

# Interview Questions (optional)

Practice Quiz, 3 questions

1  
point

1.

**3-SUM in quadratic time.** Design an algorithm for the 3-SUM problem that takes time proportional to  $n^2$  in the worst case. You may assume that you can sort the  $n$  integers in time proportional to  $n^2$  or better.

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

What do you think?

1  
point

2.

**Search in a bitonic array.** An array is *bitonic* if it is comprised of an increasing sequence of integers followed immediately by a decreasing sequence of integers. Write a program that, given a bitonic array of  $n$  distinct integer values, determines whether a given integer is in the array.

- Standard version: Use  $\sim 3 \lg n$  compares in the worst case.
- Signing bonus: Use  $\sim 2 \lg n$  compares in the worst case (and prove that no algorithm can guarantee to perform fewer than  $\sim 2 \lg n$  compares in the worst case).

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What do you think?

1  
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3.

**Egg drop.** Suppose that you have an  $n$ -story building (with floors 1 through  $n$ ) and plenty of eggs. An egg breaks if it is dropped from floor  $T$  or higher and does not break otherwise. Your goal is to devise a strategy to determine the value of  $T$  given the following limitations on the number of eggs and tosses:

- Version 0: 1 egg,  $\leq T$  tosses.
- Version 1:  $\sim 1 \lg n$  eggs and  $\sim 1 \lg n$  tosses.
- Version 2:  $\sim \lg T$  eggs and  $\sim 2 \lg T$  tosses.
- Version 3: 2 eggs and  $\sim 2\sqrt{n}$  tosses.
- Version 4: 2 eggs and  $\leq c\sqrt{T}$  tosses for some fixed constant  $c$ .

What do you think?

Submit Quiz

