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Presents an introduction to the new programming language for the Java Platform.

This book is intended for the intermediate Scala programmer who is interested in functional programming and works mainly on the web service backend side. Ideally she has experience with libraries like Akka HTTP and Slick which are in heavy use in that area. However maybe you have wondered if we can't do better even though aforementioned projects are battle tested and proven. The answer to this can be found in this book which is intended to be read from cover to cover in the given order. Within the book the following libraries will be used: Cats, Cats Effect, http4s, Doobie, Refined, fs2, tapir, Monocle and probably others. ;-) Code and book source can be found in the author's github account.

Access the power of bare-metal systems programming with Scala Native, an ahead-of-time Scala compiler. Without the baggage of legacy frameworks and virtual machines, Scala Native lets you re-imagine how your programs interact with your operating system. Compile Scala code down to

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native machine instructions; seamlessly invoke operating system APIs for low-level networking and IO; control pointers, arrays, and other memory management techniques for extreme performance; and enjoy instant start-up times. Skip the JVM and improve your code performance by getting close to the metal. Developers generally build systems on top of the work of those who came before, accumulating layer upon layer of abstraction. Scala Native provides a rare opportunity to remove layers. Without the JVM, Scala Native uses POSIX and ANSI C APIs to build concise, expressive programs that run unusually close to bare metal. Scala Native compiles Scala code down to native machine instructions instead of JVM bytecode. It starts up fast, without the sluggish warm-up phase that's common for just-in-time compilers. Scala Native programs can seamlessly invoke operating system APIs for low-level networking and IO. And Scala Native lets you control pointers, arrays, and other memory layout types for extreme performance. Write practical, bare-metal code with Scala Native, step by step. Understand the foundations of systems programming, including pointers, arrays, strings, and memory management. Use the UNIX socket API to write network client and server programs without the sort of frameworks higher-level languages rely on. Put all the pieces together to design and implement a modern, asynchronous microservice-style HTTP

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framework from scratch. Take advantage of Scala Native's clean, modern syntax to write lean, high-performance code without the JVM. What You Need: A modern Windows, Mac OS, or Linux system capable of running Docker. All code examples in the book are designed to run on a portable Docker-based build environment that runs anywhere. If you don't have Docker yet, see the Appendix for instructions on how to get it.

Summary Scala in Depth is a unique new book designed to help you integrate Scala effectively into your development process. By presenting the emerging best practices and designs from the Scala community, it guides you through dozens of powerful techniques example by example. About the Book Scala is a powerful JVM language that blends the functional and OO programming models. You'll have no trouble getting introductions to Scala in books or online, but it's hard to find great examples and insights from experienced practitioners. You'll find them in Scala in Depth. There's little heavy-handed theory here—just dozens of crisp, practical techniques for coding in Scala. Written for readers who know Java, Scala, or another OO language. Purchase of the print book comes with an offer of a free PDF, ePub, and Kindle eBook from Manning. Also available is all code from the book. What's Inside Concise, expressive, and readable code style How to integrate Scala into your existing Java

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projects Scala's 2.8.0 collections API How to use
actors for concurrent programming Mastering the
Scala type system Scala's OO features—type
member inheritance, multiple inheritance, and
composition Functional concepts and
patterns—immutability, applicative functors, and
monads =====

===== ? ===== Table of Contents Scala—a
blended language The core rules Modicum of
style—coding conventions Utilizing object orientation
Using implicits to write expressive code The type
system Using implicits and types together Using the
right collection Actors Integrating Scala with Java
Patterns in functional programming

Summary Scala in Action is a comprehensive tutorial
that introduces Scala through clear explanations and
numerous hands-on examples. Because Scala is a
rich and deep language, it can be daunting to absorb
all the new concepts at once. This book takes a "how-
to" approach, explaining language concepts as you
explore familiar programming challenges that you
face in your day-to-day work. About the Technology
Scala runs on the JVM and combines object-
orientation with functional programming. It's
designed to produce succinct, type-safe code, which
is crucial for enterprise applications. Scala
implements Actor-based concurrency through the
amazing Akka framework, so you can avoid Java's
messy threading while interacting seamlessly with

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Java. About this Book Scala in Action is a comprehensive tutorial that introduces the language through clear explanations and numerous hands-on examples. It takes a "how to" approach, explaining language concepts as you explore familiar programming tasks. You'll tackle concurrent programming in Akka, learn to work with Scala and Spring, and learn how to build DSLs and other productivity tools. You'll learn both the language and how to use it. Experience with Java is helpful but not required. Ruby and Python programmers will also find this book accessible. What's Inside A Scala tutorial How to use Java and Scala open source libraries How to use SBT Test-driven development Debugging Updated for Scala 2.10 Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Author Nilanjan Raychaudhuri is a skilled developer, speaker, and an avid polyglot programmer who works with Scala on production systems. Table of Contents PART 1 SCALA: THE BASICS Why Scala? Getting started OOP in Scala Having fun with functional data structures Functional programming PART 2 WORKING WITH SCALA Building web applications in functional style Connecting to a database Building scalable and extensible components Concurrency programming in Scala Building confidence with testing PART 3 ADVANCED STEPS Interoperability between Scala

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and Java Scalable and distributed applications using Akka

Provides a guide to using Scala and Clojure to solve in-depth programming problems.

Summary Functional and Reactive Domain Modeling teaches you how to think of the domain model in terms of pure functions and how to compose them to build larger abstractions. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Traditional distributed applications won't cut it in the reactive world of microservices, fast data, and sensor networks. To capture their dynamic relationships and dependencies, these systems require a different approach to domain modeling. A domain model composed of pure functions is a more natural way of representing a process in a reactive system, and it maps directly onto technologies and patterns like Akka, CQRS, and event sourcing.

About the Book Functional and Reactive Domain Modeling teaches you consistent, repeatable techniques for building domain models in reactive systems. This book reviews the relevant concepts of FP and reactive architectures and then methodically introduces this new approach to domain modeling. As you read, you'll learn where and how to apply it, even if your systems aren't purely reactive or functional. An expert blend of theory and practice, this book presents strong examples you'll return to

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again and again as you apply these principles to your own projects. What's Inside Real-world libraries and frameworks Establish meaningful reliability guarantees Isolate domain logic from side effects Introduction to reactive design patterns About the Reader Readers should be comfortable with functional programming and traditional domain modeling. Examples use the Scala language. About the Author Software architect Debasish Ghosh was an early adopter of reactive design using Scala and Akka. He's the author of DSLs in Action, published by Manning in 2010. Table of Contents Functional domain modeling: an introduction Scala for functional domain models Designing functional domain models Functional patterns for domain models Modularization of domain models Being reactive Modeling with reactive streams Reactive persistence and event sourcing Testing your domain model Summary - core thoughts and principles If you've had trouble trying to learn Functional Programming (FP), you're not alone. In this book, Alvin Alexander -- author of the Scala Cookbook and former teacher of Java and Object-Oriented Programming (OOP) classes -- writes about his own problems in trying to understand FP, and how he finally conquered it. What he originally learned is that experienced FP developers are driven by two goals: to use only immutable values, and write only pure functions. What he later learned is that they have

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these goals as the result of another larger goal: they want all of their code to look and work just like algebra. While that sounds simple, it turns out that these goals require them to use many advanced Scala features -- which they often use all at the same time. As a result, their code can look completely foreign to novice FP developers. As Mr. Alexander writes, "When you first see their code it's easy to ask, 'Why would anyone write code like this?'" Mr. Alexander answers that "Why?" question by explaining the benefits of writing pure functional code. Once you understand those benefits -- your motivation for learning FP -- he shares five rules for programming in the book: All fields must be immutable ('val' fields). All functions must be pure functions. Null values are not allowed. Whenever you use an 'if' you must also use an 'else'. You won't create OOP classes that encapsulate data and behavior; instead you'll design data structures using Scala 'case' classes, and write pure functions that operate on those data structures. In the book you'll see how those five, simple rules naturally lead you to write pure, functional code that reads like algebra. He also shares one more Golden Rule for learning: Always ask "Why"? Lessons in the book include: How and why to write only pure functions Why pure function signatures are much more important than OOP method signatures Why recursion is a natural tool for functional programming, and how to write

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recursive algorithms Because the Scala 'for' expression is so important to FP, dozens of pages explain the details of how it works In the end you'll see that monads aren't that difficult because they're a natural extension of the Five Rules The book finishes with lessons on FP data modeling, and two main approaches for organizing your pure functions As Mr. Alexander writes, "In this book I take the time to explain all of the concepts that are used to write FP code in Scala. As I learned from my own experience, once you understand the Five Rules and the small concepts, you can understand Scala/FP." Please note that because of the limits on how large a printed book can be, the paperback version does not include all of the chapters that are in the Kindle eBook. The following lessons are not in the paperback version: Grandma's Cookies (a story about pure functions) The ScalaCheck lessons The Type Classes lessons The appendices Because those lessons didn't fit in the print version, they have been made freely available online. (Alvin Alexander (alvinalexander.com) wrote the popular Scala Cookbook for O'Reilly, and also self-published two other books, How I Sold My Business: A Personal Diary, and A Survival Guide for New Consultants.) Summary Reactive Design Patterns is a clearly written guide for building message-driven distributed systems that are resilient, responsive, and elastic. In this book you'll find patterns for messaging, flow

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control, resource management, and concurrency, along with practical issues like test-friendly designs. All patterns include concrete examples using Scala and Akka. Foreword by Jonas Bonér. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Modern web applications serve potentially vast numbers of users - and they need to keep working as servers fail and new ones come online, users overwhelm limited resources, and information is distributed globally. A Reactive application adjusts to partial failures and varying loads, remaining responsive in an ever-changing distributed environment. The secret is message-driven architecture - and design patterns to organize it. About the Book Reactive Design Patterns presents the principles, patterns, and best practices of Reactive application design. You'll learn how to keep one slow component from bogging down others with the Circuit Breaker pattern, how to shepherd a many-staged transaction to completion with the Saga pattern, how to divide datasets by Sharding, and more. You'll even see how to keep your source code readable and the system testable despite many potential interactions and points of failure. What's Inside The definitive guide to the Reactive Manifesto Patterns for flow control, delimited consistency, fault tolerance, and much more Hard-won lessons about what doesn't work Architectures that scale under

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tremendous load About the Reader Most examples use Scala, Java, and Akka. Readers should be familiar with distributed systems. About the Author Dr. Roland Kuhn led the Akka team at Lightbend and coauthored the Reactive Manifesto. Brian Hanafee and Jamie Allen are experienced distributed systems architects. Table of Contents PART 1 -

INTRODUCTION Why Reactive? A walk-through of the Reactive Manifesto Tools of the trade PART 2 -

THE PHILOSOPHY IN A NUTSHELL Message passing Location transparency Divide and conquer Principled failure handling Delimited consistency Nondeterminism by need Message flow PART 3 -

PATTERNS Testing reactive applications Fault tolerance and recovery patterns Replication patterns Resource-management patterns Message flow patterns Flow control patterns State management and persistence patterns

Summary Functional Programming in Scala is a serious tutorial for programmers looking to learn FP and apply it to the everyday business of coding. The book guides readers from basic techniques to advanced topics in a logical, concise, and clear progression. In it, you'll find concrete examples and exercises that open up the world of functional programming. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Functional programming (FP) is a style of software

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development emphasizing functions that don't depend on program state. Functional code is easier to test and reuse, simpler to parallelize, and less prone to bugs than other code. Scala is an emerging JVM language that offers strong support for FP. Its familiar syntax and transparent interoperability with Java make Scala a great place to start learning FP. About the Book Functional Programming in Scala is a serious tutorial for programmers looking to learn FP and apply it to their everyday work. The book guides readers from basic techniques to advanced topics in a logical, concise, and clear progression. In it, you'll find concrete examples and exercises that open up the world of functional programming. This book assumes no prior experience with functional programming. Some prior exposure to Scala or Java is helpful. What's Inside Functional programming concepts The whys and hows of FP How to write multicore programs Exercises and checks for understanding About the Authors Paul Chiusano and Rúnar Bjarnason are recognized experts in functional programming with Scala and are core contributors to the Scalaz library. Table of Contents PART 1 INTRODUCTION TO FUNCTIONAL PROGRAMMING What is functional programming? Getting started with functional programming in Scala Functional data structures Handling errors without exceptions Strictness and laziness Purely functional state PART 2 FUNCTIONAL DESIGN AND

COMBINATOR LIBRARIES Purely functional
parallelism Property-based testing Parser
combinators PART 3 COMMON STRUCTURES IN
FUNCTIONAL DESIGN Monoids Monads
Applicative and traversable functors PART 4
EFFECTS AND I/O External effects and I/O Local
effects and mutable state Stream processing and
incremental I/O

Scala is a highly expressive, concise and scalable language. It is also the most prominent method of the new and exciting methodology known as object-functional programming. In this book, the authors show how Scala grows to the needs of the programmer, whether professional or hobbyist. They teach Scala with a step-by-step approach and explain how to exploit the full power of the industry-proven JVM technology. Readers can then dive into specially chosen design challenges and implementation problems, inspired by the trials of real-world software engineering. It also helps readers to embrace the power of static typing and automatic type inference. In addition, the book shows how to use the dual-object and functional-oriented natures combined at Scala's core, and so write code that is less 'boilerplate', giving a genuine increase in productivity.

Practical FP in Scala: A hands-on approach, is a book for intermediate to advanced Scala developers. Aimed at those who understand functional effects,

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referential transparency and the benefits of functional programming to some extent but who are missing some pieces to put all these concepts together to build a large application in a time-constrained manner. Throughout the chapters we will design, architect and develop a complete stateful application serving an API via HTTP, accessing a database and dealing with cached data, using the best practices and best functional libraries available in the Cats ecosystem. You will also learn about common design patterns such as managing state, error handling and anti-patterns, all accompanied by clear examples. Furthermore, at the end of the book, we will dive into some advanced concepts such as MTL, Classy Optics and Typeclass derivation.

If your application source code is overly verbose, it can be a nightmare to maintain. Write concise and expressive, type-safe code in an environment that lets you build for the JVM, browser, and more. Key Features Expert guidance that shows you to efficiently use both object-oriented and functional programming techniques Understand functional programming libraries, such as Cats and Scalaz, and use them to augment your Scala development Perfectly balances theory and hands-on exercises, assessments, and activities Book Description This book teaches you how to build and contribute to Scala programs, recognizing common patterns and techniques used with the language. You'll learn how

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to write concise, functional code with Scala. After an introduction to core concepts, syntax, and writing example applications with scalac, you'll learn about the Scala Collections API and how the language handles type safety via static types out-of-the-box. You'll then learn about advanced functional programming patterns, and how you can write your own Domain Specific Languages (DSLs). By the end of the book, you'll be equipped with the skills you need to successfully build smart, efficient applications in Scala that can be compiled to the JVM. What you will learn

- Understand the key language syntax and core concepts for application development
- Master the type system to create scalable type-safe applications while cutting down your time spent debugging
- Understand how you can work with advanced data structures via built-in features such as the Collections library
- Use classes, objects, and traits to transform a trivial chatbot program into a useful assistant
- Understand what are pure functions, immutability, and higher-order functions
- Recognize and implement popular functional programming design patterns

Who this book is for This is an ideal book for developers who are looking to learn Scala, and is particularly well suited for Java developers looking to migrate across to Scala for application development on the JVM. Intermediate level, for programmers fairly familiar with Java, but new to the functional style of

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programming and lambda expressions. Get ready to program in a whole new way. Functional Programming in Java will help you quickly get on top of the new, essential Java 8 language features and the functional style that will change and improve your code. This short, targeted book will help you make the paradigm shift from the old imperative way to a less error-prone, more elegant, and concise coding style that's also a breeze to parallelize. You'll explore the syntax and semantics of lambda expressions, method and constructor references, and functional interfaces. You'll design and write applications better using the new standards in Java 8 and the JDK. Lambda expressions are lightweight, highly concise anonymous methods backed by functional interfaces in Java 8. You can use them to leap forward into a whole new world of programming in Java. With functional programming capabilities, which have been around for decades in other languages, you can now write elegant, concise, less error-prone code using standard Java. This book will guide you through the paradigm change, offer the essential details about the new features, and show you how to transition from your old way of coding to an improved style. In this book you'll see popular design patterns, such as decorator, builder, and strategy, come to life to solve common design problems, but with little ceremony and effort. With these new capabilities in hand, Functional Programming in Java will help you

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pick up techniques to implement designs that were beyond easy reach in earlier versions of Java. You'll see how you can reap the benefits of tail call optimization, memoization, and effortless parallelization techniques. Java 8 will change the way you write applications. If you're eager to take advantage of the new features in the language, this is the book for you. What you need: Java 8 with support for lambda expressions and the JDK is required to make use of the concepts and the examples in this book.

Grok and perform effective functional programming in Scala About This Book Understand functional programming patterns by comparing them with the traditional object-oriented design patterns Write robust, safer, and better code using the declarative programming paradigm An illustrative guide for programmers to create functional programming patterns with Scala Who This Book Is For If you have done Java programming before and have a basic knowledge of Scala and its syntax, then this book is an ideal choice to help you to understand the context, the traditional design pattern applicable, and the Scala way. Having previous knowledge of design patterns will help, though it is not strictly necessary. What You Will Learn Get to know about functional programming and the value Scala's FP idioms bring to the table Solve day-to-day programming problems using functional programming idioms Cut down the

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boiler-plate and express patterns simply and elegantly using Scala's concise syntax Tame system complexity by reducing the moving parts Write easier to reason about concurrent code using the actor paradigm and the Akka library Apply recursive thinking and understand how to create solutions without mutation Reuse existing code to compose new behavior Combine the object-oriented and functional programming approaches for effective programming using Scala In Detail Scala is used to construct elegant class hierarchies for maximum code reuse and extensibility and to implement their behavior using higher-order functions. Its functional programming (FP) features are a boon to help you design "easy to reason about" systems to control the growing software complexities. Knowing how and where to apply the many Scala techniques is challenging. Looking at Scala best practices in the context of what you already know helps you grasp these concepts quickly, and helps you see where and why to use them. This book begins with the rationale behind patterns to help you understand where and why each pattern is applied. You will discover what tail recursion brings to your table and will get an understanding of how to create solutions without mutations. We then explain the concept of memorization and infinite sequences for on-demand computation. Further, the book takes you through Scala's stackable traits and dependency injection, a

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popular technique to produce loosely-coupled software systems. You will also explore how to currying favors to your code and how to simplify it by de-construction via pattern matching. We also show you how to do pipeline transformations using higher order functions such as the pipes and filters pattern. Then we guide you through the increasing importance of concurrent programming and the pitfalls of traditional code concurrency. Lastly, the book takes a paradigm shift to show you the different techniques that functional programming brings to your plate. This book is an invaluable source to help you understand and perform functional programming and solve common programming problems using Scala's programming patterns. Style and approach This is a hands-on guide to Scala's game-changing features for programming. It is filled with many code examples and figures that illustrate various Scala idioms and best practices.

Scala is a new and exciting programming language that is a hybrid between object oriented languages such as Java and functional languages such as Haskell. As such it has its own programming idioms and development styles. Scala Design Patterns looks at how code reuse can be successfully achieved in Scala. A major aspect of this is the reinterpretation of the original Gang of Four design patterns in terms of Scala and its language structures (that is the use of Traits, Classes, Objects

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and Functions). It includes an exploration of functional design patterns and considers how these can be interpreted in Scala's uniquely hybrid style. A key aspect of the book is the many code examples that accompany each design pattern, allowing the reader to understand not just the design pattern but also to explore powerful and flexible Scala language features. Including numerous source code examples, this book will be of value to professionals and practitioners working in the field of software engineering.

Function literals, Monads, Lazy evaluation, Currying, and more About This Book Write concise and maintainable code with streams and high-order functions Understand the benefits of currying your Golang functions Learn the most effective design patterns for functional programming and learn when to apply each of them Build distributed MapReduce solutions using Go Who This Book Is For This book is for Golang developers comfortable with OOP and interested in learning how to apply the functional paradigm to create robust and testable apps. Prior programming experience with Go would be helpful, but not mandatory. What You Will Learn Learn how to compose reliable applications using high-order functions Explore techniques to eliminate side-effects using FP techniques such as currying Use first-class functions to implement pure functions Understand how to implement a lambda expression

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in Go Compose a working application using the decorator pattern Create faster programs using lazy evaluation Use Go concurrency constructs to compose a functionality pipeline Understand category theory and what it has to do with FP In Detail Functional programming is a popular programming paradigm that is used to simplify many tasks and will help you write flexible and succinct code. It allows you to decompose your programs into smaller, highly reusable components, without applying conceptual restraints on how the software should be modularized. This book bridges the language gap for Golang developers by showing you how to create and consume functional constructs in Golang. The book is divided into four modules. The first module explains the functional style of programming; pure functional programming (FP), manipulating collections, and using high-order functions. In the second module, you will learn design patterns that you can use to build FP-style applications. In the next module, you will learn FP techniques that you can use to improve your API signatures, to increase performance, and to build better Cloud-native applications. The last module delves into the underpinnings of FP with an introduction to category theory for software developers to give you a real understanding of what pure functional programming is all about, along with applicable code examples. By the end of the book,

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you will be adept at building applications the functional way. Style and approach This book takes a pragmatic approach and shows you techniques to write better functional constructs in Golang. We'll also show you how use these concepts to build robust and testable apps.

Discover unique features and powerful capabilities of Scala Programming as you build projects in a wide range of domains Key Features Develop a range of Scala projects from web applications to big data analysis Leverage full power of modern web programming using Play Framework Build real-time data pipelines in Scala with a Bitcoin transaction analysis app Book Description Scala is a type-safe JVM language that incorporates object-oriented and functional programming (OOP and FP) aspects. This book gets you started with essentials of software development by guiding you through various aspects of Scala programming, helping you bridge the gap between learning and implementing. You will learn about the unique features of Scala through diverse applications and experience simple yet powerful approaches for software development. Scala Programming Projects will help you build a number of applications, beginning with simple projects, such as a financial independence calculator, and advancing to other projects, such as a shopping application and a Bitcoin transaction analyzer. You will be able to use various Scala features, such as its

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OOP and FP capabilities, and learn how to write concise, reactive, and concurrent applications in a type-safe manner. You will also learn how to use top-notch libraries such as Akka and Play and integrate Scala apps with Kafka, Spark, and Zeppelin, along with deploying applications on a cloud platform. By the end of the book, you will not only know the ins and outs of Scala, but you will also be able to apply it to solve a variety of real-world problems

What you will learn

- Build, test, and package code using Scala Build Tool
- Decompose code into functions, classes, and packages for maintainability
- Implement the functional programming capabilities of Scala
- Develop a simple CRUD REST API using the Play framework
- Access a relational database using Slick
- Develop a dynamic web UI using Scala.js
- Source streaming data using Spark Streaming and write a Kafka producer
- Use Spark and Zeppelin to analyze data

Who this book is for

If you are an amateur programmer who wishes to learn how to use Scala, this book is for you. Knowledge of Java will be beneficial, but not necessary, to understand the concepts covered in this book.

Get up to speed on Scala, the JVM language that offers all the benefits of a modern object model, functional programming, and an advanced type system. Packed with code examples, this comprehensive book shows you how to be productive with the language and ecosystem right

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away, and explains why Scala is ideal for today's highly scalable, data-centric applications that support concurrency and distribution. This second edition covers recent language features, with new chapters on pattern matching, comprehensions, and advanced functional programming. You'll also learn about Scala's command-line tools, third-party tools, libraries, and language-aware plugins for editors and IDEs. This book is ideal for beginning and advanced Scala developers alike. Program faster with Scala's succinct and flexible syntax Dive into basic and advanced functional programming (FP) techniques Build killer big-data apps, using Scala's functional combinators Use traits for mixin composition and pattern matching for data extraction Learn the sophisticated type system that combines FP and object-oriented programming concepts Explore Scala-specific concurrency tools, including Akka Understand how to develop rich domain-specific languages Learn good design techniques for building scalable and robust Scala applications Reactive programming is a better, scalable, and faster way to build applications, and one that helps us write code that is concise, clear, and readable. It can be used for many purposes such as GUIs, robotics, music, and more, and is central to many concurrent systems. This book will be your guide to getting started with Reactive programming ... You want increased customer satisfaction, faster

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development cycles, and less wasted work. Domain-driven design (DDD) combined with functional programming is the innovative combo that will get you there. In this pragmatic, down-to-earth guide, you'll see how applying the core principles of functional programming can result in software designs that model real-world requirements both elegantly and concisely - often more so than an object-oriented approach. Practical examples in the open-source F# functional language, and examples from familiar business domains, show you how to apply these techniques to build software that is business-focused, flexible, and high quality. Domain-driven design is a well-established approach to designing software that ensures that domain experts and developers work together effectively to create high-quality software. This book is the first to combine DDD with techniques from statically typed functional programming. This book is perfect for newcomers to DDD or functional programming - all the techniques you need will be introduced and explained. Model a complex domain accurately using the F# type system, creating compilable code that is also readable documentation---ensuring that the code and design never get out of sync. Encode business rules in the design so that you have "compile-time unit tests," and eliminate many potential bugs by making illegal states unrepresentable. Assemble a series of small,

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testable functions into a complete use case, and compose these individual scenarios into a large-scale design. Discover why the combination of functional programming and DDD leads naturally to service-oriented and hexagonal architectures. Finally, create a functional domain model that works with traditional databases, NoSQL, and event stores, and safely expose your domain via a website or API. Solve real problems by focusing on real-world requirements for your software. What You Need: The code in this book is designed to be run interactively on Windows, Mac and Linux. You will need a recent version of F# (4.0 or greater), and the appropriate .NET runtime for your platform. Full installation instructions for all platforms at fsharp.org.

Behind every programming language lies a vision of how programs should be built. The vision behind Clojure is of a radically simple language framework holding together a sophisticated collection of programming features. Learning Clojure involves much more than just learning the mechanics of the language. To really get Clojure you need to understand the ideas underlying this structure of framework and features. You need this book: an accessible introduction to Clojure that focuses on the ideas behind the language as well as the practical details of writing code. Clojure attracts developers on the cutting edge and is arguably the best language for learning to program in the functional style without

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compromise. But this comes with a steep learning curve. Getting Clojure directly addresses this by teaching you how to think functionally as it teaches you the language. You'll learn about Clojure's powerful data structures and high-level functions, but you'll also learn what it means for a language to be functional, and how to think in Clojure's functional way. Each chapter of Getting Clojure takes a feature or two or three from the language, explains the syntax and the mechanics behind that feature so that you can make it work before digging into the deeper questions: What is the thinking behind the feature? And how does it fit in with the rest of the language? In Getting Clojure you'll learn Clojure's very simple syntax, but you'll also learn why that syntax is integral the way the language is constructed. You'll discover that most data structures in Clojure are immutable, but also why that leads to more reliable programs. And you'll see how easy it is to write Clojure functions and also how you can use those functions to build complex and capable systems. With real-world examples of how working Clojure programmers use the language, Getting Clojure will help you see the challenges of programming through the eye of experienced Clojure developers. What You Need: You will need to some background in programming. To follow along with the examples in the book, you will need Java 6 or new, Clojure 1.8 or 1.9, and Leiningen 2.

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Software development today is embracing functional programming (FP), whether it's for writing concurrent programs or for managing Big Data. Where does that leave Java developers? This concise book offers a pragmatic, approachable introduction to FP for Java developers or anyone who uses an object-oriented language. Dean Wampler, Java expert and author of *Programming Scala* (O'Reilly), shows you how to apply FP principles such as immutability, avoidance of side-effects, and higher-order functions to your Java code. Each chapter provides exercises to help you practice what you've learned. Once you grasp the benefits of functional programming, you'll discover that it improves all of the code you write. Learn basic FP principles and apply them to object-oriented programming Discover how FP is more concise and modular than OOP Get useful FP lessons for your Java type design—such as avoiding nulls Design data structures and algorithms using functional programming principles Write concurrent programs using the Actor model and software transactional memory Use functional libraries and frameworks for Java—and learn where to go next to deepen your functional programming skills If you have an imperative (and probably object-oriented) programming background, this hands-on book will guide you through the alien world of functional programming. Author Joshua Backfield begins slowly by showing you how to apply the most

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useful implementation concepts before taking you further into functional-style concepts and practices. In each chapter, you'll learn a functional concept and then use it to refactor the fictional XXY company's imperative-style legacy code, writing and testing the functional code yourself. As you progress through the book, you'll migrate from Java 7 to Groovy and finally to Scala as the need for better functional language support gradually increases. Learn why today's finely tuned applications work better with functional code Transform imperative-style patterns into functional code, following basic steps Get up to speed with Groovy and Scala through examples Understand how first-class functions are passed and returned from other functions Convert existing methods into pure functions, and loops into recursive methods Change mutable variables into immutable variables Get hands-on experience with statements and nonstrict evaluations Use functional programming alongside object-oriented design

If you're familiar with functional programming basics and want to gain a much deeper understanding, this in-depth guide takes you beyond syntax and demonstrates how you need to think in a new way. Software architect Neal Ford shows intermediate to advanced developers how functional coding allows you to step back a level of abstraction so you can see your programming problem with greater clarity. Each chapter shows you various examples of functional thinking, using numerous code examples from Java 8 and other JVM

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languages that include functional capabilities. This book may bend your mind, but you'll come away with a much better grasp of functional programming concepts. Understand why many imperative languages are adding functional capabilities Compare functional and imperative solutions to common problems Examine ways to cede control of routine chores to the runtime Learn how memoization and laziness eliminate hand-crafted solutions Explore functional approaches to design patterns and code reuse View real-world examples of functional thinking with Java 8, and in functional architectures and web frameworks Learn the pros and cons of living in a paradigmatically richer world If you're new to functional programming, check out Josh Backfield's book *Becoming Functional*.

Learn functional data structures and algorithms for your applications and bring their benefits to your work now About This Book Moving from object-oriented programming to functional programming? This book will help you get started with functional programming. Easy-to-understand explanations of practical topics will help you get started with functional data structures. Illustrative diagrams to explain the algorithms in detail. Get hands-on practice of Scala to get the most out of functional programming. Who This Book Is For This book is for those who have some experience in functional programming languages. The data structures in this book are primarily written in Scala, however implementing the algorithms in other functional languages should be straight forward. What You Will Learn Learn to think in the functional paradigm Understand common data structures and the associated algorithms, as well as the context in which they are commonly used Take a look at the runtime and space complexities with the O notation See how ADTs are implemented in a functional setting Explore the basic theme of immutability and persistent data structures Find out how

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the internal algorithms are redesigned to exploit structural sharing, so that the persistent data structures perform well, avoiding needless copying. Get to know functional features like lazy evaluation and recursion used to implement efficient algorithms Gain Scala best practices and idioms In Detail Functional data structures have the power to improve the codebase of an application and improve efficiency. With the advent of functional programming and with powerful functional languages such as Scala, Clojure and Elixir becoming part of important enterprise applications, functional data structures have gained an important place in the developer toolkit. Immutability is a cornerstone of functional programming. Immutable and persistent data structures are thread safe by definition and hence very appealing for writing robust concurrent programs. How do we express traditional algorithms in functional setting? Won't we end up copying too much? Do we trade performance for versioned data structures? This book attempts to answer these questions by looking at functional implementations of traditional algorithms. It begins with a refresher and consolidation of what functional programming is all about. Next, you'll get to know about Lists, the work horse data type for most functional languages. We show what structural sharing means and how it helps to make immutable data structures efficient and practical. Scala is the primary implementation languages for most of the examples. At times, we also present Clojure snippets to illustrate the underlying fundamental theme. While writing code, we use ADTs (abstract data types). Stacks, Queues, Trees and Graphs are all familiar ADTs. You will see how these ADTs are implemented in a functional setting. We look at implementation techniques like amortization and lazy evaluation to ensure efficiency. By the end of the book, you will be able to write efficient functional data structures and algorithms for your applications. Style and approach Step-by-

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step topics will help you get started with functional programming. Learn by doing with hands-on code snippets that give you practical experience of the subject.

Why learn Scala? You don't need to be a data scientist or distributed computing expert to appreciate this object-oriented functional programming language. This practical book provides a comprehensive yet approachable introduction to the language, complete with syntax diagrams, examples, and exercises. You'll start with Scala's core types and syntax before diving into higher-order functions and immutable data structures. Author Jason Swartz demonstrates why Scala's concise and expressive syntax make it an ideal language for Ruby or Python developers who want to improve their craft, while its type safety and performance ensures that it's stable and fast enough for any application. Learn about the core data types, literals, values, and variables Discover how to think and write in expressions, the foundation for Scala's syntax Write higher-order functions that accept or return other functions Become familiar with immutable data structures and easily transform them with type-safe and declarative operations Create custom infix operators to simplify existing operations or even to start your own domain-specific language Build classes that compose one or more traits for full reusability, or create new functionality by mixing them in at instantiation

Write efficient, clean, and reusable code with Scala About This Book Unleash the power of Scala and apply it in the real world Increase your efficiency by leveraging the power of Creational, Structural, Behavioural, and Functional design patterns Build object oriented and functional applications quickly and effectively Who This Book Is For If you want to increase your understanding of Scala and apply it to real-life application development, then this book is for you. We've also designed the book to be used as a quick reference guide

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while creating applications. Previous Scala programming knowledge is expected. What You Will Learn Immerse yourself in industry-standard design patterns—structural, creational, and behavioral—to create extraordinary applications Feel the power of traits and their application in Scala Implement abstract and self types and build clean design patterns Build complex entity relationships using structural design patterns Create applications faster by applying functional design patterns In Detail Scala has become increasingly popular in many different IT sectors. The language is exceptionally feature-rich which helps developers write less code and get faster results. Design patterns make developer's lives easier by helping them write great software that is easy to maintain, runs efficiently and is valuable to the company or people concerned. You will learn about the various features of Scala and be able to apply well-known, industry-proven design patterns in your work. The book starts off by focusing on some of the most interesting features of Scala while using practical real-world examples. We will also cover the popular "Gang of Four" design patterns and show you how to incorporate functional patterns effectively. By the end of this book, you will have enough knowledge and understanding to quickly assess problems and come up with elegant solutions. Style and approach The design patterns in the book will be explained using real-world, step-by-step examples. For each design pattern, there will be hints about when to use it and when to look for something more suitable. This book can also be used as a practical guide, showing you how to leverage design patterns effectively.

Functional programming languages like F#, Erlang, and Scala are attracting attention as an efficient way to handle the new requirements for programming multi-processor and high-availability applications. Microsoft's new F# is a true functional language and C# uses functional language features for LINQ

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and other recent advances. Real-World Functional Programming is a unique tutorial that explores the functional programming model through the F# and C# languages. The clearly presented ideas and examples teach readers how functional programming differs from other approaches. It explains how ideas look in F#-a functional language-as well as how they can be successfully used to solve programming problems in C#. Readers build on what they know about .NET and learn where a functional approach makes the most sense and how to apply it effectively in those cases. The reader should have a good working knowledge of C#. No prior exposure to F# or functional programming is required. Purchase of the print book comes with an offer of a free PDF, ePub, and Kindle eBook from Manning. Also available is all code from the book.

Packed with examples and exercises, Get Programming with Scala is perfect starting point for developers with some OO knowledge who want to learn this multi-style programming language for the JVM, and pick up a few FP skills along the way. Master Scala, and you'll be well-equipped to match your programming approach to the type of problem you're dealing with. Packed with examples and exercises, Get Programming with Scala is perfect starting point for developers with some OO knowledge who want to learn this multi-style programming language for the JVM, and pick up a few FP skills along the way. Master Scala, and you'll be well-equipped to match your programming approach to the type of problem you're dealing with. Get Programming with Scala teaches you the core skills you'll need to code with Scala. You'll start by reviewing OOP concepts in the Scala language. Then, you'll gradually open up the world of functional programming. You'll explore functions and types and learn how to combine them to create powerful, flexible abstractions. Scala can be daunting at first, especially if

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you're seeing FP ideas for the first time. Fortunately, with the examples and exercises in this book, you'll get over the initial learning hump quickly and start doing interesting projects before you know it! Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications.

Summary Functional Programming in Java teaches Java developers how to incorporate the most powerful benefits of functional programming into new and existing Java code. You'll learn to think functionally about coding tasks in Java and use FP to make your applications easier to understand, optimize, maintain, and scale. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Here's a bold statement: learn functional programming and you'll be a better Java developer. Fortunately, you don't have to master every aspect of FP to get a big payoff. If you take in a few core principles, you'll see an immediate boost in the scalability, readability, and maintainability of your code. And did we mention that you'll have fewer bugs? Let's get started! About the Book Functional Programming in Java teaches you how to incorporate the powerful benefits of functional programming into new and existing Java code. This book uses easy-to-grasp examples, exercises, and illustrations to teach core FP principles such as referential transparency, immutability, persistence, and laziness. Along the way, you'll discover which of the new functionally inspired features of Java 8 will help you most. What's Inside Writing code that's easier to read and reason about Safer concurrent and parallel programming Handling errors without exceptions Java 8 features like lambdas, method references, and functional interfaces About the Reader Written for Java developers with no previous FP experience. About the Author Pierre-Yves Saumont is a seasoned Java developer with three decades of

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experience designing and building enterprise software. He is an R&D engineer at Alcatel-Lucent Submarine Networks.

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Hands-on Scala teaches you how to use the Scala programming language in a practical, project-based fashion. This book is designed to quickly teach an existing programmer everything needed to go from "hello world" to building production applications like interactive websites, parallel web crawlers, and distributed systems in Scala. In the process you will learn how to use the Scala language to solve challenging problems in an elegant and intuitive manner. Save time and trouble when using Scala to build object-oriented, functional, and concurrent applications. With more than 250 ready-to-use recipes and 700 code examples, this comprehensive cookbook covers the most common problems you'll encounter when using the Scala language, libraries, and tools. It's ideal not only for experienced Scala developers, but also for programmers learning to use this JVM language. Author Alvin Alexander (creator of DevDaily.com) provides solutions based on his experience using Scala for highly scalable, component-based applications that support concurrency and distribution. Packed with real-world scenarios, this book provides recipes for: Strings, numeric types, and control structures
Classes, methods, objects, traits, and packaging
Functional programming in a variety of situations
Collections covering

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Scala's wealth of classes and methods
Concurrency, using the Akka Actors library
Using the Scala REPL and the Simple Build Tool (SBT)
Web services on both the client and server sides
Interacting with SQL and NoSQL databases
Best practices in Scala development

In 1994, Design Patterns changed the landscape of object-oriented development by introducing classic solutions to recurring design problems. In 1999, Refactoring revolutionized design by introducing an effective process for improving code. With the highly anticipated Refactoring to Patterns, Joshua Kerievsky has changed our approach to design by forever uniting patterns with the evolutionary process of refactoring. This book introduces the theory and practice of pattern-directed refactorings: sequences of low-level refactorings that allow designers to safely move designs to, towards, or away from pattern implementations. Using code from real-world projects, Kerievsky documents the thinking and steps underlying over two dozen pattern-based design transformations. Along the way he offers insights into pattern differences and how to implement patterns in the simplest possible ways. Coverage includes:

- A catalog of twenty-seven pattern-directed refactorings, featuring real-world code examples
- Descriptions of twelve design smells that indicate the need for this book's refactorings
- General information and new insights about patterns and refactoring
- Detailed implementation mechanics: how low-level refactorings are combined to implement high-level patterns
- Multiple ways to implement the same pattern—and when to use each
- Practical ways to get started even if you have little experience with patterns or refactoring

Refactoring to Patterns reflects three years of refinement and the insights of more than sixty software engineering thought leaders in the global patterns, refactoring, and agile development communities. Whether you're focused on legacy or

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“greenfield” development, this book will make you a better software designer by helping you learn how to make important design changes safely and effectively.

Scala is a modern programming language for the Java Virtual Machine (JVM) that combines the best features of object-oriented and functional programming languages. Using Scala, you can write programs more concisely than in Java, as well as leverage the full power of concurrency. Since Scala runs on the JVM, it can access any Java library and is interoperable with Java frameworks. Scala for the Impatient concisely shows developers what Scala can do and how to do it. In this book, Cay Horstmann, the principal author of the international best-selling Core Java™, offers a rapid, code-based introduction that’s completely practical. Horstmann introduces Scala concepts and techniques in “blog-sized” chunks that you can quickly master and apply. Hands-on activities guide you through well-defined stages of competency, from basic to expert. Coverage includes Getting started quickly with Scala’s interpreter, syntax, tools, and unique idioms Mastering core language features: functions, arrays, maps, tuples, packages, imports, exception handling, and more Becoming familiar with object-oriented programming in Scala: classes, inheritance, and traits Using Scala for real-world programming tasks: working with files, regular expressions, and XML Working with higher-order functions and the powerful Scala collections library Leveraging Scala’s powerful pattern matching and case classes Creating concurrent programs with Scala actors Implementing domain-specific languages Understanding the Scala type system Applying advanced “power tools” such as annotations, implicits, and delimited continuations Scala is rapidly reaching a tipping point that will reshape the experience of programming. This book will help object-oriented programmers build on their existing skills, allowing

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them to immediately construct useful applications as they gradually master advanced programming techniques.

This practically-focused textbook presents a concise tutorial on data structures and algorithms using the object-functional language Scala. The material builds upon the foundation established in the title *Programming with Scala: Language Exploration* by the same author, which can be treated as a companion text for those less familiar with Scala. Topics and features: discusses data structures and algorithms in the form of design patterns; covers key topics on arrays, lists, stacks, queues, hash tables, binary trees, sorting, searching, and graphs; describes examples of complete and running applications for each topic; presents a functional approach to implementations for data structures and algorithms (excepting arrays); provides numerous challenge exercises (with solutions), encouraging the reader to take existing solutions and improve upon them; offers insights from the author's extensive industrial experience; includes a glossary, and an appendix supplying an overview of discrete mathematics. Highlighting the techniques and skills necessary to quickly derive solutions to applied problems, this accessible text will prove invaluable to time-pressured students and professional software engineers.

Master the fundamentals of Scala and understand its emphasis on functional programming that sets it apart from Java. This book will help you translate what you already know in Java to Scala to start your functional programming journey. *Learn Scala* is split into four parts: a tour of Scala, a comparison between Java and Scala, Scala-specific features and functional programming idioms, and finally a discussion about adopting Scala in existing Java teams and legacy projects. After reading and using this tutorial, you'll come away with the skills in Scala to kick-start your productivity with this growing popular language. What You'll Learn

Tour Scala

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and learn the basic syntax, constructs, and how to use the REPL Translate Java syntax that you already know into Scala Learn what Scala offers over and above Java Become familiar with functional programming concepts and idioms Gain tips and advice useful when transitioning existing Java projects to Scala Who This Book Is For Java developers looking to transition to Scala. No prior experience necessary in Scala.

In large projects, programmers tend to get overwhelmed by their complexity. It can be hard to keep track of all the interdependencies in the code-base and how its state changes on runtime. The solution to these problems is Functional Programming, a paradigm specifically designed to deal with the complexity of software development. Mastering

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