AE2ADS

Reading

M. T. Goodrich, R. Tamassia and M. H. Goldwasser, *Data Structures and Algorithms in Java*, 6th Edition, 2014.

- Chapter 9. Heaps and Priority Queues

Exercise 1

Implement the Priority Queue ADT using a heap.

Exercise 2

Implement heap sort. Analyze its time complexity.

Exercise 3

Given an integer array **nums** and an integer **k**, return the **kth** largest element in the array.

Note that it is the **kth** largest element in the sorted order, not the **kth** distinct element.

Can you solve it without sorting?

Example 1:
  Input: nums = [3,2,1,5,6,4], **k** = 2
  Output: 5
Example 2:
  Input：nums = [3,2,3,1,2,4,5,5,6], **k** = 4
  Output： 4

Exercise 4

Given a string **s**, rearrange the characters of **s** so that any two adjacent characters are not the same.
Return any possible rearrangement of **s** or return "" if not possible.

Example 1:
  Input: s = "aab"
  Output: "aba"
Example 2:
  Input: s = "aaab"
  Output:""

Exercise 5

An ugly number is a positive integer whose prime factors are limited to 2, 3, and 5. Given an integer *n*, return the *nth* ugly number.

Example 1:
  Input: n = 10
  Output: 12
  Explanation: [1, 2, 3, 4, 5, 6, 8, 9, 10, 12] is the sequence of the first 10 ugly numbers.
Example 2:
  Input: n = 1
  Output: 1
  Explanation: 1 has no prime factors, therefore all of its prime factors are limited to 2, 3, and 5.

Exercise 6

You are given two integer arrays *nums1* and *nums2* sorted in non-decreasing order and an integer *k* .

Define a pair *(u, v)* which consists of one element from the first array and one element from the second array.

Return the k pairs *(u1, v1), (u2, v2), ..., (uk vk)* with the smallest sums.

Example 1:
  Input: nums1 = [1,7,11], nums2 =[2,4,6], k = 3
  Output： [[1,2],[1,4],[1,6]]
  Explanation: The first 3 pairs are returned from the sequence：
[1,2],[1,4],[1,6],[7,2],[7,4],[11,2], [7,6],[11,4],[11,6]
Example 2:
  Input: nums1 = [1,1,2], nums2 =[1,2,3], k = 2
  Output: [[1,1], [1,1]]
  Explanation: The first 2 pairs are returned from the sequence： [1,1],[1,1],
[1,2],[2,1],[1,2], [2,2],[1,3],[1,3],[2,3]

More ICPC Exercises

https://www.luogu.com.cn/problem/list?type=CF&page=1&tag=113