Notes of the Introduction To Algorithms

Kai Zhao

January 14, 2016

Contents

Part I

Foundations

Chapter 1

The Role of Algorithms in Computing

1.1 Algorithms

Exercies

1.1-1 Give a real-world example that requires sorting or a real-world example that requires computing a convex hull.

Answer: One example that requires sorting is that teachers will sort our scores after the exam.

1.1-2 Other than speed, what other measures of efficiency might one use in a real-world setting ?

Answer: cost, space, manpower, material resources. In different cases, each can be the key of meausres of efficiency.
Reference: https://www.quora.com/Other-than-speed-what-other-measures-of-efficiency-might-one-use-in-a-real-world-setting

1.1-3 Select a data structure that you have seen previously, and discuss its strengths and limitations.

Answer: Array
strengths: access directly
limitations: costs lot when insert or delete

1.1-4 How are the shortest-path and traveling-salesman problems given similar? How they are different?

Answer:

1.1-5 Come up with a real-world problem in which only the best solution will do. Then come up with one in which a solution that is "approximately" the best is good enough.

Answer:

1.2 Algorithms as a technology

Chapter 2

Getting Started

Chapter 3

Growth of Functions

Chapter 4

Divide-and-conquer

Chapter 5

Probabilistic Analysis and Randomized Algorithms

Part II

Sorting and Order Statistics

Chapter 6

Heapsort

Part III

Data Structures

Part IV

Advanced Design and Analysis Techniques

Part V

Advanced Data Structures

Part VI

Graph Algorithms

Part VII

Selected Topics

Part VIII

Appendix: Mathematical Background