

Introduction to SQL **(Exercises)**

**Inserting, Updating and Deleting
Data**

Lesson Objectives

- Insert data with INSERT
- Modify data with UPDATE
- Delete data with DELETE
- Select and filter data with SELECT
- Aggregate data with COUNT, SUM, AVG, MIN, MAX
- Use GROUP BY and HAVING

INSERT INTO

Adding data to a table

Basic Syntax

```
INSERT INTO TableName (col1, col2, col3)  
VALUES (val1, val2, val3);
```

Exercise 1 - Insert Users

Task

Insert 3 users into the library:

- 2 students
- 1 lecturer

Solution

```
INSERT INTO Users (name, email, user_type) VALUES
  ('Mario Rossi', 'mario.rossi@students.university.edu', 'student'),
  ('Luca Bianchi', 'luca.bianchi@students.university.edu', 'student'),
  ('Anna Verdi', 'anna.verdi@university.edu', 'lecturer');
```

Exercise 2 - Insert Books

Task

- Insert 3 books into the library: specify title, author, genre, year, available copies

Solution

```
INSERT INTO Books (title, author, genre, publication_year, available_copies)
VALUES
  ('The Lord of the Rings', 'J.R.R. Tolkien', 'Fiction', 1954, 3),
  ('Database Fundamentals', 'Elmasri, Navathe', 'Computer Science', 2020, 2),
  ('Machine Learning', 'Tom Mitchell', 'Computer Science', 1997, 1);
```

UPDATE

Modifying data in a table

Basic Syntax

```
UPDATE TableName  
SET col1 = new_value  
WHERE condition;
```

Exercise 3 - Update data

Task

- After a loan, reduce the number of available copies of the book "Database Fundamentals"

Solution

```
UPDATE Books  
SET available_copies = available_copies - 1  
WHERE title = 'Database Fundamentals';
```

DELETE

Removing data from a table

Basic Syntax

```
DELETE FROM TableName  
WHERE condition;
```

Exercise 4 - Delete data

Task

- Delete the book "Machine Learning" from the library

Solution

```
DELETE FROM Books  
WHERE title = 'Machine Learning';
```

SELECT

Extracting data from a table

Basic Syntax

```
SELECT col1, col2  
FROM TableName  
WHERE condition  
ORDER BY col1 ASC/DESC;
```

Exercise 5 - Select data

Task

- Select all available books, sorted alphabetically

Solution

```
SELECT title, author, available_copies
FROM Books
WHERE available_copies > 0
ORDER BY title;
```

Aggregate Functions

Counting and statistics on data

Exercise 6 - Count books

Task

- Count the total number of available books in the library

Solution

```
SELECT SUM(available_copies) AS total_books  
FROM Books;
```

GROUP BY & HAVING

**Grouping and filtering
aggregated data**

Basic Syntax

```
SELECT col1, COUNT(*)  
FROM TableName  
GROUP BY col1  
HAVING COUNT(*) > value;
```

Exercise 7 - Group by genre

Task

- Count how many books there are per genre

Solution

```
SELECT genre, COUNT(*) AS book_count  
FROM Books  
GROUP BY genre;
```

Exercise 8 - Filter genres

Task

- Show only genres with more than 1 book

Solution

```
SELECT genre, COUNT(*) AS book_count
FROM Books
GROUP BY genre
HAVING COUNT(*) > 1;
```