


Join the discussion @ p2p.wrox.com



BUILD WINDOWS STORE APPS WITH VB

A high-angle, rear-quarter view of a red open-wheel race car, likely a Formula 1 car, on a dark asphalt track. The car is angled towards the right, showing its rear wing, engine, and rear wheel. The track has white boundary lines.

Professional Visual Basic® 2012 and .NET 4.5 Programming

Bill Sheldon, Billy Hollis, Rob Windsor, David McCarter, Gastón C. Hillar, Todd Herman

PROFESSIONAL VISUAL BASIC® 2012 AND .NET 4.5 PROGRAMMING

INTRODUCTION.....xxxi

► PART I LANGUAGE CONSTRUCTS AND ENVIRONMENT

CHAPTER 1	Visual Studio 2012	3
CHAPTER 2	The Common Language Runtime	57
CHAPTER 3	Objects and Visual Basic	103
CHAPTER 4	Custom Objects	179
CHAPTER 5	Advanced Language Constructs.....	237
CHAPTER 6	Exception Handling and Debugging	263

► PART II BUSINESS OBJECTS AND DATA ACCESS

CHAPTER 7	Arrays, Collections, and Generics.....	281
CHAPTER 8	Using XML with Visual Basic	315
CHAPTER 9	ADO.NET and LINQ	369
CHAPTER 10	Data Access with the Entity Framework	407
CHAPTER 11	Services (XML/WCF)	429

► PART III SPECIALIZED TOPICS AND LIBRARIES

CHAPTER 12	XAML Essentials	465
CHAPTER 13	Creating XAML Applications for Windows 8	517
CHAPTER 14	Applications with ASP.NET, MVC, JavaScript, and HTML.....	561
CHAPTER 15	Localization	645
CHAPTER 16	Application Services	667
CHAPTER 17	Assemblies and Reflection.....	693
CHAPTER 18	Security in the .NET Framework	719
CHAPTER 19	Parallel Programming Using Tasks and Threads	757
CHAPTER 20	Deploying XAML Applications via the Windows 8 Windows Store ..	815

INDEX..... 833

PROFESSIONAL

Visual Basic® 2012 and .NET 4.5 Programming

PROFESSIONAL

Visual Basic® 2012 and .NET 4.5 Programming

Bill Sheldon
Billy Hollis
Rob Windsor
David McCarter
Gastón C. Hillar
Todd Herman



John Wiley & Sons, Inc.

Professional Visual Basic® 2012 and .NET 4.5 Programming

Published by
John Wiley & Sons, Inc.
10475 Crosspoint Boulevard
Indianapolis, IN 46256
www.wiley.com

Copyright © 2013 by John Wiley & Sons, Inc., Indianapolis, Indiana

Published simultaneously in Canada

ISBN: 978-1-118-31445-6
ISBN: 978-1-118-33213-9 (ebk)
ISBN: 978-1-118-33542-0 (ebk)
ISBN: 978-1-118-39638-4 (ebk)

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 646-8600. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at <http://www.wiley.com/go/permissions>.

Limit of Liability/Disclaimer of Warranty: The publisher and the author make no representations or warranties with respect to the accuracy or completeness of the contents of this work and specifically disclaim all warranties, including without limitation warranties of fitness for a particular purpose. No warranty may be created or extended by sales or promotional materials. The advice and strategies contained herein may not be suitable for every situation. This work is sold with the understanding that the publisher is not engaged in rendering legal, accounting, or other professional services. If professional assistance is required, the services of a competent professional person should be sought. Neither the publisher nor the author shall be liable for damages arising herefrom. The fact that an organization or Web site is referred to in this work as a citation and/or a potential source of further information does not mean that the author or the publisher endorses the information the organization or Web site may provide or recommendations it may make. Further, readers should be aware that Internet Web sites listed in this work may have changed or disappeared between when this work was written and when it is read.

For general information on our other products and services please contact our Customer Care Department within the United States at (877) 762-2974, outside the United States at (317) 572-3993 or fax (317) 572-4002.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media such as a CD or DVD that is not included in the version you purchased, you may download this material at <http://booksupport.wiley.com>. For more information about Wiley products, visit www.wiley.com.

Library of Congress Control Number: 2012946061

Trademarks: Wiley, the Wiley logo, Wrox, the Wrox logo, Wrox Programmer to Programmer, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates, in the United States and other countries, and may not be used without written permission. Visual Basic is a registered trademark of Microsoft Corporation. All other trademarks are the property of their respective owners. John Wiley & Sons, Inc., is not associated with any product or vendor mentioned in this book.

This book is dedicated to Tracie, Billy, and Johnny, who had to put up with me locking myself away in my home office and not spending as much time with them as I'd like and they deserved.

—BILL SHELDON

I'd like to dedicate this book to those in the software development community who put users first. I've watched with regret as our profession has become inwardly focused, worrying far more about technology and process than what we can accomplish for our users and the businesses for which they work. I salute those who invest the time and effort to deliver compelling and wonderful experiences to their users, and I hope the material I contributed to this book will help them do that.

—BILLY HOLLIS

This book is dedicated to you, the reader. Unless you didn't pay for the book—in that case it's dedicated to my Mom (love ya, Mom).

—ROB WINDSOR

To my son, Kevin.

—GASTÓN C. HILLAR

For my wife, Amy. Thank you for your support while I worked on this project. I must also thank my son, Aidan, and daughter, Alaina, for their support and understanding while I was busy in my office rather than spending time with them. I love all of you.

Thank you.

—TODD HERMAN

ABOUT THE AUTHORS

BILL SHELDON is a software architect and engineer, originally from Baltimore, Maryland. Holding a degree in computer science from the Illinois Institute of Technology (IIT), Bill has worked in the IT industry since resigning his commission with the United States Navy. He is the Vice President of Information Technology for Rubio's Restaurants (www.rubios.com) and has eight years as a Microsoft MVP for Visual Basic. Bill lives in Oceanside, California, with his wife and two sons. Bill is an avid cyclist and is active in the fight against diabetes. You can track Bill down via Twitter: @NerdNotes.

BILLY HOLLIS is a developer and user-experience designer based in Nashville, Tennessee. His consulting company, Next Version Systems, offers design and development on software applications requiring innovative and intuitive user experiences. He speaks regularly at major industry conferences, usually on design concepts and user experience technologies. He is also available for training in XAML technologies and in user experience design concepts.

ROB WINDSOR is a Lead SharePoint Consultant with Portal Solutions—a Microsoft Gold Partner based in Washington, D.C., and Boston. He has 20 years' experience developing rich-client and web applications with Delphi, VB, C#, and VB.NET, and is currently spending a majority of his time working with SharePoint. Rob is a regular speaker at conferences, code camps, and user groups across North America and Europe. He regularly contributes articles and videos to MSDN, TechNet, and the Pluralsight On-Demand library, and is the coauthor of *Professional Visual Basic 2010 and .NET 4*. Rob is the founder and past president of the North Toronto .NET User Group and has been recognized as a Microsoft Most Valuable Professional for his involvement in the developer community. You can follow Rob on Twitter at @robwindsor.

DAVID MCCARTER is a Microsoft MVP and a principal software engineer/architect in San Diego. He is the editor-in-chief of dotNetTips.com, a website dedicated to helping programmers in all aspects of programming. David has written for programming magazines and has published four books, the latest of which is *David McCarter's .NET Coding Standards*, and is available at: <http://codingstandards.notlong.com>. He is one of the founders and directors of the 18-year-old San Diego .NET Developers Group (www.sddotnetdg.org). In 2008 David won the INETA Community Excellence Award for his involvement in the .NET community. David is also an inventor of a software printing system that was approved by the U.S. Patent Office in May 2008.

GASTÓN C. HILLAR is an Italian living in Argentina. He has been working with computers since he was eight years old. He began programming with the legendary Texas TI-99/4A and Commodore 64 home computers in the early '80s. He has worked as developer, architect, project manager, and IT consultant for many companies around the world. He is always looking for new adventures around the world. Gastón has written four books in English, contributed chapters to three other books, and has written more than 40 books in Spanish. He contributes to Dr. Dobbs at <http://drdobbs.com>, and is a guest blogger for Intel Software Network at <http://software.intel.com>. In 2009, 2010, 2011, and 2012, he received the Intel® Black Belt Software Developer award. In 2011, he received the Microsoft MVP on Technical Computing award.

Gastón lives in Argentina with his wife, Vanesa, and his son, Kevin. When not tinkering with computers, he enjoys developing and playing with wireless virtual reality devices and electronic toys with his father, his son, and his nephew Nico. You can reach him at gastonhillar@hotmail.com. You can follow him on Twitter at <http://twitter.com/gastonhillar>. Gastón's blog is at <http://csharpmulticore.blogspot.com>

TODD HERMAN works for APX Labs as a senior software engineer. His current focus is developing a robust library to support the XMPP standard. He has been programming since he received his first computer, a Commodore 64, on his 11th birthday. His experience ranges from developing data entry software in FoxPro for a water research laboratory, to writing biometric applications in Visual Basic for NEC. He lives in Virginia with his wife and children, spending his free time programming, playing computer games, and watching the SyFy Channel or reruns of *Firefly*.

ABOUT THE TECHNICAL EDITORS

DOUG WATERFIELD has been a software developer and architect for over 20 years and has been working with .NET languages and related technologies since their first release. He has designed and constructed solutions for Fortune 500 and Defense Department clients through Chameleon Consulting, and he is a Senior Software Engineer with Interactive Intelligence, Inc. Doug graduated from Rose-Hulman Institute of Technology in 1988 and recently earned PMP (Project Management Professional) certification from PMI. Doug and his family are very active in the Avon, Indiana, community through the Boy Scouts of America and other organizations. He can be reached at djw@iquest.net.

DOUG PARSONS lives in Northeast Ohio and has been developing software professionally for over 15 years. He has a diverse background, having worked in the political, financial, medical, and manufacturing sectors over the course of his career. He is currently employed as a Senior .NET Developer with Harley-Davidson Motor Company. In his free time he tinkers with his various motorcycles, sits on the advisory committee of a High School Technology program, and spends time with his family.

CREDITS

ACQUISITIONS EDITOR

Mary James

PROJECT EDITOR

Christina Haviland

TECHNICAL EDITORS

Doug Waterfield

Doug Parsons

PRODUCTION EDITOR

Daniel Scribner

COPY EDITOR

Christina Haviland

EDITORIAL MANAGER

Mary Beth Wakefield

FREELANCER EDITORIAL MANAGER

Rosemarie Graham

ASSOCIATE DIRECTOR OF MARKETING

David Mayhew

MARKETING MANAGER

Ashley Zurcher

BUSINESS MANAGER

Amy Knies

PRODUCTION MANAGER

Tim Tate

**VICE PRESIDENT AND EXECUTIVE GROUP
PUBLISHER**

Richard Swadley

VICE PRESIDENT AND EXECUTIVE PUBLISHER

Neil Edde

ASSOCIATE PUBLISHER

Jim Minatel

PROJECT COORDINATOR, COVER

Katie Crocker

PROOFREADER

Mark Steven Long

INDEXER

Robert Swanson

COVER DESIGNER

LeAndra Young

COVER IMAGE

© dan_prat / iStock

ACKNOWLEDGMENTS

MANY THANKS TO ALL OF THE PEOPLE associated with getting this book together and out the door. More so than any other edition, there seemed to be a real struggle as we made some truly major changes to much of the content. Thanks to those who stepped up and met the challenges that we were presented with during the production cycle.

—BILL SHELDON

THANKS TO BETH MASSI for being too busy to work on this project and thanks to the people at Wrox for accepting Beth's suggestion that I would be a suitable replacement. I'd also like to thank those who helped me advance professionally to the point that this opportunity was even possible: Craig Flanagan, Sasha Krsmanovic, Jean-Rene Roy, Mark Dunn, Carl Franklin, Richard Campbell, Barry Gervin, Dave Lloyd, Bruce Johnson, Donald Belcham, and everyone at Portal Solutions.

—ROB WINDSOR

CONTENTS

INTRODUCTION

xxxi

PART I: LANGUAGE CONSTRUCTS AND ENVIRONMENT

CHAPTER 1: VISUAL STUDIO 2012	3
Visual Studio 2012	4
Visual Basic Keywords and Syntax	5
Console Applications	10
Creating a Project from a Project Template	11
The Solution Explorer	14
Project Properties	15
Assembly Information Screen	16
Compiler Settings	18
Debug Properties	21
References	23
Resources	24
Settings	26
Other Project Property Tabs	27
Project ProVB_VS2012	28
Enhancing a Sample Application	31
Customizing the Code	33
Building Applications	44
Running an Application in the Debugger	45
Reusing Your First Windows Form	52
Useful Features of Visual Studio 2012	52
The Task List	52
Server Explorer	53
Class Diagrams	54
Summary	56
CHAPTER 2: THE COMMON LANGUAGE RUNTIME	57
Framework Profiles and Platforms	58
Client and Full Framework Profiles	59
Framework for Metro	59
Silverlight, Windows Phone, and Others	60
.NET 4.5 Portable Class Library	60

Elements of a .NET Application	61
Types	61
Modules	62
Assemblies	63
Cross-Language Integration	65
The Common Type System	65
Metadata	66
The Reflection API	69
IL Disassembler	70
Memory Management	71
Traditional Garbage Collection	72
Faster Memory Allocation for Objects	77
Garbage Collector Optimizations	79
Namespaces	81
What Is a Namespace?	81
Namespaces and References	84
Common Namespaces	86
Importing and Aliasing Namespaces	86
Aliasing Namespaces	89
Referencing Namespaces in ASP.NET	89
Creating Your Own Namespaces	90
The My Keyword	93
My.Application	94
My.Computer	97
My.Resources	99
My.User	99
Extending the My Namespace	100
Summary	102
CHAPTER 3: OBJECTS AND VISUAL BASIC	103
Object-Oriented Terminology	105
Objects, Classes, and Instances	105
Composition of an Object	105
System.Object	108
Working With Visual Basic Types	109
Value and Reference Types	109
Primitive Types	112
Commands: Conditional	114
If Then	114
Comparison Operators	115
Select Case	117

Value Types (Structures)	117
Boolean	118
Integer Types	119
Unsigned Types	120
Decimal Types	121
Char and Byte	123
DateTime	124
Reference Types (Classes)	125
The Object Class	125
The String Class	126
The DBNull Class and IsDBNull Function	130
Parameter Passing	131
ParamArray	132
Variable Scope	133
Working with Objects	134
Objects Declaration and Instantiation	134
Object References	135
Early Binding versus Late Binding	136
Data Type Conversions	137
Performing Explicit Conversions	138
Creating Classes	143
Basic Classes	143
Handling Events	152
Handling Multiple Events	153
The WithEvents Keyword	154
Raising Events	154
Declaring and Raising Custom Events	155
Receiving Events with WithEvents	156
Receiving Events with AddHandler	158
Constructor Methods	160
Object-Oriented Concepts	161
Overloading Methods	161
Overloading Constructor Methods	164
Shared Methods, Variables, and Events	165
Operator Overloading	169
Delegates	172
Summary	176
CHAPTER 4: CUSTOM OBJECTS	179
Inheritance	180
When to Use Inheritance	181

Implementing Inheritance	183
Interacting with the Base Class, Yourself, and Your Class	202
Constructors	206
Object Scope	209
Events and Inheritance	211
Shared Methods	213
Creating an Abstract Base Class	213
Multiple Interfaces	216
Object Interfaces	216
Abstract Interfaces	217
Abstraction	225
Encapsulation	228
Polymorphism	228
Method Signatures	228
Implementing Polymorphism	229
Summary	235

CHAPTER 5: ADVANCED LANGUAGE CONSTRUCTS 237

Preparing the Sample Application	238
Lambda Expressions	240
Creating a Lambda Expression Subroutine	241
Creating a Lambda Expression Function	242
Using Lambda Expressions	243
Handling Events with Lambdas	244
LINQ with Lambdas	245
Async and Await	247
The Core Concept	248
Using Async and Await	252
Iterators	256
The Core Concept	256
Using Iterators	259
Summary	261

CHAPTER 6: EXCEPTION HANDLING AND DEBUGGING 263

System.Exception	264
Handling Exceptions	265
Try, Catch, and Finally	265
The Throw Keyword	267
The Exit Try Statement	268
Using Exception Properties	269

Logging Errors	273
The Event Log	273
Using the Trace and Debug Objects	275
Summary	278

PART II: BUSINESS OBJECTS AND DATA ACCESS

CHAPTER 7: ARRAYS, COLLECTIONS, AND GENERICS **281**

Arrays	282
Multidimensional Arrays	284
The UBound Function	284
The ReDim Statement	285
The Preserve Keyword	286
Collections	286
Iterative Statements	288
Boxing	291
Generics	292
Using Generics	293
Nullable Types	294
Generic Types	295
Generic Methods	298
Creating Generics	300
Generic Types	300
Generic Methods	307
Constraints	308
Generics and Late Binding	311
Covariance and Contravariance	312
Summary	314

CHAPTER 8: USING XML WITH VISUAL BASIC **315**

An Introduction to XML	316
XML Serialization	318
Serializing	318
Deserializing	320
Source Code Style Attributes	322
System.Xml Document Support	324
XML Stream-Style Parsers	325
Document Object Model (DOM)	337
LINQ to XML	342
LINQ Helper XML Objects	343

XML Literals	347
Querying XML Documents	349
Reading and Writing XML Documents	351
XSL Transformations	354
XSLT Transforming between XML Standards	357
Other Classes and Interfaces in System.Xml.Xsl	360
XML in ASP.NET	361
The XmlDataSource Server Control	361
The XmlDataSource Control's Namespace Problem	365
The Xml Server Control	366
Summary	368
 CHAPTER 9: ADO.NET AND LINQ	 369
ADO.NET Architecture	371
Basic ADO.NET Features	372
Common ADO.NET Tasks	372
Basic ADO.NET Namespaces and Classes	377
ADO.NET Components	378
.NET Data Providers	380
Connection Object	380
Command Object	381
Using Stored Procedures with Command Objects	382
DataReader Object	385
Executing Commands Asynchronously	387
DataAdapter Objects	389
SQL Server .NET Data Provider	394
OLE DB .NET Data Provider	394
The DataSet Component	395
DataTableCollection	395
DataRelationCollection	395
ExtendedProperties	396
Creating and Using DataSet Objects	397
ADO.NET DataTable Objects	398
Advanced ADO.NET Features of the DataSet and DataTable Objects	399
Working with the Common Provider Model	401
Connection Pooling in ADO.NET	403
Transactions and System.Transactions	403
Creating Transactions	403
Creating Resource Managers	405
Summary	406

CHAPTER 10: DATA ACCESS WITH THE ENTITY FRAMEWORK	407
Object-Relational Mapping	408
Entity Framework Architecture	408
Conceptual Model	410
Storage Model	416
Mapping Model	417
LINQ to Entities	417
TheObjectContext	418
Mapping Objects to Entities	419
Simple Mapping	419
Using a Single Table for Multiple Objects	422
Updating the Model	425
Summary	426
 CHAPTER 11: SERVICES (XML/WCF)	 429
Web Services	430
How This All Fits Together	431
What Makes a WCF Service	431
The Larger Move to SOA	432
Capabilities of WCF	433
Contracts and Metadata	434
Working with the WS-* Protocols	434
Building a WCF Service	436
Creating the Interface	437
Utilizing the Interface	438
Hosting the WCF Service in a Console Application	439
Reviewing the WSDL Document	443
Building a WCF Consumer	445
Adding a Service Reference	445
Reviewing the Reference	447
Configuration File Changes	449
Writing the Consumption Code	451
Working with Data Contracts	453
Namespaces	455
Building the Host	456
Building the Consumer	456
Looking at WSDL and the Schema for HelloCustomerService	459
Summary	461

PART III: SPECIALIZED TOPICS AND LIBRARIES

CHAPTER 12: XAML ESSENTIALS	465
Features Shared by All XAML Platforms	466
The XAML Markup Language	466
A Sample Page of XAML	467
Code-Behind and Naming of Elements	468
Getting Our Terminology Straight	469
The UIElement and FrameworkElement Classes	469
Commonly Used Elements	469
Property Setting: Attribute Syntax vs. Element Syntax	470
Referencing Additional Namespaces in XAML	471
The Layout System	472
Measurement Units	472
Panels	472
Sizing and Layout of Elements	479
Controls and Content	484
Content Controls	484
Implications of the Content Model	485
Brushes	486
Resources in XAML	488
The Resources Property	488
More About Resource Dictionaries	489
Scope of a Resource	489
Data Binding	489
Data Binding: Fundamental Concepts	490
The Binding Class and Binding Expressions	491
DataContext	492
Data Bindings between XAML Elements	492
Other Ways to Specify a Data Source	493
Property Change Notification	494
Data Conversion during Binding	494
Dealing with Binding Failures	497
Complex Binding Paths	498
Working with Data Bindings in Code	498
Data Templates and ItemControls	499
Setting the Stage with Some Sample Data	500
ItemControls	501
The XAML ListBox	501
Data Templates	503

Data Binding in Data Templates	506
Switching between Data Templates	507
Changing Layout of ListBox Items with ItemsPanel	510
Additional ItemControls	510
Styles	510
What is a Style?	510
Determining the Scope of a Style	511
Implicit Styles	512
BasedOn Styles	512
ItemContainerStyle	512
Control Templates	513
“Lookless” Controls	513
Reskinning a CheckBox	514
Creating Control Templates	515
Summary	515
 CHAPTER 13: CREATING XAML APPLICATIONS FOR WINDOWS 8	 517
 How XAML Differs in Windows 8	 518
Missing Elements	518
Old Elements Replaced by Functional Equivalents in Windows 8	519
Syntax Differences	519
Using Page as the Root Visual Element	520
Windows 8 UI Conventions	520
UI/UX Guidelines	522
Interaction between Your App and the Windows 8 OS	522
Chromeless Apps	522
Snapped Views	522
Typeface and Font Guidelines	523
Sizing and Layout of Visual Elements in an App	523
New Visual Elements in Windows 8	524
AppBar	524
ListView, GridView, and FlipView Controls	527
Pickers	542
ProgressRing	543
ToggleSwitch	544
Other New Elements	544
Old Elements with New Usage	545
Changes to the Visual Designer in Visual Studio 2012	547
Better Resource Selector	547
Common vs. Advanced Property Categories	548

Transform Properties	549
Animation	549
Application Templates in Visual Studio 2012	551
Split App	552
Grid App	552
Layout Aware Pages	555
Items in the Common Folder	555
StandardStyles.xaml	555
Online Documentation for Grid App and Split App Templates	556
Implementing a Live Tile	557
Implementing Contracts	558
Summary	560
 CHAPTER 14: APPLICATIONS WITH ASP.NET, MVC, JAVASCRIPT, AND HTML	 561
Visual Studio Support for ASP.NET	562
Web Site and Web Application Projects	562
Web Server Options	562
Server-Side Development	563
Web Forms	563
Web Pages and Razor	586
ASP.NET MVC	602
Client-Side Web Development	624
Web Development with HTML and JavaScript	624
Building Windows 8 Style Apps with HTML and JavaScript	638
Summary	644
 CHAPTER 15: LOCALIZATION	 645
Cultures and Regions	646
Understanding Culture Types	647
Looking at Your Thread	647
Declaring Culture Globally in ASP.NET	649
Adopting Culture Settings in ASP.NET	650
Translating Values and Behaviors	652
Understanding Differences in Dates	652
Differences in Numbers and Currencies	654
Understanding Differences in Sorting	656
ASP.NET Resource Files	658
Making Use of Local Resources	658
Localization for Windows Store Apps	663
Summary	665

CHAPTER 16: APPLICATION SERVICES	667
Using IIS for Application Services	668
Windows Services	668
Characteristics of a Windows Service	669
Interacting with Windows Services	669
Creating a Windows Service	671
The .NET Framework Classes for Windows Services	671
Other Types of Windows Services	674
Creating a Windows Service in Visual Basic	675
Creating a File Watcher Service	676
Creating a Solution for the Windows Service	677
Adding .NET Components to the Service	677
Installing the Service	680
Starting the Service	681
Uninstalling the Service	682
Communicating with the Service	683
The ServiceController Class	683
Integrating a ServiceController into the Example	685
More about ServiceController	686
Custom Commands	686
Passing Strings to a Service	688
Debugging the Service	689
Summary	690
 CHAPTER 17: ASSEMBLIES AND REFLECTION	 693
Assemblies	694
The Manifest	694
Assembly Identity	696
Referenced Assemblies	700
Assemblies and Deployment	701
Application-Private Assemblies	701
Shared Assemblies	701
Versioning Issues	703
Application Isolation	703
Side-By-Side Execution	704
Self-Describing Components	704
Version Policies	704
Configuration Files	706
Basics of Reflection	709
The Assembly Class	710

Getting Currently Loaded Assemblies	711
The Type Class	711
Dynamic Loading of Assemblies	713
The LoadFrom Method of the Assembly Class	713
Dynamic Loading Example	714
Putting Assemblies to Work	716
Summary	716
CHAPTER 18: SECURITY IN THE .NET FRAMEWORK	719
<hr/>	
Security Concepts and Definitions	720
Windows Store Projects	722
The System.Security.Permissions Namespace	723
Code Access Permissions	727
Identity Permissions	728
Role-Based Permissions	728
Managing Code Access Permission Sets	731
User Access Control	734
Defining Your Application UAC Settings	735
Security Tools	737
Exceptions Using the SecurityException Class	738
Encryption Basics	739
Hash Algorithms	741
Cryptographic Hash Algorithms	741
Symmetric Key Encryption	744
PKCS	747
Secure Sockets Layer	752
Summary	754
CHAPTER 19: PARALLEL PROGRAMMING USING TASKS AND THREADS	757
<hr/>	
Launching Parallel Tasks	758
System.Threading.Tasks.Parallel Class	758
Parallel.Invoke	759
Transforming Sequential Code to Parallel Code	764
Detecting Hotspots	765
Measuring Speedups Achieved by Parallel Execution	767
Understanding Parallel	769
Parallelizing Loops	770
Parallel.For	770
Parallel.ForEach	775
Exiting from Parallel Loops	781