

Problem Solving Workshop #2

Tech Interviews and Competitive Programming Meetup

February 20, 2016

<https://www.meetup.com/tech-interviews-and-competitive-programming/>

Instructor: Eugene Yarovoi (can be [contacted](#) through the group Meetup page above under Organizers)

More practice questions: leetcode.com, glassdoor.com, geeksforgeeks.org

Books: Elements of Programming Interviews, Cracking the Coding Interview

Have questions you want answered? Contact the instructor, or ask on [Quora](#). You can post questions and [follow the instructor](#) and other people who write about algorithms.

Try to find optimized solutions, and provide a time and space complexity analysis with every solution for the algorithms questions.

Easy Problem

Given an array of 0s and 1s, and an integer k, find the longest contiguous streak of 1s that you can get by changing any k 0s to 1s.

Example Input: array = [1,1,0,0,1,1,1,0,1,1], k = 1

Input Explanation: We can change one (k=1) 0 to a 1 in the array

Output: 6

Output Explanation: if we change the 0 to a 1 at index 7 (counting from 0), we get a contiguous streak of 1s having length 6. This is the largest streak we can get. No other change gets us a bigger streak.

Medium Problem

Given an array and an integer k, find the maximum of every contiguous subarray of size k.

Example Input: array = [1, 2, 3, 1, 4, 5, 2, 3, 6], k = 3

Explanation: We want the maximum of each contiguous subarray of size 3, since k = 3. That means we first want to produce the max of {1, 2, 3}, then the max of {2, 3, 1}, and so on.

Output: return an array containing [3, 3, 4, 5, 5, 5, 6]

HARD PROBLEM

Given an array of integers, find the contiguous subarray that produces the largest value when its elements are bitwise XOR'ed together. That is, if the array is A, let $\text{XorSubarray}(i, j) = a[i] \wedge a[i+1] \wedge \dots \wedge a[j-1] \wedge a[j]$, where \wedge is the bitwise exclusive or (XOR) operation. Find the i, j that maximize this function. Do this in better than $O(n^2)$ complexity.

Example Input: {1, 2, 3, 4}

Output: [3, 4]

Explanation: The subarray [3, 4] has maximum XOR value. 3 is 11 in binary, and 4 is 100 in binary. Their XOR is 111 = 7. No larger XOR can be achieved with any other subarray.