



Learning F# Functional Data Structures and Algorithms

By Adnan Masood

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Get started with F# and explore functional programming paradigm with data structures and algorithms

About This Book

- Design data structures and algorithms in F# to tackle complex computing problems
- Understand functional programming with examples and easy-to-follow code samples in F#
- Provides a learning roadmap of the F# ecosystem with succinct illustrations

Who This Book Is For

If you have just started your adventure with F#, then this book will help you take the right steps to become a successful F# coder. An intermediate knowledge of imperative programming concepts, and a basic understanding of the algorithms and data structures in .NET environments using the C# language and BCL (Base Class Library), would be helpful.

What You Will Learn

- Familiarize yourself with the functional programming nature of F# and explore its fundamentals
- Utilize data structures available in F# and apply recursion and lazy evaluation
- Gain insights into functional programming paradigms; dissect F# code and analyze code available in community projects
- Build abstract data structures and utilize powerful optimization techniques such as memoization
- Explore and test built-in F# bespoke data structures and algorithms
- Become resourceful and learn how to easily reuse libraries contributed by the C# and F# community
- Understand the trade-offs in selecting purely functional (persistent) over mutable data structures

- Implement custom ADT (Abstract Data Type), and discover parallel programming and asynchrony within F#

In Detail

F# is a multi-paradigm programming language that encompasses object-oriented, imperative, and functional programming language properties. The F# functional programming language enables developers to write simple code to solve complex problems.

Starting with the fundamental concepts of F# and functional programming, this book will walk you through basic problems, helping you to write functional and maintainable code. Using easy-to-understand examples, you will learn how to design data structures and algorithms in F# and apply these concepts in real-life projects. The book will cover built-in data structures and take you through enumerations and sequences. You will gain knowledge about stacks, graph-related algorithms, and implementations of binary trees. Next, you will understand the custom functional implementation of a queue, review sets and maps, and explore the implementation of a vector. Finally, you will find resources and references that will give you a comprehensive overview of F# ecosystem, helping you to go beyond the fundamentals.

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Learning F# Functional Data Structures and Algorithms By Adnan Masood Bibliography

- Sales Rank: #1586129 in Books
- Published on: 2015-06-30
- Released on: 2015-06-29
- Original language: English
- Number of items: 1
- Dimensions: 9.25" h x .47" w x 7.50" l, .80 pounds
- Binding: Paperback
- 181 pages

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Editorial Review

About the Author

Adnan Masood

Adnan Masood, Ph.D. is a developer, software architect, and researcher and specializes in machine learning and Bayesian belief networks. He is an avid engineer and is most comfortable working with the IDE. Before joining Green Dot Corporation, a leading prepaid financial technology institution, he enjoyed life as a principal engineer of a start-up and worked for a leading UK nonprofit organization as a solutions architect. A strong believer in the development community, Adnan is an active member of the Open Web Application Security Project (OWASP), an organization dedicated to software security. In the .NET community, he is a cofounder and president of the Pasadena .NET Developers group, which he has been successfully leading for 8 years. He pursues interests in algorithmic puzzles, machine learning, functional programming, cloud computing, service-oriented architecture (SOA), .NET, design patterns, application security, and robotics. He has also led a number of successful enterprise solutions and consulted for several Fortune 500 company projects. Adnan devotes himself to his own continual, practical education. He holds certifications in big data, machine learning, and systems architecture from Massachusetts Institute of Technology; an Application Security certification from Stanford University; an SOA Smarts certification from Carnegie Mellon University; and certifications as a ScrumMaster, Microsoft Certified Trainer, Microsoft Certified Solutions Developer, and Sun Certified Java Developer. Adnan has taught Windows Communication Foundation (WCF) courses at the University of California, San Diego, and loves to conduct presentations at top academic and technology conferences (for example, IEEE-HST, IASA, and DevConnections), local code camps, and user groups. He is also a volunteer FLL robotics coach for middle school students at Universal Academy of Florida. At home, his two very energetic boys, Zakariya and Ali, keep him busy?but not quite busy enough to keep him from compulsively buying (though not always reading) books in all formats. Adnan defines Pluto as a planet, chocolate as a food group, and A Game of Thrones as historical fiction. For more details, visit Adnan's blog (<http://blog.adnanmasood.com>), GitHub repository (<http://github.com/adnanmasood>), and Twitter (@adnanmasood). Adnan can be reached at adnan.masood@owasp.org.

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