

Selection Sort

array = [~~50~~¹⁹, 38, 45, 79, ~~19~~⁵⁰, 27, 29]
0 1 2 3 4 5 6

min = ~~0~~ 4

Pass 1

↳ index of the minimum value

[19, ~~38~~²⁷, 45, 79, ~~50~~³⁸, ~~27~~, 29]
0 1 2 3 4 5 6

min = ~~2~~ 5

Pass 2

[19, 27, ~~45~~²⁹, 79, 50, ~~38~~⁴⁵, 29]
0 1 2 3 4 5 6

min = ~~2~~ 6

Pass 3

[19, 27, 29, ~~79~~³⁸, 50, ~~38~~⁷⁹, 45]
0 1 2 3 4 5 6

min = ~~3~~ 4

Pass 4

19, 27, 29, 38, ~~50~~⁴⁵, 79, ~~45~~⁵⁰
0 1 2 3 4 5 6

min = ~~4~~ 6

Pass 5

19, 27, 29, 38, 45, ~~79~~⁵⁰, ~~50~~⁷⁹
0 1 2 3 4 5 6

min = ~~5~~ 6

Pass 6

19, 27, 29, 38, 45, 50, 79
0 1 2 3 4 5 6

Note

→ At every pass, only one swap is required.

→ $(n-1)$ th Pass → 1 swap
|
1st Pass → 1 swap

} # swaps
 $(n-1)$ swaps
↳ $O(n)$

→ $(n-1) + (n-2) + (n-3) + \dots + 1 = \frac{(n-1)n}{2}$
 \Rightarrow $O(n^2)$

Time complexity → $\left. \begin{array}{l} \text{comparisons} \rightarrow O(n^2) \\ \text{swaps} \rightarrow O(n) \end{array} \right\} \Rightarrow$ $O(n^2)$