

Pthreads Programming

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Scientific Programming and Computer Architecture Pearson Education

This book covers the basic concepts and principles of operating systems, showing how to apply them to the design and implementation of complete operating systems for embedded and real-time systems. It includes all the foundational and background information on ARM architecture, ARM instructions and programming, toolchain for developing programs, virtual machines for software implementation and testing, program execution image, function call conventions, run-time stack usage and link C programs with assembly code. It describes the design and implementation of a complete OS for embedded systems in incremental steps, explaining the design principles and implementation techniques. For Symmetric Multiprocessing (SMP) embedded systems, the author examines the ARM MPCore processors, which include the SCU and GIC for interrupts routing and interprocessor communication and synchronization by Software Generated Interrupts (SGIs). Throughout the book, complete working sample systems demonstrate the design principles and implementation techniques. The content is suitable for advanced-level and graduate students working in software engineering, programming, and systems theory.

Programming Embedded Systems in C and C++ World Scientific

Shared Memory Application Programming presents the key concepts and applications of parallel programming, in an accessible and engaging style applicable to developers across many domains. Multithreaded programming is today a core technology, at the basis of all software development projects in any branch of applied computer science. This book guides readers to develop insights about threaded programming and introduces two popular platforms for multicore development: OpenMP and Intel Threading Building Blocks (TBB). Author Victor Alessandrini leverages his rich experience to explain each platform's design strategies, analyzing the focus and strengths underlying their often complementary capabilities, as well as their interoperability. The book is divided into two parts: the first develops the essential concepts of thread management and synchronization, discussing the way they are implemented in native multithreading libraries (Windows threads, Pthreads) as well as in the modern C++11 threads standard. The second provides an in-depth discussion of TBB and OpenMP including the latest features in OpenMP 4.0 extensions to ensure readers' skills are fully up to date. Focus progressively shifts from traditional thread parallelism to modern task parallelism deployed by modern programming environments.

Several chapters include examples drawn from a variety of disciplines, including molecular dynamics and image processing, with full source code and a software library incorporating a number of utilities that readers can adapt into their own projects. Designed to introduce threading and multicore programming to teach modern coding strategies for developers in applied computing Leverages author Victor Alessandrini's rich experience to explain each platform's design strategies, analyzing the focus and strengths underlying their often complementary capabilities, as well as their interoperability Includes complete, up-to-date discussions of OpenMP 4.0 and TBB Based on the author's training sessions, including information on source code and software libraries which can be repurposed

Unix-Netzwerkprogrammierung mit Threads, Sockets und SSL Morgan Kaufmann

Today, parallel computing experts can solve problems previously deemed impossible and make the "merely difficult" problems economically feasible to solve. This book presents and synthesizes the recent experiences of renowned expert developers who design robust and complex parallel computing applications. They demonstrate how to adapt and implement today's most advanced, most effective parallel computing techniques. The book begins with a highly focused introductory course designed to provide a working knowledge of all the relevant architectures, programming models, and performance issues, as well as the basic approaches to assessment, optimization, scheduling, and debugging. Next comes a series of seventeen detailed case studies all dealing with production-quality industrial and scientific applications, all presented firsthand by the actual code developers. Each chapter follows the same comparison-inviting format, presenting lessons learned and algorithms developed in the course of meeting real, non-academic challenges. A final section highlights the case studies' most important insights and turns an eye to the future of the discipline. * Provides in-depth case studies of seventeen parallel computing applications, some built from scratch, others developed through parallelizing existing applications. * Explains elements critical to all parallel programming environments, including: ** Terminology and architectures ** Programming models and methods ** Performance analysis and debugging tools * Teaches primarily by example, showing how scientists in many fields have solved daunting problems using parallel computing. * Covers a wide range of application areas biology, aerospace, semiconductor design, environmental modeling, data imaging and analysis, fluid dynamics, and more. * Summarizes the state of the art while looking to the future of parallel computing. Presents technical animations and visualizations from many of the applications detailed in the case studies via a companion web site.

Multithreaded Programming with Pthreads Springer

Covering all the essential components of Unix/Linux, including process management, concurrent programming, timer and time service, file systems and network programming, this textbook emphasizes programming practice in the Unix/Linux environment. Systems Programming in Unix/Linux is intended as a textbook for systems programming courses in technically-oriented Computer Science/Engineering curricula that emphasize both theory and programming practice. The book contains many detailed working example programs with complete source code. It is also suitable for self-study by advanced programmers and computer enthusiasts. Systems programming is an indispensable part of Computer Science/Engineering education. After taking an introductory programming course, this book is meant to further knowledge by detailing how dynamic data structures are used in practice, using programming exercises and programming projects on such topics as C structures, pointers, link lists and trees. This book provides a wide range of knowledge about computer system software and advanced programming skills, allowing readers to interface with operating system kernel, make efficient use of system resources and develop application software. It also prepares readers with the needed background to pursue advanced studies in Computer Science/Engineering, such as operating systems, embedded systems, database systems, data mining, artificial intelligence, computer networks, network security, distributed and parallel computing.

Hands-On System Programming with Linux Morgan Kaufmann

Offering comprehensive coverage of the convergence of real-time embedded systems scheduling, resource access control, software design and development, and high-level system modeling, analysis and verification Following an introductory overview, Dr. Wang delves into the specifics of hardware components, including processors, memory, I/O devices and architectures, communication structures, peripherals, and characteristics of real-time operating systems. Later chapters are dedicated to real-time task scheduling algorithms and resource access control policies, as well as priority-inversion control and deadlock avoidance. Concurrent system programming and POSIX programming for real-time systems are covered, as are finite state machines and Time Petri nets. Of special interest to software engineers will be the chapter devoted to model checking, in which the author discusses temporal logic and the NuSMV model checking tool, as well as a chapter treating real-time software design with UML. The final portion of the book explores practical issues of software reliability, aging, rejuvenation, security, safety, and power management. In addition, the book: Explains real-time embedded software modeling and design with finite state machines, Petri nets, and UML, and real-time constraints verification with the model

checking tool, NuSMV Features real-world examples in finite state machines, model checking, real-time system design with UML, and more Covers embedded computer programming, designing for reliability, and designing for safety Explains how to make engineering trade-offs of power use and performance Investigates practical issues concerning software reliability, aging, rejuvenation, security, and power management Real-Time Embedded Systems is a valuable resource for those responsible for real-time and embedded software design, development, and management. It is also an excellent textbook for graduate courses in computer engineering, computer science, information technology, and software engineering on embedded and real-time software systems, and for undergraduate computer and software engineering courses.

UNIX Systems Programming John Wiley & Sons

Multicore-Prozessoren mit zwei oder mehreren Prozessorkernen erhöhen die Leistungsfähigkeit aller Computer immens. Doch nur spezielle Techniken gewährleisten die tatsächlich schnellere Programmabarbeitung und optimale Nutzung dieser Leistungsfähigkeit. Die Autoren zeigen hier erstmals, wie Software-Entwickler parallele Programme mittels Software-Threads zur schnellen Ausführung auf Multicore-Prozessoren erstellen. Umfassend erläutern sie alle Aspekte des Themas: parallele Programmiermodelle, Konzepte der Thread-Programmierung, die Programmierumgebungen Pthreads, Java-Threads und OpenMP sowie Sprachkonstrukte und neuere Programmieransätze.

OpenMP Shared Memory Parallel Programming Springer

Practical Programming in the Cell Broadband Engine offers a unique programming guide for the Cell Broadband Engine, demonstrating a large number of real-life programs to identify and solve problems in engineering, logic design, VLSI CAD, number-theory, graph-theory, computational geometry, image processing, and other subjects. Key features include: Numerous diagrams, mnemonics, tables, charts, code samples for making program development on the CBE as accessible as possible Comprehensive reading list for introductory material to the subject matter A website providing all source codes and sample-data for examples presented in this text.

Supercomputer '93 McGraw-Hill Companies

This book is about writing software that makes the most effective use of the system you're running on -- code that interfaces directly with the kernel and core system libraries, including the shell, text editor, compiler, debugger, core utilities, and system daemons. The majority of both Unix and Linux code is still written at the system level, and Linux System Programming focuses on everything above the kernel, where applications such as Apache, bash, cp, vim, Emacs, gcc, gdb, glibc, ls, mv, and X exist. Written primarily for engineers looking to program (better) at the low level, this book is an ideal teaching tool for any programmer. Even with the trend toward high-level development, either through web software (such as PHP) or managed code (C#), someone still has to write the PHP interpreter and the C# virtual machine. Linux System Programming gives you an understanding of core internals that makes for better code, no matter where it appears in the stack. Debugging high-level code often requires you to understand the system calls and kernel behavior of your operating system, too. Key topics include: An overview of Linux, the kernel, the C library, and the C compiler Reading from and writing to files, along with other basic file I/O operations, including how the Linux kernel implements and manages file I/O Buffer size management, including the Standard I/O library Advanced I/O interfaces, memory mappings, and optimization techniques The family of system calls for basic process management Advanced process management, including real-time processes File and directories-creating, moving, copying, deleting, and managing them Memory management -- interfaces for allocating memory, managing the memory you have, and optimizing your memory access Signals and their role on a Unix system, plus basic and advanced signal interfaces Time, sleeping, and clock management, starting with the basics and continuing through POSIX clocks and high resolution timers With Linux System Programming, you will be able to take an in-depth look at Linux from both a theoretical and an applied perspective as you cover a wide range of programming topics.

Linux System Programming Springer Science & Business Media

Particularly helpful for C programmers working with such platforms as UNIX, Windows NT, Windows 95, OS/2, and NextStep, this book has many unique features, including the first detailed look at SMP (symmetrical multiprocessing) and its role in successful parallel processing. Numerous illustrative examples are included throughout.

POSIX Programmers Guide Packt Publishing Ltd

This is an introductory book on supercomputer applications written by a researcher who is working on solving scientific and engineering application problems on parallel computers. The book is intended to quickly bring researchers and graduate students working on numerical solutions of partial differential equations with various applications into the area of parallel processing. The book starts from the basic concepts of parallel processing, like speedup, efficiency and different parallel architectures, then

introduces the most frequently used algorithms for solving PDEs on parallel computers, with practical examples. Finally, it discusses more advanced topics, including different scalability metrics, parallel time stepping algorithms and new architectures and heterogeneous computing networks which have emerged in the last few years of high performance computing. Hundreds of references are also included in the book to direct interested readers to more detailed and in-depth discussions of specific topics.

The OpenMP Common Core Universitätsverlag Potsdam

OpenMP ist ein weit verbreiteter de-facto-Standard für High-Level Shared-Memory-Programmierung, der für viele Plattformen zur Verfügung steht (u.a. Linux und Microsoft Windows). Das Programmiermodell von OpenMP ermöglicht einen einfachen und flexiblen Ansatz zur Entwicklung paralleler Applikationen unter FORTRAN, C und C++. Open MP wird von den meisten High-performance Compiler- und Hardwareherstellern unterstützt. Das Buch stellt Open MP ausführlich vor und zeigt die Implementierung paralleler C/C++ Algorithmen anhand zahlreicher Beispiele.

OpenMP MIT Press

This book provides embedded software developers with techniques for programming heterogeneous Multi-Processor Systems-on-Chip (MPSoCs), capable of executing multiple applications simultaneously. It describes a set of algorithms and methodologies to narrow the software productivity gap, as well as an in-depth description of the underlying problems and challenges of today's programming practices. The authors present four different tool flows: A parallelism extraction flow for applications written using the C programming language, a mapping and scheduling flow for parallel applications, a special mapping flow for baseband applications in the context of Software Defined Radio (SDR) and a final flow for analyzing multiple applications at design time. The tool flows are evaluated on Virtual Platforms (VPs), which mimic different characteristics of state-of-the-art heterogeneous MPSoCs.

Practical Computing on the Cell Broadband Engine MIT

Press

Master the essentials of concurrent programming, including testing and debugging This textbook examines languages and libraries for multithreaded programming. Readers learn how to create threads in Java and C++, and develop essential concurrent programming and problem-solving skills. Moreover, the textbook sets itself apart from other comparable works by helping readers to become proficient in key testing and debugging techniques. Among the topics covered, readers are introduced to the relevant aspects of Java, the POSIX Pthreads library, and the Windows Win32 Applications Programming Interface. The authors have developed and fine-tuned this book through the concurrent programming courses they have taught for the past twenty years. The material, which emphasizes practical tools and techniques to solve concurrent programming problems, includes original results from the authors' research. Chapters include: * Introduction to concurrent programming * The critical section problem * Semaphores and locks * Monitors * Message-passing * Message-passing in distributed programs * Testing and debugging concurrent programs As an aid to both students and instructors, class libraries have been implemented to provide working examples of all the material that is covered. These libraries and the testing techniques they support can be used to assess student-written programs. Each chapter includes exercises that build skills in program writing and help ensure that readers have mastered the chapter's key concepts. The source code for all the listings in the text and for the synchronization libraries is also provided, as well as startup files and test cases for the exercises. This textbook is designed for upper-level undergraduates and graduate students in computer science. With its abundance of practical material and inclusion of working code, coupled with an emphasis on testing and debugging, it is also a highly useful reference for practicing programmers.

Parallele und verteilte Programmierung Springer Nature

A primer for C programmers transitioning to C++ and designed to get users up to speed quickly, this book tells users just what they need to learn first. Covering a subset of the features of C++, the user can actually use this subset to get familiar with the basics of the language. The book includes sidebars that give overviews of advanced features not covered.

Parallel Programming Carl Hanser Verlag GmbH Co KG

An Introduction to Parallel Programming, Second Edition presents a tried-and-true tutorial approach that shows students how to develop effective parallel programs with MPI, Pthreads and OpenMP. As the first undergraduate text to directly address compiling and running parallel programs on multi-core and cluster architecture, this second edition carries forward its clear explanations for designing, debugging and evaluating the performance of distributed and shared-memory programs while adding coverage of accelerators via new content on GPU programming and heterogeneous programming. New and improved user-friendly exercises teach students how to compile, run and modify example programs. Takes a tutorial approach,

starting with small programming examples and building progressively to more challenging examples Explains how to develop parallel programs using MPI, Pthreads and OpenMP programming models A robust package of online ancillaries for instructors and students includes lecture slides, solutions manual, downloadable source code, and an image bank New to this edition: New chapters on GPU programming and heterogeneous programming New examples and exercises related to parallel algorithms

Systems Programming in Unix/Linux Springer-Verlag

Das Buch behandelt die praktischen Aspekte paralleler und verteilter Programmierung und stellt die zugrundeliegenden Konzepte in angemessener Tiefe dar. Wesentlich ist dabei das Zusammenspiel der parallelen Eigenschaften des jeweiligen Anwendungsproblems, der Programmierumgebung und der Architektur des Parallelrechners. Dementsprechend werden in den einzelnen Kapiteln die unterschiedlichen Typen von Parallelrechnern und parallelen Plattformen betrachtet, ein Überblick über parallele Programmierumgebungen gegeben und Charakteristika wichtiger Anwendungsalgorithmen beschrieben. Breiten Raum nehmen die Darstellung und der Vergleich portabler Programmierplattformen wie PVM und MPI ein. Das Buch enthält insbesondere einen genauen Effizienzvergleich dieser Plattformen für viele aktuelle Parallelrechner und diskutiert die Anwendung auf Probleme, die für die Praxis der Natur- und Ingenieurwissenschaften sowie des wissenschaftlichen Rechnens relevant sind.

Solving Partial Differential Equations on Parallel Computers

Prentice Hall Professional

High-Performance Computing (HPC) delivers higher computational performance to solve problems in science, engineering and finance. There are various HPC resources available for different needs, ranging from cloud computing - that can be used without much expertise and expense - to more tailored hardware, such as Field-Programmable Gate Arrays (FPGAs) or D-Wave's quantum computer systems. High-Performance Computing in Finance is the first book that provides a state-of-the-art introduction to HPC for finance, capturing both academically and practically relevant problems.

Programming the Cell Processor Springer-Verlag

How to become a parallel programmer by learning the twenty-one essential components of OpenMP. This book guides readers through the most essential elements of OpenMP—the twenty-one components that most OpenMP programmers use most of the time, known collectively as the “OpenMP Common Core.” Once they have mastered these components, readers with no prior experience writing parallel code will be effective parallel programmers, ready to take on more complex aspects of OpenMP. The authors, drawing on twenty years of experience in teaching OpenMP, introduce material in discrete chunks ordered to support effective learning. OpenMP was created in 1997 to make it as simple as possible for applications programmers to write parallel code; since then, it has grown into a huge and complex system. The OpenMP Common Core goes back to basics, capturing the inherent simplicity of OpenMP. After introducing the fundamental concepts of parallel computing and history of OpenMP's development, the book covers topics including the core design pattern of parallel computing, the parallel and worksharing-loop constructs, the OpenMP data environment, and tasks. Two chapters on the OpenMP memory model are uniquely valuable for their pedagogic approach. The key for readers is to work through the material, use an OpenMP-enabled compiler, and write programs to experiment with each OpenMP directive or API routine as it is introduced. The book's website, updated continuously, offers a wide assortment of programs and exercises.

Parallele Programmierung Springer-Verlag

Die Automatisierung technischer Prozesse - zusammengefasst im Taschenbuch Für Studierende, Ingenieure und Techniker -Das Taschenbuch deckt sowohl die klassischen Wissensgebiete als auch die neuesten Methoden und Werkzeuge ab - Das Wissen wird kompakt und strukturiert vermittelt - Zahlreiche Aktualisierungen und Überarbeitungen der einzelnen Kapitel bringen den Leser auf den neuesten Stand Das moderne Kompendium ist bestens geeignet für die Prüfungsvorbereitung und bei Klausuren, aber auch für das schnelle Nachschlagen von Fachbegriffen, Normen und Standards.

Sockets, Shellcode, Porting, and Coding: Reverse Engineering

Exploits and Tool Coding for Security Professionals Springer

Science & Business Media

This book constitutes the thoroughly refereed post-workshop proceedings of the First and the Second International Workshop on OpenMP, IWOMP 2005 and IWOMP 2006, held in Eugene, OR, USA, and in Reims, France, in June 2005 and 2006 respectively. The first part of the book presents 16 revised full papers carefully reviewed and selected from the IWOMP 2005 program and organized in topical sections on performance tools, compiler technology, run-time environment, applications, as well as the OpenMP language and its evaluation. In the second part there are 19 papers of IWOMP 2006, fully revised and grouped thematically in sections on advanced performance tuning aspects of code development applications, and proposed extensions to OpenMP.

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