A Programmer's Introduction to C# 2.0

Third Edition

ERIC GUNNERSON AND NICK WIENHOLT

Apress®

A Programmer's Introduction to C# 2.0, Third Edition

Copyright © 2005 by Eric Gunnerson and Nick Wienholt

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system, without the prior written permission of the copyright owner and the publisher.

ISBN (pbk): 1-59059-501-7

Printed and bound in the United States of America 9 8 7 6 5 4 3 2 1

Trademarked names may appear in this book. Rather than use a trademark symbol with every occurrence of a trademarked name, we use the names only in an editorial fashion and to the benefit of the trademark owner, with no intention of infringement of the trademark.

Lead Editor: Jon Hassell
Technical Reviewer: Gavin Smyth
Editorial Board: Steve Anglin, Dan Appleman, Ewan Buckingham, Gary Cornell, Tony Davis, Jason Gilmore, Jonathan Hassell, Chris Mills, Dominic Shakeshaft, Jim Sumser
Assistant Publisher: Grace Wong
Project Manager: Kylie Johnston
Copy Edit Manager: Nicole LeClerc
Copy Editor: Kim Wimpsett
Production Manager: Kari Brooks-Copony
Compositors: Susan Glinert and Wordstop Technologies (P) Limited
Proofreader: Elizabeth Berry
Indexer: Broccoli Information Management
Artist: April Milne
Cover Designer: Kurt Krames
Interior Designer: Van Winkle Design Group
Manufacturing Manager: Tom Debolski

Distributed to the book trade in the United States by Springer-Verlag New York, Inc., 233 Spring Street, 6th Floor, New York, NY 10013, and outside the United States by Springer-Verlag GmbH & Co. KG, Tiergartenstr. 17, 69112 Heidelberg, Germany.

In the United States: phone 1-800-SPRINGER, fax 201-348-4505, e-mail `orders@springeronline.com`, or visit `http://www.springeronline.com`. Outside the United States: fax +49 6221 345229, e-mail `orders@springeronline.com`, or visit `http://www.springeronline.com`.

For information on translations, please contact Apress directly at 2560 Ninth Street, Suite 219, Berkeley, CA 94710. Phone 510-549-5930, fax 510-549-5939, e-mail `info@apress.com`, or visit `http://www.apress.com`.

The information in this book is distributed on an "as is" basis, without warranty. Although every precaution has been taken in the preparation of this work, neither the author(s) nor Apress shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information contained in this work.

The source code for this book is available to readers at `http://www.apress.com` in the Downloads section.

Contents at a Glance

Foreword to the Third Edition xxiii
Foreword to the First Two Editions xxv
About the Authors xxvii
About the Technical Reviewer xxix
Acknowledgments xxxi
Introduction xxxiii

CHAPTER 1 Object-Oriented Basics 1
CHAPTER 2 The .NET Runtime Environment 5
CHAPTER 3 C# Quick Start and C# Development 11
CHAPTER 4 Exception Handling 21
CHAPTER 5 Classes 101 31
CHAPTER 6 Base Classes and Inheritance 39
CHAPTER 7 Member Accessibility and Overloading 53
CHAPTER 8 Other Class Details 61
CHAPTER 9 Structs (Value Types) 79
CHAPTER 10 Interfaces 85
CHAPTER 11 Versioning and Aliases 99
CHAPTER 12 Statements and Flow of Execution 105
CHAPTER 13 Variable Scoping and Definite Assignment 113
CHAPTER 14 Operators and Expressions 119
CHAPTER 15 Conversions 129
CHAPTER 16 Arrays 139
CHAPTER 17 Generics 145
CHAPTER 18 Strings 157
CHAPTER 19 Properties 169
CHAPTER 20 Indexers, Enumerators, and Iterators 179
CHAPTER 21 Enumerations 199

CHAPTER 22 Attributes 207
CHAPTER 23 Delegates and Anonymous Methods 217
CHAPTER 24 Events 229
CHAPTER 25 User-Defined Conversions 239
CHAPTER 26 Operator Overloading 259
CHAPTER 27 Nullable Types 267
CHAPTER 28 Other Language Details 273
CHAPTER 29 Making Friends with the .NET Framework 283
CHAPTER 30 System.Array and the Collection Classes 293
CHAPTER 31 Threading and Asynchronous Operations 315
CHAPTER 32 Execution-Time Code Generation 341
CHAPTER 33 Interop 365
CHAPTER 34 .NET Framework Overview 375
CHAPTER 35 Windows Forms 403
CHAPTER 36 DiskDiff: More Sophistication 417
CHAPTER 37 Practical DiskDiff 431
CHAPTER 38 Deeper into C# 449
CHAPTER 39 Defensive Programming 473
CHAPTER 40 Tips for Real-World Code 485
CHAPTER 41 The Command-Line Compiler 493
CHAPTER 42 C# Compared to Other Languages 497
CHAPTER 43 C# Resources and the Future 515

INDEX 517