

DM538 – Ugeseddel 14

Uge 51

Øvelser fredag d. 20/12

1. Eksamen januar 2012 opgave 3 (især spørgsmål f)
2. Eksamen januar 2013 opgave 2 f)
3. Eksamen januar 2012 opgave 2 a)
4. This exercise is about finding the *median* of a large set S of numbers. We assume that all the numbers are distinct. Let $n = |S|$.

A number x is an ε -approximate median, if

- at least $(\frac{1}{2} - \varepsilon)n$ of the numbers in S are smaller than x , and
- at least $(\frac{1}{2} - \varepsilon)n$ of the numbers in S are larger than x .

Consider the following randomized algorithm.

A random subset $S' \subseteq S$ is chosen, and the median of S' is returned.

Let $c = |S'|$. Show that c can be chosen independently of n such that, with probability at least 0.99, the element returned is an 0.05-approximate median.

Hint: Consider the elements of S in sorted order and let a and b be the smallest and largest element, respectively, among the middle 10% of the elements. Find an upper bound on the probability that either more than half of the sampled items are smaller than a or more than half of them are larger than b .

Spørgetime

Der bliver spørgetime torsdag d. 9. januar kl 10:15 i U152.



God jul!