Database

Postgres

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EXERCISES

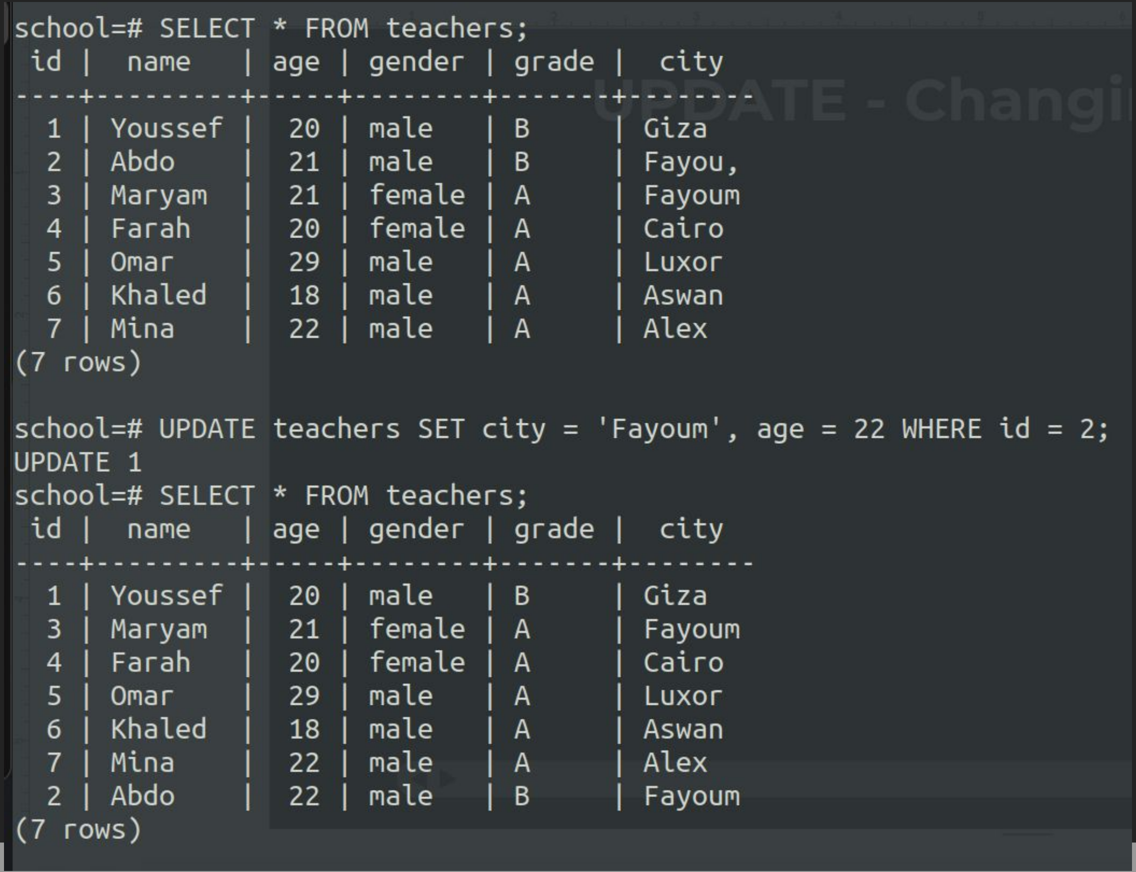
DATA TYPES:

- **Numeric:**
  INT, BIGINT, NUMERIC(p, s), DECIMAL(p, s), REAL, DOUBLE PRECISION
  NUMERIC(p, s) 274 p= 3, s = 2 “2.74”
- **Text:**
  VARCHAR(N), TEXT, CHAR(n)
- **Date-Time:**
  DATE, TIME, TIMESTAMP ‘2025-07-20 05:21:30’
- **Boolean:**
- **Auto-increment:**
  SERIAL, BIGSERIAL

INSERT - Adding data

- DEFAULT & NULL
- USING SELECT
- RETURNING
- Inserting Into Tables with Foreign Keys

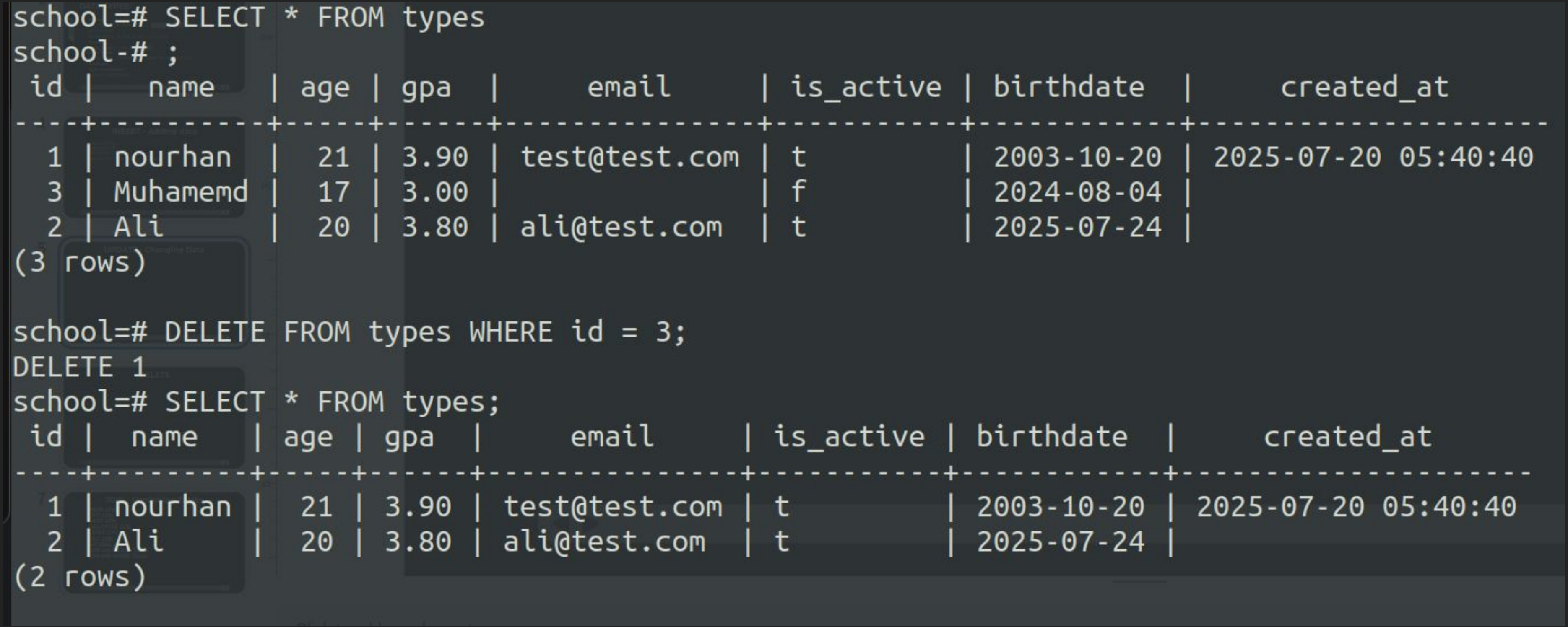
UPDATE - Changing Data



```
school=# SELECT * FROM teachers;
 id |   name   | age | gender | grade |  city
----+----------+-----+--------+-------+--------
  1 | Youssef  |  20 | male   | B     | Giza
  2 | Abdo     |  21 | male   | B     | Fayou,
  3 | Maryam   |  21 | female | A     | Fayoum
  4 | Farah    |  20 | female | A     | Cairo
  5 | Omar     |  29 | male   | A     | Luxor
  6 | Khaled   |  18 | male   | A     | Aswan
  7 | Mina     |  22 | male   | A     | Alex
(7 rows)

school=# UPDATE teachers SET city = 'Fayoum', age = 22 WHERE id = 2;
UPDATE 1
school=# SELECT * FROM teachers;
 id |   name   | age | gender | grade |  city
----+----------+-----+--------+-------+--------
  1 | Youssef  |  20 | male   | B     | Giza
  3 | Maryam   |  21 | female | A     | Fayoum
  4 | Farah    |  20 | female | A     | Cairo
  5 | Omar     |  29 | male   | A     | Luxor
  6 | Khaled   |  18 | male   | A     | Aswan
  7 | Mina     |  22 | male   | A     | Alex
  2 | Abdo     |  22 | male   | B     | Fayoum
(7 rows)
```

DELETE



```
school=# SELECT * FROM types
school-# ;
 id |   name    | age | gpa  |     email      | is_active | birthdate  |      created_at
----+-----------+-----+------+----------------+-----------+------------+---------------------
  1 | nourhan   |  21 | 3.90 | test@test.com  | t         | 2003-10-20 | 2025-07-20 05:40:40
  3 | Muhamemd  |  17 | 3.00 |                | f         | 2024-08-04 |
  2 | Ali       |  20 | 3.80 | ali@test.com   | t         | 2025-07-24 |
(3 rows)

school=# DELETE FROM types WHERE id = 3;
DELETE 1
school=# SELECT * FROM types;
 id |  name   | age | gpa  |     email      | is_active | birthdate  |      created_at
----+---------+-----+------+----------------+-----------+------------+---------------------
  1 | nourhan |  21 | 3.90 | test@test.com  | t         | 2003-10-20 | 2025-07-20 05:40:40
  2 | Ali     |  20 | 3.80 | ali@test.com   | t         | 2025-07-24 |
(2 rows)
```

JOIN - Combining Tables

- INNER JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL OUTER JOIN
- CROSS JOIN
- SELF JOIN ⇒ NEED ALTER
- NATURAL JOIN ⇒ NEED ALTER
- JOIN with Multiple Tables
- JOIN with WHERE Clause

LAB

1- Create a students table with these columns:
student_id (SERIAL PRIMARY KEY)
name (VARCHAR(100))
age (INT)
gpa (NUMERIC(3,2))
is_active (BOOLEAN)
birth_date (DATE)

2- Create a courses table with:
course_id (SERIAL PRIMARY KEY)
title (VARCHAR(100))
credits (INT)
department (VARCHAR(50))

NOT TODAY:
3- Create a junction table student_courses with:
student_id (INT references students)
course_id (INT references courses)
enrollment_date (DATE)

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LAB

4- Insert 3 records into students

5- Insert 3 records into courses

6- Insert enrollment records into student_courses (each student in at least 1 course)

7- Change one student's name

8- Deactivate students with GPA below 2.5

9- Delete all inactive students

10- List all students with their courses (INNER JOIN)

11- Show all courses including those with no students (LEFT JOIN)

12- Display all students including those not enrolled (RIGHT JOIN)

13- Find students born after 2000 enrolled in courses (multiple JOINs with WHERE)