

第 3-2 讲: 贪心

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评分: _____ 评阅: _____

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请独立完成作业, 不得抄袭。
若得到他人帮助, 请致谢。
若参考了其它资料, 请给出引用。
鼓励讨论, 但需独立书写解题过程。

1 作业 (必做部分)

题目 1 (TC 16.1-2)

解答:

题目 2 (TC 16.1-3)

解答:

题目 3 (TC 16.2-1)

解答:

题目 4 (TC 16.2-2)

解答:

题目 5 (TC 16.3-2)

解答:

题目 6 (TC 16.3-5)

解答:

题目 7 (TC 16.3-8)

解答:

题目 8 (TC 17.1-3)

解答:

题目 9 (TC 17.2-2)

解答:

题目 10 (TC 17.4-1)

解答:

2 作业 (选做部分)

题目 1 (TC Problem 16-1 (Coin Changing))

解答:

3 Open Topics

Open Topics 1 (Ternary Disk)

Trimedia Disks Inc. has developed “ternary” hard disks. Each cell on a disk can now store values 0, 1, or 2 (instead of just 0 or 1).

To take advantage of this new technology, provide a modified Huffman algorithm for constructing an optimal variable-length prefix-free code for characters from an alphabet of size n , where the characters occur with known frequencies f_1, f_2, \dots, f_n .

Prove that your algorithm is correct.

Open Topics 2 (Intervals)

Let X be a set of n intervals on the real line. A subset of intervals $Y \subseteq X$ is called a **full path** if the intervals in Y cover the intervals in X , that is, any real value that is contained in some interval in X is also contained in some interval in Y . The *size* of the full path is the number of intervals it contains.

Describe and analyze a greedy algorithm to compute the smallest full path of X as quickly as possible. Assume that your input consists of two arrays $X_L[1..n]$ and $X_R[1..n]$, representing the left and right endpoints of the intervals in X . Don't forget to prove your greedy algorithm is correct!



图 1: 蓝色的 7 个区间组成一个完整路径 (full path)

4 反馈