Interview Questions: Mergesort (ungraded)

Practice Quiz, 3 questions

Congratulations! You passed!

Next Item

1 / 1 point

1.

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

Note: these interview questions are ungraded and purely for your own enrichment. To get a hint, submit a solution.

NO

Your answer cannot be more than 10000 characters.

Thank you for your response.

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

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1 / 1 point

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.

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NO

Your answer cannot be more than 10000 characters.

Thank you for your response.

Hint: count while mergesorting.

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1 / 1 point

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.

NO

Your answer cannot be more than 10000 characters.

Thank you for your response.

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 $n_1 + n_2$.

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