

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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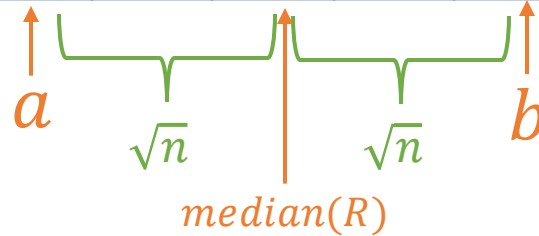
$n = 15$  here.

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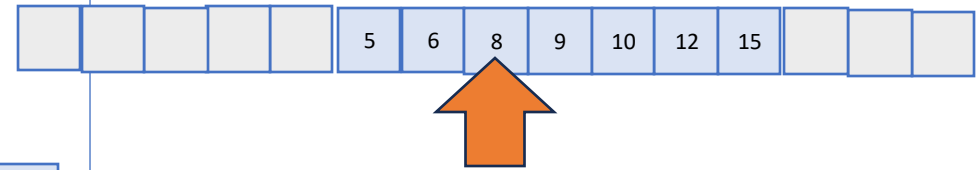
Find all the things in  $S$  between  $a$  and  $b$  (time  $O(n)$ ), to form a list  $T$ :

9	5	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 it! 

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