Synchronization Algorithms And Concurrent Programming

Synchronization Algorithms and Concurrent ProgrammingAlgorithms for Concurrent SystemsAlgorithms for Concurrent SystemsAlgorithms, Concurrency and KnowledgeConcurrent Programming: Algorithms, Principles, and FoundationsParallel AlgorithmsConcurrent ComputationsThe Art of ConcurrencyAutomated Verification of Concurrent Search StructuresParallel and Distributed Programming Using C++Algorithms and Data StructuresPrinciples of Concurrent and Distributed ProgrammingIntroduction to Concurrency in Programming LanguagesAdvances in Parallel and Vector Processing for Structural MechanicsAdvances in ComputersNew Parallel Algorithms for Direct Solution of Linear EquationsProceedings of the 1983 International Conference on Parallel ProcessingConcurrent Programming on WindowsPartial-Order Methods for the Verification of Concurrent SystemsLogic Programming and Its Applications Gadi Taubenfeld Rachid Guerraoui Rachid Guerraoui Kanchana Kanchanasut Michel Raynal Sandeep Nautam Bhatt Stuart K. Tewksbury Clay Breshears Siddharth Krishna Cameron Hughes M. Ben-Ari Matthew J. Sottile B. H. V. Topping C. Siva Ram Murthy Howard Jay Siegel Joe Duffy Patrice Godefroid Michel van Caneghem

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the first textbook that focuses purely on synchronization a fundamental challenge in computer science that is fast becoming a major performance and design issue for concurrent programming on modern architectures and for the design of distributed systems

this volume constitutes the refereed proceedings of the 1995 asian computing science conference acsc 95 held in pathumthani thailand in december 1995 the 29 fully revised papers presented were selected from a total of 102 submissions clearly the majority of the participating researchers come from south east asian countries but there is also a strong international component the volume reflects research activities particularly by asian computer science researchers in different areas special attention is paid to algorithms knowledge representation programming and specification languages verification concurrency networking and distributed systems and databases

the advent of new architectures and computing platforms means that synchronization and concurrent computing are among the most important topics in computing science concurrent programs are made up of cooperating entities processors processes agents peers sensors and synchronization is the set of concepts rules and mechanisms that allow them to coordinate their local computations in order to realize a common task 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

this volume is the result of the third dimacs implementation challenge that was conducted as part of the 1993 94 special year on parallel algorithms the implementation challenge was formulated in order to provide a forum for a concerted effort to study effective algorithms for combinatorial problems and to investigate opportunities for massive speed ups on parallel computers the challenge invluded two problem areas for research study tree searching algorithms used in game search and combinatorial optimization for example and algorithms for sparse graphs participants at sites in the us and europe undertook projects from november 1993 through october 1994 the workshop was held at dimacs in november 1994 participants were encouraged to share test results to rework their implementations considering feedback at the workshop and to submit a final report for the proceedings nine papers were selected for this volume

the 1987 princeton workshop on algorithm architecture and technology issues for models of concurrent computation was organized as an interdisciplinary work shop emphasizing current research directions toward concurrent computing systems with participants from several different fields of specialization the workshop cov ered a wide variety of topics though by no means a complete cross section of issues in this rapidly moving field the papers included in this book were prepared for the workshop and taken together provide a view of the broad range of issues and alternative directions being explored to organize the various papers the book has been divided into five parts part i considers new technology directions part ii emphasizes underlying theoretical issues communication issues which are ad dressed in the majority of papers are specifically highlighted in part iii part iv includes papers stressing the fault tolerance and reliability of systems finally part v includes systems oriented papers where the system ranges from vlsi circuits through powerful parallel computers much of the initial planning of the workshop was completed through an informal at t bell laboratories group consisting of mehdi hatamian vijay kumar adri aan ligtenberg sailesh rao p subrahmanyam and myself we are grateful to stuart schwartz both for the support of princeton university and for his orga nizing local arrangements for the workshop and to the members of the organizing committee whose recommendations for participants and discussion topics were par ticularly helpful a rosenberg and a t

if you re looking to take full advantage of multi core processors with concurrent

programming this practical book provides the knowledge and hands on experience you need the art of concurrency is one of the few resources to focus on implementing algorithms in the shared memory model of multi core processors rather than just theoretical models or distributed memory architectures the book provides detailed explanations and usable samples to help you transform algorithms from serial to parallel code along with advice and analysis for avoiding mistakes that programmers typically make when first attempting these computations written by an intel engineer with over two decades of parallel and concurrent programming experience this book will help you understand parallelism and concurrency explore differences between programming for shared memory and distributed memory learn guidelines for designing multithreaded applications including testing and tuning discover how to make best use of different threading libraries including windows threads posix threads openmp and intel threading building blocks explore how to implement concurrent algorithms that involve sorting searching graphs and other practical computations the art of concurrency shows you how to keep algorithms scalable to take advantage of new processors with even more cores for developing parallel code algorithms for concurrent programming this book is a must

search structures support the fundamental data storage primitives on key value pairs insert a pair delete by key search by key and update the value associated with a key concurrent search structures are parallel algorithms to speed access to search structures on multicore and distributed servers these sophisticated algorithms perform fine grained synchronization between threads making them notoriously difficult to design correctly indeed bugs have been found both in actual implementations and in the designs proposed by experts in peer reviewed publications the rapid development and deployment of these concurrent algorithms has resulted in a rift between the algorithms that can be verified by the state of the art techniques and those being developed and used today the goal of this book is to show how to bridge this gap in order to bring the certified safety of formal verification to high performance concurrent search structures similar techniques and frameworks can be applied to concurrent graph and network algorithms beyond search structures

this text takes complicated and almost unapproachable parallel programming techniques and presents them in a simple understandable manner it covers the fundamentals of programming for distributed environments like internets and intranets as well as the topic of based agents

principles of concurrent and distributed programming provides an introduction to concurrent programming focusing on general principles and not on specific systems

software today is inherently concurrent or distributed from event based gui designs to operating and real time systems to internet applications this edition is an introduction to concurrency and examines the growing importance of concurrency constructs embedded in programming languages and of formal methods such as model checking

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 the book describes the historical development of current programming languages and the common threads that exist among them it also contains several chapters on design patterns for parallel programming and includes quick reference guides to openmp erlang and cilk ancillary materials are available on the book s website

includes a selection of papers that were presented at the second international conference on computational structures technology held in athens greece from 30 august 1 september 1994

advances in computers

rather than parallelizing sequential algorithms the authors develop new back substitution free parallel algorithms using a bidirectional elimination technique for the solution of both dense and sparse linear equations they provide full coverage of bidirectional parallel algorithms based on gaussian elimination lu factorization householder reductions and modified gram schmidt orthogonalization givens rotations sparse cholesky factorization and sparse factorization clearly demonstrating how the bidirectional approach allows for improved speedup numerical stability and efficient implementation on multiprocessor systems plus the book offers a useful survey of the vast literature on direct methods introductory material on solving systems of linear equations and exercises it is an invaluable resource for computer scientists researchers in parallel linear algebra and anyone with an interest in parallel programming book jacket

when you begin using multi threading throughout an application the importance of clean architecture and design is critical this places an emphasis on understanding not only the platform s capabilities but also emerging best practices joe does a great job interspersing best practices alongside theory throughout his book from the foreword by craig mundie chief research and strategy officer microsoft corporation author joe duffy

has risen to the challenge of explaining how to write software that takes full advantage of concurrency and hardware parallelism in concurrent programming on windows he explains how to design implement and maintain large scale concurrent programs primarily using c and c for windows duffy aims to give application system and library developers the tools and techniques needed to write efficient safe code for multicore processors this is important not only for the kinds of problems where concurrency is inherent and easily exploitable such as server applications compute intensive image manipulation financial analysis simulations and ai algorithms but also for problems that can be speeded up using parallelism but require more effort such as math libraries sort routines report generation xml manipulation and stream processing algorithms concurrent programming on windows has four major sections the first introduces concurrency at a high level followed by a section that focuses on the fundamental platform features inner workings and api details next there is a section that describes common patterns best practices algorithms and data structures that emerge while writing concurrent software the final section covers many of the common system wide architectural and process concerns of concurrent programming this is the only book you ll need in order to learn the best practices and common patterns for programming with concurrency on windows and net

this monograph is a revised version of the author s ph d thesis submitted to the university of li□ge belgium with pierre wolper as thesis advisor the general pattern of this work is to turn logical and semantic ideas into exploitable algorithms thus it perfectly fits the modern trend viewing verification as a computer aided activity and as algorithmic as possible not as a paper and pencil one dealing exclusively with semantic and logical issues patrice godefroid uses state space exploration as the key technique which as such or elaborated into model checking is attracting growing attention for the verification of concurrent systems for most realistic examples the methods presented provide a significant reduction of memory and time requirements for protocol verification

logic programming is an emerging approach to computer science where programs are viewed as sets of logical axioms and computation is viewed as carefully controlled logical deduction the approach currently finds practical realization in the programming language prolog this volume contains details of research in the field with a special emphasis on applications including expert systems natural language parsing and analysis database management and knowledge acquisition circuit analysis and hardware verification

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