Learning Concurrent Programming in Scala

Learn the art of building intricate, modern, scalable concurrent applications using Scala

Foreword by Martin Odersky, professor at EPFL, the creator of Scala

Aleksandar Prokopec

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Learning Concurrent Programming In Scala:

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Learning Concurrent Programming in Scala Felix Frank,2014-11-28 This book is a must have tutorial for software developers aiming to write concurrent programs in Scala or broaden their existing knowledge of concurrency This book is intended for Scala programmers that have no prior knowledge about concurrent programming as well as those seeking to broaden their existing knowledge about concurrency Basic knowledge of the Scala programming language will be helpful Readers with a solid knowledge in another programming language such as Java should find this book easily accessible

Learning Concurrent Programming in Scala - Second Edition Aleksandar Prokopec,2017-03-31 Learn the art of building intricate modern scalable and concurrent applications using ScalaAbout This Book Make the most of Scala by understanding its philosophy and harnessing the power of multicores Get acquainted with cutting edge technologies in the field of concurrency through practical real world applications Get this step by step guide packed with pragmatic examplesWho This Book Is ForIf you are a Scala programmer with no prior knowledge about concurrent programming or seeking to broaden your existing knowledge about concurrency this book is for you Basic knowledge of the Scala programming language will be helpful Also if you have a solid knowledge in another programming language such as Java you should find this book easily accessible What You Will Learn Get to grips with the fundamentals of concurrent programming on modern multiprocessor systems with a particular focus on the JVM concurrency model Build high performance concurrent systems from simple low level concurrency primitives Express asynchrony in concurrent computations with futures and promises Seamlessly accelerate sequential programs by using data parallel collections Design safe scalable and easy to comprehend in memory transactional data models Transparently create distributed applications that scale across multiple machines Integrate different concurrency frameworks together in large applications Develop and implement scalable and easy to understand concurrent applications in Scala 2 12In DetailScala is a modern multiparadigm programming language designed to express common programming patterns in a concise elegant and type safe way Scala smoothly integrates the features of object oriented and functional languages In this second edition you will find an updated coverage of the Scala 2 12 platform The Scala 2 12 series targets Java 8 and requires it for execution It starts by introducing you to the foundations of concurrent programming on the JVM outlining the basics of the Java Memory Model and then shows some of the classic building blocks of concurrency such as the atomic variables thread pools and concurrent data structures along with the

caveats of traditional concurrency It then walks you through different high level concurrency abstractions each tailored toward a specific class of programming tasks while touching on the latest advancements of Async programming capabilities of Scala It also covers some useful patterns and idioms to use the techniques described Finally the book presents an overview of when to use which concurrency library and demonstrates how they all work together *Learning Scala Programming* Vikash Sharma,2018-01-30 Learn how to write scalable and concurrent programs in Scala a language that grows with you Key Features Get a grip on the functional features of the Scala programming language Understand and develop optimal applications using object oriented and functional Scala constructs Learn reactive principles with Scala and work with the Akka framework Book Description Scala is a general purpose programming language that supports both functional and object oriented programming paradigms Due to its concise design and versatility Scala s applications have been extended to a wide variety of fields such as data science and cluster computing You will learn to write highly scalable concurrent and testable programs to meet everyday software requirements We will begin by understanding the language basics syntax core data types literals variables and more From here you will be introduced to data structures with Scala and you will learn to work with higher order functions Scala s powerful collections framework will help you get the best out of immutable data structures and utilize them effectively You will then be introduced to concepts such as pattern matching case classes and functional programming features From here you will learn to work with Scala s object oriented features Going forward you will learn about asynchronous and reactive programming with Scala where you will be introduced to the Akka framework Finally you will learn the interoperability of Scala and Java After reading this book you ll be well versed with this language and its features and you will be able to write scalable concurrent and reactive programs in Scala What you will learn Get to know the reasons for choosing Scala its use and the advantages it provides over other languages Bring together functional and object oriented programming constructs to make a manageable application Master basic to advanced Scala constructs Test your applications using advanced testing methodologies such as TDD Select preferred language constructs from the wide variety of constructs provided by Scala Make the transition from the object oriented paradigm to the functional programming paradigm Write clean concise and powerful code with a functional mindset Create concurrent scalable and reactive applications utilizing the advantages of Scala Who this book is for This book is for programmers who choose to get a grip over Scala to write concurrent scalable and reactive programs No prior experience with any programming language is required to learn the concepts explained in this book Knowledge of any programming language would help the reader understanding concepts faster though *Learning Concurrent Programming in Scala* Aleksandar Prokopec,2017-02-22 Learn the art of building intricate modern scalable and concurrent applications using Scala About This Book Make the most of Scala by understanding its philosophy and harnessing the power of multicores Get acquainted with cutting edge technologies in the field of concurrency through practical real world applications Get this step by step guide packed with

pragmatic examples Who This Book Is For If you are a Scala programmer with no prior knowledge about concurrent programming or seeking to broaden your existing knowledge about concurrency this book is for you Basic knowledge of the Scala programming language will be helpful Also if you have a solid knowledge in another programming language such as Java you should find this book easily accessible What You Will Learn Get to grips with the fundamentals of concurrent programming on modern multiprocessor systems Build high performance concurrent systems from simple low level concurrency primitives Express asynchrony in concurrent computations with futures and promises Seamlessly accelerate sequential programs by using data parallel collections Design safe scalable and easy to comprehend in memory transactional data models Transparently create distributed applications that scale across multiple machines Integrate different concurrency frameworks together in large applications Develop and implement scalable and easy to understand concurrent applications in Scala 2 12 In Detail Scala is a modern multiparadigm programming language designed to express common programming patterns in a concise elegant and type safe way Scala smoothly integrates the features of object oriented and functional languages In this second edition you will find updated coverage of the Scala 2 12 platform The Scala 2 12 series targets Java 8 and requires it for execution The book starts by introducing you to the foundations of concurrent programming on the JVM outlining the basics of the Java Memory Model and then shows some of the classic building blocks of concurrency such as the atomic variables thread pools and concurrent data structures along with the caveats of traditional concurrency The book then walks you through different high level concurrency abstractions each tailored toward a specific class of programming tasks while touching on the latest advancements of async programming capabilities of Scala It also covers some useful patterns and idioms to use with the techniques described Finally the book presents an overview of when to use which concurrency library and demonstrates how they all work together and then presents new exciting approaches to building concurrent and distributed systems Style and approach The book provides a step by step introduction to concurrent programming It focuses on easy to understand examples that are pragmatic and applicable to real world applications Different topics are approached in a bottom up fashion gradually going from the simplest foundations to the most advanced features   **Mastering C# Concurrency** Eugene Agafonov,Andrew Koryavchenko,2015-10-28 Create robust and scalable applications along with responsive UI using concurrency and the multi threading infrastructure in NET and C About This Book Learn to combine your asynchronous operations with Task Parallel Library Master C s asynchronous infrastructure and use asynchronous APIs effectively to achieve optimal responsiveness of the application An easy to follow example based guide that helps you to build scalable applications using concurrency in C Who This Book Is For If you are a C developer who wants to develop modern applications in C and wants to overcome problems by using asynchronous APIs and standard patterns then this book is ideal for you Reasonable development knowledge an understanding of core elements and applications related to the Net platform and also the fundamentals of concurrency is assumed What You Will Learn Apply general

multithreading concepts to your application s design Leverage lock free concurrency and learn about its pros and cons to achieve efficient synchronization between user threads Combine your asynchronous operations with Task Parallel Library Make your code easier with C s asynchrony support Use common concurrent collections and programming patterns Write scalable and robust server side asynchronous code Create fast and responsible client applications Avoid common problems and troubleshoot your multi threaded and asynchronous applications In Detail Starting with the traditional approach to concurrency you will learn how to write multithreaded concurrent programs and compose ways that won t require locking You will explore the concepts of parallelism granularity and fine grained and coarse grained parallel tasks by choosing a concurrent program structure and parallelizing the workload optimally You will also learn how to use task parallel library cancellations timeouts and how to handle errors You will know how to choose the appropriate data structure for a specific parallel algorithm to achieve scalability and performance Further you ll learn about server scalability asynchronous I O and thread pools and write responsive traditional Windows and Windows Store applications By the end of the book you will be able to diagnose and resolve typical problems that could happen in multithreaded applications Style and approach An easy to follow example based guide that will walk you through the core principles of concurrency and multithreading using C

Learn Concurrent Programming with Go James Cutajar,2024-01-30 Concurrency doesn t need to be confusing Start writing concurrent code that improves performance scales up to handle large volumes of data and takes full advantage of modern multi processor hardware Too many developers think concurrency is extremely challenging Learn Concurrent Programming with Go is here to prove them wrong This book uses the easy to grasp concurrency tools of the Go language to demonstrate principles and techniques steadily teaching you the best practices of effective concurrency Techniques learned in this book can be applied to other languages In Learn Concurrent Programming with Go you will learn how to Implement effective concurrency for more responsive higher performing scalable software Avoid common concurrency problems such as deadlocks and race conditions Manage concurrency using goroutines mutexes readers writer locks and more Identify concurrency patterns such as pipelining worker pools and message passing Discover advantages limits and properties of parallel computing Improve your Go coding skills with advanced multithreading topics Concurrent programming allows multiple tasks to execute and interact simultaneously speeding up performance and reducing user wait time In Learn Concurrent Programming with Go you ll discover universal principles of concurrency along with how to use them for a performance boost in your Go applications Expert author James Cutajar starts with the basics of modeling concurrency in your programs demonstrates differences between message passing and memory sharing and even introduces advanced topics such as atomic variables and futexes About the technology You can improve almost any application s performance and responsiveness by introducing concurrency into the codebase This book will show you how It starts with the basics of concurrent programming and builds your skills step by step by exploring scenarios you ll face every day as a developer

Author James Cutajar explains each aspect of concurrency in plain language using the intuitive features baked into the Go language About the book Learn Concurrent Programming with Go provides a practical hands on introduction to creating software for modern multiprocessor systems In it you ll learn how to divide larger programming tasks into independent parts that can run simultaneously You ll use the Go language to implement common concurrency patterns by utilizing readers writer locks semaphores message passing and memory sharing The skills you learn will easily transfer to other languages What s inside Prevent deadlocks and race conditions Go concurrency features like goroutines mutexes channels and more Concurrency patterns including pipelining and worker pools About the reader For programmers with basic knowledge of Go or another C style language No experience in concurrent programming required About the author James Cutajar has been programming for more than 20 years He s an open source contributor blogger tech evangelist Udemy instructor and author Table of Contents PART 1 FOUNDATIONS 1 Stepping into concurrent programming 2 Dealing with threads 3 Thread communication using memory sharing 4 Synchronization with mutexes 5 Condition variables and semaphores 6 Synchronizing with waitgroups and barriers PART 2 MESSAGE PASSING 7 Communication using message passing 8 Selecting channels 9 Programming with channels PART 3 MORE CONCURRENCY 10 Concurrency patterns 11 Avoiding deadlocks 12 Atomics spin locks and futexes   **Mastering ServiceStack** Andreas Niedermair,2015-10-28 Utilize ServiceStack as the rock solid foundation of your distributed system About This Book Take advantage of the various data providers to access authentication and authorization sessions cache and database Leverage asynchronous processing for decoupling components to ease scaling Monitor and tune the performance of your distributed system Who This Book Is For Mastering ServiceStack is targeted at developers who have already implemented web services with ASMX WCF or ServiceStack and want to gain more insight into the possibilities ServiceStack has to offer to build distributed systems of all scales What You Will Learn Design a prudent and resilient API following the RESTful design Understand the internal processing chain and utilize the provided hooks Incorporate ServiceStack as a full service provider to your existing distributed system Leverage the power of asynchronous processing and add message queues to your architecture Analyze and tune the performance of your service In Detail Mastering ServiceStack covers real life problems that occur over the lifetime of a distributed system and how to solve them by deeply understanding the tools of ServiceStack Distributed systems is the enterprise solution that provide flexibility reliability scaling and performance ServiceStack is an outstanding tool belt to create such a system in a frictionless manner especially sophisticated designed and fun to use The book starts with an introduction covering the essentials but assumes you are just refreshing are a very fast learner or are an expert in building web services Then the book explains ServiceStack s data transfer object patterns and teach you how it differs from other methods of building web services with different protocols such as SOAP and SOA It also introduces more low level details such as how to extend the User Auth message queues and concepts on how the technology works By the end of this book you

will understand the concepts framework issues and resolutions related to ServiceStack Style and approach A step by step approach that follows the natural requirements of a distributed system in a conversational style Applied Scala Axionics Ltd,2025-06-12 Ready to move beyond basics This book unlocks intermediate Scala with a focus on real world applications Master concurrency deep dive into functional programming and harness Scala for big data What You ll Learn Concurrent programming Futures Akka and thread safe designs Advanced FP monads functors and category theory demystified Big Data with Spark distributed computing made accessible Patterns for scalability write high performance maintainable code Perfect for developers aiming to build reactive distributed systems **Python Concurrency with asyncio** Matthew Fowler,2022-03-15 Learn how to speed up slow Python code with concurrent programming and the cutting edge asyncio library Use coroutines and tasks alongside async await syntax to run code concurrently Build web APIs and make concurrency web requests with aiohttp Run thousands of SQL queries concurrently Create a map reduce job that can process gigabytes of data concurrently Use threading with asyncio to mix blocking code with asyncio code Python is flexible versatile and easy to learn It can also be very slow compared to lower level languages Python Concurrency with asyncio teaches you how to boost Python s performance by applying a variety of concurrency techniques You ll learn how the complex but powerful asyncio library can achieve concurrency with just a single thread and use asyncio s APIs to run multiple web requests and database queries simultaneously The book covers using asyncio with the entire Python concurrency landscape including multiprocessing and multithreading About the technology It s easy to overload standard Python and watch your programs slow to a crawl Th e asyncio library was built to solve these problems by making it easy to divide and schedule tasks It seamlessly handles multiple operations concurrently leading to apps that are lightning fast and scalable About the book Python Concurrency with asyncio introduces asynchronous parallel and concurrent programming through hands on Python examples Hard to grok concurrency topics are broken down into simple flowcharts that make it easy to see how your tasks are running You ll learn how to overcome the limitations of Python using asyncio to speed up slow web servers and microservices You ll even combine asyncio with traditional multiprocessing techniques for huge improvements to performance What s inside Build web APIs and make concurrency web requests with aiohttp Run thousands of SQL queries concurrently Create a map reduce job that can process gigabytes of data concurrently Use threading with asyncio to mix blocking code with asyncio code About the reader For intermediate Python programmers No previous experience of concurrency required About the author Matthew Fowler has over 15 years of software engineering experience in roles from architect to engineering director Table of Contents 1 Getting to know asyncio 2 asyncio basics 3 A first asyncio application 4 Concurrent web requests 5 Non blocking database drivers 6 Handling CPU bound work 7 Handling blocking work with threads 8 Streams 9 Web applications 10 Microservices 11 Synchronization 12 Asynchronous queues 13 Managing subprocesses 14 Advanced asyncio *Concurrent Patterns and Best Practices* Atul S. Khot,2018-09-27 A definitive guide to

mastering and implementing concurrency patterns in your applications Key FeaturesBuild scalable apps with patterns in multithreading synchronization and functional programmingExplore the parallel programming and multithreading techniques to make the code run fasterEfficiently use the techniques outlined to build reliable applicationsBook Description Selecting the correct concurrency architecture has a significant impact on the design and performance of your applications This book explains how to leverage the different characteristics of parallel architecture to make your code faster and more efficient To start with you ll understand the basic concurrency concepts and explore patterns around explicit locking lock free programming futures actors Then you ll get insights into different concurrency models and parallel algorithms and put them to practice in different scenarios to realize your application s true potential We ll take you through multithreading design patterns such as master slave leader follower map reduce and monitor also helping you to learn hands on coding using these patterns Once you ve grasped all of this you ll move on to solving problems using synchronizer patterns You ll discover the rationale for these patterns in distributed parallel applications followed by studying how future composition immutability and the monadic flow help create more robust code Toward the end of the book you ll learn about the actor paradigm and actor patterns the message passing concurrency paradigm What you will learnExplore parallel architecture Get acquainted with concurrency models Internalize design themes by implementing multithreading patterns Get insights into concurrent design patterns Discover design principles behind many java threading abstractions Work with functional concurrency patternsWho this book is for This is a must have guide for developers who want to learn patterns to build scalable and high performing apps It s assumed that you already have a decent level of programming knowledge *Introduction to Scala Programming_Professional Level* CPA John Kimani,Dr. James Scott,2023-06-17 Introduction to Scala Object Oriented Programming in Scala Functional Programming in Scala Collections and Pattern Matching Concurrency and Parallelism in Scala Building Applications with Scala Advanced Topics in Scala Collaborative Development with Scala **Scala Functional Programming Patterns** Atul Khot,2015-12-24 Learn Scala Programming Slava Schmidt,2018-10-31 A step by step guide in building high performance scalable applications with the latest features of Scala Key FeaturesDevelop a strong foundation in functional programming and Scala s Standard Library STL Get a detailed coverage of Lightbend Lagom the latest microservices framework from LightbendUnderstand the Akka framework and learn event based Programming with Scala Book Description The second version of Scala has undergone multiple changes to support features and library implementations Scala 2 13 with its main focus on modularizing the standard library and simplifying collections brings with it a host of updates Learn Scala Programming addresses both technical and architectural changes to the redesigned standard library and collections along with covering in depth type systems and first level support for functions You will discover how to leverage implicits as a primary mechanism for building type classes and look at different ways to test Scala code You will also learn about abstract building blocks used in functional programming giving you sufficient understanding to pick and use any

existing functional programming library out there In the concluding chapters you will explore reactive programming by covering the Akka framework and reactive streams By the end of this book you will have built microservices and learned to implement them with the Scala and Lagom framework What you will learnAcquaint yourself with the new standard library of Scala 2 13Get to grips with the Grok functional paradigmsGet familiar with type system to express domain constraintsUnderstand the actor model and different Akka librariesGrasp the concept of building microservices using Lagom frameworkDeep dive into property based testing and its practical applicationsWho this book is for This book is for beginner to intermediate level Scala developers who would like to advance and gain knowledge of the intricacies of the Scala language expand their functional programming tools and explore actor based concurrency models **Scala from Scratch: Understanding** Daniel Westheide,2020-10-11 Scala from Scratch Understanding is the second in a series of two books that teach you the Scala programming language Readers that have read Scala from Scratch Exploration or have learned some Scala through other means will get a deeper understanding of the language features and underlying functional programming concepts that have been explored in the first book You will also learn about important advanced language features that play a crucial role in many real life Scala projects While doing so you ll get to know best practices that have been established over the years By the end of the book you will have a grasp of the language its idioms and common tools and techniques allowing you to be a productive member in commercial or open source Scala projects In this book you will learn more about algebraic data types and about pattern matching and you will get insights into functional ways of error handling You will learn about essential ideas of functional programming like currying and partial functional application You will also explore advanced aspects of the Scala type system like covariance and contravariance and how to employ the type class pattern when abstracting over concrete types You will learn about the design of Scala s collections API and how to work with Scala collections effectively You will get a good grasp of property based testing an alternative to example based testing and you will dive deeper into sbt the standard build tool in the Scala ecosystem You will also learn how to interact with the outside world in a purely functional way and about different approaches at concurrent programming in Scala Functional Programming in Scala, Second Edition Michael Pilquist,Paul Chiusano,Rúnar Bjarnasson,2023-06-06 Functional Programming in Scala has helped over 30 000 developers discover the power of functional programming You ll soon see why reviewers have called it mindblowing The book smooths the complexity curve of functional programming making it simple to understand the basics and intuitive to progress to more advanced topics Concrete examples and exercises show you FP in the real world and reveal how it can improve your everyday coding practices This second edition comes packed with the latest standards of FP as well as full code updates to Scala 3 and its new language features *Scala in Action* Nilanjan Raychaudhuri,2013-04-08 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 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 and Java Scalable and distributed applications using Akka   **Programming Scala** Dean Wampler,Alex Payne,2009-09-15 Learn how to be more productive with Scala a new multi paradigm language for the Java Virtual Machine JVM that integrates features of both object oriented and functional programming With this book you ll discover why Scala is ideal for highly scalable component based applications that support concurrency and distribution Programming Scala clearly explains the advantages of Scala as a JVM language You ll learn how to leverage the wealth of Java class libraries to meet the practical needs of enterprise and Internet projects more easily Packed with code examples this book provides useful information on Scala s command line tools third party tools libraries and available language aware plugins for editors and IDEs Learn how Scala s succinct and flexible code helps you program faster Discover the notable improvements Scala offers over Java s object model Get a concise overview of functional programming and learn how Scala s support for it offers a better approach to concurrency Know how to use mixin composition with traits pattern matching concurrency with Actors and other essential features Take advantage of Scala s built in support for XML Learn how to develop domain specific languages Understand the basics for designing test driven Scala applications   **Get Programming with Scala** Daniela Sfregola,2021-09-07 Scala developers are in high demand This flexible language blends object oriented and functional programming styles so you can write flexible easy to maintain code Because Scala runs on the JVM your programs can

interact seamlessly with Java libraries and tools If you re comfortable writing Java this easy to read book will get your programming with Scala fast Get programming with Scala is a fast paced introduction to the Scala language covering both Scala 2 and Scala 3 You ll learn through lessons quizzes and hands on projects that bring your new skills to life Clear explanations make Scala s features and abstractions easy to understand As you go you ll learn to write familiar object oriented code in Scala and also discover the possibilities of functional programming **Learn Scala Programming Language from Scratch** ,2016 Scala has emerged as a very popular programming language today It has helped the programmers find the perfect balance between object oriented programming and functional programming Scala allows efficient code reuse and extensibility and its ability to handle data in real time has made it a popular choice for Big Data projects as well While it is easy to learn Scala if you are a Java developer learning it from scratch can be quite a challenge Spanning over 5 hours this course attempts to do just that help you take your first steps in the world of Scala programming with no prerequisites You will start will getting a solid understanding of the functional programming concepts You will also learn what Scala is why you should it and its core fundamentals You will then set up the development environment for Scala followed by working with Scala functions collections and higher order types You will learn about the Java Memory Model what concurrency is and how Scala can be used to extend Java concurrency After you have a firm understanding of the basics you will implement real world applications using Scala and other popular frameworks like Akka and Spark By the end of this course you will have taken your understanding of Scala programming to the next level Resource description page

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