Hey, CoderGirl

Thursday, January 21, 2016

LeetCode总结－substring, subarray, subsequence

DP动态规划

53 Maximum Subarray
［题目］在数组中找到和最大的subarray，要求是连续的。
［思路］一维DP。维护两个变量，一个是全局的最大值，一个是local的最大值，因为sublist有多个，比较哪个大。

152 Maximum Product Subarray
［题目］求subarray最大的乘积，要求连续。
［思路］一维dp。乘法要考虑符号，所以同时维持localmax 和localmin两个变量。类似上面求sum的题。

5 Longest Palindromic Substring
［题目］给定字符串s，返回最长的回文子串
［方法一］二维dp
［方法二］Manacher's Algorithm，时间复杂度为o(n)

300 Longest Increasing Subsequence
［题目］求最长递增子序列。可以不连续
［方法一］一维dp。Dp[i]表示，以i结尾的的递增子序列的最大长度。.时间复杂度O(n^2)
［方法二］利用stack＋binary search。O(nlogn)的解法。这个解法只能确定长度，但是并不能找到一个正确的上升子序列。

Slide Window滑动窗口＋hash

209 Minimum Size Subarray Sum
［题目］给定一个数组，求最短的subarray，使得其sum大于等于给定的target
［方法一］brute force。时间复杂度为O(n^2)。
［方法二］遍历＋binary search。时间复杂度为O(nlogn)
维护一个数组sum，sum[i]表示0到i的sum值。
外层循环遍历i，内层循环binary search j，使得sum[i]-sum[j] > s
［方法三］slide window。时间复杂度为O(n)
当窗口内的sum小于s时，窗口right增加
当窗口内的sum小于等于sum时，记录最小值，并且左侧窗口缩减
［注意］最外层循环终止的条件时right<数组长度，而不是left<=right

3 Longest Substring Without Repeating Characters
［题目］找最长的没有重复的substring
［思路］slide window ＋ hash

30 Substring with Concatenation of All Words
［题目］You are given a string, s, and a list of words, words, that are all of the same length. Find all starting indices of substring(s) in s that is a concatenation of each word in words exactly once and without any intervening characters.
For example, given:
s: "barfoothefoobarman"
words: ["foo", "bar"]

You should return the indices: [0,9].
［思路］slide window ＋ hash

Labels

- Backtracking
- BFS
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76 Minimum Window Substring
［题目］Given a string S and a string T, find the minimum window in S which will contain all the characters in T in complexity O(n)。
For example,
S = "ADOBECODEBANC"
T = "ABC"

Minimum window is "BANC".
［思路］slide window ＋ hash

hash

128 Longest Consecutive Sequence
［题目］求一个未排序数组的最长的连续子序列。要求o(n)。
For example,
Given [100, 4, 200, 1, 3, 2],
The longest consecutive elements sequence is [1, 2, 3, 4]. Return its length: 4.
［思路］因为要求O(n)。则考虑用hash表。把每个数字存在hash表中。遍历，如果num［i］－1不在hash中则说明是个起始点。然后判断num[i]+1在不在hash中。

159 Longest Substring with At Most Two Distinct Characters (lock)

325 Maximum Size Subarray Sum Equals k

［题目］给定有正有负的数组，然后求最长的subarray使得结果等于k

［思路］209 Minimum Size Subarray Sum是求窗口最小，全部非负数，找大于等于target的subarray，所以用two pointers。
这道题可正可负，并且是找确切的值。所以预处理一下，利用一个hash表，key存array［0...i］的sum， value存index。然后再遍历一遍，找对应的值存在不存在，并且要求比当前的index小。

follow up：

- 类似的可以找一个subarray有没有等于0的。 http://www.geeksforgeeks.org/find-if-there-is-a-subarray-with-0-sum/
- 找subarray有没有等于k的
- 找submatrix有没有等于k的（变成2D)

Posted by CoderGirl at 1:51 PM

Labels: Dynamic Programming, Hash, leetcode总结, Slide Window

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