# * Selection Sort *

arr[] : | 1 | 7 | 9 | 2 | 3 | 0 |

Sort

sorted array → | 0 | 1 | 2 | 3 | 7 | 9 |

## → what is selection Sort ?

↳ diff rounds / passes

↳ smallest element place at its right place

→ arr[] →

| 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 64 | 25 | 12 | 22 | 11 |

**Round 1:** swap 64 ... 11

64 25 12 22 11

i = 0

**Round 2:** swap 25 ... 12

11 25 12 22 64

i = 1

**Round 3:** swap 25 ... 22

11 12 25 22 64

i = 2

**Round 4:**

11 12 22 25 64

i = 3

→ last element will be sorted automatically.

Total Rounds = n - 1

→ here there will be 2 for loops

① outer : $i=0 \rightarrow n-2$ for sounds $i<n-1$

② Inner : to find min of array. $j=i+1 \rightarrow n-1$
$j<n$

Space complexity → Constant

Time complexity → $O(n^2)$, Best case : $O(n^2)$
worst case : $O(n^2)$

$n-1$
$n-2$
$n-3$
⋮
1

$= 1+2+3+\ldots\ldots+(n-2)+(n-1)$

$= \frac{n(n-1)}{2} = \frac{n^2-n}{2}$

Use case :

↳ array / vector / list & size small.

What is Stable Algo / Unstable Algo?

→ Stable sorting algorithms preserve the relative order of equal elements, while unstable sorting Algo don't. In other words stable sorting maintain the position of two equals elements relative to one another.