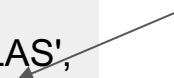
The syntax for structuring the WHERE statement remains unchanged.

UPDATE statements example

Consider the following example:

```
UPDATE actor  
SET  
first_name = 'NICHOLAS',  
last_name = 'WALBERG';
```

We have just set every actors first name to Nicholas and their last name to Walberg!!!



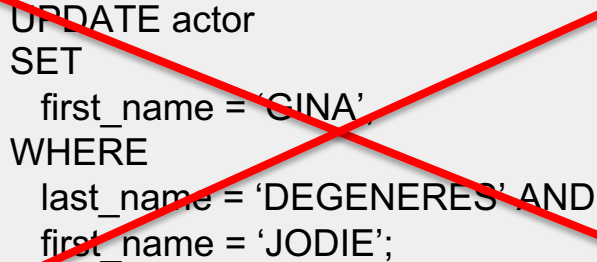
UPDATE statements example

Consider the following example:

```
UPDATE actor
SET
    first_name = 'NICK',
WHERE
    last_name = 'WAHLBERG' AND
    first_name = 'NICHOLAS';
```

UPDATE statements example

Consider the following example: A mistake was made for the film Beast Hunchback, is lists Jodie Degeneres as an actor, but it was actually Gina Degeneres who stared in it.. Fix it!



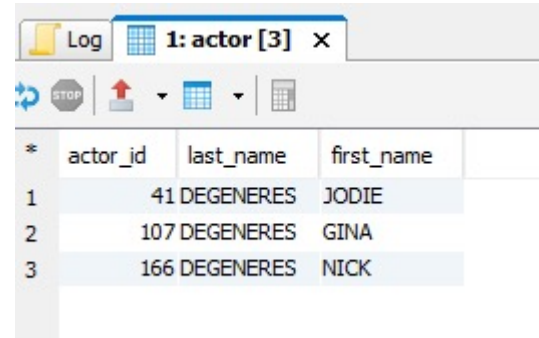
```
UPDATE actor
SET
    first_name = 'GINA'
WHERE
    last_name = 'DEGENERES' AND
    first_name = 'JODIE';
```

```
UPDATE film
SET
    ??????
```

UPDATE statements example

Consider the following example: A mistake was made for the film Beast Hunchback, is lists Jodie Degeneres as an actor, but it was actually Gina Degeneres who stared in it.. Fix it!

```
SELECT a.actor_id,  
        a.last_name, a.first_name  
FROM actor a  
WHERE a.last_name = 'DEGENERES';
```



The screenshot shows a database query result window titled "1: actor [3] x". It displays a table with 4 columns: an unnamed index column, "actor_id", "last_name", and "first_name". The table contains 3 rows of data, all with the last name "DEGENERES".

| * | actor_id | last_name | first_name |
|---|----------|-----------|------------|
| 1 | 41 | DEGENERES | JODIE |
| 2 | 107 | DEGENERES | GINA |
| 3 | 166 | DEGENERES | NICK |

Want to be able to do this 1 SELECT statement!

UPDATE statements example

Consider the following example: A mistake was made for the film Beast Hunchback, is lists Jodie Degeneres as an actor, but it was actually Gina Degeneres who stared in it.. Fix it!

```
UPDATE film_actor
SET actor_id = (
    SELECT a.actor_id
    FROM actor a
    WHERE a.first_name = 'GINA'
    AND a.last_name = 'DEGENERES'
)
WHERE film_id = (
    SELECT f.film_id
    FROM film f
    WHERE f.title = 'BEAST HUNCHBACK'
) AND
actor_id = (
    SELECT a.actor_id
    FROM actor a
    WHERE a.first_name = 'JODIE' AND a.last_name = 'DEGENERES'
);
```

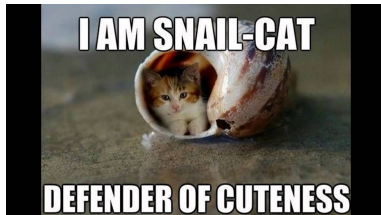
DELETE statements

A delete statement removes row or rows from the table. It follows this format:

DELETE FROM [table name]

WHERE ...

In the absence of a WHERE statement, every row in the database will be deleted!

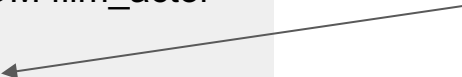


DELETE statements example

Consider the following example.

```
DELETE FROM film_actor  
WHERE  
actor_id = 2;
```

Here, we are deleting every row that has an actor_id of 2.



Referential Integrity

Database Connection: ☐ Sticky Database: ☐

dvdstore

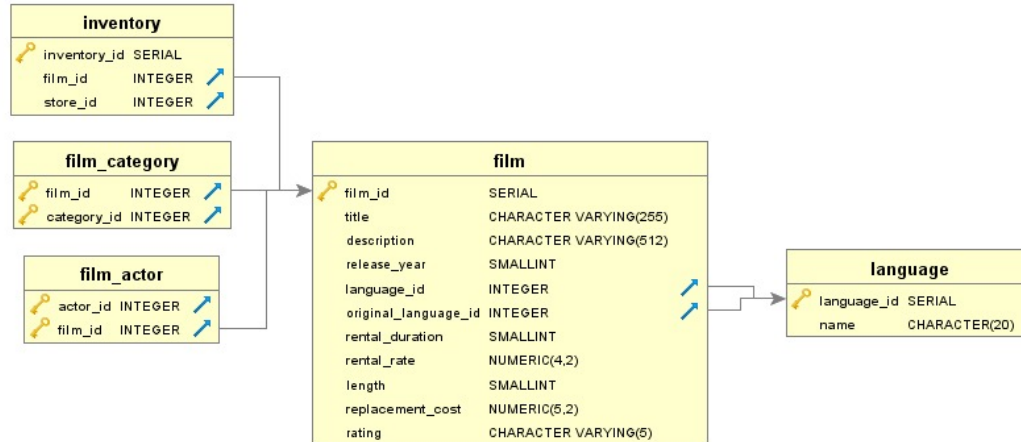
```
1 DELETE FROM actor
2 WHERE actor_id = 4;
```

2:20 [38] INS

Log

| Time | Status | Command | Exec | Fetch | Rows | Message | SQL/Command |
|----------|----------|---------|-------|-------|------|--|---|
| 15:51:03 | STARTED | | | | | Executing for: 'dvdstore/dvdstore [PostgreSQL], Database: dvdstore, Schema: ... | |
| 15:51:03 | INFO | | | | | Physical database connection acquired for: dvdstore/dvdstore | |
| 15:51:03 | FAILED | DELETE | 0.051 | | | 0 [Code: 0, SQL State: 23503] ERROR: update or delete on table "actor" violates foreign key constraint "film_actor_actor_id_fkey" on table "film_actor" Detail: Key (actor_id)=(4) is still referenced from table "film_actor". | DELETE FROM actor WHERE actor_id = 4 |
| 15:51:03 | FINISHED | | 0.051 | 0 | 0 | Failed: 1 | |

Referential Integrity



Constraints

Constraints are rules imposed on the table, upon creation, that limits the ability to change the data.

- **NOT NULL:** A value must be specified
- **PRIMARY KEY:** Define that certain column/columns are part of the key
 - **A primary key value cannot be NULL.**
- **FOREIGN KEY:** Defines a foreign key based on a primary key from a different table
- **CHECK:** Only certain values can be inserted or updated

Constraints Demo

Transactions

A large number of SQL statements can be rolled into a single transaction.

The following syntax is observed:

BEGIN TRANSACTION;

// Lots of SQL statements.

COMMIT TRANSACTION;

Your INSERT or UPDATE SQL statements **will only commit (permanently save in the database) if all the SQL statements in the transaction end successfully.**

Transactions and the ACID test

Atomicity – either all statements occur, or none occur.

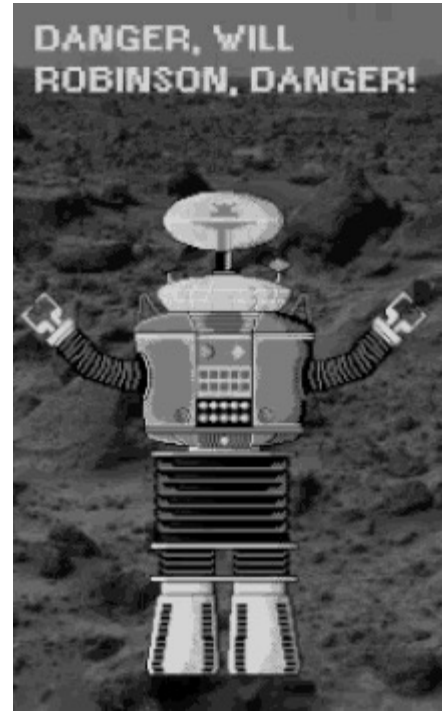
Consistency – the transaction leaves the database in a consistent state at the end.

Isolation – Execution of transaction results as if operations were executed serially.

Durability – Once transaction is committed, it will remain so.

Objectives

- INSERT
- DELETE
- UPDATE



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| Log | | | | | | | |
|----------|----------|---------|-------|-------|------|--|---|
| Time | Status | Command | Exec | Fetch | Rows | Message | SQL/Command |
| 15:51:03 | STARTED | | | | | Executing for: 'dvdstore/dvdstore' [PostgreSQL], Database: dvdstore, Schema:... | |
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| 15:51:03 | FINISHED | | 0.051 | 0 | 0 | Failed: 1 | |

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```
1 BEGIN TRANSACTION;
2
3 CREATE TABLE country (
4     code character(3) NOT NULL,
5     name varchar(64) NOT NULL,
6     continent varchar(64) NOT NULL,
7     region varchar(64) NOT NULL,
8     surfacearea real NOT NULL,
9     indepyear smallint,
0     population integer NOT NULL,
1     lifeexpectancy real,
2     gnp numeric(10,2),
3     gnppold numeric(10,2),
4     localname varchar(64) NOT NULL,
5     governmentform varchar(64) NOT NULL,
6     headofstate varchar(64),
7     capital integer,
8     code2 character(2) NOT NULL,
9     CONSTRAINT pk_country_code PRIMARY KEY (code),
0     CONSTRAINT country_continent_check CHECK ((continent = 'Asia') OR (continent :
1);
2
```