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# Software Optimization Cookbook Second Edition

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*Introduction to Software for Chemical Engineers, Second Edition* Springer Science & Business Media

A comprehensive guide to help aspiring and professional C++ developers elevate the performance of their apps by allowing them to run faster and consume fewer resources

**Key Features** Updated to C++20 with completely revised code and more content on error handling, benchmarking, memory allocators, and concurrent programming

**Explore the latest C++20 features** including concepts, ranges, and coroutines

**Utilize C++ constructs and techniques** to carry out effective data structure optimization and memory management

**Book Description** C++ High Performance, Second Edition guides you through optimizing the performance of your C++ apps. This allows them to run faster and consume fewer resources

on the device they're running on without compromising the readability of your codebase. The book begins by introducing the C++ language and some of its modern concepts in brief. Once you are familiar with the fundamentals, you will be ready to measure, identify, and eradicate bottlenecks in your C++ codebase. By following this process, you will gradually improve your style of writing code. The book then explores data structure optimization, memory management, and how it can be used efficiently concerning CPU caches. After laying the foundation, the book trains you to leverage algorithms, ranges, and containers from the standard library to achieve faster execution, write readable code, and use customized iterators. It provides hands-on examples of C++ metaprogramming, coroutines, reflection to reduce boilerplate code,

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proxy objects to perform optimizations under the constraints, and concepts Implement lazy hood, concurrent programming, and lock-free data structures. The book concludes with an overview of parallel algorithms. By the end of this book, you will have the ability to use every tool as needed to boost the efficiency of your C++ projects. What you will learn Write specialized data structures for performance-critical code Use modern metaprogramming techniques to reduce runtime calculations Achieve efficient memory management using custom memory allocators Reduce boilerplate code using reflection techniques Reap the benefits of lock-free concurrent programming Gain insights into subtle optimizations used by standard library algorithms Compose algorithms using ranges library Develop the ability to apply metaprogramming aspects such as `constexpr`,

generators and asynchronous tasks using C++20 coroutines Who this book is for If you're a C++ developer looking to improve the efficiency of your code or just keen to upgrade your skills to the next level, this book is for you.

[Introduction to High Performance Computing for Scientists and Engineers](#)

IGI Global

The Software Optimization

Cookbook The Software Optimization Cookbook

[The Software Optimization Cookbook](#)

Springer Science & Business Media

Your visual, step-by-step guide to search engine optimization, from an Internet marketing expert Techniques and best practices for search engine optimization are constantly evolving. This visual guide to

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SEO is fully updated with information on the search engine marketing principles including latest and most effective ways to move your website up in the search engine rankings. Internet marketing guru Kristopher Jones, a frequent keynote speaker at interactive marketing conferences, explains all the key concepts in a visual format so you can see how they work and what to do. Learn about keyword generation, internal linking, URL structure, content creation, using social media, and more. More than 70 percent of businesses today have websites; search engine optimization is a vital factor in growing a business by gaining new customers while increasing business from existing customers. This two-color book is the only guide to search engine optimization that is presented in a visual format. Presents keyword generation, on-site optimization involving website structure, internal linking, URL structure, content creation, off-site optimization, social media optimization and more. Author is a popular keynote speaker and panelist at interactive marketing and technology conferences. Search Engine Optimization: Your visual blueprint for effective Internet marketing, Third Edition helps visual learners master and maximize SEO techniques.

*Introduction to Software for Chemical Engineers, Second Edition* The Software Optimization Cookbook The Software Optimization Cookbook Annotation Four Intel experts explain the techniques and tools that you can use to improve the performance of applications for IA-32 processors. Simple

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explanations and code examples help you to develop software that benefits from Intel? Extended Memory 64 Technology (Intel? EM64T), multi-core processing, Hyper-Threading Technology, OpenMP\*, and multimedia extensions. This book guides you through the growing collection of software tools, compiler switches, and coding optimizations, showing you efficient ways to get the best performance from software applications.

Introduction to High Performance Computing for Scientists and Engineers

Leverage Docker to deploying software at scale

Key Features

Leverage practical examples to manage containers efficiently

Integrate with orchestration tools such as Kubernetes for controlled deployments

Learn to implement best practices on improving efficiency and security of containers

Book Description

Docker is an open source platform for building, shipping, managing, and securing

containers. Docker has become the tool of choice for people willing to work with containers. Since the market is moving toward containerization, Docker will definitely have a big role to play in the future tech market. This book starts with setting up Docker in different environment, and helps you learn how to work with Docker images. Then, you will take a deep dive into network and data management for containers. The book explores the RESTful APIs provided by Docker to perform different actions, such as image/container operations. The book then explores logs and troubleshooting Docker to solve issues and bottlenecks. You will gain an understanding of Docker use cases, orchestration, security, ecosystems, and hosting platforms to make your applications easy to deploy, build, and collaborate on. The book covers the new features of Docker 18.xx (or later), such as working with AWS and Azure, Docker Engine,

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Docker Swarm, Docker Compose, and so on. By the end of this book, you will have gained hands-on experience of finding quick solutions to different problems encountered while working with Docker. What you will learn

- Install Docker on various platforms
- Work with Docker images and containers
- Container networking and data sharing
- Docker APIs and language bindings
- Various PaaS solutions for Docker
- Implement container orchestration using Docker Swarm and Kubernetes
- Container security
- Docker on various clouds

Who this book is for Book is targeted towards developers, system administrators, and DevOps engineers who want to use Docker in his/her development, QA, or production environments. It is expected that the reader has basic Linux/Unix skills such as installing packages, editing files, managing services, and so on. Any experience in virtualization technologies such as KVM, XEN, and VMware

will be an added advantage

[Python Interactive Computing and Visualization Cookbook](#) John Wiley & Sons

Annotation Four Intel experts explain the techniques and tools that you can use to improve the performance of applications for IA-32 processors. Simple explanations and code examples help you to develop software that benefits from Intel? Extended Memory 64 Technology (Intel? EM64T), multi-core processing, Hyper-Threading Technology, OpenMP\*, and multimedia extensions. This book guides you through the growing collection of

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software tools, compiler switches, and coding optimizations, showing you efficient ways to get the best performance from software applications.

Power and Performance CRC Press  
Reflects the latest applied research and features state-of-the-art software for building and solving spreadsheet optimization models  
Thoroughly updated to reflect the latest topical and technical advances in the field, Optimization Modeling with Spreadsheets, Second Edition continues to focus on solving real-world optimization problems through the creation of mathematical models and the use of

spreadsheets to represent and analyze those models. Developed and extensively classroom-tested by the author, the book features a systematic approach that equips readers with the skills to apply optimization tools effectively without the need to rely on specialized algorithms. This new edition uses the powerful software package Risk Solver Platform (RSP) for optimization, including its Evolutionary Solver, which employs many recently developed ideas for heuristic programming. The author provides expanded coverage of integer programming and discusses linear and nonlinear programming

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using a systematic approach that emphasizes the use of spreadsheet-based optimization tools. The Second Edition also features: Classifications for the various problem types, providing the reader with a broad framework for building and recognizing optimization models Network models that allow for a more general form of mass balance A systematic introduction to Data Envelopment Analysis (DEA) The identification of qualitative patterns in order to meaningfully interpret linear programming solutions An introduction to stochastic programming and the use of RSP to solve problems of this type

Additional examples, exercises, and cases have been included throughout, allowing readers to test their comprehension of the material. In addition, a related website features Microsoft Office® Excel files to accompany the figures and data sets in the book. With its accessible and comprehensive presentation, Optimization Modeling with Spreadsheets, Second Edition is an excellent book for courses on deterministic models, optimization, and spreadsheet modeling at the upper-undergraduate and graduate levels. The book can also serve as a reference for researchers, practitioners, and consultants



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working in business, engineering, operations research, and management science.

Optimization Modeling with Spreadsheets  
CRC Press

The field of Chemical Engineering and its link to computer science is in constant evolution and new engineers have a variety of tools at their disposal to tackle their everyday problems. Introduction to Software for Chemical Engineers, Second Edition provides a quick guide to the use of various computer packages for chemical engineering applications. It covers a range of software applications from Excel and general mathematical packages such as MATLAB and MathCAD to process simulators, CHEMCAD and ASPEN, equation-based modeling languages, gProms, optimization software

such as GAMS and AIMS, and specialized software like CFD or DEM codes. The different packages are introduced and applied to solve typical problems in fluid mechanics, heat and mass transfer, mass and energy balances, unit operations, reactor engineering, process and equipment design and control. This new edition offers a wider view of packages including open source software such as R, Python and Julia. It also includes complete examples in ASPEN Plus, adds ANSYS Fluent to CFD codes, Lingo to the optimization packages, and discusses Engineering Equation Solver. It offers a global idea of the capabilities of the software used in the chemical engineering field and provides examples for solving real-world problems. Written by leading experts, this book is a must-have reference for chemical engineers looking

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to grow in their careers through the use of new and improving computer software. Its user-friendly approach to simulation and optimization as well as its example-based presentation of the software, makes it a perfect teaching tool for both undergraduate and master levels.

Pyomo — Optimization Modeling in Python Springer Science & Business Media

Learn to use IPython and Jupyter Notebook for your data analysis and visualization work. Key Features Leverage the Jupyter Notebook for interactive data science and visualization Become an expert in high-performance computing and visualization for data analysis and scientific modeling A

comprehensive coverage of scientific computing through many hands-on, example-driven recipes with detailed, step-by-step explanations Book Description Python is one of the leading open source platforms for data science and numerical computing. IPython and the associated Jupyter Notebook offer efficient interfaces to Python for data analysis and interactive visualization, and they constitute an ideal gateway to the platform. IPython Interactive Computing and Visualization Cookbook, Second Edition contains many ready-to-use, focused recipes for high-performance scientific computing

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and data analysis, from the latest IPython/Jupyter features to the most advanced tricks, to help you write better and faster code. You will apply these state-of-the-art methods to various real-world examples, illustrating topics in applied mathematics, scientific modeling, and machine learning. The first part of the book covers programming techniques: code quality and reproducibility, code optimization, high-performance computing through just-in-time compilation, parallel computing, and graphics card programming. The second part tackles data science, statistics, machine learning, signal and image processing, dynamical systems, and pure and applied mathematics. What you will learn

Master all features of the Jupyter Notebook Code better: write high-quality, readable, and well-tested programs; profile and optimize your code; and conduct reproducible interactive computing experiments

Visualize data and create interactive plots in the Jupyter Notebook Write blazingly fast Python programs with NumPy, ctypes, Numba, Cython, OpenMP, GPU programming (CUDA), parallel IPython, Dask, and more Analyze data with Bayesian or frequentist statistics (Pandas, PyMC, and R), and learn from actual

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data through machine learning (scikit-mathematics will help you learn) Gain valuable insights into signals, images, and sounds with SciPy, scikit-image, and OpenCV Simulate deterministic and stochastic dynamical systems in Python Familiarize yourself with math in Python using SymPy and Sage: algebra, analysis, logic, graphs, geometry, and probability theory Who this book is for This book is intended for anyone interested in numerical computing and data science: students, researchers, teachers, engineers, analysts, and hobbyists. A basic knowledge of Python/NumPy is recommended. Some skills in

understand the theory behind the computational methods.

Introduction to Software for Chemical Engineers "O'Reilly Media, Inc."

Written by high performance computing (HPC) experts, Introduction to High Performance Computing for Scientists and Engineers provides a solid introduction to current mainstream computer architecture, dominant parallel programming models, and useful optimization strategies for scientific HPC. From working in a scientific computing center, the author Code Complete Changhyun Kwon Full treatment, from model formulation to computational implementation, of optimization techniques that solve central

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problems in finance.

Handbook of Research on  
Computational Science and  
Engineering: Theory and Practice John  
Wiley & Sons

Get more out of your legacy systems:  
more performance, functionality,  
reliability, and manageability Is your  
code easy to change? Can you get  
nearly instantaneous feedback when  
you do change it? Do you understand  
it? If the answer to any of these  
questions is no, you have legacy code,  
and it is draining time and money away  
from your development efforts. In this  
book, Michael Feathers offers start-to-  
finish strategies for working more  
effectively with large, untested legacy  
code bases. This book draws on

material Michael created for his  
renowned Object Mentor seminars:  
techniques Michael has used in  
mentoring to help hundreds of  
developers, technical managers, and  
testers bring their legacy systems  
under control. The topics covered  
include Understanding the mechanics  
of software change: adding features,  
fixing bugs, improving design,  
optimizing performance Getting legacy  
code into a test harness Writing tests  
that protect you against introducing  
new problems Techniques that can be  
used with any language or  
platform—with examples in Java, C++ ,  
C, and C# Accurately identifying  
where code changes need to be made  
Coping with legacy systems that aren't

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object-oriented Handling applications that don't seem to have any structure  
This book also includes a catalog of twenty-four dependency-breaking techniques that help you work with program elements in isolation and make safer changes.

Search Engine Optimization Prentice Hall Professional

Revealing the secrets of the software tuning process, *The Software Optimization Cookbook* provides recipes for high-performance applications on the Intel? Pentium? III and Pentium? 4 processors. Simple explanations and C language examples show you how to address performance issues with algorithms, memory access, branching, SIMD instructions,

multiple threads, and floating-point calculations. With this book, you need not be a processor architect or assembly language expert to get the full power out of your software on the 32-bit Intel Architecture. Learn how to: Use performance tools and tested concepts to analyze and improve applications. Determine which portions of an application should be given highest priority for optimizations. Identify the reasons that certain portions of your application are slower than they should be. Improve an application by working directly on the root cause of a software bottleneck. Design an application from the ground up for maximum performance. *Optimizing Compilers for Modern*

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Architectures: A Dependence-Based Approach CRC Press

A comprehensive introduction to the tools, techniques and applications of convex optimization.

High Performance Computing CRC Press

If you are a Python developer with some experience of working on scientific, mathematical, and statistical applications and want to gain an expert understanding of NumPy programming in relation to science, math, and finance using practical recipes, then this book is for you.

Julia Programming for Operations Research Morgan Kaufmann

This entirely revised second edition of Engineering a Compiler is full of technical updates and new material covering the latest developments in compiler technology. In this comprehensive text you will learn important techniques for constructing a modern compiler. Leading educators and researchers Keith Cooper and Linda Torczon combine basic principles with pragmatic insights from their experience building state-of-the-art compilers. They will help you fully understand important techniques such as compilation of imperative and object-oriented languages, construction of static single

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assignment forms, instruction scheduling, and graph-coloring register allocation. In-depth treatment of algorithms and techniques used in the front end of a modern compiler Focus on code optimization and code generation, the primary areas of recent research and development Improvements in presentation including conceptual overviews for each chapter, summaries and review questions for sections, and prominent placement of definitions for new terms Examples drawn from several different programming languages  
Packt Publishing Ltd

This book presents a structured approach to formulate, model, and solve mathematical optimization problems for a wide range of real world situations. Among the problems covered are production, distribution and supply chain planning, scheduling, vehicle routing, as well as cutting stock, packing, and nesting. The optimization techniques used to solve the problems are primarily linear, mixed-integer linear, nonlinear, and mixed integer nonlinear programming. The book also covers important considerations for solving real-world optimization problems, such as dealing with valid inequalities and symmetry during the modeling phase, but also data interfacing and visualization of



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results in a more and more digitized world. The broad range of ideas and approaches presented helps the reader to learn how to model a variety of problems from process industry, paper and metals industry, the energy sector, and logistics using mathematical optimization techniques.

Power Distribution Planning Reference Book, Second Edition Packt Publishing Ltd

Providing more than twice the content of the original edition, this new edition is the premier source on the selection, development, and provision of safe, high-quality, and cost-effective electric utility distribution systems, and it promises vast improvements in system reliability and layout by

spanning every aspect of system planning including load forecasting, scheduling, performance, and economics. Responding to the evolving needs of electric utilities, Power Distribution Planning Reference Book presents an abundance of real-world examples, procedural and managerial issues, and engineering and analytical methodologies that are crucial to efficient and enhanced system performance.

High Performance Computing for Computational Science -- VECPAR 2010  
No Starch Press

Embedded Computing for High Performance: Design Exploration and Customization Using High-level Compilation and Synthesis Tools provides a set of real-life example implementations

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that migrate traditional desktop systems to embedded systems. Working with popular hardware, including Xilinx and ARM, the book offers a comprehensive description of techniques for mapping computations expressed in programming languages such as C or MATLAB to high-performance embedded architectures consisting of multiple CPUs, GPUs, and reconfigurable hardware (FPGAs). The authors demonstrate a domain-specific language (LARA) that facilitates retargeting to multiple computing systems using the same source code. In this way, users can decouple original application code from transformed code and enhance productivity and program portability. After reading this book, engineers will understand the processes, methodologies, and best practices needed for the development of applications for high-performance embedded computing systems. Focuses on maximizing performance while managing energy consumption in embedded systems Explains how to retarget code for heterogeneous systems with GPUs and FPGAs Demonstrates a domain-specific language that facilitates migrating and retargeting existing applications to modern systems Includes downloadable slides, tools, and tutorials Working Effectively with Legacy Code Cambridge University Press Modern computer architectures designed with high-performance microprocessors offer tremendous potential gains in performance over previous designs. Yet their very complexity makes it increasingly difficult to produce efficient code and to realize their full potential. This landmark text from two leaders in

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the field focuses on the pivotal role that compilers can play in addressing this critical issue. The basis for all the methods presented in this book is data dependence, a fundamental compiler analysis tool for optimizing programs on high-performance microprocessors and parallel architectures. It enables compiler designers to write compilers that automatically transform simple, sequential programs into forms that can exploit special features of these modern architectures. The text provides a broad introduction to data dependence, to the many transformation strategies it supports, and to its applications to important optimization problems such as parallelization, compiler memory hierarchy management, and instruction scheduling. The authors demonstrate the importance and wide applicability of dependence-

based compiler optimizations and give the compiler writer the basics needed to understand and implement them. They also offer cookbook explanations for transforming applications by hand to computational scientists and engineers who are driven to obtain the best possible performance of their complex applications. The approaches presented are based on research conducted over the past two decades, emphasizing the strategies implemented in research prototypes at Rice University and in several associated commercial systems. Randy Allen and Ken Kennedy have provided an indispensable resource for researchers, practicing professionals, and graduate students engaged in designing and optimizing compilers for modern computer architectures. \* Offers a guide to the simple, practical algorithms and

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approaches that are most effective in real-world, high-performance microprocessor and parallel systems. \* Demonstrates each transformation in worked examples. \* Examines how two case study compilers implement the theories and practices described in each chapter. \* Presents the most complete treatment of memory hierarchy issues of any compiler text. \* Illustrates ordering relationships with dependence graphs throughout the book. \* Applies the techniques to a variety of languages, including Fortran 77, C, hardware definition languages, Fortran 90, and High Performance Fortran. \* Provides extensive references to the most sophisticated algorithms known in research.

Business Optimization Using  
Mathematical Programming Elsevier  
Today ' s embedded devices and sensor

networks are becoming more and more sophisticated, requiring more efficient and highly flexible compilers. Engineers are discovering that many of the compilers in use today are ill-suited to meet the demands of more advanced computer architectures. Updated to include the latest techniques, *The Compiler Design Handbook, Second Edition* offers a unique opportunity for designers and researchers to update their knowledge, refine their skills, and prepare for emerging innovations. The completely revised handbook includes 14 new chapters addressing topics such as worst case execution time estimation, garbage collection, and energy aware compilation. The editors take special

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care to consider the growing proliferation of embedded devices, as well as the need for efficient techniques to debug faulty code. New contributors provide additional insight to chapters on register allocation, software pipelining, instruction scheduling, and type systems. Written by top researchers and designers from around the world, *The Compiler Design Handbook, Second Edition* gives designers the opportunity to incorporate and develop innovative techniques for optimization and code generation.