

Pro ASP.NET 3.5 in C# 2008

Second Edition



Matthew MacDonald and Mario Szpuszta

Apress®

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	xxxi
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 IsInRole() Method.....	982
Using the PrincipalPermission Class	983
Using the Roles API for Role-Based Authorization	985
Using the LoginView 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	1009
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	1041
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	1151
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+	1183
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