Microsoft Interview Problems

1) Find the contiguous subarray within an array, A of length N which has the largest sum.

Input Format:

The first and the only argument contains an integer array, A.

Output Format:

Return an integer representing the maximum possible sum of the contiguous subarray.

Constraints:

1 <= N <= 1e6

-1000 <= A[i] <= 1000

For example:

Input 1:

   A = [1, 2, 3, 4, -10]

Output 1:

   10

Explanation 1:

   The subarray [1, 2, 3, 4] has the maximum possible sum of 10.

2) Given a matrix of m * n elements (m rows, n columns), return all elements of the matrix in spiral order.

Example:

Given the following matrix: [[1, 2, 3], [4, 5, 6], [7, 8, 9]]

You should return [1, 2, 3, 6, 9, 8, 7, 4, 5]

3) Given a list of non-negative integers, arrange them such that they form the largest number.

For example:

Given [3, 30, 34, 5, 9], the largest formed number is 9534330.

4) Implement the next permutation, which rearranges numbers into the numerically next greater permutation of numbers for a given array A of size N.

If such arrangement is not possible, it must be rearranged as the lowest possible order i.e., sorted in an ascending order.

Note:

1. The replacement must be in-place, do **not** allocate extra memory.

2. DO NOT USE LIBRARY FUNCTION FOR NEXT PERMUTATION. Use of Library functions will disqualify your submission retroactively and will give you penalty points.

Input Format:

The first and the only argument of input has an array of integers, A.

Output Format:

Return an array of integers, representing the next permutation of the given array.

Constraints:

1 <= N <= 5e5

1 <= A[i] <= 1e9

Examples:

Input 1:

   A = [1, 2, 3]

Output 1:

   [1, 3, 2]

Input 2:

   A = [3, 2, 1]

Output 2:

   [1, 2, 3]

Input 3:

   A = [1, 1, 5]

Output 3:

   [1, 5, 1]

Input 4:

   A = [20, 50, 113]

Output 4:

   [20, 113, 50]

5) Given a linked list and a value x, partition it such that all nodes less than x come before nodes greater than or equal to x.

You should preserve the original relative order of the nodes in each of the two partitions.

For example,

Given 1->4->3->2->5->2 and x = 3,

return 1->2->2->4->3->5.

6) Given a string A representing an absolute path for a file (Unix-style).

Return the string A after simplifying the absolute path.

Note: Absolute path always begin with '/' (root directory).

Path will not have whitespace characters.

Input Format:

The only argument given is string A.

Output Format:

Return a string denoting the simplified absolute path for a file (Unix-style).

Example:

Input 1:

   A = "/home/"

Output 1:

   "/home"

Input 2:

   A = "/a/./b/../../c/"

Output 2:

   "/c"