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# Clojure Reactive Programming How To Develop Concurrent And Asynchronous Applications With Clojure

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*Clojure Reactive  
Programming How To  
Develop Concurrent  
And Asynchronous  
Applications With  
Clojure*

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**HOOD ELIEZER**

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## CLOJURE: HIGH PERFORMANCE JVM PROGRAMMING

Packt Publishing Ltd

Summary The Joy of Clojure, Second Edition is a deep look at the Clojure language. Fully updated for Clojure 1.6, this new edition goes beyond just syntax to show you the "why" of Clojure and how to write fluent Clojure code. You'll learn functional and declarative approaches to programming and will master the techniques that make Clojure so elegant and efficient. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology The Clojure programming language is a dialect of Lisp that runs on the Java Virtual Machine and JavaScript runtimes.

It is a functional programming language that offers great performance, expressive power, and stability by design. It gives you built-in concurrency and the predictable precision of immutable and persistent data structures. And it's really, really fast. The instant you see long blocks of Java or Ruby dissolve into a few lines of Clojure, you'll know why the authors of this book call it a "joyful language." It's no wonder that enterprises like Staples are betting their infrastructure on Clojure. About the Book The Joy of Clojure, Second Edition is a deep account of the Clojure language. Fully updated for Clojure 1.6, this new edition goes beyond the syntax to show you how to write fluent Clojure code. You'll learn functional and declarative approaches to programming

and will master techniques that make Clojure elegant and efficient. The book shows you how to solve hard problems related to concurrency, interoperability, and performance, and how great it can be to think in the Clojure way.

Appropriate for readers with some experience using Clojure or common Lisp. What's Inside Build web apps using ClojureScript Master functional programming techniques Simplify concurrency Covers Clojure 1.6 About the Authors Michael Fogus and Chris Houser are contributors to the Clojure and ClojureScript programming languages and the authors of various Clojure libraries and language features. Table of Contents PART 1 FOUNDATIONS Clojure philosophy Drinking from the Clojure fire hose Dipping your toes in the

pool PART 2 DATA TYPES On scalars Collection types PART 3 FUNCTIONAL PROGRAMMING Being lazy and set in your ways Functional programming PART 4 LARGE-SCALE DESIGN Macros Combining data and code Mutation and concurrency Parallelism PART 5 HOST SYMBIOSIS Java.next Why ClojureScript? PART 6 TANGENTIAL CONSIDERATIONS Data-oriented programming Performance Thinking programs Clojure changes the way you think Pragmatic Bookshelf Reactive Programming is central to many concurrent systems, and can help make the process of developing highly concurrent, event-driven, and asynchronous applications simpler and less error-prone. This book will allow you to explore Reactive Programming in

Clojure 1.9 and help you get to grips with some of its new features such as transducers, reader conditionals, additional string functions, direct linking, and socket servers. Hands-On Reactive Programming with Clojure starts by introducing you to Functional Reactive Programming (FRP) and its formulations, as well as showing you how it inspired Compositional Event Systems (CES). It then guides you in understanding Reactive Programming as well as learning how to develop your ability to work with time-varying values thanks to examples of reactive applications implemented in different frameworks. You'll also gain insight into some interesting Reactive design patterns such as the simple component, circuit breaker, request-response, and multiple-

master replication. Finally, the book introduces microservices-based architecture in Clojure and closes with examples of unit testing frameworks. By the end of the book, you will have gained all the knowledge you need to create applications using different Reactive Programming approaches. *Practical Clojure* Packt Publishing Ltd Modern web applications deserve modern tools. Harness the JVM's rich infrastructure while taking advantage of the expressive power and brisk performance of a modern functional language. Exploit Clojure's unique advantages for web development. Step by step, apply the fundamentals of programming in Clojure to build real-world, professional web applications. This edition features new libraries, tools,

and best practices, and focuses on developing modern single-page applications. Stop developing web apps with yesterday's tools. Today, developers are increasingly adopting Clojure as a web-development platform. See for yourself what makes Clojure so desirable, as you create a series of web apps of growing complexity, exhibiting the full process of web development using a modern functional language. Journey through all the steps in developing a rich Picture Gallery web application--from conception to packaging and deployment. You'll work hands-on with Clojure and build real-world, professional web apps. This fully updated second edition reveals the changes in the rapidly evolving Clojure ecosystem. Get up to speed on the many

new libraries, tools, and best practices. Gain expertise in the popular Ring/Compojure stack using the Luminus framework. Learn how Clojure works with databases and speeds development of RESTful services. See why ClojureScript is rapidly becoming a popular front-end platform, and use ClojureScript with the popular Reagent library to build single-page applications. This book is for you, whether you're already familiar with Clojure or if you're completely new to the language. What You Need: The latest JVM, Clojure 1.6+, and the Leiningen build tool, as well as an editor such as Emacs, IntelliJ, Eclipse, Light Table, or VI. *Clojure in Action* Simon and Schuster Handle every problem you come across in the world of Clojure programming with

this expert collection of recipes About This Book Discover a wide variety of practical cases and real world techniques to enhance your productivity with Clojure. Learn to resolve the everyday issues you face with a functional mindset using Clojure You will learn to write highly efficient, more productive, and error-free programs without the risk of deadlocks and race-conditions Who This Book Is For This book is for Clojure developers who have some Clojure programming experience and are well aware of their shortcomings. If you want to learn to tackle common problems, become an expert, and develop a solid skill set, then this book is for you. What You Will Learn Manipulate, access, filter, and transform your data with Clojure Write efficient

parallelized code through Clojure abstractions Tackle Complex Concurrency easily with Reactive Programming Build on Haskell abstractions to write dynamic functional tests Write AWS Lambda functions effortlessly Put Clojure in use into your IoT devices Use Clojure with Slack for instant monitoring Scaling your Clojure application using Docker Develop real-time system interactions using MQTT and websockets In Detail When it comes to learning and using a new language you need an effective guide to be by your side when things get rough. For Clojure developers, these recipes have everything you need to take on everything this language offers. This book is divided into three high impact sections. The first section gives you an



introduction to live programming and best practices. We show you how to interact with your connections by manipulating, transforming, and merging collections. You'll learn how to work with macros, protocols, multi-methods, and transducers. We'll also teach you how to work with languages such as Java, and Scala. The next section deals with intermediate-level content and enhances your Clojure skills, here we'll teach you concurrency programming with Clojure for high performance. We will provide you with advanced best practices, tips on Clojure programming, and show you how to work with Clojure while developing applications. In the final section you will learn how to test, deploy and analyze websocket behavior when your app is deployed in the cloud.

Finally, we will take you through DevOps. Developing with Clojure has never been easier with these recipes by your side! Style and approach This book takes a recipe-based approach by diving directly into helpful programming concepts. It will give you a foolproof approach to programming and teach you how to deal with problems that may arise while working with Clojure. The book is divided into three sections giving you the freedom skip to the section of your choice depending on the problem faced.

## **WEB DEVELOPMENT WITH CLOJURE**

Packt Publishing

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 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*.

*The the Clojure Workshop* Simon and Schuster

If you're an experienced programmer who has not worked with Clojure before, this guide is the perfect thorough but gentle introduction for you. Author Carin Meier not only provides a practical overview of this JVM language and its

functional programming concepts, but also includes a complete hands-on training course to help you learn Clojure in a structured way. The first half of the book takes you through Clojure's unique design and lets you try your hand at two Clojure projects, including a web app. The holistic course in second half provides you with critical tools and resources, including ways to plug into the Clojure community. Understand the basic structure of a Clojure expression Learn how to shape and control code in a functional way Discover how Clojure handles real-world state and concurrency Take advantage of Java classes and learn how Clojure handles polymorphism Manage and use libraries in a Clojure project Use the core.async library for asynchronous and concurrent

communication Explore the power of macros in Clojure programming Learn how to think in Clojure by following the book's seven-week training course [Getting Clojure](#) Addison-Wesley Professional Solve real-life programming problems with a fraction of the code that pure object-oriented programming requires. Use Scala and Clojure to solve in-depth problems with two sets of patterns: object-oriented patterns that become more concise with functional programming, and natively functional patterns. Your code will be more declarative, with fewer bugs and lower maintenance costs. Functional languages have their own patterns that enable you to solve problems with less code than object-oriented programming

alone. This book introduces you, the experienced Java programmer, to Scala and Clojure: practical, production-quality languages that run on the JVM and interoperate with existing Java. By using both the statically typed, type-inferred Scala and the dynamically typed, modern Lisp Clojure, you'll gain a broad understanding of functional programming. For each pattern, you'll first see the traditional object-oriented solution, and then dig into the functional replacements in both Scala and Clojure. These patterns are common in the functional world and deserve to become part of your problem-solving toolkit. On the object-oriented side, you'll see many common patterns, such as Command, Strategy, and Null Object. On the functional side, you'll learn core

functional patterns such as Memoization, Lazy Sequence, and Tail Recursion. Each pattern helps you solve a common programming problem. Working through them gives you a set of patterns you can use to solve problems you come across while writing programs. Finally, you'll learn how to work your existing Java code into new Scala or Clojure projects. You can start off small, adding functional code little by little, so you can complement your existing knowledge with Scala and Clojure as these languages gain popularity on the JVM. What You Need Clojure 1.5 and Scala 2.10. Optionally, Eclipse with plugins. [Data-Oriented Programming](#) No Starch Press  
If you are a Clojure developer who is interested in using Reactive

Programming to build asynchronous and concurrent applications, this book is for you. Knowledge of Clojure and Leiningen is required. Basic understanding of ClojureScript will be helpful for the web chapters, although it is not strictly necessary.

### **CLOJURE IN ACTION**

#### Pragmatic Bookshelf

Explore functional programming and discover new ways of thinking about code. You know you need to master functional programming, but learning one functional language is only the start. In this book, through articles drawn from PragPub magazine and articles written specifically for this book, you'll explore functional thinking and functional style and idioms across languages. Led by

expert guides, you'll discover the distinct strengths and approaches of Clojure, Elixir, Haskell, Scala, and Swift and learn which best suits your needs.

Contributing authors: Rich Hickey, Stuart Halloway, Aaron Bedra, Michael Bevilacqua-Linn, Venkat Subramaniam, Paul Callaghan, Jose Valim, Dave Thomas, Natasha Murashev, Tony Hillerson, Josh Chisholm, and Bruce Tate. Functional programming is on the rise because it lets you write simpler, cleaner code, and its emphasis on immutability makes it ideal for maximizing the benefits of multiple cores and distributed solutions. So far nobody's invented the perfect functional language - each has its unique strengths. In *Functional Programming: A PragPub Anthology*, you'll investigate the philosophies, tools,

and idioms of five different functional programming languages. See how Swift, the development language for iOS, encourages you to build highly scalable apps using functional techniques like map and reduce. Discover how Scala allows you to transition gently but deeply into functional programming without losing the benefits of the JVM, while with Lisp-based Clojure, you can plunge fully into the functional style. Learn about advanced functional concepts in Haskell, a pure functional language making powerful use of the type system with type inference and type classes. And see how functional programming is becoming more elegant and friendly with Elixir, a new functional language built on the powerful Erlang base. The industry has been embracing

functional programming more and more, driven by the need for concurrency and parallelism. This collection of articles will lead you to mastering the functional approach to problem solving. So put on your explorer's hat and prepare to be surprised. The goal of exploration is always discovery. What You Need: Familiarity with one or more programming languages. [Professional Clojure Apress](#) Learn how to solve problems using Clojure or ClojureScript and become a confident functional programmer with the help of engaging activities and challenging projects Key Features Master the tools and patterns of the Clojure and ClojureScript ecosystems Learn the fundamentals of functional programming and immutability Apply your skills

practically by developing a range of scalable applications

**Book Description**

The Clojure Workshop is a step-by-step guide to Clojure and ClojureScript, designed to quickly get you up and running as a confident, knowledgeable developer. Because of the functional nature of the language, Clojure programming is quite different to what many developers will have experienced. As hosted languages, Clojure and ClojureScript can also be daunting for newcomers because of complexities in the tooling and the challenge of interacting with the host platforms. To help you overcome these barriers, this book adopts a practical approach. Every chapter is centered around building something. As you progress through the book, you will progressively develop the

'muscle memory' that will make you a productive Clojure programmer, and help you see the world through the concepts of functional programming. You will also gain familiarity with common idioms and patterns, as well as exposure to some of the most widely used libraries. Unlike many Clojure books, this Workshop will include significant coverage of both Clojure and ClojureScript. This makes it useful no matter your goal or preferred platform, and provides a fresh perspective on the hosted nature of the language. By the end of this book, you'll have the knowledge, skills and confidence to creatively tackle your own ambitious projects with Clojure and ClojureScript. What you will learn

Write idiomatic code with Clojure and ClojureScript

Understand

and use common patterns and best practices Experiment with code and interact with programs using the REPL Learn the fundamentals of functional programming and immutability Master concepts including mapping, filtering, reducing and recursion Structure and build your code using namespaces and Leiningen Write unit tests to validate application behavior Simplify your code and improve efficiency with macros Who this book is for The Clojure Workshop is for anyone who is curious about functional programming and wants to get started learning Clojure or ClojureScript. Prior experience of another programming language, such as Java or JavaScript, is recommended, and will help you grasp the concepts covered in this book more

easily.

*Living Clojure* "O'Reilly Media, Inc."

If you are a Clojure developer who is interested in using Reactive Programming to build asynchronous and concurrent applications, this book is for you. Knowledge of Clojure and Leiningen is required. Basic understanding of ClojureScript will be helpful for the web chapters, although it is not strictly necessary.

*Functional Programming Patterns in Scala and Clojure* Clojure Reactive Programming

Clear, practical Clojure for the professional programmer Professional Clojure is the experienced developer's guide to functional programming using the Clojure language. Designed specifically to meet the needs of



professional developers, this book briefly introduces functional programming before skipping directly to the heart of using Clojure in a real-world setting. The discussion details the read—eval—print workflow that enables fast feedback loops, then dives into enterprise-level Clojure development with expert guidance on web services, testing, datomics, performance, and more. Read from beginning to end, this book serves as a clear, direct guide to Clojure programming—but the comprehensive coverage and detail makes it extraordinarily useful as a quick reference for mid-project snags. The author team includes four professional Clojure developers, ensuring professional-level instruction from a highly practical perspective. Clojure is an

open-source programming language maintained and supported by Cognitect., and quickly gaining use across industries at companies like Amazon, Walmart, Facebook, Netflix, and more. This guide provides a concise, yet thorough resource for professional developers needing to quickly put Clojure to work. Parse the difference between functional and object-oriented programming Understand Clojure performance and capabilities Develop reactive web pages using ClojureScript Adopt an REPL-driven development workflow Clojure is a modern dialect of Lisp, designed for concurrency and Java compatibility. It can be used with the Java virtual machine, Microsoft's Common Language Runtime, and JavaScript engines, providing a level of both versatility and

functionality that is appealing to more and more enterprise-level developers. As requirements grow increasingly complex, stepping away from imperative programming can dramatically streamline the development workflow. Professional Clojure provides the expert instruction that gets professionals up to speed and back to work quickly.

**Web Development with Clojure** Packt Publishing Ltd

For weeks, months—nay!—from the very moment you were born, you’ve felt it calling to you. At long last you’ll be united with the programming language you’ve been longing for: Clojure! As a Lisp-style functional programming language, Clojure lets you write robust and elegant code, and because it runs on the Java Virtual Machine, you can

take advantage of the vast Java ecosystem. Clojure for the Brave and True offers a "dessert-first" approach: you’ll start playing with real programs immediately, as you steadily acclimate to the abstract but powerful features of Lisp and functional programming. Inside you’ll find an offbeat, practical guide to Clojure, filled with quirky sample programs that catch cheese thieves and track glittery vampires. Learn how to:

- Wield Clojure’s core functions
- Use Emacs for Clojure development
- Write macros to modify Clojure itself
- Use Clojure’s tools to simplify concurrency and parallel programming

Clojure for the Brave and True assumes no prior experience with Clojure, the Java Virtual Machine, or functional programming. Are you ready, brave reader, to meet your

true destiny? Grab your best pair of parentheses—you're about to embark on an epic journey into the world of Clojure! Microservices with Clojure Manning Explore the world of lightning fast Clojure apps with asynchronous channels, logic, reactive programming, and more About This Book Discover Clojure's features and advantages and use them in your existing projects Explore lesser-known and more advanced features, constructs, and methodologies such as asynchronous channels, actors, logic programming, and reactive programming Measure and monitor performance, and understand optimization techniques Who This Book Is For If you're looking to learn more about its core libraries and delve into the Clojure language in detail, then this book

is ideal for you. Prior knowledge of the Clojure language is required. What You Will Learn Understand tools for the Clojure world and how they relate to Java tools and standards (such as Maven) Write simple multicore programs using Clojure's core concepts, such as atoms, agents, and refs Get to grips with Clojure's concurrency and state-management primitives in depth Analyze latency using the Criterion library Avoid reflection and boxing with type hints Maximize the impact of parallelization, functional composition, and process transformation by composing reducers and transducers Modify and add features to the Clojure language using macros Test your code with unit tests, specs, and type checks to write testable code Troubleshoot and style your Clojure code

to make it more maintainable In Detail Clojure is a general-purpose language from the Lisp family with an emphasis on functional programming. It has some interesting concepts and features such as immutability, gradual typing, thread-safe concurrency primitives, and macro-based metaprogramming, which makes it a great choice to create modern, performant, and scalable applications. This learning path aims at unleashing the true potential of the Clojure language so you can use it in your projects. It begins with installing and setting up the Clojure environment before moving on to explore the language in depth. You'll get acquainted with its various features such as functional programming, concurrency, reducers, transducers, `core.async` and

`core.logic`, and so on with a great level of detail. Moving on, you'll also learn how to enhance performance using Java interoperability and JVM-specific features from Clojure; you'll even master language features such as asynchronous channels, actors, logic programming, reactive programming, metaprogramming, and so on. This learning path combines some of the best that Packt has to offer in one complete, curated package. It includes content from the following Packt products: Clojure for Java Developers by Eduardo Diaz Clojure High Performance Programming, Second Edition by Shantanu Kumar Mastering Clojure by Akhil Wali Style and approach This is an easy-to-follow, step-by-step guide to start writing Clojure programs, making

use of all of its varied features and advantages.

### The Clojure Workshop Pragmatic Bookshelf

Distributed across servers, difficult to test, and resistant to modification-- modern software is complex. *Grokking Simplicity* is a friendly, practical guide that will change the way you approach software design and development. It introduces a unique approach to functional programming that explains why certain features of software are prone to complexity, and teaches you the functional techniques you can use to simplify these systems so that they're easier to test and debug. Available in PDF (ePub, kindle, and liveBook formats coming soon). about the technology Even experienced developers struggle

with software systems that sprawl across distributed servers and APIs, are filled with redundant code, and are difficult to reliably test and modify. Adopting ways of thinking derived from functional programming can help you design and refactor your codebase in ways that reduce complexity, rather than encouraging it. *Grokking Simplicity* lays out how to use functional programming in a professional environment to write a codebase that's easier to test and reuse, has fewer bugs, and is better at handling the asynchronous nature of distributed systems. about the book In *Grokking Simplicity*, you'll learn techniques and, more importantly, a mindset that will help you tackle common problems that arise when software gets complex. Veteran

functional programmer Eric Normand guides you to a crystal-clear understanding of why certain features of modern software are so prone to complexity and introduces you to the functional techniques you can use to simplify these systems so that they're easier to read, test, and debug. Through hands-on examples, exercises, and numerous self-assessments, you'll learn to organize your code for maximum reusability and internalize methods to keep unwanted complexity out of your codebase. Regardless of the language you're using, the ways of thinking in this book will help recognize problematic code and tame even the most complex software. what's inside Apply functional programming principles to reduce codebase complexity Work with data

transformation pipelines for code that's easier to test and reuse Tools for modeling time to simplify asynchrony 60 exercises and 100 questions to test your knowledge about the reader For experienced programmers. Examples are in JavaScript. about the author Eric Normand has been a functional programmer since 2001 and has been teaching functional programming online and in person since 2007. Visit [LispCast.com](http://LispCast.com) to see more of his credentials.

### **Reactive with ClojureScript Recipes** Apress

Drowning in unnecessary complexity, unmanaged state, and tangles of spaghetti code? In the best tradition of Lisp, Clojure gets out of your way so you can focus on expressing simple solutions

to hard problems. Clojure cuts through complexity by providing a set of composable tools--immutable data, functions, macros, and the interactive REPL. Written by members of the Clojure core team, this book is the essential, definitive guide to Clojure. This new edition includes information on all the newest features of Clojure, such as transducers and specs. Clojure joins the flexibility and agility of Lisp with the reach, stability, and performance of Java. Combine Clojure's tools for maximum effectiveness as you work with immutable data, functional programming, and safe concurrency to write programs that solve real-world problems. Start by reading and understanding Clojure syntax and see how Clojure is evaluated. From there,

find out about the sequence abstraction, which combines immutable collections with functional programming to create truly reusable data transformation code. Clojure is a functional language; learn how to write programs in a functional style, and when and how to use recursion to your advantage. Discover Clojure's unique approach to state and identity, techniques for polymorphism and open systems using multimethods and protocols, and how to leverage Clojure's metaprogramming capabilities via macros. Finally, put all the pieces together in a real program. New to this edition is coverage of Clojure's spec library, one of the most interesting new features of Clojure for describing both data and functions. You can use Clojure spec to validate data, destructure data,

explain invalid data, and generate large numbers of tests to verify the correctness of your code. With this book, you'll learn how to think in Clojure, and how to take advantage of its combined strengths to build powerful programs quickly. What You Need: Java 6 or higher Clojure 1.9

## GROKING SIMPLICITY

John Wiley & Sons

This book is the first definitive reference for the Clojure language, providing both an introduction to functional programming in general and a more specific introduction to Clojure's features. This book demonstrates the use of the language through examples, including features such as software transactional memory (STM) and

immutability, which may be new to programmers coming from other languages. Overview of functional programming and description of what sets Clojure apart from other languages Detailed explanation of Clojure's special features Examples of real-world tasks that are well-suited to Clojure's capabilities, starting with simple tasks and moving on to more complex applications

*Learn ClojureScript* Pragmatic Bookshelf

Whether you are a Java expert or at a beginner level, you'll benefit from this book, because it will teach you a brand new way of coding and thinking. The book starts with an explanation of what reactive programming is, why it is so appealing, and how we can integrate it in to Java. It continues by introducing the



new Java 8 syntax features, such as lambdas and function references, and some functional programming basics. From this point on, the book focuses on RxJava in depth. It goes through creating Observables, transforming, filtering, and combining them, and concurrency and testing to finish with extending the library itself. This book is a definite tutorial in RxJava filled with a lot of well-described examples. It explains reactive programming concepts in plain and readable language, without scientific formulas and terms.

*Mastering Clojure* Apress

Clojure Reactive Programming Packt Publishing Ltd

## FUNCTIONAL PROGRAMMING

## PATTERNS IN SCALA AND CLOJURE

Packt Publishing Ltd

Today, developers are increasingly adopting Clojure as a web-development platform. See for yourself what makes Clojure so desirable, as you create a series of web apps of growing complexity, exploring the full process of web development using a modern functional language. This fully updated third edition reveals the changes in the rapidly evolving Clojure ecosystem and provides a practical, complete walkthrough of the Clojure web-stack. Stop developing web apps with yesterday's tools. Today, developers are increasingly adopting Clojure as a web-development platform. See for yourself what makes Clojure so desirable, as you

work hands-on with Clojure and build a series of web apps of increasing size and scope, culminating in a professional grade web app using all the techniques you've learned along the way. This fully updated third edition will get you up to speed on the changes in the rapidly evolving Clojure ecosystem - the many new libraries, tools, and best practices. Build a fully featured SPA app with re-frame, a popular front-end framework for ClojureScript supporting a functional style MVC approach for managing the UI state in Single-Page Application-style

applications. Gain expertise in the popular Ring/Compojure stack using the Luminus framework. Learn how Clojure works with databases and speeds development of RESTful services. See why ClojureScript is rapidly becoming a popular front-end platform, and use ClojureScript with the popular re-frame library to build single-page applications. Whether you're already familiar with Clojure or completely new to the language, you'll be able to write web applications with Clojure at a professional level.

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