Practice Quiz, 3 questions

✓ Congratulations! You passed!

Next Item



1 / 1 points

1.

Nuts and bolts. A disorganized carpenter has a mixed pile of n nuts and n bolts. The goal is to find the corresponding pairs of nuts and bolts. Each nut fits exactly one bolt and each bolt fits exactly one nut. By fitting a nut and a bolt together, the carpenter can see which one is bigger (but the carpenter cannot compare two nuts or two bolts directly). Design an algorithm for the problem that uses $n \log n$ compares (probabilistically).

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

quick sort			

Your answer cannot be more than 10000 characters.

Thank you for your response.

Hint: modify the quicksort partitioning part of quicksort.

R*emark*: This <u>research paper</u> gives an algorithm that runs in $n\log^4 n$ time in the worst case.

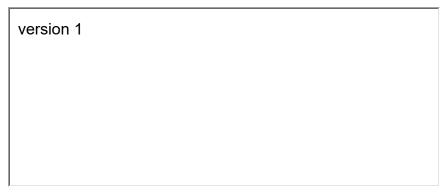
Interview Questions: Quicksort (ungraded)

3/3 points (100%)

Practice Quiz, 3 quest2ns

Selection in two sorted arrays. Given two sorted arrays $a[\]$ and $b[\]$, of sizes n_1 and n_2 , respectively, design an algorithm to find the k^{th} largest key. The order of growth of the worst case running time of your algorithm should be $\log n$, where $n=n_1+n_2$.

- ullet Version 1: $n_1=n_2$ and k=n/2
- Version 2: k=n/2
- · Version 3: no restrictions



Your answer cannot be more than 10000 characters.

Thank you for your response.

Hint: there are two basic approaches.

- Approach A: Compute the median in $a[\]$ and the median in $b[\]$. Recur in a subproblem of roughly half the size.
- Approach B: Design a constant-time algorithm to determine whether a[i] is the k^{th} largest key. Use this subroutine and binary search.

Dealing with corner cases can be tricky.



1/1 points

Decimal dominants. Given an array with n keys, design an

	algorithm to find	all values that	occur more	than $n/10$ tiı	mes. The
Interview (Ouestions: O	uieksorti(1	ungrade	d)d he linea	r

3/3 points (100%)

Practice Quiz, 3 quest	^{ons} uick sort 3-way	

Your answer cannot be more than 10000 characters.

Thank you for your response.

 ${\it Hint:}$ determine the $(n/10)^{th}$ largest key using quickselect and check if it occurs more than n/10 times.

Alternate solution hint: use 9 counters.

