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KEY=PROGRAMMING - MARLEE MALLORY

Programming Erlang

Software for a Concurrent World

Pragmatic Bookshelf 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.

Concurrent Programming in ERLANG

A complete description of Erlang, a programming language for building robust concurrent systems. The book contains many examples of how robust real-time systems can be programmed using this language.

Erlang Programming

A Concurrent Approach to Software Development

"O'Reilly Media, Inc." This book is an in-depth introduction to Erlang, a programming language ideal for any situation where concurrency, fault tolerance, and fast response is essential. Erlang is gaining widespread adoption with the advent of multi-core processors and their new scalable approach to concurrency. With this guide you'll learn how to write complex concurrent programs in Erlang, regardless of your programming background or experience. Written by leaders of the international Erlang community -- and based on their training material -- Erlang Programming focuses on the language's syntax and semantics, and explains pattern matching, proper lists, recursion, debugging, networking, and concurrency. This book helps you: Understand the strengths of Erlang and why its designers included specific features Learn the concepts behind concurrency and Erlang's way of handling it Write efficient Erlang programs while keeping code neat and readable Discover how Erlang fills the requirements for distributed systems Add simple graphical user interfaces with little effort Learn Erlang's tracing mechanisms for debugging concurrent and distributed systems Use the built-in Mnesia database and other table storage features Erlang Programming provides exercises at the end of each chapter and

simple examples throughout the book.

Learn You Some Erlang for Great Good!

A Beginner's Guide

No Starch Press Erlang is the language of choice for programmers who want to write robust, concurrent applications, but its strange syntax and functional design can intimidate the uninitiated. Luckily, there's a new weapon in the battle against Erlang-phobia: Learn You Some Erlang for Great Good! Erlang maestro Fred Hébert starts slow and eases you into the basics: You'll learn about Erlang's unorthodox syntax, its data structures, its type system (or lack thereof!), and basic functional programming techniques. Once you've wrapped your head around the simple stuff, you'll tackle the real meat-and-potatoes of the language: concurrency, distributed computing, hot code loading, and all the other dark magic that makes Erlang such a hot topic among today's savvy developers. As you dive into Erlang's functional fantasy world, you'll learn about: –Testing your applications with EUnit and Common Test –Building and releasing your applications with the OTP framework –Passing messages, raising errors, and starting/stopping processes over many nodes –Storing and retrieving data using Mnesia and ETS –Network programming with TCP, UDP, and the inet module –The simple joys and potential pitfalls of writing distributed, concurrent applications Packed with lighthearted illustrations and just the right mix of offbeat and practical example programs, Learn You Some Erlang for Great Good! is the perfect entry point into the sometimes-crazy, always-thrilling world of Erlang.

Designing for Scalability with Erlang/OTP

Implement Robust, Fault-Tolerant Systems

"O'Reilly Media, Inc." If you need to build a scalable, fault tolerant system with requirements for high availability, discover why the Erlang/OTP platform stands out for the breadth, depth, and consistency of its features. This hands-on guide demonstrates how to use the Erlang programming language and its OTP framework of reusable libraries, tools, and design principles to develop complex commercial-grade systems that simply cannot fail. In the first part of the book, you'll learn how to design and implement process behaviors and supervision trees with Erlang/OTP, and bundle them into standalone nodes. The second part addresses reliability,

scalability, and high availability in your overall system design. If you're familiar with Erlang, this book will help you understand the design choices and trade-offs necessary to keep your system running. Explore OTP's building blocks: the Erlang language, tools and libraries collection, and its abstract principles and design rules Dive into the fundamentals of OTP reusable frameworks: the Erlang process structures OTP uses for behaviors Understand how OTP behaviors support client-server structures, finite state machine patterns, event handling, and runtime/code integration Write your own behaviors and special processes Use OTP's tools, techniques, and architectures to handle deployment, monitoring, and operations

Erlang and OTP in Action

Simon and Schuster Concurrent programming has become a required discipline for all programmers. Multi-core processors and the increasing demand for maximum performance and scalability in mission-critical applications have renewed interest in functional languages like Erlang that are designed to handle concurrent programming. Erlang, and the OTP platform, make it possible to deliver more robust applications that satisfy rigorous uptime and performance requirements. Erlang and OTP in Action teaches you to apply Erlang's message passing model for concurrent programming--a completely different way of tackling the problem of parallel programming from the more common multi-threaded approach. This book walks you through the practical considerations and steps of building systems in Erlang and integrating them with real-world C/C++, Java, and .NET applications. Unlike other books on the market, Erlang and OTP in Action offers a comprehensive view of how concurrency relates to SOA and web technologies. This hands-on guide is perfect for readers just learning Erlang or for those who want to apply their theoretical knowledge of this powerful language. You'll delve into the Erlang language and OTP runtime by building several progressively more interesting real-world distributed applications. Once you are competent in the fundamentals of Erlang, the book takes you on a deep dive into the process of designing complex software systems in Erlang. Purchase of the print book comes with an offer of a free PDF, ePub, and Kindle eBook from Manning. Also available is all code from the book.

ECOOP - Object-Oriented Programming

21th European Conference, Berlin, Germany, July 30 - August 3, 2007, Proceedings

Springer Science & Business Media The21stEuropeanConferenceonObject-OrientedProgramming,ECOOP2007, was held in Berlin, Germany, on July 30 to August 3, 2007. ECOOP is the most importantand inspiring forumin Europeandbeyond for researchers,practiti- ers, and students working in that smorgasbord of topics and approaches known as object orientation. This topic area was explored and challenged by excellent invited speakers—two of which were the winners of this year's Dahl-Nygaard award—in the carefully refereed and selected technical papers, on posters, via demonstrations, and in tutorials. Each of the many workshops complemented this with a very interactive and dynamic treatment of more speci?c topics. - nally, panels allowed for loud and lively disagreement. Yet, it is one of ECOOP's specialqualities that this plethora ofactivities add upto a coherentandexciting whole, rather than deteriorating into chaos. The Program Committee received 161 submissions this year. Only 135 of them were carried through the full review process, because of a number of - tractions and a number of submissions of abstracts that were never followed by a full paper. However, the remaining papers were of very high quality and we accepted25 of them for publication. Helping very goodpapers to be published is more useful than having an impressively low acceptance rate. The papers were selected according to four groups of criteria, whose priority depended on the paper: relevance; originality and signi?cance; precisionand correctness;and p- sentation and clarity. Each paper had three, four, or ?ve reviews, depending on how controversial it was.

The Pragmatic Programmer

From Journeyman to Master

Addison-Wesley Professional What others in the trenches say about The Pragmatic Programmer... "The cool thing about this book is that it's great for keeping the programming process fresh. The book helps you to continue to grow and clearly comes from people who have been there." —Kent Beck, author of Extreme Programming Explained: Embrace Change "I found this book to be a great mix of solid advice and wonderful analogies!" —Martin Fowler, author of Refactoring and UML Distilled "I would buy a copy, read it twice, then tell all my colleagues to run out and grab a copy. This is a book I would never loan because I would worry about it being lost."

—Kevin Ruland, Management Science, MSG-Logistics "The wisdom and practical experience of the authors is obvious. The topics presented are relevant and useful.... By far its greatest strength for me has been the outstanding analogies—tracer bullets, broken windows, and the fabulous helicopter-based explanation of the need for orthogonality, especially in a crisis situation. I have little doubt that this book will eventually become an excellent source of useful information for journeymen programmers and expert mentors alike." —John Lakos, author of Large-Scale C++ Software Design "This is the sort of book I will buy a dozen copies of when it comes out so I can give it to my clients." —Eric Vought, Software Engineer "Most modern books on software development fail to cover the basics of what makes a great software developer, instead spending their time on syntax or technology where in reality the greatest leverage possible for any software team is in having talented developers who really know their craft well. An excellent book." —Pete McBreen, Independent Consultant "Since reading this book, I have implemented many of the practical suggestions and tips it contains. Across the board, they have saved my company time and money while helping me get my job done quicker! This should be a desktop reference for everyone who works with code for a living." —Jared Richardson, Senior Software Developer, iRenaissance, Inc. "I would like to see this issued to every new employee at my company...." —Chris Cleeland, Senior Software Engineer, Object Computing, Inc. "If I'm putting together a project, it's the authors of this book that I want. . . . And failing that I'd settle for people who've read their book." —Ward Cunningham Straight from the programming trenches, The Pragmatic Programmer cuts through the increasing specialization and technicalities of modern software development to examine the core process--taking a requirement and producing working, maintainable code that delights its users. It covers topics ranging from personal responsibility and career development to architectural techniques for keeping your code flexible and easy to adapt and reuse. Read this book, and you'll learn how to Fight software rot; Avoid the trap of duplicating knowledge; Write flexible, dynamic, and adaptable code; Avoid programming by coincidence; Bullet-proof your code with contracts, assertions, and exceptions; Capture real requirements; Test ruthlessly and effectively; Delight your users; Build teams of pragmatic programmers; and Make your developments more precise with automation. Written as a series of self-contained sections and filled with entertaining anecdotes, thoughtful examples, and interesting analogies, The Pragmatic Programmer illustrates the best practices and major pitfalls of many different aspects of software development. Whether you're a new coder, an experienced programmer, or a manager responsible for software projects, use these lessons daily, and you'll quickly see improvements in personal productivity, accuracy, and job satisfaction. You'll learn skills and develop habits and attitudes that form the foundation for long-term success in your career. You'll become a Pragmatic Programmer.

Programming Elixir ≥ 1.6

Functional |> Concurrent |> Pragmatic |> Fun

Pragmatic Bookshelf This book is the introduction to Elixir for experienced programmers, completely updated for Elixir 1.6 and beyond. Explore functional programming without the academic overtones (tell me about monads just one more time). Create concurrent applications, butget them right without all the locking and consistency headaches. Meet Elixir, a modern, functional, concurrent language built on the rock-solid Erlang VM. Elixir's pragmatic syntax and built-in support for metaprogramming will make you productive and keep you interestedfor the long haul. Maybe the time is right for the Next Big Thing. Maybe it's Elixir. Functional programming techniques help you manage the complexities of today's real-world, concurrent systems; maximize uptime; and manage security. Enter Elixir, with its modern, Ruby-like, extendable syntax, compile and runtime evaluation, hygienic macro system, and more. But, just as importantly, Elixir brings a sense of enjoyment to parallel,functional programming. Your applications become fun to work with, and the language encourages you to experiment. Part 1 covers the basics of writing sequential Elixir programs. We'll look at the language, the tools, and the conventions. Part 2 uses these skills to start writing concurrent code-applications that use all the cores on your machine, or all the machines on your network! And we do it both with and without OTP. Part 3 looks at the more advanced features of the language, from DSLs and code generation to extending the syntax. This edition is fully updated with all the new features of Elixir 1.6, with a new chapter on structuring OTP applications, and new sections on the debugger, code formatter, Distillery, and protocols. What You Need: You'll need a computer, a little experience with another high-levellanguage, and a sense of adventure. No functional programmingexperience is needed.

Building Web Applications with Erlang

Working with REST and Web Sockets on Yaws

"O'Reilly Media, Inc." "Working with REST and Web-Sockets on Yaws"--Cover.

Handbook of Neuroevolution Through Erlang

Springer Science & Business Media Handbook of Neuroevolution Through Erlang presents both the theory behind, and the methodology of, developing a neuroevolutionary-based computational intelligence system using Erlang. With a foreword written by Joe Armstrong, this handbook offers an extensive tutorial for creating a state of the art Topology and Weight Evolving Artificial Neural Network (TWEANN) platform. In a step-by-step format, the reader is guided from a single simulated neuron to a complete system. By following these steps, the reader will be able to use novel technology to build a TWEANN system, which can be applied to Artificial Life simulation, and Forex trading. Because of Erlang's architecture, it perfectly matches that of evolutionary and neurocomptational systems. As a programming language, it is a concurrent, message passing paradigm which allows the developers to make full use of the multi-core & multi-cpu systems. Handbook of Neuroevolution Through Erlang explains how to leverage Erlang's features in the field of machine learning, and the system's real world applications, ranging from algorithmic financial trading to artificial life and robotics.

Seven Concurrency Models in Seven Weeks

When Threads Unravel

Offers information on how to exploit the parallel architectures in a computer's GPU to improve code performance, scalability, and resilience.

Parallel and Concurrent Programming in Haskell

Techniques for Multicore and Multithreaded

Programming

"O'Reilly Media, Inc." 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

Elixir in Action

Simon and Schuster Summary Revised and updated for Elixir 1.7, Elixir in Action, Second Edition teaches you how to apply Elixir to practical problems associated with scalability, fault tolerance, and high availability. Along the way, you'll develop an appreciation for, and considerable skill in, a functional and concurrent style of programming. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology When you're building mission-critical software, fault tolerance matters. The Elixir programming language delivers fast, reliable applications, whether you're building a large-scale distributed system, a set of backend services, or a simple web app. And Elixir's elegant syntax and functional programming mindset make your software easy to write, read, and maintain. About the Book Elixir in Action, Second Edition teaches you how to build production-quality distributed applications using the Elixir programming language. Author Saša Jurić introduces this powerful language using examples that highlight the benefits of Elixir's functional and concurrent programming. You'll discover how the OTP framework can radically reduce tedious low-level coding tasks. You'll also explore practical approaches to concurrency as you learn to distribute a production system over multiple machines. What's inside Updated for Elixir 1.7 Functional and concurrent programming Introduction to distributed system design Creating deployable releases About the Reader You'll need intermediate skills with client/server applications and a language like Java, C#, or Ruby. No previous experience with Elixir required. About the Author Saša Jurić is a developer with extensive experience using Elixir and Erlang in complex server-side systems. Table of Contents First steps Building

blocks Control flow Data abstractions Concurrency primitives Generic server processes Building a concurrent system Fault-tolerance basics Isolating error effects Beyond GenServer Working with components Building a distributed system Running the system

Programming Concurrency on the JVM

Mastering Synchronization, STM, and Actors

Pragmatic Bookshelf More than ever, learning to program concurrency is critical to creating faster, responsive applications. Speedy and affordable multicore hardware is driving the demand for high-performing applications, and you can leverage the Java platform to bring these applications to life. Concurrency on the Java platform has evolved, from the synchronization model of JDK to software transactional memory (STM) and actor-based concurrency. This book is the first to show you all these concurrency styles so you can compare and choose what works best for your applications. You'll learn the benefits of each of these models, when and how to use them, and what their limitations are. Through hands-on exercises, you'll learn how to avoid shared mutable state and how to write good, elegant, explicit synchronization-free programs so you can create easy and safe concurrent applications. The techniques you learn in this book will take you from dreading concurrency to mastering and enjoying it. Best of all, you can work with Java or a JVM language of your choice - Clojure, JRuby, Groovy, or Scala - to reap the growing power of multicore hardware. If you are a Java programmer, you'd need JDK 1.5 or later and the Akka 1.0 library. In addition, if you program in Scala, Clojure, Groovy or JRuby you'd need the latest version of your preferred language. Groovy programmers will also need GPars.

Concurrent Objects and Beyond

Papers dedicated to Akinori Yonezawa on the Occasion of His 65th Birthday

Springer This Festschrift volume includes a collection of papers written in honor of the accomplishments of Professor Yonezawa on the occasion of his 65th birthday in 2012. With a few exceptions, the papers in this Festschrift were presented at an international

symposium celebrating this occasion. Also included are reprints of two of Professor Yonezawa's most influential papers on the programming language ABCL. The volume is a testament strong and lasting impact Professor Yonezawa's research accomplishments as well as the inspiration he has been to colleagues and students alike.

Central European Functional Programming School

5th Summer School, CEFP 2013, Cluj-Napoca, Romania, July 8-20, 2013, Revised Selected Papers

Springer This volume presents the revised lecture notes of selected talks given at the Fifth Central European Functional Programming School, CEFP 2013, held in July 2013 in Cluj-Napoca, Romania. The 14 revised full papers presented were carefully reviewed and selected. The lectures cover a wide range of distributed and multicore functional programming subjects. The last 5 papers are selected papers of the PhD Workshop organized for the participants of the summer school.

Software Engineering and Formal Methods

15th International Conference, SEFM 2017, Trento, Italy, September 4–8, 2017, Proceedings

Springer This book constitutes the refereed proceedings of the 15th International Conference on Software Engineering and Formal Methods, SEFM 2017, held in Trento, Italy, in September 2017. The 17 full papers and 6 short papers presented were carefully reviewed and selected from 102 submissions. The papers deal with a large range of topics in the following research areas: new frontiers in software architecture; software verification and testing; software development methods; application and technology transfer; security and safety; and design principles.

Practical Aspects of Declarative Languages

12th International Symposium, PADL 2010, Madrid, Spain, January 18-19, 2010, Proceedings

Springer This book constitutes the refereed proceedings of the 12th International Symposium on Practical Aspects of Declarative Languages, PADL 2010, held in Madrid, Spain, in January 2010, colocated with POPL 2010, the Symposium on Principles of Programming Languages. The 22 revised full papers presented together with 2 invited talks were carefully reviewed and selected from 58 submissions. The volume features original work emphasizing novel applications and implementation techniques for all forms of clarative concepts, including functions, relations, logic, and constraints. The papers address all current aspects of declarative programming; they are organized in topical sections on non-monotonic reasoning - answer set programming, types, parallelism and distribution, code quality assurance, domain specific languages, programming aids, constraints, and tabling - agents.

Introducing Erlang

Getting Started in Functional Programming

"O'Reilly Media, Inc." If you're new to Erlang, its functional style can seem difficult, but with help from this hands-on introduction, you'll scale the learning curve and discover how enjoyable, powerful, and fun this language can be. In this updated second edition, author Simon St.Laurent shows you how to write simple Erlang programs by teaching you one skill at a time. You'll learn about pattern matching, recursion, message passing, process-oriented programming, and establishing pathways for data rather than telling it where to go. By the end of your journey, you'll understand why Erlang is ideal for concurrency and resilience. Get cozy with Erlang's shell, its command line interface Define functions, using the fun tool, to represent repeated calculations Discover atoms, pattern matching, and guards: the foundations of your program structure Delve into the heart of Erlang processing with recursion, strings, lists, and higher-order functions Create processes, send messages among them, and apply pattern matching to incoming messages Store and

manipulate structured data with Erlang Term Storage and the Mnesia database Learn about Open Telecom Platform, Erlang's open source libraries and tools

Programming Multi-Agent Systems

10th International Workshop, ProMAS 2012, Valencia, Spain, June 5, 2012, Revised Selected Papers

Springer This book constitutes the thoroughly refereed post-conference proceedings of the 10th International Workshop on Programming Multi-Agents Systems held in Valencia, Spain, in June 2012. The 10 revised full papers presented were carefully selected from 14 submissions covering a wide range of topics in multi-agent system programming languages, including language design and efficient implementation, agent communication, and robot programming. I addition to these regular papers, the volume includes six papers from the Multi-Agent programming Contest 2012 (MAPC).

Functional and Logic Programming

10th International Symposium, FLOPS 2010, Sendai, Japan, April 19-21, 2010, Proceedings

Springer This book constitutes the refereed proceedings of the 10th International Symposium on Functional and Logic Programming, FLOPS 2010, held in Sendai, Japan, in April 2010. The 21 revised full papers presented together with 3 invited talks were carefully reviewed and selected from 49 submissions. The papers are organized in topical sections on types; program analysis and transformation; foundations; logic programming; evaluation and normalization; term rewriting; and parallelism and control.

Practical Aspects of Declarative Languages

13th International Symposium, PADL 2011, Austin, TX, USA, January 24-25, 2011. Proceedings

Springer This book constitutes the refereed proceedings of the 13th International Symposium on Practical Aspects of Declarative Languages, PADL 2011, held in Austin, TX, USA, in January 2011, co-located with POPL 2011, the Symposium on Principles of Programming Languages. The 17 revised full papers presented together with one application paper were carefully reviewed and selected from 40 submissions. The volume features a variety of contributions ranging from message-passing and mobile networks, concurrent and parallel programming, event processing and reactive programming, profiling and portability in Prolog, constraint programming, grammar combinators, belief set merging and work on new language extensions and tools.

Design of Multithreaded Software

The Entity-Life Modeling Approach

John Wiley & Sons This book assumes familiarity with threads (in a language such as Ada, C#, or Java) and introduces the entity-life modeling (ELM) design approach for certain kinds of multithreaded software. ELM focuses on "reactive systems," which continuously interact with the problem environment. These "reactive systems" include embedded systems, as well as such interactive systems as cruise controllers and automated teller machines. Part I covers two fundamentals: program-language thread support and state diagramming. These are necessary for understanding ELM and are provided primarily for reference. Part II covers ELM from different angles. Part III positions ELM relative to other design approaches.

Functional and Logic Programming

13th International Symposium, FLOPS 2016, Kochi, Japan, March 4-6, 2016, Proceedings

Springer This book constitutes the proceedings of the 13th International Symposium on Functional and Logic Programming, FLOPS 2016, held in Kochi, Japan, in March 2016. The 14 papers presented in this volume were carefully reviewed and selected from 36 submissions. They cover the following topics: functional and logic programming; program transformation and re-writing; and extracting programs from proofs of their correctness.

Software Agent-Based Applications, Platforms and Development Kits

Springer Science & Business Media This book introduces major agent platforms, frameworks, systems, tools, and applications. Each system is described by their developers in sufficient detail so that the reader can get a good understanding of the architecture, functionality, and application areas of the system. All systems are running systems. One main focus of the book lies on agent platforms and toolkits.

Distributed Applications and Interoperable Systems

18th IFIP WG 6.1 International Conference, DAIS 2018,

Held as Part of the 13th International Federated Conference on Distributed Computing Techniques, DisCoTec 2018, Madrid, Spain, June 18-21, 2018, Proceedings

Springer This book constitutes the proceedings of the 18th IFIP International Conference on Distributed Applications and Interoperable Systems, DAIS 2018, held in Madrid, Spain, in June 2018. The 10 papers presented together with 2 short papers in this volume were carefully reviewed and selected from 33 submissions. The papers are organized in topical sections on application domains, including stream processing, video dissemination, storage, privacy protection, and large-scale orchestration.

Principles of Concurrent and Distributed Programming

Pearson Education The latest edition of a classic text on concurrency and distributed programming - from a winner of the ACM/SIGCSE Award for Outstanding Contribution to Computer Science Education.

Encyclopedia of Parallel Computing

Springer Science & Business Media Containing over 300 entries in an A-Z format, the Encyclopedia of Parallel Computing provides easy, intuitive access to relevant information for professionals and researchers seeking access to any aspect within the broad field of parallel computing. Topics for this comprehensive reference were selected, written, and peer-reviewed by an international pool of distinguished researchers in the field. The Encyclopedia is broad in scope, covering machine organization, programming languages, algorithms, and applications. Within each area, concepts, designs, and specific implementations are presented. The highly-structured essays in this work comprise synonyms, a definition and discussion of the topic, bibliographies, and links to related literature. Extensive cross-references to other entries within the Encyclopedia support efficient, user-friendly searchers for immediate access to

useful information. Key concepts presented in the Encyclopedia of Parallel Computing include; laws and metrics; specific numerical and non-numerical algorithms; asynchronous algorithms; libraries of subroutines; benchmark suites; applications; sequential consistency and cache coherency; machine classes such as clusters, shared-memory multiprocessors, special-purpose machines and dataflow machines; specific machines such as Cray supercomputers, IBM's cell processor and Intel's multicore machines; race detection and auto parallelization; parallel programming languages, synchronization primitives, collective operations, message passing libraries, checkpointing, and operating systems. Topics covered: Speedup, Efficiency, Isoefficiency, Redundancy, Amdahls law, Computer Architecture Concepts, Parallel Machine Designs, Benmarks, Parallel Programming concepts & design, Algorithms, Parallel applications. This authoritative reference will be published in two formats: print and online. The online edition features hyperlinks to cross-references and to additional significant research. Related Subjects: supercomputing, high-performance computing, distributed computing

Real World Haskell

Code You Can Believe In

"O'Reilly Media, Inc." 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.

Introduction to Concurrency in Programming Languages

CRC Press Exploring how concurrent programming can be assisted by language-level techniques, Introduction to Concurrency in Programming Languages presents high-level language techniques for dealing with concurrency in a general context. It provides an understanding of programming languages that offer concurrency features as part of the language definition. The book supplies a conceptual framework for different aspects of parallel algorithm design and implementation. It first addresses the limitations of traditional programming techniques and models when dealing with concurrency. The book then explores the current state of the art in concurrent programming and describes high-level language constructs for concurrency. It also discusses the historical evolution of

hardware, corresponding high-level techniques that were developed, and the connection to modern systems, such as multicore and manycore processors. The remainder of the text focuses on common high-level programming techniques and their application to a range of algorithms. The authors offer case studies on genetic algorithms, fractal generation, cellular automata, game logic for solving Sudoku puzzles, pipelined algorithms, and more. Illustrating the effect of concurrency on programs written in familiar languages, this text focuses on novel language abstractions that truly bring concurrency into the language and aid analysis and compilation tools in generating efficient, correct programs. It also explains the complexity involved in taking advantage of concurrency with regard to program correctness and performance.

Tests and Proofs

Second International Conference, TAP 2008, Prato, Italy, April 9-11, 2008, Proceedings

Springer This volume contains the research papers, invited papers, and abstracts of - torials presented at the Second International Conference on Tests and Proofs (TAP 2008) held April 9–11, 2008 in Prato, Italy. TAP was the second conference devoted to the convergence of proofs and tests. It combines ideas from both areasfor the advancement of softwarequality. To provethe correctnessof a programis to demonstrate, through impeccable mathematical techniques, that it has no bugs; to test a programis to run it with the expectation of discovering bugs. On the surface, the two techniques seem contradictory: if you have proved your program, it is fruitless to comb it for bugs; and if you are testing it, that is surely a sign that you have given up on anyhope of proving its correctness.Accordingly,proofs and tests have,since the onset of software engineering research, been pursued by distinct communities using rather di?erent techniques and tools. And yet the development of both approaches leads to the discovery of c-mon issues and to the realization that each may need the other. The emergence of model checking has been one of the ?rst signs that contradiction may yield to complementarity, but in the past few years an increasing number of research e?orts have encountered the need for combining proofs and tests, dropping e- lier dogmatic views of their incompatibility and taking instead the best of what each of these software engineering domains has to o?er.

Parallel Computing: On the Road to Exascale

IOS Press As predicted by Gordon E. Moore in 1965, the performance of computer processors increased at an exponential rate. Nevertheless, the increases in computing speeds of single processor machines were eventually curtailed by physical constraints. This led to the development of parallel computing, and whilst progress has been made in this field, the complexities of parallel algorithm design, the deficiencies of the available software development tools and the complexity of scheduling tasks over thousands and even millions of processing nodes represent a major challenge to the construction and use of more powerful parallel systems. This book presents the proceedings of the biennial International Conference on Parallel Computing (ParCo2015), held in Edinburgh, Scotland, in September 2015. Topics covered include computer architecture and performance, programming models and methods, as well as applications. The book also includes two invited talks and a number of mini-symposia. Exascale computing holds enormous promise in terms of increasing scientific knowledge acquisition and thus contributing to the future well-being and prosperity of mankind. A number of innovative approaches to the development and use of future high-performance and high-throughput systems are to be found in this book, which will be of interest to all those whose work involves the handling and processing of large amounts of data.

C++ Concurrency in Action

Simon and Schuster Summary This bestseller has been updated and revised to cover all the latest changes to C++ 14 and 17! C++ Concurrency in Action, Second Edition teaches you everything you need to write robust and elegant multithreaded applications in C++17. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology You choose C++ when your applications need to run fast. Well-designed concurrency makes them go even faster. C++ 17 delivers strong support for the multithreaded, multiprocessor programming required for fast graphic processing, machine learning, and other performance-sensitive tasks. This exceptional book unpacks the features, patterns, and best practices of production-grade C++ concurrency. About the Book C++ Concurrency in Action, Second Edition is the definitive guide to writing elegant multithreaded applications in C++. Updated for C++ 17, it carefully addresses every aspect of concurrent development, from starting new threads to designing fully functional multithreaded algorithms and data structures. Concurrency master Anthony Williams presents examples and practical tasks in every chapter, including insights that will delight even the most experienced developer. What's inside Full coverage of new C++ 17 features Starting and managing threads Synchronizing concurrent operations Designing concurrent code Debugging multithreaded applications About the Reader Written for intermediate C and C++ developers. No prior experience with

concurrency required. About the Author Anthony Williams has been an active member of the BSI C++ Panel since 2001 and is the developer of the just::thread Pro extensions to the C++ 11 thread library. Table of Contents Hello, world of concurrency in C++! Managing threads Sharing data between threads Synchronizing concurrent operations The C++ memory model and operations on atomic types Designing lock-based concurrent data structures Designing lock-free concurrent data structures Designing concurrent code Advanced thread management Parallel algorithms Testing and debugging multithreaded applications

Software Engineering and Formal Methods

17th International Conference, SEFM 2019, Oslo, Norway, September 18–20, 2019, Proceedings

Springer Nature This book constitutes the refereed proceedings of the 17th International Conference on Software Engineering and Formal Methods, SEFM 2019, held in Oslo, Norway, in September 2019. The 27 full papers presented were carefully reviewed and selected from 89 submissions. The papers cover a large variety of topics, including testing, formal verification, program analysis, runtime verification, malware and attack detection,and software development and evolution and address a wide range of systems, such as cyber-physical systems, UAVs, autonomous robots, and feature-oriented and operating systems. They are organized in the following topical sections: cooperative asynchronous systems; cyber-physical systems; feature-oriented and versioned systems; model-based testing; model inference; ontologies and machine learning; operating systems; program analysis; relating models and implementations; runtime verification; security; and verification.

FM 2009: Formal Methods

Second World Congress, Eindhoven, The Netherlands,

November 2-6, 2009, Proceedings

Springer th FM 2009, the 16 International Symposium on Formal Methods, marked the 10th an- versary of the First World Congress on Formal Methods that was held in 1999 in Toulouse, France. We wished to celebrate this by advertising and organizing FM 2009 as the Second World Congress in the FM series, aiming to once again bring together the formal methods communities from all over the world. The statistics displayed in the table on the next page include the number of countries represented by the Programme Committee members, as well as of the authors of submitted and accepted papers. Novel this year was a special track on tools and industrial applications. Subm- sions of papers on these topics were especially encouraged, but not given any special treatment. (It was just as hard to get a special track paper accepted as any other paper.) What we did promote, however, was a discussion of how originality, contri- tion, and soundness should be judged for these papers. The following questions were used by our Programme Committee.

Laser Spectroscopy IV

Proceedings of the Fourth International Conference, Rottarch-Egern, Fed. Rep. of Germany, June 11-15, 1979

Springer Science & Business Media Traditionally, the discipline of parallel computing has encompassed a wide range of topics ranging from machine organization all the way to applications. The Encyclopedia of Parallel Computing is likewise broad in scope, covering machine organization, programming, algorithms, and applications. Within each area, the Encyclopedia covers concepts, designs, and specific implementations. In the area of algorithms, the encyclopedia will cover (1) concepts such as cache-oblivious algorithms and systolic algorithms, (2) specific numerical and non-numerical algorithms such as parallel matrix-matrix multiplication and graph algorithms to, for example, find connected components in parallel, and (3) implementations of algorithms in the form of widely used libraries such as LAPACK. In the area of architecture, the encyclopedia will contain (1) concepts such as sequential consistency and cache coherency, (2) machine classes such as shared-memory multiprocessors and dataflow machines, and (3) specific machines such as IBM's cell processor and Intel's multicore machines. In the area of software, it will cover (1) concepts such as races and autoparallelization, and (2) designs in the form of parallel programming languages, library interfaces, and operating systems. The

encyclopedia also will cover application issues emphasizing the type of parallel computation involved and the magnitude in terms of computational requirements of the applications.Each encyclopedia entry will be concise and clear and will contain references to the literature for readers wishing to study the topic of the entry in depth. The broad coverage--together with extensive pointers to the literature for in-depth study'will make the encyclopedia an invaluable reference tool for researchers, practitioners and students alike.

Concurrent Data Processing in Elixir

Pragmatic Bookshelf Learn different ways of writing concurrent code in Elixir and increase your application's performance, without sacrificing scalability or fault-tolerance. Most projects benefit from running background tasks and processing data concurrently, but the world of OTP and various libraries can be challenging. Which Supervisor and what strategy to use? What about GenServer? Maybe you need back-pressure, but is GenStage, Flow, or Broadway a better choice? You will learn everything you need to know to answer these questions, start building highly concurrent applications in no time, and write code that's not only fast, but also resilient to errors and easy to scale. Whether you are building a high-frequency stock trading application or a consumer web app, you need to know how to leverage concurrency to build applications that are fast and efficient. Elixir and the OTP offer a range of powerful tools, and this guide will show you how to choose the best tool for each job, and use it effectively to quickly start building highly concurrent applications. Learn about Tasks, supervision trees, and the different types of Supervisors available to you. Understand why processes and process linking are the building blocks of concurrency in Elixir. Get comfortable with the OTP and use the GenServer behaviour to maintain process state for long-running jobs. Easily scale the number of running processes using the Registry. Handle large volumes of data and traffic spikes with GenStage, using back-pressure to your advantage. Create your first multi-stage data processing pipeline using producer, consumer, and producer-consumer stages. Process large collections with Flow, using MapReduce and more in parallel. Thanks to Broadway, you will see how easy it is to integrate with popular message broker systems, or even existing GenStage producers. Start building the high-performance and fault-tolerant applications Elixir is famous for today. What You Need: You'll need Elixir 1.9+ and Erlang/OTP 22+ installed on a Mac OS X, Linux, or Windows machine.

Fundamental Approaches to Software Engineering

23rd International Conference, FASE 2020, Held as Part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2020, Dublin, Ireland, April 25–30, 2020, Proceedings

Springer Nature This open access book constitutes the proceedings of the 23rd International Conference on Fundamental Approaches to Software Engineering, FASE 2020, which took place in Dublin, Ireland, in April 2020, and was held as Part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2020. The 23 full papers, 1 tool paper and 6 testing competition papers presented in this volume were carefully reviewed and selected from 81 submissions. The papers cover topics such as requirements engineering, software architectures, specification, software quality, validation, verification of functional and non-functional properties, model-driven development and model transformation, software processes, security and software evolution.

Simulation, Modeling, and Programming for Autonomous Robots

Second International Conference, SIMPAR 2010, Darmstadt, Germany, November 15-18, 2010,

Proceedings

Springer Why are the many highly capable autonomous robots that have been promised for novel applications driven by society, industry, and research not available - day despite the tremendous progress in robotics science and systems achieved during the last decades? Unfortunately, steady improvements in speci?c robot abilities and robot hardware have not been matched by corresponding robot performance in real world environments. This is mainly due to the lack of - vancements in robot software that master the development of robotic systems of ever increasing complexity. In addition, fundamental open problems are still awaiting sound answers while the development of new robotics applications s-fersfromthelackofwidelyusedtools,libraries,andalgorithmsthataredesigned in a modular and performant manner with standardized interfaces. Simulation environments are playing a major role not only in reducing development time and cost, e. g. , by systematic software- or hardware-in-the-loop testing of robot performance, but also in exploring new types of robots and applications. H-ever,their use may still be regardedwith skepticism. Seamless migrationof code using robot simulators to real-world systems is still a rare circumstance, due to the complexity of robot, world, sensor, and actuator modeling. These challenges drive the quest for the next generation of methodologies and tools for robot development. The objective of the International Conference on Simulation, Modeling, and ProgrammingforAutonomous Robots (SIMPAR) is to o?er a unique forum for these topics and to bring together researchersfrom academia and industry to identify and solve the key issues necessary to ease the development of increasingly complex robot software.