

Array S of n distinct numbers:

9	5	34	1	2	33	12	4	15	3	6	8	10	18	0
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$n = 15$ here.

Choose a set R of size $n^{3/4}$ by drawing that many things uniformly at random, independently.

5	12	15	5	10	3	33
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Sort R :

3	5	5	10	12	15	33
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a \sqrt{n} $\text{median}(R)$ \sqrt{n} b

Find all the things in S between a and b (time $O(n)$), to form a list T :

5	9	12	15	6	8	10
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If $|T| < 4n^{3/4}$, sort T :
(otherwise output FAIL)

5	6	8	9	10	12	15
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- We can see in time $O(n)$ that there are 5 things in S less than a , and 3 things in S larger than b .
- The median is the 8'th smallest thing in S , which is the $8 - 5 = 3$ 'rd smallest thing in T .
- Return

8

If this calculation shows that the median is not in T , output FAIL.