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WAN FOKKINK


MIT Press

Distributed Algorithms An Intuitive Approach

**Paola Flocchini, Giuseppe
Prencipe, Nicola Santoro**



Distributed Algorithms An Intuitive Approach:

Distributed Algorithms Nancy A. Lynch, 1996-04-16 In *Distributed Algorithms* Nancy Lynch provides a blueprint for designing implementing and analyzing distributed algorithms She directs her book at a wide audience including students programmers system designers and researchers *Distributed Algorithms* contains the most significant algorithms and impossibility results in the area all in a simple automata theoretic setting The algorithms are proved correct and their complexity is analyzed according to precisely defined complexity measures The problems covered include resource allocation communication consensus among distributed processes data consistency deadlock detection leader election global snapshots and many others The material is organized according to the system model first by the timing model and then by the interprocess communication mechanism The material on system models is isolated in separate chapters for easy reference The presentation is completely rigorous yet is intuitive enough for immediate comprehension This book familiarizes readers with important problems algorithms and impossibility results in the area readers can then recognize the problems when they arise in practice apply the algorithms to solve them and use the impossibility results to determine whether problems are unsolvable The book also provides readers with the basic mathematical tools for designing new algorithms and proving new impossibility results In addition it teaches readers how to reason carefully about distributed algorithms to model them formally devise precise specifications for their required behavior prove their correctness and evaluate their performance with realistic measures

Distributed Algorithms, second edition Wan Fokkink, 2018-02-02 The new edition of a guide to distributed algorithms that emphasizes examples and exercises rather than the intricacies of mathematical models This book offers students and researchers a guide to distributed algorithms that emphasizes examples and exercises rather than the intricacies of mathematical models It avoids mathematical argumentation often a stumbling block for students teaching algorithmic thought rather than proofs and logic This approach allows the student to learn a large number of algorithms within a relatively short span of time Algorithms are explained through brief informal descriptions illuminating examples and practical exercises The examples and exercises allow readers to understand algorithms intuitively and from different perspectives Proof sketches arguing the correctness of an algorithm or explaining the idea behind fundamental results are also included The algorithms presented in the book are for the most part classics selected because they shed light on the algorithmic design of distributed systems or on key issues in distributed computing and concurrent programming This second edition has been substantially revised A new chapter on distributed transaction offers up to date treatment of database transactions and the important evolving area of transactional memory A new chapter on security discusses two exciting new topics blockchains and quantum cryptography Sections have been added that cover such subjects as rollback recovery fault tolerant termination detection and consensus for shared memory An appendix offers pseudocode descriptions of many algorithms Solutions and slides are available for instructors *Distributed Algorithms* can be used in courses for upper level

undergraduates or graduate students in computer science or as a reference for researchers in the field *Distributed Algorithms* Wan Fokkink, 2013-12-06 A comprehensive guide to distributed algorithms that emphasizes examples and exercises rather than mathematical argumentation **DISTRIBUTED ALGORITHMS AN INTUITIVE APPROACH.** FOKKINK., 2019 Formal Techniques for Distributed Objects, Components, and Systems Marieke Huisman, António Ravara, 2023-06-09 This book constitutes the refereed proceedings of the 43rd IFIP WG 6.1 International Conference on Formal Techniques for Distributed Objects Components and Systems FORTE 2023 held in Lisbon Portugal in June 2023 as part of the 18th International Federated Conference on Distributed Computing Techniques DisCoTec 2023 The 13 regular papers and 3 short papers presented in this book were carefully reviewed and selected from 26 submissions They cover topics such as concurrent programming security probabilities time and other resources and model based testing and petri nets A Journey from Process Algebra via Timed Automata to Model Learning Nils Jansen, Mariëlle Stoelinga, Petra van den Bos, 2022-09-06 This Festschrift dedicated to Frits W Vaandrager on the occasion of his 60th birthday contains papers written by many of his closest collaborators Frits has been a Professor of Informatics for Technical Applications at Radboud University Nijmegen since 1995 where his research focuses on formal methods concurrency theory verification model checking and automata learning The volume contains contributions of colleagues Ph D students and researchers with whom Frits has collaborated and inspired reflecting a wide spectrum of scientific interests and demonstrating successful work at the highest levels of both theory and practice Networked Systems Karima Echihabi, Roland Meyer, 2021-12-01 This book constitutes the revised selected papers of the 9th International Conference on Networked Systems NETYS 2021 held virtually in May 2021 The 15 revised full papers and 2 short papers presented were carefully reviewed and selected from 32 submissions The papers are organized in the following thematic blocks distributed systems blockchain and verification

Runtime Verification Jyotirmoy Deshmukh, Dejan Ničković, 2020-10-07 This book constitutes the refereed proceedings of the 20th International Conference on Runtime Verification RV 2020 held in Los Angeles CA USA in October 2020 The conference was held virtually due to the COVID 19 pandemic The 14 regular papers and 2 short papers presented in this book were carefully reviewed and selected from 43 submissions Also included are an invited paper 5 tutorial papers 6 tool papers and a benchmark paper The RV conference is concerned with all aspects of monitoring and analysis of hardware software and more general system executions The papers are organized in the following topical sections runtime verification for autonomy runtime verification for software runtime verification with temporal logic specifications stream based monitoring and runtime verification for cyber physical systems Handbook of Algorithms for Wireless Networking and Mobile Computing Azzedine Boukerche, 2005-11-28 The Handbook of Algorithms for Wireless Networking and Mobile Computing focuses on several aspects of mobile computing particularly algorithmic methods and distributed computing with mobile communications capability It provides the topics that are crucial for building the foundation for the design and

construction of future generations of mobile and wireless networks including cellular wireless ad hoc sensor and ubiquitous networks Following an analysis of fundamental algorithms and protocols the book offers a basic overview of wireless technologies and networks Other topics include issues related to mobility aspects of QoS provisioning in wireless networks future applications and much more

Stabilization, Safety, and Security of Distributed Systems Rachid Guerraoui, Franck Petit, 2009-11-04 This book constitutes the refereed proceedings of the 11th International Symposium on Stabilization Safety and Security of Distributed Systems SSS 2009 held in Lyon France in November 2009 The 49 revised full papers and 14 brief announcements presented together with three invited talks were carefully reviewed and selected from 126 submissions The papers address all safety and security related aspects of self stabilizing systems in various areas The most topics related to self systems The special topics were alternative systems and models autonomic computational science cloud computing embedded systems fault tolerance in distributed systems dependability formal methods in distributed systems grid computing mobility and dynamic networks multicore computing peer to peer systems self organizing systems sensor networks stabilization and system safety and security

Distributed Algorithms, 1997 **Distributed Computing by Mobile Entities** Paola Flocchini, Giuseppe Prencipe, Nicola Santoro, 2019-01-12 Distributed Computing by Mobile Entities is concerned with the study of the computational and complexity issues arising in systems of decentralized computational entities operating in a spatial universe Encompassing and modeling a large variety of application environments and systems from robotic swarms to networks of mobile sensors from software mobile agents in communication networks to crawlers and viruses on the web the theoretical research in this area intersects distributed computing with the fields of computational geometry especially for continuous spaces control theory graph theory and combinatorics especially for discrete spaces The research focus is on determining what tasks can be performed by the entities under what conditions and at what cost In particular the central question is to determine what minimal hypotheses allow a given problem to be solved This book is based on the lectures and tutorial presented at the research meeting on Moving and Computing mac held at La Maddalena Island in June 2017 Greatly expanded revised and updated each of the lectures forms an individual Chapter Together they provide a map of the current knowledge about the boundaries of distributed computing by mobile entities

CONCUR ..., 1995 **Introduction to Distributed Algorithms** Gerard Tel, 2000-09-28 Distributed algorithms have been the subject of intense development over the last twenty years The second edition of this successful textbook provides an up to date introduction both to the topic and to the theory behind the algorithms The clear presentation makes the book suitable for advanced undergraduate or graduate courses whilst the coverage is sufficiently deep to make it useful for practising engineers and researchers The author concentrates on algorithms for the point to point message passing model and includes algorithms for the implementation of computer communication networks Other key areas discussed are algorithms for the control of distributed applications wave broadcast

election termination detection randomized algorithms for anonymous networks snapshots deadlock detection synchronous systems and fault tolerance achievable by distributed algorithms The two new chapters on sense of direction and failure detectors are state of the art and will provide an entry to research in these still developing topics Design and Analysis of Distributed Algorithms Nicola Santoro,2006-12-13 This text is based on a simple and fully reactive computational model that allows for intuitive comprehension and logical designs The principles and techniques presented can be applied to any distributed computing environment e g distributed systems communication networks data networks grid networks internet etc The text provides a wealth of unique material for learning how to design algorithms and protocols perform tasks efficiently in a distributed computing environment Application and Theory of Petri Nets ,1999 *Proceedings* ,1998

Proceedings of the ... Annual ACM Symposium on Principles of Distributed Computing ,2005 **Elements of Distributed Algorithms** Wolfgang Reisig,1998-08-20 Distributed Computing is rapidly becoming the principal computing paradigm in diverse areas of computing communication and control Processor clusters local and wide area networks and the information highway evolved a new kind of problems which can be solved with distributed algorithms In this textbook a variety of distributed algorithms are presented independently of particular programming languages or hardware using the graphically suggestive technique of Petri nets which is both easy to comprehend intuitively and formally rigorous By means of temporal logic the author provides surprisingly simple yet powerful correctness proofs for the algorithms The scope of the book ranges from distributed control and synchronization of two sites up to algorithms on any kind of networks Numerous examples show that description and analysis of distributed algorithms in this framework are intuitive and technically transparent *Databases in Networked Information Systems* ,2005

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