

Pro ASP.NET 3.5 in C# 2008

Second Edition



Matthew MacDonald and Mario Szpuszta

Pro ASP.NET 3.5 in C# 2008, Second Edition

Copyright © 2007 by Matthew MacDonald and Mario Szpuszta

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system, without the prior written permission of the copyright owner and the publisher.

ISBN-13 (pbk): 978-1-59059-893-1

ISBN-10 (pbk): 1-59059-893-8

Printed and bound in the United States of America 9 8 7 6 5 4 3 2 1

Trademarked names may appear in this book. Rather than use a trademark symbol with every occurrence of a trademarked name, we use the names only in an editorial fashion and to the benefit of the trademark owner, with no intention of infringement of the trademark.

Lead Editor: Jonathan Hassell

Technical Reviewer: Andy Olsen

Editorial Board: Steve Anglin, Ewan Buckingham, Tony Campbell, Gary Cornell, Jonathan Gennick, Jason Gilmore, Kevin Goff, Jonathan Hassell, Matthew Moodie, Joseph Ottinger, Jeffrey Pepper, Ben Renow-Clarke, Dominic Shakeshaft, Matt Wade, Tom Welsh

Project Manager: Denise S. Lincoln

Copy Editors: Ami Knox, Damon Larson, Susannah Pfalzer

Associate Production Director: Kari Brooks-Copony

Production Editor: Katie Stence

Compositor: Pat Christenson

Proofreaders: Lisa Hamilton and Linda Seifert

Indexer: Broccoli Information Management

Artist: April Milne

Cover Designer: Kurt Krames

Manufacturing Director: Tom Debolski

Distributed to the book trade worldwide by Springer-Verlag New York, Inc., 233 Spring Street, 6th Floor, New York, NY 10013. Phone 1-800-SPRINGER, fax 201-348-4505, e-mail orders-ny@springer-sbm.com, or visit <http://www.springeronline.com>.

For information on translations, please contact Apress directly at 2855 Telegraph Avenue, Suite 600, Berkeley, CA 94705. Phone 510-549-5930, fax 510-549-5939, e-mail info@apress.com, or visit <http://www.apress.com>.

The information in this book is distributed on an “as is” basis, without warranty. Although every precaution has been taken in the preparation of this work, neither the author(s) nor Apress shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information contained in this work.

The source code for this book is available to readers at <http://www.apress.com>.

Contents at a Glance

About the Authors	xxix
About the Technical Reviewer	xxxi
Introduction	xxxiii

PART 1 ■■■ Core Concepts

■ CHAPTER 1	Introducing ASP.NET	3
■ CHAPTER 2	Visual Studio	23
■ CHAPTER 3	Web Forms	71
■ CHAPTER 4	Server Controls	115
■ CHAPTER 5	ASP.NET Applications	167
■ CHAPTER 6	State Management	219

PART 2 ■■■ Data Access

■ CHAPTER 7	ADO.NET Fundamentals	259
■ CHAPTER 8	Data Components and the DataSet	299
■ CHAPTER 9	Data Binding	341
■ CHAPTER 10	Rich Data Controls	385
■ CHAPTER 11	Caching and Asynchronous Pages	451
■ CHAPTER 12	Files and Streams	497
■ CHAPTER 13	LINQ	531
■ CHAPTER 14	XML	587

PART 3 ■■■ Building ASP.NET Websites

■ CHAPTER 15	User Controls	645
■ CHAPTER 16	Themes and Master Pages	665
■ CHAPTER 17	Website Navigation	695
■ CHAPTER 18	Website Deployment	745

PART 4 ■■■ Security

■ CHAPTER 19	The ASP.NET Security Model	827
■ CHAPTER 20	Forms Authentication	859
■ CHAPTER 21	Membership	885
■ CHAPTER 22	Windows Authentication	939
■ CHAPTER 23	Authorization and Roles	975
■ CHAPTER 24	Profiles	1009
■ CHAPTER 25	Cryptography	1041
■ CHAPTER 26	Custom Membership Providers	1071

PART 5 ■■■ Advanced User Interface

■ CHAPTER 27	Custom Server Controls	1109
■ CHAPTER 28	Design-Time Support	1151
■ CHAPTER 29	Dynamic Graphics and GDI+	1183
■ CHAPTER 30	Portals with Web Part Pages	1215

PART 6 ■■■ Client-Side Programming

■ CHAPTER 31	JavaScript and Ajax Techniques	1273
■ CHAPTER 32	ASP.NET AJAX	1323
■ CHAPTER 33	Silverlight	1379
■ INDEX		1441

Contents

About the Authors	xxix
About the Technical Reviewer	xxxix
Introduction	xxxiii

PART 1 ■■■ Core Concepts

■ CHAPTER 1	Introducing ASP.NET	3
	The Evolution of Web Development	3
	The Early Web Development World	4
	What's Wrong with Classic ASP?	4
	ASP.NET	6
	Seven Important Facts About ASP.NET	6
	Fact 1: ASP.NET Is Integrated with the .NET Framework	7
	Fact 2: ASP.NET Is Compiled, Not Interpreted	7
	Fact 3: ASP.NET Is Multilanguage	9
	Fact 4: ASP.NET Is Hosted by the Common Language Runtime	11
	Fact 5: ASP.NET Is Object-Oriented	13
	Fact 6: ASP.NET Is Multidevice and Multibrowser	14
	Fact 7: ASP.NET Is Easy to Deploy and Configure	15
	ASP.NET 3.5: The Story Continues	15
	ASP.NET 2.0	16
	ASP.NET 3.5	17
	Silverlight	20
	Summary	21
■ CHAPTER 2	Visual Studio	23
	The .NET Development Model	24
	The Compiler	24
	The Visual Studio IDE	25
	Websites and Web Projects	26
	Creating a Projectless Website	26
	Multitargeting	29
	Designing a Web Page	30

The Visual Studio IDE	36
Solution Explorer	38
Document Window	39
Toolbox	39
Error List and Task List	40
Server Explorer	42
The Code Editor	42
Adding Assembly References	43
IntelliSense and Outlining	46
The Code Model	48
How Code-Behind Files Are Connected to Pages	51
How Control Tags Are Connected to Page Variables	52
How Events Are Connected to Event Handlers	53
Web Projects	55
Creating a Web Project	56
Migrating a Website from a Previous Version of Visual Studio	58
Visual Studio Debugging	59
Single-Step Debugging	60
Variable Watches	63
Advanced Breakpoints	64
Visual Studio Macros	65
The Web Development Helper	67
Summary	69

CHAPTER 3	Web Forms	71
	Page Processing	71
	HTML Forms	72
	Dynamic User Interface	73
	The ASP.NET Event Model	74
	Automatic Postbacks	75
	View State	77
	XHTML Compliance	82
	Web Forms Processing Stages	86
	Page Framework Initialization	87
	User Code Initialization	88
	Validation	88
	Event Handling	89
	Automatic Data Binding	89
	Cleanup	90
	A Page Flow Example	90
	The Page As a Control Container	92
	Showing the Control Tree	93
	The Page Header	97
	Dynamic Control Creation	98

The Page Class	99
Session, Application, and Cache	100
Request	100
Response	102
Server	104
User	107
Trace	107
Accessing the HTTP Context in Another Class	113
Summary	114

CHAPTER 4 **Server Controls** 115

Types of Server Controls	115
The Server Control Hierarchy	116
HTML Server Controls	118
The HtmlControl Class	119
The HtmlContainerControl Class	119
The HtmlInputControl Class	119
The HTML Server Control Classes	120
Setting Style Attributes and Other Properties	122
Programmatically Creating Server Controls	123
Handling Server-Side Events	125
Web Controls	127
The WebControl Base Class	129
Basic Web Control Classes	130
Units	132
Enumerations	132
Colors	133
Fonts	133
Focus	135
The Default Button	136
Scrollable Panels	137
Handling Web Control Events	137
The List Controls	140
The Selectable List Controls	142
The BulletedList Control	144
Input Validation Controls	146
The Validation Controls	146
The Validation Process	147
The BaseValidator Class	148
The RequiredFieldValidator Control	150
The RangeValidator Control	150
The CompareValidator Control	151
The RegularExpressionValidator Control	151

The CustomValidator Control	154
The ValidationSummary Control	156
Using the Validators Programmatically	157
Validation Groups	158
Rich Controls	160
The AdRotator Control	161
The Calendar Control	163
Summary	165

■ CHAPTER 5 **ASP.NET Applications** 167

Anatomy of an ASP.NET Application	167
The Application Domain	168
Application Lifetime	169
Application Updates	169
Application Directory Structure	170
The global.asax Application File	171
Application Events	173
Demonstrating Application Events	175
ASP.NET Configuration	176
The machine.config File	176
The web.config File	179
<system.web> Settings	183
Reading and Writing Configuration Sections Programmatically	187
The Website Administration Tool (WAT)	190
Extending the Configuration File Structure	192
Encrypting Configuration Sections	196
.NET Components	198
Creating a Component	199
Using a Component Through the App_Code Directory	200
Using a Component Through the Bin Directory	201
Extending the HTTP Pipeline	203
HTTP Handlers and HTTP Modules	204
Creating a Custom HTTP Handler	206
Configuring a Custom HTTP Handler	207
Registering HTTP Handlers Without Configuring IIS	208
Creating an Advanced HTTP Handler	210
Creating an HTTP Handler for Non-HTML Content	212
Creating a Custom HTTP Module	215
Summary	218

CHAPTER 6	State Management	219
	ASP.NET State Management	219
	View State	222
	A View State Example	223
	Storing Objects in View State	224
	Retaining Member Variables	227
	Assessing View State	228
	View State Security	230
	Transferring Information Between Pages	231
	The Query String	231
	Cross-Page Posting	233
	Cookies	240
	Session State	241
	Session Architecture	241
	Using Session State	243
	Configuring Session State	244
	Securing Session State	250
	Application State	251
	Static Application Variables	253
	Summary	255

PART 2 ■■■ Data Access

CHAPTER 7	ADO.NET Fundamentals	259
	The ADO.NET Architecture	260
	ADO.NET Data Providers	260
	Standardization in ADO.NET	262
	SQL Server 2005	263
	Fundamental ADO.NET Classes	263
	The Connection Class	265
	Connection Strings	265
	Testing a Connection	266
	Connection Pooling	268
	Connection Statistics	270
	The Command and DataReader Classes	270
	Command Basics	271
	The DataReader Class	272
	The ExecuteReader() Method and the DataReader	273
	The ExecuteScalar() Method	278

The ExecuteNonQuery() Method	279
SQL Injection Attacks	279
Using Parameterized Commands	282
Calling Stored Procedures	284
Transactions	286
Transactions and ASP.NET Applications	287
Isolation Levels	291
Savepoints	293
Provider-Agnostic Code	294
Creating the Factory	294
Create Objects with Factory	295
A Query with Provider-Agnostic Code	296
Summary	297

■ CHAPTER 8 **Data Components and the DataSet** 299

Building a Data Access Component	299
The Data Package	300
The Stored Procedures	302
The Data Utility Class	303
Testing the Database Component	309
Disconnected Data	311
Web Applications and the DataSet	312
XML Integration	313
The DataSet	313
The DataAdapter Class	315
Filling a DataSet	316
Working with Multiple Tables and Relationships	317
Searching for Specific Rows	321
Using the DataSet in a Data Access Class	322
Data Binding	323
The DataView Class	323
Sorting with a DataView	324
Filtering with a DataView	325
Advanced Filtering with Relationships	327
Calculated Columns	328
Typed DataSets	330
Custom TableAdapters	331
Creating a Typed DataSet	332
Dissecting the Typed DataSet	334
Using the Typed DataSet	337
Summary	339

CHAPTER 9	Data Binding	341
	Basic Data Binding	341
	Single-Value Binding	342
	Other Types of Expressions	344
	Repeated-Value Binding	348
	Data Source Controls	355
	The Page Life Cycle with Data Binding	356
	The SqlDataSource	357
	Selecting Records	357
	Parameterized Commands	360
	Handling Errors	364
	Updating Records	365
	Deleting Records	369
	Inserting Records	370
	Disadvantages of the SqlDataSource	370
	The ObjectDataSource	371
	Selecting Records	372
	Updating Records	377
	Updating with a Data Object	377
	The Limits of the Data Source Controls	381
	The Problem	381
	Adding the Extra Items	382
	Handling the Extra Options with the SqlDataSource	383
	Handling the Extra Options with the ObjectDataSource	384
	Summary	384
CHAPTER 10	Rich Data Controls	385
	The GridView	386
	Defining Columns	386
	Formatting the GridView	390
	Formatting Fields	390
	Styles	392
	Formatting-Specific Values	395
	GridView Row Selection	397
	Using Selection to Create a Master-Details Form	398
	The SelectedIndexChanged Event	400
	Using a Data Field As a Select Button	401
	Sorting the GridView	401
	Sorting with the SqlDataSource	402
	Sorting with the ObjectDataSource	402
	Sorting and Selection	404
	Advanced Sorting	405

Paging the GridView	406
Automatic Paging	407
Custom Pagination with the ObjectDataSource	408
Customizing the Pager Bar	411
GridView Templates	412
Using Multiple Templates	414
Editing Templates in Visual Studio	415
Binding to a Method	416
Handling Events in a Template	417
Editing with a Template	418
The ListView	423
Grouping	426
Paging	428
The DetailsView and FormView	429
The DetailsView	429
The FormView	432
Advanced Grids	433
Summaries in the GridView	434
A Parent/Child View in a Single Table	435
Editing a Field Using a Lookup Table	438
Serving Images from a Database	440
Detecting Concurrency Conflicts	445
Summary	450

■ CHAPTER 11 Caching and Asynchronous Pages 451

Understanding ASP.NET Caching	451
Output Caching	452
Declarative Output Caching	452
Caching and the Query String	453
Caching with Specific Query String Parameters	454
Custom Caching Control	455
Caching with the HttpCachePolicy Class	456
Post-Cache Substitution and Fragment Caching	457
Cache Profiles	459
Cache Configuration	460
Data Caching	461
Adding Items to the Cache	462
A Simple Cache Test	464
Cache Priorities	465
Caching with the Data Source Controls	466
Cache Dependencies	469
File and Cache Item Dependencies	469
Aggregate Dependencies	470

The Item Removed Callback	471
Understanding SQL Cache Notifications	473
Cache Notifications in SQL Server 2000 and SQL Server 7	474
Cache Notifications in SQL Server 2005 and SQL Server 2008	479
Custom Cache Dependencies	481
A Basic Custom Cache Dependency	482
A Custom Cache Dependency Using Message Queues	483
Asynchronous Pages	485
Creating an Asynchronous Page	486
Querying Data in an Asynchronous Page	488
Handling Errors	490
Using Caching with Asynchronous Tasks	492
Multiple Asynchronous Tasks and Timeouts	495
Summary	496
CHAPTER 12 Files and Streams	497
Working with the File System	497
The Directory and File Classes	498
The DirectoryInfo and FileInfo Classes	500
The DriveInfo Class	503
Working with Attributes	504
Filter Files with Wildcards	506
Retrieving File Version Information	506
The Path Class	507
A File Browser	510
Reading and Writing Files with Streams	514
Text Files	516
Binary Files	517
Uploading Files	518
Making Files Safe for Multiple Users	520
Compression	525
Serialization	526
Summary	529
CHAPTER 13 LINQ	531
LINQ Basics	531
Deferred Execution	533
How LINQ Works	534
LINQ Expressions	534
LINQ Expressions “Under the Hood”	541
LINQ to DataSet	544
Typed DataSets	546
Null Values	547

LINQ to SQL	547
Data Entity Classes	548
The DataContext	550
LINQ to SQL Queries “Under the Hood”	551
LINQ to SQL and Database Components	554
Selecting a Single Record or Value	556
Generating Data Classes Automatically	557
Relationships	563
Generating Methods for Stored Procedures	571
Committing Changes	573
The LinqDataSource	578
Displaying Data	579
Getting Related Data	582
Editing Data	583
Validation	583
Summary	586
 CHAPTER 14 XML	 587
When Does Using XML Make Sense?	587
An Introduction to XML	588
The Advantages of XML	589
Well-Formed XML	590
XML Namespaces	590
XML Schemas	592
Stream-Based XML Processing	594
Writing XML Files	594
Reading XML Files	597
In-Memory XML Processing	600
The XmlDocument	601
The XPathNavigator	605
The XDocument	607
Searching XML Content	612
Searching with XmlDocument	612
Searching XmlDocument with XPath	615
Searching XDocument with LINQ	617
Validating XML Content	619
A Basic Schema	619
Validating with XmlDocument	619
Validating with XDocument	621
Transforming XML Content	622
A Basic Stylesheet	622
Using XslCompiledTransform	623

Using the Xml Control	625
Transforming XML with LINQ to XML	625
XML Data Binding	627
Nonhierarchical Binding	627
Using XPath	629
Nested Grids	632
Hierarchical Binding with the TreeView	633
Using XSLT	635
Binding to XML Content from Other Sources	637
Updating XML Through the XmlDataSource	637
XML and the ADO.NET DataSet	638
Converting the DataSet to XML	639
Accessing a DataSet As XML	640
Summary	642

PART 3 ■■■ Building ASP.NET Websites

■ CHAPTER 15 User Controls	645
User Control Basics	645
Creating a Simple User Control	646
Converting a Page to a User Control	647
Adding Code to a User Control	648
Handling Events	648
Adding Properties	649
Using Custom Objects	651
Adding Events	654
Exposing the Inner Web Control	657
Dynamically Loading User Controls	657
Portal Frameworks	658
Partial Page Caching	661
VaryByControl	662
Sharing Cached Controls	663
Summary	663
■ CHAPTER 16 Themes and Master Pages	665
Cascading Style Sheets	665
Creating a Stylesheet	665
Applying Stylesheet Rules	668

Themes	670
Theme Folders and Skins	671
Applying a Simple Theme	672
Handling Theme Conflicts	673
Creating Multiple Skins for the Same Control	674
Skins with Templates and Images	675
Using CSS in a Theme	677
Applying Themes Through a Configuration File	677
Applying Themes Dynamically	678
Standardizing Website Layout.	680
Master Page Basics	680
A Simple Master Page	681
A Simple Content Page	683
Default Content.	684
Master Pages with Tables and CSS Layout.	685
Master Pages and Relative Paths	687
Applying Master Pages Through a Configuration File.	688
Advanced Master Pages	689
Interacting with the Master Page Class	689
Dynamically Setting a Master Page	690
Nesting Master Pages	691
Summary.	693

■ CHAPTER 17 Website Navigation 695

Pages with Multiple Views.	695
The MultiView Control	696
The Wizard Control.	700
Site Maps	707
Defining a Site Map	708
Binding to a Site Map.	710
Breadcrumbs	711
Showing a Portion of the Site Map.	713
The Site Map Objects.	716
Adding Custom Site Map Information.	718
Creating a Custom SiteMapProvider.	718
URL Mapping.	725
Security Trimming	726
The TreeView Control.	728
The TreeNode	729
Populating Nodes on Demand.	731
TreeView Styles	733

The Menu Control	737
Menu Styles	740
Menu Templates	741
Summary	743

■ CHAPTER 18 Website Deployment 745

Internet Information Services (IIS)	745
IIS Websites and Virtual Directories	746
IIS Management Console and IIS Configuration	747
Mapping Websites, Virtual Directories, and Files to URLs	748
Diving into the Architecture of IIS	750
Installing IIS	765
Managing Websites	771
Managing Virtual Directories and Websites with IIS 5.x and IIS 6.0	772
Managing Application Pools in IIS 6.0	778
Managing Virtual Directories and Websites with IIS 7.0	784
Managing Application Pools in IIS 7.0	796
Deploying Your ASP.NET Applications	798
Verifying the ASP.NET Installation on IIS 5.x and IIS 6.0	800
ASP.NET Side-By-Side Execution on IIS 5.x and IIS 6.0	801
ASP.NET Side-By-Side Execution on IIS 7.0	803
Configuring HTTP Runtime Settings when Deploying on IIS 5.x	803
Compilation Models in ASP.NET	804
Deploying with Visual Studio	808
Visual Studio 2005 Web Deployment Projects	809
The VirtualPathProvider in ASP.NET	815
Health Monitoring in ASP.NET	819
Understanding the Basic Structure	820
Events and Providers	820
Summary	823

PART 4 ■■■ Security

■ CHAPTER 19 The ASP.NET Security Model 827

What It Means to Create Secure Software	827
Understanding Potential Threats	828
Secure Coding Guidelines	828
Understanding Gatekeepers	829
Understanding the Levels of Security	830
Authentication	831
Authorization	832

Confidentiality and Integrity	833
Pulling It All Together	833
Internet Information Services Security	835
Authentication and Authorization on IIS 5.x and IIS 6.0	835
Security Configuration on IIS 7.0	838
Understanding Secure Sockets Layer	843
ASP.NET Security Architecture	852
Authentication	853
Authorization	855
The Security Context	855
Membership and Roles APIs	857
Summary	858

■ CHAPTER 20 Forms Authentication 859

Introducing Forms Authentication	859
Why Use Forms Authentication?	860
Why Would You Not Use Forms Authentication?	862
Why Not Implement Cookie Authentication Yourself?	863
The Forms Authentication Classes	864
Implementing Forms Authentication	865
Configuring Forms Authentication	865
Denying Access to Anonymous Users	869
Creating a Custom Login Page	869
Custom Credentials Store	876
Persistent Cookies in Forms Authentication	877
IIS 7.0 and Forms Authentication	878
Summary	884

■ CHAPTER 21 Membership 885

Introducing the ASP.NET Membership API	885
Using the Membership API	888
Configuring Forms Authentication	889
Creating the Data Store	890
Configuring Connection String and Membership Provider	896
Creating and Authenticating Users	900
Using the Security Controls	902
The Login Control	904
The LoginStatus Control	914
The LoginView Control	915
The PasswordRecovery Control	916
The ChangePassword Control	921
The CreateUserWizard Control	922

Configuring Membership in IIS 7.0	926
Configuring Providers and Users	926
Using the Membership API with Other Applications	928
Using the Membership Class	930
Retrieving Users from the Store	930
Updating Users in the Store	933
Creating and Deleting Users	933
Validating Users	934
Using Membership in Windows Forms	935
Summary	937
 CHAPTER 22 Windows Authentication	 939
Introducing Windows Authentication	939
Why Use Windows Authentication?	940
Why Would You Not Use Windows Authentication?	941
Mechanisms for Windows Authentication	942
Implementing Windows Authentication	948
Configuring IIS 5.x or IIS 6.0	948
Configuring IIS 7.0	950
Configuring ASP.NET	952
Denying Access to Anonymous Users	955
Accessing Windows User Information	957
Impersonation	962
Impersonation in Windows 2000	963
Impersonation on Windows XP	964
Impersonation and Delegation on Windows Server 2003	964
Impersonation on Windows Vista	967
Impersonation and Delegation on Windows Server 2008	968
Configured Impersonation	968
Programmatic Impersonation	970
Summary	973
 CHAPTER 23 Authorization and Roles	 975
URL Authorization	975
Authorization Rules	976
File Authorization	981
Authorization Checks in Code	982
Using the <code>IsInRole()</code> Method	982
Using the <code>PrincipalPermission</code> Class	983
Using the Roles API for Role-Based Authorization	985
Using the <code>LoginView</code> Control with Roles	991
Accessing Roles Programmatically	992
Using the Roles API with Windows Authentication	994

Protecting Non-ASP.NET Resources in IIS 5 and 6	997
Adding a File Type Mapping	997
Writing a Custom HTTP Handler	998
Authorization and Roles in IIS 7.0	1000
Authorization with ASP.NET Roles in IIS 7.0	1002
Managing ASP.NET Roles with IIS 7.0	1005
Summary	1006

■ CHAPTER 24 Profiles

Understanding Profiles	1009
Profile Performance	1009
How Profiles Store Data	1010
Profiles and Authentication	1011
Profiles vs. Custom Data Components	1011
Using the SqlProfileProvider	1012
Creating the Profile Tables	1012
Configuring the Provider	1015
Defining Profile Properties	1016
Using Profile Properties	1017
Profile Serialization	1018
Profile Groups	1020
Profiles and Custom Data Types	1021
The Profiles API	1024
Anonymous Profiles	1026
Custom Profile Providers	1029
The Custom Profile Provider Classes	1029
Designing the FactoredProfileProvider	1031
Coding the FactoredProfileProvider	1033
Testing the FactoredProfileProvider	1037
Summary	1040

■ CHAPTER 25 Cryptography

Encrypting Data: Confidentiality Matters	1041
The .NET Cryptography Namespace	1042
Understanding the .NET Cryptography Classes	1046
Symmetric Encryption Algorithms	1047
Asymmetric Encryption	1048
The Abstract Encryption Classes	1049
The ICryptoTransform Interface	1050
The CryptoStream Class	1050

Encrypting Sensitive Data	1051
Managing Secrets	1052
Using Symmetric Algorithms	1053
Using Asymmetric Algorithms	1058
Encrypting Sensitive Data in a Database	1061
Encrypting the Query String	1065
Wrapping the Query String	1066
Creating a Test Page	1069
Summary	1070

CHAPTER 26 Custom Membership Providers

1071

Architecture of Custom Providers	1071
Basic Steps for Creating Custom Providers	1073
Overall Design of the Custom Provider	1073
Designing and Implementing the Custom Store	1074
Implementing the Provider Classes	1082
Using the Custom Provider Classes	1102
Summary	1106

PART 5 ■■■ Advanced User Interface

CHAPTER 27 Custom Server Controls

1109

Custom Server Control Basics	1109
Creating a Bare-Bones Custom Control	1110
Using a Custom Control	1112
Custom Controls in the Toolbox	1113
Creating a Web Control That Supports Style Properties	1114
The Rendering Process	1118
Dealing with Different Browsers	1119
The HtmlTextWriter	1119
Browser Detection	1120
Browser Properties	1122
Overriding Browser Type Detection	1124
Adaptive Rendering	1125
Control State and Events	1127
View State	1127
Control State	1129
Postback Data and Change Events	1131
Triggering a Postback	1133
Extending Existing Web Controls	1135
Composite Controls	1135
End SidebarDerived Controls	1138

Template Controls	1141
Creating a Template Control	1141
Using Customized Templates	1143
Styles	1148
Summary	1150

■ CHAPTER 28 Design-Time Support

The Key Players	1151
Design-Time Attributes	1152
The Properties Window	1153
Attributes and Inheritance	1157
The Toolbox Icon	1158
Web Resources	1159
Creating a Resource	1159
Retrieving a Resource	1160
Text Substitution	1161
Code Serialization	1162
Type Converters	1162
Serialization Attributes	1170
Type Editors	1172
Control Designers	1174
Design-Time HTML	1175
Smart Tags	1177
Summary	1182

■ CHAPTER 29 Dynamic Graphics and GDI+

The ImageMap Control	1183
Creating Hotspots	1184
Handling Hotspot Clicks	1185
A Custom Hotspot	1186
Drawing with GDI+	1188
Simple Drawing	1189
Image Format and Quality	1191
The Graphics Class	1192
Using a GraphicsPath	1194
Pens	1195
Brushes	1198
Embedding Dynamic Graphics in a Web Page	1199
Using the PNG Format	1200
Passing Information to Dynamic Images	1201
Custom Controls That Use GDI+	1204
Charting with GDI+	1208
Summary	1213

CHAPTER 30 Portals with Web Part Pages	1215
Typical Portal Pages	1216
Basic Web Part Pages	1217
Creating the Page Design	1218
WebPartManager and WebPartZone Controls	1219
Adding Web Parts to the Page	1221
Customizing the Page	1224
Creating Web Parts	1226
Simple Web Part Tasks	1227
Developing Advanced Web Parts	1235
Web Part Editors	1244
Connecting Web Parts	1250
Custom Verbs and Web Parts	1258
User Controls and Advanced Web Parts	1259
Uploading Web Parts Dynamically	1262
Authorizing Web Parts	1268
Final Tasks for Personalization	1268
Summary	1269

PART 6 ■■■ Client-Side Programming

CHAPTER 31 JavaScript and Ajax Techniques	1273
JavaScript Essentials	1273
The HTML Document Object Model	1274
Client-Side Events	1275
Script Blocks	1277
Manipulating HTML Elements	1279
Debugging JavaScript	1280
Basic JavaScript Examples	1282
Creating a JavaScript Page Processor	1282
Using JavaScript to Download Images Asynchronously	1285
Rendering Script Blocks	1290
Script Injection Attacks	1291
Request Validation	1291
Disabling Request Validation	1292
Custom Controls with JavaScript	1294
Pop-Up Windows	1294
Rollover Buttons	1298
Frames	1301
Frame Navigation	1302
Inline Frames	1303

Understanding Ajax	1304
The XMLHttpRequest Object	1305
An Ajax Example	1307
Using Ajax with Client Callbacks	1311
Creating a Client Callback	1311
Client Callbacks “Under the Hood”	1317
Client Callbacks in Custom Controls	1318
Summary	1322

■ CHAPTER 32 ASP.NET AJAX 1323

Introducing ASP.NET AJAX	1323
ASP.NET AJAX on the Client: The Script Libraries	1325
ASP.NET AJAX on the Server: The ScriptManager	1325
Server Callbacks	1326
Web Services in ASP.NET AJAX	1327
The Web Service Proxy	1334
Placing a Web Method in a Page	1336
ASP.NET AJAX Application Services	1337
ASP.NET AJAX Server Controls	1344
Partial Rendering with the UpdatePanel	1344
Timed Refreshes with the Timer	1351
Time-Consuming Updates with UpdateProgress	1352
Deeper into the Client Libraries	1355
Understanding the Client Model	1356
Object-Oriented Programming in JavaScript	1357
The Web-Page Framework	1364
Control Extenders	1369
Installing the ASP.NET AJAX Control Toolkit	1370
The AutoCompleteExtender	1371
The ASP.NET AJAX Control Toolkit	1374
Summary	1378

■ CHAPTER 33 Silverlight 1379

Understanding Silverlight	1379
Silverlight vs. Flash	1380
Silverlight Adoption	1382
Silverlight and WPF	1382
Installing Silverlight and the Visual Studio Extensions	1383
Creating a Silverlight Project	1384
The HTML Entry Page	1385
The Silverlight Initialization Script	1386
The XAML Page	1388
The XAML Code-Behind	1391

Properties and Events	1392
Silverlight Compilation	1393
Silverlight Essentials	1394
.NET Framework Classes in Silverlight	1395
The Canvas	1396
Text	1401
Interacting with HTML	1402
Isolated Storage	1406
Silverlight and ASP.NET	1408
ASP.NET Futures	1408
Communicating Between Silverlight and ASP.NET	1412
Drawing in 2D	1412
Simple Shapes	1413
Paths and Geometries	1417
Brushes	1425
Transparency	1427
Animation	1429
Animation Basics	1430
Defining an Animation	1430
An Interactive Animation Example	1434
Transforms	1437
Summary	1440

INDEX	1441
-------------	------