

Contents

What You Need to Use This Book	xv
Acknowledgments	xxii
Introduction	xviii
 Chapter 1 The Philosophy of .NET	 1
Understanding the Current State of Affairs	1
The .NET Solution	5
Building Blocks of .NET (CLR, CTS, and CLS)	6
.NET-Aware Programming Languages	7
What VB .NET Brings to the Table	9
An Overview of .NET Binaries (aka Assemblies)	10
The Role of Microsoft Intermediate Language	12
The Role of Metadata	15
Compiling IL to Platform-Specific Instructions	16
.NET Types and .NET Namespaces	17
Understanding the Common Language Runtime	17
Understanding the Common Type System	20
Understanding the Common Language Specification	24
Working with Namespaces	26
A Tour of the .NET Namespaces	27
Referencing External Assemblies	30
Increasing Your Namespace Nomenclature	31
Summary	39
 Chapter 2 Building Visual Basic .NET Applications	 41
Building VB .NET Applications	
Using the Command Line Compiler	41
Building Your First VB .NET Application	43

Building VB .NET Applications	
Using the Visual Studio .NET IDE	49
Building Your VS .NET Test Application	53
Configuring a VB .NET Project	55
The Properties Window	59
Adding Some Code	60
What Happened to the World of VB 6.0?	68
Upgrading VB 6.0 Projects into VB .NET	72
The Microsoft.VisualBasic.Compatibility.VB6 Namespace	75
Should You Upgrade?	75
Summary	76

Chapter 3 VB .NET Language Fundamentals77

The Role of the Module Type	77
The Main Method	80
Data Types and Variable Declarations	81
Experimenting with the System Data Types	85
Data Type Conversions	88
Concatenation Operators	89
Basic Input and Output with the Console Class	90
Introducing VB .NET String Formatting	91
Anatomy of a Simple VB .NET Class	93
Creating Objects: Constructor Basics	94
Default Values	99
Defining Program Constants	100
Understanding Value Types and Reference Types	102
The Master Node: System.Object	107
VB .NET Iteration Constructs	113
VB .NET Control Flow Constructs	117
Additional VB .NET Operators	119
Defining Custom Class Methods	121
Method Parameter Modifiers (ByRef and ByVal)	127
Shared Methods	132
Static (Not Shared) Data	137
Array Manipulation in VB .NET	139
String Manipulation in VB .NET	143
VB .NET Enumerations	146
Defining Structures in VB .NET	151
Defining Custom Namespaces	153
Summary	158

Chapter 4 Object-Oriented Programming with VB .NET	159
A Catalog of VB .NET OO-Centric Keywords	159
Formal Definition of the VB .NET Class	161
Member Overloading	165
Defining the Default Public Interface	166
Pillars of OOP	168
The First Pillar: VB .NET's Encapsulation Services	173
Pseudo-Encapsulation: Creating Read-Only Fields	181
The Second Pillar: VB .NET's Inheritance Support	182
Keeping Family Secrets: The "Protected" Keyword	186
Nested Type Definitions	192
The Third Pillar: VB .NET's Polymorphic Support	193
Casting between Class Types (CType)	202
Exception Handling	204
Understanding Object Lifetime	215
Finalizing an Object Reference	216
Building an Ad Hoc Destruction Method	218
Interacting with the Garbage Collector	219
Summary	225
 Chapter 5 Interfaces and Collections	 227
Understanding Interface-Based Programming	227
Building a Custom Enumerator (IEnumerable and IEnumerator)	241
Building Cloneable Objects (ICloneable)	245
Building Comparable Objects (IComparable)	251
Exploring the System.Collections Namespace	257
Summary	262
 Chapter 6 Delegates, Events, and Callback Interfaces	 263
A Quick Recap of Events à la VB 6.0	263
Designing an Event Interface	267
The VB .NET Delegate Keyword	271
The Simplest Possible Example	274
Building a More Elaborate Delegate Example	277

Understanding (and Using) Events	286
Summary	296
Problems with Classic COM Binaries	297
An Overview of .NET Assemblies	300
Building a Single File Test Assembly	308
A VB .NET Client Application	312
A C# Client Application	313
Cross-Language Inheritance	315
Exploring the CarLibrary's Manifest	319
Exploring the CarLibrary's Types	323
Building Multifile Assemblies	326
Understanding Private Assemblies	331
Probing Basics	333
Understanding Shared Assemblies	338
Understanding Shared Names	339
Using a Shared Assembly	346
Understanding .NET Version Policies	347
Recording Version Information	348
Building SharedAssembly Version 2.0	351
Specifying Custom Version Policies	352
Using the .NET Administrative Tool (mscorcfg.msc)	354
The Ngen.exe Utility	363
Review of Traditional Win32 Thread Programming	364
Understanding System.AppDomain	366
System.Threading Namespace	369
Naming Threads	373
Concurrency Revisited	377
The VB .NET "SyncLock" Keyword	380
Using System.Threading.Interlocked	382
Summary	384

Chapter 8 Type Reflection and Attribute-Based Programming385

Understanding Reflection	385
The System.Type Class	386
Investigating the System.Reflection Namespace	393
Dynamically Loading an Assembly	393
Understanding Dynamic Invocation (Late Binding)	398
Understanding (and Building) Dynamic Assemblies	402
Understanding Attributed Programming	410

Building Custom Attributes	414
The VB .NET “AssemblyInfo.vb” File	418
Discovering Attributes at Runtime	419
Summary	420

Chapter 9 Building a Better Window (Introducing Windows Forms)

A Tale of Two GUI Namespaces	421
Overview of the Windows Forms Namespace	422
Building a Windows Forms Application by Hand	422
Building a Visual Studio .NET Windows Forms Project Workspace	426
The System.Windows.Forms.Application Class	432
The Anatomy of a Form	437
Basic Form Functionality	437
The System.ComponentModel.Component Class	438
The Control Class	439
Control Events	444
Responding to Keyboard Events	451
The Control Class Revisited	452
The ScrollableControl Class	456
ContainerControl Class	457
The Form Class	457
Building Menus with Windows Forms	459
Building Your Menu System	462
Building a Menu Using Visual Studio .NET	470
Understanding Status Bars	472
Building a Status Bar Using Visual Studio .NET	479
Building a ToolBar	481
Building ToolBars at Design Time	486
A Minimal and Complete Windows Forms Application	490
Interacting with the System Registry	492
Interacting with the Event Viewer	496
Building an MDI Application	500
Summary	506

Chapter 10 A Better Painting Framework (GDI+)	...507
Remembering the World of VB 6.0 Graphics Programming	.....507
Survey of the GDI+ Namespaces	.....508
Overview of the System.Drawing Namespace	.....509
Configuring a GDI+ Project Workspace	.....511
Examining the System.Drawing Utility Types	.....511
Understanding Paint Sessions	.....516
Understanding the Graphics Class	.....520
Default GDI+ Coordinate System	.....522
Establishing an Active Color	.....526
Manipulating Fonts	.....530
Survey of the System.Drawing.Drawing2D Namespace	.....542
Working with Pens	.....545
Rendering Images	.....560
Dragging, Hit Testing, and the PictureBox Control	.....564
Understanding the .NET Resource Format	.....574
System.Resources Namespace	.....576
Working with ResourceWriters	.....581
Working with ResourceManagers	.....583
Automatic Resource Configuration a la Visual Studio .NET	...584
Summary	.....587
 Chapter 11 Programming with Windows	
Form Controls	.....589
Understanding the Windows Forms Control Hierarchy	.....589
Adding Controls to Forms (the Hard Way)	.....590
Adding Controls to Forms (the Easy Way)	.....594
The TextBox Control	.....596
The Mighty Button Type (and the ButtonBase Parent Class)	...600
Working with CheckBoxes	.....603
Working with RadioButtons and GroupBoxes	.....605
ListBoxes and ComboBoxes	.....610
Configuring the Tab Order	.....615
The TrackBar Control	.....617
The MonthCalendar Control	.....620
More on the System.DateTime Type	.....623
The Spin Controls: DomainUpDown and NumericUpDown	.....625
Working with Panel Controls	.....628
Assigning ToolTips to Controls	.....629

Working with the ErrorProvider	632
Configuring a Control's Anchoring Behavior	634
Configuring a Control's Docking Behavior	636
Building Custom Dialog Boxes	638
Form Inheritance	645
Understanding Custom Controls	647
The Class, Control, UserControl, and Component Distinction ..	648
Building a Custom UserControl	650
Creating the Images	651
Building the Design Time GUI	654
Establishing the Default Public Sector	655
Defining the Custom Events	657
Supporting Custom Properties	657
Controlling the Animation	659
Building a VB .NET Client Application	660
Select Members of the System.ComponentModel Namespace	663
Enhancing the Design Time Appearance of CarControl	665
Building a .NET (Data) Component	668
Connecting to the Cars Database	669
Using Your Custom Component	672
Summary	675

Chapter 12 Input, Output, and Object Serialization677

Exploring the System.IO Namespace	677
The Directory(Info) and File(Info) Types	679
Enumerating Files with the DirectoryInfo Type	683
Creating Subdirectories with the DirectoryInfo Type	684
The Shared Members of the Directory Class	686
The FileInfo Class	688
The Abstract Stream Class	693
Working with StreamWriters and StreamReaders	697
Working with StringWriters	702
Working with StringReaders	704
Working with Binary Data (BinaryReaders and BinaryWriters) ..	705
Object Persistence in the .NET Framework	710
The Role of Object Graphs	710
Configuring Objects for Serialization	711
Serialization Using a Binary Formatter	716
Serialization Using a SOAP Formatter	719

Custom Serialization (and the ISerializable Interface)	720
A Windows Forms Car Logger Application	724
Summary	732
 Chapter 13 Interacting with Unmanaged Code	733
Understanding Interoperability Issues	733
A Painfully Simple Example: VB .NET Applications	
Communicating with VB 6.0 COM Types	734
The System.Runtime.InteropServices Namespace	737
Understanding .NET to COM Interoperability	739
The Role of COM IDL	742
Importing the Type Library	747
Examining the Generated Assembly Manifest	751
Building a More Interesting VB 6.0 COM Server	753
Examining the Interop Assembly	756
The Complete VB .NET Client	761
Understanding COM to .NET Interoperability	762
The Role of the CCW	763
Understanding the “Class Interface”	764
Building Your .NET Type	765
Generating the Type Library and Registering the .NET Types ..	767
Examining the Exported Type Information	768
Viewing the Type Using the OLE/COM Object Viewer	770
Examining the Registration Entries	771
Building a Visual Basic 6.0 Test Client	773
.NET to COM Mapping Issues	775
Controlling the Generated IDL (or Influencing Tlbexp.exe) ..	779
Interacting with COM+ Component Services	781
Building COM+-Aware Types	784
Building a COM+-Aware VB .NET Type	785
Examining the Component Services Explorer	787
Summary	789
 Chapter 14 Data Access with ADO.NET	791
The Need for ADO.NET	791
Understanding the ADO.NET Namespaces	794
The Types of System.Data	795
Examining the DataColumn Type	796

Examining the DataRow Type	803
Details of the DataTable	808
Building a Complete DataTable	809
Understanding the DataView Type	820
Understanding the Role of the DataSet	822
Expressing Relations Using the DataRelation Type	829
Reading and Writing XML-Based DataSets	834
Building a Simple Test Database	837
ADO.NET Managed Providers	838
Working with the OleDb Managed Provider	839
The Role of the OleDbDataAdapter Type	848
Working with the SQL Managed Provider	852
Autogenerated SQL Commands	859
Filling a Multitabled DataSet (and Adding DataRelations) ...	861
Bring in the Wizards!	865
Summary	874

Chapter 15 Web Development and ASP.NET877

Web Applications and Web Servers	877
The Basic Structure of an HTML Document	880
Basic HTML Text Formatting	882
Visual Studio .NET HTML Editors	886
HTML Form Development	888
The Role of Client-Side Scripting	894
Submitting the Form Data (GET and POST)	899
Building a Classic Active Server Page	900
Building Your First Official ASP.NET Application	905
Some Problems with Classic ASP	906
Some Benefits of ASP.NET	906
The ASP.NET Namespaces	907
Creating a Simple VB .NET Web Application	908
The Architecture of an ASP.NET Web Application	915
Understanding the Application/Session Distinction	922
The Globals.asax File and HttpApplication Type	926
The Life Cycle of a Page-Derived Type	929
Understanding ViewState	932
Debugging and Tracing ASP.NET Applications	934
Understanding the Benefits of Web Form Controls	936
Working with Web Form Controls	938
Categories of Web Form Controls	942

Understanding Server-Side Event Handling	955
A Complete ASP.NET Example	960
Summary	969

Chapter 16 Building (and Understanding)

Web Services	971
Understanding the Role of Web Services	971
The Anatomy of a Web Service	972
An Overview of the Web Service Namespaces	973
Examining the System.Web.Services Namespace	974
Building a Simple Web Service	975
The WebMethodAttribute Type	982
Understanding the Web Service Description Language (WSDL) ..	988
Web Service Invocation Protocols	991
WSDL into VB .NET Code (Generating a Proxy)	997
Building the Assembly	1001
Building a Client	1002
Generating a Proxy with VS.NET	1004
A More Interesting Web Service (and Web Client)	1006
Serialization of Custom Types (Further Details)	1011
Understanding the Discovery Service Protocol	1014
Summary	1016
 Index	 1019