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Time complexity of binary search for an unsorted array

Asked 9 years, 1 month ago Modified 3 years, 4 months ago Viewed 48k times



14



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I am stuck up with two time complexities. To do a binary search with sorted array is $O(\log N)$. So to search an unsorted array we have to sort it first so that becomes $O(N \log N)$. So then we can perform binary search which gives the complexity as $O(N)$ but I have read that it could be $O(N \log N)$. Which is correct?

[arrays](#) [sorting](#) [binary-search](#)

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asked Apr 9, 2013 at 20:33



[user1521306](#)

195 3 3 8

It's true, a binary search will not work on an unsorted array; however, you'd first have to sort the array to perform the binary search. At least that's how I have learned recently. – [user2373448](#) Nov 21, 2017 at 21:16

3 Answers

Sorted by: Highest score (default)



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Binary Search is for "Sorted" lists. The complexity is $O(\log n)$.

Binary Search does not work for "un-Sorted" lists. For these lists just do a straight search starting from the first element; this gives a complexity of $O(n)$. If you were to sort the array with MergeSort or any other $O(n \log n)$ algorithm then the complexity would be $O(n \log n)$.

$O(\log n) < O(n) < O(n \log n)$

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edited Mar 19, 2015 at 22:43

answered Apr 9, 2013 at 21:31



Yay295

1,496 2 15 26



LuiNova

376 3 3



The answer to your question is in your question itself.

4

You are first sorting the list. If you sort your list using quick or merge sort, the complexity becomes $O(n \log n)$. Part - 1 gets over.



Second part of performing a binary search is done on the 'Sorted list'. The complexity of binary search is $O(\log n)$. Therefore ultimately the complexity of the program remains $O(n \log n)$.



However, if you wish to calculate the median of the array, you don't have to sort the list. A simple application of a linear, or sequential, search can help you with that.

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edited Aug 21, 2018 at 10:33



Olly

7,269 1 19 35

answered Dec 2, 2013 at 18:19



yuvrajm

316 1 3 15



0

The time complexity of linear search is $O(n)$ and that of binary search is $O(\log n)$ (log base-2). If we have an unsorted array and want to use binary search for this, we have to sort the array first. And here we have to spend a time $O(n \log n)$ to sort the array and then spend time to search element.



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edited Nov 19, 2016 at 7:41



skrtbhtngr

2,184 21 29

answered Nov 19, 2016 at 6:37



Akash saha

1