Feedback — Interview Questions: Mergesort

You submitted this homework on **Sun 24 Mar 2013 2:23 PM PDT -0700**. You will be able to view your score after the deadline passes.

These interview questions are for your own enrichment and are not assessed. If you click the *Submit Answers* button, you will get a hint.

Question 1

Merging with smaller auxiliary array. Suppose that the subarray `a[0]` to `a[N-1]` is sorted and the subarray `a[N]` to `a[2*N-1]` is sorted. How can you merge the two subarrays so that `a[0]` to `a[2*N-1]` is sorted using an auxiliary array of size N (instead of $2N$)?

Your Answer	Score	Explanation
Total	0.00 / 0.00	

Question Explanation

Hint: copy only the left half into the auxiliary array.

Question 2

Counting inversions. An *inversion* in an array $a[\,]$ is a pair of entries $a[i]$ and $a[j]$ such that $i < j$ but $a[i] > a[j]$. Given an array, design a linearithmic algorithm to count the number of inversions.

Your Answer	Score	Explanation
Total	0.00 / 0.00	

Question Explanation

Hint: count while mergesorting.

Question 3

Shuffling a linked list. Given a singly-linked list containing N items, rearrange the items uniformly at random. Your algorithm should consume a logarithmic (or constant) amount of extra memory and run in time proportional to $N \log N$ in the worst case.

Your Answer	Score	Explanation
Total	0.00 / 0.00	

Question Explanation

Hint: design a linear-time subroutine that can take two uniformly shuffled linked lists of sizes N_1 and N_2 and combined them into a uniformly shuffled linked lists of size $N_1 + N_2$.