

Selection Sort

Selection Sort: select an element & put it on its correct index.

Example:

4, 5, 1, 2, 3
0 1 2 3 4

[get the greatest element of the array & put it on its correct index]

4, 3, 1, 2, 5

Adaptive:

2, 3, 1, 4, 5

Reduce no. of swap steps as compare to bubble sort

2, 1, 3, 4, 5

1, 2, 3, 4, 5 → Sorted!!

→ Here we selected maximum element & put it on right index, we can also do vice versa i.e., select minimum element and put it on right index!!

Complexity:

Total comparisons ⇒ 4, 5, 1, 2, 3 (n-1)

4, 3, 1, 2, 5 (n-2)

2, 3, 1, 4, 5 (n-3)

2, 1, 3, 4, 5 1

1, 2, 3, 4, 5 0

already at correct position ignore in future steps.

$$= 0 + 1 + 2 + 3 + \dots + (n-1) = \frac{n(n-1)}{2} = \boxed{\frac{n^2 - n}{2}}$$

Worst case → $O(n^2)$

Best case → $O(n^2)$

↑ neglect less dominating & constant terms

⇒ It is not stable sorting algorithm.

⇒ It performs well on small lists.