

Unix System Programming Using C

Software -- Operating Systems.

The Art of UNIX Programming poses the belief that understanding the unwritten UNIX engineering tradition and mastering its design patterns will help programmers of all stripes to become better programmers. This book attempts to capture the engineering wisdom and design philosophy of the UNIX, Linux, and Open Source software development community as it has evolved over the past three decades, and as it is applied today by the most experienced programmers. Eric Raymond offers the next generation of "hackers" the unique opportunity to learn the connection between UNIX philosophy and practice through careful case studies of the very best UNIX/Linux programs.

Push the limits of what C - and you - can do, with this high-intensity guide to the most advanced capabilities of C Key Features Make the most of C's low-level control, flexibility, and high performance A comprehensive guide to C's most powerful and challenging features A thought-provoking guide packed with hands-on exercises and examples Book Description There's a lot more to C than knowing the language syntax. The industry looks for developers with a rigorous, scientific understanding of the principles and practices. Extreme C will teach you to use C's advanced low-level power to write effective, efficient systems. This intensive, practical guide will help you become an expert C programmer. Building on your existing C knowledge, you will master preprocessor directives, macros, conditional compilation, pointers, and much more. You will gain new insight into algorithm design, functions, and structures. You will discover how C helps you squeeze maximum performance out of critical, resource-constrained applications. C still plays a critical role in 21st-century programming, remaining the core language for precision engineering, aviations, space research, and more. This book shows how C works with Unix, how to implement OO principles in C, and fully covers multi-processing. In Extreme C, Amini encourages you to think, question, apply, and experiment for yourself. The book is essential for anybody who wants to take their C to the next level. What you will learn Build advanced C knowledge on strong foundations, rooted in first principles Understand memory structures and compilation pipeline and how they work, and how to make most out of them Apply object-oriented design principles to your procedural C code Write low-level code that's close to the hardware and squeezes maximum performance out of a computer system Master concurrency, multithreading, multi-processing, and integration with other languages Unit Testing and debugging, build systems, and inter-process communication for C programming Who this book is for Extreme C is for C programmers who want to dig deep into the language and its capabilities. It will help you make the most of the low-level control C gives you. This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. Beginning computing students often finish the introduction to programming course without having had exposure to various system tools, without knowing how to optimize program performance and without understanding how programs interact with the larger computer system. Adam Hoover's System Programming with C and Unix introduces students to commonly used system tools (libraries, debuggers, system calls, shells and scripting languages) and then explains how to utilize these tools to optimize program development. The text also examines lower level data types with an emphasis on memory and understanding how and why different data types are used. 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.

Your programming advisor for UNIX performance! This tutorial and reference introduces C programmers to programming with the UNIX operating system. Contains tips and notes to help readers add power to their programming.

This book teaches systems programming with the latest versions of C through a set of practical examples and problems. It covers the development of a handful of programs, implementing efficient coding examples. Practical Systems Programming with C contains three main parts: getting your hands dirty with C programming; practical systems programming using concepts such as processes, signals, and inter-process communication; and advanced socket-based programming which consists of developing a network application for reliable communication. You will be introduced to a marvelous ecosystem of systems programming with C, from handling basic system utility commands to communicating through socket programming. With the help of socket programming you will be able to build client-server applications in no time. The "secret sauce" of this book is its curated list of topics and solutions, which fit together through a set of different pragmatic examples; each topic is covered from scratch in an easy-to-learn way. On that journey, you'll focus on practical implementations and an outline of best practices and potential pitfalls. The book also includes a bonus chapter with a list of advanced topics and directions to grow your skills. What You Will Learn Program with operating systems using the latest version of C Work with Linux Carry out multithreading with C Examine the POSIX standard Work with files, directories, processes, and signals Explore IPC and how to work with it Who This Book Is For Programmers who have an exposure to C programming and want to learn systems programming. This book will help them to learn about core concepts of operating systems with the help of C programming. .

If you think "Modern" and "C" don't belong in the same sentence, think again. The C standards committee actively reviews and extends the language, with updated published C standards as recently as 2018. In Modern C, author Jens Gustedt teaches you the skills and features you need to write relevant programs in this tried-and-true language, including Linux and Windows, device drivers, web servers and browsers, smartphones, and much more! Modern C teaches you to take your C programming skills to new heights, whether you're just starting out with C or have more extensive experience. Organized by level, this comprehensive guide lets you jump in where it suits you best while still reaping the maximum benefits. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications.

This text concentrates on the programming interface that exists between the UNIX kernel and applications software that runs in the UNIX environment - the UNIX system call interface. The techniques required by systems programmers are developed in depth and illustrated by a wealth of examples.

This practical guide contains a detailed set of C standards and UNIX system comparisons for the construction of highly portable software. Professionals will learn the underlying causes of portability problems as well as the techniques for creating portable UNIX system software. It shortens the software development and test cycle and enables the user to reduce the cost of long-term support.

Explore the fundamentals of systems programming starting from kernel API and filesystem to network programming and process

communications Key Features Learn how to write Unix and Linux system code in Golang v1.12 Perform inter-process communication using pipes, message queues, shared memory, and semaphores Explore modern Go features such as goroutines and channels that facilitate systems programming Book Description System software and applications were largely created using low-level languages such as C or C++. Go is a modern language that combines simplicity, concurrency, and performance, making it a good alternative for building system applications for Linux and macOS. This Go book introduces Unix and systems programming to help you understand the components the OS has to offer, ranging from the kernel API to the filesystem, and familiarize yourself with Go and its specifications. You'll also learn how to optimize input and output operations with files and streams of data, which are useful tools in building pseudo terminal applications. You'll gain insights into how processes communicate with each other, and learn about processes and daemon control using signals, pipes, and exit codes. This book will also enable you to understand how to use network communication using various protocols, including TCP and HTTP. As you advance, you'll focus on Go's best feature-concurrency helping you handle communication with channels and goroutines, other concurrency tools to synchronize shared resources, and the context package to write elegant applications. By the end of this book, you will have learned how to build concurrent system applications using Go What you will learn Explore concepts of system programming using Go and concurrency Gain insights into Golang's internals, memory models and allocation Familiarize yourself with the filesystem and IO streams in general Handle and control processes and daemons' lifetime via signals and pipes Communicate with other applications effectively using a network Use various encoding formats to serialize complex data structures Become well-versed in concurrency with channels, goroutines, and sync Use concurrency patterns to build robust and performant system applications Who this book is for If you are a developer who wants to learn system programming with Go, this book is for you. Although no knowledge of Unix and Linux system programming is necessary, intermediate knowledge of Go will help you understand the concepts covered in the book

Provides the nitty gritty details on how UNIX interacts with applications. Includes many extended examples on topics ranging from string manipulation to network programming

Using C on the UNIX System A Guide to System Programming O'Reilly & Associates Incorporated

Find solutions to all your problems related to Linux system programming using practical recipes for developing your own system programs Key Features Develop a deeper understanding of how Linux system programming works Gain hands-on experience of working with different Linux projects with the help of practical examples Learn how to develop your own programs for Linux Book Description Linux is the world's most popular open source operating system (OS). Linux System Programming Techniques will enable you to extend the Linux OS with your own system programs and communicate with other programs on the system. The book begins by exploring the Linux filesystem, its basic commands, built-in manual pages, the GNU compiler collection (GCC), and Linux system calls. You'll then discover how to handle errors in your programs and will learn to catch errors and print relevant information about them. The book takes you through multiple recipes on how to read and write files on the system, using both streams and file descriptors. As you advance, you'll delve into forking, creating zombie processes, and daemons, along with recipes on how to handle daemons using systemd. After this, you'll find out how to create shared libraries and start exploring different types of interprocess communication (IPC). In the later chapters, recipes on how to write programs using POSIX threads and how to debug your programs using the GNU debugger (GDB) and Valgrind will also be covered. By the end of this Linux book, you will be able to develop your own system programs for Linux, including daemons, tools, clients, and filters. What you will learn Discover how to write programs for the Linux system using a wide variety of system calls Delve into the working of POSIX functions Understand and use key concepts such as signals, pipes, IPC, and process management Find out how to integrate programs with a Linux system Explore advanced topics such as filesystem operations, creating shared libraries, and debugging your programs Gain an overall understanding of how to debug your programs using Valgrind Who this book is for This book is for anyone who wants to develop system programs for Linux and gain a deeper understanding of the Linux system. The book is beneficial for anyone who is facing issues related to a particular part of Linux system programming and is looking for specific recipes or solutions.

This Rust book is designed to guide you through systems programming with Rust using practical examples and projects. You'll explore various Rust features, along with useful techniques, which will help you to develop system tools, utilities, and more.

The classic guide to UNIX® programming-completely updated! UNIX application programming requires a mastery of system-level services. Making sense of the many functions-more than 1,100 functions in the current UNIX specification-is a daunting task, so for years programmers have turned to Advanced UNIX Programming for its clear, expert advice on how to use the key functions reliably. An enormous number of changes have taken place in the UNIX environment since the landmark first edition. In Advanced UNIX Programming, Second Edition, UNIX pioneer Marc J. Rochkind brings the book fully up to date, with all-new, comprehensive coverage including: POSIX Solaris™ Linux® FreeBSD Darwin, the Mac™ OS X kernel And more than 200 new system calls Rochkind's fully updated classic explains all the UNIX system calls you're likely to need, all in a single volume! Interprocess communication, networking (sockets), pseudo terminals, asynchronous I/O, advanced signals, realtime, and threads Covers the system calls you'll actually use-no need to plow through hundreds of improperly implemented, obsolete, and otherwise unnecessary system calls! Thousands of lines of example code include a Web browser and server, a keystroke recorder/player, and a shell complete with pipelines, redirection, and background processes Emphasis on the practical-ensuring portability, avoiding pitfalls, and much more! Since 1985, the one book to have for mastering UNIX application programming has been Rochkind's Advanced UNIX Programming. Now completely updated, the second edition remains the choice for up-to-the-minute, in-depth coverage of the essential system-level services of the UNIX family of operating systems.

This book presents an introduction to the C programming language, featuring a structured approach and aimed at professionals and students with some experience of high-level languages. Features *includes embedded summary material in bulleted form *highlights common traps and pitfalls in C programming.

Describes the concepts of programming with Linux, covering such topics as shell programming, file structure, managing memory, using MySQL, debugging, processes and signals, and GNOME.

The Linux Programming Interface (TLPI) is the definitive guide to the Linux and UNIX programming interface—the interface employed by nearly every application that runs on a Linux or UNIX system. In this authoritative work, Linux programming expert Michael Kerrisk provides detailed descriptions of the system calls and library functions that you need in order to master the craft of system programming, and accompanies his explanations with clear, complete example programs. You'll find descriptions of over

500 system calls and library functions, and more than 200 example programs, 88 tables, and 115 diagrams. You'll learn how to:

- Read and write files efficiently
- Use signals, clocks, and timers
- Create processes and execute programs
- Write secure programs
- Write multithreaded programs using POSIX threads
- Build and use shared libraries
- Perform interprocess communication using pipes, message queues, shared memory, and semaphores
- Write network applications with the sockets API

While The Linux Programming Interface covers a wealth of Linux-specific features, including epoll, inotify, and the /proc file system, its emphasis on UNIX standards (POSIX.1-2001/SUSv3 and POSIX.1-2008/SUSv4) makes it equally valuable to programmers working on other UNIX platforms. The Linux Programming Interface is the most comprehensive single-volume work on the Linux and UNIX programming interface, and a book that's destined to become a new classic.

A hands-on guide to making system programming with C++ easy

Key Features

- Write system-level code leveraging C++17
- Learn the internals of the Linux Application Binary Interface (ABI) and apply it to system programming
- Explore C++ concurrency to take advantage of server-level constructs

Book Description

C++ is a general-purpose programming language with a bias toward system programming as it provides ready access to hardware-level resources, efficient compilation, and a versatile approach to higher-level abstractions. This book will help you understand the benefits of system programming with C++17. You will gain a firm understanding of various C, C++, and POSIX standards, as well as their respective system types for both C++ and POSIX. After a brief refresher on C++, Resource Acquisition Is Initialization (RAII), and the new C++ Guideline Support Library (GSL), you will learn to program Linux and Unix systems along with process management. As you progress through the chapters, you will become acquainted with C++'s support for IO. You will then study various memory management methods, including a chapter on allocators and how they benefit system programming. You will also explore how to program file input and output and learn about POSIX sockets. This book will help you get to grips with safely setting up a UDP and TCP server/client. Finally, you will be guided through Unix time interfaces, multithreading, and error handling with C++ exceptions. By the end of this book, you will be comfortable with using C++ to program high-quality systems. What you will learn

- Understand the benefits of using C++ for system programming
- Program Linux/Unix systems using C++
- Discover the advantages of Resource Acquisition Is Initialization (RAII)
- Program both console and file input and output
- Uncover the POSIX socket APIs and understand how to program them
- Explore advanced system programming topics, such as C++ allocators
- Use POSIX and C++ threads to program concurrent systems
- Grasp how C++ can be used to create performant system applications

Who this book is for

If you are a fresh developer with intermediate knowledge of C++ but little or no knowledge of Unix and Linux system programming, this book will help you learn system programming with C++ in a practical way.

bull; Learn UNIX essentials with a concentration on communication, concurrency, and multithreading techniques

bull; Full of ideas on how to design and implement good software along with unique projects throughout

bull; Excellent companion to Stevens' Advanced UNIX System Programming

Twenty five years ago, as often happens in our industry, pundits laughed at and called Linux a joke. To say that view has changed is a massive understatement. This book will cement for you both the conceptual 'why' and the practical 'how' of systems programming on Linux, and covers Linux systems programming on the latest 4.x kernels.

For the past 20 years, UNIX insiders have cherished and zealously guarded pirated photocopies of this manuscript, a "hacker trophy" of sorts. Now legal (and legible) copies are available. An international "who's who" of UNIX wizards, including Dennis Ritchie, have contributed essays extolling the merits and importance of this underground classic.

UNIX, UNIX LINUX & UNIX TCL/TK. Write software that makes the most effective use of the Linux system, including the kernel and core system libraries. The majority of both Unix and Linux code is still written at the system level, and this book helps you focus 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 at the low level, this updated edition of Linux System Programming gives you an understanding of core internals that makes for better code, no matter where it appears in the stack. -- Provided by publisher.

Learning the new system's programming language for all Unix-type systems

About This Book

Learn how to write system's level code in Golang, similar to Unix/Linux systems code

Ramp up in Go quickly

Deep dive into Goroutines and Go concurrency to be able to take advantage of Go server-level constructs

Who This Book Is For

Intermediate Linux and general Unix programmers. Network programmers from beginners to advanced practitioners. C and C++ programmers interested in different approaches to concurrency and Linux systems programming. What You Will Learn

- Explore the Go language from the standpoint of a developer conversant with Unix, Linux, and so on
- Understand Goroutines, the lightweight threads used for systems and concurrent applications
- Learn how to translate Unix and Linux systems code in C to Golang code
- How to write fast and lightweight server code
- Dive into concurrency with Go
- Write low-level networking code

In Detail

Go is the new systems programming language for Linux and Unix systems. It is also the language in which some of the most prominent cloud-level systems have been written, such as Docker. Where C programmers used to rule, Go programmers are in demand to write highly optimized systems programming code. Created by some of the original designers of C and Unix, Go expands the systems programmers toolkit and adds a mature, clear programming language. Traditional system applications become easier to write since pointers are not relevant and garbage collection has taken away the most problematic area for low-level systems code: memory management. This book opens up the world of high-performance Unix system applications to the beginning Go programmer. It does not get stuck on single systems or even system types, but tries to expand the original teachings from Unix system level programming to all types of servers, the cloud, and the web. Style and approach

This is the first book to introduce Linux and Unix systems programming in Go, a field for which Go has actually been developed in the first place.

Because the UNIX system was originally designed by programmers for use by other programmers, it was used in an environment of open cooperation where security was of minimal concern. Now that its use has spread to universities, businesses, and government, the confidential and sensitive nature of the data stored on UNIX systems has made the security of these systems of paramount importance. Despite all the technical papers and workshops on UNIX security, this book is unique. "UNIX System Security" is the first up-to-date source to provide the UNIX system user or administrator with the information needed to protect the data and system from unauthorized use. By following the procedures described in this book and making use of the C programs and shell scripts provided as examples, you can protect your UNIX system from most attackers. The author begins by examining four high-profile breaches of UNIX security as illustrations of how a UNIX system can be attacked. He then provides the information necessary to protect against these forms of attack, and offers the tools that can be used to do so. Focusing on the

most recent release of Berkeley and System V UNIX, and such vendor derivatives as SunOS and ULTRIX, the book gives information that can be applied to any version of UNIX since Seventh Edition. Issues discussed include account and password security, securing the file system, encryption and authentication systems, TCP/IP network security, the Network Information Service (NIS), NFS, RFS, workstation security, terminals and modems, and UUCP. Other chapters describe how to respond if your system is attacked and how to develop a comprehensive security policy for your organization. The book also gives comprehensive lists of freely available security software, and publications and mailing lists dealing with UNIX security.

Learn to write advanced C programs that are strongly type-checked, compact, and easy to maintain. This book focuses on real-life applications and problem solving in networking, database development, compilers, operating systems, and CAD.

A problem-solution-based guide to help you overcome hurdles effectively while working with kernel APIs, filesystems, networks, threads, and process communications

Key Features Learn to apply the latest C++ features (from C++11, 14, 17, and 20) to facilitate systems programming Create robust and concurrent systems that make the most of the available hardware resources Delve into C++ inbuilt libraries and frameworks to design robust systems as per your business needs

Book Description C++ is the preferred language for system programming due to its efficient low-level computation, data abstraction, and object-oriented features. System programming is about designing and writing computer programs that interact closely with the underlying operating system and allow computer hardware to interface with the programmer and the user. The C++ System Programming Cookbook will serve as a reference for developers who want to have ready-to-use solutions for the essential aspects of system programming using the latest C++ standards wherever possible. This C++ book starts out by giving you an overview of system programming and refreshing your C++ knowledge. Moving ahead, you will learn how to deal with threads and processes, before going on to discover recipes for how to manage memory. The concluding chapters will then help you understand how processes communicate and how to interact with the console (console I/O). Finally, you will learn how to deal with time interfaces, signals, and CPU scheduling. By the end of the book, you will become adept at developing robust systems applications using C++. What you will learn

Get up to speed with the fundamentals including makefile, man pages, compilation, and linking and debugging Understand how to deal with time interfaces, signals, and CPU scheduling Develop your knowledge of memory management Use processes and threads for advanced synchronizations (mutexes and condition variables) Understand interprocess communications (IPC): pipes, FIFOs, message queues, shared memory, and TCP and UDP Discover how to interact with the console (console I/O) Who this book is for This book is for C++ developers who want to gain practical knowledge of systems programming. Though no experience of Linux system programming is assumed, intermediate knowledge of C++ is necessary. Introduces the features of the C programming language, discusses data types, variables, operators, control flow, functions, pointers, arrays, and structures, and looks at the UNIX system interface

For intermediate to experienced C programmers who want to become UNIX system programmers. Explains system calls and special library routines available on the system. Annotation copyrighted by Book News, Inc., Portland, OR

"This book is organized around three concepts fundamental to OS construction: virtualization (of CPU and memory), concurrency (locks and condition variables), and persistence (disks, RAIDS, and file systems"--Back cover.

The revision of the definitive guide to Unix system programming is now available in a more portable format.

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