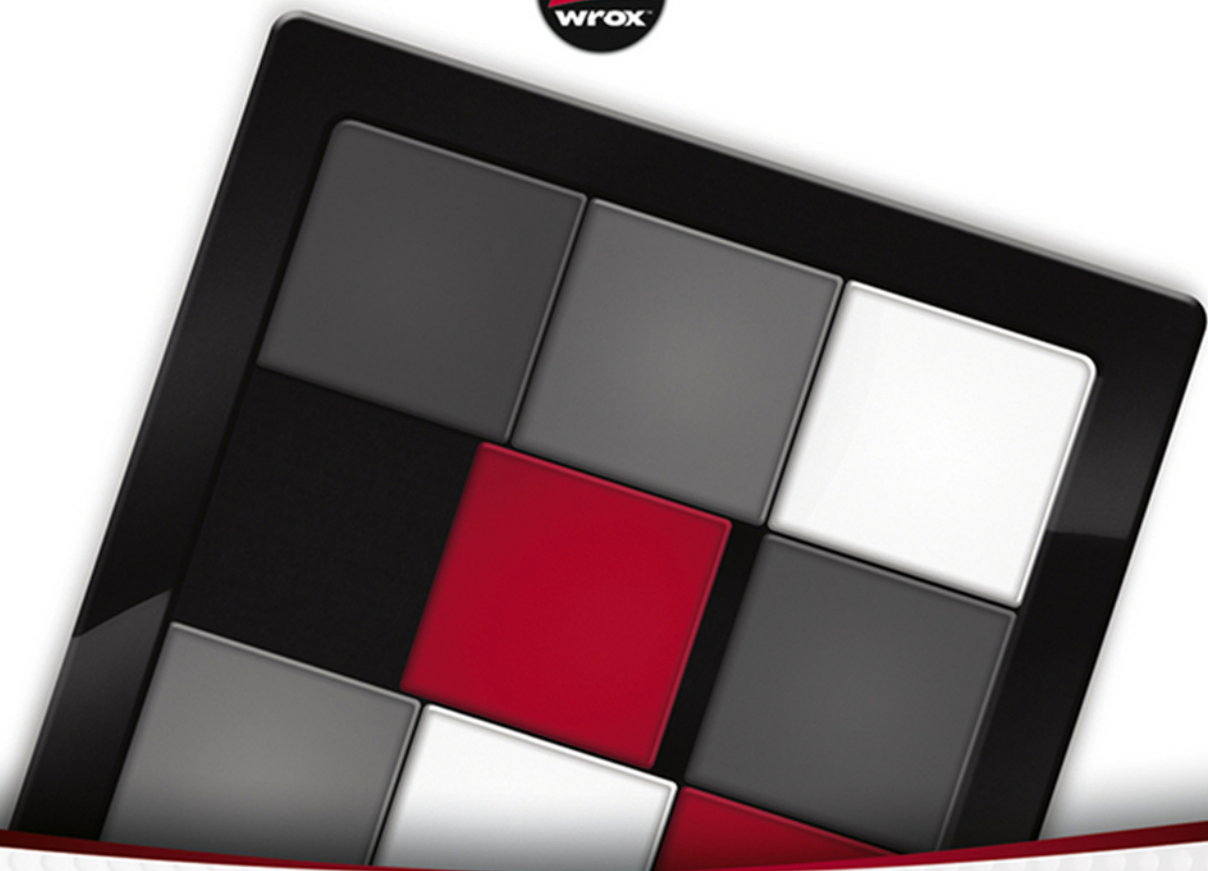


Join the discussion @ p2p.wrox.com



Wrox Programmer to Programmer™



Beginning

Windows® 8

Application Development

István Novák, György Balássy, Zoltán Arvai, Dávid Fülöp

BEGINNING

Windows[®] 8 Application Development

István Novák
György Balássy
Zoltán Arvai
Dávid Fülöp



John Wiley & Sons, Inc.

Beginning Windows® 8 Application Development

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

Copyright © 2012 by John Wiley & Sons, Inc., Indianapolis, Indiana

Published simultaneously in Canada

ISBN: 978-1-118-01268-0
ISBN: 978-1-118-22183-9 (ebk)
ISBN: 978-1-118-23562-1 (ebk)
ISBN: 978-1-118-26050-0 (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: 2012943021

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. Windows 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.

*To Henriett, Eszter, and Réka. Thank you for your
love and support.*

—ISTVÁN NOVÁK

*To Adrienn. Thank you for being so supportive and
for always standing behind me.*

—ZOLTÁN ARVAI

*To all my friends and family who endured while I was
writing the umpteenth “last” paragraph for the day—
at 10 p.m....on our holiday.*

—DÁVID FÜLÖP

CREDITS

Acquisitions Editor

Mary James

Project Editor

Kevin Shafer

Technical Editor

Alex Golesh

Production Editor

Kathleen Wisor

Copy Editor

Kim Cofer

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

Composer

Jeff Lytle, Happenstance Type-O-Rama

Proofreaders

Jennifer Bennet, Word One

Sarah Kaikini, Word One

Louise Watson, Word One

Indexer

Johnna VanHoose Dinse

Cover Designer

Ryan Sneed

Cover Image

© Donall O Cleirigh/iStockPhoto

ABOUT THE AUTHORS

ISTVÁN NOVÁK is an associate and the chief technology consultant of SoftwArt, a small Hungarian IT consulting company. He works as a software architect and community evangelist. In the last 20 years, he participated in more than 50 enterprise software development projects. In 2002, he co-authored the first Hungarian book about .NET development. In 2007, he was awarded with the Microsoft Most Valuable Professional (MVP) title, and in 2011 he became a Microsoft Regional Director. As the main author, he contributed in writing the *Visual Studio 2010 and .NET 4 Six-In-One* book (Indianapolis: Wiley, 2010), and he is the author of *Beginning Visual Studio LightSwitch Development* (Indianapolis: Wiley, 2011). He holds master's degree from the Technical University of Budapest, Hungary, and also has a doctoral degree in software technology. He lives in Dunakeszi, Hungary, with his wife and two teenage daughters. He is a passionate scuba diver. You may have a good chance of meeting him underwater at the Red Sea in any season of the year.

GYÖRGY BALÁSSY teaches web development as a lecturer at the Budapest University of Technology and Economics. He is a founding member of the local MSDN Competence Center (MSDNCC), having an important role in evangelizing the .NET platform as a speaker, book author, and consultant. Balássy provided leadership in the foundation of the Hungarian .NET community as a key evangelist on Microsoft events, technical forums, and as the head of the Portal Technology Group in the MSDNCC. He is a regular speaker on academic and industrial events, presenting in-depth technical sessions on .NET, ASP.NET, Office development, and ethical hacking, with which he won the Best Speaker and the Most Valuable Professional awards in SharePoint, ASP.NET, and IIS multiple times. He was also selected to be a member of the ASPInsiders group. Since 2005, Balássy has been the Microsoft Regional Director in Hungary. You can visit his blog at <http://gyorgybalassy.wordpress.com> or reach him at balassy@aut.bme.hu.

ZOLTÁN ARVAI is a software engineer specializing in client application development and front-end architectures. He's very passionate about user experience and next-generation user interfaces. He's been a freelancer the last seven years, working on several .NET projects, mainly in the enterprise software development world. Arvai was honored with the Microsoft Most Valuable Professional (MVP) award in 2009, and has been recognized three times as a Silverlight MVP. He is a frequent speaker at local Microsoft events. Arvai has co-authored Hungarian books about Silverlight 4.0 and Windows Phone 7.5. He lives in Budapest, Hungary, where he enjoys playing jazz on his old piano, and is a big fan of meeting different cultures all over the world.

DÁVID FÜLÖP is a Hungarian software developer who spent the past decade building .NET and, later, Silverlight applications. Apart from writing code and writing books about writing code, he's been a freelance software development trainer teaching developers of various companies, and giving lectures to college students at the University of Óbuda. Also, he's a recurring presenter at local Microsoft-related developer events. In his free time, he does karate, plays online, and furiously tries to learn the Klingon language.

ABOUT THE TECHNICAL EDITOR

ALEX GOLESH is a Chief Technology Officer (CTO) at Sela (located in Seattle). He is an international expert who specializes in Windows 8, Windows Phone, XNA, Silverlight, and Windows Presentation Foundation (WPF). Golesh is currently consulting for various enterprises worldwide, architecting and developing Windows 8, Windows Phone, Rich Internet Applications (RIA), and Smart Client solutions. He has been developing training samples and courses for various product groups at Microsoft (in Redmond, WA). He conducts lectures and workshops, and leads projects worldwide in the fields of Windows 8, Windows Phone, RIA, and Smart Client. He has conducted Windows Phone 7, WPF, and Silverlight trainings in Israel, India, Sweden, and Poland as a part of the Microsoft Early Adoption Program. He has received recognition as a Microsoft Most Valuable Professional (MVP) for four years in a row.

ACKNOWLEDGMENTS

WRITING THIS BOOK WAS A GREAT ADVENTURE! Just a few weeks after I had completed my previous book, Paul Reese called and asked me to participate in a book about Windows 8. I did not hesitate, and immediately said “yes.” I’m happy that Paul took a chance on me again, and hope he’ll be content with the result.

This book wouldn’t have been completed on time without Kevin Shafer and Mary E. James. Kevin not only did amazing editorial work, but also undertook the burdens of adjusting the book again and again as Microsoft changed the terminology of Windows 8. Mary always kept the book on the right track, and encouraged us when we had to revise previously completed chapters because of breaking changes in a new release of Windows 8.

I’d also like to thank Kim Cofer for thoroughly reading the manuscript, removing ambiguities, and translating complex paragraphs to simple and tangle-free sentences. Alex Golesh not only reviewed the book from technical point of view, but also suggested great ideas to make the exercises in this book easier to follow and understand. I’m very grateful for his help.

I would not have been able to create this book without such a great authoring team. So, I’d like to thank György, Zoltán, and Dávid for adding their hearts and souls to this adventure. It was great to work with you!

Finally, I owe many kisses to my wife and daughters for letting me spend so many hours in my study, working on this book. I’ll keep my promise, and we’ll spend the remaining weekends of this summer together.

—ISTVÁN NOVÁK

WRITING THIS BOOK WAS REALLY DIFFICULT, but definitely one of the most exciting tasks I’ve ever completed. Windows 8 is so exciting, and there is so much to tell and write about the possibilities and brilliant technological solutions that it seemed almost impossible to fit all this information into a single book.

I would have never succeeded without the help of István Novák, Kevin Shafer, and Mary E. James. Thank you for leading me on the right path with my chapters to make this book as awesome as it has turned out to be.

I’d also like to thank György and Dávid for contributing to this book, and putting all the hard work into this project. It was really great and fun to work with you guys!

I'd also like to thank Kim Cofer and Alex Golesh, who thoroughly read my chapters and made sure that the silly mistakes I made would never see the sunlight. Thank you for all your suggestions and your hard work.

I'm very grateful for the chance to work on this project. It was a real adventure. Thank you all for your help.

Last, but not least, Adrienn, thank you for supporting me all the way, and accepting that I couldn't be with you on those long nights. I promise I'll make it up to you.

—ZOLTÁN ARVAI

FIRST OF ALL, I'D LIKE TO THANK ZOLTÁN AND ISTVÁN for inviting me on board to participate in writing my first non-Hungarian book. You do know how much fun it was! Thank you for guiding me, and keeping me from making all my sample apps Trek- or South Park-related. I'd also like to thank György, who made the book complete with his invaluable chapters.

I'd like to thank to the editorial crew at Wiley: Kevin Shafer for the incredibly insightful advice on making every page better, and Mary E. James for helping me with the book writing process. Kim Cofer deserves all my appreciation for making my English-like sentences really English. The book's readability improved a lot thanks to Kim. Last, but not least, I'd like to thank Alex Golesh, our Technical Editor, who was always there to make the book thorough by providing another vital point of view on every matter.

Finally, I'd like to thank my parents, Gyuri and Zsuzsa, and my girlfriend, Dóri, for their support while I was living like a hermit for days, living my life aloof with my laptops when a deadline was near. I hope you can forgive the short bursts of complete lack of interest in socializing, sleeping or eating, just like our cats, Seven and Cica could.

—DÁVID FÜLÖP

CONTENTS

INTRODUCTION

xix

PART I: INTRODUCTION TO WINDOWS 8 APPLICATION DEVELOPMENT

CHAPTER 1: A BRIEF HISTORY OF WINDOWS APPLICATION DEVELOPMENT 3

The Life of Windows 3

From Windows 3.1 to 32-bit 4

Windows XP and Windows Vista 5

Windows 7 Blots Out Vista Fiasco 6

The Paradigm Shift of Windows 8 6

 Microsoft Takes the First Steps Toward Consumers 6

 Windows 8 Appears on the Scene 7

History of APIs and Tools 9

The Power of C 10

C++ Takes Over C 12

Visual Basic 14

Delphi 15

The Emergence of .NET 15

New UI Technologies 17

Catch-22 of Windows Application Development 19

Summary 20

CHAPTER 2: USING WINDOWS 8 25

Two Worlds, One Operating System 25

Input Methods 27

 Multi-Touch Input 27

 The Software Keyboard 29

 Other Input Devices 30

Logging In 30

The Start Screen 31

 Evolution of the Start Menu 32

 Browsing and Searching for Installed Apps 34

 Using Live Tiles 39

 The Context Bar of a Live Tile 39

 Relocating Live Tiles 42

 Live Tile Groups 43

Using Windows 8 Style Apps	46
Closing a Windows 8 Style App	46
Switching between Windows 8 Style Apps	47
Using Multiple Windows 8 Style Apps at the Same Time	47
The Windows Charm Bar	50
Introducing the Charm Bar	50
The Start Button	50
The Search Button	51
The Share Button	52
The Devices Button	54
The Settings Button	55
The Windows Desktop	56
Introducing the Desktop App	56
Switching between Desktop Programs	57
Where Is the Start Button?	57
Summary	58
CHAPTER 3: WINDOWS 8 ARCHITECTURE FROM A DEVELOPER'S POINT OF VIEW	61
<hr/>	
Windows 8 Development Architecture	62
Desktop Application Layers	64
Windows 8 Style Application Layers	65
The Challenge	66
Architecture Layers Overview	66
Understanding Windows Runtime	67
Windows Runtime Architecture Overview	68
Windows Runtime Design Principles	68
The Building Blocks of Windows Runtime	69
Metadata in Windows Runtime	70
Metadata Format	71
Namespaces	75
Language Projections	76
Benefits of Windows Runtime	78
What's not in Windows Runtime	79
.NET Framework 4.5	80
The Installation Model of .NET Framework 4.5	80
Window Runtime Integration	81
Asynchrony Support	82
Other New Features	82

Picking the Appropriate Technology for Your Project	83
The Windows Store	83
Windows 8 or Desktop Applications?	84
Choosing a Programming Language	85
Summary	85
CHAPTER 4: GETTING TO KNOW YOUR DEVELOPMENT ENVIRONMENT	89
<hr/>	
Introducing the Toolset	90
Visual Studio 2012	90
A Brief History of Visual Studio	90
Visual Studio Editions	91
Installing Visual Studio 2012 Express for Windows 8	91
A Short Tour of the Visual Studio IDE	93
Creating a New Project	94
Using Samples and Extensions	101
Creating a New Project from a Sample	102
Installing and Using Extensions	103
A Few Useful Things to Learn about the IDE	105
The Visual Studio Start Page	106
Window Management	106
Using Quick Launch	107
Lighting Up Your Applications with Expression Blend	108
Starting Expression Blend with a Visual Studio Solution	109
Adding an Animated Object to the UI	111
Starting the Animation	114
Using Visual Studio and Blend Together	115
Summary	115
PART II: CREATING WINDOWS 8 APPLICATIONS	
<hr/>	
CHAPTER 5: PRINCIPLES OF MODERN WINDOWS APPLICATION DEVELOPMENT	121
<hr/>	
Windows 8 Style Applications	122
What Is the Windows 8 Design Language?	122
General Design Principles for Windows 8 Applications	123
Application Structure and Navigation Models	124

Asynchronous Development Platform	131
Introduction to Asynchronous Programming	132
Evolution of Asynchronous Programming on the .NET Platform	134
Asynchronous Programming with C# 5.0	137
Asynchronous Development on Windows Runtime	150
Asynchronous Programming with JavaScript Promises	153
Summary	163
CHAPTER 6: CREATING WINDOWS 8 STYLE APPLICATIONS WITH HTML5, CSS, AND JAVASCRIPT	165
<hr/>	
HTML5 and CSS on the Web	166
Getting to Know HTML5 Technologies	166
New Semantic and Structural Elements	167
New Media Elements	167
New Form Elements and Input Types	167
Drawing	167
First Steps with HTML	168
Styling Pages with CSS	172
First Steps with CSS	173
Running Client-Side Code	181
First Steps with JavaScript	181
HTML5 Applications on Windows Runtime	188
The Windows Library for JavaScript (WinJS)	188
Creating Windows 8 Style Applications with JavaScript	189
Accessing the Filesystem	190
Managing Data	195
Respecting the User's Device	204
Scrolling and Zooming	213
Canvas Graphics in Windows 8 Style Applications	217
Using the Windows 8 Animation Library	222
Summary	228
CHAPTER 7: USING XAML TO CREATE WINDOWS 8 STYLE USER INTERFACES	231
<hr/>	
Describing the User Interface Using XAML	232
Using Namespaces	234
Understanding the Layout Management System	237
A New Concept: Dependency Properties	238
Taking Dependency Properties One Step Further with Attached Properties	238
Properties Affecting the Size and Layout of a Control	239
The Canvas Panel	240

The StackPanel Panel	240
The Grid Panel	241
Defining Rows and Columns	241
Placing a Control Inside a Grid	242
The VariableSizedWrapGrid Panel	243
Reusable Resources in XAML	248
Referencing Resources	248
The Hierarchy of Resources	249
Resource Dictionaries	249
System Resources	250
Basic Controls in Windows 8 Style Applications	251
Controls with Simple Values	252
The Border Element	252
The Image Element	253
The TextBlock Element	254
The TextBox Control	254
The PasswordBox Control	255
Displaying Progress with the ProgressBar and ProgressRing Controls	255
Content Controls	256
The Button Control	256
The CheckBox and the RadioButton Controls	257
The ScrollViewer Control	257
The ToggleSwitch Control	257
Working with Data	259
Data Binding Dependency Properties and Notifications	260
Binding Modes and Directions	262
The DataContext Property	262
Changing the Data in the Binding Pipeline Using Value Converters	263
Binding to Collections	264
Summary	268
CHAPTER 8: WORKING WITH XAML CONTROLS	271
<hr/>	
Using Animations in Your Application	272
Animation Library	272
Theme Transitions	273
Theme Animations and Storyboards	274
Getting to Know Visual States	276
Custom Animations	280
Transformations	281
Origin of Transformations	282
Applying Multiple Transformations	283
Transformations in the 3-D Space	283

Designing the Visual Look of a Control	285
Connecting the Control with the Inside	286
Responding to Interactions	287
Working with Expression Blend	290
The Toolbar	291
The Projects Panel	291
The Assets Panel	292
The States Panel	292
The Device Panel	292
The Objects and Timeline Panel	293
The Designer Surface	293
The Properties Panel	294
The Resources Panel	294
Working with Complex Controls	298
Getting to Know the ListViewBase Controls	298
Using the GridView Control	299
Binding to Data	299
Grouping Data	300
Defining Visual Groups	301
Using the ListView Control	302
Comparing ListView to ListBox	302
Using the FlipView Control	304
Using SemanticZoom	305
Using the AppBar Control	309
Summary	310
CHAPTER 9: BUILDING WINDOWS 8 STYLE APPLICATIONS	313
<hr/>	
The Lifecycle of a Windows 8 Application	314
Application Lifecycle States	314
Managing Application State Changes	315
Suspending, Resuming, and Closing the Application	316
Using Application Lifecycle Events	317
Deploying Windows 8 Apps	322
Application Packages	323
The Application Package Manifest	326
Installation, Update, and Removal	327
Commanding Surfaces	328
Using the Context Menu	329
Using the App Bar	331
Using Message Dialog Boxes	337
Using the Settings Charm in Your App	340

Persisting Application Data	342
Application Data Stores	343
The ApplicationData Class	343
Applications and the Start Screen	347
Application Logo and the Splash Screen	347
Vivifying App Tiles with Notifications	349
Tile Notification Format	350
Updating Tile Notifications	350
Removing Tile Notifications	351
Managing Normal and Wide Tile Notifications	351
Using Tile Images	352
Other Live Tile Features	352
Tile Notification Samples	353
Summary	353
CHAPTER 10: CREATING MULTI-PAGE APPLICATIONS	357
Navigation Basics	358
Navigation Patterns	358
Hub Navigation	358
Direct Navigation	359
Hierarchical Navigation	359
Semantic Zoom	360
Working with Pages	362
Navigating Backward and Forward	363
Parameters and Navigation Events	366
Navigation Event Arguments	366
Using Navigation Parameters	367
Navigating Away from Pages	368
Using App Bars for Navigation	369
The Intuitive Solution	370
Fixing the App Bar Issue	372
Launching Files and Web Pages	375
Using the Split Application and Grid Application Templates	377
The Structure of the Templates	378
Managing Sample Data and Runtime Data	382
Layout Management	384
Using Logical Pages	385
Using Rich Text Columns	385
Other Features to Study	386
Summary	387

CHAPTER 11: BUILDING CONNECTED APPLICATIONS	391
Integrating with the Operating System and Other Apps	392
Pickers: Unified Design to Access Data	392
Understanding the Concept of Contracts	400
Using Contracts	400
The Search Contract	402
The Share Target Contract	407
Accessing the Internet	412
Detecting the Changes of Internet Connectivity	412
Using Feeds	415
Accessing Windows Live	420
Summary	428
CHAPTER 12: LEVERAGING TABLET FEATURES	431
Accommodating Tablet Devices	432
Building Location-Aware Applications	432
Using Geolocation	433
Using Sensors	441
Using Raw Sensor Data	442
Using the Accelerometer	442
Using the Gyroscope	448
Using the Ambient Light Sensor	455
Using Sensor Fusion Data	456
Using the Magnetometer through the Compass	457
Using the Inclinometer	457
Detecting Device Orientation in a Simple Way	458
Other Options for Detecting Device Orientation	459
Summary	460
PART III: ADVANCING TO PROFESSIONAL WINDOWS 8 DEVELOPMENT	
CHAPTER 13: CREATING WINDOWS 8 STYLE APPLICATIONS WITH C++	465
Microsoft and the C++ Language	466
Clean and Safe	467
C++ and Windows 8 Apps	470
Privileges of C++ in Windows 8 Apps	470
Windows Runtime and C++	471
Managing Windows Runtime Objects in C++	472
Defining Runtime Classes	474
Exceptions	475

Discovering C++ Features with Visual Studio	478
Creating C++ Projects	478
Elements of a C++ Project	480
Using the Platform::String type	481
Using Runtime Collections	483
Using Asynchronous Operations	484
Using Accelerated Massive Parallelism	486
Summary	489
<hr/> CHAPTER 14: ADVANCED PROGRAMMING CONCEPTS	<hr/> 493
Building Solutions with Multiple Languages	494
Hybrid Solutions	494
Creating a Hybrid Solution with C# and C++ Projects	495
Creating and Consuming Windows Runtime Components	498
Background Tasks	502
Understanding Background Tasks	502
Background Tasks and System Resources	503
How Background Tasks Work	503
Trigger Events and Task Conditions	504
The Lock Screen and Background Tasks	505
The BackgroundTaskHost.exe Program	506
Communicating between Foreground Applications and Background Tasks	506
Canceling Background Tasks	507
Application Updates	507
Implementing Background Tasks	507
Creating a Simple Background Task	507
Managing Task Progress and Cancelation	512
Input Devices	516
Querying Input Device Capabilities	516
Keyboard Capabilities	516
Mouse Capabilities	517
Touch Device Capabilities	518
Querying Pointer Device Information	518
Summary	520
<hr/> CHAPTER 15: TESTING AND DEBUGGING WINDOWS 8 APPLICATIONS	<hr/> 525
The Quality of Your Software	526
Becoming Familiar with Debugging	526
Controlling the Program Flow in Debug Mode	527

Monitoring and Editing Variables	528
The Locals Window	528
The Watch Window	529
The Immediate Window	529
The Breakpoints Window	530
Changing the Code While Debugging	531
Windows 8 Style Application-Specific Scenarios	532
Debugging Application Lifecycle Events	532
Specifying Deployment Targets	532
Introduction to Software Testing	534
Introduction to Unit Testing	534
Unit Testing Windows 8 Style Applications	535
Summary	538
CHAPTER 16: INTRODUCING THE WINDOWS STORE	541
<hr/>	
Getting to Know the Windows Store	541
How Customers See an App in the Windows Store	542
Application Details	542
Making Money with Your App	543
Full-Featured Apps	544
Free Trial Period	544
Creating a Trial Version	544
Using In-App Purchases	545
Implementing an In-App Purchase	546
Displaying Advertisements	547
Let's Talk About the Money	548
The Developer Registration Process	550
Submitting the Application	551
The Application Certification Process	553
The Windows App Certification Kit	553
Summary	554
<hr/>	
PART IV: APPENDICES	
APPENDIX A: ANSWERS TO EXERCISES	559
<hr/>	
APPENDIX B: USEFUL LINKS	573
<hr/>	
INDEX	577

INTRODUCTION

DURING ITS 27 YEARS OF LIFE, Windows has undergone several big changes. Without a doubt, both users and developers perceive a big leap from Windows 7 to Windows 8! When Microsoft began development of the newest Windows version, it totally re-imagined the operating system. Instead of patching the previous versions and just adding new or mandatory features, Microsoft started developing Windows 8 from the ground up by defining the user experience as one of the top priorities.

The new operating system was previewed at the beginning of summer in 2011. At the Build developer's conference held in Anaheim, California, in September 2011, Microsoft publicly released the Developer Preview version of Windows 8. Moreover, conference attendees were given an Intel-based quad-core Samsung tablet with Windows 8 Developer Preview installed. This event provided big momentum and built anticipation for the release of Microsoft's newest operating system. Windows 8 was no longer just a concept. It was actually touchable — figuratively and physically.

Windows 8 introduces a new kind of application, referred to as *Windows 8 style apps*. These apps provide a novel approach for the users by means of a new user interface (UI)—such as the authentically digital user experience of the design, the fluent and responsive application screens, and the experience of browsing and installing apps from the Windows Store. These new apps not only provide a unique and pleasurable user experience, but developers can also take advantage of novel tools, APIs, and programming techniques!

WHO THIS BOOK IS FOR

This book was created with the variety of programmers and software developers in mind. Although the tools and the programming languages for creating Windows 8 applications have matured and are used by millions of programmers all around the world, the majority of concepts and APIs are fairly new.

If you have experience with C++ programming or (in the realm of .NET) with C#/Visual Basic, or you have experience creating web pages with HTML and JavaScript, you'll be able to use your existing skills and learn the new concepts and APIs. The chapters of this book are built on each other. If you read them from the beginning to the end, you'll get to know the fundamentals of designing and creating Windows 8 style apps — even if you're a novice programmer, or if you've just turned to Windows development.

The first part of the book prepares you for Windows 8 style app development. It provides an overview of the most important concepts and tools, and explains the architectural basics of the new development platform. If you're a seasoned Windows programmer, you can skip Chapter 1 and Chapter 4.

The second part of the book starts by explaining the essential principles that are the key traits of modern app development, and these are used in the subsequent chapters.

The four programming languages that can be used for creating Windows 8 style apps are C++, C#, Visual Basic, and JavaScript. The size and scope of this book would have doubled if all four languages had been treated in detail, so C# is used in most of the samples and exercises. If you have web development experience, or you're interested in programming apps with web technologies, Chapter 6 focuses on HTML5, CSS3, and JavaScript. If you're using C++ today, Chapter 13 treats that great programming language in the context of Windows 8 apps.

WHAT THIS BOOK COVERS

Windows 8 promises that you can run every Windows 7 application on the new version of the operating system. Moreover, you can use existing technologies and tools to develop applications on Windows 8. This book focuses on the Windows 8 style app development that is brand new and not available in any previous versions of the operating system. It treats the existing technologies only in the context of Windows 8 style app development.

After reading this book, you will be familiar with the following general areas:

- The architectural basics of the new application development platform
- The fundamental new principles and traits of Windows 8 application development — using both .NET languages and HTML/JavaScript
- The basics of Windows 8 style app development using the HTML5/CSS3/JavaScript web technologies
- The XAML markup used to create a Windows 8 style app UI with the built-in UI controls
- The creation of a more complex UI with multiple pages and new commanding surfaces introduced in Windows 8
- The fundamental APIs of Windows Runtime, which is used to create full-fledged applications that leverage touch and tablet features
- The scenarios in which the C++ programming language is the right choice
- The distribution and sale of your apps in the Windows Store

You learn about these topics through hands-on exercises that walk you through the use of Microsoft Visual Studio 2012 Express for Windows 8 in tandem with Microsoft Expression Blend to create Windows 8 style apps.

HOW THIS BOOK IS STRUCTURED

This book is divided into three sections that will help you understand the concepts behind Windows 8 application development as well as become familiar with the fundamental tools and techniques.

- The first part provides a quick overview that presents the fundamental changes brought into application development by Windows 8 — including the user experience scenarios, UI concepts, application architecture, and tools.
- In the second part, the numerous hands-on exercises enable you to learn the main concepts, fundamental techniques, and best practices of Windows 8 style application development.
- The third part introduces a few advanced topics that help you to step toward becoming a professional Windows 8 app developer.

Most chapters first establish a context and treat the essential concepts, illustrated with figures and code snippets. You learn how to use these concepts through hands-on exercises, in which you build Windows 8 apps from scratch and improve the ones you built earlier. Each exercise concludes with a “How It Works” section that explains how (including all important details) the exercise achieves its objective.

Part I: Introduction to Windows 8 Application Development

Windows 8 totally changes the landscape of application development with the new style of app. In this part, you become acquainted with the fundamental concepts, technologies, and tools that make it possible to leverage these great features.

- **Chapter 1: “A Brief History of Windows Application Development”**—Windows 8 represents the biggest leap in the entire lifetime of the operating system family. Here you learn how the operating system evolved during the past 27 years, and then you traverse the development technologies and tools as they developed in tandem with Windows.
- **Chapter 2: “Using Windows 8”**—Windows 8 changes a lot in terms of the UI. It was built with a more touch-centric approach in mind. Although the user may learn these things intuitively, for a developer, it is imperative to know all the nooks and crannies of using the Windows 8 UI. After reading this chapter, you will get the sense of building really engaging and intuitive apps that users use not just to complete a task but enjoy using.
- **Chapter 3: “Windows 8 Architecture from a Developer’s Point of View”**—Windows 8 provides a new development model via a new kind of application — Windows 8 style apps — while still allowing for the development of traditional desktop applications. Here you learn the architecture of components that help you to develop these kinds of apps, including the cornerstone, Windows Runtime.
- **Chapter 4: “Getting to Know Your Development Environment”**—Microsoft provides great tools to leverage the magnificent Windows 8 technologies. In this chapter, you learn about the two fundamental tools you are going to utilize while developing your apps: Visual Studio 2012 and Expression Blend.

Part II: Creating Windows 8 Applications

In this part, you learn the indispensable concepts and patterns you need to know about developing Windows 8 applications. You start with modern principles and move toward creating application UIs. Having this knowledge, you shift to techniques and components that enable you to develop full-fledged Windows 8 style apps.

- **Chapter 5: “Principles of Modern Windows Application Development”**—Before you start to program, you must understand the basic principles of modern Windows application development. Here you learn about the key concepts of the Windows 8 design language, and then you explore and try out the brand new asynchronous programming patterns in C# and JavaScript.
- **Chapter 6: “Creating Windows 8 Style Applications with HTML5, CSS, and JavaScript”**—Windows 8 enables web developers to build on their past experiences because they can utilize their existing HTML, CSS, and JavaScript knowledge. This chapter provides a brief overview of these technologies in regard to Windows 8 style app development.
- **Chapter 7: “Using XAML to Create Windows 8 Style User Interfaces”**—In this chapter, you learn about the basics of developing Windows 8 style application UIs using eXtensible Application Markup Language (XAML). XAML provides a way to develop the UI with a rich set of tools, including layout management, styles, templates, and data binding, as you will discover here.
- **Chapter 8: “Working with XAML Controls”**—Windows 8 provides a number of predefined UI controls, including buttons, text boxes, lists, grids — any many more — that can be used in XAML. In this chapter, you learn not only how to use these controls, but how to transform and customize them, and how to utilize Expression Blend.
- **Chapter 9: “Building Windows 8 Style Applications”**—Windows 8 style applications use a set of patterns to provide a uniform user experience. Here you learn about patterns that determine how your application can implement the same user interaction experience as the new apps that are shipped as a part of Windows 8. You also learn important details about integrating your apps with the operating system’s Start screen.
- **Chapter 10: “Creating Multi-Page Applications”**—In this chapter, you learn how to create applications with multiple pages. You start by studying the navigation concepts used in Windows 8 style apps, and you get acquainted with the UI controls that support paging. Visual Studio provides two project templates — the Grid Application template and the Split Application template — that are great for starting your multi-page apps. Here you discover the details surrounding these templates.
- **Chapter 11: “Building Connected Applications”**—Modern applications often leverage services available on the Internet, such as weather information, financial services, social networks, and many others. In this chapter, you learn how to utilize Windows 8 features that enable you to develop connected applications using these Internet services as building blocks.

- **Chapter 12: “Leveraging Tablet Features”**—Windows 8 is very focused on tablets with touchscreen devices and various sensors. Here you discover the APIs that enable you to integrate touch experience and sensor information into your apps to provide a great tablet-aware user experience.

Part III: Advancing to Professional Windows 8 Development

The topics treated in this part widen your knowledge of Windows 8 style app development. Here you learn concepts and techniques that enable you to start creating professional apps and even monetize them through the Windows Store.

- **Chapter 13: “Creating Windows 8 Style Applications with C++”**—The C++ programming language has experienced a renaissance because of its performance characteristics. Now you can develop Windows 8 style apps with C++. In this chapter, you learn how the newest version of C++ supports Windows 8 apps, and in which scenarios C++ is the best choice.
- **Chapter 14: “Advanced Programming Concepts”**—In this chapter, you learn several concepts that enable you to develop more advanced Windows 8 style apps, such as hybrid projects that mix several programming languages, background tasks, and querying input devices and touch capabilities.
- **Chapter 15: “Testing and Debugging Windows 8 Style Applications”**—Creating high-quality apps is important if you want to achieve success with them. Here you learn how to write additional code to test your application logic to ensure that your code behaves exactly the way it should. You will also learn indispensable debugging techniques to find the root causes of malfunctions in your code.
- **Chapter 16: “Introducing the Windows Store”**—As a developer, you can submit your application to the Windows Store to enable users to buy and install it seamlessly. In this chapter, you learn about the prerequisites and the flow of the submission process, as well as other tools that help you in this workflow.

WHAT YOU NEED TO USE THIS BOOK

Windows 8 supports two separate hardware platforms. One of them is the Intel platform (just as all previous Windows versions have supported it), including the 32-bit x86 and 64-bit x64 versions. The other one is based on the ARM processor architecture (typically used on mobile phones and touchscreen tablet devices), and this platform (Windows on ARM) is new in the Windows family of operating systems.

To create Windows 8 style applications, you need the development tools, and those run only on the Intel platform. So, you must install either the x86 or the x64 version of Windows 8 on your computer used for development. As of the writing of this book, Windows on ARM is not available.

You can use Microsoft Visual Studio 2012 and Microsoft Expression Blend to create Windows 8 style apps. If you have an appropriate Microsoft Developer Network (MSDN) subscription, you may have licenses for using these tools. Otherwise, you can download Microsoft Visual Studio 2012 Express for Windows 8 — including Expression Blend — for free. This book uses the Express version. Owing to the development tools, the Windows 8 style apps you create will run on both the Intel and ARM platforms.

CONVENTIONS

To help you get the most from the text and keep track of what’s happening, we’ve used a number of conventions throughout the book.

TRY IT OUT

The “Try It Out” is an exercise you should work through, following the text in the book.

1. It usually consists of a set of steps.
2. Each step has a number.
3. Follow the steps through with your copy of the database.

How It Works

After each “Try It Out” exercise, the code you’ve typed is explained in detail.

As for styles in the text:

- We *highlight* new terms and important words when we introduce them.
- We show keyboard strokes like this: Ctrl+A.
- We show filenames, URLs, and code within the text like so: `persistence.properties`.
- We present code in two different ways:

We use a monofont type with no highlighting for most code examples.

We use bold to emphasize code that is particularly important in the present context or to show changes from a previous code snippet.

SOURCE CODE

As you work through the examples in this book, you may choose either to type in all the code manually, or to use the source code files that accompany the book. All the source code used in this book is available for download at <http://www.wrox.com>. When at the site, simply locate the book’s title (use the Search box or one of the title lists) and click the Download Code link on the book’s detail page to obtain all the source code for the book.

NOTE Because many books have similar titles, you may find it easiest to search by ISBN; this book's ISBN is 978-1-118-01268-0.

Once you download the code, just decompress it with your favorite compression tool. Alternatively, you can go to the main Wrox code download page at <http://www.wrox.com/dynamic/books/download.aspx> to see the code available for this book and all other Wrox books.

ERRATA

We make every effort to ensure that there are no errors in the text or in the code. However, no one is perfect, and mistakes do occur. If you find an error in one of our books (like a spelling mistake or faulty piece of code), we would be very grateful for your feedback. By sending in errata, you may save another reader hours of frustration, and at the same time, you will be helping us provide even higher quality information.

To find the errata page for this book, go to <http://www.wrox.com> and locate the title using the Search box or one of the title lists. Then, on the book details page, click the Book Errata link. On this page, you can view all errata that has been submitted for this book and posted by Wrox editors. A complete book list, including links to each book's errata, is also available at www.wrox.com/misc-pages/booklist.shtml.

If you don't spot "your" error on the Book Errata page, go to www.wrox.com/contact/techsupport.shtml and complete the form there to send us the error you have found. We'll check the information and, if appropriate, post a message to the book's errata page and fix the problem in subsequent editions of the book.

P2P.WROX.COM

For author and peer discussion, join the P2P forums at p2p.wrox.com. The forums are a web-based system for you to post messages relating to Wrox books and related technologies, and to interact with other readers and technology users. The forums offer a subscription feature to e-mail you topics of interest of your choosing when new posts are made to the forums. Wrox authors, editors, other industry experts, and your fellow readers are present on these forums.

At <http://p2p.wrox.com>, you will find a number of different forums that will help you, not only as you read this book, but also as you develop your own applications. To join the forums, just follow these steps:

1. Go to p2p.wrox.com and click the Register link.
2. Read the terms of use and click Agree.
3. Complete the required information to join, as well as any optional information you wish to provide, and click Submit.

4. You will receive an e-mail with information describing how to verify your account and complete the joining process.

NOTE *You can read messages in the forums without joining P2P, but in order to post your own messages, you must join.*

Once you join, you can post new messages and respond to messages other users post. You can read messages at any time on the web. If you would like to have new messages from a particular forum e-mailed to you, click the Subscribe to this Forum icon by the forum name in the forum listing.

For more information about how to use the Wrox P2P, be sure to read the P2P FAQs for answers to questions about how the forum software works, as well as many common questions specific to P2P and Wrox books. To read the FAQs, click the FAQ link on any P2P page.

PART I

Introduction to Windows 8 Application Development

- ▶ **CHAPTER 1:** A Brief History of Windows Application Development
- ▶ **CHAPTER 2:** Using Windows 8
- ▶ **CHAPTER 3:** Windows 8 Architecture from a Developer's Point of View
- ▶ **CHAPTER 4:** Getting to Know Your Development Environment

