

Give a chart to show time and space complexity of various sorting methods.

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**Time Complexity:** Time Complexity is defined as the number of times a particular instruction set is executed rather than the total time is taken. It is because the total time took also depends on some external factors like the compiler used, processor's speed, etc.

**Space Complexity:** Space Complexity is the total memory space required by the program for its execution.

Both are calculated as the function of input size( $n$ ).

One important thing here is that in spite of these parameters the efficiency of an algorithm also depends upon the nature and size of the input.

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Algorithm Time Complexity

Best. Average. Worst

Selection Sort  $\Omega(n^2)$ ,  $\theta(n^2)$ ,  $\mathcal{O}(n^2)$

Bubble Sort  $\Omega(n)$ ,  $\theta(n^2)$ ,  $\mathcal{O}(n^2)$

Insertion Sort  $\Omega(n)$ ,  $\theta(n^2)$ ,  $\mathcal{O}(n^2)$

Heap Sort  $\Omega(n \log(n))$ ,  $\theta(n \log(n))$ ,  $\mathcal{O}(n \log(n))$

Quick Sort.  $\Omega(n \log(n))$ ,  $\theta(n \log(n))$ ,  $\mathcal{O}(n^2)$

merge Sort.  $\Omega(n \log(n))$ ,  $\theta(n \log(n))$ ,  $\mathcal{O}(n \log(n))$

Bucket Sort  $\Omega(n+k)$ ,  $\theta(n+k)$ ,  $\mathcal{O}(n^2)$

Radix Sort  $\Omega(nk)$ ,  $\theta(nk)$ ,  $\mathcal{O}(nk)$

Count Sort  $\Omega(n+k)$ ,  $\theta(n+k)$ ,  $\mathcal{O}(n+k)$