$$n = 10^5 \qquad \underline{\underline{1}} \quad 2 \quad 3 \quad 4 \quad 5 \quad\quad 6 \quad - \quad - \quad - \quad - \quad - \quad -$$

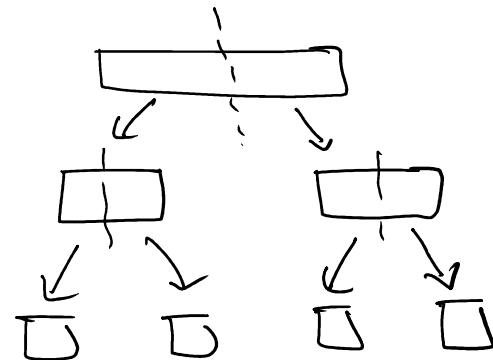$$Prob^y = \frac{1}{N} \cdot \frac{1}{n-2} \cdot \frac{1}{n-3} \cdot \quad - - - - - - - - - -$$

$$= \boxed{\frac{1}{n!}}$$

Complexity:

S.C: $O(n)$

T.C : $O(n \log n)$ // Avg. Case

$\quad\quad\quad \longrightarrow$ Worse Case $\underline{\underline{O(N^2)}}$

$C++$ Sort function $\longrightarrow$ Intro Sort

$$[Quick\ Sort\ +\ Insertion\ Sort]$$

$\underline{O(N \log)}$

Quick Sort
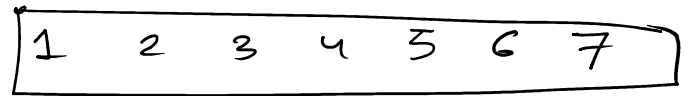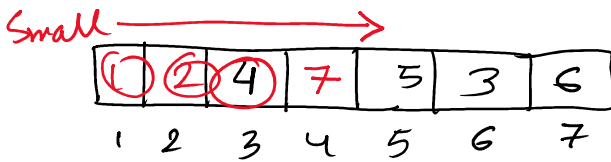
① No Extra Memory

② Beginners find it hard to understand

③ Better understanding of probability.

③ Better understanding of probability.

④ Find optimal pivot

Merge Sort

① Case independent

Small ———————→

①	②	④	7	5	3	6
1	2	3	4	5	6	7

1	2	3	4	5	6	7

$$① + ① = ②$$

$$①_t$$

$$\underline{O(N)} \ ?$$

$$scrap\left(arr[small], \underbrace{arr[x]}_{(small)}\right) \rightarrow \underline{O(1)}$$
$$\quad\quad\quad\quad {}_{1,2,3,\ldots n}$$

$$value \longrightarrow position \ of \ value \longrightarrow \underline{O(1)}$$