

Contents

Introduction	xvii
Chapter 1: What Is XML?	1
Comparing HTML and XML	2
What Is XML Capable Of?	3
What Is XSL?	3
Creating and Displaying a Simple XML Document	4
Embedding XML in HTML Pages (Data Islands)	7
Introducing the XML Document Object Model	11
XML Browsers and Different Internet Browsers	12
The Document Type Definition	12
XML Syntax	13
Elements	17
Attributes	19
Reserved Characters in XML	24
Ignoring the XML Parser with CDATA	24
What Are XML Namespaces?	24
XML in Many Languages	26
Summary	27
Exercises	27
Chapter 2: The XML Document Object Model	29
Basic XML DOM Structure	30
The Primary XML DOM Classes	32
The Node Class	33
The NodeList Class	34
The NamedNodeMap Class	35
The Document Class	38
The Element Class	42
The Attr Class	44
The Text Class	45
More Obscure XML DOM Classes	47
The parseError Class	47
HTTPRequest Class	50
Other Classes	52

Contents

Generating XML Using ASP	52
Summary	54
Exercises	54
Chapter 3: Extending the Power of XML with XSL	57
What Is XSL?	57
The Roots of XSL	58
Basic XSL Elements Syntax	59
Processing Instruction Elements	60
xsl:processing-instruction	60
xsl:stylesheet	60
xsl:comment	61
xsl:script	61
Transformation Elements	61
xsl:template	61
xsl:apply-templates	64
xsl:call-template	66
Node Creation Elements	66
xsl:element	66
xsl:attribute	67
xsl:copy	67
xsl:copy-of	68
Data Retrieval Elements	69
xsl:value-of	69
xsl:output	70
xsl:text	70
Control Structure Elements	70
xsl:if	70
xsl:for-each	71
xsl:choose, xsl:when and xsl:otherwise	72
xsl:sort	74
xsl:variable	75
xsl:param	75
Advanced XSL Syntax	76
Function Versus Method	76
XSL Function Syntax	77
XSL Method Syntax	81
XSL Pattern Matching Syntax	81
Combining the XML DOM and XSL	82
Summary	84
Exercises	85

Chapter 4: Relational Database Tables and XML	87
Using SQL for Database Access	88
Queries	89
The SELECT Command	89
The WHERE Clause	92
The ORDER BY Clause	100
The GROUP BY Clause	102
The JOIN Clause	104
Subqueries	110
The UNION Clause	115
Changing Data in a Database	119
Subqueries in Database Change Statements	120
What Is a Transaction?	121
Changing Database Objects	121
Generating XML Pages Using Basic SQL	122
Summary	128
Exercises	129
Chapter 5: Oracle Database and XML	131
The Oracle XMLType Data Type	131
Oracle XMLType Data Type Methods	132
Implementing XML in an Oracle Database	134
Creating XML Documents from an Oracle Database	134
The SQL/XML Standard	135
The SYS_XMLGEN Function	146
PL/SQL and XML	151
XML and the Database	153
New XML Documents	153
Retrieving from XML Documents	154
Using XMLType Methods to Read XML Documents	155
Changing and Removing XML Document Content	159
Summary	161
Exercises	162
Chapter 6: SQL Server and XML	165
The SQL Server XML Data Type	166
SQL Server XML Data Type Methods	168
Generating XML: The FOR XML Clause	169
FOR XML RAW Mode	170
FOR XML AUTO Mode	174

Contents

FOR XML EXPLICIT Mode	179
FOR XML PATH Mode	181
Generating Tuples from XML: OPENXML	183
Working with XML Data Types	185
Adding XML Documents to SQL Server	185
Retrieving and Modifying XML Data Types	186
Defining XML Content with XSD Schemas	191
Strongly Typing XML Documents with XSD	191
Mapping an XSD Schema to a Table	192
Annotating the XSD Script to Enforce Relationships	193
Storing XSD as a Schema Collection	195
Creating Indexes on XML Data Types	199
Summary	202
Exercises	202
Chapter 7: XML in Heterogeneous Environments	205
<hr/>	
Basic XML Document Transfer	206
Sharing XML with Web Services	207
The HTTP Protocol	207
Transformation Processing	208
Web Services Protocol	208
Applying Semantics to XML Transfers	209
Simple Object Access Protocol	210
External Data and XML	219
B2B Data Transfer	220
Summary	222
Exercises	222
Chapter 8: Understanding XML Documents as Objects	225
<hr/>	
Why Explain the Object Model Here?	225
XML Data as a Relational Structure	226
The Basics of the Object Data Model	230
Creating an Object Model from a Relational Model	232
XML Data as an Object Structure	235
Summary	242
Exercises	242

Chapter 9: What Is a Native XML Database?	245
An XML Document Is a Database	246
Defining a Native XML Database	248
Creating a Native XML Database	248
Schema-Less Native XML Database Collections	252
What Is Indexing?	256
Indexing a Native XML Database	258
What About Using XSL and the XML DOM?	259
Classify Native XML Databases by Content	260
Document-Centric XML	260
Data-Centric XML	260
Using a Native XML Database	261
Summary	262
Exercises	262
Chapter 10: Navigating XML Documents Using XPath	265
What Is XPath?	265
Absolute and Relative Paths	266
XPath Nodes	266
XPath Node Relationships	267
XPath Expression Syntax	268
Simple Expressions to Find Nodes	272
Find Specific Values Using Predicates	274
XPath Operators	275
Use Wildcards to Find Unknown Nodes	277
Expressions on Multiple Paths	278
XPath Axes	279
XPath Functions	281
Accessor Functions	282
Errors and Tracing	283
Constructor Functions	283
Numeric Functions	284
String Functions	285
URI Functions	285
Boolean Functions	286
Boolean Operators	286
Functions on Durations, Dates, and Times	286
QName Functions	287

Contents

Node Functions	288
Sequence Functions	288
Context Functions	289
Summary	293
Exercises	293
Chapter 11: Reading XML Documents Using XQuery	295
What Is XQuery?	296
Shared Components	296
The Basics of XQuery	296
Executing XQuery Queries	296
Using Saxon	297
Embedding XQuery Code into HTML	299
XQuery Terminology	302
XQuery Syntax	303
Functions in XQuery	303
XQuery FLWOR	304
FLWOR: The Basic for Loop and Return Clause	304
FLWOR: Adding a where Clause	306
FLWOR: Adding an Order By Clause	307
FLWOR: Declaring Variables with the Let Clause	308
FLWOR: Embedded for Loops and Communication	309
XQuery in Oracle XML DB	311
What Is XQueryX?	312
Summary	313
Exercises	314
Chapter 12: Some Advanced XML Standards	315
XLink and XPointer	316
What Is XLink?	316
Simple XLinks	316
Some More Advanced XLink Attributes	320
Extended XLinks	322
What Is XPointer?	333
XForms and HTML Form Generation	339
The XForms Model	339
XForms Namespaces	340
Other XForms Input Types	342
Data Types in XForms	342
Restricting Values with XForms Properties	343
XForms Object Actions	344

Built-in and User-Defined Functions	345
Binding Data Using XPath	346
Embedding XML Documents with XInclude	348
Formatting XML Output Using XML-FO	348
Summary	348
Exercises	349
Chapter 13: Data Modeling and XML	351
<hr/>	
The Document Type Definition	352
DTD Elements	354
DTD Element Categories	354
DTD Element Content	355
DTD Element Cardinality	357
DTD Attributes	360
Attribute Types	361
Attribute Defaults	362
DTD Entities	364
Built-In Entities and ASCII Code Character Entities	364
Custom and Parameter Entities	365
The XML Schema Definition	370
Global and Local Types	370
Basic XSD Structures	371
XML Schema Data Types	371
Cardinality	373
Element Ordering Sequence and Choice	374
Custom Data Types	375
Substitution	379
Summary	380
Exercises	380
Chapter 14: Applying XML Databases in Industry	381
<hr/>	
What Can XML Do?	381
Managing Complex Data with XML	382
Does Database Size Matter?	382
Are Schema Changes Easier with XML?	383
Native XML Databases	384
Specific XML Vocabularies	386
XML Vocabularies	386
Commercial Implementation of XML	392
When to Use a Native XML Database	394
Summary	396

Contents

Glossary **397**

Appendix A: Exercise Answers **419**

Appendix B: The Sample Database **427**

Appendix C: Syntax Conventions **431**

Appendix D: XML Technology **433**

Appendix E: XML Relational Database Technology **435**

Index **445**