

Course Outline | A Foundation in SQL for MySQL

3 day(s)

Overview

This is a course for those who need to manipulate data by interacting with MySQL relational databases using Structured Query Language (SQL) and who need to progress their SQL skills beyond the basics. It is aimed at those who need to extract data from, and insert data into, existing MySQL databases to an in-depth level and who also need to create and modify MySQL databases and tables. The course is highly practical in nature and the focus throughout is on coding MySQL-based SQL by hand. On completion, a comprehensive set of course notes, examples, tutor and attendee scripts are made available online for each attendee.

Prerequisites

No prior SQL, MySQL or relational database experience is assumed.

Course Outline

An Overview of MySQL Relational Databases

- The Role of the MySQL Database Server
- Using a Client to interact with the MySQL Server
- Some Available Clients for MySQL
- Databases, Tables, Rows and Columns
- Primary Keys and Foreign Keys Explained
- Introducing Data Types: Character, Numeric, Date and Time
- The Basics of Database Normalization

Introducing SQL for MySQL

- Creating and Editing SQL
- About Statements, Batches and Scripts
- Executing and Parsing SQL Scripts
- SQL Syntax and The Rules of SQL
- About Keywords, Identifiers, Operators, Whitespace and Case
- About the Semi Colon
- SQL Conventions and Good Practice

Retrieving Data with SQL: First Steps

- Introducing Queries: The SELECT Statement
- The Clauses of the SELECT Statement
- About Optional Clauses and Mandatory Clauses
- Using FROM to Specify the Source Table(s)
- Retrieving Entire Tables
- Retrieving Specific Columns
- The Importance of Clause Order
- How to Build Successful Queries
- Types of Output: About the Result Set
- Using Column Aliases to Rename Columns
- Performing Calculations
- Using Numeric and String Operators to Create Derived Output
- Ways of Limiting the Output
- Using ORDER BY to Sort the Output
- Ways of Working: Some Tips

Using WHERE to Filter Results

- Working with Comparison Operators (=, >= etc)
- Numeric and String Based Filtering
- Filtering Based on Calculations
- Eliminating Duplicate Results with DISTINCT

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- Working with Execution Order
- Column Aliases: Where You Can and Cannot Use Them
- Extending Filters with AND and OR
- Solving AND/OR Difficulties with Brackets
- Excluding Results with NOT: Some Tips
- Range Filtering using BETWEEN and IN
- NULL and its Implications Explained
- Catering for NULL
- Matching Patterns with LIKE

Getting Results From Multiple Tables

- Qualifying Column Names
- Joins Explained
- The Different Types of Joins
- Creating an Inner Join: WHERE Syntax
- Creating an Inner Join: INNER JOIN Syntax
- Table Aliases: The Need
- Working with Self Joins
- Outer Joins: An Example
- How to Simplify Joins: An Approach

Using Standard MySQL Functions

- How to Use Standard MySQL Functions to Modify Results
- How to Find the Right Function
- Mathematical, String and Conversion Functions
- Functions for Modifying and Calculating Dates
- Formatting Numbers to Two Decimal Places
- Replacing NULL with a Specific Value
- Using Standard MySQL Functions in WHERE
- Using CASE to Specify Output Conditions

Working with Dates

- Understanding How Dates are Stored
- Introducing Date Functions
- Converting Text Dates To Date Format
- Establishing Today's Date
- Extracting Parts of a Date (Day, Month, Year)
- Displaying Dates in Specific Date Formats
- Filtering with Dates

Grouping and Summarizing Results

- The difference Between Tabular and Scalar Results
- Using Aggregate Functions (MAX(), SUM(), AVG(), COUNT() etc)
- The Way Aggregate Functions Work
- Where to Use and Where Not to Use Aggregate Functions
- Using GROUP BY to Group Results
- The Need for HAVING: Filtering the Result Table

Working with Subqueries

- Subqueries Explained
- Where you can Use Subqueries
- How to Successfully Construct Subqueries
- Subqueries for Filtering
- Subqueries to Create Derived Columns

Working with Views

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- Views Explained
- Advantages of Views
- How to use Views to Simplify your Work
- Creating Views
- Dropping Views

Inserting, Updating and Deleting Data

- Inserting Single Rows
- Inserting Multiple Rows
- Inserting Rows by Column Position
- Inserting Rows by Column Name
- Dealing with Auto-Incrementing Values
- Dealing with Nulls when Inserting
- Inserting Data from one Table into Another
- Updating Data
- Deleting Data
- Modifying Data through a View

Inserting, Updating and Deleting in a Transaction Environment

- Transactions Explained
- Why Use Transactions?
- Protecting Yourself with Transactions
- How to Setup a Transaction Environment
- Checking Your Work
- Undoing your Changes with ROLLBACK
- Committing the Transaction

Creating and Modifying Tables

- Using CREATE TABLE
- Specifying Primary and Foreign Keys
- Using DEFAULT values
- Constraining Input
- Using Temporary Tables
- Creating a New Table From an Existing Table
- Altering and Dropping Tables