Algorithmic Puzzles

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Plan of the Talk

- What is an algorithmic puzzle?
- Two taxonomies of algorithmic puzzles
- Algorithmic puzzles in research
- Algorithmic problem solving and puzzles in education
- Puzzles in job interviews (?)
- Q&A

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R Barnett

Algorithmic Puzzles:

   Algorithmic Puzzles Anany Levitin,Maria Levitin,2011-10-14 Algorithmic puzzles are puzzles involving well defined procedures for solving problems This book will provide an enjoyable and accessible introduction to algorithmic puzzles that will develop the reader s algorithmic thinking The first part of this book is a tutorial on algorithm design strategies and analysis techniques Algorithm design strategies exhaustive search backtracking divide and conquer and a few others are general approaches to designing step by step instructions for solving problems Analysis techniques are methods for investigating such procedures to answer questions about the ultimate result of the procedure or how many steps are executed before the procedure stops The discussion is an elementary level with puzzle examples and requires neither programming nor mathematics beyond a secondary school level Thus the tutorial provides a gentle and entertaining introduction to main ideas in high level algorithmic problem solving The second and main part of the book contains 150 puzzles from centuries old classics to newcomers often asked during job interviews at computing engineering and financial companies The puzzles are divided into three groups by their difficulty levels The first fifty puzzles in the Easier Puzzles section require only middle school mathematics The sixty puzzle of average difficulty and forty harder puzzles require just high school mathematics plus a few topics such as binary numbers and simple recurrences which are reviewed in the tutorial All the puzzles are provided with hints detailed solutions and brief comments The comments deal with the puzzle origins and design or analysis techniques used in the solution The book should be of interest to puzzle lovers students and teachers of algorithm courses and persons expecting to be given puzzles during job interviews   *Algorithmic Puzzles* Anany Levitin,Maria Levitin,2011-10-12 Algorithmic puzzles are puzzles involving well defined procedures for solving problems This book will provide an enjoyable and accessible introduction to algorithmic puzzles that will develop the reader s algorithmic thinking   *Mathematical and Algorithmic Puzzles* Pramod Ganapathi,2024-05-29 This book presents serious mathematical and algorithmic puzzles that are mostly counterintuitive The presented puzzles are simultaneously entertaining challenging intriguing and haunting This book introduces its readers to counterintuitive mathematical ideas and revolutionary algorithmic insights from a wide variety of topics The presented solutions that are discovered by many mathematicians and computer scientists are highly counterintuitive and show supreme mathematical beauty These counterintuitive solutions are intriguing to the degree that they shatter our preconceived notions shake our long held belief systems debunk our fundamental intuitions and finally rob us of sleep and haunt us for a lifetime Multiple ways of attacking the same puzzle are presented which teach the application of elegant problem solving strategies   *Programming for the Puzzled* Srini Devadas,2017-11-03 Learning programming with one of the coolest applications around algorithmic puzzles ranging from scheduling selfie time to verifying the six degrees of separation hypothesis This book builds a bridge between the recreational world of algorithmic puzzles puzzles that can be solved by algorithms and the pragmatic world of computer

programming teaching readers to program while solving puzzles Few introductory students want to program for programming s sake Puzzles are real world applications that are attention grabbing intriguing and easy to describe Each lesson starts with the description of a puzzle After a failed attempt or two at solving the puzzle the reader arrives at an Aha moment a search strategy data structure or mathematical fact and the solution presents itself The solution to the puzzle becomes the specification of the code to be written Readers will thus know what the code is supposed to do before seeing the code itself This represents a pedagogical philosophy that decouples understanding the functionality of the code from understanding programming language syntax and semantics Python syntax and semantics required to understand the code are explained as needed for each puzzle Readers need only the rudimentary grasp of programming concepts that can be obtained from introductory or AP computer science classes in high school The book includes more than twenty puzzles and more than seventy programming exercises that vary in difficulty Many of the puzzles are well known and have appeared in publications and on websites in many variations They range from scheduling selfie time with celebrities to solving Sudoku problems in seconds to verifying the six degrees of separation hypothesis The code for selected puzzle solutions is downloadable from the book s website the code for all puzzle solutions is available to instructors   Geek Sudoku Adams Media,2013-01-18 Put your brains to the test with these sudoku puzzles If you re a puzzler and think you know all there is to know about sudoku think again Filled with fun and challenging puzzles Geek Sudoku tests your logic as you analyze each set of numbers and solve the algorithms on the board Every puzzle will stimulate your mathematical genius while you search for its solution With more than seventy five addictive number puzzles this puzzle collection will separate the n00bs from the real deal   Data Structure and Algorithmic Narasimha Karumanchi,2016   *Data Structures And Algorithms Made Easy* Narasimha Karumanchi,2023-07-21 Data Structures And Algorithms Made Easy Data Structures and Algorithmic Puzzles is a book that offers solutions to complex data structures and algorithms It can be used as a reference manual by those readers in the computer science industry This book serves as guide to prepare for interviews exams and campus work In short this book offers solutions to various complex data structures and algorithmic problems Topics Covered Introduction Recursion and Backtracking Linked Lists Stacks Queues Trees Priority Queue and Heaps Disjoint Sets ADT Graph Algorithms Sorting Searching Selection Algorithms Medians Symbol Tables Hashing String Algorithms Algorithms Design Techniques Greedy Algorithms Divide and Conquer Algorithms Dynamic Programming Complexity Classes Miscellaneous Concepts   **Data Structures and Algorithms Made Easy in Java** Narasimha Karumanchi,2020   Algorithmics David Harel,Roni Rosner,1992 Provides a study of the fundamental theoretical ideas of computing and examining how to design accurate and efficient algorithms   **Congressus Numerantium** ,1994   *Algorithms, Data Structures, and Problem Solving with C++* Mark Allen Weiss,1996 Providing a complete explanation of problem solving and algorithms using C the author s theoretical perspective emphasizes software engineering and object oriented programming and encourages readers to think abstractly

Numerous code examples and case studies are used to support the algorithms presented   **Conference Proceedings** ,1999   **Learning Algorithms Through Programming and Puzzle Solving** Alexander Kulikov,Pavel Pevzner,2018-12-17 Learning Algorithms Through Programming and Puzzle Solving is one of the first textbooks to emerge from the recent Massive Open Online Course MOOC revolution and a com panion to the authors online specialization on Coursera and MicroMasters Program on edX The book introduces a programming centric approach to learning algorithms and strikes a unique balance between algorithmic ideas programming challenges and puz zle solving Since the launch of this project on Coursera and edX hundreds of thousands students tried to solve programming challenges and algorithmic puzzles covered in this book The book is also a step towards developing an Intelligent Tutoring System for learning algo rithms In a classroom once a student takes a wrong turn there are limited opportunities to ask a question resulting in a learning breakdown or the inability to progress further without individual guidance When a student suffers a learning breakdown that student needs immediate help in order to proceed Traditional textbooks do not provide such help but the automated grading system described in this MOOC book does The book is accompanied by additional educational materials that include the book website video lectures slides FAQs and other resources available at Coursera and EdX   *Introduction to the Design and Analysis of Algorithms* Seymour E. Goodman,S. T. Hedetniemi,1977   Systems: Research and Design Donald P. Eckman,1961 Below the twilight arch a mythology of systems Systems organizations and interdisciplinary research On the choice of objectives in systems studies The use of operations research in the study of very large systems A decision model for a fourth level model in the boulding sense On the impedance matching problems of systems that include men and computers   *Mathematical Reports* ,2006   *Discrete Algorithmic Mathematics, Second Edition* Stephen B. Maurer,Anthony Ralston,1998 What is discrete algorithmic mathematics Mathematical preliminaries Algorithms Mathematical induction Graphs and trees Fundamental counting methods Difference equations Probability An introduction to mathematical logic Algorithmic linear algebra Infinite processes in discrete mathematics Sorting things out with sorting   **Byte** ,1981-10   **Computer Game Developers' Conference Conference Proceedings** ,1996   *Performance Analysis of Searching Algorithms* Mohamed Eshtawie,Waafa Alrahman,Nuri Elshamam,2021-10-12 Academic Paper from the year 2021 in the subject Computer Science Applied language English abstract Problem solving is an essential topic in Artificial Intelligence study and application It is concerned with solving mathematical problems and clues such as puzzles This study is primarily concerned with the ability of some searching algorithms such as Restricted Boltzmann Machines Message Passing Breadth First Search and Depth First Search to Solve Sudoku puzzle problems in the area of AI For each of these methods a code in Java language will be written and executed so that performance analysis can take place A comparison analysis between the selected algorithms will be done The analysis will cover some parameters such as time space optimality completeness

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