

Writing T-SQL Queries in SQL Server 2005

Table of Contents

INTRODUCTION.....	INTRO-1
Installing the Practice Files.....	INTRO-2
Software Requirements	INTRO-2
Sample Database	INTRO-2
Installation.....	INTRO-3
About the Authors	INTRO-4
A TOUR OF SQL SERVER 2005	1-1
SQL Server 2005 Editions, Components, and Tools	1-2
Editions	1-2
Server Components	1-3
Management Tools	1-4
Documentation and Samples.....	1-4
Using SQL Server Management Studio (SSMS)	1-5
Connecting Management Studio.....	1-5
The Object Explorer	1-5
Exploring the Sample Databases.....	1-8
Database Objects	1-11
Working with Tables and Queries.....	1-13
Creating Tables.....	1-13
Creating a View.....	1-15
Generating Scripts	1-16
New Transact-SQL Features	1-18
Common Table Expressions (CTEs)	1-18
Ranking Functions	1-19
TOP(n) and APPLY.....	1-20
PIVOT	1-21
FOR XML PATH	1-23
Try/Catch Error Handling	1-25
Using EXECUTE AS	1-26
Using Snapshot Isolation	1-26
Running CLR Code in SQL Server 2005	1-26
Business Intelligence Services	1-28
SQL Server Integration Services (SSIS)	1-28
SQL Server Business Intelligence Development Studio (BIDS)	1-28

Table of Contents

Reporting Services.....	1-31
Analysis Services (SSAS)	1-31
DESIGNING AND CREATING A DATABASE.....	2-1
Relational Database Design Principles.....	2-2
The Origins of Relational Design	2-3
Data Normalization	2-5
Understanding Referential Integrity	2-10
Beyond Normalization.....	2-14
Implementing the Design	2-16
Database Storage	2-16
Creating Databases	2-18
Modifying Database Options.....	2-24
Creating Tables.....	2-25
Creating Constraints	2-34
Triggers.....	2-38
Creating Indexes.....	2-39
Using Database Diagrams	2-42
LAB 2: DESIGNING AND CREATING A DATABASE.....	2-51
Lab 2 Overview.....	2-52
Create a SQL Server Database.....	2-53
Create SQL Server Tables	2-54
Create Relationships Using a Database Diagram	2-57
DATA SELECTION QUERIES	3-1
Understanding Transact-SQL.....	3-2
Schemas and Naming in SQL Server 2005	3-3
The SELECT Statement	3-5
Selecting All Columns	3-6
Concatenating Columns.....	3-7
Naming Columns	3-8
Using DISTINCT to Limit Values.....	3-9
The WHERE Clause	3-11
Transact-SQL Comparison Operators	3-12
The LIKE Operator.....	3-13
The BETWEEN Operator.....	3-15
Using IS NULL to Test for Nulls	3-16
Multiple Conditions with AND, OR, and NOT.....	3-17
Operator Precedence.....	3-19
Using the IN Operator	3-19

Using ORDER BY to Sort Data.....	3-21
Sorting on a Single Column	3-21
Sorting by Multiple Columns	3-22
Sorting with Expressions.....	3-23
The GROUP BY Clause	3-24
Aggregate Functions.....	3-24
Counting Rows.....	3-24
Counting Columns	3-25
Counting with a WHERE Clause.....	3-25
Using GROUP BY.....	3-26
Using ORDER BY with GROUP BY.....	3-27
Using HAVING with GROUP BY.....	3-28
TOP Values Queries	3-29
Joining Tables.....	3-31
Cross Joins (Cartesian Products)	3-31
The Use of Keys in Joining	3-31
Join Notation	3-32
Inner Joins	3-34
Outer Joins.....	3-37
Self Joins	3-42
LAB 3: DATA SELECTION QUERIES.....	3-49
Lab 3 Overview.....	3-50
Simple Select Query	3-51
Aggregate Query	3-53
Joining Tables with an Inner Join	3-55
Aggregate Query with Multiple Inner Joins	3-57
Aggregate Query with Inner and Outer Joins	3-59
MODIFYING DATA.....	4-1
Modifying Data.....	4-2
Inserting Data	4-3
Inserting a Single Value	4-3
Inserting Multiple Values.....	4-6
Inserting Multiple Rows.....	4-7
Creating a New Table Using SELECT INTO	4-9
Temporary Tables.....	4-9
Using Bulk Copy to Insert Data.....	4-13
Updating Data.....	4-15

Table of Contents

Updating a Single Row	4-15
Updating Multiple Rows and Columns	4-16
Updating from Another Table	4-16
Updating with TOP	4-17
Updating Large Value Types with UPDATE .WRITE	4-17
Deleting Data	4-19
Deleting a Single Row.....	4-19
Deleting Multiple Rows	4-19
Understanding Transaction Isolation	4-21
Isolation Levels Explained	4-21
Blocking and Deadlocks.....	4-23
Using Snapshot Isolation	4-25
LAB 4: MODIFYING DATA.....	4-33
Lab 4 Overview.....	4-34
Adding a Product	4-35
Editing a Product	4-37
Deleting a Product	4-39
WORKING WITH SQL SERVER MANAGEMENT STUDIO	5-1
Getting Started with SSMS	5-2
Connecting to Management Studio.....	5-2
Configuring SSMS Options	5-4
SSMS Toolbars.....	5-9
Overview of SSMS Menu Options	5-10
Configuring SSMS Windows.....	5-15
Exploring the Object Explorer	5-19
Right-Click Menu Options	5-19
Server and Database Objects.....	5-20
Displaying and Filtering Objects	5-22
Finding Objects	5-22
Editing Database Objects in the SSMS Designers	5-25
Working with the Query Editor	5-27
Displaying Multiple Code Windows.....	5-27
Formatting and Editing Code	5-28
Scripting with SSMS	5-31
Executing Queries.....	5-36
Creating Projects and Solutions.....	5-40
Working Offline	5-42
Using SQL Server Books Online	5-45

Getting Help in SSMS	5-45
LAB 5: WORKING WITH SQL SERVER MANAGEMENT STUDIO.....	5-51
Lab 5 Overview.....	5-52
Creating a New Table	5-53
Creating Scripts	5-55
TRANSACT-SQL PROGRAMMING	6-1
Overview of Transact-SQL	6-2
Transact-SQL Extensions	6-2
Batches and Scripts	6-3
Variables	6-4
Delimiters and Operators	6-6
Transact-SQL and Data Types	6-7
Using Built-In Functions.....	6-13
Working with Nulls	6-13
Handling Numbers	6-16
Manipulating Strings	6-19
Working with Date and Time Values.....	6-28
Using the @@ Functions	6-31
Controlling Flow	6-34
IF...ELSE.....	6-34
BEGIN...END.....	6-34
GOTO, RETURN, and Labels.....	6-35
CASE	6-37
WHILE.....	6-41
WAITFOR	6-41
Ranking Results.....	6-43
LAB 6: TRANSACT-SQL PROGRAMMING	6-51
Lab 6 Overview.....	6-52
Converting Data Types	6-53
Using Built-In Functions.....	6-55
Using Control of Flow Constructs	6-57
TRANSACTIONS AND ERROR HANDLING	7-1
Transaction Concepts.....	7-2
Passing the ACID Test.....	7-2
Transaction Types	7-3
Avoiding Blocked Transactions.....	7-5

Table of Contents

Working around Deadlocks.....	7-5
Applications and Transactions.....	7-7
Designing Transactional Support.....	7-7
Understanding Compile and Runtime Errors	7-8
Creating Explicit Transactions	7-12
Explicit Transaction Syntax.....	7-12
Transact-SQL Error Handling in Transactions	7-13
Using RAISERROR	7-20
Using TRY/CATCH Error Handling.....	7-22
TRY/CATCH Overview	7-22
Using TRY/CATCH in a Stored Procedure	7-25
Handling Uncommittable Transactions with XACT_STATE.....	7-28
LAB 7: TRANSACTIONS AND ERROR HANDLING	7-35
Lab 7 Overview.....	7-36
Create a Transaction in a Stored Procedure	7-37
Use TRY/CATCH Error Handling.....	7-40
INDEX.....	INDEX-1

Writing T-SQL Queries in SQL Server 2005

Table of Contents

INTRODUCTION.....	INTRO-1
Installing the Practice Files.....	INTRO-2
Software Requirements	INTRO-2
Sample Database	INTRO-2
Installation.....	INTRO-3
About the Authors	INTRO-4
 CREATING VIEWS	8-1
What Is a View?.....	8-2
Advantages of Views	8-2
Views and Security	8-2
Creating Views.....	8-4
View Rules	8-4
View Syntax and Options.....	8-5
Tools for Creating Views.....	8-7
View Examples	8-13
Nesting Views, Derived Tables, and CTEs	8-16
Encrypting View Definitions	8-19
Updating Data Using a View.....	8-21
Updating Rules	8-21
Updating Behavior	8-21
Using Computed Columns.....	8-26
Creating a Computed Column	8-26
Indexed Views	8-29
How Indexed Views Work	8-29
Partitioned Views	8-33
 LAB 8: CREATING VIEWS.....	8-37
Lab 8 Overview.....	8-38
Creating a Summary View	8-39
Using Views to Update Data.....	8-41
 CREATING STORED PROCEDURES AND TRIGGERS	9-1
Creating Stored Procedures	9-2
Stored Procedure Features.....	9-2
Stored Procedures Performance Benefits	9-3

Table of Contents

Reasons to Use Stored Procedures	9-5
Stored Procedure Syntax.....	9-6
Creating Stored Procedures Using SSMS	9-7
Creating and Executing Stored Procedures.....	9-8
Working with Parameters.....	9-10
Testing and Debugging Stored Procedures.....	9-18
Creating Triggers	9-23
Uses for Triggers	9-23
How Triggers Work	9-24
Creating an AFTER Trigger	9-25
Creating an INSTEAD OF Trigger on a View.....	9-27
Creating a DDL Trigger to Restrict Table Creation	9-29
LAB 9: CREATING STORED PROCEDURES AND TRIGGERS	9-35
Lab 9 Overview.....	9-36
Creating a Stored Procedure	9-37
Testing a Stored Procedure.....	9-40
CREATING USER-DEFINED FUNCTIONS	10-1
User-Defined Function Overview.....	10-2
Scalar Functions	10-4
Scalar Function Syntax.....	10-4
Scalar Function Examples	10-5
Inline Table-Valued Functions	10-9
Inline Syntax	10-9
Inline Function Example.....	10-10
Executing Inline Table-Valued Functions.....	10-10
Inline Functions with Parameters.....	10-11
Updating Data with Inline Functions	10-12
Multi-Statement Table-Valued Functions.....	10-15
Multi-Statement Function Syntax	10-15
Multi-Statement Function Example	10-16
Executing Multi-Statement Functions	10-21
Joining to Functions	10-22
Using Functions, Views, and Stored Procedures	10-23
Using Scalar Functions	10-23
Using Table-Valued Functions	10-24
Choosing Between Functions, Views, and Stored Procedures	10-25
LAB 10: CREATING USER-DEFINED FUNCTIONS	10-31

Lab 10 Overview	10-32
Create a Scalar Function	10-33
Create an Inline Table-Valued Function	10-35
Create a Multi-Statement Table-Valued Function.....	10-37
 USING .NET CODE IN SQL SERVER 2005	11-1
Introduction	11-2
Ways to Use SQLCLR	11-3
Enabling SQLCLR.....	11-4
Writing SQLCLR Code.....	11-6
Creating SQLCLR Code Manually	11-6
Creating SQLCLR Code Using Visual Studio 2005	11-10
SQL Data Types	11-14
Accessing Local Data	11-16
Returning Results	11-17
SQLCLR Code Modules	11-24
Stored Procedures and Triggers.....	11-24
User-Defined Functions	11-29
Aggregates.....	11-31
Managing Code Modules.....	11-38
System Catalogs.....	11-38
Troubleshooting	11-41
SQLCLR Security	11-45
Code Access Security (CAS).....	11-47
SQLCLR Permission Sets.....	11-48
T-SQL vs. .NET Code.....	11-51
 LAB 11: USING .NET CODE IN SQL SERVER 2005	11-55
Lab 11 Overview	11-56
Enable SQLCLR Code Execution.....	11-57
Create a SQLCLR Stored Procedure Manually	11-58
Create a SQLCLR Stored Procedure Using Visual Studio	11-64
 ADVANCED QUERY TECHNIQUES	12-1
Full-Text Search	12-2
SQL Server 2005 Enhancements	12-2
Configuring Full-Text Search	12-3
Writing Full-Text Queries	12-7
The CONTAINS Predicate	12-8

Table of Contents

The FREETEXT Predicate.....	12-13
Using CONTAINSTABLE and FREETEXTTABLE.....	12-14
Using Full-Text DDL.....	12-18
Generating XML with FOR XML	12-19
Using AUTO Mode.....	12-19
Using RAW Mode	12-23
Using EXPLICIT Mode.....	12-27
Using PATH Mode	12-31
Using APPLY	12-37
Comparing APPLY to Using Joins	12-37
Using APPLY with Table-Valued Functions.....	12-40
Combining APPLY with FOR XML PATH	12-41
Creating Recursive Queries.....	12-43
Using a Common Table Expression (CTE).....	12-43
Creating Pivot Queries.....	12-47
Rotating Column Data into Column Headings	12-47
Executing Dynamic SQL.....	12-51
Overcoming PIVOT Limitations.....	12-51
Using Parameters with sp_executesql	12-53
Using QUOTENAME()	12-55
Using sp_executesql with Output Parameters	12-57
Signing Stored Procedures with Certificates.....	12-58
LAB 12: ADVANCED QUERY TECHNIQUES	12-65
Lab 12 Overview.....	12-66
Configure Full-Text Indexing.....	12-67
Write Queries Using Full-Text Syntax.....	12-68
INDEX.....	INDEX-1