TO PASS 1% or higher

Keep Learning

100%

Interview Questions: Radix Sorts (ungraded)

TOTAL POINTS 3

1. **2-sum.** Given an array a of n 64-bit integers and a target value T, determine whether there are two distinct integers i and i 1/1 point j such that $a_i+a_j=T$. Your algorithm should run in linear time in the worst case.

2 sum problem



Correct

Hint: sort the array in linear time.

2. American flag sort. Given an array of n objects with integer keys between 0 and R-1, design a linear-time algorithm to 1/1 point rearrange them in ascending order. Use extra space at most proportional to \$R\$\$.

An American flag sort is an efficient, in-place variant of radix sort that distributes items into buckets. Noncomparative sorting algorithms such as radix sort and American flag sort are typically used to sort large objects such as strings, for which comparison is not a unit-time operation.



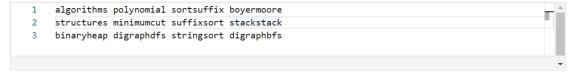
✓ Correct

Hint: first compute the frequency counts for each integer, which tells you where the keys need to go. Then cyclically permute the keys into their proper places.

3. **Cyclic rotations.** Two strings s and t are *cyclic rotations* of one another if they have the same length and s consists of a suffix of t followed by a prefix of t. For example, "suffixsort" and "sortsuffix" are cyclic rotations.

1 / 1 point

Given n distinct strings, each of length L, design an algorithm to determine whether there exists a pair of distinct strings that are cyclic rotations of one another. For example, the following list of n=12 strings of length L=10 contains exactly one pair of strings ("suffixsort" and "sortsuffix") that are cyclic rotations of one another.



The order of growth of the running time should be nL^2 (or better) in the worst case. Assume that the alphabet size R is a small constant.

Signing bonus. Do it in NnL time in the worst case.

Cyclic rotations problem.

What does this `N` mean in `NnL`



Hint: define a fingerprint of a string in such a way that two strings are cyclic rotations of one another if and only if they have the same fingerprint.

Signing bonus: design an algorithm to find the fingerprint of a string of length L in time proportional to L in the worst case.