

Hands-on course , 3  
day(s)  
Ref : PSQ

## Participants

SQL query designers,  
future DBMS developers,  
administrators or maintenance  
managers.

## Pre-requisites

Basic programming  
knowledge.

## Next sessions

# SQL Server: SQL Programming

*This course will enable you to learn the fundamentals of the SQL language. You'll learn about the principles of relational databases (relational algebra, set theory) and explore the syntax of SQL for querying, analyzing data, and working with databases.*

## OBJECTIVES

Understand the relational model and identify the objects of a database.  
Query and classify a table's data using simple operators.  
Return data from multiple tables using joins and subqueries.  
Group together data and perform calculations for analysis purposes.  
Work with data in database tables.

### 1) Relational algebra and the SQL standard.

#### 2) Database theory

#### 3) Querying single-table data

#### 4) Multiple-table querying

### 5) Data analysis

#### 6) Updating data

#### 7) Introduction to procedural SQL

## 1) Relational algebra and the SQL standard.

- The concepts of the relational model.
- History of RDBMSs and the SQL language.
- Entities, associations, and ER diagrams.
- Types of data and value expressions.

### **Jeu de rôle**

*Getting started with the software SQL Server Management Studio. Discovering the studied database.*

## 2) Database theory

- Elements of the DBMS.
- Tables, keys, and normal forms.
- Entities, associations, and ER diagrams.
- Column and table restrictions.

### **Workshop**

*Identifying the objects of a database. Determining the normal form type of a relationship and a transformer, creating an ER diagram.*

## 3) Querying single-table data

- Structure of a SELECT query.
- WHERE filters, predicates, and ternary logic (NULL).
- SQL operators and expressions.
- Predefined functions.

### **Workshop**

*Extraction using the WHERE clause. Using IN, LIKE, CASE, etc. operators of numerical operators, data, string functions Data sorting*

## 4) Multiple-table querying

- Combining results with set clauses (UNION, INTERSECT, EXCEPT).
- Overview of joins.
- Embedding queries.
- Using CTEs and discovering recursive queries.
- Correlated subqueries and the EXISTS operator.

### **Workshop**

*Using set clauses, creating queries with joins.*

## 5) Data analysis

- Aggregation functions (AVG, SUM, COUNT, etc.).
- Creating subsets (GROUP BY clause).
- Filtering aggregates with the HAVING clause.
- Discovering data analysis functions (LEAD, LAG...) and ranks (RANK, ROW\_NUMBER, NTILE...).

### **Workshop**

*Analyzing data by writing queries that use calculations with grouping.*

## 6) Updating data

- INSERT, UPDATE, DELETE, TRUNCATE orders.

- Simple updates.
- Updating with subqueries.
- Updating data through views.

**Workshop**

*Database table insertion and update operations.*

## 7) Introduction to procedural SQL

- SQL dialects of major publishers.
- Basic notions of triggers.
- Introduction to stored procedures.
- UDFs or "user" functions.

**Workshop**

*Creating a stored procedure.*