

Data Structures And Algorithms With Object Oriented Design Patterns In C

Using only practically useful techniques, this book teaches methods for organizing, reorganizing, exploring, and retrieving data in digital computers, and the mathematical analysis of those techniques. The authors present analyses that are relatively brief and non-technical but illuminate the important performance characteristics of the algorithms. Data Structures and Their Algorithms covers algorithms, not the expression of algorithms in the syntax of particular programming languages. The authors have adopted a pseudocode notation that is readily understandable to programmers but has a simple syntax.

In the era of self-taught developers and programmers, essential topics in the industry are frequently learned without a formal academic foundation. A solid grasp of data structures and algorithms (DSA) is imperative for anyone looking to do professional software development and engineering, but classes in the subject can be dry or spend too much time on theory and unnecessary readings. Regardless of your programming language background, Codeless Data Structures and Algorithms has you covered. In this book, author Armstrong Subero will help you learn DSAs without writing a single line of code. Straightforward explanations and diagrams give you a confident handle on the topic while ensuring you never have to open your code editor, use a compiler, or look at an integrated development environment. Subero introduces you to linear, tree, and hash data structures and gives you important insights behind the most common algorithms that you can directly apply to your own programs. Codeless Data Structures and Algorithms provides you with the knowledge about DSAs that you will need in the professional programming world, without using any complex mathematics or irrelevant information. Whether you are a new developer seeking a basic understanding of the subject or a decision-maker wanting a grasp of algorithms to apply to your projects, this book belongs on your shelf. Quite often, a new, refreshing, and unpretentious approach to a topic is all you need to get inspired. What You'll LearnUnderstand tree data structures without delving into unnecessary details or going into too much theoryGet started learning linear data structures with a basic discussion on computer memory Study an overview of arrays, linked lists, stacks and queues Who This Book Is ForThis book is for beginners, self-taught developers and programmers, and anyone who wants to understand data structures and algorithms but don't want to wade through unnecessary details about quirks of a programming language or don't have time to sit and read a massive book on the subject. This book is also useful for non-technical decision-makers who are curious about how algorithms work.

Data -- Data Structures.

The book is an introduction to the theory of cubic metaplectic forms on the 3-dimensional hyperbolic space and the author's research on cubic metaplectic forms on special linear and symplectic groups of rank 2. The topics include: Kubota and Bass-Milnor-Serre homomorphisms, cubic metaplectic Eisenstein series, cubic theta functions, Whittaker functions. A special method is developed and applied to find Fourier coefficients of the Eisenstein series and cubic theta functions. The book is intended for readers, with beginning graduate-level background, interested in further research in the theory of metaplectic forms and in possible applications.

Algorithms and Data Structures

Data Structures and Algorithms 2

Data Structures and Algorithms Using Java

Codeless Data Structures and Algorithms

Data Structures and Algorithms in Python

Data Structures & Their Algorithms

Creating robust software requires the use of efficient algorithms, but programmers seldom think about them until a problem occurs. Algorithms in a Nutshell describes a large number of existing algorithms for solving a variety of problems, and helps you select and implement the right algorithm for your needs -- with just enough math to let you understand and analyze algorithm performance. With its focus on application, rather than theory, this book provides efficient code solutions in several programming languages that you can easily adapt to a specific project. Each major algorithm is presented in the style of a design pattern that includes information to help you understand why and when the algorithm is appropriate. With this book, you will: Solve a particular coding problem or improve on the performance of an existing solution Quickly locate algorithms that relate to the problems you want to solve, and determine why a particular algorithm is the right one to use Get algorithmic solutions in C, C++, Java, and Ruby with implementation tips Learn the expected performance of an algorithm, and the conditions it needs to perform at its best Discover the impact that similar design decisions have on different algorithms Learn advanced data structures to improve the efficiency of algorithms With Algorithms in a Nutshell, you'll learn how to improve the performance of key algorithms essential for the success of your software applications.

"Algorithms and data structures are much more than abstract concepts. Mastering them enables you to write code that runs faster and more efficiently, which is particularly important for today's web and mobile apps. This book takes a practical approach to data structures and algorithms, with techniques and real-world scenarios that you can use in your daily production code. Graphics and examples make these computer science concepts understandable and relevant. You can use these techniques with any language; examples in the book are in JavaScript, Python, and Ruby. Use Big O notation, the primary tool for evaluating algorithms, to measure and articulate the efficiency of your code, and modify your algorithm to make it faster. Find out how your choice of arrays, linked lists, and hash tables can dramatically affect the code you write. Use recursion to solve tricky problems and create algorithms that run exponentially faster than the alternatives. Dig into advanced data structures such as binary trees and graphs to help scale specialized applications such as social networks and mapping software. You'll even encounter a single keyword that can give your code a turbo boost. Jay Wengrow brings to this book the key teaching practices he developed as a web development bootcamp founder and educator. Use these techniques today to make your code faster and more scalable. "

Explore data structures and algorithm concepts and their relation to everyday JavaScript development. A basic understanding of these ideas is essential to any JavaScript developer wishing to analyze and build great software solutions. You'll discover how to implement data structures such as hash tables, linked lists, stacks, queues, trees, and graphs. You'll also learn how a URL shortener, such as bit.ly, is developed and what is happening to the data as a PDF is uploaded to a webpage. This book covers the practical applications of data structures and algorithms to encryption, searching, sorting, and pattern matching. It is crucial for JavaScript developers to understand how data structures work and how to design algorithms. This book and the accompanying code provide that essential foundation for doing so. With JavaScript Data Structures and Algorithms you can start developing your knowledge and applying it to your JavaScript projects today. What You'll Learn Review core data structure fundamentals: arrays, linked-lists, trees, heaps, graphs, and hash-tableReview core algorithm fundamentals: search, sort, recursion, breadth/depth first search, dynamic programming, bitwise operators Examine how the core data structure and algorithms knowledge fits into context of JavaScript explained using prototypical inheritance and native JavaScript objects/data types Take a high-level look at commonly used design patterns in JavaScript Who This Book Is For Existing web developers and software engineers seeking to develop or revisit their fundamental data structures knowledge; beginners and students studying JavaScript independently or via a course or coding bootcamp.

*Learn Data Structures & Algorithms in Swift!Data structures and algorithms form the basis of computer programming and are the starting point for anyone looking to become a software engineer. Choosing the proper data structure and algorithm involves understanding the many details and trade-offs of using them, which can be time-consuming to learn - and confusing.This is where this book, Data Structures & Algorithms in Swift, comes to the rescue! In this book, you'll learn the nuts and bolts of how fundamental data structures and algorithms work by using easy-to-follow tutorials loaded with illustrations; you'll also learn by working in Swift playground code.Who This Book Is ForThis book is for developers who know the basics of Swift syntax and want a better theoretical understanding of what data structures and algorithms are to build more complex programs or ace a whiteboard interview.Topics Covered in Data Structures & Algorithms in Swift*Basic data structures and algorithms, including stacks, queues and linked lists. *How protocols can be used to generalize algorithms. *How to leverage the algorithms of the Swift standard library with your own data structures. *Trees, tries and graphs. *Building algorithms on top of other primitives. *A complete spectrum of sorting algorithms from simple to advanced. *How to think about algorithmic complexity. *Finding shortest paths, traversals, subgraphs and much more.After reading this book, you'll have a solid foundation on data structures and algorithms and be ready to solve more complex problems in your apps elegantly.*

Advanced Algorithms and Data Structures

Learn Data Structures and Algorithms with Golang

Foundations and Probabilistic Methods for Design and Analysis

Data Structures and Algorithms: A First Course

Data Structures & Algorithm Analysis in C++

Data Structures and Algorithms in Java

An updated, innovative approach to data structures and algorithms Written by an author team of experts in their fields, this authoritative guide demystifies even the most difficult mathematical concepts so that you can gain a clear understanding of data structures and algorithms in C++. The unparalleled author team incorporates the object-oriented design paradigm using C++ as the implementation language, while also providing intuition and analysis of fundamental algorithms. Offers a unique multimedia format for learning the fundamentals of data structures and algorithms Allows you to visualize key analytic concepts, learn about the most recent insights in the field, and do data structure design Provides clear approaches for developing programs Features a clear, easy-to-understand writing style that breaks down even the most difficult mathematical concepts Building on the success of the first edition, this new version offers you an innovative approach to fundamental data structures and algorithms.

Learn to implement complex data structures and algorithms using Python Key FeaturesUnderstand the analysis and design of fundamental Python data structuresExplore advanced Python concepts such as Big O notation and dynamic programmingLearn functional and reactive implementations of traditional data structuresBook Description Data structures allow you to store and organize data efficiently. They are critical to any problem, provide a complete solution, and act like reusable code. Hands-On Data Structures and Algorithms with Python teaches you the essential Python data structures and the most common algorithms for building easy and maintainable applications. This book helps you to understand the power of linked lists, double linked lists, and circular linked lists. You will learn to create complex data structures, such as graphs, stacks, and queues. As you make your way through the chapters, you will explore the application of binary searches and binary search trees, along with learning common techniques and structures used in tasks such as preprocessing, modeling, and transforming data. In the concluding chapters, you will get to grips with organizing your code in a manageable, consistent, and extendable way. You will also study how to bubble sort, selection sort, insertion sort, and merge sort algorithms in detail. By the end of the book, you will have learned how to build components that are easy to understand, debug, and use in different applications. You will get insights into Python implementation of all the important and relevant algorithms. What you will learnUnderstand object representation, attribute binding, and data encapsulationGain a solid understanding of Python data structures using algorithmsStudy algorithms using examples with pictorial representationLearn complex algorithms through easy explanation, implementing PythonBuild sophisticated and efficient data applications in PythonUnderstand common programming algorithms used in Python data scienceWrite efficient and robust code in Python 3.7Who this book is for This book is for developers who want to learn data structures and algorithms in Python to write complex and flexible programs. Basic Python programming knowledge is expected.

Data structures and algorithms are presented at the college level in a highly accessible format that presents material with one-page displays in a way that will appeal to both teachers and students. The thirteen chapters cover: Models of Computation, Lists, Induction and Recursion, Trees, Algorithm Design, Hashing, Heaps, Balanced Trees, Sets Over a Small Universe, Graphs, Strings, Discrete Fourier Transform, Parallel Computation. Key features: Complicated concepts are expressed clearly in a single page with minimal notation and without the "clutter" of the syntax of a particular programming language; algorithms are presented with self-explanatory "pseudo-code." * Chapters 1-4 focus on elementary concepts, the exposition unfolding at a slower pace. Sample exercises with solutions are provided. Sections that may be skipped for an introductory course are starred. Requires only some basic mathematics background and some computer programming experience. * Chapters 5-13 progress at a faster pace. The material is suitable for undergraduates or first-year graduates who need only review Chapters 1 -4. * This book may be used for a one-semester introductory course (based on Chapters 1-4 and portions of the chapters on algorithm design, hashing, and graph algorithms) and for a one-semester advanced course that starts at Chapter 5. A year-long course may be based on the entire book. * Sorting, often perceived as rather technical, is not treated as a separate chapter, but is used in many examples (including bubble sort, merge sort, tree sort, heap sort, quick sort, and several parallel algorithms). Also, lower bounds on sorting by comparisons are included with the presentation of heaps in the context of lower bounds for comparison-based structures. * Chapter 13 on parallel models of computation is something of a mini-book itself, and a good way to end a course. Although it is not clear what parallel

Data Structures & Algorithms books by Hemant Jain is a series of books about the usage of Data Structures and Algorithms in computer programming. The book is easy to follow and is written for interview preparation point of view. In these books, the examples are solved in various languages like Go, C, C++, Java, C#, Python, VB, JavaScript and PHP. GitHub Repositories for these books. https://github.com/Hemant-Jain-Author Book's Composition This book introduces you to the world of data structures and algorithms. Data structures defines the way in which data is arranged in memory for fast and efficient access while algorithms are a set of instruction to solve problems by manipulating these data structures. Designing an efficient algorithm is a very important skill that all software companies, e.g. Microsoft, Google, Facebook etc. pursues. Most of the interviews for these companies are focused on knowledge of data-structures and algorithms. They look for how candidates use concepts of data structures and algorithms to solve complex problems efficiently. Apart from knowing, a programming language you also need to have good command of these key computer fundamentals to not only qualify the interview but also excel in you jobs as a software engineer. This book assumes that you are a C language developer. You are not an expert in C language, but you are well familiar with concepts of classes, functions, arrays, pointers and recursion. At the start of this book, we will be looking into Complexity Analysis followed by the various data structures and their algorithms. We will be looking into a Linked-List, Stack, Queue, Trees, Heap, Hash-Table and Graphs. We will also be looking into Sorting, Searching techniques. In last few chapters, we will be looking into various algorithmic techniques. Such as, Brute-Force algorithms, Greedy algorithms, Divide and Conquer algorithms, Dynamic Programming, Reduction and Backtracking. . Table of Contents Chapter 0: How to use this book Chapter 1: Algorithms Analysis Chapter 2: Approach to solve algorithm design problems Chapter 3: Abstract Data Type & C# Collections Chapter 4: Searching Chapter 5: Sorting Chapter 6: Linked List Chapter 7: Stack Chapter 8: Queue Chapter 9: Tree Chapter 10: Priority Queue Chapter 11: Hash-Table Chapter 12: Graphs Chapter 13: String Algorithms Chapter 14: Algorithm Design Techniques Chapter 15: Brute Force Algorithm Chapter 16: Greedy Algorithm Chapter 17: Divide & Conquer Chapter 18: Dynamic Programming Chapter 19: Backtracking Chapter 20: Complexity Theory

Python Data Structures and Algorithm

The Basic Toolbox

Data Structures and Algorithms in C++

JavaScript Data Structures and Algorithms

C++ Data Structures and Algorithms

This textbook explains the concepts and techniques required to write programs that can handle large amounts of data efficiently. Project-oriented and classroom-tested, the book presents a number of important algorithms supported by examples that bring meaning to the problems faced by computer programmers. The idea of computational complexity is also introduced, demonstrating what can and cannot be computed efficiently so that the programmer can make informed judgements about the algorithms they use. Features: includes both introductory and advanced data structures and algorithms topics, with suggested chapter sequences for those respective courses provided in the preface; provides learning goals, review questions and programming exercises in each chapter, as well as numerous illustrative examples; offers downloadable programs and supplementary files at an associated website, with instructor materials available from the author; presents a primer on Python for those from a different language background.

A comprehensive treatment focusing on the creation of efficient data structures and algorithms, this text explains how to select or design the data structure best suited to specific problems. It uses C++ as the programming language and is suitable for second-year data structure courses and computer science courses in algorithmic analysis.

Increase speed and performance of your applications with efficient data structures and algorithms About This Book See how to use data structures such as arrays, stacks, trees, lists, and graphs through real-world examples Find out about important and advanced data structures such as searching and sorting algorithms Understand important concepts such as big-o notation, dynamic programming, and functional data structured Who This Book Is For This book is for R developers who want to use data structures efficiently. Basic knowledge of R is expected. What You Will Learn Understand the rationality behind data structures and algorithms Understand computation evaluation of a program featuring asymptotic and empirical algorithm analysis Get to know the fundamentals of arrays and linked-based data structures Analyze types of sorting algorithms Search algorithms along with hashing Understand linear and tree-based indexing Be able to implement a graph including topological sort, shortest path problem, and Prim's algorithm Understand dynamic programming (Knapsack) and randomized algorithms In Detail In this book, we cover not only classical data structures, but also functional data structures. We begin by answering the fundamental question: why data structures? We then move on to cover the relationship between data structures and algorithms, followed by an analysis and evaluation of algorithms. We introduce the fundamentals of data structures, such as lists, stacks, queues, and dictionaries, using real-world examples. We also cover topics such as indexing, sorting, and searching in depth. Later on, you will be exposed to advanced topics such as graph data structures, dynamic programming, and randomized algorithms. You will come to appreciate the intricacies of high performance and scalable programming using R. We also cover special R data structures such as vectors, data frames, and atomic vectors. With this easy-to-read book, you will be able to understand the power of linked lists, double linked lists, and circular linked lists. We will also explore the application of binary search and will go in depth into sorting algorithms such as bubble sort, selection sort, insertion sort, and merge sort. Style and approach This easy-to-read book with its fast-paced nature will improve the productivity of an R programmer and improve the performance of R applications. It is packed with real-world examples.

Although traditional texts present isolated algorithms and data structures, they do not provide a unifying structure and offer little guidance on how to appropriately select among them. Furthermore, these texts furnish little, if any, source code and leave many of the more difficult aspects of the implementation as exercises. A fresh alternative to conventional data structures and algorithms books, A Practical Guide to Data Structures and Algorithms using Java presents comprehensive coverage of fundamental data structures and algorithms in a unifying framework with full implementation details. Recognizing that software development is a top-down process, this applications-centered book provides careful guidance to students and practitioners. Complete and thoroughly integrated Java implementations expose key differences among a wide range of important data structures, including many useful abstract data types not provided in standard Java libraries. Fundamental algorithms appear within the context of their supporting data structures. Case studies, examples, decision trees, and comparison charts throughout the stylized presentation illustrate and support an efficient methodology for the careful selection and application of data structures and algorithms. Appendices summarize major features of the Java programming language, introduce asymptotic notation and complexity analysis, and discuss design patterns applied in the book. A true marriage of theory and practice, this book sets a new standard as a comprehensive practical guide to data structures and algorithms. Practitioners and students will reach for this book often to quickly identify the best data structure or algorithm for their applications.

Data Structures & Algorithms In Go

Introduction to Data Structures and Algorithms with C++

Algorithms in a Nutshell

An Introduction to Understanding and Implementing Core Data Structure and Algorithm Fundamentals

Level Up Your Core Programming Skills

Bringing classic computing approaches to the Web

Data Structures & Theory of Computation

Data Structures and Algorithms in Java. Second Edition is designed to be easy to read and understand although the topic itself is complicated. Algorithms are the procedures that software programs use to manipulate data structures. Besides clear and simple example programs, the author includes a workshop as a small demonstration program executable on a Web browser. The programs demonstrate in graphical form what data structures look like and how they operate. In the second edition, the program is rewritten to improve operation and clarify the algorithms, the example programs are revised to work with the latest version of the Java JDK, and questions and exercises will be added at the end of each chapter making the book even more useful. Educational Supplement Suggested solutions to the programming projects found at the end of

each chapter are made available to instructors at recognized educational institutions. This educational supplement can be found at www.prenhall.com, in the Instructor Resource Center.

THIS TEXTBOOK is about computer science. It is also about Python. However, there is much more. The study of algorithms and data structures is central to understanding what computer science is all about. Learning computer science is not unlike learning any other type of difficult subject matter. The only way to be successful is through deliberate and incremental exposure to the fundamental ideas. A beginning computer scientist needs practice so that there is a thorough understanding before continuing on to the more complex parts of the curriculum. In addition, a beginner needs to be given the opportunity to be successful and gain confidence. This textbook is designed to serve as a text for a first course on data structures and algorithms, typically taught as the second course in the computer science curriculum. Even though the second course is considered more advanced than the first course, this book assumes you are beginners at this level. You may still be struggling with some of the basic ideas and skills from a first computer science course and yet be ready to further explore the discipline and continue to practice problem solving. We cover abstract data types and data structures, writing algorithms, and solving problems. We look at a number of data structures and solve classic problems that arise. The tools and techniques that you learn here will be applied over and over as you continue your study of computer science.

This Festschrift volume, published in honour of J. Ian Munro, contains contributions written by some of his colleagues, former students, and friends. In celebration of his 66th birthday the colloquium "Conference on Space Efficient Data Structures, Streams and Algorithms" was held in Waterloo, ON, Canada, during August 15-16, 2013. The articles presented herein cover some of the main topics of Ian's research interests.

Together they give a good overall perspective of the last 40 years of research in algorithms and data structures.

Data Structures and Algorithms with JavaScript

Papers in Honor of J. Ian Munro, on the Occasion of His 66th Birthday

Learn programming techniques to build effective, maintainable, and readable code in Rust 2018

Data Structures and Algorithms with Python

A Practical Guide to Data Structures and Algorithms using Java

Hands-On Data Structures and Algorithms with Rust

Create sound software designs with data structures that use modern object-oriented design patterns! Author Bruno Preiss presents the fundamentals of data structures and algorithms from a modern, object-oriented perspective. The text promotes object-oriented design using Java and illustrates the use of the latest object-oriented design patterns. Virtually all the data structures are discussed in the context of a single class hierarchy. This framework clearly shows the relationships between data structures and illustrates how polymorphism and inheritance can be used effectively. Key Features of the Text * All data structures are presented using a common framework. This shows the relationship between the data structures and how they are implemented. * Object-oriented design patterns are used to demonstrate how a good design fits together and transcends the problem at hand. * A single Java software design is used throughout the text to provide a better understanding of the operation of complicated data structures. * Just-in-time presentation of mathematical analysis techniques introduces students to mathematical concepts as needed. Visit the Text's Web Site A comprehensive web site is available for users of the text at www.wiley.com/college/preiss. The site includes: * The Web Book (a hypertext version of the complete book) * Links to the Java Source Code (all the program examples from the text) * Opus5 Package (a Java package comprised of all the source code from the text) * Documentation (source code documentation) * Demo Applets (various Java applets that illustrate data structures and algorithms from the text) * Archive (JAR format archive of the source code from the text) * Front Matter (table of contents and preface) * Solutions Manual (password required) * Errata

This concise introduction is ideal for readers familiar with programming and basic mathematical language. It uses pictures, words and high-level pseudocode to explain algorithms and presents efficient implementations using real programming languages.

This is a complete introduction to the critical topic of data structures, written from the object-oriented perspective most students and practitioners are adopting.The book introduces data structures using C++, a language whose classes and object-oriented constructs are specifically designed to efficiently implement data structures. The opening chapters introduce the ideas behind object-oriented programming and C++; once these ideas are explained, the book introduces data structures and algorithms from an O-O point of view. All standard data structures are described, including stacks, queues, sets, linked lists, trees and graphs. Searching and sorting algorithms are also studied.This book is for students and others working with data structures, especially object-oriented developers interested in ways data structures can enhance their effectiveness.

Data Structures and Algorithms with PythonSpringer

Data Structures and Algorithms

Hands-On Data Structures and Algorithms with Python

Data Structures and Algorithms with Object-Oriented Design Patterns in Java

Write complex and powerful code using the latest features of Python 3.7, 2nd Edition

Graph Algorithms and NP-Completeness

Data Structures & Algorithms in Swift (Fourth Edition)

Explore Golang's data structures and algorithms to design, implement, and analyze code in the professional setting **Key Features***Learn the basics of data structures and algorithms and implement them efficiently**Use data structures such as arrays, stacks, trees, lists and graphs in real-world scenarios**Compare the complexity of different algorithms and data structures for improved code performance***Book Description** *Golang is one of the fastest growing programming languages in the software industry. Its speed, simplicity, and reliability make it the perfect choice for building robust applications. This brings the need to have a solid foundation in data structures and algorithms with Go so as to build scalable applications. Complete with hands-on tutorials, this book will guide you in using the best data structures and algorithms for problem solving. The book begins with an introduction to Go data structures and algorithms. You'll learn how to store data using linked lists, arrays, stacks, and queues. Moving ahead, you'll discover how to implement sorting and searching algorithms, followed by binary search trees. This book will also help you improve the performance of your applications by stringing data types and implementing hash structures in algorithm design. Finally, you'll be able to apply traditional data structures to solve real-world problems. By the end of the book, you'll have become adept at implementing classic data structures and algorithms in Go, propelling you to become a confident Go programmer. What you will learn**Improve application performance using the most suitable data structure and algorithm**Explore the wide range of classic algorithms such as recursion and hashing algorithms**Work with algorithms such as garbage collection for efficient memory management* *Analyze the cost and benefit trade-off to identify algorithms and data structures for problem solving**Explore techniques for writing pseudocode algorithm and ace whiteboard coding in interviews**Discover the pitfalls in selecting data structures and algorithms by predicting their speed and efficiency**Who this book is for* *This book is for developers who want to understand how to select the best data structures and algorithms that will help solve coding problems. Basic Go programming experience will be an added advantage.*

Learn how to build efficient, secure and robust code in C++ by using data structures and algorithms - the building blocks of C++ **Key Features** *Use data structures such as arrays, stacks, trees, lists, and graphs with real-world examples* *Learn the functional and reactive implementations of the traditional data structures* *Explore illustrations to present data structures and algorithms, as well as their analysis, in a clear, visual manner* **Book Description** *C++ is a general-purpose programming language which has evolved over the years and is used to develop software for many different sectors. This book will be your companion as it takes you through implementing classic data structures and algorithms to help you get up and running as a confident C++ programmer. We begin with an introduction to C++ data structures and algorithms while also covering essential language constructs. Next, we will see how to store data using linked lists, arrays, stacks, and queues. Then, we will learn how to implement different sorting algorithms, such as quick sort and heap sort. Along with these, we will dive into searching algorithms such as linear search, binary search and more. Our next mission will be to attain high performance by implementing algorithms to string datatypes and implementing hash structures in algorithm design. We'll also analyze Brute Force algorithms, Greedy algorithms, and more. By the end of the book, you'll know how to build components that are easy to understand, debug, and use in different applications. What you will learn* *Know how to use arrays and lists to get better results in complex scenarios* *Build enhanced applications by using hash tables, dictionaries, and sets* *Implement searching algorithms such as linear search, binary search, jump search, exponential search, and more* *Have a positive impact on the efficiency of applications with tree traversal* *Explore the design used in sorting algorithms like Heap sort, Quick sort, Merge sort and Radix sort* *Implement various common algorithms in string data types* *Find out how to design an algorithm for a specific task using the common algorithm paradigms* *Who this book is for* *This book is for developers who would like to learn the Data Structures and Algorithms in C++. Basic C++ programming knowledge is expected.*

Advanced Algorithms and Data Structures introduces a collection of algorithms for complex programming challenges in data analysis, machine learning, and graph computing. Summary *As a software engineer, you'll encounter countless programming challenges that initially seem confusing, difficult, or even impossible. Don't despair! Many of these "new" problems already have well-established solutions. Advanced Algorithms and Data Structures teaches you powerful approaches to a wide range of tricky coding challenges that you can adapt and apply to your own applications. Providing a balanced blend of classic, advanced, and new algorithms, this practical guide upgrades your programming toolbox with new perspectives and hands-on techniques. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology* *Can you improve the speed and efficiency of your applications without investing in new hardware? Well, yes, you can: Innovations in algorithms and data structures have led to huge advances in application performance. Pick up this book to discover a collection of advanced algorithms that will make you a more effective developer. About the book* *Advanced Algorithms and Data Structures introduces a collection of algorithms for complex programming challenges in data analysis, machine learning, and graph computing. You'll discover cutting-edge approaches to a variety of tricky scenarios. You'll even learn to design your own data structures for projects that require a custom solution. What's inside* *Build on basic data structures you already know* *Profile your algorithms to speed up application* *Store and query strings efficiently* *Distribute clustering algorithms with MapReduce* *Solve logistics problems using graphs and optimization algorithms* *About the reader* *For intermediate programmers. About the author* *Marcello La Rocca is a research scientist and a full-stack engineer. His focus is on optimization algorithms, genetic algorithms, machine learning, and quantum computing. Table of Contents* *1* *Introducing data structures* *PART 1* *IMPROVING OVER BASIC DATA STRUCTURES* *2* *Improving priority queues: d-way heaps* *3* *Treaps: Using randomization to balance binary search trees* *4* *Bloom filters: Reducing the memory for tracking content* *5* *Disjoint sets: Sub-linear time processing* *6* *Trie, radix trie: Efficient string search* *7* *Use case: LRU cache* *PART 2* *MULTIDEMENSIONAL QUERIES* *8* *Nearest neighbors search* *9* *K-d trees: Multidimensional data indexing* *10* *Similarity Search Trees: Approximate nearest neighbors search for image retrieval* *11* *Applications of nearest neighbor search* *12* *Clustering* *13* *Parallel clustering: MapReduce and canopy clustering* *PART 3* *PLANAR GRAPHS AND MINIMUM CROSSING NUMBER* *14* *An introduction to graphs: Finding paths of minimum distance* *15* *Graph embeddings and planarity: Drawing graphs with minimal edge intersections* *16* *Gradient descent: Optimization problems (not just) on graphs* *17* *Simulated annealing: Optimization beyond local minima* *18* *Genetic algorithms: Biologically inspired, fast-converging optimization*

This textbook teaches introductory data structures.

Implementing Practical Data Structures with Swift

Learn how to write efficient code to build scalable and robust applications in C++

Space-Efficient Data Structures, Streams, and Algorithms

An Introduction to Data Structures and Algorithms

Data Structures and Algorithm Analysis in Java, Third Edition

Learning Functional Data Structures and Algorithms

The design and analysis of efficient data structures has long been recognized as a key component of the Computer Science curriculum. Goodrich, Tomassia and Goldwasser's approach to this classic topic is based on the object-oriented paradigm as the framework of choice for the design of data structures. For each ADT presented in the text, the authors provide an associated Java interface. Concrete data structures realizing the ADTs are provided as Java classes implementing the interfaces. The Java code implementing fundamental data structures in this book is organized in a single Java package, net.datastructures. This package forms a coherent library of data structures and algorithms in Java specifically designed for educational purposes in a way that is complimentary with the Java Collections Framework.

This is a central topic in any computer science curriculum. To distinguish this textbook from others, the author considers probabilistic methods as being fundamental for the construction of simple and efficient algorithms, and in each chapter at least one problem is solved using a randomized algorithm. Data structures are discussed to the extent needed for the implementation of the algorithms. The specific algorithms examined were chosen because of their wide field of application. This book originates from lectures for undergraduate and graduate students. The text assumes experience in programming algorithms, especially with elementary data structures such as chained lists, queues, and stacks. It also assumes familiarity with mathematical methods, although the author summarizes some basic notations and results from probability theory and related mathematical terminology in the appendices. He includes many examples to explain the individual steps of the algorithms, and he concludes each chapter with numerous exercises.

Implement classic and functional data structures and algorithms using Python *About This Book* *A step by step guide, which will provide you with a thorough discussion on the analysis and design of fundamental Python data structures. Get a better understanding of advanced Python concepts such as big-o notation, dynamic programming, and functional data structures. Explore illustrations to present data structures and algorithms, as well as their analysis, in a clear, visual manner. Who This Book Is For* *The book will appeal to Python developers. A basic knowledge of Python is expected. What You Will Learn* *Gain a solid understanding of Python data structures. Build sophisticated data applications. Understand the common programming patterns and algorithms used in Python data science. Write efficient, robust code. In Detail* *Data structures allow you to organize data in a particular way efficiently. They are critical to any problem, provide a complete solution, and act like reusable code. In this book, you will learn the essential Python data structures and the most common algorithms. With this easy-to-read book, you will be able to understand the power of linked lists, double linked lists, and circular linked lists. You will be able to create complex data structures such as graphs, stacks and queues. We will explore the application of binary searches and binary search trees. You will learn the common techniques and structures used in tasks such as preprocessing, modeling, and transforming data. We will also discuss how to organize your code in a manageable, consistent, and extendable way. The book will explore in detail sorting algorithms such as bubble sort, selection sort, insertion sort, and merge sort. By the end of the book, you will learn how to build components that are easy to understand, debug, and use in different applications. Style and Approach* *The easy-to-read book with its fast-paced nature will improve the productivity of Python programmers and improve the performance of Python applications.*

Based on the authors' market leading data structures books in Java and C++, this textbook offers a comprehensive, definitive introduction to data structures in Python by authoritative authors. Data Structures and Algorithms in Python is the first authoritative object-oriented book available for the Python data structures course. Designed to provide a comprehensive introduction to data structures and algorithms, including their design, analysis, and implementation, the text will maintain the same general structure as Data Structures and Algorithms in Java and Data Structures and Algorithms in C++.

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Learn functional data structures and algorithms for your applications and bring their benefits to your work now About This Book Moving from object-oriented programming to functional programming? This book will help you get started with functional programming. Easy-to-understand explanations of practical topics will help you get started with functional data structures. Illustrative diagrams to explain the algorithms in detail. Get hands-on practice of Scala to get the most out of functional programming. Who This Book Is For This book is for those who have some experience in functional programming languages. The data structures in this book are primarily written in Scala, however implementing the algorithms in other functional languages should be straight forward. What You Will Learn Learn to think in the functional paradigm Understand common data structures and the associated algorithms, as well as the context in which they are commonly used Take a look at the runtime and space complexities with the O notation See how ADTs are implemented in a functional setting Explore the basic theme of immutability and persistent data structures Find out how the internal algorithms are redesigned to exploit structural sharing, so that the persistent data structures perform well, avoiding needless copying. Get to know functional features like lazy evaluation and recursion used to implement efficient algorithms Gain Scala best practices and idioms In Detail Functional data structures have the power to improve the codebase of an application and improve efficiency. With the advent of functional programming and with powerful functional languages such as Scala, Clojure and Elixir becoming part of important enterprise applications, functional data structures have gained an important place in the developer toolkit. Immutability is a cornerstone of functional programming. Immutable and persistent data structures are thread safe by definition and hence very appealing for writing robust concurrent programs. How do we express traditional algorithms in functional setting? Won't we end up copying too much? Do we trade performance for versioned data structures? This book attempts to answer these questions by looking at functional implementations of traditional algorithms. It begins with a refresher and consolidation of what functional programming is all about. Next, you'll get to know about Lists, the work horse data type for most functional languages. We show what structural sharing means and how it helps to make immutable data structures efficient and practical. Scala is the primary implementation languages for most of the examples. At times, we also present Clojure snippets to illustrate the underlying fundamental theme. While writing code, we use ADTs (abstract data types). Stacks, Queues, Trees and Graphs are all familiar ADTs. You will see how these ADTs are implemented in a functional setting. We look at implementation techniques like amortization and lazy evaluation to ensure efficiency. By the end of the book, you will be able to write efficient functional data structures and algorithms for your applications. Style and approach Step-by-step topics will help you get started with functional programming. Learn by doing with hands-on code snippets that give you practical experience of the subject.

As an experienced JavaScript developer moving to server-side programming, you need to implement classic data structures and algorithms associated with conventional object-oriented languages like C# and Java. This practical guide shows you how to work hands-on with a variety of storage mechanisms—including linked lists, stacks, queues, and graphs—within the constraints of the JavaScript environment. Determine which data structures and algorithms are most appropriate for the problems you're trying to solve, and understand the tradeoffs when using them in a JavaScript program. An overview of the JavaScript features used throughout the book is also included. This book covers: Arrays and lists: the most common data structures Stacks and queues: more complex list-like data structures Linked lists: how they overcome the shortcomings of arrays Dictionaries: storing data as key-value pairs Hashing: good for quick insertion and retrieval Sets: useful for storing unique elements that appear only once Binary Trees: storing data in a hierarchical manner Graphs and graph algorithms: ideal for modeling networks Algorithms: including those that help you sort or search data Advanced algorithms: dynamic programming and greedy algorithms Design and implement professional level programs by exploring modern data structures and algorithms in Rust. Key FeaturesUse data structures such as arrays, stacks, trees, lists and graphs with real-world examplesLearn the functional and reactive implementations of the traditional data structuresExplore illustrations to present data structures and algorithms, as well as their analysis, in a clear, visual manner.Book Description Rust has come a long way and is now utilized in several contexts. Its key strengths are its software infrastructure and resource-constrained applications, including desktop applications, servers, and performance-critical applications, not forgetting its importance in systems' programming. This book will be your guide as it takes you through implementing classic data structures and algorithms in Rust, helping you to get up and running as a confident Rust programmer. The book begins with an introduction to Rust data structures and algorithms, while also covering essential language constructs. You will learn how to store data using linked lists, arrays, stacks, and queues. You will also learn how to implement sorting and searching algorithms. You will learn how to attain high performance by implementing algorithms to string data types and implement hash structures in algorithm design. The book will examine algorithm analysis, including Brute Force algorithms, Greedy algorithms, Divide and Conquer algorithms, Dynamic Programming, and Backtracking. By the end of the book, you will have learned how to build components that are easy to understand, debug, and use in different applications. What you will learnDesign and implement complex data structures in RustAnalyze, implement, and improve searching and sorting algorithms in RustCreate and use well-tested and reusable components with RustUnderstand the basics of multithreaded programming and advanced algorithm designBecome familiar with application profiling based on benchmarking and testingExplore the borrowing complexity of implementing algorithmsWho this book is for This book is for developers seeking to use Rust solutions in a practical/professional setting; who wants to learn essential Data Structures and Algorithms in Rust. It is for developers with basic Rust language knowledge, some experience in other programming languages is required.

All young computer scientists who aspire to write programs must learn something about algorithms and data structures. This book does exactly that. Based on lecture courses developed by the author over a number of years the book is written in an informal and friendly way specifically to appeal to students. The book is divided into four parts: the first on Data Structures introduces a variety of structures and the fundamental operations associated with them, together with descriptions of how they are implemented in Pascal; the second discusses algorithms and the notion of complexity; Part III is concerned with the description of successively more elaborate structures for the storage of records and algorithms for retrieving a record from such a structure by means of its key; and finally, Part IV consists of very full solutions to nearly all the exercises in the book.

A Common-Sense Guide to Data Structures and Algorithms

Open Data Structures

Python Data Structures and Algorithms

Problem Solving with Algorithms and Data Structures Using Python

A technical book about popular space-efficient data structures and fast algorithms that are extremely useful in modern Big Data applications. The purpose of this book is to introduce technology practitioners, including software architects and developers, as well as technology decision makers to probabilistic data structures and algorithms.

Reading this book, you will get a theoretical and practical understanding of probabilistic data structures and learn about their common uses.

Implement classic and functional data structures and algorithms using PythonAbout This Book* A step by step guide, which will provide you with a thorough discussion on the analysis and design of fundamental Python data structures.* Get a better understanding of advanced Python concepts such as big-o notation, dynamic programming, and functional data structures.* Explore illustrations to present data structures and algorithms, as well as their analysis, in a clear, visual manner.**Who This Book Is For**The book will appeal to Python developers. A basic knowledge of Python is expected.**What You Will Learn*** Gain a solid understanding of Python data structures.* Build sophisticated data applications.* Understand the common programming patterns and algorithms used in Python data science.* Write efficient robust code.**In Detail**Data structures allow you to organize data in a particular way efficiently. They are critical to any problem, provide a complete solution, and act like reusable code. In this book, you will learn the essential Python data structures and the most common algorithms. With this easy-to-read book, you will be able to understand the power of linked lists, double linked lists, and circular linked lists. You will be able to create complex data structures such as graphs, stacks and queues. We will explore the application of binary searches and binary search trees. You will learn the common techniques and structures used in tasks such as preprocessing, modeling, and transforming data. We will also discuss how to organize your code in a manageable, consistent, and extendable way. The book will explore in detail sorting algorithms such as bubble sort, selection sort, insertion sort, and merge sort. By the end of the book, you will learn how to build components that are easy to understand, debug, and use in different applications.**Style and approach**The easy-to-read book with its fast-paced nature will improve the productivity of Python programmers and improve the performance of Python applications. **Comprehensive treatment focuses on creation of efficient data structures and algorithms and selection or design of data structure best suited to specific problems. This edition uses Java as the programming language.**