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Functional languages help developers support concurrency by encouraging immutable data structures that can be passed between threads without having to worry about a shared state, all while avoiding side effects. Concurrency in .NET teaches readers how to build concurrent and scalable programs in .NET using the functional paradigm. This intermediate-level guide is aimed at developers, architects, and passionate computer programmers. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications.

Summary Concurrency in .NET teaches you how to build concurrent and scalable programs in .NET using the functional paradigm. This intermediate-level guide is aimed at developers, architects, and passionate computer programmers who are interested

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Parallel Programming in writing code with improved speed and effectiveness by adopting a declarative and pain-free programming style. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Unlock the incredible performance built into your multi-processor machines. Concurrent applications run faster because they spread work across processor cores, performing several tasks at the same time. Modern tools and techniques on the .NET platform, including parallel LINQ, functional programming, asynchronous programming, and the Task Parallel Library, offer powerful alternatives to traditional thread-based concurrency. About the Book Concurrency in .NET teaches you to write code that delivers the speed you need for performance-sensitive applications. Featuring examples in both C# and F#, this book guides you through concurrent and parallel designs that

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Functional Programming in theory and practice. You'll start with the foundations of concurrency and master essential techniques and design practices to optimize code running on modern multiprocessor systems. What's Inside The most important concurrency abstractions Employing the agent programming model Implementing real-time event-stream processing Executing unbounded asynchronous operations Best concurrent practices and patterns that apply to all platforms About the Reader For readers skilled with C# or F#. About the Book Riccardo Terrell is a seasoned software engineer and Microsoft MVP who is passionate about functional programming. He has over 20 years' experience delivering cost-effective technology solutions in a competitive business environment. Table of Contents PART 1 - Benefits of functional programming applicable to concurrent programs

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Functional concurrency foundations Functional programming techniques for concurrency Functional data structures and immutability PART 2 - How to approach the different parts of a concurrent program The basics of processing big data: data parallelism, part 1 PLINQ and MapReduce: data parallelism, part 2 Real-time event streams: functional reactive programming Task-based functional parallelism Task asynchronicity for the win Asynchronous functional programming in F# Functional combinators for fluent concurrent programming Applying reactive programming everywhere with agents Parallel workflow and agent programming with TPL Dataflow PART 3 - Modern patterns of concurrent programming applied Recipes and design patterns for successful concurrent programming Building a scalable mobile app with concurrent functional programming

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If you're one of the many developers uncertain about concurrent and multithreaded development, this practical cookbook will change your mind. With more than 75 code-rich recipes, author Stephen Cleary demonstrates parallel processing and asynchronous programming techniques, using libraries and language features in .NET 4.5 and C# 5.0. Concurrency is becoming more common in responsive and scalable application development, but it's been extremely difficult to code. The detailed solutions in this cookbook show you how modern tools raise the level of abstraction, making concurrency much easier than before. Complete with ready-to-use code and discussions about how and why the solution works, you get recipes for using: `async` and `await` for asynchronous operations
Parallel programming with the Task Parallel Library The TPL

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Dataflow library for creating dataflow pipelines
Capabilities that
Reactive Extensions build on top of LINQ
Unit testing with
concurrent code
Interop scenarios for combining concurrent
approaches Immutable, threadsafe, and producer/consumer
collections
Cancellation support in your concurrent code
Asynchronous-friendly Object-Oriented Programming
Thread
synchronization for accessing data

Summary Functional Programming in C# teaches you to apply functional thinking to real-world problems using the C# language. The book, with its many practical examples, is written for proficient C# programmers with no prior FP experience. It will give you an awesome new perspective. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning

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Parallel Programming. About the Technology Functional programming changes the way you think about code. For C# developers, FP techniques can greatly improve state management, concurrency, event handling, and long-term code maintenance. And C# offers the flexibility that allows you to benefit fully from the application of functional techniques. This book gives you the awesome power of a new perspective. About the Book Functional Programming in C# teaches you to apply functional thinking to real-world problems using the C# language. You'll start by learning the principles of functional programming and the language features that allow you to program functionally. As you explore the many practical examples, you'll learn the power of function composition, data flow programming, immutable data structures, and monadic composition with LINQ. What's Inside Write readable, team-friendly code

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Master async and data streams Radically improve error handling
Event sourcing and other FP patterns About the Reader Written for
proficient C# programmers with no prior FP experience. About the
Author Enrico Buonanno studied computer science at Columbia
University and has 15 years of experience as a developer, architect,
and trainer. Table of Contents PART 1 - CORE CONCEPTS

Introducing functional programming Why function purity matters
Designing function signatures and types Patterns in functional
programming Designing programs with function composition
PART 2 - BECOMING FUNCTIONAL Functional error handling
Structuring an application with functions Working effectively with
multi-argument functions Thinking about data functionally Event
sourcing: a functional approach to persistence PART 3 -
ADVANCED TECHNIQUES Lazy computations, continuations,

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and the beauty of monadic composition Stateful programs and
stateful computations Working with asynchronous computations
Data streams and the Reactive Extensions An introduction to
message-passing concurrency

Pro Asynchronous Programming with .NET teaches the essential skill of asynchronous programming in .NET. It answers critical questions in .NET application development, such as: how do I keep my program responding at all times to keep my users happy? how do I make the most of the available hardware? how can I improve performance? In the modern world, users expect more and more from their applications and devices, and multi-core hardware has the potential to provide it. But it takes carefully crafted code to turn that potential into responsive, scalable applications. With Pro

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Asynchronous Programming with .NET you will: Meet the underlying model for asynchrony on Windows—threads. Learn how to perform long blocking operations away from your UI thread to keep your UI responsive, then weave the results back in as seamlessly as possible. Master the `async/await` model of asynchrony in .NET, which makes asynchronous programming simpler and more achievable than ever before. Solve common problems in parallel programming with modern `async` techniques. Get under the hood of your asynchronous code with debugging techniques and insights from Visual Studio and beyond. In the past asynchronous programming was seen as an advanced skill. It's now a must for all modern developers. **Pro Asynchronous Programming with .NET** is your practical guide to using this important programming skill anywhere on the .NET platform.

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Summary Rx.NET in Action teaches developers how to build event-driven applications using the Reactive Extensions (Rx) library.

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Technology Modern applications must react to streams of data such as user and system events, internal messages, and sensor input.

Reactive Extensions (Rx) is a .NET library containing more than 600 operators that you can compose together to build reactive client- and server-side applications to handle events asynchronously in a way that maximizes responsiveness, resiliency, and elasticity.

About the Book Rx.NET in Action teaches developers how to build event-driven applications using the Rx library. Starting with an overview of the design and architecture of Rx-based reactive

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Parallel Programming applications, you'll get hands-on with in-depth code examples to discover firsthand how to exploit the rich query capabilities that Rx provides and the Rx concurrency model that allows you to control both the asynchronicity of your code and the processing of event handlers. You'll also learn about consuming event streams, using schedulers to manage time, and working with Rx operators to filter, transform, and group events. What's Inside Introduction to Rx in C# Creating and consuming streams of data and events Building complex queries on event streams Error handling and testing Rx code About the Reader Readers should understand OOP concepts and be comfortable coding in C#. About the Author Tamir Dresher is a senior software architect at CodeValue and a prominent member of Israel's Microsoft programming community. Table of Contents PART 1 - GETTING STARTED WITH REACTIVE

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EXTENSIONS Reactive programming Hello, Rx Functional thinking in C# PART 2 - CORE IDEAS Creating observable sequences Creating observables from .NET asynchronous types Controlling the observer-observable relationship Controlling the observable temperature Working with basic query operators Partitioning and combining observables Working with Rx concurrency and synchronization Error handling and recovery **APPENDIXES** Writing asynchronous code in .NET The Rx Disposables library Testing Rx queries and operators

This book is the introduction to Elixir for experienced programmers, completely updated for Elixir 1.6 and beyond. Explore functional programming without the academic overtones (tell me about monads just one more time). Create concurrent

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Parallel Programming applications, but get them right without all the locking and consistency headaches. Meet Elixir, a modern, functional, concurrent language built on the rock-solid Erlang VM. Elixir's pragmatic syntax and built-in support for metaprogramming will make you productive and keep you interested for the long haul. Maybe the time is right for the Next Big Thing. Maybe it's Elixir. Functional programming techniques help you manage the complexities of today's real-world, concurrent systems; maximize uptime; and manage security. Enter Elixir, with its modern, Ruby-like, extendable syntax, compile and runtime evaluation, hygienic macro system, and more. But, just as importantly, Elixir brings a sense of enjoyment to parallel, functional programming. Your applications become fun to work with, and the language encourages you to experiment. Part 1 covers the basics of writing sequential

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Elixir programs. We'll look at the language, the tools, and the conventions. Part 2 uses these skills to start writing concurrent code-applications that use all the cores on your machine, or all the machines on your network! And we do it both with and without OTP. Part 3 looks at the more advanced features of the language, from DSLs and code generation to extending the syntax. This edition is fully updated with all the new features of Elixir 1.6, with a new chapter on structuring OTP applications, and new sections on the debugger, code formatter, Distillery, and protocols. What You Need: You'll need a computer, a little experience with another high-level language, and a sense of adventure. No functional programming experience is needed.

Threads are a fundamental part of the Java platform. As multicore

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processors become the norm, using concurrency effectively becomes essential for building high-performance applications. Java SE 5 and 6 are a huge step forward for the development of concurrent applications, with improvements to the Java Virtual Machine to support high-performance, highly scalable concurrent classes and a rich set of new concurrency building blocks. In *Java Concurrency in Practice*, the creators of these new facilities explain not only how they work and how to use them, but also the motivation and design patterns behind them. However, developing, testing, and debugging multithreaded programs can still be very difficult; it is all too easy to create concurrent programs that appear to work, but fail when it matters most: in production, under heavy load. *Java Concurrency in Practice* arms readers with both the theoretical underpinnings and concrete techniques for building

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reliable, scalable, maintainable concurrent applications. Rather than simply offering an inventory of concurrency APIs and mechanisms, it provides design rules, patterns, and mental models that make it easier to build concurrent programs that are both correct and performant. This book covers: Basic concepts of concurrency and thread safety Techniques for building and composing thread-safe classes Using the concurrency building blocks in java.util.concurrent Performance optimization dos and don'ts Testing concurrent programs Advanced topics such as atomic variables, nonblocking algorithms, and the Java Memory Model

Summary This bestseller has been updated and revised to cover all the latest changes to C++ 14 and 17! C++ Concurrency in Action, Second Edition teaches you everything you need to write robust and

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Elegant multithreaded applications in C++17. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology You choose C++ when your applications need to run fast. Well-designed concurrency makes them go even faster. C++ 17 delivers strong support for the multithreaded, multiprocessor programming required for fast graphic processing, machine learning, and other performance-sensitive tasks. This exceptional book unpacks the features, patterns, and best practices of production-grade C++ concurrency. About the Book C++ Concurrency in Action, Second Edition is the definitive guide to writing elegant multithreaded applications in C++. Updated for C++ 17, it carefully addresses every aspect of concurrent development, from starting new threads to designing fully functional multithreaded algorithms and data structures.

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Concurrency master Anthony Williams presents examples and practical tasks in every chapter, including insights that will delight even the most experienced developer. What's inside Full coverage of new C++ 17 features Starting and managing threads Synchronizing concurrent operations Designing concurrent code Debugging multithreaded applications About the Reader Written for intermediate C and C++ developers. No prior experience with concurrency required. About the Author Anthony Williams has been an active member of the BSI C++ Panel since 2001 and is the developer of the just::thread Pro extensions to the C++ 11 thread library. Table of Contents Hello, world of concurrency in C++! Managing threads Sharing data between threads Synchronizing concurrent operations The C++ memory model and operations on atomic types Designing lock-based concurrent data structures

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Designing lock-free concurrent data structures
Designing concurrent code
Advanced thread management
Parallel algorithms
Testing and debugging multithreaded applications

Enhance your enterprise application development skills by mastering parallel programming techniques in .NET and C#

Key Features
Write efficient, fine-grained, and scalable parallel code with C# and .NET Core
Experience how parallel programming works by building a powerful application
Learn the fundamentals of multithreading by working with IIS and Kestrel

Book Description
In today's world, every CPU has a multi-core processor. However, unless your application has implemented parallel programming, it will fail to utilize the hardware's full processing capacity. This book will show you how to write modern software on the optimized

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Parallel Programming .NET Core 3 framework using C# 8. Hands-On Parallel Programming with C# 8 and .NET Core 3 covers how to build multithreaded, concurrent, and optimized applications that harness the power of multi-core processors. Once you've understood the fundamentals of threading and concurrency, you'll gain insights into the data structure in .NET Core that supports parallelism. The book will then help you perform asynchronous programming in C# and diagnose and debug parallel code effectively. You'll also get to grips with the new Kestrel server and understand the difference between the IIS and Kestrel operating models. Finally, you'll learn best practices such as test-driven development, and run unit tests on your parallel code. By the end of the book, you'll have developed a deep understanding of the core concepts of concurrency and asynchrony to create responsive

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Parallel Programming applications that are not CPU-intensive. What you will learn

- Analyze and break down a problem statement for parallelism
- Explore the APM and EAP patterns and how to move legacy code to Task Apply reduction techniques to get aggregated results Create PLINQ queries and study the factors that impact their performance
- Solve concurrency problems caused by producer-consumer race conditions Discover the synchronization primitives available in .NET Core Understand how the threading model works with IIS and Kestrel Find out how you can make the most of server resources

Who this book is for If you want to learn how task parallelism is used to build robust and scalable enterprise architecture, this book is for you. Whether you are a beginner to parallelism in C# or an experienced architect, you'll find this book useful to gain insights into the different threading models supported in .NET Standard and

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.NET Core. Prior knowledge of C# is required to understand the concepts covered in this book.

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