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Introduction To Algorithms

MIT Press The first edition won the award for Best 1990 Professional and Scholarly Book in Computer Science and Data Processing by the Association of American Publishers. There are books on algorithms that are rigorous but incomplete and others that cover masses of material but lack rigor. Introduction to Algorithms combines rigor and comprehensiveness. The book covers a broad range of algorithms in depth, yet makes their design and analysis accessible to all levels of readers. Each chapter is relatively self-contained and can be used as a unit of study. The algorithms are described in English and in a pseudocode designed to be readable by anyone who has done a little programming. The explanations have been kept elementary without sacrificing depth of coverage or mathematical rigor. The first edition became the standard reference for professionals and a widely used text in universities worldwide. The second edition features new chapters on the role of algorithms, probabilistic analysis and randomized algorithms, and linear programming, as well as extensive revisions to virtually every section of the book. In a subtle but important change, loop invariants are introduced early and used throughout the text to prove algorithm correctness. Without changing the mathematical and analytic focus, the authors have moved much of the mathematical foundations material from Part I to an appendix and have included additional motivational material at the beginning.

Algorithms Unplugged

Springer Science & Business Media Algorithms specify the way computers process information and how they execute tasks. Many recent technological innovations and achievements rely on algorithmic ideas - they facilitate new applications in science, medicine, production, logistics, traffic, communication and entertainment. Efficient algorithms not only enable your personal computer to execute the newest generation of games with features unimaginable only a few years ago, they are also key to several recent scientific breakthroughs - for example, the sequencing of the human genome would not have been possible without the invention of new algorithmic ideas that speed up computations by several orders of magnitude. The greatest improvements in the area of algorithms rely on beautiful ideas for tackling computational tasks more efficiently. The problems solved are not restricted to arithmetic tasks in a narrow sense but often relate to exciting questions of nonmathematical flavor, such as: How can I find the exit out of a maze? How can I partition a treasure map so that the treasure can only be found if all parts of the map are recombined? How should I plan my trip to minimize cost? Solving these challenging problems requires logical reasoning, geometric and combinatorial imagination, and, last but not least, creativity - the skills needed for the design and analysis of algorithms. In this book we present some of the most beautiful algorithmic ideas in 41 articles written in colloquial, nontechnical language. Most of the articles arose out of an initiative among German-language universities to communicate the fascination of algorithms and computer science to high-school students. The book can be understood without any prior knowledge of algorithms and computing, and it will be an enlightening and fun read for students and interested adults.

Introduction to Algorithms, third edition

MIT Press The latest edition of the essential text and professional reference, with substantial new material on such topics as vEB trees, multithreaded algorithms, dynamic programming, and edge-based flow. Some books on algorithms are rigorous but incomplete; others cover masses of material but lack rigor. Introduction to Algorithms uniquely combines rigor and comprehensiveness. The book covers a broad range of algorithms in depth, yet makes their design and analysis accessible to all levels of readers. Each chapter is relatively self-contained and can be used as a unit of study. The algorithms are described in English and in a pseudocode designed to be readable by anyone who has done a little programming. The explanations have been kept elementary without sacrificing depth of coverage or mathematical rigor. The first edition became a widely used text in universities worldwide as well as the standard reference for professionals. The second edition featured new chapters on the role of algorithms, probabilistic analysis and randomized algorithms, and linear programming. The third edition has been revised and updated throughout. It

includes two completely new chapters, on van Emde Boas trees and multithreaded algorithms, substantial additions to the chapter on recurrence (now called “Divide-and-Conquer”), and an appendix on matrices. It features improved treatment of dynamic programming and greedy algorithms and a new notion of edge-based flow in the material on flow networks. Many exercises and problems have been added for this edition. The international paperback edition is no longer available; the hardcover is available worldwide.

Algorithms Unlocked

MIT Press For anyone who has ever wondered how computers solve problems, an engagingly written guide for nonexperts to the basics of computer algorithms. Have you ever wondered how your GPS can find the fastest way to your destination, selecting one route from seemingly countless possibilities in mere seconds? How your credit card account number is protected when you make a purchase over the Internet? The answer is algorithms. And how do these mathematical formulations translate themselves into your GPS, your laptop, or your smart phone? This book offers an engagingly written guide to the basics of computer algorithms. In *Algorithms Unlocked*, Thomas Cormen—coauthor of the leading college textbook on the subject—provides a general explanation, with limited mathematics, of how algorithms enable computers to solve problems. Readers will learn what computer algorithms are, how to describe them, and how to evaluate them. They will discover simple ways to search for information in a computer; methods for rearranging information in a computer into a prescribed order (“sorting”); how to solve basic problems that can be modeled in a computer with a mathematical structure called a “graph” (useful for modeling road networks, dependencies among tasks, and financial relationships); how to solve problems that ask questions about strings of characters such as DNA structures; the basic principles behind cryptography; fundamentals of data compression; and even that there are some problems that no one has figured out how to solve on a computer in a reasonable amount of time.

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Algorithms for Functional Programming

Springer This book presents a variety of widely used algorithms, expressing them in a pure functional programming language to make their structure and operation clearer to readers. In the opening chapter the author introduces the specific notations that constitute the variant of Scheme that he uses. The second chapter introduces many of the simpler and more general patterns available in functional programming. The chapters that follow introduce and explain

data structures, sorting, combinatorial constructions, graphs, and sublist search. Throughout the book the author presents the algorithms in a purely functional version of the Scheme programming language, which he makes available on his website. The book is supported with exercises, and it is suitable for undergraduate and graduate courses on programming techniques.

Parallel Programming Concepts and Practice

Morgan Kaufmann **Parallel Programming: Concepts and Practice** provides an upper level introduction to parallel programming. In addition to covering general parallelism concepts, this text teaches practical programming skills for both shared memory and distributed memory architectures. The authors' open-source system for automated code evaluation provides easy access to parallel computing resources, making the book particularly suitable for classroom settings. Covers parallel programming approaches for single computer nodes and HPC clusters: OpenMP, multithreading, SIMD vectorization, MPI, UPC++ Contains numerous practical parallel programming exercises Includes access to an automated code evaluation tool that enables students the opportunity to program in a web browser and receive immediate feedback on the result validity of their program Features an example-based teaching of concept to enhance learning outcomes

Global Algorithmic Capital Markets

High Frequency Trading, Dark Pools, and Regulatory Challenges

Oxford University Press, USA Global capital markets have undergone fundamental transformations in recent years and, as a result, have become extraordinarily complex and opaque. Trading space is no longer measured in minutes or seconds but in time units beyond human perception: milliseconds, microseconds, and even nanoseconds. Technological advances have thus scaled up imperceptible and previously irrelevant time differences into operationally manageable and enormously profitable business opportunities for those with the proper high-tech trading tools. These tools include the fastest private communication and trading lines, the most powerful computers and sophisticated algorithms capable of speedily analysing incoming news and trading data and determining optimal trading strategies in microseconds, as well as the possession of gigantic collections of historic and real-time market data. Fragmented capital markets are also becoming a rapidly growing reality in Europe and Asia, and are an established feature of U.S. trading. This raises urgent market governance issues that have largely been overlooked. **Global Algorithmic Capital Markets** seeks to understand how recent market transformations are affecting core public policy objectives such as investor protection and reduction of systemic risk, as well as fairness, efficiency, and transparency. The operation and health of capital markets affect all of us and have profound implications for equality and justice in society. This unique set of chapters by leading scholars, industry insiders, and regulators discusses ways to strengthen market governance for the benefit of society at whole.

Introduction to Algorithms, fourth edition

MIT Press A comprehensive update of the leading algorithms text, with new material on matchings in bipartite graphs, online algorithms, machine learning, and other topics. Some books on algorithms are rigorous but incomplete; others cover masses of material but lack rigor. **Introduction to Algorithms** uniquely combines rigor and comprehensiveness. It covers a broad range of algorithms in depth, yet makes their design and analysis accessible to all levels of readers, with self-contained chapters and algorithms in pseudocode. Since the publication of the first edition, **Introduction to Algorithms** has become the leading algorithms text in universities worldwide as well as the standard reference for professionals. This fourth edition has been updated throughout. New for the fourth edition • New chapters on matchings in bipartite graphs, online algorithms, and machine learning • New material on topics including solving recurrence equations, hash tables, potential functions, and suffix arrays • 140 new exercises and 22 new problems • Reader feedback-informed improvements to old problems • Clearer, more personal, and gender-neutral writing style • Color added to improve visual presentation • Notes, bibliography, and index updated to reflect developments in the field • Website with new supplementary material

Planning with Markov Decision Processes

An AI Perspective

Springer Nature **Markov Decision Processes (MDPs)** are widely popular in Artificial Intelligence for modeling sequential decision-making scenarios with probabilistic dynamics. They are the framework of choice when designing an intelligent agent that needs to act for long periods of time in an environment where its actions could have uncertain outcomes.

MDPs are actively researched in two related subareas of AI, probabilistic planning and reinforcement learning. Probabilistic planning assumes known models for the agent's goals and domain dynamics, and focuses on determining how the agent should behave to achieve its objectives. On the other hand, reinforcement learning additionally learns these models based on the feedback the agent gets from the environment. This book provides a concise introduction to the use of MDPs for solving probabilistic planning problems, with an emphasis on the algorithmic perspective. It covers the whole spectrum of the field, from the basics to state-of-the-art optimal and approximation algorithms. We first describe the theoretical foundations of MDPs and the fundamental solution techniques for them. We then discuss modern optimal algorithms based on heuristic search and the use of structured representations. A major focus of the book is on the numerous approximation schemes for MDPs that have been developed in the AI literature. These include determinization-based approaches, sampling techniques, heuristic functions, dimensionality reduction, and hierarchical representations. Finally, we briefly introduce several extensions of the standard MDP classes that model and solve even more complex planning problems. Table of Contents: Introduction / MDPs / Fundamental Algorithms / Heuristic Search Algorithms / Symbolic Algorithms / Approximation Algorithms / Advanced Notes

Medical Informatics, e-Health

Fundamentals and Applications

Springer Science & Business Media Over the years, medical informatics has matured into a true scientific discipline. Fundamental and applied aspects are now taught in various fields of health, including medicine, dentistry, pharmacy, nursing and public health. Medical informatics is also often included in the curricula of many other disciplines, including the life sciences, engineering and economics. Medical informatics is a complex and rapidly changing discipline. Relatively few books have been published on the subject, and they rapidly become obsolete. This book is the fruit of a collaborative effort between authors teaching medical informatics in France and others who are conducting research in this field. In addition, an international perspective was pursued, as reflected in the inclusion of various developments and actions in both the USA and Europe. This book is divided into 18 chapters, all of which include learning objectives, recommendations for further reading, exercises and bibliographic references.

Introduction to Algorithms, fourth edition

MIT Press A comprehensive update of the leading algorithms text, with new material on matchings in bipartite graphs, online algorithms, machine learning, and other topics. Some books on algorithms are rigorous but incomplete; others cover masses of material but lack rigor. Introduction to Algorithms uniquely combines rigor and comprehensiveness. It covers a broad range of algorithms in depth, yet makes their design and analysis accessible to all levels of readers, with self-contained chapters and algorithms in pseudocode. Since the publication of the first edition, Introduction to Algorithms has become the leading algorithms text in universities worldwide as well as the standard reference for professionals. This fourth edition has been updated throughout. New for the fourth edition • New chapters on matchings in bipartite graphs, online algorithms, and machine learning • New material on topics including solving recurrence equations, hash tables, potential functions, and suffix arrays • 140 new exercises and 22 new problems • Reader feedback-informed improvements to old problems • Clearer, more personal, and gender-neutral writing style • Color added to improve visual presentation • Notes, bibliography, and index updated to reflect developments in the field • Website with new supplementary material

Communicating Process Architectures 2017 & 2018

WoTUG-39 & WoTUG-40

IOS Press Concurrent and parallel systems are intrinsic to the technology which underpins almost every aspect of our lives today. This book presents the combined post-proceedings for two important conferences on concurrent and parallel systems: Communicating Process Architectures 2017, held in Sliema, Malta, in August 2017, and Communicating Process Architectures 2018, held in Dresden, Germany, in August 2018. CPA 2017: Fifteen papers were accepted for presentation and publication, they cover topics including mathematical theory, programming languages, design and support tools, verification, and multicore infrastructure and applications ranging from supercomputing to embedded. A workshop on domain-specific concurrency skeletons and the abstracts of eight fringe presentations reporting on new ideas, work in progress or interesting thoughts associated with concurrency are also included in these proceedings. CPA 2018: Eighteen papers were accepted for presentation and publication, they cover topics including mathematical theory, design and programming language and support tools, verification, multicore run-time infrastructure, and applications at all levels from supercomputing to embedded. A workshop on translating CSP-based languages to common programming languages and the abstracts of four fringe presentations on work in progress, new ideas, as well as demonstrations and concerns that certain common practices in concurrency are harmful are also included in these proceedings. The book will be of interest to all those whose work involves concurrent and parallel systems.

Data Compression

The Complete Reference

Springer Science & Business Media This book provides a comprehensive reference for the many different types and methods of compression. Included are a detailed and helpful taxonomy, analysis of most common methods, and discussions on the use and comparative benefits of methods and description of "how to" use them. Detailed descriptions and explanations of the most well-known and frequently used compression methods are covered in a self-contained fashion, with an accessible style and technical level for specialists and nonspecialists. Comments and suggestions of many readers have been included as a benefit to future readers, and a website is maintained and updated by the author.

Handbook of Data Compression

Springer Science & Business Media Data compression is one of the most important fields and tools in modern computing. From archiving data, to CD-ROMs, and from coding theory to image analysis, many facets of modern computing rely upon data compression. This book provides a comprehensive reference for the many different types and methods of compression. Included are a detailed and helpful taxonomy, analysis of most common methods, and discussions on the use and comparative benefits of methods and description of "how to" use them. Detailed descriptions and explanations of the most well-known and frequently used compression methods are covered in a self-contained fashion, with an accessible style and technical level for specialists and non-specialists.

Asper Review of International Business and Trade Law: Volume XIX

Asper Review of International Business and Trade Law The Asper Review of International Business and Trade Law provides reviews and articles on developments in the areas of international trade, business, & economy.

Tools and Methods for Analysis, Debugging, and Performance Improvement of Equation-Based Models

Linköping University Electronic Press Equation-based object-oriented (EEO) modeling languages such as Modelica provide a convenient, declarative method for describing models of cyber-physical systems. Because of the ease of use of EEO languages, large and complex models can be built with limited effort. However, current state-of-the-art tools do not provide the user with enough information when errors appear or simulation results are wrong. It is of paramount importance that such tools should give the user enough information to correct errors or understand where the problems that lead to wrong simulation results are located. However, understanding the model translation process of an EEO compiler is a daunting task that not only requires knowledge of the numerical algorithms that the tool executes during simulation, but also the complex symbolic transformations being performed. As part of this work, methods have been developed and explored where the EEO tool, an enhanced Modelica compiler, records the transformations during the translation process in order to provide better diagnostics, explanations, and analysis. This information is used to generate better error-messages during translation. It is also used to provide better debugging for a simulation that produces unexpected results or where numerical methods fail. Meeting deadlines is particularly important for real-time applications. It is usually essential to identify possible bottlenecks and either simplify the model or give hints to the compiler that enable it to generate faster code. When profiling and measuring execution times of parts of the model the recorded information can also be used to find out why a particular system model executes slowly. Combined with debugging information, it is possible to find out why this system of equations is slow to solve, which helps understanding what can be done to simplify the model. A tool with a graphical user interface has been developed to make debugging and performance profiling easier. Both debugging and profiling have been combined into a single view so that performance metrics are mapped to equations, which are mapped to debugging information. The algorithmic part of Modelica was extended with meta-modeling constructs (MetaModelica) for language modeling. In this context a quite general approach to debugging and compilation from (extended) Modelica to C code was developed. That makes it possible to use the same executable format for simulation executables as for compiler bootstrapping when the compiler written in MetaModelica compiles itself. Finally, a method and tool prototype suitable for speeding up simulations has been developed. It works by partitioning the model at appropriate places and compiling a simulation executable for a suitable parallel platform.

Internet Daemons

Digital Communications Possessed

U of Minnesota Press A complete history and theory of internet daemons brings these little-known—but very consequential—programs into the spotlight We're used to talking about how tech giants like Google, Facebook, and Amazon rule the internet, but what about daemons? Ubiquitous programs that have colonized the Net's infrastructure—as well as the devices we use to access it—daemons are little known. Fenwick McKelvey weaves together history, theory, and policy to give a full account of where daemons come from and how they influence our lives—including their role in hot-button issues like network neutrality. Going back to Victorian times and the popular thought experiment Maxwell's Demon, McKelvey charts how daemons evolved from concept to reality, eventually blossoming into the pandaemonium of code-based creatures that today orchestrates our internet. Digging into real-life examples like sluggish connection speeds, Comcast's efforts to control peer-to-peer networking, and Pirate Bay's attempts to elude daemon control (and skirt copyright), McKelvey shows how daemons have been central to the internet, greatly influencing everyday users. *Internet Daemons* asks important questions about how much control is being handed over to these automated, autonomous programs, and the consequences for transparency and oversight.

Production Studies, The Sequel!

Cultural Studies of Global Media Industries

Routledge *Production Studies, The Sequel!* is an exciting exploration of the experiences of media workers in local, global, and digital communities—from prop-masters in Germany, Chinese film auteurs, producers of children's television in Qatar, Italian radio broadcasters, filmmakers in Ethiopia and Nigeria, to seemingly-autonomous Twitterbots. Case studies examine international production cultures across five continents and incorporate a range of media, including film, television, music, social media, promotional media, video games, publishing and public broadcasting. Using the lens of cultural studies to examine media production, *Production Studies, The Sequel!* takes into account transnational production flows and places production studies in conversation with other major areas of media scholarship including audience studies, media industries, and media history. A follow-up to the successful *Production Studies*, this collection highlights new and important research in the field, and promises to generate continued discussion about the past, present, and future of production studies.

Systems Biology of Tumor Microenvironment

Quantitative Modeling and Simulations

Springer This edited volume discusses the complexity of tumor microenvironments during cancer development, progression and treatment. Each chapter presents a different mathematical model designed to investigate the interactions between tumor cells and the surrounding stroma and stromal cells. The topics covered in this book include the quantitative image analysis of a tumor microenvironment, the microenvironmental barriers in oxygen and drug delivery to tumors, the development of tumor microenvironmental niches and sanctuaries, intravenous transport of the circulating tumor cells, the role of the tumor microenvironment in chemotherapeutic interventions, the interactions between tumor cells, the extracellular matrix, the interstitial fluid, and the immune and stromal cells. Mathematical models discussed here embrace both continuous and agent-based approaches, as well as mathematical frameworks of solid mechanics, fluid dynamics and optimal control theory. The topics in each chapter will be of interest to a biological community wishing to apply the mathematical methods to interpret their experimental data, and to a biomathematical audience interested in exploring how mathematical models can be used to address complex questions in cancer biology.

Graph-Powered Machine Learning

Simon and Schuster At its core, machine learning is about efficiently identifying patterns and relationships in data. Many tasks, such as finding associations among terms so you can make accurate search recommendations or locating individuals within a social network who have similar interests, are naturally expressed as graphs. *Graph-Powered Machine Learning* introduces you to graph technology concepts, highlighting the role of graphs in machine learning and big data platforms. You'll get an in-depth look at techniques including data source modeling, algorithm design, link analysis, classification, and clustering. As you master the core concepts, you'll explore three end-to-end projects that illustrate architectures, best design practices, optimization approaches, and common pitfalls. Key Features · The lifecycle of a machine learning project · Three end-to-end applications · Graphs in big data platforms · Data source modeling · Natural language processing, recommendations, and relevant search · Optimization methods Readers comfortable with machine learning basics. About the technology By organizing and analyzing your data as graphs, your applications work more fluidly with graph-centric algorithms like nearest neighbor or page rank where it's important to quickly identify and exploit relevant relationships. Modern graph data stores, like Neo4j or Amazon Neptune, are readily available tools that support graph-powered machine learning. Alessandro Negro is a Chief Scientist at GraphAware. With extensive experience in software development, software architecture, and data management, he

has been a speaker at many conferences, such as Java One, Oracle Open World, and Graph Connect. He holds a Ph.D. in Computer Science and has authored several publications on graph-based machine learning.

TRANSPORTATION PLANNING : PRINCIPLES, PRACTICES AND POLICIES

PHI Learning Pvt. Ltd. Transportation planning plays a key role as a lifeline for any society. It comprises applications of science and art, where a great deal of judgment coupled with its technical elements is required to arrive at a meaningful decision in order to develop transportation infrastructure facilities for the community. It, thereby, helps in achieving a safer, faster, comfortable, convenient, economical, sustainable and environment-friendly movement of people and goods traffic. In this context, the book has been written, and now updated in the second edition dealing with the basic principles and fundamentals of transportation planning. It also keeps abreast of the current techniques practices and policies conducted in transportation planning. Exploiting a systematic approach avoiding prolixity, this book will prove to be a vade mecum for the undergraduate and postgraduate students of civil engineering and transportation engineering. Besides, the book is of immense benefit to the students opting a course on Mater of Planning conducted in various institutes. **HIGHLIGHTS OF THE BOOK** • Systematically organised concepts well-supported with ample illustrations • Prodigious illustrative figures and tables • Chapter-end summary helps in grasping the quirk concepts • State-of-the-art data garnered in the book presents an updated version • Chapter-end review questions help students to prepare for the examination **NEW TO THE SECOND EDITION** • Provides Fuzzy Logic, Artificial Neural Network and Neuro Fuzzy Model techniques (Chapter 4) • Incorporates the formation of travel demand model with soft computing techniques including trip generation model (Chapter 5) • Provides a practical approach of calibrating Origin Destination Matrix (Chapter 6) • Incorporates the concept of mode choice models with a number of worked-out examples (Chapter 7) • Provides a case study on mobility plan of Gandhinagar, Gujarat, demonstrating the development of all stages of transport modelling (Chapter 11) • Includes a new appendix on "Applications of Soft Computing in Trip Distribution and Traffic Assignment"

TRANSPORTATION PLANNING

PHI Learning Pvt. Ltd. Transportation planning plays a useful role as a lifeline for any society. It comprises applications of science and art, where a great deal of judgement coupled with its technical elements is required to arrive at a meaningful decision in order to develop transportation infrastructure facilities for the community. Transportation planning, thereby, helps in achieving a safer, faster, comfortable, convenient, economical and environment-friendly movement of people and goods traffic. In this context, an attempt has been made to write a comprehensive book on this subject, which not only deals with the basic principles and fundamentals of transportation planning but also keeps abreast of the current practices and policies conducted in transportation planning. Divided into 23 chapters, the book felicitously proffers the fundamental techniques of transportation planning and travel demand modelling, urban form and urban structure and their relation with transport pattern, land use-transport model, accessibility and mobility consideration in transport modelling, graph theory and road network planning, cost benefit analysis, mass transport planning, applications of intelligent transport system, applications of software in transport planning, and transport policies. Exploiting a systematic approach avoiding prolixity, this book will prove to be a vade mecum for the undergraduate and postgraduate students of civil engineering and transportation engineering. Besides, this book is of immense benefit to the students opting a course on Master of Planning conducted in various institutes. **Highlights of the Book** • Systematically organised concepts well-supported with ample illustrations • Prodigious illustrative figures and tables • Incorporates chapter-end summary to help in grasping the quirk concepts • Presents state-of-the-art data • Includes chapter-end review questions to help students prepare for examination

The Algorithm Design Manual

Springer Science & Business Media This newly expanded and updated second edition of the best-selling classic continues to take the "mystery" out of designing algorithms, and analyzing their efficacy and efficiency. Expanding on the first edition, the book now serves as the primary textbook of choice for algorithm design courses while maintaining its status as the premier practical reference guide to algorithms for programmers, researchers, and students. The reader-friendly Algorithm Design Manual provides straightforward access to combinatorial algorithms technology, stressing design over analysis. The first part, Techniques, provides accessible instruction on methods for designing and analyzing computer algorithms. The second part, Resources, is intended for browsing and reference, and comprises the catalog of algorithmic resources, implementations and an extensive bibliography. **NEW to the second edition:** • Doubles the tutorial material and exercises over the first edition • Provides full online support for lecturers, and a completely updated and improved website component with lecture slides, audio and video • Contains a unique catalog identifying the 75 algorithmic problems that arise most often in practice, leading the reader down the right path to solve them • Includes several NEW "war stories" relating experiences from real-world applications • Provides up-to-date links leading to the very best algorithm implementations available in C, C++, and Java

Clean Code in Python

Develop maintainable and efficient code

Packt Publishing Ltd Tackle inefficiencies and errors the Pythonic way Key Features Enhance your coding skills using the new features introduced in Python 3.9 Implement the refactoring techniques and SOLID principles in Python Apply microservices to your legacy systems by implementing practical techniques Book Description Experienced professionals in every field face several instances of disorganization, poor readability, and testability due to unstructured code. With updated code and revised content aligned to the new features of Python 3.9, this second edition of Clean Code in Python will provide you with all the tools you need to overcome these obstacles and manage your projects successfully. The book begins by describing the basic elements of writing clean code and how it plays a key role in Python programming. You will learn about writing efficient and readable code using the Python standard library and best practices for software design. The book discusses object-oriented programming in Python and shows you how to use objects with descriptors and generators. It will also show you the design principles of software testing and how to resolve problems by implementing software design patterns in your code. In the concluding chapter, we break down a monolithic application into a microservices-based one starting from the code as the basis for a solid platform. By the end of this clean code book, you will be proficient in applying industry-approved coding practices to design clean, sustainable, and readable real-world Python code. What you will learn Set up a productive development environment by leveraging automatic tools Leverage the magic methods in Python to write better code, abstracting complexity away and encapsulating details Create advanced object-oriented designs using unique features of Python, such as descriptors Eliminate duplicated code by creating powerful abstractions using software engineering principles of object-oriented design Create Python-specific solutions using decorators and descriptors Refactor code effectively with the help of unit tests Build the foundations for solid architecture with a clean code base as its cornerstone Who this book is for This book is designed to benefit new as well as experienced programmers. It will appeal to team leads, software architects and senior software engineers who would like to write Pythonic code to save on costs and improve efficiency. The book assumes that you have a strong understanding of programming

Modern C

Simon and Schuster 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.

Programming Models for Parallel Computing

MIT Press An overview of the most prominent contemporary parallel processing programming models, written in a unique tutorial style. With the coming of the parallel computing era, computer scientists have turned their attention to designing programming models that are suited for high-performance parallel computing and supercomputing systems. Programming parallel systems is complicated by the fact that multiple processing units are simultaneously computing and moving data. This book offers an overview of some of the most prominent parallel programming models used in high-performance computing and supercomputing systems today. The chapters describe the programming models in a unique tutorial style rather than using the formal approach taken in the research literature. The aim is to cover a wide range of parallel programming models, enabling the reader to understand what each has to offer. The book begins with a description of the Message Passing Interface (MPI), the most common parallel programming model for distributed memory computing. It goes on to cover one-sided communication models, ranging from low-level runtime libraries (GASNet, OpenSHMEM) to high-level programming models (UPC, GA, Chapel); task-oriented programming models (Charm++, ADLB, Scioto, Swift, CnC) that allow users to describe their computation and data units as tasks so that the runtime system can manage computation and data movement as necessary; and parallel programming models intended for on-node parallelism in the context of multicore architecture or attached accelerators (OpenMP, Cilk Plus, TBB, CUDA, OpenCL). The book will be a valuable resource for graduate students, researchers, and any scientist who works with data sets and large computations. Contributors Timothy Armstrong, Michael G. Burke, Ralph Butler, Bradford L. Chamberlain, Sunita Chandrasekaran, Barbara Chapman, Jeff Daily, James Dinan, Deepak Eachempati, Ian T. Foster, William D. Gropp, Paul Hargrove, Wen-mei Hwu, Nikhil Jain, Laxmikant Kale, David Kirk, Kath Knobe, Ariram Krishnamoorthy, Jeffery A. Kuehn, Alexey Kukanov, Charles E. Leiserson, Jonathan Lifflander, Ewing Lusk, Tim Mattson, Bruce Palmer, Steven C. Pieper, Stephen W. Poole, Arch D. Robison, Frank Schlimbach, Rajeev Thakur, Abhinav Vishnu, Justin M. Wozniak, Michael Wilde, Kathy Yelick, Yili Zheng

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Алгоритми доступно

K.I.C. **Ця книжка відчиняє браму до світу алгоритмів. Не обтяжені складною математикою пояснення, подані в неформальному стилі, що робить книжку доступнішою. А перелік тем робить її корисною як для студентів, так і для професіоналів, що хочуть відновити призабуті навички чи відкрити для себе нові шляхи.**

Matters Computational

Ideas, Algorithms, Source Code

Springer Science & Business Media **This book provides algorithms and ideas for computationalists. Subjects treated include low-level algorithms, bit wizardry, combinatorial generation, fast transforms like the Fourier transform, and fast arithmetic for both real numbers and finite fields. Various optimization techniques are described and the actual performance of many given implementations is examined. The focus is on material that does not usually appear in textbooks on algorithms. The implementations are done in C++ and the GP language, written for POSIX-compliant platforms such as the Linux and BSD operating systems.**

Design of Energy-Efficient Application-Specific

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Springer Science & Business Media **After a brief introduction to low-power VLSI design, the design space of ASIP instruction set architectures (ISAs) is introduced with a special focus on important features for digital signal processing. Based on the degrees of freedom offered by this design space, a consistent ASIP design flow is proposed: this design flow starts with a given application and uses incremental optimization of the ASIP hardware, of ASIP coprocessors and of the ASIP software by using a top-down approach and by applying application-specific modifications on all levels of design hierarchy. A broad range of real-world signal processing applications serves as vehicle to illustrate each design decision and provides a hands-on approach to ASIP design. Finally, two complete case studies demonstrate the feasibility and the efficiency of the proposed methodology and quantitatively evaluate the benefits of ASIPs in an industrial context.**

Interaction Design for 3D User Interfaces

The World of Modern Input Devices for Research, Applications, and Game Development

CRC Press In this new era of computing, where the iPhone, iPad, Xbox Kinect, and similar devices have changed the way to interact with computers, many questions have risen about how modern input devices can be used for a more intuitive user interaction. *Interaction Design for 3D User Interfaces: The World of Modern Input Devices for Research, Applications, a*

Advanced Data Mining and Applications

Second International Conference, ADMA 2006, Xi'an, China, August 14-16, 2006, Proceedings

Springer Here are the proceedings of the 2nd International Conference on Advanced Data Mining and Applications, ADMA 2006, held in Xi'an, China, August 2006. The book presents 41 revised full papers and 74 revised short papers together with 4 invited papers. The papers are organized in topical sections on association rules, classification, clustering, novel algorithms, multimedia mining, sequential data mining and time series mining, web mining, biomedical mining, advanced applications, and more.

Introduction to Information Retrieval

Cambridge University Press Class-tested and coherent, this textbook teaches classical and web information retrieval, including web search and the related areas of text classification and text clustering from basic concepts. It gives an up-to-date treatment of all aspects of the design and implementation of systems for gathering, indexing, and searching documents; methods for evaluating systems; and an introduction to the use of machine learning methods on text collections. All the important ideas are explained using examples and figures, making it perfect for introductory courses in information retrieval for advanced undergraduates and graduate students in computer science. Based on feedback from extensive classroom experience, the book has been carefully structured in order to make teaching more natural and effective. Slides and additional exercises (with solutions for lecturers) are also available through the book's supporting website to help course instructors prepare their lectures.

Logische und Methodische Grundlagen der Programm- und Systementwicklung

Datenstrukturen, funktionale, sequenzielle und objektorientierte Programmierung - Unter Mitarbeit von Alexander Malkis

Springer-Verlag Dieses Buch vermittelt Studierenden und Praktikern die Grundlagen der System- und Programmentwicklung. In diesem Buch stellen Manfred Broy und Alexander Malkis die wesentlichen Grundlagen und Methoden der Programmentwicklung vor. Die Autoren vermitteln Studierenden der Informatik und Praktikern aus dem Bereich Software-Engineering, wie sie grundlegende Aufgaben der Programmentwicklung auf wissenschaftlicher Basis verstehen und bewältigen. Sie fassen alle behandelten wissenschaftlichen Ansätze und Methoden übersichtlich zusammen und führen diese anhand von praktischen Beispielen näher aus. Die Kernthemen des Werks im Überblick Das Buch „Logische und Methodische Grundlagen der Programm- und Systementwicklung“ widmet sich folgenden Themen: ? Algebraische Spezifikationen von Daten- und Rechenstrukturen ? Spezifikation und Implementierung ? Nachweis der Korrektheit für funktionale, sequenzielle und objektorientierte Programmierung? Korrektheits- und Terminierungsbeweise? Design-by-Contract ? Schrittweise Verfeinerung

Low-Level Programming

C, Assembly, and Program Execution on Intel® 64

Architecture

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Dancing with Qubits

How quantum computing works and how it can change the world

Packt Publishing Ltd **Explore the principles and practicalities of quantum computing Key FeaturesDiscover how quantum computing works and delve into the math behind it with this quantum computing textbookLearn how it may become the most important new computer technology of the centuryExplore the inner workings of quantum computing technology to quickly process complex cloud data and solve problemsBook Description Quantum computing is making us change the way we think about computers. Quantum bits, a.k.a. qubits, can make it possible to solve problems that would otherwise be intractable with current computing technology. Dancing with Qubits is a quantum computing textbook that starts with an overview of why quantum computing is so different from classical computing and describes several industry use cases where it can have a major impact. From there it moves on to a fuller description of classical computing and the mathematical underpinnings necessary to understand such concepts as superposition, entanglement, and interference. Next up is circuits and algorithms, both basic and more sophisticated. It then nicely moves on to provide a survey of the physics and engineering ideas behind how quantum computing hardware is built. Finally, the book looks to the future and gives you guidance on understanding how further developments will affect you. Really understanding quantum computing requires a lot of math, and this book doesn't shy away from the necessary math concepts you'll need. Each topic is introduced and explained thoroughly, in clear English with helpful examples. What you will learnSee how quantum computing works, delve into the math behind it, what makes it different, and why it is so powerful with this quantum computing textbookDiscover the complex, mind-bending mechanics that underpin quantum systemsUnderstand the necessary concepts behind classical and quantum computingRefresh and extend your grasp of essential mathematics, computing, and quantum theoryExplore the main applications of quantum computing to the fields of scientific computing, AI, and elsewhereExamine a detailed overview of qubits, quantum circuits, and quantum algorithmWho this book is for Dancing with Qubits is a quantum computing textbook for those who want to deeply explore the inner workings of quantum computing. This entails some sophisticated mathematical exposition and is therefore best suited for those with a healthy interest in mathematics, physics, engineering, and computer science.**