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

Marcel Souza

Learning Concurrent Programming In Scala:

Learning Concurrent Programming in Scala Aleksandar Prokopec,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 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   *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   **Scala Design Patterns** Ivan Nikolov,2016-02-29 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 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 **Scala Functional Programming Patterns** Atul S. Khot,2015-12-29 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 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 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 *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 **Scala for Data Science** Pascal Bugnion,2016-01-28 Leverage the power of Scala with different tools to build scalable robust data science applications About This Book A complete guide for scalable data science solutions from data ingestion to data visualization Deploy horizontally scalable data processing pipelines and take advantage of web frameworks to build engaging visualizations Build functional type safe routines to interact with relational and NoSQL databases with the help of tutorials and examples provided Who This Book Is For If you are a Scala developer or data scientist or if you want to enter the field of data science then this book will give you all the tools you need to implement data science solutions What You Will Learn

Transform and filter tabular data to extract features for machine learning Implement your own algorithms or take advantage of MLLib s extensive suite of models to build distributed machine learning pipelines Read transform and write data to both SQL and NoSQL databases in a functional manner Write robust routines to query web APIs Read data from web APIs such as the GitHub or Twitter API Use Scala to interact with MongoDB which offers high performance and helps to store large data sets with uncertain query requirements Create Scala web applications that couple with JavaScript libraries such as D3 to create compelling interactive visualizations Deploy scalable parallel applications using Apache Spark loading data from HDFS or Hive In Detail Scala is a multi paradigm programming language it supports both object oriented and functional programming and scripting language used to build applications for the JVM Languages such as R Python Java and so on are mostly used for data science It is particularly good at analyzing large sets of data without any significant impact on performance and thus Scala is being adopted by many developers and data scientists Data scientists might be aware that building applications that are truly scalable is hard Scala with its powerful functional libraries for interacting with databases and building scalable frameworks will give you the tools to construct robust data pipelines This book will introduce you to the libraries for ingesting storing manipulating processing and visualizing data in Scala Packed with real world examples and interesting data sets this book will teach you to ingest data from flat files and web APIs and store it in a SQL or NoSQL database It will show you how to design scalable architectures to process and modelling your data starting from simple concurrency constructs such as parallel collections and futures through to actor systems and Apache Spark As well as Scala s emphasis on functional structures and immutability you will learn how to use the right parallel construct for the job at hand minimizing development time without compromising scalability Finally you will learn how to build beautiful interactive visualizations using web frameworks This book gives tutorials on some of the most common Scala libraries for data science allowing you to quickly get up to speed with building data science and data engineering solutions Style and approach A tutorial with complete examples this book will give you the tools to start building useful data engineering and data science solutions straightaway **Scala: Guide for Data Science Professionals** Pascal Bugnion,Arun Manivannan,Patrick R. Nicolas,2017-02-24 Scala will be a valuable tool to have on hand during your data science journey for everything from data cleaning to cutting edge machine learning About This Book Build data science and data engineering solutions with ease An in depth look at each stage of the data analysis process from reading and collecting data to distributed analytics Explore a broad variety of data processing machine learning and genetic algorithms through diagrams mathematical formulations and source code Who This Book Is For This learning path is perfect for those who are comfortable with Scala programming and now want to enter the field of data science Some knowledge of statistics is expected What You Will Learn Transfer and filter tabular data to extract features for machine learning Read clean transform and write data to both SQL and NoSQL databases Create Scala web applications that couple with JavaScript libraries such as D3 to create compelling interactive visualizations

Load data from HDFS and HIVE with ease Run streaming and graph analytics in Spark for exploratory analysis Bundle and scale up Spark jobs by deploying them into a variety of cluster managers Build dynamic workflows for scientific computing Leverage open source libraries to extract patterns from time series Master probabilistic models for sequential data In Detail Scala is especially good for analyzing large sets of data as the scale of the task doesn t have any significant impact on performance Scala s powerful functional libraries can interact with databases and build scalable frameworks resulting in the creation of robust data pipelines The first module introduces you to Scala libraries to ingest store manipulate process and visualize data Using real world examples you will learn how to design scalable architecture to process and model data starting from simple concurrency constructs and progressing to actor systems and Apache Spark After this you will also learn how to build interactive visualizations with web frameworks Once you have become familiar with all the tasks involved in data science you will explore data analytics with Scala in the second module You ll see how Scala can be used to make sense of data through easy to follow recipes You will learn about Bokeh bindings for exploratory data analysis and quintessential machine learning with algorithms with Spark ML library You ll get a sufficient understanding of Spark streaming machine learning for streaming data and Spark graphX Armed with a firm understanding of data analysis you will be ready to explore the most cutting edge aspect of data science machine learning The final module teaches you the A to Z of machine learning with Scala You ll explore Scala for dependency injections and implicits which are used to write machine learning algorithms You ll also explore machine learning topics such as clustering dimentionality reduction Naive Bayes Regression models SVMs neural networks and more This learning path combines some of the best that Packt has to offer into one complete curated package It includes content from the following Packt products Scala for Data Science Pascal Bugnion Scala Data Analysis Cookbook Arun Manivannan Scala for Machine Learning Patrick R Nicolas Style and approach A complete package with all the information necessary to start building useful data engineering and data science solutions straight away It contains a diverse set of recipes that cover the full spectrum of interesting data analysis tasks and will help you revolutionize your data analysis skills using Scala   **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   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   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 Concurrency Programming with Java 9 Javier Fernandez Gonzalez,2017-07-17 Master the principles to make applications robust scalable and responsive About This Book Implement concurrent applications using the Java 9 Concurrency API and its new components Improve the performance of your applications and process more data at the same time taking advantage of

all of your resources Construct real world examples related to machine learning data mining natural language processing and more Who This Book Is For This book is for competent Java developers who have basic understanding of concurrency but knowledge of effective implementation of concurrent programs or usage of streams for making processes more efficient is not required What You Will Learn Master the principles that every concurrent application must follow See how to parallelize a sequential algorithm to obtain better performance without data inconsistencies and deadlocks Get the most from the Java Concurrency API components Separate the thread management from the rest of the application with the Executor component Execute phased based tasks in an efficient way with the Phaser components Solve problems using a parallelized version of the divide and conquer paradigm with the Fork Join framework Find out how to use parallel Streams and Reactive Streams Implement the map and reduce and map and collect programming models Control the concurrent data structures and synchronization mechanisms provided by the Java Concurrency API Implement efficient solutions for some actual problems such as data mining machine learning and more In Detail Concurrency programming allows several large tasks to be divided into smaller sub tasks which are further processed as individual tasks that run in parallel Java 9 includes a comprehensive API with lots of ready to use components for easily implementing powerful concurrency applications but with high flexibility so you can adapt these components to your needs The book starts with a full description of the design principles of concurrent applications and explains how to parallelize a sequential algorithm You will then be introduced to Threads and Runnables which are an integral part of Java 9 s concurrency API You will see how to use all the components of the Java concurrency API from the basics to the most advanced techniques and will implement them in powerful real world concurrency applications The book ends with a detailed description of the tools and techniques you can use to test a concurrent Java application along with a brief insight into other concurrency mechanisms in JVM Style and approach This is a complete guide that implements real world examples of algorithms related to machine learning data mining and natural language processing in client server environments All the examples are explained using a step by step approach

 Functional and Concurrent Programming Michel Charpentier,2022-11-16 Leverage Modern Language Constructs to Write High Quality Code Faster The functional and concurrent programming language features supported by modern languages can be challenging even for experienced developers These features may appear intimidating to OOP programmers because of a misunderstanding of how they work Programmers first need to become familiar with the abstract concepts that underlie these powerful features In Functional and Concurrent Programming Michel Charpentier introduces a core set of programming language constructs that will help you be productive in a variety of programming languages now and in the future Charpentier illustrates key concepts with numerous small focused code examples written in Scala and with case studies that provide a thorough grounding in functional and concurrent programming skills These skills will carry from language to language including the most recent incarnations of Java Using these features will enable developers and

programmers to write high quality code that is easier to understand debug optimize and evolve Key topics covered include Recursion and tail recursion Pattern matching and algebraic datatypes Persistent structures and immutability Higher order functions and lambda expressions Lazy evaluation and streams Threads and thread pools Atomicity and locking Synchronization and thread safe objects Lock free non blocking patterns Futures promises and functional concurrent programming As a bonus the book includes a discussion of common typing strategies used in modern programming languages including type inference subtyping polymorphism type classes type bounds and type variance Most of the code examples are in Scala which includes many of the standard features of functional and concurrent programming however no prior knowledge of Scala is assumed You should be familiar with concepts such as classes methods objects types variables loops and conditionals and have enough programming experience to not be distracted by simple matters of syntax

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 **Concurrent Programming, Open Systems and Formal Methods** Jose Meseguer,Carlos A. Varela,Nalini Venkatasubramanian,2025-09-24 This Festschrift is dedicated to Gul Agha in recognition of his outstanding research and teaching impact Gul Agha received his undergraduate degree at Caltech in 1977 and his A M M S and Ph D degrees at the University of Michigan Ann Arbor His thesis led to the MIT Press book Actors A Model of Concurrent Computation in Distributed Systems a work cited nearly 5000 times After researcher and lecturer appointments at MIT and Yale he moved to the University of Illinois Urbana Champaign where he started as an assistant professor in 1989 and subsequently become a full professor and the founding director of the Open Systems Laboratory The team s goal is to develop concurrent programming languages and systems that support applications with high performance fault tolerance or real time requirements and this work has been very influential across domains such as Software Engineering Formal Methods Programming Languages Concurrency Theory Distributed Systems and Cyber Physical Systems Gul Agha is a

Fellow of the IEEE and a Fellow of the ACM other honors include the IBM Faculty Award the ONR Young Investigator Award and the ACM Recognition of Service Award Over the course of his career Gul has been a highly impactful mentor and he has collaborated in research and in publications with a wide range of scientists and engineers in academia and in industry Beyond his deep expertise they have been inspired by his well rounded intellect philosophy of life and sense of humor and their successes are reflected in the papers contributed to this volume <u>Programming Concurrency on the JVM</u> Venkat Subramaniam,2011-08-21 More than ever learning to program concurrency is critical to creating faster responsive applications Speedy and affordable multicore hardware is driving the demand for high performing applications and you can leverage the Java platform to bring these applications to life Concurrency on the Java platform has evolved from the synchronization model of JDK to software transactional memory STM and actor based concurrency This book is the first to show you all these concurrency styles so you can compare and choose what works best for your applications You ll learn the benefits of each of these models when and how to use them and what their limitations are Through hands on exercises you ll learn how to avoid shared mutable state and how to write good elegant explicit synchronization free programs so you can create easy and safe concurrent applications The techniques you learn in this book will take you from dreading concurrency to mastering and enjoying it Best of all you can work with Java or a JVM language of your choice Clojure JRuby Groovy or Scala to reap the growing power of multicore hardware If you are a Java programmer you d need JDK 1 5 or later and the Akka 1 0 library In addition if you program in Scala Clojure Groovy or JRuby you d need the latest version of your preferred language Groovy programmers will also need GPars **LEARN EVERYTHING ABOUT JAVASCRIPT PYTHON JAVA C# AND SQL** Marcel Souza, Unlock the doors to a world of coding mastery with Learn Everything About JavaScript Python Java C and SQL Whether you re stepping into the coding universe for the first time or expanding your existing skills this comprehensive guide is your ticket to becoming a true programming virtuoso Dive headfirst into the core principles of coding unraveling the mysteries of JavaScript Python Java C and SQL This book is your trusty guide walking you through each language s nuances quirks and potential applications Harness the power of JavaScript to breathe life into web pages tame the versatility of Python for data manipulation wield the strength of Java for robust applications leverage C for Windows development and master SQL for seamless database management But it doesn t stop at the basics this guide propels you into the realm of advanced coding techniques Uncover the secrets of building dynamic websites crafting intelligent algorithms and even dipping your toes into the vast ocean of data science and machine learning Whether you re a newbie eager to learn or a seasoned coder looking to expand your repertoire Learn Everything About JavaScript Python Java C and SQL is your compass in the coding wilderness Don t miss out on the chance to become a coding maestro Grab your copy now and embark on your journey to coding greatness **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 *Mastering Concurrency Programming with Java 8* Javier Fernández González,2016-02-29 Master the principles and techniques of multithreaded programming with the Java 8 Concurrency API About This Book Implement concurrent applications using the Java 8 Concurrency API and its new components Improve the performance of your applications or process more data at the same time taking advantage of all of your resources Construct real world examples related to machine learning data mining image processing and client server environments Who This Book Is For If you are a competent Java developer with a good understanding of concurrency but have no knowledge of how to effectively implement concurrent programs or use streams to make processes more efficient then this book is for you What You Will Learn Design concurrent applications by converting a sequential algorithm into a concurrent one Discover how to avoid all the possible problems you can get in concurrent algorithms Use the Executor framework to manage concurrent tasks without creating threads Extend and modify Executors to adapt their behavior to your needs Solve problems using the divide and conquer technique and the Fork Join framework Process massive data sets with parallel streams and Map Reduce implementation Control data race conditions using concurrent data structures and synchronization mechanisms Test and monitor concurrent applications In Detail Concurrency programming allows several large tasks to be divided into smaller sub tasks which are further processed as individual tasks

that run in parallel All the sub tasks are combined together once the required results are achieved they are then merged to get the final output The whole process is very complex This process goes from the design of concurrent algorithms to the testing phase where concurrent applications need extra attention Java includes a comprehensive API with a lot of ready to use components to implement powerful concurrency applications in an easy way but with a high flexibility to adapt these components to your needs The book starts with a full description of design principles of concurrent applications and how to parallelize a sequential algorithm We ll show you how to use all the components of the Java Concurrency API from basics to the most advanced techniques to implement them in powerful concurrency applications in Java You will be using real world examples of complex algorithms related to machine learning data mining natural language processing image processing in client server environments Next you will learn how to use the most important components of the Java 8 Concurrency API the Executor framework to execute multiple tasks in your applications the phaser class to implement concurrent tasks divided into phases and the Fork Join framework to implement concurrent tasks that can be split into smaller problems using the divide and conquer technique Toward the end we will cover the new inclusions in Java 8 API the Map and Reduce model and the Map and Collect model The book will also teach you about the data structures and synchronization utilities to avoid data race conditions and other critical problems Finally the book ends with a detailed description of the tools and techniques that you can use to test a Java concurrent application Style and approach A complete guide implementing real world examples with algorithms related to machine learning data mining and natural language processing in client server environments All the examples are explained in a step by step approach

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