

# Interview Questions: Hash Tables

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The **hard deadline** for this homework is **Mon 16 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

**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).

## Question 2

**Hashing with wrong hashCode() or equals().** Suppose that you implement a data type `OlympicAthlete` for use in a `java.util.HashMap`.

- Describe what happens if you override `hashCode()` but not `equals()`.
- Describe what happens if you override `equals()` but not `hashCode()`.
- Describe what happens if you override `hashCode()` but implement `public boolean equals(OlympicAthlete that)` instead of `public boolean equals(Object that)`.

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