Interview Questions: Priority Queues

Help Center

The **hard deadline** for this homework is **Mon 9 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.

☐ **In accordance with the Coursera Honor Code, I (abhijit taware) certify that the answers here are my own work.**

Question 1

Dynamic median. Design a data type that supports insert in logarithmic time, find-the-median in constant time, and remove-the-median in logarithmic time.

Question 2

Randomized priority queue. Describe how to add the methods `sample()` and `delRandom()` to our binary heap implementation. The two methods return a key that is chosen uniformly at random among the remaining keys, with the latter method also removing that key. The `sample()` method should take constant time; the `delRandom()` method should take logarithmic time. Do not worry about resizing the underlying array.

Question 3

Taxicab numbers. A *taxicab* number is an integer that can be expressed as the sum of two cubes of integers in two different ways: $a^3 + b^3 = c^3 + d^3$. For example, $1729 = 9^3 + 10^3 = 1^3 + 12^3$. Design an algorithm to find all taxicab numbers with a, b, c, and d less than N.

- *Version 1:* Use time proportional to $N^2 \log N$ and space proportional to N^2.
- *Version 2:* Use time proportional to $N^2 \log N$ and space proportional to N.

- [ ] **In accordance with the Coursera Honor Code, I (abhijit taware) certify that the answers here are my own work.**

Submit Answers Save Answers

You cannot submit your work until you agree to the Honor Code. Thanks!