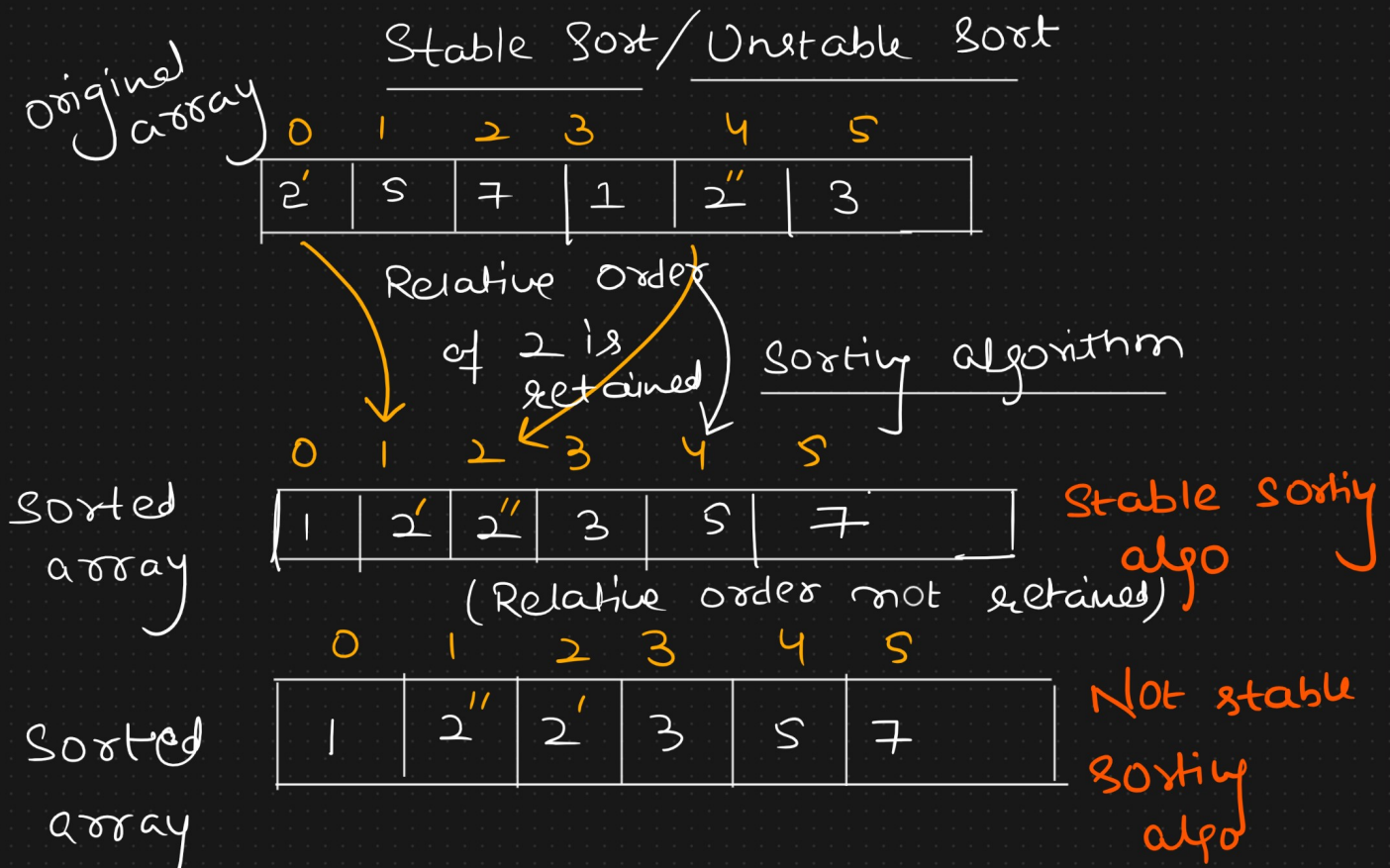Sorting → ascending or descending order

Inplace/Outplace Sorting Algorithms

Inplace Sorting
↳ not taking any extra space
to execute the
sorting algorithm

Outplace Sorting
↳ taking extra space to
execute the sorting
algorithm

Stable Sort/Unstable Sort

Original array

0	1	2	3	4	5	
2'	S	7	1	2"	3	

Relative order
of 2 is
retained

Sorting algorithm

Sorted array

0	1	2	3	4	5	
1	2'	2"	3	S	7	

(Relative order not retained)

Stable Sorting algo

Sorted array

0	1	2	3	4	5
1	2"	2'	3	S	7

Not stable Sorting algo

$20 \atop 70$, $50 \atop 20$ $70 \atop 50$ $30 \atop 30$ $10 \atop 90$ $90 \atop 5$ $5 \atop 15$ $15 \atop 70$, $15 \atop 90$ 90 $n-i-1$

   0   1   2   3   4   5   6 $n=7$

↑ ⇑ ↑ ↑ ↑ ↑ ↑

Bubble Sort

(Ascending order)

Pass 1 : $\left(20, \; \underset{\uparrow}{50}, \; \underset{50}{\overset{30}{30}}, \; \underset{\downarrow}{70}, \; \underset{\uparrow}{\overset{5}{8}}, \; \underset{\uparrow}{\overset{15}{15}} \right) \; \underline{\underline{90}}$

Pass 2 : $\left(20, \; \underset{\uparrow}{30}, \; \underset{\uparrow}{\overset{5}{50}}, \; \underset{\uparrow}{\overset{8\,15}{5}}, \; \underset{50}{18} \right) \; \underline{\underline{70}}, \; \underline{\underline{90}}$

Pass 3 : $\left(20, \; \underset{\uparrow}{30}, \; \underset{\uparrow}{\overset{15\atop 30}{8}}, \; \underset{\uparrow}{\overset{30}{15}} \right) \; \underline{\underline{50}}, \; \underline{\underline{70}}, \; 90$

Pass 4 : $\left(\underset{5}{\overset{20}{20}}, \; \underset{20}{8}, \; 15 \right) \; \underline{30}, \; \underline{50}, \underline{70}, \underline{90}$

Pass 5 : $\underset{\uparrow}{5}, \; \underset{\uparrow}{\overset{15}{15}}, \left(20, \; 30, \; 50, \; 70, \; 90 \right)$

Pass 6 : $5, \; 15, \; 20, \; 30, \; 50, \; 70, \; 90$

$\boxed{n = 7}$ 6 —— Pass

      ↳ $(n-1)$ —— Iterations