

Introduction to Sorting Algorithms

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Following our discussion on data structures as queues and linked lists, one of the most important topics, we, now delve into a new one from the arena of algorithms named **sorting**. The session today will just be an introduction. We'll answer a few of the basic questions like, what is sorting? What is it being taught? What are the applications? And many more. So, just hold on and follow the trail.

What is sorting?

Even though you are familiar with sorting, allow me to reiterate the basics.

So, sorting is a method to arrange a set of elements in either increasing or decreasing order according to some basis/relationship among the elements. Sorting are of two types, as you could deduce from the definition:

1. Sorting in ascending order, and
2. Sorting in descending order.

Sorting in ascending order:

Sorting any set of elements in ascending order refers to arranging the elements, let them be numbers, from the smallest to the largest. E.g., the set(1, 9, 2, 8, 7), when sorted in ascending order, becomes (1, 2, 7, 8, 9).

Sorting in descending order:

Sorting any set of elements in descending order refers to arranging the elements, let them be numbers, from the largest to the smallest. E.g., the same set(1, 9, 2, 8, 7), when sorted in descending order, becomes (9, 8, 7, 2, 1).

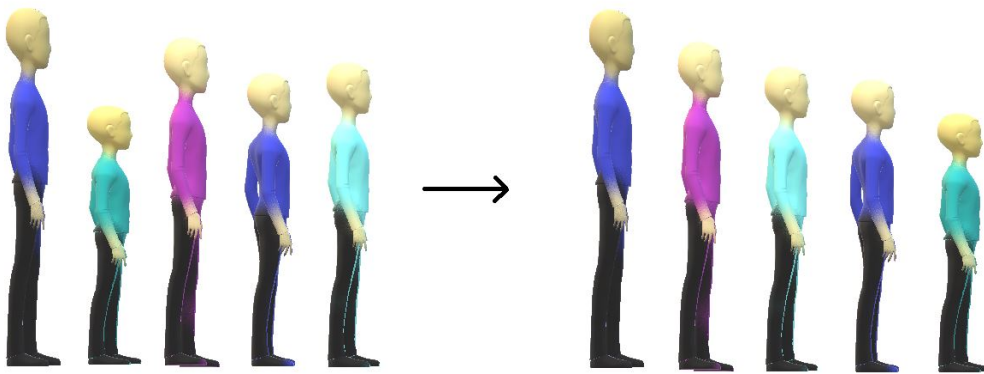
Another question that might cross your mind is why you are being taught this. So, let's explore the need of sorting methods.

Why do we need sorting?

To make you understand the reason why we need sorting in the simplest of ways, I would show some real-life applications of sorting that you might encounter almost daily.

1. There are social media applications, news applications, even your emails or file managers, where you want things to be arranged according to dates. You want the newest on top and oldest at the end. And this feature uses the method of sorting. And more specifically, sorting based on the date of publishing/modification.

2. Another example is the product delivery applications, be it delivering food like Swiggy, Zomato, or other shopping applications such as Amazon and Flipkart. You want the top-rated products on the top for your convenience. Sometimes you would need the products to be sorted according to their prices, be it the cheapest at first or the costliest at first. So, every one of these uses the sorting algorithm.
3. The third and most useful application is the dictionary. In a dictionary, the words are sorted lexicographically for you to find any word easily.
4. Another easy concept is that of binary search. If you remember, we discussed in the beginning that searching in a sorted array takes at most $O(\log N)$ time. And when it's not sorted, it can take up to $O(n)$. So, when an array is sorted, it minimizes the effort to find an element. Retrieval becomes much faster.
5. School assembly. If you recall the days of your high school, you stood height-wise during your morning assembly. The basis of sorting here is your height.



I believe I have given you enough examples to give you an understanding of sorting. In the coming videos, we will be discussing several methods to sort a set of elements. We will be seeing several algorithms, and discussing the basis of choosing which algorithm is the best for a particular set of elements. We have a lot of fun ahead of us.

I appreciate your support throughout. I hope you enjoyed the tutorial. If you genuinely appreciate my work, please let your friends know about this course too. If you haven't checked out the whole playlist yet, move on to codewithharry.com or my YouTube channel to access it. See you all in the next tutorial where we'll see the criteria for analyzing different sorting algorithms. Till then keep coding.