Interview Questions (optional)

2/2 points earned (100%)

Excellent!

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1.
4-SUM. Given an array $a[\ ]$ of n integers, the 4-SUM problem is to determine if there exist distinct indices i, j, k, and l such that $a[i] + a[j] = a[k] + a[l]$. Design an algorithm for the 4-SUM problem that takes time proportional to n^2 (under suitable technical assumptions).

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

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Thank you for your response.

Hint: create a hash table with $\binom{n}{2}$ key-value pairs.

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2.

Hashing with wrong hashCode() or equals(). Suppose that you implement a data type \mathtt{OlympicAthlete} for use in a \mathtt{java.util.HashMap}.

- Describe what happens if you override \mathtt{hashCode()} but not \mathtt{equals()}.
- Describe what happens if you override \mathtt{equals()} but not \mathtt{hashCode()}.
- Describe what happens if you override \mathtt{hashCode()} but implement \verb#public boolean equals(OlympicAthlete that)# instead of \verb#public boolean equals(Object that)#.

a

Thank you for your response.

Hint: it's code—try it and see!