SQL Server Programming

Duration : 5 Days

Overview

This 5 day course is intended for students new to querying and programming with Microsoft SQL Server products who need a total immersion in the subject on a SQL Server 2016, 2017 or 2019 platform. This is a very comprehensive and intensive course with plenty of illustrated examples and augmented with practical hands-on exercises to enhance the learning experience.

Additionally, with the course structure being fully modularised, customised versions of this course can also be devised and delivered to suit individual requirements. In fact, specific content from this course could also be combined with material from other related courses to produce a bespoke training package – just ask for details.

Prerequisites

Students should be familiar with basic programming concepts and, also understand the fundamental design of relational databases including, but not restricted to, the purpose of primary and foreign keys, entity relationships, and data normalisation, such as can be found in the following course.

❯ Microsoft SQL Server Relational Database Design and Querying Fundamentals

Objectives

Upon successful completion of this course delegates will be able to:

❯ Identify the Primary Components of a Typical SQL Server 2016, 2017 or 2019 Installation
❯ Identify the Tools Available in SQL Server 2016, 2017 or 2019
❯ Use SQL Server Management Studio (SSMS)
❯ Understand the Components of Transact-SQL (T-SQL)
❯ Retrieve, Filter and Sort Data
❯ Work with the Native SQL Server Data Types
❯ Query Data from Multiple Tables Using Joins
❯ Summarize and Group Data
❯ Use Window Functions for Ranking and Aggregating Data
❯ Combine and Limit Result Sets
❯ Work with Subqueries
❯ Use Crosstab Queries
❯ Use Common Table Expressions
❯ Work with SQL Server Date and Time Data
❯ Modify Data with INSERT, DELETE and UPDATE
❯ Merge Data with the MERGE Statement
❯ Understand and Implement Transactions
❯ Understand SQL Server Locks
❯ Understand SQL Server Indexes
❯ Understand Query Performance Issues
❯ Create and Manage Views
❯ Control the Flow of Program Execution
❯ Create and Implement Stored Procedures
❯ Handle Errors and Exceptions
❯ Create and Implement User Defined Functions
❯ Create and Implement Triggers

Course Content

1. **Introduction to SQL Server Management Studio**
   Identify the Tools and Components of SQL Server
   Identifying the Elements of SSMS
   Objects in a SQL Server Database
   Synonyms
   Database Diagrams
   Components of a SQL Server Database Table
   The Querying Environment
   Creating a Script
   Adding Comments to your Code

2. **Introduction to SQL and Transact-SQL**
   ANSI-SQL and Transact-SQL (T-SQL)
   Categories of SQL Statements

3. **Using the SELECT Statement to Retrieve Data**
   Examine the Basic Syntax of the SELECT
   Statement
   Using String Literals and Expressions
   Retrieving Columns of Data from a Table
   Using Aliases for Column Names

4. **Filtering Rows of Data with the WHERE Clause**
   How to Use the WHERE Clause
   Overview of Operators
   Filter Data by Using Comparison Operators
   Filter Data by Using String Comparisons
   Filter Data by Using Logical Operators
   Filter Data Using a Range of Values
   Filter Data Using a List of Values
   Filter Data with NULL Values
   Filtering Date and Time Data

5. **Formatting and Sorting Result Sets**
   Sorting Data Using the ORDER BY Clause
   Eliminating Duplicate Rows with DISTINCT
   Introducing Native SQL Server Functions
   Getting Help on Functions
   Functions Relating to NULL Values
   Using the CASE Expression

6. **Working with SQL Server Data Types**
   Native SQL Server Data Types
   Data Type Precedence
   Implicit Data Type Conversions
   Explicit Data Type Conversion Functions
   Working with Variables
   Using Batches

7. **Querying Data from Multiple Tables Using Joins**
   Introduction to Joins
   Using Inner Joins
   Using Outer Joins
   Using Cross Joins
   Using Aliases for Table Names
   Joining More than Two Tables
   Joining a Table to Itself (Self Join)
   Using Non-Equi Joins

8. **Summarizing Data Using Aggregate Functions**
   Using Aggregate Functions Native to SQL Server
   Using Aggregate Functions with NULL Values
   Grouping Summarized Data with GROUP BY
   Filtering Grouped Data Using the HAVING Clause
   Using the ROLLUP and CUBE Operators
   Using GROUPING SETS

9. **Window Functions**
   Aggregate Window Functions
   Ranking Functions
   Analytic Window Functions

10. **Combining and Limiting Result Sets**
    Combining Result Sets Using the UNION Operator
    Using the EXCEPT and INTERSECT Operators
    Using UNION, EXCEPT, and INTERSECT
    Together
    Limiting Result Sets Using the TOP Operator
    Using OFFSET/FETCH NEXT Filters

11. **Working with Subqueries**
    Introduction to Subqueries
    Using Subqueries as Expressions and Derived
    Tables
    Using Correlated Subqueries
    Using EXISTS with Correlated Subqueries
    Using the APPLY Operator

12. **Temporary Storage**
    Table Variables
    Temporary Tables

13. **Crosstab Queries**
    Using the PIVOT Operator
    Using the UNPIVOT Operator

14. **Common Table Expressions**
    Introduction to Common Table Expressions
    Using Common Table Expressions
    Recursive Queries Using Common Table
    Expressions

15. **SQL Server Date and Time Data Types**
    Understanding SQL Server Date and Time Data
    Types
    Querying and Modifying Date and Time Data
    Native SQL Server Date and Time Functions
    Guidelines and Techniques for Querying Dates

16. **Inserting Data into Tables**
    Inserting a Single Row into a Table
    Inserting Multiple Rows into a Table
    Inserting Values into Identity Columns
    The SEQUENCE Object
    Differentiating Various INSERT Statements
    Using the OUTPUT Clause with INSERT

17. Deleting Data from Tables
Deleting Rows from a Table
Truncating a Table
Deleting Rows Based on Data in Other Tables
Using the OUTPUT Clause with DELETE

18. Updating Data in Tables
Updating Rows in a Table
Updating Rows Based on Data in Other Tables
Using the OUTPUT Clause with UPDATE

19. Merging Data
The MERGE Statement
Practical Examples of Using MERGE

20. Transactions and Locking
What Is a Transaction?
How SQL Server Modifies Data in Tables
Managing Transactions
Nested Transactions
Transaction Isolation Levels
Delayed Durability
SQL Server Locking Architecture
Managing Locks

21. SQL Server Indexes
Understanding SQL Server Index Architecture
Creating and Using Nonclustered Indexes
Creating and Using Clustered Indexes
Filtered Indexes

22. Query Performance Considerations
How SQL Server Processes T-SQL Queries
Examining Execution Plans
Dynamically Generating T-SQL Code
Writing Efficient Search Arguments

23. Implementing Views
Overview of Views
Creating and Modifying a View
Guidelines for Creating Views
Examining the Impact of Using SELECT * in Views
Restrictions for Modifying Data by Using Views
Indexed Views
Partitioned Views

24. Deleting Data from Tables
Deleting Rows from a Table
Truncating a Table
Deleting Rows Based on Data in Other Tables
Using the OUTPUT Clause with DELETE

25. Updating Data in Tables
Updating Rows in a Table
Updating Rows Based on Data in Other Tables
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Appendix 1. Querying Metadata Understanding Metadata
Querying Metadata by Using Views
Querying Metadata by Using Stored Procedures
Querying Metadata by Using Functions Metadata
Discovery in SQL Server

Appendix 2. Distributed Queries
Ad Hoc Distributed Queries
Linked Servers
Distributed Queries Against Linked Servers