

T-SQL 2005 with Advanced Topics

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Course description: In this course, you will learn how to build basic queries using Transact-SQL, the language of SQL Server. Then you will learn how to build effective views, stored procedures, triggers, and user-defined functions using Transact-SQL. You will learn about the new enhancements to the Transact-SQL programming language including improved support for error handling and hierarchical queries, and how programmers can now use .NET languages like C# and Visual Basic to build database objects.

Course outline:

SQL Editions/Components

- Introduction
- SQL Server Editions
- SQL Server Comparisons
- Scalability/Performance
- High Availability Features
- Manageability Features
- Security Features
- Programmability Features
- Integration/Interoperability
- Business Intelligence Features
- Server Components
- SQL Server Mgmt. Studio
- Business Intelligence M.S.
- Other Management Tools
- Summary

Using Management Studio

- Introduction
- Starting Config. Manager
- Performance Tools
- B.I. Development Studio
- Management Studio
- SQL 2005 Schemas
- Northwind Database
- Running a T-SQL Script
- Overview of Database Security
- Other Server Objects
- Replication and Management

- Overview of Table Objects
- Overview of Views
- Overview of Programmability
- Summary

Working w/ Tables and Queries

- Introduction
- Working with Tables
- Template Explorer
- Help / Books Online
- Working with Queries
- New in T-SQL: CTE
- New in T-SQL: Calculate Rank
- New in T-SQL: TOP(N)
- New in T-SQL: PIVOT
- XML in SQL Server 2005
- APPLY and FOR XML Path
- Summary

Additional New Features

- Introduction
- Try/Catch Error Handling
- EXECUTE AS
- Snapshot Isolation Level
- SQLCLR
- SQL Management Objects
- Replication Mgmt. Objects
- B.I. Development Studio
- Integration Services (SSIS)
- Reporting Services
- Analysis Services (SSAS)

- Access the Samples / Tutorials
- AdventureWorksDW Sample
- SSIS Sample
- SSAS Sample
- Summary

Database Design Principles

- Introduction
- Origins of Relational Design
- Rel./Attrib./Tuple/Candidate
- Primary/Surrogate/Foreign
- Surrogate Keys
- Data Normalization
- Data Normalization Demo
- The Create Database Script
- First Normal Form
- First Normal Form Examples
- Summary

Second/Third Normal Form

- Introduction
- Second Normal Form
- Second Normal Form Ex.
- Third Normal Form
- Third Normal Form Examples
- Beyond Codd's Normal Forms
- Summary

Relational/Referential Integrity

- Introduction
- One-to-Many Relationships
- Create a New Diagram
- Additional Tables to Diagram

- Many-to-Many Relationships
- One-to-One Relationships
- Enforcing Referential Integrity
- Cascading Updates/Deletes
- New Cascading Actions
- Enforcing Data Integrity
- Summary

Implementing Data Storage

- Introduction
- Pages
- Extents
- Files
- Using Files and Filegroups
- Data Integrity
- Creating a Database
- Modifying Database Options
- Filegroups
- View Script to Create DB
- Summary

Rules for Identifiers

- Introduction
- Object Name Requirements
- Schemas Explained
- Create a Table/Data Type
- Summary

Data Types Explained

- Introduction
- Character-based Data Types
- Numeric Data Types
- Date Data Types

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- Binary Data Types
- Identifier Data Types
- sql_variant Data Type
- Variable-only Data Type
- xml Data Type
- User-Defined Types
- View Column Properties
- Computed Columns
- Set the Identity Specification
- View the SQL Scripts Created
- Summary

Constraints/Indexes/Diagrams

- Introduction
- Constraints Explained
- Create a Check Constraint
- Test the Constraint
- Triggers/Uses for Triggers
- Indexes Explained
- Create a New Index
- View Index Script
- Create a Database Diagram
- Diagram Right-Click Options
- Summary

Understanding T-SQL

- Introduction
- Understanding Transact-SQL
- Schemas and Naming
- The SELECT Statement
- Selecting All Columns
- Concatenating Columns
- Aliasing Column Names
- DISTINCT to Limit Values
- The WHERE Clause
- T-SQL Comparison Operators
- The LIKE Operator
- The BETWEEN Operator
- Using IS NULL to Test for Nulls
- AND, OR, and NOT
- Operator Precedence
- Using the IN Operator
- Using a Subquery
- Summary

Sorting and Grouping

- Introduction
- Sorting on a Single Field
- Sorting in Descending Order
- Sorting by Multiple Columns
- Sorting using Expressions
- Aggregate Functions
- Using COUNT
- Using GROUP BY
- ORDER BY with GROUP BY

- HAVING with GROUP BY
- Using TOP
- Summary

Joining Tables

- Introduction
- Cross Joins (Cartesian Prod.)
- Joining in the WHERE Clause
- Join Notation
- Using Table Aliases
- Inner Joins
- Join w/ WHERE & ORDER BY
- Multiple Inner Join
- Aggregates & Grouping w/ Joins
- Inner vs Outer Joins
- Left Outer Joins
- Right Outer Joins
- Full Join
- Combining Inner & Outer Joins
- Self Joins
- Summary

Inserting Data

- Introduction
- Inserting Data
- Set a Database Context
- Inserting a Single Value
- Suppress Rows Affected
- Using SET NOCOUNT ON
- Retrieving Identity Values
- Dealing with Delimiters
- Inserting Multiple Rows
- Insert Using a SELECT clause
- Insert Using SELECT INTO
- Summary

Advanced Inserting Data

- Introduction
- Temporary Tables
- Create a Temp Table
- Using CREATE TABLE
- Global Temp Tables
- Inserting with Output
- Using BULK INSERT
- Summary

Updating and Deleting Data

- Introduction
- Updating a Single Row
- Updating Multiple Rows & Col.
- Updating from Another Table
- Updating with TOP
- Updating with UPDATE.WRITE
- Deleting a Single Row
- Deleting Multiple Rows
- Delete All Rows
- Using TRUNCATE TABLE

- Summary

Transaction Isolation

- Introduction
- Isolation Levels Explained
- READ COMMITTED
- READ UNCOMMITTED
- REPEATABLE READ
- SERIALIZABLE
- Blocking and Deadlocks
- EAD COMMITTED Demo
- EAD UNCOMMITTED Demo
- Using Snapshot Isolation
- Snapshot Isolation Caveats
- Enabling Snapshot Isolation
- SNAPSHOT ISOLATION
- View Code Used to Clean Up
- Summary

Management Studio

- Introduction
- Connecting to SSMS
- Configuring SSMS Options
- SSMS Toolbars
- SSMS Menu Options
- File/Edit Menus
- Advanced Menu
- View/Query Menus
- Project/Tools menus
- Window/Community/Help
- Configuring SSMS Windows
- Exploring the Object Explorer
- Right-Click Menu Options
- Server and Database Objects
- Displaying/Filtering Objects
- Viewing Dependent Objects
- Object Summary Pages
- Edit Objects
- Summary

Query Editor and Help

- Introduction
- Open a Query Editor Window
- Multiple Code Window
- Formatting and Editing Code
- Indenting Code
- Search w/ Find and Replace
- Scripting with SSMS
- CREATE TABLE Script
- Creating an INSERT Script
- Execute Stored Proc. Script
- Using the Template Explorer
- Executing Queries
- Setting Options
- Displaying the Execution Plan

- Displaying the Client Statistics
- Saving Query Results
- Running in SQLCMD Mode
- Creating Projects & Solutions
- Working Offline
- Getting Help in SSMS
- Accessing F1 Help
- SQL Server Books Online
- Exploring the Toolbar
- Summary

T-SQL Functions

- Introduction
- Batches and Scripts
- Variables
- Delimiters and Operators
- Using CAST
- Type Coercion & Precedence
- Data Type Precedence
- Using an Explicit Cast
- Using CONVERT
- Using CONVERT with Style
- Using STR
- Working with Nulls
- IS NULL
- ISNULL
- NULLIF
- COALESCE
- Summary

More on T-SQL Functions

- Introduction
- IsNumeric
- RAND
- ROUND
- Combining RAND and ROUND
- REPLACE and STUFF
- LEN, LEFT, and RIGHT
- SUBSTRING
- CHARINDEX
- PATINDEX
- SPACE
- CHAR and ASCII
- LOWER and UPPER
- Case-insensitive Filtering
- COLLATE
- LTRIM and RTRIM
- GETDATE
- MONTH, DAY, and YEAR
- DATEPART and DATENAME
- DATEADD and DATEDIFF
- @@ROWCOUNT
- @@IDENTITY

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- @@TRANSCOUNT
- @@ERROR
- Summary

T-SQL Flow Control

- Introduction
- Using IF...ELSE
- Using BEGIN...END
- Using GOTO
- Using RETURN
- Using CASE
- Replace IIF/Conditional
- Using WHILE
- Using WAITFOR
- Summary

T-SQL Ranking Functions

- Introduction
- New Ranking Func. Explained
- UnitPrice, Listed by UnitPrice
- UnitPrice, Listed by ProdName
- Rank Using PARTITION
- Overall, Listed by ProdName
- Summary

Transactions

- Introduction
- Passing the ACID Test
- Features that Support ACID
- Transaction Types
- Isolation Levels & Transactions
- Transactions and Locking
- Viewing Lock Information
- Deadlocks: The Problem
- Deadlocks: Solutions
- Creating Transactions in Apps.
- Designing Trans. Support
- Creating Efficient Transactions
- Compile/Runtime Errors
- Compile Trans. Error Demo
- Runtime Trans. Error Demo
- Summary

Explicit Trans./Error Handling

- Introduction
- Creating Explicit Transactions
- Using @@TRANSCOUNT
- T-SQL Error Handling in Trans.
- Using Simple Error Handling
- Stored Procs to Manage Trans.
- Err. Handling in a Stored Proc.
- Error Severity Levels Explained
- Creating a User-Defined Error
- Using Try/Catch
- Try/Catch Details
- Error Handling Functions
- Display Detailed Error Info.

- RAISERROR in a Try/Catch
- Trans. with XACT_STATE
- Using SET XACT_ABORT ON
- Summary

Creating Views

- Introduction
- Why Use Views?
- Views and Security
- View Rules
- Syntax and Options
- Creating Views Using SSMS
- Alter a View
- Script View as a SELECT
- Creating Views from Templates
- Try to Create a Sorted View
- Summary

Working with Views

- Introduction
- Some View Examples
- Mailing Label View Example
- View Example Using Top
- Correlated Subquery View Ex.
- View Example Using a JOIN
- Derived Tables & Nesting View
- Common Table Expressions
- Encrypting View Definitions
- Using CHECK OPTION
- Updating Rules
- Updating Views
- Views w/ Computed Column
- Updating Views with Joins
- Creating a Computed Column
- IsPersisted Prop./PERSISTED
- Indexed View Explained
- Indexed View Requirements
- Partitioned Views
- Summary

Stored Procedures

- Introduction
- Stored Procedure Features
- SP Performance Benefits
- Using Schema Qualifiers
- Reasons to Use SPs
- Stored Procedure Syntax
- Creating Stored Procedures
- Using Parameters in a SP
- Returning Results from a SP
- Return Values in a Result Set
- Using Variables in SPs
- Limitations in Statements
- Summary

Stored Proc. Debug/Triggers

- Introduction

- Debugging SPs with PRINT
- Other SP Debugging Tips
- Overview of Creating Triggers
- Uses / Limits for Triggers
- Trouble with Triggers
- How Triggers Work
- How to Create Triggers
- Creating Triggers Demo
- INSTEAD OF Trigger Demo
- DDL Triggers
- Stop Adding a Table Trigger
- Drop a DDL Trigger
- Summary

User-Defined Functions

- Introduction
- Scalar Functions
- Inline Table-Valued Function
- Multi-Statement Table-Valued
- CLR Functions Explained
- Create a Scalar Function
- Scalar Function w/Parameters
- User-Defined Function Options
- Call Scalar Func. w/Param.
- Create an Inline TVF
- Calling an Inline TVF
- Inline Function w/Parameters
- Update From Inline Function
- Summary

Multi-Statement Functions

- Introduction
- Create a Multi-Statement Func.
- Call a Multi-Statement Function
- Filter on a Field
- Join Functions to Tables
- Use within Scalar Function
- Use within a Subquery
- Summary

Using .NET Code

- Introduction
- Hosting .NET Code
- Ways to Use SQLCLR
- Enabling SQLCLR
- Enabling SQLCLR Demo
- Writing SQLCLR Code
- SQLCLR Code Manually
- SQLCLR Code Using VS 2005
- SQL Data Types
- Data Type Comparison
- Accessing Local Data
- Returning Results
- Return Data w/ Stored Proc.
- Return Rows of Data

- Summary

SQLCLR Code Modules

- Introduction
- Stored Procedures/Triggers
- Creating an SQLCLR Trigger
- Test the New Trigger
- User-Defined Functions
- Create a Hashing UDF
- Test the Hashing UDF
- Aggregates
- Create a Concatenate Aggreg.
- View C.A. Code
- System Catalogs
- View sys.assemblies
- View sys.assembly_files
- View sys.assembly_modules
- sys.procedures/sys.triggers
- Debugging Using Visual Studio
- Viewing Loaded Assemblies
- Profiler/Performance Counters
- Summary

SQLCLR Security

- Introduction
- Broken SQLCLR Code Demo
- Code Access Security (CAS)
- SQLCLR Permission Sets
- Fixed SQLCLR Code Demo
- SET TRUSTWORTHY ON
- Benefit of SQLCLR Code
- Summary

Planning/Configuring Full Text

- Introduction
- Advant. of Full-Text Search
- Full-Text Enhancements in '05
- Indexing Performance
- DDL
- Integrated Backup/Restore
- XML Support
- Thesaurus Support
- Multi-Language Support
- FT Search T-SQL Queries
- Create a Full-Text Index Demo
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Full-Text Search Queries

- Introduction
- Writing Full-Text Queries
- CONTAINS Predicate
- CONTAINS with Simple Terms
- CONTAINS w/ Gen. Terms
- CONTAINS with Thesaurus
- View/Modify the Thesaurus
- CONTAINS with Prefix Terms
- CONTAINS w/ Proximity Terms

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- FREETEXT Predicate
- Ranking Relevance
- Joins to Fetch Text Values
- Limiting the Number of Results
- Use Weights to Influence Rank
- Using Full-Text DDL
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FOR XML AUTO/RAW

- Introduction
- Using AUTO Mode
- Nesting Hierarchy in AUTO
- Adding a Root Element
- Generate Elements in AUTO
- Generating XML Schema
- Using RAW Mode
- Naming the Row Element
- Generate Elements in RAW
- Including Null Values
- Summary

FOR XML EXPLICIT/PATH

- Introduction
- Using FOR XML EXPLICIT
- Constructing the UNION Query
- Special Column Aliases
- Using PATH Mode
- Elements/Subelements/Attrib.
- Subqueries to Nest Results
- PATH Mode Col. Alias Exp.
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APPLY/Common Table Exp.

- Introduction
- Using APPLY
- Comparing APPLY/Using Joins
- Using CROSS/OUTER APPLY
- Things We Can't Do with a Join
- APPLY w/ Table-Valued Func.
- Combine APPLY w/ FXP
- Creating Recursive Queries
- Classic Recursive Queries
- Recursive Query Using a CTE
- Summary

Pivot and Dynamic SQL

- Introduction
- Col. into Headings w/ PIVOT
- QUOTENAME / SQL Injection
- Converting Nulls to Zeros
- Using Dynamic SQL
- Overcoming PIVOT Limitations
- Parameters w/ sp_executesql
- Summary

Pivot/Dynamic SQL Continued

- Introduction
- Using QUOTENAME()
- Defend Against SQL Injection

- QUOTENAME with Quotes
- Output w/ sp_executesql
- Signing Stored Proc. w/ Cert.
- Create a Signed Cert. Demo
- Test the Signed Certificate
- Run the Clean Up Code
- Summary

Partitions

- Introduction
- Table-based Partitioning
- Why Partition?
- Partition History in SQL Server
- Range Partitions
- Partition Key
- Multiple Filegroups
- Index Partitioning
- Summary

Create Partitioned Tables

- Introduction
- Overview
- Create Partition Function
- LEFT/RIGHT Boundaries
- Demo: Partition Function
- Datetime Values
- Partition Scheme
- Demo: Partition Scheme
- Create Table/Index
- Demo: Create Table/Index
- Summary

Query Partitions

- Introduction
- Overview
- \$PARTITION Function
- Demo: \$PARTITION
- Catalog Views
- sys.partition_functions
- sys.partition_range_values
- sys.partition_schemes
- sys.data_spaces
- Demo: Catalog Views
- Manage Partitions
- Mod Part Tables/Indexes
- Mod Partition Function
- Split Partitions
- Merge Partitions
- Switch Partitions
- Modify Partition Scheme
- Backup Partitions
- Performance Considerations
- Summary: Partitions
- Summary

Work with Nulls

- Introduction

- Overview
- SqlTypes vs. CLR Types
- System.Data.SqlTypes
- Review: SqlTypes/CLR Types
- ANSI_NULLS Option
- Demo: ANSI_NULLS Option
- NULLs and SqlBoolean
- Demo: NULLs and SqlBoolean
- Assign NULL Values
- CLR Integration
- Direct Assignment
- NULLIF / COALESCE
- Demo: Assign NULL Values
- Demo: COALESCE
- Summary

Ranking

- Introduction
- Grouped Data
- ROW_NUMBER
- RANK
- DENSE_RANK
- Demo: ROW_NUMBER
- Demo: RANK
- Demo: DENSE_RANK
- NTILE
- Demo: NTILE
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Correlated Subqueries

- Introduction
- Overview
- Subquery Basics
- Correlated Subquery
- Where Clause
- ANY / SOME / ALL Modifiers
- Demo: Subquery
- HAVING
- UPDATE
- JOINS / Temp Tables
- Summary

CTE's

- Introduction
- Overview
- CTE Syntax
- Recursive CTE
- Demo: Recursive CTE
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Complex Data / Structures

- Introduction
- Overview
- Data Type Precedence
- Explicit Conversion w/CAST
- IMPLICIT Conversion
- Multinational Data

- Collation Labels
- Collation Precedence
- Demo: COLLATE Clause
- Query Hierarchical Data
- Multi-Referential
- Adjacency List
- Demo: CTE w/Recursion
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Write Efficient Queries

- Introduction
- Overview
- EXISTS Clause
- Demo: EXISTS Clause
- JOINS vs. Subqueries
- One-Pass Queries
- Demo: One-Pass Queries
- Summary

Write Efficient Queries 2

- Introduction
- Multiple ResultsSets
- Temporary Tables
- Table Variables
- UDFs
- Demo: UDFs
- Summary

Write Efficient Queries 3

- Introduction
- Common Table Expression
- Demo: CTEs
- Worktables
- Demo: Worktables
- Summary

Working w/Complex Query

- Introduction
- Overview
- Implicit Transactions
- Demo: Implicit Transactions
- Use Sub Tasks
- Demo: Use Sub Tasks
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Maintain Query Files

- Introduction
- Overview
- Source Control
- Visual SourceSafe
- Put Files in Source Control
- Demo: Source Control
- Keyword Expansion/Comment
- Enable Keyword Expansion
- Demo: Keyword Expansion
- Version Information
- Demo: Retrieve Version Info
- Demo: Compare Versions
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- Introduction

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- Declare XML Objects
- Demo: XML Data Type
- XML Data Type Restrictions
- Load XML Data
- Demo: Load XML Data
- SELECT...FOR XML
- Demo: SELECT...FOR XML
- Bulk Load w/OPENROWSET
- Demo: OPENROWSET
- Indexing Columns
- Demo: Indexing Columns
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- Introduction
- Overview
- Typed/Untyped XML
- Schema Basics
- Demo: Examine XSD File
- Register Schemas
- Demo: Register Schema
- View Stored Schema
- Catalog Views/Functions
- sys.xml_schema_collections
- sys.xml_schema_namespaces
- sys.xml_schema_components
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- Overview
- XQuery
- query() Method
- value() Method
- exist() Method
- modify() Method
- nodes() Method
- Demo: XQuery
- FOR XML
- OPENXML
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- Demo: OPENXML
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- XML Support
- Storing XML
- Index XML Columns
- Querying
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