

Index

A

Add (T) method, 225

AddAfterSelf, 113

AddAnnotation method, 101, 103, 106, 158

AddBeforeSelf, 113

ADO Provider, 218

ADO.NET, 199. *See also* LINQ to SQL

command object, 42–43

DataSets, 3, 271, 272, 284

ADO.NET Entity Framework, 329–344

Entity Data Model Generator tool, 342–344

example, 332–340

installation, 331

overview, 329–331

querying entity data model, 340–341

working with objects, 341–342

Aggregate operator, 64

aggregating query operators, 64–68

Aggregate, 64

Average, 54, 64–65

Count, 54, 65

LongCount, 55, 66

Max, 55, 66–67

Min, 55, 67

Sum, 55, 67–68

All operator, 54, 83–84

Always value, 264

Ancestors method, 161–163

AncestorsAndSelf method, 101, 164–165

AND logical operator, 38

annotations, 158–160

anonymous types, 23

C#, 23

lambda expressions v., 28

named types v., 40

object initializers of, 26

Visual Basic, 23

Any operator, 54, 84–85

API class methods, LINQ to XSD, 354–358

APIs

LINQ, 145, 152

LINQ to SQL, 218

standard query operators v., 53

AsEnumerable operator, 74

Association attribute, 202, 206–207, 214

IsForeignKey property, 206

IsUnique property, 206

LINQ to SQL joins, 218

Name property, 206

OtherKey property, 206

properties, 206

Storage property, 206

ThisKey property, 206

Attach method, 302–303

AttachAll method, 304

Attribute axis property, 186

Attribute method, 101

attribute-based mapping, LINQ to SQL, 202–209

Database attribute, 202–203

mapping columns, 203–205

mapping functions, 208–209

mapping relationships, 206–207

mapping stored procedures, 207–208

mapping tables, 203

ORD tool, 202

Parameter attribute, 209

SqlMetal tool, 202

attributes, 102, 117–120

adding, 117

Association, 202, 206–207, 214

IsForeignKey property, 206

IsUnique property, 206

LINQ to SQL joins, 218

Name property, 206

OtherKey property, 206

properties, 206

attributes (*continued*)

attributes (*continued*)

- Storage property, 206
- ThisKey property, 206
- Column, 203–205
 - AutoSync property, 204
 - CanBeNull property, 204
 - DbType property, 204
 - Expression property, 204
 - IsDbGenerated property, 204, 212
 - IsDiscriminator property, 204
 - IsPrimaryKey property, 204, 212
 - IsVersion property, 204
 - Name property, 204
 - properties, 204
 - Storage property, 204
 - UpdateCheck property, 204
- Database, 202–203
 - deleting, 119–120
 - Remove method, 119–120
 - SetAttributeValue method, 120
 - elements v., 102–103, 117
 - Parameter, 209
 - DbType property, 209
 - Name property, 209
 - properties, 209
 - Remove method
 - deleting attributes, 119–120
 - RemoveAttributes method, 102
 - ReplaceAttributes method, 102
 - retrieving, 117–119
 - SetAttributeValue method, 102, 115
 - deleting attributes, 120
- Attributes method**, 101
- AutoSync property**, 204
- Average operator**, 54, 64–65
- aw.cs file**, 298
- aw.dbml file**, 298
- axis methods**, 161–167
 - Ancestors, 161–163
 - AncestorsAndSelf, 164–165
 - Descendants, 163–164
 - DescendantsAndSelf, 165–166
 - ElementsAfterSelf, 166–167
 - ElementsBeforeSelf, 166–167
 - XML trees and, 167

B

- binding data, LINQ to DataSets**, 279–281
 - implicit, 281
- BindingNavigator component**, 307
- BindingSource component**, 307
- bracketing**, 269

C

- C#**
 - anonymous types, 23
 - creating XML trees
 - LINQ to XML, 124–128
 - extension methods, 26–28
 - implicitly typed variables, 22
 - lambda expressions, 29
 - object initializers, 24–25
 - query expressions, 22
- CanBeNull property**, 204
- case study, Fabrikam**, 313–328
 - application configuration file added, 314
 - designing user interface, 316–319
 - LINQ references, 314
 - login form, 317–318
 - mappings to database objects, 315
 - ProductMain form, 322–324
 - run Fabrikam.sql, 313–314
 - objects created, 314
 - SelectProduct form, 319–321
 - server objects added, 315
- Cast operator**, 54, 74–75
- ChangeConflictException class**, 265
- Changed event**, 170–171
- Changing event**, 168–170
- Child axis property**, 186
- Class member**, 202
- classes**
 - ChangeConflictException, 265
 - CompiledQuery, 251
 - DataAdapter, 272, 273, 274
 - DataContext, 200–201, 202, 219–220
 - creating/configuring, 288–290
 - LINQ to SQL queries, 219–220

Contains operator

- mapping for stored procedures/functions, 292–293
- strongly typed, 220–221
- DataRowComparer, 281–282
- DataShape, 254
- DataTableExtensions, 280
- entity, LINQ to SQL, 202, 203, 257–270
 - creating for tables/view mapping, 290–291
- EntitySet, 252
- LINQ to SQL, 288
- LINQ to XML, 96–107, 122
 - list, 97
 - XAttribute, 12, 13, 97, 102–104
 - XDocument, 97, 104–107
 - XElement, 12, 13, 14, 97, 98–102
- MemberChangeConflict, 266
- MethodInfo, 233
- pluralization of, in O/R Designer, 296
- Table (of TEntity), 302
- TestAnnotation, 160
- TransactionScope, 267, 269
- XAttribute, 12, 97, 102–104
 - example, 13
 - methods, 103
 - XElement class v., 103
- XCDATA, 97
- XComment, 97
- XContainer, 97
- XDeclaration, 97–98
- XDocument, 97, 104–107
 - methods, 106
 - objects in, 104–105
- XElement, 12, 14, 97, 98–102
 - methods, 100, 101–102
 - XAttribute class v., 103
 - XML document construction, 12–13
- XName, 97
 - names, 142
 - string representation, 142
- XNamespace, 97
 - namespaces, 97, 142
- XNode, 97, 112
 - XML manipulation in LINQ to XML, 112–117
- XNodeDocumentOrderComparer, 97
- XNodeEqualityComparer, 97
- XObject, 97
 - XObjectChange, 97
 - XObjectChangeEventArgs, 97
 - XProcessingInstruction, 97
 - XText, 97
- Clone method, LINQ to XSD**, 356–357
- CLR (Common Language Runtime)**, 14, 23
 - metadata, 14
- /code:file**, 296
- Column attribute**, 203–205
 - AutoSync property, 204
 - CanBeNull property, 204
 - DbType property, 204
 - Expression property, 204
 - IsDbGenerated property, 204, 212
 - IsDiscriminator property, 204
 - IsPrimaryKey property, 204, 212
 - IsVersion property, 204
 - Name property, 204
 - properties, 204
 - Storage property, 204
 - UpdateCheck property, 204
- columns, mapping**, 203–205
- Common Language Runtime. See CLR**
- Community Technology Preview (CTP) build**, 21
- Compile method**, 251
- compiled queries, LINQ to SQL**, 251
- CompiledQuery class**, 251
- compile-time type checking**, 4
- composite keys**, 255
- Concat operator**, 63–64
- concatenating query operators**, 63–64
- concurrency, optimistic**, 263, 303–304
 - conflicts, 263–266
 - ChangeConflictException, 265
 - ConflictMode enumeration, 264–265
 - RefreshMode enumeration, 265–266
 - UpdateCheck property, 263–264
- Configure Behavior dialog box**, 294
- ConflictMode enumeration**, 264–265
 - ContinueOnConflict value, 264
 - FailOnFirstConflict value, 264
- /c[onnection]:**, 343
- contactBindingSource control**, 308
- ContactID column**, 211, 212, 213, 214
- ContactsPart**, 236
- Contains operator**, 85

/context:type

/context:type, 297

ContinueOnConflict value, 264

conversion query operators, 73–77

AsEnumerable, 74

Cast, 54, 74–75

OfType, 75

ToArray, 75–76

ToDictionary, 76

ToList, 76–77

ToLookup, 77

CopyToDataTable method, 280

Count operator, 54, 65

CreateDatabase method, 219

CreateQuery method, 219

CreateReader method, 101, 102, 106

CreateWriter method, 101, 106

CRUD operations, 209

.cs file, 288

CTP build. *See* **Community Technology Preview build**

D

data binding, LINQ to DataSets, 279–281

implicit, 281

data loading

deferred, 252–253

turning off, 254–255

immediate, 252–253

data manipulation, via LINQ to SQL queries,

221–225

Data Source Configuration Wizard, 278,

305–307

data source, LINQ query, 32–33

DataAdapter class, 272, 273, 274

Database attribute, 202–203

database relationships, LINQ to SQL, 245–250

defining/representing, 245–250

querying across, 250

/database:name, 296

DataContext class, 200–201, 202, 219–220

creating/configuring, 288–290

LINQ to SQL queries, 219–220

mapping for stored procedures/functions,
292–293

strongly typed, 220–221

DataContext methods, 292

DataGridView, 280

DataReader, 43

DataRowComparer class, 281–282

DataRows, 272

comparing, 281–284

DataSet Designer, 17

DataSets. *See also* **LINQ to DataSets**

ADO.NET, 3, 271, 272, 284

defined, 271

typed, 278–279

DataShape class, 254

DataSource property, 280

DataTableExtensions class, 280

DataView, 280, 281

.dbml file, 288

/dbml:file, 296

DbType property, 204, 209

Descendants () method, 134–135

declarative query syntax, 7, 8, 21, 275

Default property, 282

DefaultIfEmpty operator, 78

deferred data loading, 252–253

turning off, 254–255

deferred query execution, 35

immediate v., 252–255

DeferredLoadingEnabled property, 254–255

DELETE function, 293

DeleteDatabase method, 219, 220

deleting data

entity objects, 226–227

LINQ to SQL queries, 225

Descendant axis property, 186

DescendantNodes method, 101, 106

DescendantNodesAndSelf method, 101

Descendants method, 163–164

DescendantsAndSelf method, 101, 165–166

descending clause, 38

DirectoryInformation table, 9

INSERT statement, 10

Distinct operator, 54, 68–69, 281

DLINQ. *See* **LINQ to SQL**

Document Object Model. *See* **DOM**

DOM (Document Object Model), 4, 12, 14, 95

limitations, 120

LINQ to XML v., 120–121

Extension indexer property

- XML reshaping/modifying
 - load/modify/save approach, 137–138
- dot notation**, 250
- E**
- element(s)**, 98
 - attributes v., 102–103, 117
- Element method**, 101, 106
- element query operators**, 77–82
 - DefaultIfEmpty, 78
 - ElementAt, 78–79
 - ElementAtOrDefault, 79
 - First, 79
 - FirstOrDefault, 80
 - Last, 80
 - LastOrDefault, 80–81
 - Single, 29, 81
 - SingleOrDefault, 82
- ElementAt () method**, 134
- ElementAt operator**, 78–79
- ElementAtOrDefault operator**, 79
- Elements () method**, 135
- ElementsAfterSelf method**, 166–167
- ElementsBeforeSelf method**, 166–167
- embedded expressions**, 128–129, 182–184
 - Visual Basic and, 182–184
 - in XML literals, 182–184
- embedded queries, in XML literals**, 184, 187
- Empty operator**, 71–72
- entities management**, 121
- entity classes, LINQ to SQL**, 202, 203, 257–270
 - creating for tables/view mapping, 290–291
 - entity changes
 - concurrent, 263–266
 - submitting, 258–263
 - tracking, 258
- Entity Data Model Generator tool**, 342–344
 - examples, 344
 - functionality, 342
 - modes, 343
 - options, 343–344
- entity objects**
 - deleting data, 226–227
 - inserting data, 225–226
 - LINQ to SQL queries, 225–227
 - updating data, 226
- /entitybase:type**, 297
- EntityClassGeneration**, 343
- /entitycontainer:**, 344
- EntitySet class**, 252
- equality query operators**, 82–83
 - SequenceEqual, 82–83
- Equals method**, 281
- events, LINQ to XML**, 167–171
 - Changed, 170–171
 - Changing, 168–170
- ExecuteQuery method**, 219
- ExecuteReader () method**, 43
- Except operator**, 71, 281
- execution, query**, 32, 33–36
 - deferred, 35
 - deferred v. immediate, 252–255
 - immediate, 35–36
 - local, 251, 252
 - remote, 251, 252
 - local v., 251–252
- "Expanding the Results View will enumerate the IEnumerable,"** 34
- explicit distributable transactions**, 267
- explicit local transactions**, 267
 - example, 268–269
- Expression(of TDelegate)**, 42
- Expression property**, 204
- expression trees**, 42
 - lambda expressions, 42
- expressions**, 128
 - embedded, 128–129, 182–184
 - Visual Basic and, 182–184
 - in XML literals, 182–184
 - lambda, 28–29, 54, 145
 - anonymous types v., 28
 - C# example, 29
 - expression trees, 42
 - LINQ with, 29
 - method syntax and, 44
 - rules for use, 29
- ExtensibilityMethodDefinitions region**, 294, 295
- Extension indexer property**, 186
 - illustration, 186–187

extension methods

extension methods, 26–28, 54
 best practices, 28
 C#, 26–28
 Visual Basic, 28
external mapping, LINQ to SQL, 299–302

F

Fabrikam case study, 313–328
 application configuration file added, 314
 designing user interface, 316–319
 LINQ references, 314
 login form, 317–318
 mappings to database objects, 315
 ProductMain form, 322–324
 run Fabrikam.sql, 313–314
 objects created, 314
 SelectProduct form, 319–321
 server objects added, 315
FailOnFirstConflict value, 264
Field method, 278
First () method, 134
First operator, 79
FirstOrDefault operator, 80
For Each loop, 34
FOR EACH statement, 8
foreach loop, 34, 35
foreach statement, 8
foreign keys, 212–215
from clause, 37
FromSSDLGeneration, 343
FullGeneration, 343
Function attribute, 208–209, 227
functional construction, 111, 137–139, 153–158
 benefits, 156
functions
 DataContext mapping for, 292–293
 DELETE, 293
 INSERT, 293
 mapping
 attribute-based, 208–209
 DataContext class, 292–293
 user-defined, 240–243
 mapping/calling, 240–243
/functions, 296

G

generation query operators, 71–73
 Empty, 71–72
 Range, 72–73
 repeat, 73
generator, 37
GetChildRows method, 272
GetEnumerator method, 43
GetHashCode method, 281
GetParentRow method, 272
GetQueryText method, 219
GetTable method, 221
group operator, 255
GroupBy operator, 55, 62–63, 255
grouping, 62
grouping operator, 62–63
 GroupBy, 55, 62–63, 255
GroupJoin operator, 55, 59, 60–62

H

/help, 344

I

IDbConnection, 219
identity specification, 211
IEnumerable<T> interface, 8, 54
 IQueryable<T> interface v., 54
 var keyword v., 40–41
IEnumerator<T> interface, 41, 43
IGrouping, 77
immediate data loading, 252–253
immediate query execution, 35–36
 deferred v., 252–255
implicit binding, 281
implicit transactions, 267
implicitly typed variables, 22
 C#, 22
 Visual Basic, 22
/incsd!:, 343
/inmsl:, 343
inner join, 59
Inputfile, 297
INSERT function, 293

LINQ to DataSets

INSERT statement, for DirectoryInformation table, 10

inserting data

- entity objects, 225–226
- LINQ to SQL queries, 222–224
- /inssdl:, 343

intersect operator, 70–71, 281, 284

IQueryable interface, 42–43, 252

IQueryable (Of T) interface, 42–43, 217, 218

IQueryable<T> interface, 11, 54

- IEnumerable<T> interface v., 54

IsAfter method, 101, 106

IsBefore method, 101, 106

IsDbGenerated property, 204, 212

IsDiscriminator property, 204

IsForeignKey property, 206

IsPrimaryKey property, 204, 212

IsUnique property, 206

IsVersion property, 204

J

join clause, 40

- LINQ to SQL joins, 218

join operator, 55, 59–60, 250

joining operators, 59–62

- GroupJoin, 55, 59, 60–62
- join, 55, 59–60, 250

joins, LINQ to SQL, 218

- Association attribute, 218
- join clause, 218

K

KeepChanges value, 265

KeepCurrentValues, 265

keys

- composite, 255
- foreign, 212–215
- primary, 210–212

L

lambda expressions, 28–29, 54, 145

- anonymous types v., 28
- C# example, 29

expression trees, 42

LINQ with, 29

method syntax and, 44

rules for use, 29

lambda operator, 29

/language:, 344

Language Integrated Query. See LINQ

/language:language, 297

Last operator, 80

LastOrDefault operator, 80–81

.layout file, 288

LINQ (Language Integrated Query), 3

APIs, 145, 152

defined, 3, 7

features, 145

flexibility, 145

goal, 3

history/background, 3–6

illustrations, 6–7

lambda expressions with, 29

language specific features, in Visual Studio
2008, 21–29

overview, 7–10

Providers, 41

LINQ to SQL, 41

purpose, 7

queries, 31–51

actions, 32–36

common terms, 41–43

concepts, 37–43

data source, 32–33

LINQ to SQL queries v., 218

parts, 32–36

polymorphic, 42

query creation, 32, 33

syntax options, 43–51

strong points, 145

syntax v. SQL syntax, 36–37

LINQ to DataSets, 3, 41, 271–285

comparing DataRows, 281–284

data binding, 279–281

implicit, 281

loading data, 273–274

overview, 272

project creation, 272–273

LINQ to DataSets (continued)

LINQ to DataSets (continued)

queries, 275–279

 across multiple tables, 277–278

 single table, 275–276

 typed DataSets, 278–279

LINQ to Entities, 329–344. See also ADO.NET

 Entity Framework

LINQ to Objects, 41

LINQ to SQL (DLINQ), 199–215

advanced topics, 287–310

API, 218

attribute-based mapping, 202–209

 Database attribute, 202–203

 mapping columns, 203–205

 mapping functions, 208–209

 mapping relationships, 206–207

 mapping stored procedures, 207–208

 mapping tables, 203

 Parameter attribute, 209

classes, 288

concurrency conflicts, 263–266

external mapping, 299–302

joins, 218

 Association attribute, 218

multi-tier operations, 302–310

n-tier operations, 302–310

 best practices, 303–304

 examples, 304–305

 insertion/deletion, 304

 optimistic concurrency, 303–304

 O/R Designer example, 305–310

O/R Designer, 17, 287–296

 attribute-based mapping, 202

 creating/opening, 288

 DataContext creation/configuration, 288–290

 DataContext mapping for stored
 procedures/functions, 292–293

 entity class creation for tables/view mapping,
 290–291

 n-tier operations, 305–310

 pluralization of classes in, 296

 validation logic, 294–295

Provider, 218

queries, 217–244

 advanced concepts, 245–256

 compiled, 251

 components involved, 218–219

 composite keys, 255

 concepts, 217–219

 data manipulation via, 221–225

 database relationships, 245–250

 DataContext class, 219–220

 DataShape class, 254

 deferred v. immediate data loading, 252–255

 deleting data, 225

 entity objects, 225–227

 goal, 16

 illustrations, 14–15

 inserting data, 222–224

 LINQ Provider, 41

 LINQ queries v., 218

 object model, 201–202

 overview, 14–16, 200–201

 parts, 217–218

 Person.Contact table and, 147–149

 read-only data, 255–256

 remote v. local execution, 251–252

 stored procedures, 227–240

 UDFs, 240–243

 updating data, 224–225

relational data basics, 209–215

SQL Metal command-line tool, 296–299

 /? option, 297

 attribute-based mapping, 202

 /code:file, 296

 /context:type, 297

 /database:name, 296

 /dbml:file, 296

 /entitybase:type, 297

 /functions, 296

 Inputfile, 297

 /language:language, 297

 location, 297

 /map:file, 297

 /namespace:name, 297

 options, 296–297

 /password:password, 296

 /pluralize, 297

 /serialization:option, 297

 /server:name, 296

 /sprocs, 296

 /timeout:timeout, 296

load options

- /user:name, 296
- /views, 296
- transactions, 267–269
 - explicit distributable, 267
 - explicit local, 267
 - illustrations, 267–269
 - implicit, 267
- LINQ to XML (XLINQ)**, 95–122
 - adding attributes, 117
 - annotations, 158–160
 - axis methods, 161–167
 - Ancestors, 161–163
 - AncestorsAndSelf, 164–165
 - Descendants, 163–164
 - DescendantsAndSelf, 165–166
 - ElementsAfterSelf, 166–167
 - ElementsBeforeSelf, 166–167
 - XML trees and, 167
 - benefits, 154
 - classes, 96–107, 122
 - list, 97
 - XAttribute, 12, 13, 97, 102–104
 - XDocument, 97, 104–107
 - XElement, 12, 13, 14, 97, 98–102
 - creating XML elements, 110–111
 - deleting attributes, 119–120
 - deleting XML, 116–117
 - DOM v., 120–121
 - events, 167–171
 - Changed, 170–171
 - Changing, 168–170
 - features in Visual Basic.NET, 179–195
 - functional construction, 111, 137–139, 153–158
 - illustrations, 12–13
 - inserting XML, 113
 - LINQ enabled, 96, 345
 - loading XML, 107–109
 - from file, 107
 - from string, 107–108
 - from TextReader, 108–109
 - manipulating XML, 112–117
 - XNode class, methods of, 112–117
 - MSXML v., 121
 - overview, 12–14, 95–96
 - Person.Contact table and, 147–149
 - programming fundamentals, 96–107
 - programming techniques/topics, 123–143
 - advanced, 153–177
 - queries, 132–137
 - retrieving attributes, 117–119
 - saving XML, 109
 - single programming interface, 96
 - SQL data to XML tree, 145–149
 - streaming XML documents, 171–177
 - large, 176–177
 - traversing XML, 111–112
 - types, 167–168
 - XObjectChange, 168
 - XObjectChangeEventArgs, 168
 - XObjectChangeEventHandler, 168
 - updating XML, 113–115
 - whitespace, 121
 - XML namespaces, 141–143
 - XML trees
 - creating, 123–129
 - modifying/reshaping, 137–139
 - populating from text, 130–131
 - querying, 132–137
 - serializing, 139–141
 - XmlReader v., 121
 - XSLT v., 121
- LINQ to XSD**, 345–358
 - API class methods, 354–358
 - Clone method, 356–357
 - default values, 357–358
 - example, 346–353
 - installation, 346
 - Load method, 355
 - mapping rules, 354
 - overview, 345–346
 - Parse method, 355–356
 - Preview, 346
 - Save method, 356
- LinqToXsdSchema**, 351–352
- LinqToXsdSources**, 353
- Load method**, 101, 106
 - LINQ to XSD, 355
 - populating XML trees from text, 130–131
- load options**, 189–191
 - None, 190
 - PreserveWhitespace, 190

load options (*continued*)

load options (*continued*)

SetBaseUri, 190

SetLineInfo, 190

LoadOptions enumeration, 190

LongCount operator, 55, 66

Lookup, 77

M

/map:file, 297

mapping, attribute-based

columns, 203–205

functions, 208–209

ORD tool, 202

relationships, 206–207

stored procedures, 207–208

tables, 203

mapping rules, LINQ to XSD, 354

Max operator, 55, 66–67

MemberChangeConflict class, 266

method(s)

Add (T), 225

AddAnnotation, 101, 103, 106, 158

Ancestors, 161–163

AncestorsAndSelf, 101, 164–165

API class, LINQ to XSD, 354–358

Attach, 302–303

AttachAll, 304

Attribute, 101

axis, 161–167

Ancestors, 161–163

AncestorsAndSelf, 101, 164–165

Descendants, 163–164

DescendantsAndSelf, 165–166

ElementsAfterSelf, 166–167

ElementsBeforeSelf, 166–167

XML trees and, 167

Clone, LINQ to XSD, 356–357

Compile, 251

CopyToDataTable, 280

CreateDatabase, 219

CreateQuery, 219

CreateReader, 101, 102, 106

CreateWriter, 101, 106

DataContext, 292

Descendants (), 134–135

DeleteDatabase, 219, 220

DescendantNodes, 101, 106

DescendantNodesAndSelf, 101

Descendants, 163–164

DescendantsAndSelf, 101, 165–166

Element, 101, 106

ElementAt (), 134

Elements (), 135

ElementsAfterSelf, 166–167

ElementsBeforeSelf, 166–167

Equals, 281

ExecuteQuery, 219

ExecuteReader (), 43

extension, 26–28, 54

best practices, 28

C#, 26–28

Visual Basic, 28

Field, 278

First (), 134

GetChildRows, 272

GetEnumerator, 43

GetHashCode, 281

GetParentRow, 272

GetQueryText, 219

GetTable, 221

IsAfter, 101, 106

IsBefore, 101, 106

Load, 101, 106

LINQ to XSD, 355

populating XML trees from text, 130–131

MoveNext (), 34

Nodes, 101, 106

NodesAfterSelf, 101, 106

NodesBeforeSelf, 102, 106

Parse, 102, 106

LINQ to XSD, 355–356

manipulating XML in Visual Basic, 189–191

populating XML trees from text, 130

ReadFrom (), 171

Remove, 102, 103, 106, 116, 304

deleting attributes, 119–120

Remove (T), 225

RemoveAll, 102, 116

RemoveAttributes, 102

RemoveNodes, 102, 106

Replace, 113

object(s)

- ReplaceAll, 102, 113
 - ReplaceAttributes, 102
 - ReplaceNodes, 113
 - ReplaceWith, 113, 114
 - Save, 102, 106
 - LINQ to XSD, 356
 - Select, 272
 - SetAttributeValue, 102, 115
 - deleting attributes, 120
 - SetElementValue, 102, 115
 - SetValue, 102, 103
 - SubmitChanges, 219, 220, 256
 - ToArray, 35
 - ToList, 35
 - WriteTo, 102
 - XAttribute class, 103
 - XDocument class, 106
 - XElement class, 100, 101–102
 - XNode class
 - XML manipulation in LINQ to XML, 112–117
 - method syntax**, 45–51, 275
 - example, 44
 - lambda expressions and, 44
 - query syntax v., 43–44
 - using, 45–51
 - MethodInfo class**, 233
 - Min operator**, 55, 67
 - MoveNext () method**, 34
 - MSXML**, 121
 - LINQ to XML v., 121
 - multi-tier operations, LINQ to SQL**, 302–310
- N**
- Name property**, 204, 206, 209
 - named types**
 - anonymous types v., 40
 - object initializers of, 26
 - names, XML**, 141, 142
 - XName class, 142
 - /namespace:**, 344
 - /namespace:name**, 297
 - namespaces**, 141, 143
 - System.Core, 272
 - System.Data, 199
 - System.Data.DataSetExtensions, 272
 - System.Reflection, 233
 - System.Runtime.CompilerServices, 28
 - System.Transactions, 267
 - System.Xml, 12, 95, 199
 - System.Xml.Linq, 96, 122
 - XML, 141–143
 - XNamespace class, 97, 142
 - .NET Framework**
 - 3.5, 4, 17, 21, 30
 - 1.0, 18
 - 1.1, 18
 - 3.0, 18
 - technologies, 18
 - 2.0, 18
 - version choice for Visual Studio 2008, 20
 - Never value**, 264
 - New Project dialog box**, 19–20, 45
 - nodes**, 98
 - Nodes method**, 101, 106
 - NodesAfterSelf method**, 101, 106
 - NodesBeforeSelf method**, 102, 106
 - /nologo**, 344
 - None load option**, 190
 - n-tier operations, LINQ to SQL**, 302–310
 - best practices, 303–304
 - examples, 304–305
 - insertion/deletion, 304
 - optimistic concurrency, 303–304
 - O/R Designer example, 305–310
- O**
- OBDC**, 199
 - object(s)**
 - ADO.NET command, 42–43
 - in ADO.NET Entity Framework, 341–342
 - entity
 - deleting data, 226–227
 - inserting data, 225–226
 - LINQ to SQL queries, 225–227
 - updating data, 226
 - XComment, 105
 - XDeclaration, 104
 - in XDocument class, 104–105
 - XDocumentType, 104

object(s) *(continued)*

object(s) *(continued)*

XElement, 104
 XProcessingInstruction, 105

object initializers, 23–26
 of anonymous types, 26
 C#, 24–25
 of named types, 26
 Visual Basic, 25–26

object mapping
 example, 8–9

Object Relational Designer (O/R Designer), 17, 287–296
 attribute-based mapping, 202
 creating/opening, 288
 DataContext creation/configuration, 288–290
 DataContext mapping for stored
 procedures/functions, 292–293
 entity class creation for tables/view mapping,
 290–291
 n-tier operations, 305–310
 pluralization of classes in, 296
 validation logic, 294–295

ObjectChangeConflict class, 266

object-oriented (OO) programming, 3

ObjectTrackingEnabled property, 255

OfType operator, 75

OLE DB, 199

OO programming. See object-oriented programming

operators. See standard query operators

optimistic concurrency, 263, 303–304
 conflicts, 263–266
 ChangeConflictException, 265
 ConflictMode enumeration, 264–265
 RefreshMode enumeration, 265–266
 UpdateCheck property, 263–264
 n-tier operations, 303–304

O/R Designer. See Object Relational Designer

OR logical operator, 38

Orcas, Beta 1, 345

ORD tool. See Object Relational Designer

Orderby clause, 38, 43–44

OrderBy operator, 55, 57

OrderByDescending operator, 55, 58
 Reverse operator v., 59

OtherKey property, 206

/outcsdl :, 343
/outms l:, 343
/outobjectlayer:, 343
OUTPUT parameter, 234
/outssdl :, 343
/outviews:, 344
OverwriteCurrentValues, 265

P

Parameter attribute, 209
 DbType property, 209
 Name property, 209
 properties, 209

Parse method, 102, 106
 LINQ to XSD, 355–356
 manipulating XML in Visual Basic, 189–191
 populating XML trees from text, 130

partitioning query operators, 86–88
 Skip, 55, 86
 SkipWhile, 55, 86–87
 Take, 55, 87
 TakeWhile, 55, 87–88

/password:password, 296

Person.Contact table
 letter S contacts, 7
 LINQ to SQL and, 147–149
 LINQ to XML and, 147–149
 query/query filter, 15
 schema defined, 14
 table design, 210–211

pluralization of classes, in O/R Designer, 296

/pluralize, 297

polymorphic queries, 42

prefixes, XML, 98, 141

PreserveWhitespace load option, 190

primary keys, 210–212

ProductsPart, 236

/p[roject]:, 343

projection query operators, 55–56
 Select, 55–56
 SelectMany, 55–56

projections, 38, 55

properties, 204
 Association attribute, 206
 AutoSync, 204

queries

CanBeNull, 204
 Column, 204
 DataSource, 280
 DbType, 204, 209
 Default, 282
 DeferredLoadingEnabled, 254–255
 Descendant axis, 186
 Expression, 204
 Extension indexer, 186
 illustration, 186–187
 IsDbGenerated, 204, 212
 IsDiscriminator, 204
 IsForeignKey, 206
 IsPrimaryKey, 204, 212
 IsUnique, 206
 IsVersion, 204
 Name, 204, 206, 209
 OtherKey, 206
 relationship, 250
 Storage, 204, 206
 ThisKey, 206
 UpdateCheck, 204
 Always value, 264
 concurrency conflicts, 263–264
 Never value, 264
 WhenChanged value, 264
 Value, 186

/prov[ider];, 343

Providers

ADO, 218
 LINQ, 41
 LINQ to SQL, 41
 LINQ to SQL, 218

Q**quantifier query operators**, 83–85

All, 54, 83–84
 Any, 54, 84–85
 Contains, 85

queries

creation, 32, 33
 importance, 33
 embedded in XML literals, 184, 187
 execution, 32, 33–36
 deferred, 35

 deferred v. immediate, 252–255
 immediate, 35–36
 local, 251, 252
 remote, 251, 252
 expressions, 21–22, 55
 C#, 22
 Visual Basic, 22
 LINQ, 31–51
 actions, 32–36
 common terms, 41–43
 concepts, 37–43
 data source, 32–33
 LINQ to SQL queries v., 218
 parts, 32–36
 polymorphic, 42
 query creation, 32, 33
 syntax options, 43–51
 LINQ to DataSets, 275–279
 across multiple tables, 277–278
 single table, 275–276
 typed DataSets, 278–279
 LINQ to SQL, 207–244
 advanced concepts, 245–256
 compiled, 251
 components involved, 218–219
 composite keys, 255
 concepts, 217–219
 data manipulation via, 221–225
 database relationships, 245–250
 DataContext class, 219–220
 DataShape class, 254
 deferred v. immediate data loading,
 252–255
 deleting data, 225
 entity objects, 225–227
 goal, 16
 illustrations, 14–15
 inserting data, 222–224
 LINQ Provider, 41
 LINQ queries v., 218
 object model, 201–202
 overview, 14–16, 200–201
 Person.Contact table and, 147–149
 read-only data, 255–256
 remote v. local execution, 251–252
 stored procedures, 227–240

queries (continued)

queries (continued)

- UDFs, 240–243
 - updating data, 224–225
- LINQ to XML, 132–137
- syntax, 43, 45–51, 275
 - example, 44
 - method syntax v., 43–44
 - using, 45–51
- XML trees, 132–136

query operators. See standard query operators

R

- Range operator**, 72–73
- range variable**, 37
- ReadFrom () method**, 171
- read-only data**, 255–256
- /refcsdl :**, 343
- RefreshMode enumeration**, 265–266
 - KeepChanges value, 265
 - KeepCurrentValues, 265
 - OverwriteCurrentValues, 265
- relational data**, 209–215. *See also* LINQ to SQL
 - foreign keys, 212–215
 - primary keys, 210–212
- relationship properties**, 250
- relationships, mapping**, 206–207
- Remove method**, 102, 103, 106, 116, 304
 - deleting attributes, 119–120
- Remove (T) method**, 225
- RemoveAll method**, 102, 116
- RemoveAttributes method**, 102
- RemoveNodes method**, 102, 106
- repeat operator**, 73
- Replace method**, 113
- ReplaceAll method**, 102, 113
- ReplaceAttributes method**, 102
- ReplaceNodes method**, 113
- ReplaceWith method**, 113, 114
- Required value**, 269
- RequiredNew value**, 269
- restriction operator**, 57
 - where, 11, 57
- Results View**, 34
- Reverse operator**, 57, 59
 - OrderByDescending v., 59

S

- Save method**, 102, 106
 - LINQ to XSD, 356
- select clause**, 38, 39
- Select method**, 272
- Select operator**, 55–56
- select query operator**, 11
- SelectMany operator**, 55–56
- SequenceEqual operator**, 82–83
- sequences**, 53–54
- serialization**, 109, 139
 - /serialization:option, 297
- serializing XML trees**, 139–141, 143
 - whitespace and, 139, 140, 141
- /server:name**, 296
- Set Primary Key button**, 211
- set query operators**, 68–71
 - Distinct, 54, 68–69, 281
 - Except, 71, 281
 - intersect, 70–71, 281, 284
 - Union, 70, 281
- SetAttributeValue method**, 102, 115
 - deleting attributes, 120
- SetBaseUri load option**, 190
- SetElementValue method**, 102, 115
- SetLineInfo load option**, 190
- SetValue method**, 102, 103
- Single operator**, 29, 81
- SingleOrDefault operator**, 82
- Skip operator**, 55, 86
- SkipWhile operator**, 55, 86–87
- sorting operators**, 57–59
 - OrderBy, 55, 57
 - OrderByDescending, 55, 58
 - Reverse operator v., 59
 - Reverse, 57, 59
 - OrderByDescending v., 59
 - ThenBy, 55, 58
 - ThenByDescending, 55, 58–59
- /sprocs**, 296
- SQL. See also LINQ to SQL**
 - database, to XML tree, 145–149
 - Query Analyzer, 15
 - Server
 - query processing, 36

 standard query operators

- Server Management Studio, 15
- Server table, XML data to, 149–152
- syntax, LINQ syntax v., 36–37
- SQL Metal command-line tool**, 296–299
 - /? option, 297
 - attribute-based mapping, 202
 - /code:file, 296
 - /context:type, 297
 - /database:name, 296
 - /dbml:file, 296
 - /entitybase:type, 297
 - /functions, 296
 - Inputfile, 297
 - /language:language, 297
 - location, 297
 - /map:file, 297
 - /namespace:name, 297
 - options, 296–297
 - /password:password, 296
 - /pluralize, 297
 - /serialization:option, 297
 - /server:name, 296
 - /sprocs, 296
 - /timeout:timeout, 296
 - /user:name, 296
 - /views, 296
- SqlDataAdapter**, 273–274
- standard query operators**, 6, 10–12, 33, 53–92
 - Aggregate, 64
 - aggregating, 64–68
 - Aggregate, 64
 - Average, 54, 64–65
 - Count, 54, 65
 - LongCount, 55, 66
 - Max, 55, 66–67
 - Min, 55, 67
 - Sum, 55, 67–68
 - All, 54, 83–84
 - Any, 54, 84–85
 - API v., 53
 - AsEnumerable, 74
 - Average, 54, 64–65
 - Cast, 54, 74–75
 - categorization, 11
 - Concat, 63–64
 - concatenating, 63–64
 - Contains, 85
 - conversion, 73–77
 - AsEnumerable, 74
 - Cast, 54, 74–75
 - OfType, 75
 - ToArray, 75–76
 - ToDictionary operator, 76
 - ToList, 76–77
 - ToLookup, 77
 - Count, 54, 65
 - DefaultIfEmpty, 78
 - defined, 53
 - Distinct, 54, 68–69, 281
 - element, 72–82
 - DefaultIfEmpty, 78
 - ElementAt, 78–79
 - ElementAtOrDefault, 79
 - First, 79
 - FirstOrDefault, 80
 - Last, 80
 - LastOrDefault, 80–81
 - Single, 29, 81
 - SingleOrDefault, 82
 - ElementAt, 78–79
 - ElementAtOrDefault, 79
 - Empty, 71–72
 - equality, 82–83
 - SequenceEqual, 82–83
 - example/illustration, 6, 88–92
 - Except, 71, 281
 - First, 79
 - FirstOrDefault, 80
 - generation, 71–73
 - Empty, 71–72
 - Range, 72–73
 - repeat, 73
 - GroupBy, 55, 62–63
 - grouped by function, 54–88
 - grouping, 62–63
 - GroupJoin, 55, 59, 60–62
 - illustration/example, 6, 88–92
 - intersect, 70–71, 281, 284
 - join, 55, 59–60, 250
 - joining, 59–62
 - Last, 80
 - LastOrDefault, 80–81

standard query operators (*continued*)

standard query operators (*continued*)

LongCount, 55, 66
 Max, 55, 66–67
 Min, 55, 67
 OfType, 75
 OrderBy, 55, 57
 OrderByDescending, 55, 58
 Reverse operator v., 59
 overview, 53–54
 partitioning, 86–88
 Skip, 55, 86
 SkipWhile, 55, 86–87
 Take, 55, 87
 TakeWhile, 55, 87–88
 projection, 55–56
 Select, 55–56
 SelectMany, 55–56
 quantifier, 83–85
 All, 54, 83–84
 Any, 54, 84–85
 Contains, 85
 Range, 72–73
 repeat, 73
 restriction, 57
 Reverse, 57, 59
 OrderByDescending v., 59
 Select, 55–56
 select, 11
 SelectMany, 55–56
 SequenceEqual, 82–83
 set, 68–71
 Distinct, 54, 68–69, 281
 Except, 71, 281
 intersect, 70–71, 281, 284
 Union, 70, 281
 sets, 11
 Single, 29, 81
 SingleOrDefault, 82
 Skip, 55, 86
 SkipWhile, 55, 86–87
 sorting, 57–59
 OrderBy, 55, 57
 OrderByDescending, 55, 58, 59
 Reverse, 57, 59
 ThenBy, 55, 58
 ThenByDescending, 55, 58–59

Sum, 55, 67–68
 syntax, 33
 Take, 55, 87
 TakeWhile, 55, 87–88
 ThenBy, 55, 58
 ThenByDescending, 55, 58–59
 ToArray, 75–76
 ToDictionary, 76
 ToList, 76–77
 ToLookup, 77
 types, 54
 Union, 70, 281
 where, 11, 57
<State> element, 114, 115
Storage property, 204, 206
stored procedures
 DataContext mapping for, 292–293
 mapped, 207–208
 for multiple results, 235–240
 passing parameters to, 234–235
 mapping/calling, 227–240
 returning single result, 227–234
StoredProcedure attribute, 207–208, 227
streaming XML documents, 171–177
 large, 176–177
 XmlReader and, 171
string representation, XName class, 142
strongly typed DataContext, 220–221
SubmitChanges method, 219, 220, 256
Sum operator, 55, 67–68
Suppress value, 269
syntax
 LINQ v. SQL, 36–37
 method, 45–51, 275
 example, 44
 query syntax v., 43–44
 using, 45–51
 query, 43, 45–51, 275
 example, 44
 using, 45–51
 readability, 44
 standard query operators, 33
System.Core namespace, 272
System.Data namespace, 199
System.Data.DataSetExtensions namespace,
 272

System.Data.Linq, 96
System.Reflection namespace, 233
System.Runtime.CompilerServices namespace,
 28
System.Transactions namespace, 267
System.Xml namespace, 12, 95, 199
System.Xml.Linq namespace, 96, 122
System.Xml.Schema, 4
System.Xml.XPath, 4
System.Xml.Xsl, 4

T

Table (of TEntity) class, 302
Table collection, 221
tables, mapping, 203
Take operator, 55, 87
TakeWhile operator, 55, 87–88
TestAnnotation class, 160
TextReader, loading XML from, 108–109
ThenBy operator, 55, 58
ThenByDescending operator, 55, 58–59
ThisKey property, 206
/timeout:timeout, 296
ToArray method, 35
ToArray operator, 75–76
ToDictionary operator, 76
ToList method, 35
ToList operator, 76–77
ToLookup operator, 77
transactions, LINQ to SQL, 267–269
 explicit distributable, 267
 explicit local, 267
 example, 268–269
 illustrations, 267–269
 implicit, 267
TransactionScope class, 267, 269
TransactionScopeOption enumeration, 269
 Required value, 269
 RequiredNew value, 269
 Suppress value, 269
typed DataSets, 278–279
typed XML, 345, 346. *See also* LINQ to XSD
types, LINQ to XML, 167–168. *See also* events,
 LINQ to XML
 XObjectChange, 168

XObjectChangeEventArgs, 168
 XObjectChangeEventHandler, 168

U

UDFs. *See* user-defined functions
Union operator, 70, 281
UPDATE function, 293
UpdateCheck property, 204
 Always value, 264
 concurrency conflicts, 263–264
 Never value, 264
 WhenChanged value, 264
updating data
 entity objects, 226
 LINQ to SQL queries, 224–225
user-defined functions (UDFs), 240–243
 mapping/calling, 240–243
/user:name, 296
using directive, 239, 243
using statements, 107, 147

V

ValidateArtifacts, 343
Value property, 186
var keyword, 13, 22, 39
 IEnumerable<T> interface v., 40–41
ViewGeneration, 343
/views, 296
Visual Basic.NET
 anonymous types, 23
 creating XML trees
 LINQ to XML, 128–129
 embedded expressions and, 182–184
 extension methods, 28
 implicitly typed variables, 22
 LINQ to XML features in, 179–195
 example, 191–194
 object initializers, 25–26
 query expressions, 22
 XML in
 accessing, 185–188
 creating, 179–185
 loading, 188–189
 manipulating, with Parse method, 189–191

Visual Studio (earlier versions)

Visual Studio (earlier versions)

- .NET, 18
- .NET 2003, 18
- 97, 17
- 6.0, 17
- 2005, 18

Visual Studio 2008, 17–30

- download, 21
- history/background, 17–18
- language-specific LINQ features, 21–29
- .NET Framework versions, 20
- new features, 18
- New Project dialog box, 19–20
- start up, 18–19

W

WCF (Windows Communication Foundation),
18

WF (Windows Workflow Foundation), 18

WhenChanged value, 264

where clause, 37

where query operator, 11, 57

whitespace

- LINQ to XML and, 121
- serializing XML trees and, 139, 140, 141
- in XML literals, 184–185

Windows Communication Foundation. See WCF

Windows Forms Control Library, 20, 21

Windows Presentation Foundation. See WPF

Windows Workflow Foundation. See WF

WPF (Windows Presentation Foundation), 18

WriteTo method, 102

X

XAttribute class, 12, 97, 102–104

- example, 13
- methods, 103
- XElement class v., 103

XCDATA class, 97

XComment class, 97

XComment objects, 105

XContainer class, 97

XDeclaration class, 97–98

XDeclaration objects, 104

XDocument class, 97, 104–107

- methods, 106
- objects in, 104–105

XDocumentType class, 97

XDocumentType objects, 104

XElement class, 12, 14, 97, 98–102

- methods, 100, 101–102
- XAttribute class v., 103
- XML document construction, 12–13

XElement objects, 104

XLINQ. See LINQ to XML

XML. See also LINQ to XML

- accessing, in Visual Basic, 185–188
- creating, in Visual Basic, 179–185
- declarations, 97
- document construction
 - XElement, 12–13
- document parsing, 4–5
- limitations, 4–5, 95, 98
- prefixes, 98, 141
- streaming documents, 171–177
 - large, 176–177
- typed, 345, 346. *See also* LINQ to XSD

XML literals, 128, 129, 180–182

- creating XML trees, 128–129
- embedding expressions, 182–184
- embedding queries in, 184, 187
- overview, 180–182
- whitespace in, 184–185

XML namespaces, 141–143

XML trees

- axis methods and, 167
- creating, 123–129
 - C#, 124–128
 - Visual Basic, 128–129
 - XML literals, 128–129
- modifying/reshaping, 137–139
- populating from text, 130–131
 - Load method, 130–131
 - Parse method, 130
- querying, 132–137
- serializing, 139–141
- SQL database to, 145–149
- to SQL server table, 149–152
 - insert, 150
 - update, 151–152

XText class

- XmlDocument**, 4
- XmlReader**, 4, 102, 131
 - LINQ to XML v., 121
 - streaming XML and, 171
- XmlWriter**, 4
- XName class**, 97
 - names, 142
 - string representation, 142
- XNamespace class**, 97
 - namespaces, 97, 142
- XNode class**, 97, 112
 - methods
 - XML manipulation in LINQ to XML, 112–117
- XNodeDocumentOrderComparer class**, 97
- XNodeEqualityComparer class**, 97
- XObject class**, 97
- XObjectChange class**, 97
- XObjectChange type**, 168
- XObjectChangeEventArgs class**, 97
- XObjectChangeEventArgs type**, 168
- XObjectChangeEventHandler**, 97
- XObjectChangeEventHandler type**, 168
- XPath**, 12, 14, 95
- XProcessingInstruction class**, 97
- XProcessingInstruction objects**, 105
- XQuery**, 4, 14
- XSLT**, 4, 14, 95
 - LINQ to XML v., 121
- XText class**, 97