Microsoft Transact-SQL Programming

Duration: 5 Days *(Face-to-Face & Remote-Live)*, or 35 Hours *(On-Demand)*

Price: CDN$3,275 *(Face-to-Face & Remote-Live)*, or CDN$1,995 *(On-Demand)*

Discounts: We offer multiple discount options. Click here for more info.

Delivery Options: Attend face-to-face in the classroom, remote-live or on-demand training.

Students Will Learn

- Designing normalized table structures for relational databases
- Creating databases and tables
- Using primary and foreign keys
- Writing SQL queries
- Using inner and outer joins
- Using set operators (`UNION`, `INTERSECT`, `EXCEPT`)
- Using DML for `SELECT`, `INSERT`, `UPDATE`, `DELETE`
- Using subqueries
- Using triggers and stored procedures
- Using aggregate functions to return totals and subtotals
- Programming features of T-SQL
- Table expressions
- T-SQL specific data types and functions
- T-SQL cursors

Course Description

This Transact-SQL programming course teaches students relational database fundamentals and SQL programming skills in the Microsoft SQL Server environment. Topics covered include relational database architecture, database design techniques, and simple and complex query skills. The course also covers Microsoft-specific T-SQL programming constructs, creation and use of stored procedures and user-defined functions, use of cursors and updateable views.

This class is intended for analysts, developers, designers, administrators, and managers new to the SQL programming language. Upon completion, participants will understand SQL functions, join techniques, database objects and constraints, and will be able to write useful stored procedures and views as well as complex queries and updates. Comprehensive hands on exercises are integrated throughout to reinforce learning and develop real competency.

Course Prerequisites

General computer knowledge.

Course Overview

Relational Database Fundamentals

- Overview of Relational Database Concepts
- Relational Databases and Relational Database Management Systems
- Data Normalization
- DDL Syntax

Writing Basic SQL Queries

- Displaying Table Structures
- Retrieving Column Data From a Table or View
- Selecting Unique Values
- Filtering Rows Using the `WHERE` Clause
- Sorting Results Using `ORDER BY`
- Joining Multiple Tables
- Using Column and Table Aliases

Creating a Database

- Database Development Methodology Overview
- Building a Logical Data Model
  - Identifying Entities and Attributes
  - Isolating Keys
  - Relationships Between Entities
  - Creating Entity-Relationship Diagrams
- Transforming to Physical Design
  - Migrating Entities to Tables
  - Selecting Primary Keys
  - Defining Columns
  - Enforcing Relationships with Foreign Keys
- Constructing the Database Using DDL
  - Creating Tables, Indexes, Constraints and Views
  - Dropping Tables, Indexes, Constraints and Views
  - Modifying Tables, Indexes, Constraints and Views

Manipulating Query Results

- Using Row Functions
  - Character
  - Numeric
  - Date and Time
  - Data Conversion (`CAST` and `CONVERT`)
- Using the `CASE` Function
- Handling Null Values

Advanced Query Techniques

- Inner Joins
- Outer Joins (Left, Right, Full)
- Performing Self-Joins
- Subqueries
  - Simple
  - Correlated
- Using the `EXISTS` Operator
- Tips for Developing Complex SQL Queries
- Using Aggregate Functions
  - `AVG`

Manipulating Table Data Using SQL's Data Manipulation Language (DML)

- Inserting Data into Tables
- Updating Existing Data
- Deleting Records
- Truncating Tables
- Performing Bulk Inserts
- Using the `OUTPUT` Clause
- Merging Data
- Working with Identity Columns and Sequences

    - COUNT
    - SUM
    - MIN
    - MAX
- Performing Set Operations
    - UNION
    - INTERSECT
    - EXCEPT/MINUS
- Aggregating Results Using GROUP BY
- Restricting Groups with the HAVING Clause
- Creating Temporary Tables

User-Defined Functions

- Definition and Benefits of Use
- CREATE FUNCTION
    - Syntax
    - RETURN Clause and the RETURNS Statement
    - Scalar vs. Table Functions
- Comparison with Stored Procedures
- Returning Scalar Values and Tables
- ALTER and DROP FUNCTION

Stored Procedures

- Definition and Benefits of Use
- CREATE PROCEDURE
    - Syntax
    - Defining Input Parameters
    - Defining Output Parameters
    - Defining Optional Parameters
- ALTER and DROP PROCEDURE
- Implementation Differences

Triggers

- Definition and Benefits of Use
- Alternatives (e.g., Constraints)
- CREATE TRIGGER
    - Syntax
    - Trigger Types
- "Inserted" (or "NEW") and "Deleted" (or "OLD") Tables
- Event Handling and Trigger Execution
- ALTER and DROP TRIGGER

Complex Queries

- Using Wildcard Characters with Like
- Allowing Users to Build SQL Queries Dynamically
- Pivoting Data
- Summarizing Data with ROLLUP and CUBE
- Using Partitioned Aggregates

T-SQL Code Constructs

- Exploiting the Programming Features of T-SQL
    - Conditional Constructs
    - Looping Constructs
- Building Multi-Batch Scripts
- Invoking System Functions
- Using Variables in Scripts
- Using Temporary Tables in Scripts
- Handling Errors
    - Using TRY...CATCH Blocks
    - Using System Variables and Functions

Working with Data Types and Functions

- Effective Use of Data Types in SQL
    - String
    - Numeric
    - Time/Date
    - Other
- Substitution of Non-null Values with the COALESCE and ISNULL Functions
- Analyzing Data Points Using Ranking Functions

Using T-SQL Cursors

- Overview of Cursors

Working with Table Expressions

- Overview of Table Expressions

- Declaring a Cursor
- Using `OPEN CURSOR`, `CLOSE CURSOR`, `DEALLOCATE CURSOR` Statements
- FETCHing Results
- Testing `@@FETCH_STATUS` and `@@CURSOR_ROWS`
- Updating Records with Cursors
- Working with Views
- Using Derived Tables
- Common Table Expressions
- Table-Valued Functions

Hands On Technology Transfer
The Best Way to Transfer Technology Skills

1 Village Square, Suite 8
14 Fletcher Street
Chelmsford, MA 01824

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