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Get started with Julia for engineering and numerical 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.

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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.

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9. Strings, 10. Functions, 11. Control Flow, 12. Input Output, 13.

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

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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 semantic errors Explore interface design and data structures through case studies

Design and develop high-performance, reusable, 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,

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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

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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 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

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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.

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>

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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 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.

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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

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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 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.

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

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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

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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 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

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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.

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

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scripting language. Written by 15-year-old 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

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and generically • Understand and program basic machine learning apps

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

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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 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

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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

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enough material to get started with the language from an application standpoint.

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.

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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; 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

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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.

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