Interview Questions: Mergesort

Help Center

The **hard deadline** for this homework is **Mon 2 Nov 2015 10:29 AM IST**.

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

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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 $2N$)?

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.

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.

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