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KEY=CONCURRENT - KOCH LOGAN

NONSEQUENTIAL AND DISTRIBUTED PROGRAMMING WITH GO

SYNCHRONIZATION OF CONCURRENT PROCESSES: COMMUNICATION - COOPERATION - COMPETITION

Springer Nature Der Band bietet eine kompakte Einführung in die Nichtsequentielle Programmierung als gemeinsamen Kern von Vorlesungen über Betriebssysteme, Verteilte Systeme, Parallele Algorithmen, Echtzeitprogrammierung und Datenbanktransaktionen. Basiskonzepte zur Synchronisation und Kommunikation nebenläufiger Prozesse werden systematisch dargestellt: Schlösser, Semaphore, Monitore, lokaler und netzweiter Botschaftenaustausch. Die Algorithmen sind in der Programmiersprache Google Go formuliert, mit der viele Synchronisationskonzepte ausgedrückt werden können.

ON CONCURRENT PROGRAMMING

Springer Science & Business Media Here, one of the leading figures in the field provides a comprehensive survey of the subject, beginning with prepositional logic and concluding with concurrent programming. It is based on graduate courses taught at Cornell University and is designed for use as a graduate text. Professor Schneier emphasises the use of formal methods and assertional reasoning using notation and paradigms drawn from programming to drive the exposition, while exercises at the end of each chapter extend and illustrate the main themes covered. As a result, all those interested in studying concurrent computing will find this an invaluable approach to the subject.

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.

CONCURRENT AND DISTRIBUTED COMPUTING IN JAVA

John Wiley & Sons Concurrent and Distributed Computing in Java addresses fundamental concepts in concurrent computing with Java examples. The book consists of two parts. The first part deals with techniques for programming in shared-memory based systems. The book covers concepts in Java such as threads, synchronized methods, waits, and notify to expose students to basic concepts for multi-threaded programming. It also includes algorithms for mutual exclusion, consensus, atomic objects, and wait-free data structures. The second part of the book deals with programming in a message-passing system. This part covers resource allocation problems, logical clocks, global property detection, leader election, message ordering, agreement algorithms, checkpointing, and message logging. Primarily a textbook for upper-level undergraduates and graduate students, this thorough treatment will also be of interest to professional programmers.

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.

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.

CONCURRENCY

THE WORKS OF LESLIE LAMPORT

Morgan & Claypool This book is a celebration of Leslie Lamport's work on concurrency, interwoven in four-and-a-half decades of an evolving industry: from the introduction of the first personal computer to an era when parallel and distributed multiprocessors are abundant. His works lay formal foundations for concurrent computations executed by interconnected computers. Some of the algorithms have become standard engineering practice for fault tolerant distributed computing – distributed systems that continue to function correctly despite failures of individual components. He also developed a substantial body of work on the formal specification and verification of concurrent systems, and has contributed to the development of automated tools applying these methods. Part I consists of technical chapters of the book and a biography. The technical chapters of this book present a retrospective on Lamport's original ideas from experts in the field. Through this lens, it portrays their long-lasting impact. The chapters cover timeless notions Lamport introduced: the Bakery algorithm, atomic shared registers and sequential consistency; causality and logical time; Byzantine Agreement; state machine replication and Paxos; temporal logic of actions (TLA). The professional biography tells of Lamport's career, providing the context in which his work arose and broke new grounds, and discusses LaTeX – perhaps Lamport's most influential contribution outside the field of concurrency. This chapter gives a voice to the people behind the achievements, notably Lamport himself, and additionally the colleagues around him, who inspired, collaborated, and helped him drive worldwide impact. Part II consists of a selection of Leslie Lamport's most influential papers. This book touches on a lifetime of contributions by Leslie Lamport to the field of concurrency and on the extensive influence he had on people working in the field. It will be of value to historians of science, and to researchers and students who work in the area of concurrency and who are interested to read about the work of one of the most influential researchers in this field.

PROGRAMMING WITH ACTORS

STATE-OF-THE-ART AND RESEARCH PERSPECTIVES

The set of papers collected in this issue originated from the AGERE! Workshop series - the last edition was held in 2017 - and concern the application of actor-based approaches to mainstream application domains and the discussion of related issues. The issue is divided into two parts. The first part concerns Web Programming; Data-Intensive Parallel Programming; Mobile Computing; Self-Organizing Systems and the second part concerns Scheduling; Debugging; Communication and Coordination; Monitoring.

THE ORIGIN OF CONCURRENT PROGRAMMING

FROM SEMAPHORES TO REMOTE PROCEDURE CALLS

Springer Science & Business Media An essential reader containing 19 important papers on the invention and early development of concurrent programming and its relevance to computer science and computer engineering. All of them are written by the pioneers in concurrent programming, including Brinch Hansen himself, and have introductions added that summarize the papers and put them in perspective. The editor provides an overview chapter and neatly places all developments in perspective with chapter introductions and expository apparatus. Essential resource for graduates, professionals, and researchers in CS with an interest in concurrent programming principles. A familiarity with operating system principles is assumed.

DISTRIBUTED COMPUTING

PRINCIPLES, ALGORITHMS, AND SYSTEMS

Cambridge University Press Designing distributed computing systems is a complex process requiring a solid understanding of the design problems and the theoretical and practical aspects of their solutions. This comprehensive textbook covers the fundamental principles and models underlying the theory, algorithms and systems aspects of distributed computing. Broad and detailed coverage of the theory is balanced with practical systems-related issues such as mutual exclusion, deadlock detection, authentication, and failure recovery. Algorithms are carefully selected, lucidly presented, and described without complex proofs. Simple explanations and illustrations are used to elucidate the algorithms. Important emerging topics such as peer-to-peer networks and network security are also considered. With vital algorithms, numerous illustrations, examples and homework problems, this textbook is suitable for advanced undergraduate and graduate students of electrical and computer engineering and computer science. Practitioners in data networking and sensor networks will also find this a valuable resource. Additional resources are available online at www.cambridge.org/9780521876346.

IS PARALLEL PROGRAMMING HARD

CONCURRENT PROGRAMMING: ALGORITHMS, PRINCIPLES, AND FOUNDATIONS

Springer Science & Business Media This book is devoted to the most difficult part of concurrent programming, namely synchronization concepts, techniques and principles when the cooperating entities are asynchronous, communicate through a shared memory, and may experience failures. Synchronization is no longer a set of tricks but, due to research results in recent decades, it relies today on

sane scientific foundations as explained in this book. In this book the author explains synchronization and the implementation of concurrent objects, presenting in a uniform and comprehensive way the major theoretical and practical results of the past 30 years. Among the key features of the book are a new look at lock-based synchronization (mutual exclusion, semaphores, monitors, path expressions); an introduction to the atomicity consistency criterion and its properties and a specific chapter on transactional memory; an introduction to mutex-freedom and associated progress conditions such as obstruction-freedom and wait-freedom; a presentation of Lamport's hierarchy of safe, regular and atomic registers and associated wait-free constructions; a description of numerous wait-free constructions of concurrent objects (queues, stacks, weak counters, snapshot objects, renaming objects, etc.); a presentation of the computability power of concurrent objects including the notions of universal construction, consensus number and the associated Herlihy's hierarchy; and a survey of failure detector-based constructions of consensus objects. The book is suitable for advanced undergraduate students and graduate students in computer science or computer engineering, graduate students in mathematics interested in the foundations of process synchronization, and practitioners and engineers who need to produce correct concurrent software. The reader should have a basic knowledge of algorithms and operating systems.

RESEARCH DIRECTIONS IN PARALLEL FUNCTIONAL PROGRAMMING

Springer Science & Business Media Programming is hard. Building a large program is like constructing a steam locomotive through a hole the size of a postage stamp. An artefact that is the fruit of hundreds of person-years is only ever seen by anyone through a lOO-line window. In some ways it is astonishing that such large systems work at all. But parallel programming is much, much harder. There are so many more things to go wrong. Debugging is a nightmare. A bug that shows up on one run may never happen when you are looking for it - but unfailingly returns as soon as your attention moves elsewhere. A large fraction of the program's code can be made up of marshalling and coordination algorithms. The core application can easily be obscured by a maze of plumbing. Functional programming is a radical, elegant, high-level attack on the programming problem. Radical, because it dramatically eschews side-effects; elegant, because of its close connection with mathematics; high-level, be cause you can say a lot in one line. But functional programming is definitely not (yet) mainstream. That's the trouble with radical approaches: it's hard for them to break through and become mainstream. But that doesn't make functional programming any less fun, and it has turned out to be a won derful laboratory for rich type systems, automatic garbage collection, object models, and other stuff that has made the jump into the mainstream.

SPECIFICATION AND ANALYSIS OF CONCURRENT SYSTEMS

THE COSY APPROACH

Springer Science & Business Media Concurrent systems abound in human experience but their fully adequate conceptualization as yet eludes our most able thinkers. The COSY (ConcurrentSystem) notation and theory was developed in the last decade as one of a number of mathematical approaches for conceptualizing and analyzing concurrent and reactive systems. The COSY approach extends theconventional notions of grammar and automaton from formal language and automata theory to collections of "synchronized" grammars and automata, permitting system specification and analysis of "true" concurrency without reduction to non-determinism. COSY theory is developed to a great level of detail and constitutes the first uniform and self-contained presentationof all results about COSY published in the past, as well as including many new results. COSY theory is used to analyze a sufficient number of typical problems involving concurrency, synchronization and scheduling, to allow the reader to apply the techniques presented tosimilar problems. The COSY model is also related to many alternative models of concurrency, particularly Petri Nets, Communicating Sequential Processes and the Calculus of Communicating Systems.

CREATING COMPONENTS

OBJECT ORIENTED, CONCURRENT, AND DISTRIBUTED COMPUTING IN JAVA

CRC Press Concurrency is a powerful technique for developing efficient and lightning- fast software. For instance, concurrency can be used in common applications such as online order processing to speed processing and ensure transaction reliability. However, mastering concurrency is one of the greatest challenges for both new and veteran programmers. Softwar

DISTRIBUTED AND CLOUD COMPUTING

FROM PARALLEL PROCESSING TO THE INTERNET OF THINGS

Morgan Kaufmann Distributed and Cloud Computing: From Parallel Processing to the Internet of Things offers complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing. It is the first modern, up-to-date distributed systems textbook; it explains how to create high-performance, scalable, reliable systems, exposing the design principles, architecture, and innovative applications of parallel, distributed, and cloud computing systems. Topics covered by this book include: facilitating management, debugging, migration, and disaster recovery through virtualization; clustered systems for research or ecommerce applications; designing systems as web services; and social networking systems using peer-to-peer computing. The principles of cloud computing are discussed using examples from open-source and commercial applications, along with case studies from the leading distributed computing vendors such as Amazon, Microsoft, and Google. Each chapter includes exercises and further reading, with lecture slides and more available online. This book will be ideal for students taking a distributed systems or distributed computing class, as well as for professional system designers and engineers looking for a reference to the latest distributed technologies including cloud, P2P and grid computing. Complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing Includes case studies from the leading distributed computing vendors: Amazon, Microsoft, Google, and more Explains how to use virtualization to facilitate management, debugging, migration, and disaster recovery Designed for undergraduate or graduate students taking a distributed systems course—each chapter includes

exercises and further reading, with lecture slides and more available online

CONCURRENT PROGRAMMING IN JAVA

DESIGN PRINCIPLES AND PATTERNS

Addison-Wesley Professional Software -- Programming Languages.

MODELS FOR PARALLEL AND DISTRIBUTED COMPUTATION

THEORY, ALGORITHMIC TECHNIQUES AND APPLICATIONS

Springer Science & Business Media Parallel and distributed computation has been gaining a great lot of attention in the last decades. During this period, the advances attained in computing and communication technologies, and the reduction in the costs of those technolo gies, played a central role in the rapid growth of the interest in the use of parallel and distributed computation in a number of areas of engineering and sciences. Many actual applications have been successfully implemented in various plat forms varying from pure shared-memory to totally distributed models, passing through hybrid approaches such as distributed-shared memory architectures. Parallel and distributed computation differs from dassical sequential compu tation in some of the following major aspects: the number of processing units, independent local dock for each unit, the number of memory units, and the programming model. For representing this diversity, and depending on what level we are looking at the problem, researchers have proposed some models to abstract the main characteristics or parameters (physical components or logical mechanisms) of parallel computers. The problem of establishing a suitable model is to find a reasonable trade-off among simplicity, power of expression and universality. Then, be able to study and analyze more precisely the behavior of parallel applications.

PARALLEL AND DISTRIBUTED COMPUTATION: NUMERICAL METHODS

Athena Scientific This highly acclaimed work, first published by Prentice Hall in 1989, is a comprehensive and theoretically sound treatment of parallel and distributed numerical methods. It focuses on algorithms that are naturally suited for massive parallelization, and it explores the fundamental convergence, rate of convergence, communication, and synchronization issues associated with such algorithms. This is an extensive book, which aside from its focus on parallel and distributed algorithms, contains a wealth of material on a broad variety of computation and optimization topics. It is an excellent supplement to several of our other books, including Convex Optimization Algorithms (Athena Scientific, 2015), Nonlinear Programming (Athena Scientific, 1999), Dynamic Programming and Optimal Control (Athena Scientific, 2012), Neuro-Dynamic Programming (Athena Scientific, 1996), and Network Optimization (Athena Scientific, 1998). The on-line edition of the book contains a 95-page solutions manual.

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

OBJECT-ORIENTED CONCURRENT PROGRAMMING

Mit Press This book deals with a major theme of the Japanese Fifth Generation Project, which emphasizes logic programming, parallelism, and distributed systems. It presents a collection of tutorials and research papers on a new programming and design methodology in which the system to be constructed is modeled as a collection of abstract entities called "objects" and concurrent messages passing among objects. This methodology is particularly powerful in exploiting as well as harnessing the parallelism that is naturally found in problem domains.The book includes several proposals for programming languages that support this methodology, as well as the applications of object-oriented concurrent programming to such diverse areas as artificial intelligence, software engineering, music synthesis, office information systems, and system programming. It is the first compilation of research results in this rapidly emerging area.Contents: Concurrent Programming Using Actors. Concurrent Object-Oriented Programming in Act-1. Modelling and Programming in a Concurrent Object-Oriented Language, ABCL/1. Concurrent Programming in ConcurrentSmallTalk. Orient84K: An Object-Oriented Concurrent Programming Language for Knowledge Representation. POOL-T: A Parallel Object-Oriented Programming Language. Concurrent Strategy Execution in Omega. The Formes System: A Musical Application of Object-Oriented Concurrent Programming. Distributed Problem Solving in ABCL/1.The contributors are Gul Agha (MIT), Pierre America (Phillips Research Laboratory, Eindhoven), Giuseppe Attardi (DELPHI SpA), Jean Pierre Briot (IRCAM, Paris), Pierre Cointe (IRCAM, Paris), Carl Hewitt (MIT), Yutaka Ishikawa (Keio University), Henry Lieberman (MIT), Etsuya Shibayama (Tokyo Institute of Technology), Mario Tokoro (Keio University), Yasuhiko Yokote (Keio University), and Akinori Yonezawa (Tokyo Institute of Technology).Object-Oriented Concurrent Programming is included in The MIT Press Series in Artificial Intelligence, edited by Patrick Henry Winston and Michael Brady.

DESIGNING DISTRIBUTED SYSTEMS

PATTERNS AND PARADIGMS FOR SCALABLE, RELIABLE SERVICES

"O'Reilly Media, Inc." In the race to compete in today's fast-moving markets, large enterprises are busy adopting new technologies for creating new products, processes, and business models. But one obstacle on the road to digital transformation is placing too much emphasis on technology, and not enough on the types of processes technology enables. What if different lines of business could build their own services and applications—and decision-making was distributed rather than centralized? This report explores the concept of a digital business platform as a way of empowering individual business sectors to act on data in real time. Much innovation in a digital enterprise will increasingly happen at the edge, whether it involves business users (from marketers to data scientists) or IoT devices. To facilitate the process, your core IT team can provide these sectors with the digital tools they need to innovate quickly. This report explores: Key cultural and organizational changes for developing business capabilities through cross-functional product teams A platform for integrating applications, data sources, business partners, clients, mobile apps, social networks, and IoT devices Creating internal API programs for building innovative edge services in low-code or no-code environments Tools including Integration Platform as a Service, Application Platform as a Service, and Integration Software as a Service The challenge of integrating microservices and serverless architectures Event-driven architectures for processing and reacting to events in real time You'll also learn about a complete pervasive integration solution as a core component of a digital business platform to serve every audience in your organization.

OPERATING SYSTEMS

CONCURRENT AND DISTRIBUTED SOFTWARE DESIGN

Pearson Education Both theory and practice are blended together in order to learn how to build real operating systems that function within a distributed environment. An introduction to standard operating system topics is combined with newer topics such as security, microkernels and embedded systems. This book also provides an overview of operating system fundamentals. For programmers who want to refresh their basic skills and be brought up-to-date on those topics related to operating systems.

CONTROL FLOW AND DATA FLOW: CONCEPTS OF DISTRIBUTED PROGRAMMING

INTERNATIONAL SUMMER SCHOOL

Springer Science & Business Media In a time of multiprocessor machines, message switching networks and process control programming tasks, the foundations of programming distributed systems are among the central challenges for computing sci enti sts. The foundati ons of di stributed programming compri se all the fasci nating questions of computing science: the development of adequate com putational , conceptual and semantic model s for distributed systems, specification methods, verification techniques, transformation rules, the development of suitable representations by programming languages, evaluation and execution of programs describing distributed systems. Being the 7th in a series of ASI Summer Schools at Marktoberdorf, these lectures concentrated on distributed systems. Already during the previous Summer School s at Marktoberdorf aspects of di stributed systems were important periodical topics. The rising interest in distributed systems, their design and implementation led to a considerable amount of research in this area. This is impressively demonstrated by the broad spectrum of the topics of the papers in this vol ume, although they are far from being comprehensive for the work done in the area of distributed systems. Distributed systems are extraordinarily complex and allow many distinct viewpoints. Therefore the literature on distributed systems sometimes may look rather confusing to people not working in the field. Nevertheless there is no reason for resignation: the Summer School was able to show considerable convergence in ideas, approaches and concepts for distributed systems.

TOPICS IN PARALLEL AND DISTRIBUTED COMPUTING

INTRODUCING CONCURRENCY IN UNDERGRADUATE COURSES

Morgan Kaufmann Topics in Parallel and Distributed Computing provides resources and guidance for those learning PDC as well as those teaching students new to the discipline. The pervasiveness of computing devices containing multicore CPUs and GPUs, including home and office PCs, laptops, and mobile devices, is making even common users dependent on parallel processing. Certainly, it is no longer sufficient for even basic programmers to acquire only the traditional sequential programming skills. The preceding trends point to the need for imparting a broad-based skill set in PDC technology. However, the rapid changes in computing hardware platforms and devices, languages, supporting programming environments, and research advances, poses a challenge both for newcomers and seasoned computer scientists. This edited collection has been developed over the past several years in conjunction with the IEEE technical committee on parallel processing (TCPP), which held several workshops and discussions on learning parallel computing and integrating parallel concepts into courses throughout computer science curricula. Contributed and developed by the leading minds in parallel computing research and instruction Provides resources and guidance for those learning PDC as well as those teaching students new to the discipline Succinctly addresses a range of parallel and distributed computing topics Pedagogically designed to ensure understanding by experienced engineers and newcomers Developed over the past several years in conjunction with the IEEE technical committee on parallel processing (TCPP), which held several workshops and discussions on learning parallel computing and integrating parallel concepts

PROCEEDINGS OF THE ... ACM SIGPLAN SYMPOSIUM ON PRINCIPLES & PRACTICE OF PARALLEL PROGRAMMING

PPOPP.

JOB SCHEDULING STRATEGIES FOR PARALLEL PROCESSING

22ND INTERNATIONAL WORKSHOP, JSSPP 2018, VANCOUVER, BC, CANADA, MAY 25, 2018, REVISED SELECTED PAPERS

Springer This book constitutes the thoroughly refereed post-conference proceedings of the 22nd International Workshop on Job Scheduling Strategies for Parallel Processing, JSSPP 2018, held in Vancouver, Canada, in May 2018. The 7 revised full papers presented were carefully reviewed and selected from12 submissions. The papers cover topics in the fields of design and evaluation of new scheduling approaches. They focus on several interesting problems in resource management and scheduling.

FORMAL METHODS FOR OPEN OBJECT-BASED DISTRIBUTED SYSTEMS

VOLUME 1

Springer Object-based Distributed Computing is being established as the most pertinent basis for the support of large, heterogeneous computing and telecommunications systems. The advent of Open Object-based Distributed Systems (OODS) brings new challenges and opportunities for the use and development of formal methods. Formal Methods for Open Object-based Distributed Systems presents the latest research in several related fields, and the exchange of ideas and experiences in a number of topics including: formal models for object-based distributed computing; semantics of object-based distributed systems and programming languages; formal techniques in object-based and object oriented specification, analysis and design; refinement and transformation of specifications; multiple viewpoint modeling and consistency between different models; formal techniques in distributed systems verification and testing; types, service types and subtyping; specification, verification and testing of quality of service constraints and formal methods and the object life cycle. It contains the selected proceedings of the International Workshop on Formal Methods for Open Object-based Distributed Systems, sponsored by the International Federation for Information Processing, and based in Paris, France, in March 1996.

EMERGING RESEARCH IN CLOUD DISTRIBUTED COMPUTING SYSTEMS

IGI Global Traditional computing concepts are maturing into a new generation of cloud computing systems with wide-spread global applications. However, even as these systems continue to expand, they are accompanied by overall performance degradation and wasted resources. Emerging Research in Cloud Distributed Computing Systems covers the latest innovations in resource management, control and monitoring applications, and security of cloud technology. Compiling and analyzing current trends, technological concepts, and future directions of computing systems, this publication is a timely resource for practicing engineers, technologists, researchers, and advanced students interested in the domain of cloud computing.

CONCURRENT PROGRAMMING IN ML

Cambridge University Press Concurrent Programming ML (CML), included as part of the SML of New Jersey (SML/NJ) distribution, combines the best features of concurrent programming and functional programming. This practical, "how-to" book focuses on the use of concurrency to implement naturally concurrent applications. In addition to a tutorial introduction to programming in CML, the book presents three extended examples using CML for practical systems programming: a parallel software build system, a simple concurrent window manager, and an implementation of distributed tuple spaces. This book also illustrates advanced SML programming techniques, and includes a chapter on the implementation of concurrency using features provided by the SML/NJ system. It will be of interest to programmers, students, and professional researchers working in computer language development.

INTRODUCTION TO RELIABLE AND SECURE DISTRIBUTED PROGRAMMING

Springer Science & Business Media In modern computing a program is usually distributed among several processes. The fundamental challenge when developing reliable and secure distributed programs is to support the cooperation of processes required to execute a common task, even when some of these processes fail. Failures may range from crashes to adversarial attacks by malicious processes. Cachin, Guerraoui, and Rodrigues present an introductory description of fundamental distributed programming abstractions together with algorithms to implement them in distributed systems, where processes are subject to crashes and malicious attacks. The authors follow an incremental approach by first introducing basic abstractions in simple distributed environments, before moving to more sophisticated abstractions and more challenging environments. Each core chapter is devoted to one topic, covering reliable broadcast, shared memory, consensus, and extensions of consensus. For every topic, many exercises and their solutions enhance the understanding This book represents the second edition of "Introduction to Reliable Distributed Programming". Its scope has been extended to include security against malicious actions by non-cooperating processes. This important domain has become widely known under the name "Byzantine fault-tolerance".

PRINCIPLES OF CONCURRENT PROGRAMMING

Prentice Hall Mathematics of Computing -- Parallelism.

INTEGRATED MODEL OF DISTRIBUTED SYSTEMS

Springer In modern distributed systems, such as the Internet of Things or cloud computing, verifying their correctness is an essential aspect. This requires modeling approaches that reflect the natural characteristics of such systems: the locality of their components, autonomy of their decisions, and their asynchronous communication. However, most of the available verifiers are unrealistic because

one or more of these features are not reflected. Accordingly, in this book we present an original formalism: the Integrated Distributed Systems Model (IMDS), which defines a system as two sets (states and messages), and a relation of the "actions" between these sets. The server view and the traveling agent's view of the system provide communication duality, while general temporal formulas for the IMDS allow automatic verification. The features that the model checks include: partial deadlock and partial termination, communication deadlock and resource deadlock. Automatic verification can support the rapid development of distributed systems. Further, on the basis of the IMDS, the Dedan tool for automatic verification of distributed systems has been developed.

THE ART OF MULTIPROCESSOR PROGRAMMING, REVISED REPRINT

Elsevier Revised and updated with improvements conceived in parallel programming courses, The Art of Multiprocessor Programming is an authoritative guide to multicore programming. It introduces a higher level set of software development skills than that needed for efficient single-core programming. This book provides comprehensive coverage of the new principles, algorithms, and tools necessary for effective multiprocessor programming. Students and professionals alike will benefit from thorough coverage of key multiprocessor programming issues. This revised edition incorporates much-demanded updates throughout the book, based on feedback and corrections reported from classrooms since 2008 Learn the fundamentals of programming multiple threads accessing shared memory Explore mainstream concurrent data structures and the key elements of their design, as well as synchronization techniques from simple locks to transactional memory systems Visit the companion site and download source code, example Java programs, and materials to support and enhance the learning experience

PARALLEL PROGRAMMING

FOR MULTICORE AND CLUSTER SYSTEMS

Springer Science & Business Media Innovations in hardware architecture, like hyper-threading or multicore processors, mean that parallel computing resources are available for inexpensive desktop computers. In only a few years, many standard software products will be based on concepts of parallel programming implemented on such hardware, and the range of applications will be much broader than that of scientific computing, up to now the main application area for parallel computing. Rauber and Rünger take up these recent developments in processor architecture by giving detailed descriptions of parallel programming techniques that are necessary for developing efficient programs for multicore processors as well as for parallel cluster systems and supercomputers. Their book is structured in three main parts, covering all areas of parallel computing: the architecture of parallel systems, parallel programming models and environments, and the implementation of efficient application algorithms. The emphasis lies on parallel programming techniques needed for different architectures. For this second edition, all chapters have been carefully revised. The chapter on architecture of parallel systems has been updated considerably, with a greater emphasis on the architecture of multicore systems and adding new material on the latest developments in computer architecture. Lastly, a completely new chapter on general-purpose GPUs and the corresponding programming techniques has been added. The main goal of the book is to present parallel programming techniques that can be used in many situations for a broad range of application areas and which enable the reader to develop correct and efficient parallel programs. Many examples and exercises are provided to show how to apply the techniques. The book can be used as both a textbook for students and a reference book for professionals. The material presented has been used for courses in parallel programming at different universities for many years.

DISTRIBUTED SYSTEMS

Createspace Independent Publishing Platform For this third edition of -Distributed Systems, - the material has been thoroughly revised and extended, integrating principles and paradigms into nine chapters: 1. Introduction 2. Architectures 3. Processes 4. Communication 5. Naming 6. Coordination 7. Replication 8. Fault tolerance 9. Security A separation has been made between basic material and more specific subjects. The latter have been organized into boxed sections, which may be skipped on first reading. To assist in understanding the more algorithmic parts, example programs in Python have been included. The examples in the book leave out many details for readability, but the complete code is available through the book's Website, hosted at www.distributed-systems.net. A personalized digital copy of the book is available for free, as well as a printed version through Amazon.com.

SELECTED WRITINGS ON COMPUTING: A PERSONAL PERSPECTIVE

Springer Stepwise program construction. Parallelism in multi-record transactions. Finding the maximum strong components in a directed granph. trip reporte E.W.Dijkstra, summer school munich. The solution to a cyclic relaxation problem. Trip reporte IBM seminar "communication and computers". Self-stabilization in spite of distributed control. Acceptance speech for the AFIPS harry goode memorial award 1974. Speech at the occasion of an anniversary. Inside "mathematics inc". A multidisciplinary approach to mathematics. Ond the role of scientific thought. A time-wise hierarchy imposed upon the use of a two-level store. A new elephant built from mosquitoes humming in harmony. Monotonic replacement algorithms and their implementation. Trip report E.W.Dijkstra. Trip report visit ETH Zurich. A letter to my old friend Jonathan. "Craftsman or scientist?". Exercises in making programs robust. Trip report E.W.Dijkstra. how do we tell truths that might hurt?. Variation on a theme: an open letter to C.A.R hoare. A post-scriptum to EWD501. Erratum and embellishmething . A synthesis merging?. Commets at a symposium. Trip report E.W.Dijkstra. On a warning from E.A.Hauch. More on auck's warning. A collection of beautiful proofs. Mathematics inc., a private letter from its chairman. A personal summary of the gries-owicki theory. A "non Trip report". Formal techniques and sizearble programs. An exercises for Dr.R.M.Burstall. A great improvement. To H.D.Mills, chairman software methodology panel. On subgoal induction. Trip report E.W.Dijkstra. More about the function. A proof of a theorem communicated to us. Trip report E.W.Dijkstra. A parable. Trip report E.W.Dijkstra. A correctness proof for communicating processes: a small exercise. An elephant inspered by the dutch national flag. On the fact the atlantic ocean has two sides. Trip report E.W.Dijkstra. A somewhat open letter to EAA. On webster, users, bugs, and aristotle, On making solution more and more fine-grained. The mathematics behind the banker's algorithm. On two beautiful solutions designed by martin rem. Trip

report E.W.Dijkstra. why naive program transformation systems are unlikely to word. The three golden rules for successful scientific research. The introduction of MAES. A class of simple communication patterns. "Why is software so expensive?" an explanation to the hardware designer. A theorem about odd powes of odd integers. Porgram inversion. On weak and strong termination. The equivalence of bounded nondeterminacy and continuity. A story that starts with a very good computer.

VERIFICATION OF SEQUENTIAL AND CONCURRENT PROGRAMS

Springer Science & Business Media Software -- Software Engineering.

INTRODUCTION TO DISTRIBUTED ALGORITHMS

Cambridge University Press Introduction : distributed systems - The model - Communication protocols - Routing algorithms - Deadlock-free packet switching - Wave and traversal algorithms - Election algorithms - Termination detection - Anonymous networks - Snapshots - Sense of direction and orientation - Synchrony in networks - Fault tolerance in distributed systems - Fault tolerance in asynchronous systems - Fault tolerance in synchronous systems - Failure detection - Stabilization.

PROGRAMMING DISTRIBUTED COMPUTING SYSTEMS

A FOUNDATIONAL APPROACH

MIT Press An introduction to fundamental theories of concurrent computation and associated programming languages for developing distributed and mobile computing systems. Starting from the premise that understanding the foundations of concurrent programming is key to developing distributed computing systems, this book first presents the fundamental theories of concurrent computing and then introduces the programming languages that help develop distributed computing systems at a high level of abstraction. The major theories of concurrent computation—including the π-calculus, the actor model, the join calculus, and mobile ambients—are explained with a focus on how they help design and reason about distributed and mobile computing systems. The book then presents programming languages that follow the theoretical models already described, including Pict, SALSA, and JoCaml. The parallel structure of the chapters in both part one (theory) and part two (practice) enable the reader not only to compare the different theories but also to see clearly how a programming language supports a theoretical model. The book is unique in bridging the gap between the theory and the practice of programming distributed computing systems. It can be used as a textbook for graduate and advanced undergraduate students in computer science or as a reference for researchers in the area of programming technology for distributed computing. By presenting theory first, the book allows readers to focus on the essential components of concurrency, distribution, and mobility without getting bogged down in syntactic details of specific programming languages. Once the theory is understood, the practical part of implementing a system in an actual programming language becomes much easier.