

① QuickSort

R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}	R_{11}	left	right
[12	2	16	30	8	28	4	10	20	6	18]	1	11
[4	2	6	10	8]	12	[28	30	20	16	18]	1	5
[2]	4	[6	10	8]	12	[28	30	20	16	18]	1	1
2	4	[6	10	8]	12	[28	30	20	16	18]	3	5
2	4	6	[10	8]	12	[28	30	20	16	18]	4	5
2	4	6	8	10	12	[28	30	20	16	18]	7	11
2	4	6	8	10	12	[16	18	20]	28	[30]	7	9
2	4	6	8	10	12	16	[18	20]	28	[30]	8	9
2	4	6	8	10	12	16	18	20	28	[30]	11	11
2	4	6	8	10	12	16	18	20	28	30		

② Is "Quick sort" STABLE?

counter-example:

QuickSort(2, 1, 1), and mark two identical elements 1, 1 as 1a, 1b

→ QuickSort(2, 1a, 1b)

R_1	R_2	R_3	left	right
[2	1a	1b]	1	3
1b	1a	2		

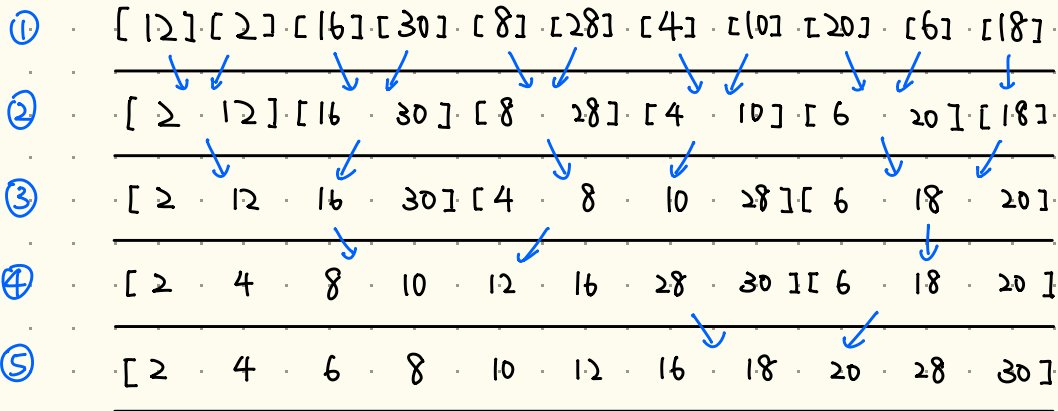
In original array 1a was located one position BEFORE 1b,
 after the quick sort, 1a is positioned one place AFTER 1b,
 proving that QuickSort algorithm is UNSTABLE

③ Write the status of the list

(12, 2, 16, 30, 8, 28, 4, 10, 20, 6, 18)

at the end of each phase of MergeSort

phase



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