

Getting Started With Julia

Programming By Ivo Balbaert

A comprehensive introduction to optimization with a focus on practical algorithms for the design of engineering systems. This book offers a comprehensive introduction to optimization with a focus on practical algorithms. The book approaches optimization from an engineering perspective, where the objective is to design a system that optimizes a set of metrics subject to constraints. Readers will learn about computational approaches for a range of challenges, including searching high-dimensional spaces, handling problems where there are multiple competing objectives, and accommodating uncertainty in the metrics. Figures, examples, and exercises convey the intuition behind the mathematical approaches. The text provides concrete implementations in the Julia programming language. Topics covered include derivatives and their generalization to multiple dimensions; local descent and first- and second-order methods that inform local descent; stochastic methods, which introduce randomness into the optimization process; linear constrained optimization, when both the objective function and the constraints are linear; surrogate models, probabilistic surrogate models, and using probabilistic surrogate models to guide optimization; optimization under uncertainty;

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uncertainty propagation; expression optimization; and multidisciplinary design optimization.

Appendixes offer an introduction to the Julia language, test functions for evaluating algorithm performance, and mathematical concepts used in the derivation and analysis of the optimization methods discussed in the text. The book can be used by advanced undergraduates and graduate students in mathematics, statistics, computer science, any engineering field, (including electrical engineering and aerospace engineering), and operations research, and as a reference for professionals.

Master how to use the Julia language to solve business critical data science challenges. After covering the importance of Julia to the data science community and several essential data science principles, we start with the basics including how to install Julia and its powerful libraries. Many examples are provided as we illustrate how to leverage each Julia command, dataset, and function. Specialized script packages are introduced and described. Hands-on problems representative of those commonly encountered throughout the data science pipeline are provided, and we guide you in the use of Julia in solving them using published datasets. Many of these scenarios make use of existing packages and built-in functions, as we cover:

1. An overview of the data science pipeline

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along with an example illustrating the key points, implemented in Julia 2. 2. Options for Julia IDEs 3. 3. Programming structures and functions 4. 4. Engineering tasks, such as importing, cleaning, formatting and storing data, as well as performing data preprocessing 5. 5. Data visualization and some simple yet powerful statistics for data exploration purposes 6. 6. Dimensionality reduction and feature evaluation 7. 7. Machine learning methods, ranging from unsupervised (different types of clustering) to supervised ones (decision trees, random forests, basic neural networks, regression trees, and Extreme Learning Machines) 8. 8. Graph analysis including pinpointing the connections among the various entities and how they can be mined for useful insights. Each chapter concludes with a series of questions and exercises to reinforce what you learned. The last chapter of the book will guide you in creating a data science application from scratch using Julia.

Over 40 recipes to get you up and running with programming using Julia About This Book Follow a practical approach to learn Julia programming the easy way Get an extensive coverage of Julia's packages for statistical analysis This recipe-based approach will help you get familiar with the key concepts in Juli Who This Book Is For This book is for data scientists and data analysts who are familiar with the basics of the Julia language. Prior

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experience of working with high-level languages such as MATLAB, Python, R, or Ruby is expected. What You Will Learn Extract and handle your data with Julia Uncover the concepts of metaprogramming in Julia Conduct statistical analysis with StatsBase.jl and Distributions.jl Build your data science models Find out how to visualize your data with Gadfly Explore big data concepts in Julia In Detail Want to handle everything that Julia can throw at you and get the most of it every day? This practical guide to programming with Julia for performing numerical computation will make you more productive and able work with data more efficiently. The book starts with the main features of Julia to help you quickly refresh your knowledge of functions, modules, and arrays. We'll also show you how to utilize the Julia language to identify, retrieve, and transform data sets so you can perform data analysis and data manipulation. Later on, you'll see how to optimize data science programs with parallel computing and memory allocation. You'll get familiar with the concepts of package development and networking to solve numerical problems using the Julia platform. This book includes recipes on identifying and classifying data science problems, data modelling, data analysis, data manipulation, meta-programming, multidimensional arrays, and parallel computing. By the end of the book, you will acquire the skills to work more effectively with your

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data. Style and approach This book has a recipe-based approach to help you grasp the concepts of Julia programming.

A step-by-step guide that demonstrates how to build simple-to-advanced applications through examples in Julia Lang 1.x using modern tools

Key Features

- Work with powerful open-source libraries for data wrangling, analysis, and visualization
- Develop full-featured, full-stack web applications
- Learn to perform supervised and unsupervised machine learning and time series analysis with Julia

Book Description Julia is a new programming language that offers a unique combination of performance and productivity. Its powerful features, friendly syntax, and speed are attracting a growing number of adopters from Python, R, and Matlab, effectively raising the bar for modern general and scientific computing. After six years in the making, Julia has reached version 1.0. Now is the perfect time to learn it, due to its large-scale adoption across a wide range of domains, including fintech, biotech, education, and AI. Beginning with an introduction to the language, *Julia Programming Projects* goes on to illustrate how to analyze the Iris dataset using DataFrames. You will explore functions and the type system, methods, and multiple dispatch while building a web scraper and a web app. Next, you'll delve into machine learning, where you'll build a books recommender system. You will also see how

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to apply unsupervised machine learning to perform clustering on the San Francisco business database. After metaprogramming, the final chapters will discuss dates and time, time series analysis, visualization, and forecasting. We'll close with package development, documenting, testing and benchmarking. By the end of the book, you will have gained the practical knowledge to build real-world applications in Julia. What you will learn Leverage Julia's strengths, its top packages, and main IDE options Analyze and manipulate datasets using Julia and DataFrames Write complex code while building real-life Julia applications Develop and run a web app using Julia and the HTTP package Build a recommender system using supervised machine learning Perform exploratory data analysis Apply unsupervised machine learning algorithms Perform time series data analysis, visualization, and forecasting Who this book is for Data scientists, statisticians, business analysts, and developers who are interested in learning how to use Julia to crunch numbers, analyze data and build apps will find this book useful. A basic knowledge of programming is assumed.

Targeted at middle and high school programmers, this book aims to explain basic computer science concepts while teaching the Julia programming language. As a fast and productive high level language, Julia is ideal for beginner programmers.

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The learning curve for programming can be quite steep and this book aims to ease this transition by encouraging practise and gradually introducing more complex concepts. The book contains 50 programming challenges that encourages the reader to write their own programs. The solutions to all challenges are given at the end of the book. This book will make readers comfortable with using computers to solve any problems, and leave them well prepared for more significant programming in their maths, science or computer science courses at college. After finishing the exercises in this book, the reader should feel more familiar with: Loops and conditionals, Structuring code with functions, Reading and writing files, Installing and using packages, Sorting and searching, and Simple Statistics and Plotting. With a foreword by Jeff Bezanson, co-creator of the Julia programming language.

This monograph uses the Julia language to guide the reader through an exploration of the fundamental concepts of probability and statistics, all with a view of mastering machine learning, data science, and artificial intelligence. The text does not require any prior statistical knowledge and only assumes a basic understanding of programming and mathematical notation. It is accessible to practitioners and researchers in data science, machine learning, bio-statistics, finance, or engineering who may wish to

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solidify their knowledge of probability and statistics. The book progresses through ten independent chapters starting with an introduction of Julia, and moving through basic probability, distributions, statistical inference, regression analysis, machine learning methods, and the use of Monte Carlo simulation for dynamic stochastic models. Ultimately this text introduces the Julia programming language as a computational tool, uniquely addressing end-users rather than developers. It makes heavy use of over 200 code examples to illustrate dozens of key statistical concepts. The Julia code, written in a simple format with parameters that can be easily modified, is also available for download from the book's associated GitHub repository online.

You Will Learn Python 3! Zed Shaw has perfected the world's best system for learning Python 3. Follow it and you will succeed—just like the millions of beginners Zed has taught to date! You bring the discipline, commitment, and persistence; the author supplies everything else. In Learn Python 3 the Hard Way, you'll learn Python by working through 52 brilliantly crafted exercises. Read them. Type their code precisely. (No copying and pasting!) Fix your mistakes. Watch the programs run. As you do, you'll learn how a computer works; what good programs look like; and how to read, write, and think about code. Zed then teaches you even more in 5+ hours of video where he shows you how to break, fix, and

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debug your code—live, as he’s doing the exercises. Install a complete Python environment Organize and write code Fix and break code Basic mathematics Variables Strings and text Interact with users Work with files Looping and logic Data structures using lists and dictionaries Program design Object-oriented programming Inheritance and composition Modules, classes, and objects Python packaging Automated testing Basic game development Basic web development It’ll be hard at first. But soon, you’ll just get it—and that will feel great! This course will reward you for every minute you put into it. Soon, you’ll know one of the world’s most powerful, popular programming languages. You’ll be a Python programmer. This Book Is Perfect For Total beginners with zero programming experience Junior developers who know one or two languages Returning professionals who haven’t written code in years Seasoned professionals looking for a fast, simple, crash course in Python 3

Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. A quick guide to start writing your own fun and useful Julia apps—no prior experience required! This engaging guide shows, step by step, how to build custom programs using Julia, the open-source, intuitive scripting language. Written by 15-year-old

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technology phenom Tanmay Bakshi, the book is presented in an accessible style that makes learning easy and enjoyable. Tanmay Teaches Julia for Beginners: A Springboard to Machine Learning for All Ages clearly explains the basics of Julia programming and takes a look at cutting-edge machine learning applications. You will also discover how to interface your Julia apps with code written in Python. Inside, you'll learn to:

- Set up and configure your Julia environment
- Get up and running writing your own Julia apps
- Define variables and use them in your programs
- Use conditions, iterations, for-loops, and while-loops
- Create, go through, and modify arrays
- Build an app to manage things you lend and get back from your friends
- Create and utilize dictionaries
- Simplify maintenance of your code using functions
- Apply functions on arrays and use functions recursively and generically
- Understand and program basic machine learning apps

Design and develop high performing programs with Julia About This Book Learn to code high reliability and high performance programs Stand out from the crowd by developing code that runs faster than your peers' codes This book is intended for developers who are interested in high performance technical programming. Who This Book Is For This book is for beginner and intermediate Julia programmers who are interested in high performance technical computing. You will have a basic familiarity with Julia syntax, and have written some small programs in the language. What You Will

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Learn Discover the secrets behind Julia's speed Get a sense of the possibilities and limitations of Julia's performance Analyze the performance of Julia programs Measure the time and memory taken by Julia programs Create fast machine code using Julia's type information Define and call functions without compromising Julia's performance Understand number types in Julia Use Julia arrays to write high performance code Get an overview of Julia's distributed computing capabilities In Detail Julia is a high performance, high-level dynamic language designed to address the requirements of high-level numerical and scientific computing. Julia brings solutions to the complexities faced by developers while developing elegant and high performing code. Julia High Performance will take you on a journey to understand the performance characteristics of your Julia programs, and enables you to utilize the promise of near C levels of performance in Julia. You will learn to analyze and measure the performance of Julia code, understand how to avoid bottlenecks, and design your program for the highest possible performance. In this book, you will also see how Julia uses type information to achieve its performance goals, and how to use multiple dispatch to help the compiler to emit high performance machine code. Numbers and their arrays are obviously the key structures in scientific computing – you will see how Julia's design makes them fast. The last chapter will give you a taste of Julia's distributed computing capabilities. Style and approach This is a hands-on manual that will give you good explanations about the important concepts related to Julia programming.

Great programmers aren't born--they're made. The industry is moving from object-oriented languages to functional languages, and you need to commit to radical improvement. New programming languages arm you with the tools and idioms you need to refine your craft. While other language

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primers take you through basic installation and "Hello, World," we aim higher. Each language in Seven More Languages in Seven Weeks will take you on a step-by-step journey through the most important paradigms of our time. You'll learn seven exciting languages: Lua, Factor, Elixir, Elm, Julia, MiniKanren, and Idris. Learn from the award-winning programming series that inspired the Elixir language. Hear how other programmers across broadly different communities solve problems important enough to compel language development. Expand your perspective, and learn to solve multicore and distribution problems. In each language, you'll solve a non-trivial problem, using the techniques that make that language special. Write a fully functional game in Elm, without a single callback, that compiles to JavaScript so you can deploy it in any browser. Write a logic program in Clojure using a programming model, MiniKanren, that is as powerful as Prolog but much better at interacting with the outside world. Build a distributed program in Elixir with Lisp-style macros, rich Ruby-like syntax, and the richness of the Erlang virtual machine. Build your own object layer in Lua, a statistical program in Julia, a proof in code with Idris, and a quiz game in Factor. When you're done, you'll have written programs in five different programming paradigms that were written on three different continents. You'll have explored four languages on the leading edge, invented in the past five years, and three more radically different languages, each with something significant to teach you.

"Julia walks like Python and runs like C". This phrase explains why Julia is fast growing as the most favoured option for data analytics and numerical computation. Julia is the fastest modern open-source language for data science, machine learning and scientific computing. Julia provides the functionality, ease-of-use and intuitive syntax of R, Python, MATLAB, SAS or Stata combined with the speed, capacity

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and performance of C, C++ or Java. Present books is both for beginners and experienced users. While experienced users can use this as a reference, new users can learn the fine details of julia program's composition. CHAPETRS: 1. Introduction, 2. Object Oriented programming, 3. Basic maths with Julia, 4. Complex Numbers, 5. Rational and Irrational numbers, 6. Mathematical Functions, 7. Arrays, 8. Arrays for matrix operations, 9. String,s 10. Functions, 11. Control Flow, 12. Input Output, 13.

The book contains selected problems aimed for high school students that are interested in competing in math competitions or simply for people of all ages and backgrounds who want to expand their knowledge and to challenge themselves with interesting questions. The problems are mostly selected from an extensive collection of problems from Polish Mathematical Olympics and many appear here in English for the first time. Each chapter consists of many sections devoted to a collection of related topics. Each of these sections starts with a problem followed by the necessary background (definitions and theorems used), careful and detailed solution, and discussion of possible generalizations.

Design and develop high-performance programs in Julia 1.0
Key Features Learn the characteristics of high-performance Julia code Use the power of the GPU to write efficient numerical code Speed up your computation with the help of newly introduced shared memory multi-threading in Julia 1.0

Book Description Julia is a high-level, high-performance dynamic programming language for numerical computing. If you want to understand how to avoid bottlenecks and design your programs for the highest possible performance, then this book is for you. The book starts with how Julia uses type information to achieve its performance goals, and how to use multiple dispatches to help the compiler emit high-

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performance machine code. After that, you will learn how to analyze Julia programs and identify issues with time and memory consumption. We teach you how to use Julia's typing facilities accurately to write high-performance code and describe how the Julia compiler uses type information to create fast machine code. Moving ahead, you'll master design constraints and learn how to use the power of the GPU in your Julia code and compile Julia code directly to the GPU. Then, you'll learn how tasks and asynchronous IO help you create responsive programs and how to use shared memory multithreading in Julia. Toward the end, you will get a flavor of Julia's distributed computing capabilities and how to run Julia programs on a large distributed cluster. By the end of this book, you will have the ability to build large-scale, high-performance Julia applications, design systems with a focus on speed, and improve the performance of existing programs. What you will learn

- Understand how Julia code is transformed into machine code
- Measure the time and memory taken by Julia programs
- Create fast machine code using Julia's type information
- Define and call functions without compromising Julia's performance
- Accelerate your code via the GPU
- Use tasks and asynchronous IO for responsive programs
- Run Julia programs on large distributed clusters

Who this book is for
This book is for beginners and intermediate Julia programmers who are interested in high-performance technical programming. A basic knowledge of Julia programming is assumed.

This quick Julia programming language guide is a condensed code and syntax reference to the Julia 1.x programming language, updated with the latest features of the Julia APIs, libraries, and packages. It presents the essential Julia syntax in a well-organized format that can be used as a handy reference. This book provides an introduction that reveals basic Julia structures and syntax; discusses data types,

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control flow, functions, input/output, exceptions, metaprogramming, performance, and more. Additionally, you'll learn to interface Julia with other programming languages such as R for statistics or Python. You will learn how to use Julia packages for data analysis, numerical optimization and symbolic computation, and how to disseminate your results in dynamic documents or interactive web pages. In this book, the focus is on providing important information as quickly as possible. It is packed with useful information and is a must-have for any Julia programmer.

What You Will Learn

- Set up the software needed to run Julia and your first Hello World example
- Work with types and the different containers that Julia makes available for rapid application development
- Use vectorized, classical loop-based code, logical operators, and blocks
- Explore Julia functions by looking at arguments, return values, polymorphism, parameters, anonymous functions, and broadcasts
- Build custom structures in Julia
- Interface Julia with other languages such as C/C++, Python, and R
- Program a richer API, modifying the code before it is executed using expressions, symbols, macros, quote blocks, and more
- Maximize your code's performance

Who This Book Is For

Experienced programmers new to Julia, as well as existing Julia coders new to the now stable Julia version 1.0 release.

Leverage the power of Julia to design and develop high performing programs

About This Book

Get to know the best techniques to create blazingly fast programs with Julia Stand out from the crowd by developing code that runs faster than your peers' code

Complete an extensive data science project through the entire cycle from ETL to analytics and data visualization

Who This Book Is For

This learning path is for data scientists and for all those who work in technical and scientific computation projects. It will be great for Julia developers who are interested in high-performance technical

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computing. This learning path assumes that you already have some basic working knowledge of Julia's syntax and high-level dynamic languages such as MATLAB, R, Python, or Ruby. What You Will Learn Set up your Julia environment to achieve the highest productivity Solve your tasks in a high-level dynamic language and use types for your data only when needed Apply Julia to tackle problems concurrently and in a distributed environment Get a sense of the possibilities and limitations of Julia's performance Use Julia arrays to write high performance code Build a data science project through the entire cycle of ETL, analytics, and data visualization Display graphics and visualizations to carry out modeling and simulation in Julia Develop your own packages and contribute to the Julia Community In Detail In this learning path, you will learn to use an interesting and dynamic programming language—Julia! You will get a chance to tackle your numerical and data problems with Julia. You'll begin the journey by setting up a running Julia platform before exploring its various built-in types. We'll then move on to the various functions and constructs in Julia. We'll walk through the two important collection types—arrays and matrices in Julia. You will dive into how Julia uses type information to achieve its performance goals, and how to use multiple dispatch to help the compiler emit high performance machine code. You will see how Julia's design makes code fast, and you'll see its distributed computing capabilities. By the end of this learning path, you will see how data works using simple statistics and analytics, and you'll discover its high and dynamic performance—its real strength, which makes it particularly useful in highly intensive computing tasks. 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: Getting Started with Julia by Ivo Balbaert Julia High Performance by Avik Sengupta Mastering

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Julia by Malcolm Sherrington Style and approach This hands-on manual will give you great explanations of the important concepts related to Julia programming.

Loosely based on the Odyssey, this landmark of modern literature follows ordinary Dubliners through an entire day in 1904. Captivating experimental techniques range from interior monologues to exuberant wordplay and earthy humor.

Updated and expanded with more than 80 pages of new content! Improve your athletic performance, extend your athletic career, treat stiffness and achy joints, and prevent and rehabilitate injuries—all without having to seek out a coach, doctor, chiropractor, physical therapist, or masseur. In *Becoming a Supple Leopard*, Dr. Kelly Starrett—founder of MobilityWOD.com—shares his revolutionary approach to mobility and maintenance of the human body and teaches you how to hack your own movement, allowing you to live a healthier, more fulfilling life. This new edition of the New York Times and Wall Street Journal bestseller has been thoroughly revised to make it even easier to put to use. Want to truly understand the principles that guide human movement? *Becoming a Supple Leopard* lays out a blueprint for moving safely and effectively through life and sport. Want to learn how to apply those principles to specific movements, whether you are doing squats in the gym or picking up a bag of groceries? Hundreds of step-by-step photos show you not only how to perform a host of exercise movements, such the squat, deadlift, pushup, kettlebell swing, clean, snatch, and muscle-up, but also how to correct the common faults associated with those movements. Frustrated because you can't perform a

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certain movement correctly due to range of motion restrictions? Breaking the body down into 14 distinct areas, Starrett demonstrates hundreds of mobilization techniques that will help you resolve restrictions and reclaim your mobility. Unsure how to put it all together into a program that addresses your individual needs? This updated edition lays out dozens of prescriptions that allow you to hone in on a specific limitation, a nagging injury, or an exercise fault that you just can't seem to get right. It even offers a 14-day full-body mobility overhaul. Performance is what drives us as human beings, but dysfunctional movement patterns can bring the human body to an abrupt halt. Often, the factors that impede performance are invisible even to seasoned athletes and coaches. Becoming a Supple Leopard makes the invisible visible. Whether you are a professional athlete, a weekend warrior, or simply someone wanting to live healthy and free from physical restrictions, this one-of-a-kind training manual will teach you how to harness your athletic potential and maintain your body. Learn how to perform basic maintenance on your body, unlock your athletic potential, live pain-free...and become a Supple Leopard. This step-by-step guide to movement and mobility will show you how to: - Move safely and efficiently in all situations - Organize your spine and joints in optimal, stable positions - Restore normal function to your joints and tissues - Accelerate recovery after training sessions and competition - Properly perform strength and conditioning movements like the squat, bench press, pushup, deadlift, clean, and snatch - Build efficient, transferable movement patterns and skill

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progressions from simple to more advanced exercises -
Identify, diagnose, and correct inefficient movement patterns - Treat and resolve common symptoms like low back pain, carpal tunnel, shoulder pain, and tennis elbow - Prevent and rehabilitate common athletic injuries - Use mobilization techniques to address short and stiff muscles, soft tissue and joint capsule restriction, motor control problems, and joint range of motion limitations - Create personalized mobility prescriptions to improve movement efficiency

A riveting investigation into how a restive region of China became the site of a nightmare Orwellian social experiment—the definitive police state—and the global technology giants that made it possible Blocked from facts and truth, under constant surveillance, surrounded by a hostile alien police force: Xinjiang’s Uyghur population has become cursed, oppressed, outcast. Most citizens cannot discern between enemy and friend. Social trust has been destroyed systematically. Friends betray each other, bosses snitch on employees, teachers expose their students, and children turn on their parents. Everyone is dependent on a government that nonetheless treats them with suspicion and contempt. Welcome to the Perfect Police State. Using the haunting story of one young woman’s attempt to escape the vicious technological dystopia, his own reporting from Xinjiang, and extensive firsthand testimony from exiles, Geoffrey Cain reveals the extraordinary intrusiveness and power of the tech surveillance giants and the chilling implications for all our futures.

Get started with Julia for engineering and numerical

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computing, especially data science, machine learning, and scientific computing applications. This book explains how Julia provides the functionality, ease-of-use and intuitive syntax of R, Python, MATLAB, SAS, or Stata combined with the speed, capacity, and performance of C, C++, or Java. You'll learn the OOP principles required to get you started, then how to do basic mathematics with Julia. Other core functionality of Julia that you'll cover, includes working with complex numbers, rational and irrational numbers, rings, and fields. Beginning Julia Programming takes you beyond these basics to harness Julia's powerful features for mathematical functions in Julia, arrays for matrix operations, plotting, and more. Along the way, you also learn how to manage strings, write functions, work with control flows, and carry out I/O to implement and leverage the mathematics needed for your data science and analysis projects. "Julia walks like Python and runs like C". This phrase explains why Julia is quickly growing as the most favored option for data analytics and numerical computation. After reading and using this book, you'll have the essential knowledge and skills to build your first Julia-based application.

What You'll Learn
Obtain core skills in Julia
Apply Julia in engineering and science applications
Work with mathematical functions in Julia
Use arrays, strings, functions, control flow, and I/O in Julia
Carry out plotting and display basic graphics

Who This Book Is For
Those who are new to Julia; experienced users may also find this helpful as a reference.

Literate programming is a programming methodology

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that combines a programming language with a documentation language, making programs more easily maintained than programs written only in a high-level language. A literate programmer is an essayist who writes programs for humans to understand. When programs are written in the recommended style they can be transformed into documents by a document compiler and into efficient code by an algebraic compiler. This anthology of essays includes Knuth's early papers on related topics such as structured programming as well as the Computer Journal article that launched literate programming. Many examples are given, including excerpts from the programs for TeX and METAFONT. The final essay is an example of CWEB, a system for literate programming in C and related languages. Index included.

Enter the exciting world of Julia, a high-performance language for technical computing

Key Features

- Leverage Julia's high speed and efficiency for your applications
- Work with Julia in a multi-core, distributed, and networked environment
- Apply Julia to tackle problems concurrently and in a distributed environment

Book Description The release of Julia 1.0 is now ready to change the technical world by combining the high productivity and ease of use of Python and R with the lightning-fast speed of C++. Julia 1.0 programming gives you a head start in tackling your numerical and data problems. You will begin by learning how to set up a running Julia platform, before exploring its various built-in types. With the help of practical examples, this book walks you through two important collection types: arrays

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and matrices. In addition to this, you will be taken through how type conversions and promotions work. In the course of the book, you will be introduced to the homo-iconicity and metaprogramming concepts in Julia. You will understand how Julia provides different ways to interact with an operating system, as well as other languages, and then you'll discover what macros are. Once you have grasped the basics, you'll study what makes Julia suitable for numerical and scientific computing, and learn about the features provided by Julia. By the end of this book, you will also have learned how to run external programs. This book covers all you need to know about Julia in order to leverage its high speed and efficiency for your applications. What you will learn

- Set up your Julia environment to achieve high productivity
- Create your own types to extend the built-in type system
- Visualize your data in Julia with plotting packages
- Explore the use of built-in macros for testing and debugging, among other uses
- Apply Julia to tackle problems concurrently
- Integrate Julia with other languages such as C, Python, and MATLAB

Who this book is for Julia 1.0 Programming is for you if you are a statistician or data scientist who wants a crash course in the Julia programming language while building big data applications. A basic knowledge of mathematics is needed to understand the various methods that are used or created during the course of the book to exploit the capabilities that Julia is designed with.

"This book is a great way to both start learning data science through the promising Julia language and to become an efficient data scientist."- Professor Charles

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Bouveyron, INRIA Chair in Data Science, Université Côte d'Azur, Nice, France Julia, an open-source programming language, was created to be as easy to use as languages such as R and Python while also as fast as C and Fortran. An accessible, intuitive, and highly efficient base language with speed that exceeds R and Python, makes Julia a formidable language for data science. Using well known data science methods that will motivate the reader, Data Science with Julia will get readers up to speed on key features of the Julia language and illustrate its facilities for data science and machine learning work. Features: Covers the core components of Julia as well as packages relevant to the input, manipulation and representation of data. Discusses several important topics in data science including supervised and unsupervised learning. Reviews data visualization using the Gadfly package, which was designed to emulate the very popular ggplot2 package in R. Readers will learn how to make many common plots and how to visualize model results. Presents how to optimize Julia code for performance. Will be an ideal source for people who already know R and want to learn how to use Julia (though no previous knowledge of R or any other programming language is required). The advantages of Julia for data science cannot be understated. Besides speed and ease of use, there are already over 1,900 packages available and Julia can interface (either directly or through packages) with libraries written in R, Python, Matlab, C, C++ or Fortran. The book is for senior undergraduates, beginning graduate students, or practicing data scientists

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who want to learn how to use Julia for data science.

"This book is a great way to both start learning data science through the promising Julia language and to become an efficient data scientist." Professor Charles Bouveyron INRIA Chair in Data Science Université Côte d'Azur, Nice, France

Algorithms are a dominant force in modern culture, and every indication is that they will become more pervasive, not less. The best algorithms are undergirded by beautiful mathematics. This text cuts across discipline boundaries to highlight some of the most famous and successful algorithms. Readers are exposed to the principles behind these examples and guided in assembling complex algorithms from simpler building blocks. Written in clear, instructive language within the constraints of mathematical rigor, *Algorithms from THE BOOK* includes a large number of classroom-tested exercises at the end of each chapter. The appendices cover background material often omitted from undergraduate courses. Most of the algorithm descriptions are accompanied by Julia code, an ideal language for scientific computing. This code is immediately available for experimentation. *Algorithms from THE BOOK* is aimed at first-year graduate and advanced undergraduate students. It will also serve as a convenient reference for professionals throughout the mathematical sciences, physical sciences, engineering, and the quantitative sectors of the biological and social sciences.

Getting Started with JuliaPackt Publishing Ltd
Design and develop high-performance, reusable,

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and maintainable applications using traditional and modern Julia patterns with this comprehensive guide

Key Features

Explore useful design patterns along with object-oriented programming in Julia 1.0

Implement macros and metaprogramming techniques to make your code faster, concise, and efficient

Develop the skills necessary to implement design patterns for creating robust and maintainable applications

Book Description

Design patterns are fundamental techniques for developing reusable and maintainable code. They provide a set of proven solutions that allow developers to solve problems in software development quickly. This book will demonstrate how to leverage design patterns with real-world applications. Starting with an overview of design patterns and best practices in application design, you'll learn about some of the most fundamental Julia features such as modules, data types, functions/interfaces, and metaprogramming. You'll then get to grips with the modern Julia design patterns for building large-scale applications with a focus on performance, reusability, robustness, and maintainability. The book also covers anti-patterns and how to avoid common mistakes and pitfalls in development. You'll see how traditional object-oriented patterns can be implemented differently and more effectively in Julia. Finally, you'll explore various use cases and examples, such as how expert Julia developers use design patterns in their

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open source packages. By the end of this Julia programming book, you'll have learned methods to improve software design, extensibility, and reusability, and be able to use design patterns efficiently to overcome common challenges in software development. What you will learn Master the Julia language features that are key to developing large-scale software applications Discover design patterns to improve overall application architecture and design Develop reusable programs that are modular, extendable, performant, and easy to maintain Weigh up the pros and cons of using different design patterns for use cases Explore methods for transitioning from object-oriented programming to using equivalent or more advanced Julia techniques Who this book is for This book is for beginner to intermediate-level Julia programmers who want to enhance their skills in designing and developing large-scale applications. "... a curriculum geared toward helping students gain skills in consciously regulating their actions, which in turn leads to increased control and problem solving abilities. Using a cognitive behavior approach, the curriculum's learning activities are designed to help students recognize when they are in different states called "zones," with each of four zones represented by a different color. In the activities, students also learn how to use strategies or tools to stay in a zone or move from one to another. Students explore

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calming techniques, cognitive strategies, and sensory supports so they will have a toolbox of methods to use to move between zones. To deepen students' understanding of how to self-regulate, the lessons set out to teach students these skills: how to read others' facial expressions and recognize a broader range of emotions, perspective about how others see and react to their behavior, insight into events that trigger their less regulated states, and when and how to use tools and problem solving skills. The curriculum's learning activities are presented in 18 lessons. To reinforce the concepts being taught, each lesson includes probing questions to discuss and instructions for one or more learning activities. Many lessons offer extension activities and ways to adapt the activity for individual student needs. The curriculum also includes worksheets, other handouts, and visuals to display and share. These can be photocopied from this book or printed from the accompanying CD."--Publisher's website.

The main goal of this book is to teach fundamental programming principles to beginners using Julia, one of the fastest growing programming languages today. Julia can be classified as a "modern" language, possessing many features not available in more popular languages like C and Java. The book is organized in 10 chapters. Chapter 1 gives an overview of the programming process. It shows how

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to write a first Julia program and introduces some of the basic building blocks needed to write programs. Chapter 2 is all about numbers- integers, floating-point, operators, expressions-how to work with them and how to print them. Chapter 3 shows how to write programs which can make decisions. It explains how to use if and if...else statements. Chapter 4 explains the notion of 'looping' implemented using for and while statements. It also explains how to read data from a file and write results to a file. Chapter 5 formally treats with functions, enabling a (large) program to be broken up into smaller manageable units which work together to solve a given problem. Chapter 6 is devoted to characters and strings. In Julia, we can work with them as seamlessly as we do with numbers. Chapter 7 tackles array processing, which is significantly easier in Julia than other languages. Chapter 8 is about sorting and searching techniques. Sorting puts data in an order that can be searched more quickly/easily, and makes it more palatable for human consumption. Chapter 9 introduces structures, enabling us to group data in a form that can be manipulated more easily as a unit. Chapter 10 deals with two useful data structures-dictionaries and sets. These enable us to solve certain kinds of problems more easily and conveniently than we can without them. This book is intended for anyone who is learning programming for the first time. The presentation is

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based on the fact that many students (though not all) have difficulties in learning programming. To overcome this, the book uses an approach which provides clear examples, detailed explanations of very basic concepts and numerous interesting problems (not just artificial exercises whose only purpose is to illustrate some language feature). This book provides the reader with a comprehensive overview of the new open source programming language Go (in its first stable and maintained release Go 1) from Google. The language is devised with Java / C#-like syntax so as to feel familiar to the bulk of programmers today, but Go code is much cleaner and simpler to read, thus increasing the productivity of developers. You will see how Go: simplifies programming with slices, maps, structs and interfaces incorporates functional programming makes error-handling easy and secure simplifies concurrent and parallel programming with goroutines and channels And you will learn how to: make use of Go's excellent standard library program Go the idiomatic way using patterns and best practices in over 225 working examples and 135 exercises This book focuses on the aspects that the reader needs to take part in the coming software revolution using Go.

Julia is a well-constructed programming language with fast execution speed, eliminating the classic problem of performing analysis in one language and

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translating it for performance into a second. This book will help you develop and enhance your programming skills in Julia to solve real-world automation challenges. This book starts off with a refresher on installing and running Julia on different platforms. Next, you will compare the different ways of working with Julia and explore Julia's key features in-depth by looking at design and build. You will see how data works using simple statistics and analytics, and discover Julia's speed, its real strength, which makes it particularly useful in highly intensive computing tasks and observe how Julia can cooperate with external processes in order to enhance graphics and data visualization. Finally, you will look into meta-programming and learn how it adds great power to the language and establish networking and distributed computing with Julia. Discover the new features and widely used packages in Julia to solve complex computational problems in your statistical applications. Key Features Address the core problems of programming in Julia with the most popular packages for common tasks Tackle issues while working with Databases and Parallel data processing with Julia Explore advanced features such as metaprogramming, functional programming, and user defined types Book Description Julia, with its dynamic nature and high-performance, provides comparatively minimal time for the development of computational models

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with easy-to-maintain computational code. This book will be your solution-based guide as it will take you through different programming aspects with Julia. Starting with the new features of Julia 1.0, each recipe addresses a specific problem, providing a solution and explaining how it works. You will work with the powerful Julia tools and data structures along with the most popular Julia packages. You will learn to create vectors, handle variables, and work with functions. You will be introduced to various recipes for numerical computing, distributed computing, and achieving high performance. You will see how to optimize data science programs with parallel computing and memory allocation. We will look into more advanced concepts such as metaprogramming and functional programming. Finally, you will learn how to tackle issues while working with databases and data processing, and will learn about on data science problems, data modeling, data analysis, data manipulation, parallel processing, and cloud computing with Julia. By the end of the book, you will have acquired the skills to work more effectively with your data

What you will learn

- Boost your code's performance using Julia's unique features
- Organize data in to fundamental types of collections: arrays and dictionaries
- Organize data science processes within Julia and solve related problems
- Scale Julia computations with cloud computing
- Write data to IO streams with Julia

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and handle web transfer Define your own immutable and mutable types Speed up the development process using metaprogramming Who this book is for This book is for developers who would like to enhance their Julia programming skills and would like to get some quick solutions to their common programming problems. Basic Julia programming knowledge is assumed.

Build production-ready machine learning and NLP systems using functional programming, development platforms, and cloud deployment. KEY FEATURES ?

In-depth explanation and code samples highlighting the features of the Julia language. ? Extensive coverage of the Julia development ecosystem, package management, DevOps environment integration, and performance management tools. ? Exposure to the most important Julia packages that aid in Data and Text Analytics and Deep Learning.

DESCRIPTION The Julia Programming language enables data scientists and programmers to create prototypes without sacrificing performance.

Nonetheless, skeptics question its readiness for production deployments as a new platform with a 1.0 release in 2018. This book removes these doubts and offers a comprehensive glimpse at the language's use throughout developing and deploying production-ready applications. The first part of the book teaches experienced programmers and scientists about the Julia language features in great

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detail. The second part consists of gaining hands-on experience with the development environment, debugging, programming guidelines, package management, and cloud deployment strategies. In the final section, readers are introduced to a variety of third-party packages available in the Julia ecosystem for Data Processing, Text Analytics, and developing Deep Learning models. This book provides an extensive overview of the programming language and broadens understanding of the Julia ecosystem. As a result, it assists programmers, scientists, and information architects in selecting Julia for their next production deployments.

WHAT YOU WILL LEARN ? Get to know the complete fundamentals of Julia programming. ? Explore Julia development frameworks and how to work with them. ? Dig deeper into the concepts and applications of functional programming. ? Uncover the Julia infrastructure for development, testing, and deployment. ? Learn to practice Julia libraries and the Julia package ecosystem. ? Processing Data, Deep Learning, and Natural Language Processing with Julia.

WHO THIS BOOK IS FOR This book is for Data Scientists and application developers who want to learn about Julia application development. No prior Julia knowledge is required but knowing the basics of programming helps understand the objectives of this book.

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A handbook for MATLAB which gives a focused approach to the software for students and professional researchers.

Learn Julia language for data science and data analytics
About This Book Set up Julia's environment and start building simple programs Explore the technical aspects of Julia and its potential when it comes to speed and data processing Write efficient and high-quality code in Julia Who This Book Is For This book allows existing programmers, statisticians and data scientists to learn the Julia and take its advantage while building applications with complex numerical and scientific computations. Basic knowledge of mathematics is needed to understand the various methods that will be used or created in the book to exploit the capabilities for which Julia is made. What You Will Learn Understand Julia's ecosystem and create simple programs Master the type system and create your own types in Julia Understand Julia's type system, annotations, and conversions Define functions and understand meta-programming and multiple dispatch Create graphics and data visualizations using Julia Build programs capable of networking and parallel computation Develop real-world applications and use connections for RDBMS and NoSQL Learn to interact with other programming

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languages—C and Python—using Julia In Detail Julia is a highly appropriate language for scientific computing, but it comes with all the required capabilities of a general-purpose language. It allows us to achieve C/Fortran-like performance while maintaining the concise syntax of a scripting language such as Python. It is perfect for building high-performance and concurrent applications. From the basics of its syntax to learning built-in object types, this book covers it all. This book shows you how to write effective functions, reduce code redundancies, and improve code reuse. It will be helpful for new programmers who are starting out with Julia to explore its wide and ever-growing package ecosystem and also for experienced developers/statisticians/data scientists who want to add Julia to their skill-set. The book presents the fundamentals of programming in Julia and in-depth informative examples, using a step-by-step approach. You will be taken through concepts and examples such as doing simple mathematical operations, creating loops, metaprogramming, functions, collections, multiple dispatch, and so on. By the end of the book, you will be able to apply your skills in Julia to create and explore applications of any domain. Style and approach This book demonstrates the basics of Julia along with some data structures and testing tools that will give you enough material to get started with the language from an application standpoint.

Last Updated: December 2017 The main motivation of writing this book was to help the author himself. He is a professor in the field of operations research, and his daily activities involve building models of mathematical optimization, developing algorithms for solving the problems, implementing those algorithms using computer programming languages, experimenting with data, etc. Three languages are involved: human language, mathematical language, and computer language. His team of students need to go over three

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different languages, which requires "translation" among the three languages. As this book was written to teach his research group how to translate, this book will also be useful for anyone who needs to learn how to translate in a similar situation. The Julia Language is as fast as C, as convenient as MATLAB, and as general as Python with a flexible algebraic modeling language for mathematical optimization problems. With the great support from Julia developers, especially the developers of the JuMP--Julia for Mathematical Programming--package, Julia makes a perfect tool for students and professionals in operations research and related areas such as industrial engineering, management science, transportation engineering, economics, and regional science. For more information, visit: <http://www.chkwon.net/julia>

If you're just learning how to program, Julia is an excellent JIT-compiled, dynamically typed language with a clean syntax. This hands-on guide uses Julia 1.0 to walk you through programming one step at a time, beginning with basic programming concepts before moving on to more advanced capabilities, such as creating new types and multiple dispatch. Designed from the beginning for high performance, Julia is a general-purpose language ideal for not only numerical analysis and computational science but also web programming and scripting. Through exercises in each chapter, you'll try out programming concepts as you learn them. Think Julia is perfect for students at the high school or college level as well as self-learners and professionals who need to learn programming basics. Start with the basics, including language syntax and semantics Get a clear definition of each programming concept Learn about values, variables, statements, functions, and data structures in a logical progression Discover how to work with files and databases Understand types, methods, and multiple dispatch Use debugging techniques to fix syntax, runtime, and

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semantic errors Explore interface design and data structures through case studies

A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples.

Learn dynamic programming with Julia to build apps for data analysis, visualization, machine learning, and the web Key Features Leverage Julia's high speed and efficiency to build fast, efficient applications Perform supervised and unsupervised machine learning and time series analysis

Tackle problems concurrently and in a distributed environment Book Description Julia offers the high productivity and ease of use of Python and R with the lightning-fast speed of C++. There's never been a better time to learn this language, thanks to its large-scale adoption across a wide range of domains, including fintech, biotech and artificial intelligence (AI). You will begin by learning how to set up a running Julia platform, before exploring its various built-in types. This Learning Path walks you through two important collection types: arrays and matrices. You'll be taken through how type conversions and promotions work, and in further chapters you'll study how Julia interacts with operating systems and other languages. You'll also learn about the use of macros, what makes Julia suitable for numerical and scientific computing, and how to run external programs. Once you have grasped the basics, this Learning Path goes on to how to analyze the Iris dataset using DataFrames. While building a web scraper and a web app, you'll explore the use of functions, methods, and multiple dispatches. In the final chapters, you'll delve into machine learning, where you'll build a book recommender system. By the end of this Learning Path, you'll be well versed with Julia and have the skills you need to leverage its high speed and efficiency for your applications. This Learning Path includes

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content from the following Packt products: Julia 1.0 Programming - Second Edition by Ivo Balbaert Julia Programming Projects by Adrian Salceanu What you will learn Create your own types to extend the built-in type system Visualize your data in Julia with plotting packages Explore the use of built-in macros for testing and debugging Integrate Julia with other languages such as C, Python, and MATLAB Analyze and manipulate datasets using Julia and DataFrames Develop and run a web app using Julia and the HTTP package Build a recommendation system using supervised machine learning Who this book is for If you are a statistician or data scientist who wants a quick course in the Julia programming language while building big data applications, this Learning Path is for you. Basic knowledge of mathematics and programming is a must.

Explore the various packages in Julia that support image processing and build neural networks for video processing and object tracking. Key Features Build a full-fledged image processing application using JuliaImages Perform basic to advanced image and video stream processing with Julia's APIs Understand and optimize various features of OpenCV with easy examples Book Description Hands-On Computer Vision with Julia is a thorough guide for developers who want to get started with building computer vision applications using Julia. Julia is well suited to image processing because it's easy to use and lets you write easy-to-compile and efficient machine code. . This book begins by introducing you to Julia's image processing libraries such as Images.jl and ImageCore.jl. You'll get to grips with analyzing and transforming images using JuliaImages; some of the techniques discussed include enhancing and adjusting images. As you make your way through the chapters, you'll learn how to classify images, cluster them, and apply neural networks to solve computer vision problems. In the

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concluding chapters, you will explore OpenCV applications to perform real-time computer vision analysis, for example, face detection and object tracking. You will also understand Julia's interaction with Tesseract to perform optical character recognition and build an application that brings together all the techniques we introduced previously to consolidate the concepts learned. By end of the book, you will have understood how to utilize various Julia packages and a few open source libraries such as Tesseract and OpenCV to solve computer vision problems with ease. What you will learn

- Analyze image metadata and identify critical data using JuliaImages
- Apply filters and improve image quality and color schemes
- Extract 2D features for image comparison using JuliaFeatures
- Cluster and classify images with KNN/SVM machine learning algorithms
- Recognize text in an image using the Tesseract library
- Use OpenCV to recognize specific objects or faces in images and videos
- Build neural network and classify images with MXNet

Who this book is for Hands-On Computer Vision with Julia is for Julia developers who are interested in learning how to perform image processing and want to explore the field of computer vision. Basic knowledge of Julia will help you understand the concepts more effectively.

This book is for you if you are a data scientist or working on any technical or scientific computation projects. The book assumes you have a basic working knowledge of high-level dynamic languages such as MATLAB, R, Python, or Ruby.

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