

# Software Optimization Cookbook Second Edition

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*The Software Optimization Cookbook* "O'Reilly Media, Inc." CD-ROM contains source code.

[The Software Optimization Cookbook](#) Packt Publishing Ltd

[Numerical Recipes in C++: The Art of Scientific Computing](#) By William H. Press

[Vibrational Medicine](#) CRC Press

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 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 data through machine learning (scikit-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 mathematics will help you understand the theory behind the computational methods.

C++ High Performance Packt Publishing Ltd

*Analysis and Optimization of Differential Systems* focuses on the qualitative aspects of deterministic and stochastic differential equations. Areas covered include: Ordinary and partial differential systems; Optimal control of deterministic and stochastic evolution equations; Control theory of Partial Differential Equations (PDE's); Optimization methods in PDE's with numerous applications to mechanics and physics; Inverse problems; Stability theory; Abstract optimization problems; Calculus of variations; Numerical treatment of solutions to differential equations and related optimization problems. These research fields are under very active development and the present volume should be of interest to students and researchers working in applied mathematics or in system engineering. This volume contains selected contributions presented during the International Working Conference on Analysis and Optimization of Differential Systems, which was sponsored by the International Federation for Information Processing (IFIP) and held in Constanta, Romania in September 2002. Among the aims of this conference was the creation of new international contacts and collaborations, taking advantage of the new developments in Eastern Europe, particularly in Romania. The conference benefited from the support of the European Union via the EURROMAT program.

[Embedded Computing for High Performance](#) Springer Science & Business Media

Until the late 1980s, information processing was associated with large mainframe computers and huge tape drives. During the 1990s, this trend shifted toward information processing with personal computers, or PCs. The trend toward miniaturization continues and in the future the majority of information processing systems will be small mobile computers, many of which will be embedded into larger products and interfaced to the physical environment. Hence, these kinds of systems are called embedded systems. Embedded systems together with their physical environment are called cyber-physical systems. Examples include systems such as transportation and fabrication equipment. It is expected that the total market volume of embedded systems will be significantly larger than that of traditional information processing systems such as PCs and mainframes. Embedded systems share a number of common characteristics. For example, they must be dependable, efficient, meet real-time constraints and require customized

user interfaces (instead of generic keyboard and mouse interfaces). Therefore, it makes sense to consider common principles of embedded system design. Embedded System Design starts with an introduction into the area and a survey of specification models and languages for embedded and cyber-physical systems. It provides a brief overview of hardware devices used for such systems and presents the essentials of system software for embedded systems, like real-time operating systems. The book also discusses evaluation and validation techniques for embedded systems. Furthermore, the book presents an overview of techniques for mapping applications to execution platforms. Due to the importance of resource efficiency, the book also contains a selected set of optimization techniques for embedded systems, including special compilation techniques. The book closes with a brief survey on testing. Embedded System Design can be used as a text book for courses on embedded systems and as a source which provides pointers to relevant material in the area for PhD students and teachers. It assumes a basic knowledge of information processing hardware and software. Courseware related to this book is available at <http://ls12-www.cs.tu-dortmund.de/~marwedel>.

*Flask Framework Cookbook* Morgan Kaufmann

Convex optimization problems arise frequently in many different fields. This book provides a comprehensive introduction to the subject, and shows in detail how such problems can be solved numerically with great efficiency. The book begins with the basic elements of convex sets and functions, and then describes various classes of convex optimization problems. Duality and approximation techniques are then covered, as are statistical estimation techniques. Various geometrical problems are then presented, and there is detailed discussion of unconstrained and constrained minimization problems, and interior-point methods. The focus of the book is on recognizing convex optimization problems and then finding the most appropriate technique for solving them. It contains many worked examples and homework exercises and will appeal to students, researchers and practitioners in fields such as engineering, computer science, mathematics, statistics, finance and economics.

**Proceedings** Packt Publishing Ltd

Revealing the secrets of the software tuning process, *The Software Optimization Cookbook* provides recipes for high-performance applications on the Intel<sup>®</sup> Pentium<sup>®</sup> III and Pentium<sup>®</sup> 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.

**Parallel Programming with Intel Parallel Studio XE** Artech House Publishers

Use Qt 5 to design and build functional, appealing, and user-friendly graphical user interfaces (GUIs) for your applications. **Key Features** Learn to use Qt 5 to design and customize the look and feel of your application Improve the visual quality of an application by using graphics rendering and animation Understand the balance of presentation and web content that will make an application appealing yet functional **Book Description** With the growing need to develop GUIs for multiple targets and multiple screens, improving the visual quality of your application becomes important so that it stands out from your competitors. With its cross-platform ability and the latest UI paradigms, Qt makes it possible to build intuitive, interactive, and user-friendly user interfaces for your applications. *Qt5 C++ GUI Programming Cookbook, Second Edition* teaches you how to develop functional and appealing user interfaces using the latest version of QT5 and

C++. This book will help you learn a variety of topics such as GUI customization and animation, graphics rendering, implementing Google Maps, and more. You will also be taken through advanced concepts like asynchronous programming, event handling using signals and slots, network programming, various aspects of optimizing your application. By the end of the book, you will be confident to design and customize GUI applications that meet your clients' expectations and have an understanding of best practice solutions for common problems. What you will learn **Animate GUI elements using Qt5's built-in animation system** **Draw shapes and 2D images using Qt5's powerful rendering system** **Implement an industry-standard OpenGL library in your project** **Build a mobile app that supports touch events and exports it onto devices** **Parse and extract data from an XML file and present it on your GUI** **Interact with web content by calling JavaScript functions from C++** **Access MySQL and SQLite databases to retrieve data and display it on your GUI** **Who this book is for** This intermediate-level book is designed for those who want to develop software using Qt 5. If you want to improve the visual quality and content presentation of your software application, this book is for you. **Prior experience of C++ programming is required.**

**Embedded Linux Development Using Yocto Project Cookbook** Packt Publishing Ltd

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

**Convex Optimization** Cambridge University Press

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

**CODES+ISSS ...** Createspace Independent Publishing Platform

This book constitutes the thoroughly refereed post-conference proceedings of the 9th International Conference on High Performance Computing for Computational Science, VECPAR 2010, held in Berkeley, CA, USA, in June 2010. The 34 revised full papers presented together with five invited contributions were carefully selected during two rounds of reviewing and revision. The papers are organized in topical sections on linear algebra and solvers on emerging architectures, large-scale simulations, parallel and distributed computing, numerical algorithms.

**Proceedings of the ... ACM SIGPLAN Symposium on Principles & Practice of Parallel Programming** John Wiley & Sons

Build state-of-the-art web applications quickly and efficiently using Flask and related technologies with Python 3 **Key Features** Updated to Flask 1.0.3 and Python 3.7 with coverage of Microservices Get the most out of the powerful Flask framework and maintain the flexibility of your design choices Write cleaner and maintainable code with the help of sample apps **Book Description** Flask, the lightweight Python

web framework, is popular due to its powerful modular design that lets you build scalable web apps. With this recipe-based guide, you'll explore modern solutions and best practices for Flask web development. Updated to the latest version of Flask and Python 3, this second edition of Flask Framework Cookbook moves away from some of the old and obsolete libraries and introduces recipes on bleeding edge technologies. You'll discover different ways of using Flask to create, deploy, and manage microservices. This Flask Python book starts by covering the different configurations that a Flask application can make use of, and then helps you work with templates and learn about the ORM and view layers. You'll also be able to write an admin interface and get to grips with debugging and logging errors. Finally, you'll grasp a variety of deployment and post-deployment techniques for platforms such as Apache, Tornado, and Heroku. By the end of this book, you'll have gained all the knowledge you need to write Flask applications in the best possible way and scale them using standard industry practices. What you will learn

Explore web application development in Flask, right from installation to post-deployment stages  
Make use of advanced templating and data modeling techniques  
Discover effective debugging, logging, and error handling techniques in Flask  
Integrate Flask with different technologies such as Redis, Sentry, and MongoDB  
Deploy and package Flask applications with Docker and Kubernetes  
Design scalable microservice architecture using AWS Lambda  
Continuous integration and Continuous deployment

Who this book is for  
If you are a web developer who wants to learn more about developing scalable and production-ready applications in Flask, this is the book for you. You'll also find this book useful if you are already aware of Flask's major extensions and want to use them for better application development. Basic Python programming experience along with basic understanding of Flask is assumed.

**Introduction to Software for Chemical Engineers, Second Edition**  
CRC Press

Enhanced by powerful Win32 software, this new and improved version of C/NL 2 for Windows lets you run fast, accurate circuit analysis and optimization -- on Windows 95, Windows NT, and Windows 3.1! As with its earlier version, the software lets you analyze and optimize the gain, return loss, noise performance, and nonlinear distortion of a wide variety of linear RF and microwave circuits. But now, you can import circuits with multiple coupled lines, first generated by LINPAR for Windows, or export a set of port impedances into software that can then synthesize a matching network for the port. Featuring enhanced graphics, increased circuit size, and an improved on-line help function with convenient hypertext jumps, this software package offers superior performance at an affordable price.

***Engineering Optimization*** CRC Press

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

**C/NL 2 for Windows 95, NT, and 3.1** Morgan Kaufmann

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, 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

***System Center 2012 R2 Virtual Machine Manager Cookbook*** John Wiley & Sons

Optimize code for multi-core processors with Intel's Parallel Studio  
Parallel programming is rapidly becoming a "must-know" skill for developers. Yet, where to start? This teach-yourself tutorial is an ideal starting point for developers who already know Windows C and C++ and are eager to add parallelism to their code. With a focus on applying tools, techniques, and language extensions to implement parallelism, this essential resource teaches you how to write programs for multicore and leverage the power of multicore in your programs. Sharing hands-on case studies and real-world examples, the authors examine the challenges of each project and show you how to overcome them. Explores conversion of serial code to parallel  
Focuses on implementing Intel Parallel Studio  
Highlights the benefits of using parallel code  
Addresses error and performance optimization of code  
Includes real-world scenarios that illustrate the techniques of advanced parallel programming situations  
Parallel Programming with Intel Parallel Studio dispels any concerns of difficulty and gets you started creating faster code with Intel Parallel Studio.

**Embedded System Design** CRC Press

Computational statistics and statistical computing are two areas that employ computational, graphical, and numerical approaches to solve statistical problems, making the versatile R language an ideal computing environment for these fields. This second edition continues to encompass the traditional core material of computational statistics, with an

***NumPy Cookbook - Second Edition*** Prentice Hall Professional

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. Purchase of the print or Kindle book includes a free eBook in PDF format. 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.

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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, proxy objects to perform optimizations under the 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`, constraints, and concepts
- Implement lazy 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.

#### Docker Cookbook Packt Publishing Ltd

By using computer simulations in research and development, computational science and engineering (CSE) allows empirical inquiry where traditional experimentation and methods of inquiry are difficult, inefficient, or prohibitively expensive. The Handbook of Research on Computational Science and Engineering: Theory and Practice is a reference for interested researchers and decision-makers who want a timely introduction to the possibilities in CSE to advance their ongoing research and applications or to discover new resources and cutting edge developments. Rather than reporting results obtained using CSE models, this comprehensive survey captures the architecture of the cross-disciplinary field, explores the long term implications of technology choices, alerts readers to the hurdles facing CSE, and identifies trends in future development.

#### **Statistical Computing with R, Second Edition** SIAM

The original comprehensive guide to energetic healing with a new preface by the author and updated resources. • More than 125,000 copies sold. • Explores the actual science of etheric energies, replacing the Newtonian worldview with a new model based on Einstein's physics of energy. • Summarizes key points at the end of each chapter to help the serious student absorb and retain the wealth of information presented. Vibrational Medicine has gained widespread acceptance by individuals, schools, and health-care institutions nationwide as the textbook of choice for the study of alternative medicine. Trained in a variety of alternative therapies as well as conventional Western medicine, Dr. Gerber provides an encyclopedic treatment of energetic healing, covering subtle-energy fields, acupuncture, Bach flower remedies, homeopathy, radionics, crystal healing, electrotherapy, radiology, chakras, meditation, and psychic healing. He explains current theories about how various energy therapies work and offers readers new insights into the physical and spiritual perspectives of health and disease.