

Contents

Introduction	xxxi
Chapter 1: Visual Basic 2008 Core Elements	1
Initial Keywords and Syntax	2
Console Applications	5
Value and Reference Types	8
Primitive Types	10
Commands: Conditional	11
If Then	12
Comparison Operators	12
Select Case	14
Value Types (Structures)	15
Boolean	15
Integer Types	16
Unsigned Types	17
Decimal Types	18
Char and Byte	20
DateTime	21
Reference Types (Classes)	21
The Object Class	21
The String Class	22
The DBNull Class and IsDBNull Function	25
Nullable Types	26
Arrays	27
Collections	30
Commands: Looping Statements	32
For Each and For Next	32
While, Do While, and Do Until	33
Boxing	34
Parameter Passing	35
ParamArray	36
Variable Scope	37
Data Type Conversions	38
Implicit Conversions and Compiler Options	39

Contents

XML Literals	42
Performing Explicit Conversions	44
Summary	47
Chapter 2: Object Syntax Introduction	49
Object-Oriented Terminology	50
Objects, Classes, and Instances	50
Composition of an Object	50
Working with Objects	54
Object Declaration and Instantiation	54
Object References	55
Dereferencing Objects	56
Early Binding versus Late Binding	56
Creating Classes	60
Basic Classes	60
Constructor Methods	79
Termination and Cleanup	80
Advanced Concepts	81
Overloading Methods	81
Overloading Constructor Methods	84
Shared Methods, Variables, and Events	85
Operator Overloading	90
Delegates	93
Classes versus Components	98
Summary	99
Chapter 3: Object-Oriented Programming	101
Inheritance	102
Implementing Inheritance	104
Preventing Inheritance	151
Multiple Interfaces	151
Object Interfaces	151
Secondary Interfaces	152
Abstraction	159
Encapsulation	162
Polymorphism	165
Method Signatures	165
Implementing Polymorphism	165
Inheritance	176
When to Use Inheritance	176
Inheritance and Multiple Interfaces	180

Contents

How Deep to Go?	186
The Fragile Base Class Problem	187
Summary	190
<hr/>	
Chapter 4: The Common Language	193
<hr/>	
Elements of a .NET Application	194
Modules	194
Assemblies	195
Types	196
Versioning and Deployment	197
Better Support for Versioning	197
Better Deployment	198
Cross-Language Integration	199
The Common Type System	199
Metadata	200
Better Support for Metadata	201
Attributes	201
The Reflection API	204
IL Disassembler	204
Memory Management	205
Traditional Garbage Collection	206
Faster Memory Allocation for Objects	213
Garbage Collector Optimizations	215
Summary	217
<hr/>	
Chapter 5: Localization	219
<hr/>	
Cultures and Regions	219
Understanding Culture Types	220
Looking at Your Thread	221
Declaring Culture Globally in ASP.NET	224
Adopting Culture Settings in ASP.NET	225
Translating Values and Behaviors	226
Understanding Differences in Dates	227
Understanding Differences in Numbers and Currencies	228
Understanding Differences in Sorting Strings	231
Working with ASP.NET Resource Files	233
Making Use of Local Resources	234
Making Use of Global Resources	240
Resource Files in Windows Forms	242
Summary	246

Contents

Chapter 6: Generics	247
Using Generics	247
Generic Types	249
Generic Methods	254
Creating Generics	255
Generic Types	255
Generic Methods	264
Constraints	265
Generics and Late Binding	268
Summary	269
Chapter 7: Namespaces	271
What Is a Namespace?	272
Namespaces and References	275
Common Namespaces	277
Importing and Aliasing Namespaces	280
Importing Namespaces	280
Aliasing Namespaces	282
Referencing Namespaces in ASP.NET	282
Creating Your Own Namespaces	283
The My Keyword	286
My.Application	287
My.Computer	291
My.Forms Namespace	294
My.Resources	294
My.User	295
My.WebServices	295
Extending the My Namespace	295
Summary	297
Chapter 8: Exception Handling and Debugging	299
A Brief Review of Error Handling in VB6	300
Exceptions in .NET	301
Important Properties and Methods of an Exception	301
How Exceptions Differ from the Err Object in VB6	302
Structured Exception-Handling Keywords	302
The Try, Catch, and Finally Keywords	303
The Throw Keyword	305
Throwing a New Exception	306

Contents

The Exit Try Statement	307
Nested Try Structures	308
Using Exception Properties	309
The Message Property	310
The InnerException and TargetSite Properties	311
Interoperability with VB6-Style Error Handling	315
Error Logging	316
The Event Log	316
Events, Methods, and Properties	318
Writing to Trace Files	319
Analyzing Problems and Measuring Performance via the Trace Class	321
Summary	325
Chapter 9: Data Access with ADO.NET 3.5	327
ADO.NET Architecture	328
Basic ADO.NET Features	329
Common ADO.NET Tasks	329
Basic ADO.NET Namespaces and Classes	332
ADO.NET Components	333
.NET Data Providers	334
Connection Object	335
Command Object	335
Using Stored Procedures with Command Objects	336
DataReader Object	340
Executing Commands Asynchronously	342
DataAdapter Objects	344
SQL Server .NET Data Provider	348
OLE DB .NET Data Provider	349
The DataSet Component	349
DataTableCollection	350
DataRelationCollection	350
ExtendedProperties	350
Creating and Using DataSet Objects	351
ADO.NET DataTable Objects	353
Advanced ADO.NET Features of the DataSet and DataTable Objects	354
Working with the Common Provider Model	356
Connection Pooling in ADO.NET	358
Building a Data Access Component	359
Constructors	360
Properties	361

Contents

Stored Procedure XML Structure	362
Methods	363
Using DataSet Objects to Bind to DataGrids	374
Summary	378
Chapter 10: Using XML in Visual Basic 2008	379
An Introduction to XML	380
XML Serialization	382
Source Code Style Attributes	387
System.Xml Document Support	389
XML Stream-Style Parsers	389
Writing an XML Stream	390
Reading an XML Stream	394
Using the MemoryStream Object	405
Document Object Model (DOM)	408
XSLT Transformations	415
XSLT Transforming between XML Standards	420
Other Classes and Interfaces in System.Xml.Xsl	422
ADO.NET	423
ADO.NET and SQL Server 2000's Built-in XML Features	425
XML and SQL Server 2005	427
XML and SQL Server 2008	428
XML in ASP.NET 3.5	428
The XmlDataSource Server Control	428
The XmlDataSource Control's Namespace Problem	432
The Xml Server Control	433
Summary	435
Chapter 11: LINQ	437
LINQ to SQL and Visual Studio 2008	439
Calling the Products Table Using LINQ to SQL: Creating the Console Application	439
Adding a LINQ to SQL Class	440
Introducing the O/R Designer	441
Creating the Product Object	442
How Objects Map to LINQ Objects	444
The DataContext Object	445
The Table(TEntity) Object	449
Working Without the O/R Designer	449
Creating Your Own Custom Object	449
Querying with Your Custom Object and LINQ	450

Contents

Limiting the Columns Called with the Query	452
Working with Column Names	452
Creating Your Own DataContext Object	453
Custom Objects and the O/R Designer	454
Querying the Database	456
Using Query Expressions	456
Query Expressions in Detail	456
Filtering Using Expressions	457
Performing Joins	458
Grouping Items	459
Stored Procedures	461
LINQ to XML	462
LINQ to XML and .NET 3.5	462
New Objects for Creating XML Documents	462
Visual Basic 2008 Ventures Down Another Path	462
Namespaces and Prefixes	463
New XML Objects from the .NET Framework 3.5	463
XDocument	463
XElement	464
XNamespace	465
XComment	467
XAttribute	468
Visual Basic 2008 and XML Literals	468
Using LINQ to Query XML Documents	470
Querying Static XML Documents	470
Querying Dynamic XML Documents	472
Working Around the XML Document	473
Reading from an XML Document	473
Writing to an XML Document	475
Using LINQ to SQL with LINQ to XML	476
Setting Up the LINQ to SQL Components	476
Querying the Database and Outputting XML	477
Summary	478
Chapter 12: Security in the .NET Framework	481
Security Concepts and Definitions	482
Permissions in the System.Security.Permissions Namespace	484
Code Access Permissions	486
Role-Based Permissions	487
Identity Permissions	490

Contents

Managing Code Access Permissions	490
Managing Security Policy	495
Determining an Application's Minimum Permissions	506
Using Visual Studio to Figure Minimum Permissions	508
Security Tools	510
Exceptions Using the SecurityException Class	511
Cryptography Basics	513
Hash Algorithms	514
Summary	535
Chapter 13: Visual Studio 2008	537
Visual Studio 2008: Express through Team Suite	538
Creating a Project from a Project Template	541
The Solution Explorer	545
My Project Properties	546
Assembly Information Screen	547
Compile Settings	549
Debug Properties	550
References	552
Resources	554
Settings	556
Project ProVBVS in Visual Studio	559
Form Properties Set in Code	561
Additional Components for Visual Studio 2008	570
Enhancing a Sample Application	571
Customizing the Code	572
Building Applications	577
Useful Features of Visual Studio 2008	583
Build Configurations	583
The Task List	586
The Command Window	586
Server Explorer	587
Recording and Using Macros in Visual Studio 2008	587
Class Diagrams	590
Team System	591
Team Edition for Developers	593
Performance Tools	595
Unit Tests	596
Summary	598

Contents

Chapter 14: Working with SQL Server	599
SQL Server Compact Edition	600
Connecting to a SQL Server Compact Edition Database	601
Synchronizing Data	604
CLR Integration in SQL Server 2005	615
Deciding between T-SQL and Visual Basic	615
Creating User-Defined Types	617
Creating Stored Procedures	632
Exposing Web Services from SQL Server	639
Summary	645
Resources	646
Chapter 15: Windows Forms	647
Changes in Windows Forms Version 2.0	647
Changes to Existing Controls	648
New Controls	649
Replacements for Older Windows Forms Controls	650
Default Instances of Forms	651
The System.Windows.Forms Namespace	651
Using Forms	651
Showing Forms via Sub Main	652
Setting the Startup Form	653
Startup Location	653
Form Borders	654
Always on Top — The TopMost Property	654
Owned Forms	654
Making Forms Transparent and Translucent	656
Visual Inheritance	657
Scrollable Forms	657
MDI Forms	658
An MDI Example in VB 2008	659
Dialog Forms	660
Forms at Runtime	663
Controls	664
Control Tab Order	664
Dynamic Sizing and Positioning of Controls	665
FlowLayoutPanel Control	668
TableLayoutPanel Control	670

Contents

Panel and GroupBox Container Controls	670
Extender Providers	671
Advanced Capabilities for Data Entry	674
Validating Data Entry	677
Toolbars and the New ToolStrip Control	678
Menus	681
Common Dialogs	683
Drag and Drop	685
Summary of Standard Windows.Forms Controls	688
Retired Controls	691
Handling Groups of Related Controls	691
Adding Controls at Runtime	693
Other Handy Programming Tips	694
Summary	694
Chapter 16: Windows Forms Advanced Features	697
Packaging Logic in Visual Controls	697
Custom Controls in Windows Forms	698
Inheriting from an Existing Control	698
Building a Composite Control	699
Writing a Control from Scratch	699
Inheriting from an Existing Control	699
Process Overview	700
Writing Code for an Inherited Control	700
Other Useful Attributes	703
Defining a Custom Event for the Inherited Control	704
A CheckedListBox Limiting Selected Items	705
The Control and UserControl Base Classes	709
The Control Class	709
The UserControl Class	709
A Composite UserControl	710
Creating a Composite UserControl	711
Resizing the Control	712
Exposing Properties of Contained Controls	712
Stepping Through the Example	713
Building a Control from Scratch	717
Painting a Custom Control with GDI+	717
Attaching an Icon for the Toolbox	723
Embedding Controls in Other Controls	723
Summary	725

Contents

Chapter 17: Windows Presentation Foundation	727
What, Where, Why, How — WPF Strategy	728
Raster Graphics and Vector Graphics	729
Should Your Next Windows Project Use WPF?	730
Creating a WPF Application	730
Leveraging WPF with XAML	734
Customizing the User Interface	752
Customizing the Buttons	761
Expression Blend	765
Summary	776
Chapter 18: Integrating WPF and Windows Forms	779
The Integration Library	780
Hosting WPF Controls in Windows Forms	782
Creating a WPF Control Library	782
The Windows Forms Application	785
Hosting Windows Forms Controls in WPF	792
Integration Limitations	797
Summary	798
Chapter 19: Working with ASP.NET 3.5	801
The Goals of ASP.NET	801
Developer Productivity	801
Administration and Management	802
Performance and Scalability	802
The ASP.NET Compilation System	802
Health Monitoring for Your ASP.NET Applications	803
Reading and Writing Configuration Settings	803
Localization	804
Objects for Accessing Data	804
The IDE for Building ASP.NET 3.5 Pages	805
Building ASP.NET Applications	806
Application Location Options	807
IIS	808
FTP	808
Websites Requiring FrontPage Extensions	810
The ASP.NET Page Structure Options	810
Inline Coding	812
Code-Behind Model	814

Contents

ASP.NET 3.5 Page Directives	815
ASP.NET Page Events	816
ASP.NET Application Folders	818
\App_Code Folder	818
\App_Data Folder	822
\App_Themes Folder	822
\App_GlobalResources Folder	822
\App_LocalResources	823
\App_WebReferences	823
\App_Browsers	823
Global.asax	823
ASP.NET Server Controls	827
Types of Server Controls	827
Building with Server Controls	829
Working with Server Control Events	830
Manipulating Pages and Server Controls with JavaScript	833
Using Page.ClientScript.RegisterClientScriptBlock	834
Using Page.ClientScript.RegisterStartupScript	835
Using Page.ClientScript.RegisterClientScriptInclude	836
Summary	837
Chapter 20: ASP.NET 3.5 Advanced Features	839
Applications and Pages	839
Cross-Page Posting	839
ASP.NET Compilation	844
Master Pages	847
Creating a Master Page	848
Creating the Content Page	850
Declaring the Master Page Application-Wide	853
Providing Default Content in Your Master Page	853
Data-Driven Applications	853
Using the GridView and SqlDataSource Controls	855
Allowing Editing and Deleting of Records with GridView	859
Don't Stop There!	863
Navigation	864
Using the SiteMapPath Server Control	865
Menu Server Control	866
The TreeView Server Control	867
Membership and Role Management	870
Personalization	874

Contents

Configuring ASP.NET in IIS on Vista	876
Working with the ASP.NET Provider Model	877
Working with Microsoft SQL Server from 7.0 to 2008	879
ASP.NET AJAX	884
Understanding the Need for AJAX	885
ASP.NET AJAX and Visual Studio 2008	888
Client-Side Technologies	888
Server-Side Technologies	889
Developing with ASP.NET AJAX	889
Building a Simple ASP.NET Page with AJAX	890
Summary	895
Chapter 21: Silverlight Development	897
Looking at Silverlight	897
Silverlight Browser Requirements	897
Two Versions of Silverlight	898
Installing Silverlight	898
Developing Silverlight Applications	900
Building a Simple Silverlight Application	901
Silverlight Examples	906
A Simple Hello World! Example	906
Working with Multiple Elements	908
Events and Silverlight	910
Summary	914
Chapter 22: Visual Studio Tools for Office	915
Examining the VSTO Releases	916
Office Automation versus VSTO	917
VSTO Project Types	917
Office Business Application Architecture	918
Working with Both VBA and VSTO	920
Creating a Document Template (Word)	925
Adding Content to the Document	927
Adding a Ribbon and an Actions Pane	929
Activating the Actions Pane	932
Updating a Content Control	935
Creating an Office Add-In (Excel)	939
Outlook Form Regions	945
Summary	954

Contents

Chapter 23: Assemblies	955
Assemblies	956
The Manifest	957
Assembly Identity	959
Referenced Assemblies	962
Assemblies and Deployment	963
Application-Private Assemblies	963
Shared Assemblies	963
Versioning Issues	965
Application Isolation	965
Side-by-Side Execution	965
Self-Describing	966
Version Policies	966
Configuration Files	968
Dynamic Loading of Assemblies	971
The Assembly Class	971
Dynamic Loading Example	973
Putting Assemblies to Work	974
Summary	974
Chapter 24: Deployment	977
Application Deployment	978
Why Deployment Is Straightforward in .NET	978
XCOPY Deployment	978
Using the Windows Installer	979
ClickOnce Deployment	979
New in Visual Studio 2008	979
Visual Studio Deployment Projects	980
Project Templates	980
Creating a Deployment Project	982
Modifying the Deployment Project	986
Project Properties	987
The File System Editor	990
The Registry Editor	994
The File Types Editor	996
The User Interface Editor	997
The Custom Actions Editor	1000
The Launch Conditions Editor	1002
Building	1005
Internet Deployment of Windows Applications	1006
No-Touch Deployment	1006

Contents

ClickOnce Deployment	1007
Custom Deployment Options	1016
Summary	1017
Chapter 25: Working with Classic COM and Interfaces	1019
Understanding COM	1019
COM and .NET in Practice	1020
A Legacy Component	1021
The .NET Application	1024
Trying It All Out	1026
Using TlbImp Directly	1026
Late Binding	1028
ActiveX Controls	1033
The Legacy ActiveX Control	1033
A .NET Application, Again	1035
Trying It All Out, Again	1037
Using .NET Components in the COM World	1038
A .NET Component	1038
RegAsm	1041
TlbExp	1043
Summary	1044
Chapter 26: Threading	1045
What Is a Thread?	1045
Processes, AppDomains, and Threads	1047
Thread Scheduling	1048
Thread Safety and Thread Affinity	1050
When to Use Threads	1051
Designing a Background Task	1052
Interactive Applications	1052
Implementing Threading	1053
A Quick Tour	1053
Threading Options	1056
Manually Creating a Thread	1061
Shared Data	1062
Avoid Sharing Data	1064
Sharing Data with Synchronization	1066
Synchronization Objects	1068
Summary	1077

Contents

Chapter 27: Windows Workflow Foundation	1079
Workflow in Applications	1079
Building Workflows	1080
Adding Workflow with Windows Workflow Foundation	1082
A Simple Workflow	1084
Standard Activities	1089
Building Custom Activities	1092
Using Workflows with Other Applications	1098
Using Workflow Foundation with Windows Forms	1098
Using Workflow Foundation with ASP.NET	1100
Summary	1104
Resources	1104
Chapter 28: XML Web Services	1105
Introduction to Web Services	1105
Early Architectural Designs	1107
The Network Angle	1107
Application Development	1107
Merging the Two with the Web	1107
The Foundations of Web Services	1108
The Problems	1109
The Other Players	1110
What All the Foundations Missed	1110
Building a Web Service	1115
A Realistic Example	1118
Using Visual Studio 2008 to Build Web Services	1119
Overloading WebMethods	1128
Caching Web Service Responses	1131
SOAP Headers	1131
Building a Web Service with SOAP Headers	1132
Consuming a Web Service Using SOAP Headers	1133
Requesting Web Services Using SOAP 1.2	1135
Visual Basic and System.Web.Services	1136
System.Web.Services Namespace	1136
System.Web.Services.Description Namespace	1137
System.Web.Services.Discovery Namespace	1138
System.Web.Services.Protocols Namespace	1139
Architecting with Web Services	1140
Why Web Services?	1140
How This All Fits Together	1140
State Management for XML Web Services	1141

Contents

Security in Web Services	1141
The Secure Sockets Layer	1142
Directory-Level Security	1142
Other Types of Security	1143
The Downside	1143
Security	1143
State	1143
Transactions	1143
Speed and Connectivity	1143
Where We Go from Here	1144
Summary	1144
Chapter 29: Remoting	1145
Remoting Overview	1146
Basic Terminology	1146
SingleCall, Singleton, and Activated Objects	1149
Implementing Remoting	1153
A Simple Example	1154
Using IIS as a Remoting Host	1164
Using Activator.GetObject	1168
Interface-Based Design	1169
Using Generated Proxies	1171
Summary	1172
Chapter 30: Enterprise Services	1173
Transactions	1173
The ACID Test	1174
Transactional Components	1175
An Example of Transactions	1176
Other Aspects of Transactions	1188
Just-In-Time	1188
Object Pooling	1189
Queued Components	1189
An Example of Queued Components	1190
Transactions with Queued Components	1194
Transactions and System.Transactions	1196
Creating Transactions	1196
Creating Resource Managers	1199
Summary	1199

Contents

Chapter 31: Network Programming	1201
Protocols, Addresses, and Ports	1201
Addresses and Names	1203
Ports: They're Not Just for Ships	1204
Firewalls: Can't Live with Them, Can't Live without Them	1204
The System.Net Namespace	1205
Web Requests (and Responses)	1205
Simplifying Common Web Requests with WebClient	1223
Creating Your Own Web Server with HttpListener	1225
Summary	1233
Chapter 32: Windows Communication Foundation	1235
The Larger Move to SOA	1236
WCF Overview	1237
Capabilities of WCF	1237
Working with the WS-* Protocols	1238
Building a WCF Service	1239
What Makes a WCF Service	1240
Creating Your First WCF Service	1241
Building the WCF Consumer	1248
Adding a Service Reference	1248
Reviewing the Reference	1250
Configuration File Changes	1253
Writing the Consumption Code	1255
Working with Data Contracts	1257
Building a Service with a Data Contract	1258
Building the Host	1259
Building the Consumer	1260
Looking at WSDL and the Schema for HelloCustomerService	1261
Namespaces	1263
Touching on Security	1263
Summary	1265
Chapter 33: Windows Services	1267
Example Windows Services	1267
Characteristics of a Windows Service	1268
Interacting with Windows Services	1268
Creating a Windows Service	1269
The .NET Framework Classes for Windows Services	1270
Other Types of Windows Services	1273

Contents

Creating a Windows Service in Visual Basic	1273
Creating a Counter Monitor Service	1275
Installing the Service	1277
Starting the Service	1278
Uninstalling the Service	1279
Monitoring a Performance Counter	1280
Creating a Performance Counter	1280
Integrating the Counter into the Service	1281
Changing the Value in the Performance Counter	1282
Communicating with the Service	1283
The ServiceController Class	1284
Integrating a ServiceController into the Example	1285
More About ServiceController	1286
Custom Commands	1287
Passing Strings to a Service	1289
Creating a File Watcher	1289
Writing Events Using an Event Log	1289
Creating a FileSystemWatcher	1290
Debugging the Service	1293
Summary	1296
Chapter 34: Visual Basic and the Internet	1297
Downloading Internet Resources	1297
Sockets	1301
Building the Application	1301
Creating Conversation Windows	1304
Sending Messages	1311
Shutting Down the Application	1316
Using Internet Explorer in Your Applications	1321
Windows Forms and HTML — No Problem!	1321
Summary	1330
Appendix A: The Visual Basic Compiler	1331
The vbc.exe.config File	1331
Simple Steps to Compilation	1333
Compiler Output	1334
/nologo	1334
/utf8output[+:-]	1334
/verbose	1335
Optimization	1335

Contents

Output files	1336
.NET Assemblies	1337
Debugging and Error-Checking	1339
Help	1340
Language	1341
Preprocessor: /define	1341
Resources	1342
Miscellaneous Features	1343
Looking at the vbc.rsp File	1344
Appendix B: Visual Basic Power Packs Tools	1347
Visual Basic Power Packs	1348
Getting the Visual Basic Power Packs	1349
Using the Interop Forms Toolkit 2.0	1349
Creating a Simple Interop Form	1351
Deployment	1354
Debugging	1354
VB6 Development	1355
Final Interop Tips	1355
Using the Power Packs 2.0 Tools	1356
Summary	1360
Appendix C: Visual Basic Resources	1361
On the Web	1361
Books	1362
Author Blogs	1362
Index	1363