

LINQ

Part 1: Pro LINQ: Language Integrated Query in C#

1 *Hello LINQ*

A Paradigm Shift

Query XML

Query a SQL Server Database

Introduction

LINQ Is About Data Queries

How to Obtain LINQ

LINQ Is Not Just for Queries

Tips to Get You Started

Use the var Keyword When Confused

Use the Cast or OfType Operators for Legacy Collections

The OfType Operator versus the Cast Operator

Don't Assume a Query Is Bug-Free

Take Advantage of Deferred Queries

Use the DataContext Log

2 *C# Language Enhancements for LINQ*

C# Language Additions

Lambda Expressions

Expression Trees

Keyword var, Object Initialization, and Anonymous Types

Extension Methods

Partial Methods

Query Expressions

Part 2: LINQ to Objects

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LINQ to Objects Overview

IEnumerable<T>, Sequences, and the Standard Query Operators

Returning IEnumerable<T>, Yielding, and Deferred Queries

Func Delegates

The Standard Query Operators Alphabetical Cross-Reference

A Tale of Two Syntaxes

4 Deferred Operators

Referenced Namespaces

Referenced Assemblies

Common Classes

The Deferred Operators by Purpose

Restriction

Projection

Partitioning

Concatenation

Ordering

Join

Grouping

Set

Conversion

Element

Generation

5 Nondeferred Operators

Referenced Namespaces

Common Classes

The Nondeferred Operators by Purpose

Conversion

Equality

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Quantifiers

Aggregate

Part 3: LINQ to SQL

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Introducing LINQ to SQL

The DataContext

Entity Classes

Associations

Concurrency Conflict Detection

Concurrency Conflict Resolution

Prerequisites for Running the Examples

Obtaining the Appropriate Version of the Northwind Database

Generating the Northwind Entity Classes

Generating the Northwind XML Mapping File

Using the LINQ to SQL API

IQueryable<T>

Some Common Methods

GetStringFromDb()

ExecuteStatementInDb()

7 LINQ to SQL Tips and Tools

Introduction to LINQ to SQL Tips and Tools

Tips

- Use the DataContext.Log Property
- Use the GetChangeSet() Method
- Consider Using Partial Classes or Mapping Files
- Consider Using Partial Methods

Tools

- SQLMetal
- The Object Relational Designer
- Use SQLMetal and the O/R Designer Together

8 LINQ to SQL Database Operations

Prerequisites for Running the Examples

- Some Common Methods
- Using the LINQ to SQL API

Standard Database Operations

- Inserts
- Queries
- Updates
- Deletes

Overriding Database Modification Statements

- Overriding the Insert Method
- Overriding the Update Method
- Overriding the Delete Method
- Example
- Overriding in the Object Relational Designer
- Considerations

SQL Translation

9 The LINQ to SQL DataContext

Prerequisites for Running the Examples

Some Common Methods

Using the LINQ to SQL API

[Your]DataContext Class

The DataContext Class

The DataContext Class Implements IDisposable

Primary Purposes

The Data Context Lifetime

DataContext() and [Your]DataContext()

SubmitChanges()

DatabaseExists()

CreateDatabase()

DeleteDatabase()

CreateMethodCallQuery()

ExecuteQuery()

Translate()

ExecuteCommand()

ExecuteMethodCall()

GetCommand()

GetChangeSet()

GetTable()

Refresh()

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Prerequisites for Running the Examples

Some Common Methods

Using the LINQ to SQL API

Concurrency Conflicts

Optimistic Concurrency

Pessimistic Concurrency

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The Four Steps for Inserting a Record

Creating an Entity Type with the Create[T] Method

Inserting an Attached Entity Object

Attaching Objects After They Have Been Created

Attaching Objects in the Other Direction

Obtaining an IQueryable Result from LINQ to Entities

Similar LINQ to Entities Queries

Using a Compiled LINQ to Entities Query

Displaying the SQL Statement

The Effect of Lazy Object Loading

Eager Loading of the Orders Data

Eagerly Loading Multiple Related Entity Types

Explicit Loading to Control Database Queries

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Querying an Imported Stored Procedure

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A LINQ to Entities Outer Join

A Simple Entity Object Update

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Deleting a Record Using the EntitySet Class

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Manually Deleting a Graph of Related Objects

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An Example of a Concurrency Problem

Handling a Concurrency Conflict

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Significant API Design Enhancements

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Favor of Element Centricity

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The LINQ to XML Object Model

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XML Creation

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Creating Attributes with XAttribute

Creating Comments with XComment

Creating Containers with XContainer

Creating Declarations with XDeclaration

Creating Document Types with XDocumentType

Creating Documents with XDocument

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Creating Processing Instructions with XProcessingInstruction

Creating Streaming Elements with XStreamingElement

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Attribute Creation

Attribute Traversal

Attribute Modification

XML Annotations

Adding Annotations with XObject.AddAnnotation

Accessing Annotations with XObject.Annotation() or XObject.Annotations()

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XObject.Changing

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Introduction to LINQ to XML Operators

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AncestorsAndSelf

Prototypes

Examples

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DescendantsAndSelf

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- DataTable Operators
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 - CopyToDataTable<DataRow>