

Programming Haskell Graham Hutton

This book teaches functional programming using Haskell and examples drawn from multimedia applications.

Haskell in Depth unlocks a new level of skill with this challenging language. Going beyond the basics of syntax and structure, this book opens up critical topics like advanced types, concurrency, and data processing. Summary Turn the corner from “Haskell student” to “Haskell developer.”

Haskell in Depth explores the important language features and programming skills you’ll need to build production-quality software using Haskell. And along the way, you’ll pick up some interesting insights into why Haskell looks and works the way it does. Get ready to go deep! Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Software for high-precision tasks like financial transactions, defense systems, and scientific research must be absolutely, provably correct. As a purely functional programming language, Haskell enforces a mathematically rigorous approach that can lead to concise, efficient, and bug-free code. To write such code you’ll need deep understanding. You can get it from this book! About the book Haskell in Depth unlocks a new level of skill with this challenging language. Going beyond the basics of syntax and structure, this book opens up critical topics like advanced types, concurrency, and data processing. You’ll discover key parts of the Haskell ecosystem and master core design patterns that will transform how you write software. What’s inside Building applications, web services, and networking apps Using sophisticated libraries like lens, singletons, and servant Organizing projects with Cabal and Stack Error-handling and

testing Pure parallelism for multicore processors About the reader For developers familiar with Haskell basics. About the author Vitaly Bragilevsky has been teaching Haskell and functional programming since 2008. He is a member of the GHC Steering Committee. Table of Contents PART 1 CORE HASKELL 1 Functions and types 2 Type classes 3 Developing an application: Stock quotes PART 2 INTRODUCTION TO APPLICATION DESIGN 4 Haskell development with modules, packages, and projects 5 Monads as practical functionality providers 6 Structuring programs with monad transformers PART 3 QUALITY ASSURANCE 7 Error handling and logging 8 Writing tests 9 Haskell data and code at run time 10 Benchmarking and profiling PART 4 ADVANCED HASKELL 11 Type system advances 12 Metaprogramming in Haskell 13 More about types PART 5 HASKELL TOOLKIT 14 Data-processing pipelines 15 Working with relational databases 16 Concurrency Haskell Programming makes Haskell as clear, painless, and practical as it can be, whether you're a beginner or an experienced hacker. Learning Haskell from the ground up is easier and works better. With our exercise-driven approach, you'll build on previous chapters such that by the time you reach the notorious Monad, it'll seem trivial.

This book constitutes the thoroughly refereed revised selected papers of the 19th International Symposium on Trends in Functional Programming, TFP 2018, held in Gothenburg, Sweden, in June 2018. The 7 revised full papers were selected from 13 submissions and present papers in all aspects of functional programming, taking a broad view of current and future trends in the area. It aspires to be a lively environment for presenting the latest research results, and other contributions, described in draft papers submitted prior to the symposium.

Programming in Haskell Cambridge University Press

Introduces fundamental techniques for reasoning mathematically about functional programs. Ideal for a first- or second-year undergraduate course.

Thorsten and Isaac have written this book based on a programming course we teach for Master's Students at the School of Computer Science of the University of Nottingham. The book is intended for students with little or no background in programming coming from different backgrounds educationally as well as culturally. It is not mainly a Python course but we use Python as a vehicle to teach basic programming concepts. Hence, the words conceptual programming in the title. We cover basic concepts about data structures, imperative programming, recursion and backtracking, object-oriented programming, functional programming, game development and some basics of data science.

Agda is an advanced programming language based on Type Theory. Agda's type system is expressive enough to support full functional verification of programs, in two styles. In external verification, we write pure functional programs and then write proofs of properties about them. The proofs are separate external artifacts, typically using structural induction. In internal verification, we specify properties of programs through rich types for the programs themselves. This often necessitates including proofs inside code, to show the type checker that the specified properties hold. The power to prove properties of programs in these two styles is a profound addition to the practice of programming, giving programmers the power to guarantee the absence of bugs, and thus improve the quality of software more than previously possible. Verified Functional Programming in Agda is the first book to provide a systematic exposition of external and internal verification in Agda, suitable for undergraduate students of Computer Science. No familiarity with functional programming

or computer-checked proofs is presupposed. The book begins with an introduction to functional programming through familiar examples like booleans, natural numbers, and lists, and techniques for external verification. Internal verification is considered through the examples of vectors, binary search trees, and Braun trees. More advanced material on type-level computation, explicit reasoning about termination, and normalization by evaluation is also included. The book also includes a medium-sized case study on Huffman encoding and decoding.

This text focuses on software development for embedded controllers using the C language. This book is built on Atmel® AVR architecture and implementation, and features the CodeVisionAVR compiler, as well as other powerful, yet inexpensive, development tools. This book is suitable as a handbook for those desiring to learn the AVR processors or as a text for college-level microcontroller courses. Included with the book is a CDROM containing samples all of the example programs from the book as well as an evaluation version of the CodeVisionAVR C Compiler and IDE. In *More OCaml* John Whittington takes a meandering tour of functional programming with OCaml, introducing various language features and describing some classic algorithms. The book ends with a large worked example dealing with the production of PDF files. There are questions for each chapter together with worked answers and hints. *More OCaml* will appeal both to existing OCaml programmers who

wish to brush up their skills, and to experienced programmers eager to explore functional languages such as OCaml. It is hoped that each reader will find something new, or see an old thing in a new light. For the more casual reader, or those who are used to a different functional language, a summary of basic OCaml is provided at the front of the book. Summary Get Programming with Haskell leads you through short lessons, examples, and exercises designed to make Haskell your own. It has crystal-clear illustrations and guided practice. You will write and test dozens of interesting programs and dive into custom Haskell modules. You will gain a new perspective on programming plus the practical ability to use Haskell in the everyday world. (The 80 IQ points: not guaranteed.) Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Programming languages often differ only around the edges—a few keywords, libraries, or platform choices. Haskell gives you an entirely new point of view. To the software pioneer Alan Kay, a change in perspective can be worth 80 IQ points and Haskellers agree on the dramatic benefits of thinking the Haskell way—thinking functionally, with type safety, mathematical certainty, and more. In this hands-on book, that's exactly what you'll learn to do. What's Inside Thinking in Haskell Functional programming basics Programming in types Real-

world applications for Haskell About the Reader
Written for readers who know one or more
programming languages. Table of Contents Lesson
1 Getting started with Haskell Unit 1 -
FOUNDATIONS OF FUNCTIONAL
PROGRAMMING Lesson 2 Functions and functional
programming Lesson 3 Lambda functions and lexical
scope Lesson 4 First-class functions Lesson 5
Closures and partial application Lesson 6 Lists
Lesson 7 Rules for recursion and pattern matching
Lesson 8 Writing recursive functions Lesson 9
Higher-order functions Lesson 10 Capstone:
Functional object-oriented programming with robots!
Unit 2 - INTRODUCING TYPES Lesson 11 Type
basics Lesson 12 Creating your own types Lesson
13 Type classes Lesson 14 Using type classes
Lesson 15 Capstone: Secret messages! Unit 3 -
PROGRAMMING IN TYPES Lesson 16 Creating
types with "and" and "or" Lesson 17 Design by
composition—Semigroups and Monoids Lesson 18
Parameterized types Lesson 19 The Maybe type:
dealing with missing values Lesson 20 Capstone:
Time series Unit 4 - IO IN HASKELL Lesson 21
Hello World!—introducing IO types Lesson 22
Interacting with the command line and lazy I/O
Lesson 23 Working with text and Unicode Lesson 24
Working with files Lesson 25 Working with binary
data Lesson 26 Capstone: Processing binary files
and book data Unit 5 - WORKING WITH TYPE IN A

CONTEXT Lesson 27 The Functor type class
Lesson 28 A peek at the Applicative type class:
using functions in a context Lesson 29 Lists as
context: a deeper look at the Applicative type class
Lesson 30 Introducing the Monad type class Lesson
31 Making Monads easier with donotation Lesson 32
The list monad and list comprehensions Lesson 33
Capstone: SQL-like queries in Haskell Unit 6 -
ORGANIZING CODE AND BUILDING PROJECTS
Lesson 34 Organizing Haskell code with modules
Lesson 35 Building projects with stack Lesson 36
Property testing with QuickCheck Lesson 37
Capstone: Building a prime-number library Unit 7 -
PRACTICAL HASKELL Lesson 38 Errors in Haskell
and the Either type Lesson 39 Making HTTP
requests in Haskell Lesson 40 Working with JSON
data by using Aeson Lesson 41 Using databases in
Haskell Lesson 42 Efficient, stateful arrays in Haskell
Afterword - What's next? Appendix - Sample
answers to exercise

Richard Bird takes a radical approach to algorithm design, namely, design by calculation. These 30 short chapters each deal with a particular programming problem drawn from sources as diverse as games and puzzles, intriguing combinatorial tasks, and more familiar areas such as data compression and string matching. Each pearl starts with the statement of the problem expressed using the functional programming language Haskell,

a powerful yet succinct language for capturing algorithmic ideas clearly and simply. The novel aspect of the book is that each solution is calculated from an initial formulation of the problem in Haskell by appealing to the laws of functional programming. Pearls of Functional Algorithm Design will appeal to the aspiring functional programmer, students and teachers interested in the principles of algorithm design, and anyone seeking to master the techniques of reasoning about programs in an equational style.

This volume presents the tutorials given during the First International Spring School on Advanced Functional Programming Techniques, held in Bastad, Sweden in May 1995. The last few years have seen important new developments in functional programming techniques: concepts, such as monads, type classes, and several new special purpose libraries of higher-order functions are new and powerful methods for structuring programs. This book brings programmers, software engineers and computer scientists up-to-date with the latest techniques. Most tutorial contributions contain exercises to familiarize the reader with the new concepts and techniques, and only basic knowledge in functional programming is assumed.

Summary Functional Programming in Scala is a serious tutorial for programmers looking to learn FP and apply it to the everyday business of coding. The

book guides readers from basic techniques to advanced topics in a logical, concise, and clear progression. In it, you'll find concrete examples and exercises that open up the world of functional programming. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology

Functional programming (FP) is a style of software development emphasizing functions that don't depend on program state. Functional code is easier to test and reuse, simpler to parallelize, and less prone to bugs than other code. Scala is an emerging JVM language that offers strong support for FP. Its familiar syntax and transparent interoperability with Java make Scala a great place to start learning FP. About the Book Functional Programming in Scala is a serious tutorial for programmers looking to learn FP and apply it to their everyday work. The book guides readers from basic techniques to advanced topics in a logical, concise, and clear progression. In it, you'll find concrete examples and exercises that open up the world of functional programming. This book assumes no prior experience with functional programming. Some prior exposure to Scala or Java is helpful. What's Inside Functional programming concepts The whys and hows of FP How to write multicore programs Exercises and checks for understanding About the Authors Paul Chiusano and Rúnar Bjarnason are recognized experts in

functional programming with Scala and are core contributors to the Scalaz library. Table of Contents
PART 1 INTRODUCTION TO FUNCTIONAL PROGRAMMING What is functional programming? Getting started with functional programming in Scala Functional data structures Handling errors without exceptions Strictness and laziness Purely functional state
PART 2 FUNCTIONAL DESIGN AND COMBINATOR LIBRARIES Purely functional parallelism Property-based testing Parser combinators
PART 3 COMMON STRUCTURES IN FUNCTIONAL DESIGN Monoids Monads Applicative and traversable functors
PART 4 EFFECTS AND I/O External effects and I/O Local effects and mutable state Stream processing and incremental I/O

The development of information processing systems requires models, calculi, and theories for the analysis of computations. Complex software systems are best constructed in a careful, systematic, and disciplined structuring of the development process. Starting from basic requirement specifications in which all the relevant details are formalized, the envisaged solution should be developed step by step by adding more and more details and giving evidence or formal proofs to show the correctness of the steps, until a description of a solution is obtained that has all the required properties. The Marktoberdorf Advanced Study Institute 1992

presented scientific highlights in approaches to the systematic study of reliable software and hardware systems using functional, algebraic, and logical calculi. Leading scientists treated the specification, development, verification, and implementation of complex time-sensitive systems, such as signal processing systems, process control systems, and general software systems. The mathematical foundations of specification and refinement were carefully treated, and several formalisms for describing processes were introduced. Emphasis was put on application-oriented descriptions of signal processing systems with real-time dependencies. Formalisms for reasoning about distributed causality-based computations were presented and new styles of programming leading to shorter and more expressive notations were demonstrated. This book is based on the Institute, and gives an impressive demonstration of the state of the art and the essential progress in our formal abilities to specify, refine, verify, develop, and implement complex software systems including embedded systems and hard real-time dependent systems.

Beginning Haskell provides a broad-based introduction to the Haskell language, its libraries and environment, and to the functional programming paradigm that is fast growing in importance in the software industry. The book takes a project-based approach to learning the language that is unified

around the building of a web-based storefront. Excellent coverage is given to the Haskell ecosystem and supporting tools. These include the Cabal build tool for managing projects and modules, the HUnit and QuickCheck tools for software testing, the Scotty framework for developing web applications, Persistent and Esqueleto for database access, and also parallel and distributed programming libraries. Functional programming is gathering momentum, allowing programmers to express themselves in a more concise way, reducing boilerplate and increasing the safety of code. Indeed, mainstream languages such as C# and Java are adopting features from functional programming, and from languages implementing that paradigm. Haskell is an elegant and noise-free pure functional language with a long history, having a huge number of library contributors and an active community. This makes Haskell the best tool for both learning and applying functional programming, and *Beginning Haskell* the perfect book to show off the language and what it can do. Takes you through a series of projects showing the different parts of the language. Provides an overview of the most important libraries and tools in the Haskell ecosystem. Teaches you how to apply functional patterns in real-world scenarios.

Introducing functional programming in the Haskell language, this book is written for students and

programmers with little or no experience. It emphasises the process of crafting programmes, problem solving and avoiding common programming pitfalls. Covering basic functional programming, through abstraction to larger scale programming, students are lead step by step through the basics, before being introduced to more advanced topics. This edition includes new material on testing and domain-specific languages and a variety of new examples and case studies, including simple games. Existing material has been expanded and re-ordered, so that some concepts – such as simple data types and input/output – are presented at an earlier stage. The full text downloaded to your computer With eBooks you can: search for key concepts, words and phrases make highlights and notes as you study share your notes with friends eBooks are downloaded to your computer and accessible either offline through the Bookshelf (available as a free download), available online and also via the iPad and Android apps. Upon purchase, you'll gain instant access to this eBook. Time limit The eBooks products do not have an expiry date. You will continue to access your digital ebook products whilst you have your Bookshelf installed. A multi-user game, web site, cloud application, or networked database can have thousands of users all interacting at the same time. You need a powerful, industrial-strength tool to handle the really hard

problems inherent in parallel, concurrent environments. You need Erlang. In this second edition of the bestselling *Programming Erlang*, you'll learn how to write parallel programs that scale effortlessly on multicore systems. Using Erlang, you'll be surprised at how easy it becomes to deal with parallel problems, and how much faster and more efficiently your programs run. That's because Erlang uses sets of parallel processes-not a single sequential process, as found in most programming languages. Joe Armstrong, creator of Erlang, introduces this powerful language in small steps, giving you a complete overview of Erlang and how to use it in common scenarios. You'll start with sequential programming, move to parallel programming and handling errors in parallel programs, and learn to work confidently with distributed programming and the standard Erlang/Open Telecom Platform (OTP) frameworks. You need no previous knowledge of functional or parallel programming. The chapters are packed with hands-on, real-world tutorial examples and insider tips and advice, and finish with exercises for both beginning and advanced users. The second edition has been extensively rewritten. New to this edition are seven chapters covering the latest Erlang features: maps, the type system and the Dialyzer, WebSockets, programming idioms, and a new stand-alone execution environment. You'll write programs

that dynamically detect and correct errors, and that can be upgraded without stopping the system.

There's also coverage of rebar (the de facto Erlang build system), and information on how to share and use Erlang projects on github, illustrated with examples from cowboy and bitcask. Erlang will change your view of the world, and of how you program. What You Need The Erlang/OTP system. Download it from erlang.org.

This book identifies, defines and illustrates the fundamental concepts and engineering techniques relevant to applications of software languages in software development. It presents software languages primarily from a software engineering perspective, i.e., it addresses how to parse, analyze, transform, generate, format, and otherwise process software artifacts in different software languages, as they appear in software development. To this end, it covers a wide range of software languages – most notably programming languages, domain-specific languages, modeling languages, exchange formats, and specifically also language definition languages. Further, different languages are leveraged to illustrate software language engineering concepts and techniques. The functional programming language Haskell dominates the book, while the mainstream programming languages Python and Java are additionally used for illustration. By doing this, the book collects and organizes scattered

knowledge from software language engineering, focusing on application areas such as software analysis (software reverse engineering), software transformation (software re-engineering), software composition (modularity), and domain-specific languages. It is designed as a textbook for independent study as well as for bachelor's (advanced level) or master's university courses in Computer Science. An additional website provides complementary material, for example, lecture slides and videos. This book is a valuable resource for anyone wanting to understand the fundamental concepts and important engineering principles underlying software languages, allowing them to acquire much of the operational intelligence needed for dealing with software languages in software development practice. This is an important skill set for software engineers, as languages are increasingly permeating software development. Haskell is one of the leading languages for teaching functional programming, enabling students to write simpler and cleaner code, and to learn how to structure and reason about programs. This introduction is ideal for beginners: it requires no previous programming experience and all concepts are explained from first principles via carefully chosen examples. Each chapter includes exercises that range from the straightforward to extended projects, plus suggestions for further reading on

more advanced topics. The author is a leading Haskell researcher and instructor, well-known for his teaching skills. The presentation is clear and simple, and benefits from having been refined and class-tested over several years. The result is a text that can be used with courses, or for self-learning.

Features include freely accessible Powerpoint slides for each chapter, solutions to exercises and examination questions (with solutions) available to instructors, and a downloadable code that's fully compliant with the latest Haskell release.

This volume contains the revised lecture notes corresponding to nine of the lecture courses presented at the 5th International School on Advanced Functional Programming, AFP 2004, held in Tartu, Estonia, August 14 –21, 2004.

"It's easy to start writing code with Python: that's why the language is so immensely popular. However, Python has unique strengths, charms, and expressivity that can be hard to grasp at first -- as well as hidden pitfalls that can easily trip you up if you aren't aware of them. Effective Python will help you harness the full power of Python to write exceptionally robust, efficient, maintainable, and well-performing code. Utilizing the concise, scenario-driven style pioneered in Scott Meyers's best-selling Effective C++, Brett Slatkin brings together 53 Python best practices, tips, shortcuts, and realistic code examples from expert programmers. Through

realistic examples, Slatkin uncovers little-known Python quirks, intricacies, and idioms that powerfully impact code behavior and performance. You'll learn how to choose the most efficient and effective way to accomplish key tasks when multiple options exist, and how to write code that's easier to understand, maintain, and improve. Drawing on his deep understanding of Python's capabilities, Slatkin offers practical advice for each major area of development with both Python 3.x and Python 2.x. Coverage includes: * Algorithms * Objects * Concurrency * Collaboration * Built-in modules * Production techniques * And more Each section contains specific, actionable guidelines organized into items, each with carefully worded advice supported by detailed technical arguments and illuminating examples. Using Effective Python, you can systematically improve all the Python code you write: not by blindly following rules or mimicking incomprehensible idioms, but by gaining a deep understanding of the technical reasons why they make sense."--[Source inconnue].

Long ago, when Alexander the Great asked the mathematician Menaechmus for a crash course in geometry, he got the famous reply ``There is no royal road to mathematics." Where there was no shortcut for Alexander, there is no shortcut for us. Still, the fact that we have access to computers and mature programming languages means that there

are avenues for us that were denied to the kings and emperors of yore. The purpose of this book is to teach logic and mathematical reasoning in practice, and to connect logical reasoning with computer programming in Haskell. Haskell emerged in the 1990s as a standard for lazy functional programming, a programming style where arguments are evaluated only when the value is actually needed. Haskell is a marvelous demonstration tool for logic and maths because its functional character allows implementations to remain very close to the concepts that get implemented, while the laziness permits smooth handling of infinite data structures. This book does not assume the reader to have previous experience with either programming or construction of formal proofs, but acquaintance with mathematical notation, at the level of secondary school mathematics is presumed. Everything one needs to know about mathematical reasoning or programming is explained as we go along. After proper digestion of the material in this book, the reader will be able to write interesting programs, reason about their correctness, and document them in a clear fashion. The reader will also have learned how to set up mathematical proofs in a structured way, and how to read and digest mathematical proofs written by others. This is the updated, expanded, and corrected second edition of a much-acclaimed textbook. Praise

for the first edition: 'Doets and van Eijck's ``The Haskell Road to Logic, Maths and Programming'' is an astonishingly extensive and accessible textbook on logic, maths, and Haskell.' Ralf Laemmel, Professor of Computer Science, University of Koblenz-Landau

Strategies for building large systems that can be easily adapted for new situations with only minor programming modifications. Time pressures encourage programmers to write code that works well for a narrow purpose, with no room to grow. But the best systems are evolvable; they can be adapted for new situations by adding code, rather than changing the existing code. The authors describe techniques they have found effective--over their combined 100-plus years of programming experience--that will help programmers avoid programming themselves into corners. The authors explore ways to enhance flexibility by:

- Organizing systems using combinators to compose mix-and-match parts, ranging from small functions to whole arithmetics, with standardized interfaces
- Augmenting data with independent annotation layers, such as units of measurement or provenance
- Combining independent pieces of partial information using unification or propagation
- Separating control structure from problem domain with domain models, rule systems and pattern matching, propagation, and dependency-directed

backtracking • Extending the programming language, using dynamically extensible evaluators Haskell is the world's leading lazy functional programming language, widely used for teaching, research, and applications. The language continues to develop rapidly, but in 1998 the community decided to capture a stable snapshot of the language: Haskell 98. All Haskell compilers support Haskell 98, so practitioners and educators alike have a stable base for their work. This book constitutes the agreed definition of Haskell 98, both the language itself and its supporting libraries, and should be a standard reference work for anyone involved in research, teaching, or application of Haskell. Well-respected text for computer science students provides an accessible introduction to functional programming. Cogent examples illuminate the central ideas, and numerous exercises offer reinforcement. Includes solutions. 1989 edition. Boost the performance of your Haskell applications using optimization, concurrency, and parallel programming About This Book Explore the benefits of lazy evaluation, compiler features, and tools and libraries designed for high performance Write fast programs at extremely high levels of abstraction Work through practical examples that will help you address the challenges of writing efficient code Who This Book Is For To get the most out of this book, you need to have a working knowledge of reading

and writing basic Haskell. No knowledge of performance, optimization, or concurrency is required. What You Will Learn Program idiomatic Haskell that's also surprisingly efficient Improve performance of your code with data parallelism, inlining, and strictness annotations Profile your programs to identify space leaks and missed opportunities for optimization Find out how to choose the most efficient data and control structures Optimize the Glasgow Haskell Compiler and runtime system for specific programs See how to smoothly drop to lower abstractions wherever necessary Execute programming for the GPU with Accelerate Implement programming to easily scale to the cloud with Cloud Haskell In Detail Haskell, with its power to optimize the code and its high performance, is a natural candidate for high performance programming. It is especially well suited to stacking abstractions high with a relatively low performance cost. This book addresses the challenges of writing efficient code with lazy evaluation and techniques often used to optimize the performance of Haskell programs. We open with an in-depth look at the evaluation of Haskell expressions and discuss optimization and benchmarking. You will learn to use parallelism and we'll explore the concept of streaming. We'll demonstrate the benefits of running multithreaded and concurrent applications. Next we'll guide you through various profiling tools that will help

you identify performance issues in your program. We'll end our journey by looking at GPGPU, Cloud and Functional Reactive Programming in Haskell. At the very end there is a catalogue of robust library recommendations with code samples. By the end of the book, you will be able to boost the performance of any app and prepare it to stand up to real-world punishment. Style and approach This easy-to-follow guide teaches new practices and techniques to optimize your code, and then moves towards more advanced ways to effectively write efficient Haskell code. Small and simple practical examples will help you test the concepts yourself, and you will be able to easily adapt them for any application.

Get a practical, hands-on introduction to the Haskell language, its libraries and environment, and to the functional programming paradigm that is fast growing in importance in the software industry. This book contains excellent coverage of the Haskell ecosystem and supporting tools, include Cabal and Stack for managing projects, HUnit and QuickCheck for software testing, the Spock framework for developing web applications, Persistent and Esqueleto for database access, and parallel and distributed programming libraries. You'll see how functional programming is gathering momentum, allowing you to express yourself in a more concise way, reducing boilerplate, and increasing the safety of your code. Haskell is an elegant and noise-free

pure functional language with a long history, having a huge number of library contributors and an active community. This makes Haskell the best tool for both learning and applying functional programming, and Practical Haskell takes advantage of this to show off the language and what it can do. What You Will

Learn Get started programming with Haskell

Examine the different parts of the language Gain an overview of the most important libraries and tools in the Haskell ecosystem Apply functional patterns in real-world scenarios Understand monads and monad transformers Proficiently use laziness and resource management Who This Book Is For

Experienced programmers who may be new to the Haskell programming language. However, some prior exposure to Haskell is recommended.

This easy-to-use, fast-moving tutorial introduces you to functional programming with Haskell. You'll learn how to use Haskell in a variety of practical ways, from short scripts to large and demanding applications. Real World Haskell takes you through the basics of functional programming at a brisk pace, and then helps you increase your understanding of Haskell in real-world issues like I/O, performance, dealing with data, concurrency, and more as you move through each chapter.

This practical, example-driven introduction teaches the foundations of the Mathematica language so it can be applied to solving concrete problems.

Covers fundamental and advanced Java database programming techniques for beginning and experienced readers This book covers the practical considerations and applications in database programming using Java NetBeans IDE, JavaServer Pages, JavaServer Faces, and Java Beans, and comes complete with authentic examples and detailed explanations. Two data-action methods are developed and presented in this important resource. With Java Persistence API and plug-in Tools, readers are directed step by step through the entire database programming development process and will be able to design and build professional data-action projects with a few lines of code in mere minutes. The second method, runtime object, allows readers to design and build more sophisticated and practical Java database applications. Advanced and updated Java database programming techniques such as Java Enterprise Edition development kits, Enterprise Java Beans, JavaServer Pages, JavaServer Faces, Java RowSet Object, and JavaUpdatable ResultSet are also discussed and implemented with numerous example projects. Ideal for classroom and professional training use, this text also features: A detailed introduction to NetBeans Integrated Development Environment Java web-based database programming techniques (web applications and web services) More than thirty detailed, real-life sample projects analyzed via line-by-line illustrations

Problems and solutions for each chapter A wealth of supplemental material available for download from the book's ftp site, including PowerPoint slides, solution manual, JSP pages, sample image files, and sample databases Coverage of two popular database systems: SQL Server 2008 and Oracle This book provides undergraduate and graduate students as well as database programmers and software engineers with the necessary tools to handle the database programming issues in the JavaNetBeans environment. To obtain instructor materials please send an email to: pressbooks@ieee.org

It's all in the name: *Learn You a Haskell for Great Good!* is a hilarious, illustrated guide to this complex functional language. Packed with the author's original artwork, pop culture references, and most importantly, useful example code, this book teaches functional fundamentals in a way you never thought possible. You'll start with the kid stuff: basic syntax, recursion, types and type classes. Then once you've got the basics down, the real black belt master-class begins: you'll learn to use applicative functors, monads, zippers, and all the other mythical Haskell constructs you've only read about in storybooks. As you work your way through the author's imaginative (and occasionally insane) examples, you'll learn to:

- Laugh in the face of side effects as you wield purely functional programming techniques
- Use the magic of Haskell's "laziness" to play with infinite sets of

data –Organize your programs by creating your own types, type classes, and modules –Use Haskell's elegant input/output system to share the genius of your programs with the outside world Short of eating the author's brain, you will not find a better way to learn this powerful language than reading Learn You a Haskell for Great Good!

The second edition of Haskell: The Craft of Functional Programming is essential reading for beginners to functional programming and newcomers to the Haskell programming language. The emphasis is on the process of crafting programs and the text contains many examples and running case studies, as well as advice on program design, testing, problem solving and how to avoid common pitfalls.

Haskell is a purely functional language that allows programmers to rapidly develop clear, concise, and correct software. The language has grown in popularity in recent years, both in teaching and in industry. This book is based on the author's experience of teaching Haskell for more than twenty years. All concepts are explained from first principles and no programming experience is required, making this book accessible to a broad spectrum of readers. While Part I focuses on basic concepts, Part II introduces the reader to more advanced topics. This new edition has been extensively updated and expanded to include recent and more advanced

features of Haskell, new examples and exercises, selected solutions, and freely downloadable lecture slides and example code. The presentation is clean and simple, while also being fully compliant with the latest version of the language, including recent changes concerning applicative, monadic, foldable, and traversable types.

This book is devoted to five main principles of algorithm design: divide and conquer, greedy algorithms, thinning, dynamic programming, and exhaustive search. These principles are presented using Haskell, a purely functional language, leading to simpler explanations and shorter programs than would be obtained with imperative languages. Carefully selected examples, both new and standard, reveal the commonalities and highlight the differences between algorithms. The algorithm developments use equational reasoning where applicable, clarifying the applicability conditions and correctness arguments. Every chapter concludes with exercises (nearly 300 in total), each with complete answers, allowing the reader to consolidate their understanding and apply the techniques to a range of problems. The book serves students (both undergraduate and postgraduate), researchers, teachers, and professionals who want to know more about what goes into a good algorithm and how such algorithms can be expressed in purely functional terms.

In *Haskell from the Very Beginning* John Whittington takes a no-prerequisites approach to teaching the basics of a modern general-purpose programming language. Each small, self-contained chapter introduces a new topic, building until the reader can write quite substantial programs. There are plenty of questions and, crucially, worked answers and hints. *Haskell from the Very Beginning* will appeal both to new programmers, and to experienced programmers eager to explore functional languages such as Haskell. It is suitable both for formal use within an undergraduate or graduate curriculum, and for the interested amateur.

If you have a working knowledge of Haskell, this hands-on book shows you how to use the language's many APIs and frameworks for writing both parallel and concurrent programs. You'll learn how parallelism exploits multicore processors to speed up computation-heavy programs, and how concurrency enables you to write programs with threads for multiple interactions. Author Simon Marlow walks you through the process with lots of code examples that you can run, experiment with, and extend. Divided into separate sections on *Parallel and Concurrent Haskell*, this book also includes exercises to help you become familiar with the concepts presented: Express parallelism in Haskell with the *Eval* monad and *Evaluation Strategies* Parallelize ordinary Haskell code with the

Par monad Build parallel array-based computations, using the Repa library Use the Accelerate library to run computations directly on the GPU Work with basic interfaces for writing concurrent code Build trees of threads for larger and more complex programs Learn how to build high-speed concurrent network servers Write distributed programs that run on multiple machines in a network

Praise for this book, Python Without Fear “This is really a great book. I wish I’d had it when I was learning Python.” –John M. Wargo, author of Apache Cordova 4 Programming Praise for the previous book in the series, C++ Without Fear “I’m in love with your C++ Without Fear book. It keeps me awake for hours during the night. Thanks to you, I got most of the idea in just a few hours.” –Laura Viral, graduate physics student at CERN and Istanbul, Turkey “It’s hard to tell where I began and ended with your book. I felt like I woke up and literally knew how to write C++ code. I can’t overstate the confidence you gave me.” – Danny Grady, senior programmer/analyst at a Fortune 500 Company Whether you’re new to programming or moving from another language, Python Without Fear will quickly make you productive! Brian Overland’s unique approach to Python includes: Taking you by the hand while teaching topics from the very basics to intermediate and advanced features of Python Teaching by examples that are explained line by line

Heavy emphasis on examples that are fun and useful, including games, graphics, database applications, file storage, puzzles, and more! How to think “Pythonically” and avoid common “gotchas” Register your product at informit.com/register for convenient access to downloads, updates, and/or corrections as they become available.

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