SQL (Structured Query Language)

Learn how to manage data and create queries that extract and manipulate information from relational databases (RDBMS) with SQL.

SQL Level 1: Introduction

SQL is a 'must know' technology for anyone in the IT industry! Use SQL to create queries that extract and manipulate information from relational databases. Learn to create expressions that calculate and summarize information and search, filter and sort your data. SQL can be used with almost all relational databases such as Microsoft Access, Microsoft SQL Server and Oracle, as well as business applications such as Crystal Reports, Business Objects and many more.

In this fun and informative class you will learn how to use over 30 different SQL clauses and functions and leave with a good working knowledge and understanding of the SQL language.

Upon completion of this course, students will be able to:

1. Understand database and SQL fundamentals
2. Work with SQL script files and coding standards
3. Return and organize data from a single table
4. Code Derived Columns and use built functions
5. Use basic WHERE Clauses to filter data
6. Use Advanced WHERE Clauses to filter data
7. Understand relational database theory and data diagrams
8. Plan and write simple multi table queries
9. Understand different join types and what they do
10. Summarize and filter data with aggregate functions
11. Understand and use action queries and their best practices
12. Use and debug sub-queries and know when to use them

<u>Course Outline</u>
1. Database and SQL Fundamentals
- Setting up the class databases
- Fundamentals of SQL and data types

2. Working with SQL Script Files
- Creating/Saving/Opening Script Files
- SQL Basics, Terminologies, and Standards

3. Returning Data from a Single Table
- Returning columns with SELECT and renaming with AS
- Removing duplicate records with DISTINCT
- Sorting the output with ORDER BY

4. Using SQL Expressions and Built-in Functions
- Performing calculations and order of evaluation
- Adding a derived column to query

5. Filtering Records with the WHERE Clause
- Formatting criteria based on field data type
- Using AND, OR and NOT in a WHERE clause

6. Advanced Filtering Techniques using WHERE
- Using LIKE for matching and BETWEEN with ranges
- Using IN and NOT IN with criteria lists
- Filtering NULL values

7. Relational Database Theory and Terminologies
- Create a multi-table data diagram
- Identify primary keys, foreign keys, and relationship types

8. Writing Multi-Table JOIN Clauses
- Planning a multi-table query and qualifying field names
- Coding an INNER JOIN step-by-step

9. Understanding Different JOIN Types
- INNER JOIN and matching data
- OUTER JOIN and non-matching data
- Explain what CROSS JOIN and SELF JOIN are

10. Summarizing Data with GROUP BY
- Working with aggregate functions
- Grouping with GROUP BY and filtering with HAVING

11. Using Action Queries
- Action queries, database permissions, and best practices
- Code a SELECT INTO to copy a data table

12. Working with Sub-Queries and Best Practices
- Understanding sub-queries and their uses
- Coding and debugging a sub-query

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SQL Level 2: Intermediate

Take your SQL skills to the next level by learning how to do more work with SQL inside the database before pushing data across the network to your applications. This class takes a time efficient 'problem / solution/ discussion' approach and covers the topics that are important to today's SQL developers.

This class teaches you how to use window functions, pivoting rows into columns, reverse-pivoting columns into rows, using pivoting to facilitate inter-row calculations, and double-pivoting a result set. Also covered is the topic of 'bucketization', how to create histograms, summarize data into buckets, perform aggregations over a moving range of values, generate running-totals and subtotals, and other advanced, data warehousing techniques.

Upon completion of this course, students will know about:

- Retrieving Records
- Conditional SQL & Sample Data
- Conditional Sorting & Stacking Rows
- Views and Different Join Types
- Working with Text Data
- Working Numerical Data
- Working with Dates
- Grouping and Window Functions
- Pivoting and Pivot Reports
- Other Ways to Pivot
- Bucketization and Histograms
- Analyzing and Presenting Data

Lesson 1: Retrieving Records
- About the SQL Cookbook
- Setting up the Sample Databases
- Using Multiple Conditions
- Referencing Aliased Columns

Lesson 2: Conditional SQL & Sample Data
- Using CASE WHEN THEN
- Limiting Rows Returned
- Returning Random Rows
- Transforming NULL Values

Lesson 3: Conditional Sorting & Stacking Rows
- Dealing with Nulls when Sorting
- Conditional Sorting
- Using UNION ALL to Stack Rows
- Using UNION to Remove Duplicates

Lesson 4: Views & Different Join Types
- How and Why to use Views
- Using CROSS JOINS
- CROSS JOIN vs INNER JOIN
- Using OUTER JOINS

Lesson 5: Working with Text Data
- Walking a String
- Counting Occurrences
- Removing Unwanted Characters

Lesson 6: Working Numerical Data
- Generate a Running Total
- Averages without High and Low
- Changing Values in a Running Total

Lesson 7: Working with Dates
- Adding/Subtracting Date Intervals
- Calculating Date Differences
- Counting Work Days

Lesson 8: Grouping & Window Functions
- GROUP BY Review
- Using the OVER function
- Using OVER (PARTITION BY)
- NULLS and Windowing

Lesson 9: Pivoting & Pivot Reports
- Pivoting Rows into Columns
- Pivoting to Columns Multi Row
- Pivoting Columns to Rows

Lesson 10: Other Ways to Pivot
- Using the PIVOT operator in SQL
- Using Excel Pivot Tables
- Connecting to Databases
- Using Excel Power Pivot

Lesson 11: Bucketization & Histograms
- Creating Fixed Size Buckets
- Creating Variable Size Buckets
- Coding Horizontal Histograms

Lesson 12: Analyzing & Presenting Data
- BI Systems Pros and Cons
- Power BI Features and Demonstration

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- Working with Dates
- Grouping and Window Functions
- Pivoting and Pivot Reports
- Other Ways to Pivot

- Bucketization and Histograms
- Analyzing and Presenting Data