Merge Sort

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Traditional Merge Sort

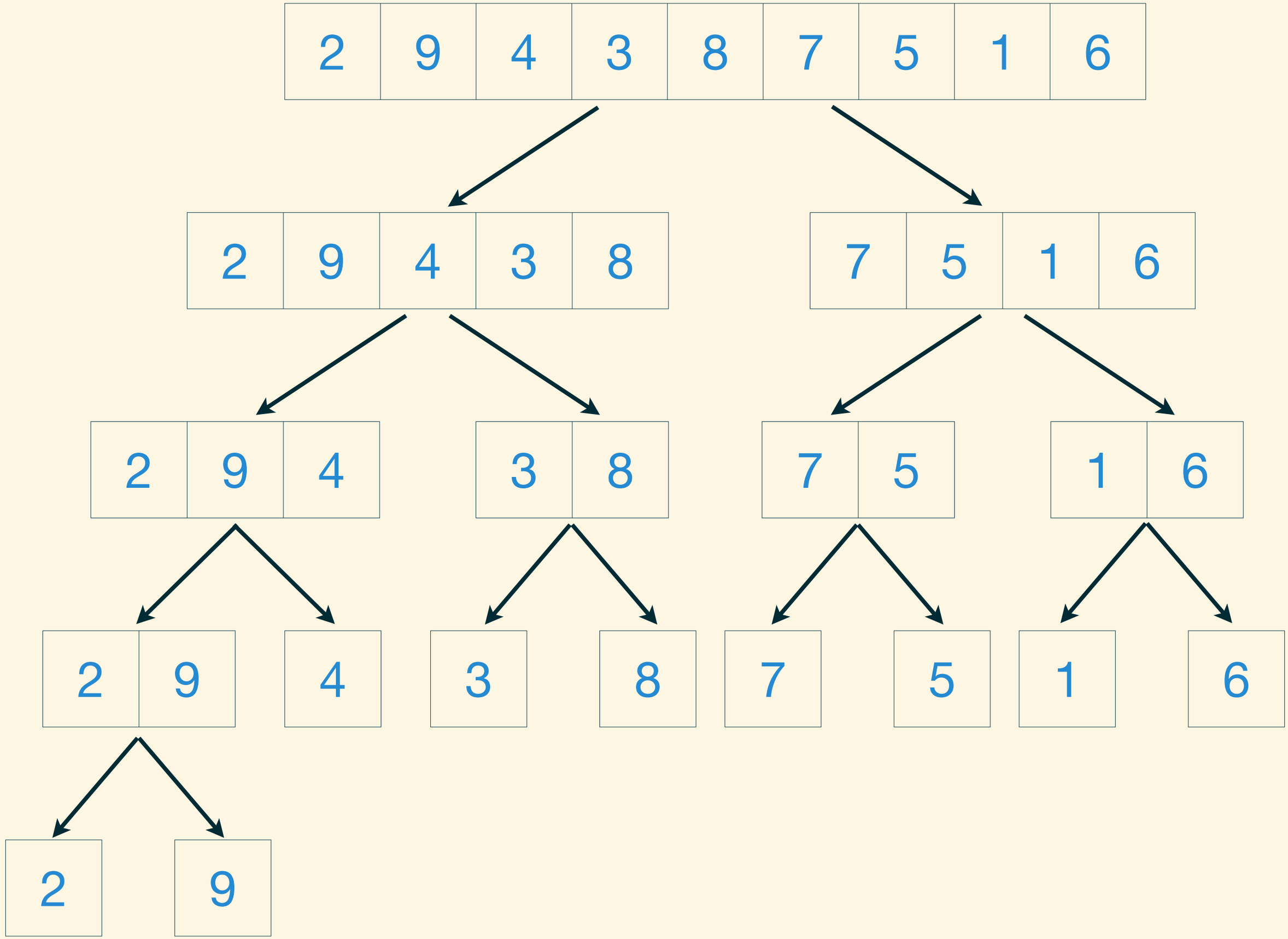
Algorithm

採用 divide & conquer 策略

Divide

將當前數列對半切割遞迴進行

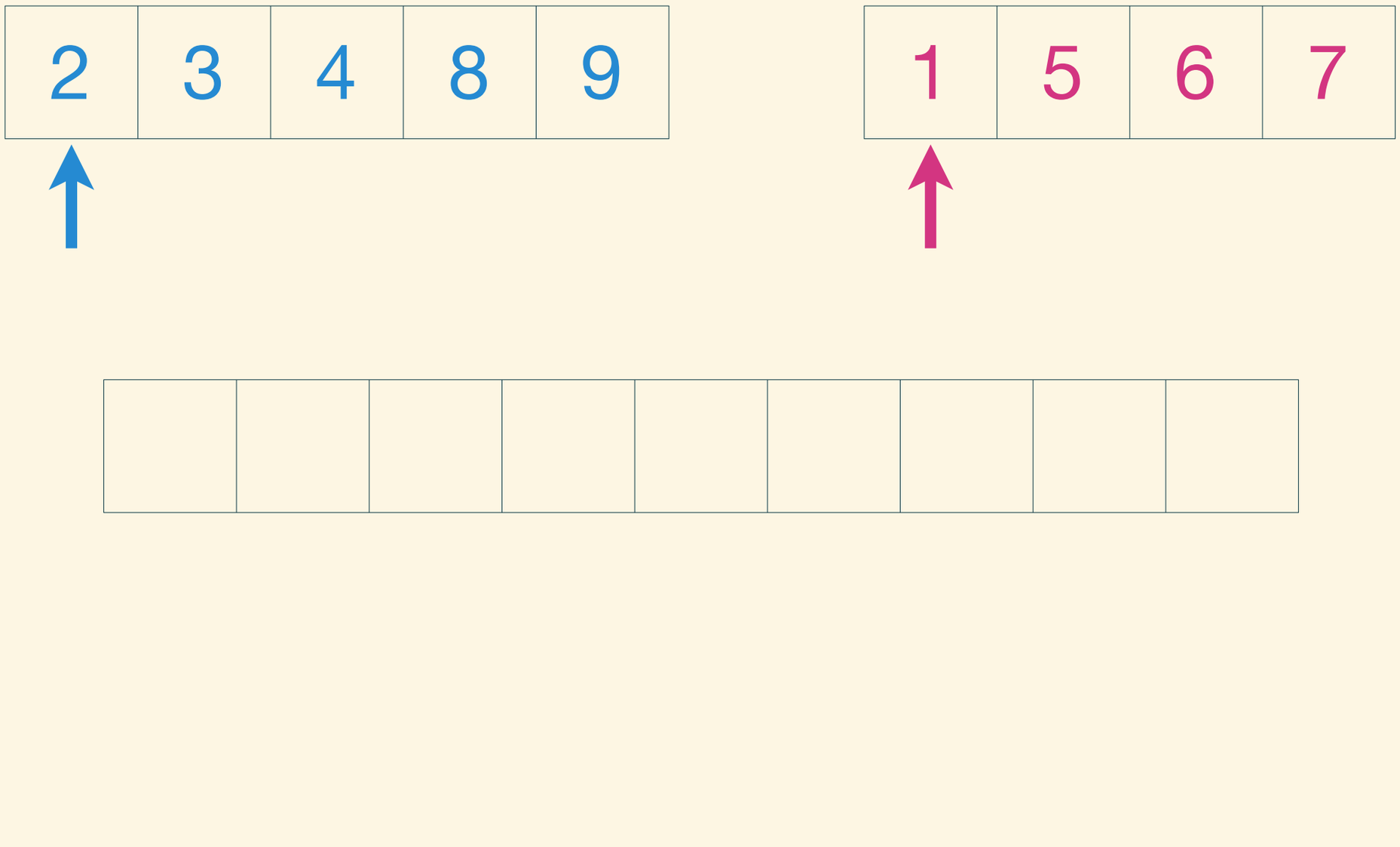
直到僅剩一個元素


2 9 4 3 8 7 5 1 6
2 9 4 3 8
7 5 1 6
2 9 4
3 8
7 5
1 6
2 9
4
3
8
7
5
1
6
2
9

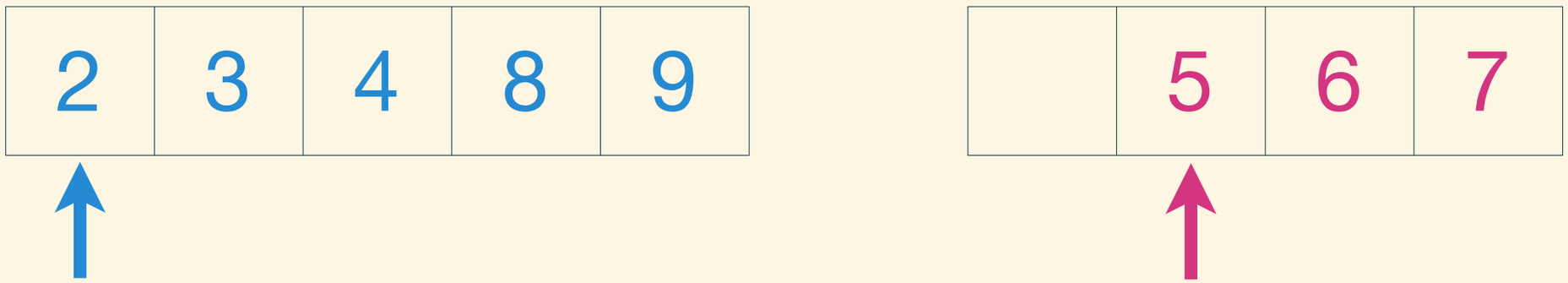
Conquer

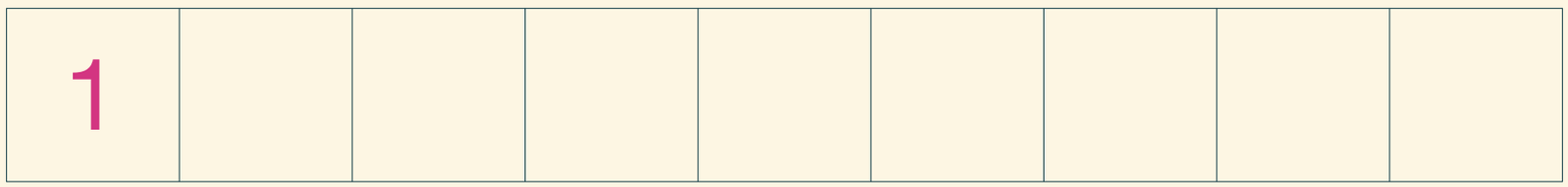
1. 利用兩個指標指向兩個有序數列 A 與 B
2. 比較指標指向的數值
3. 將較小的數值放入新的數列 C，並將該指標指向下一數值
4. 直到某一指標指向數列結尾，將另一數列剩餘的數值放都入數列 C

Merge Two Sequence



Merge Two Sequence





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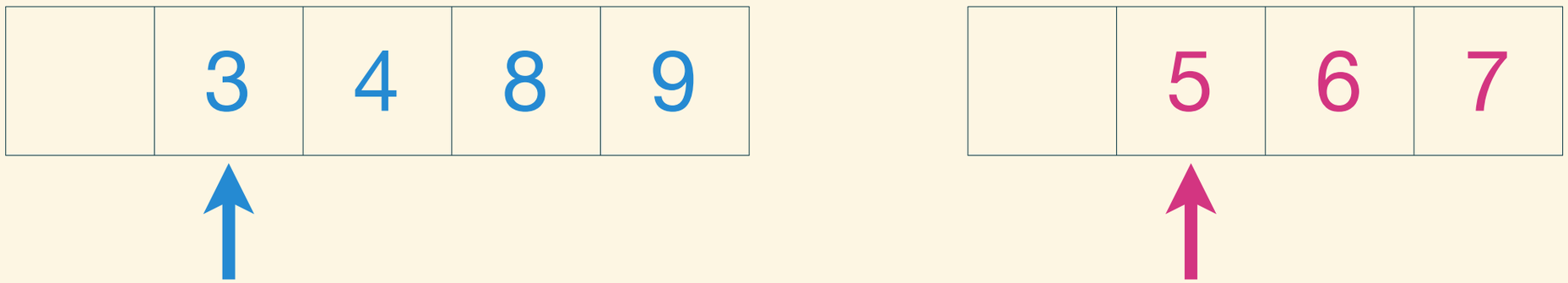

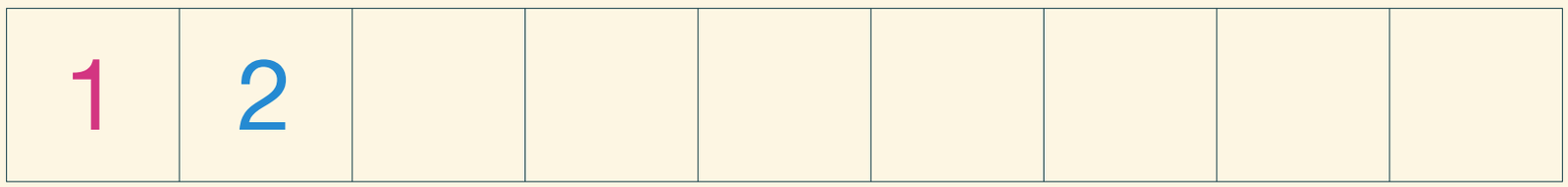

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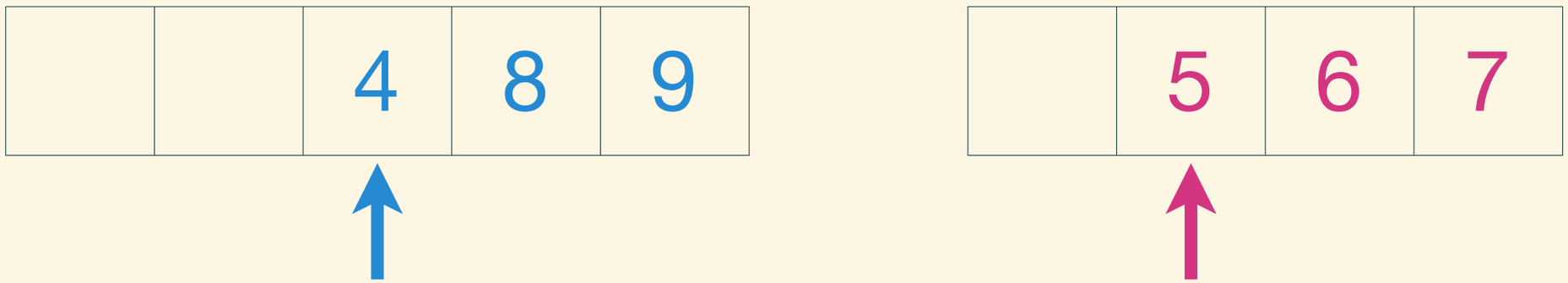

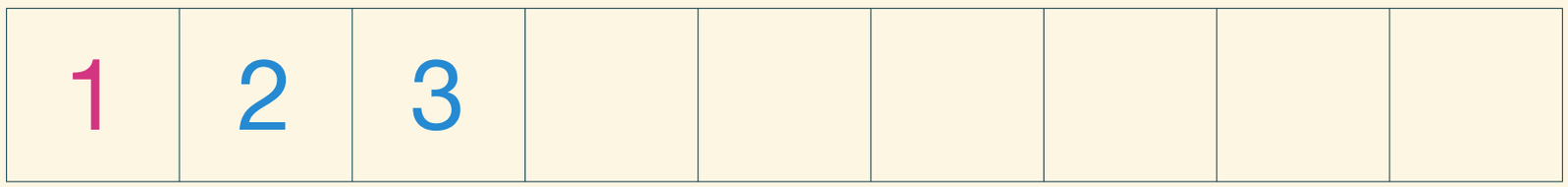

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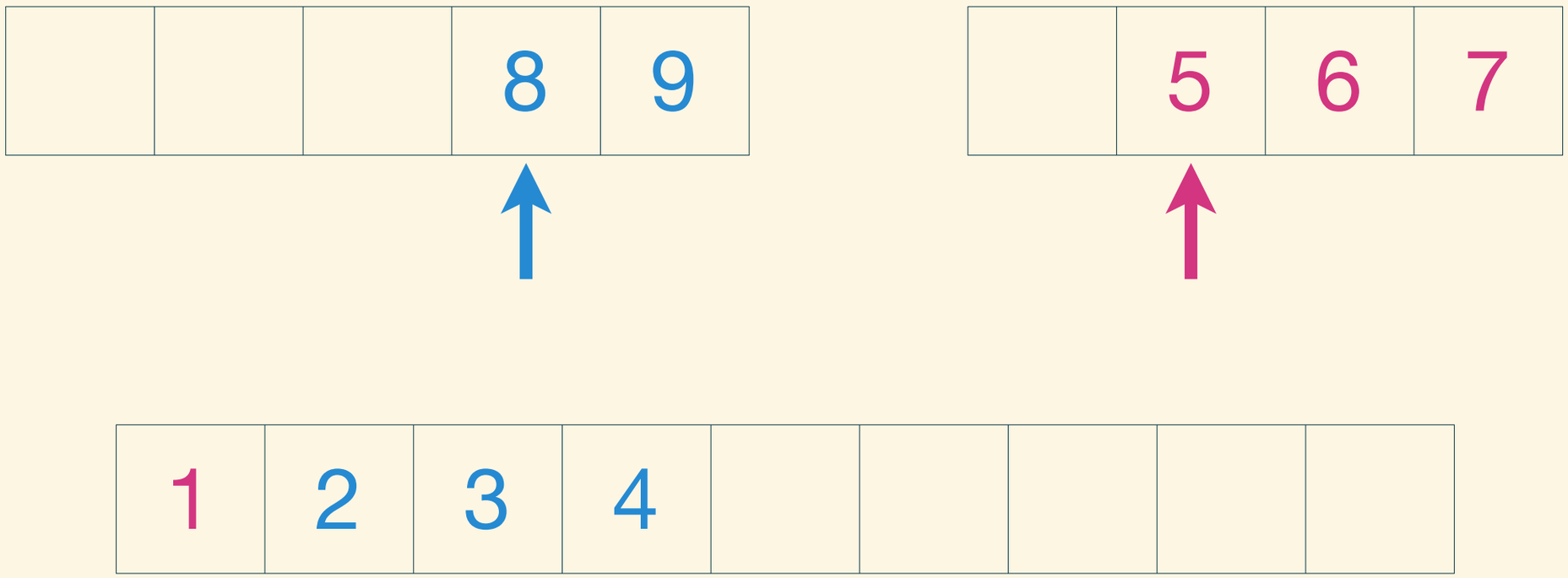

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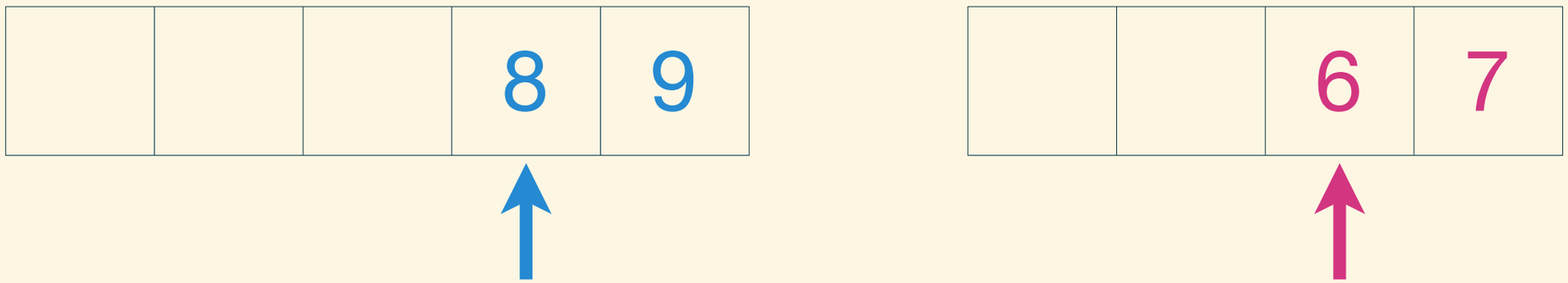

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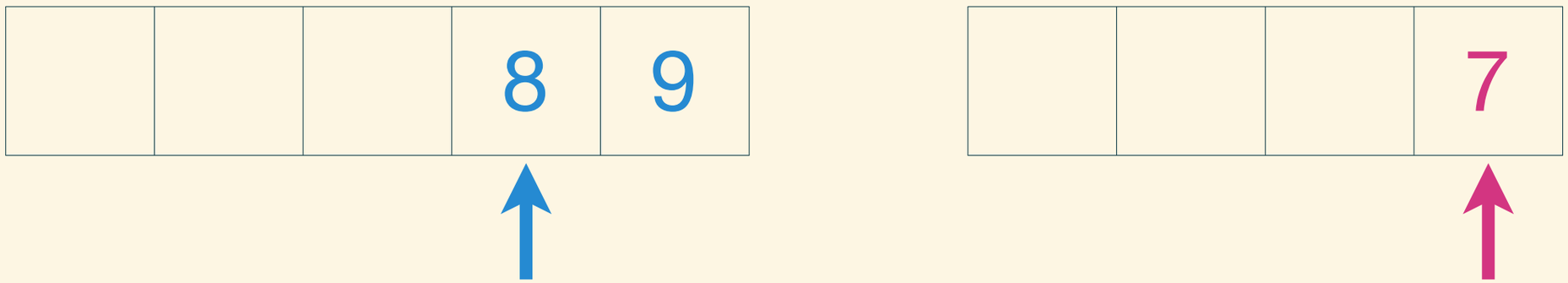

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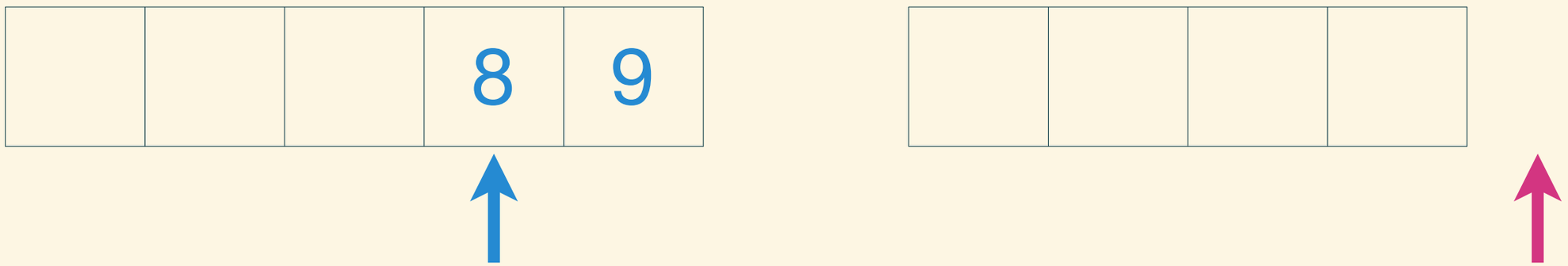

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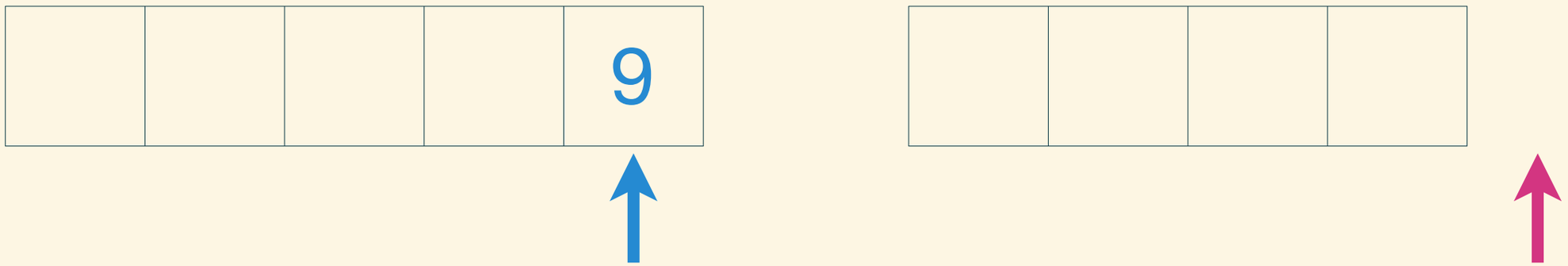

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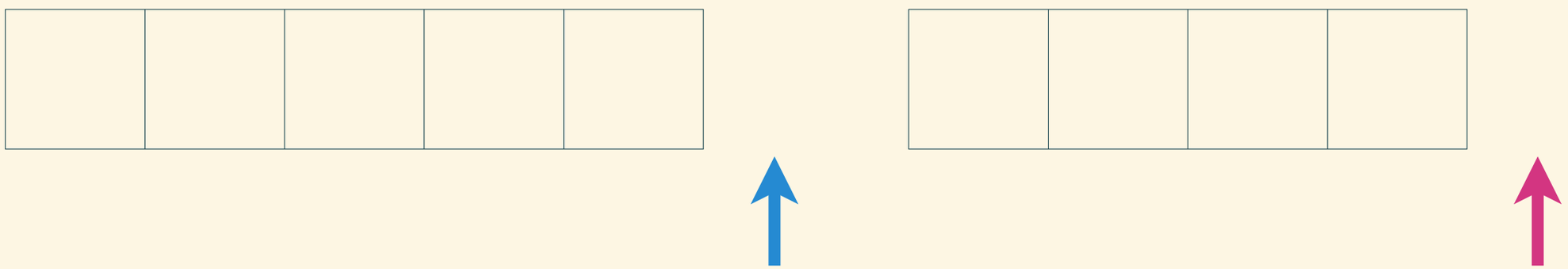
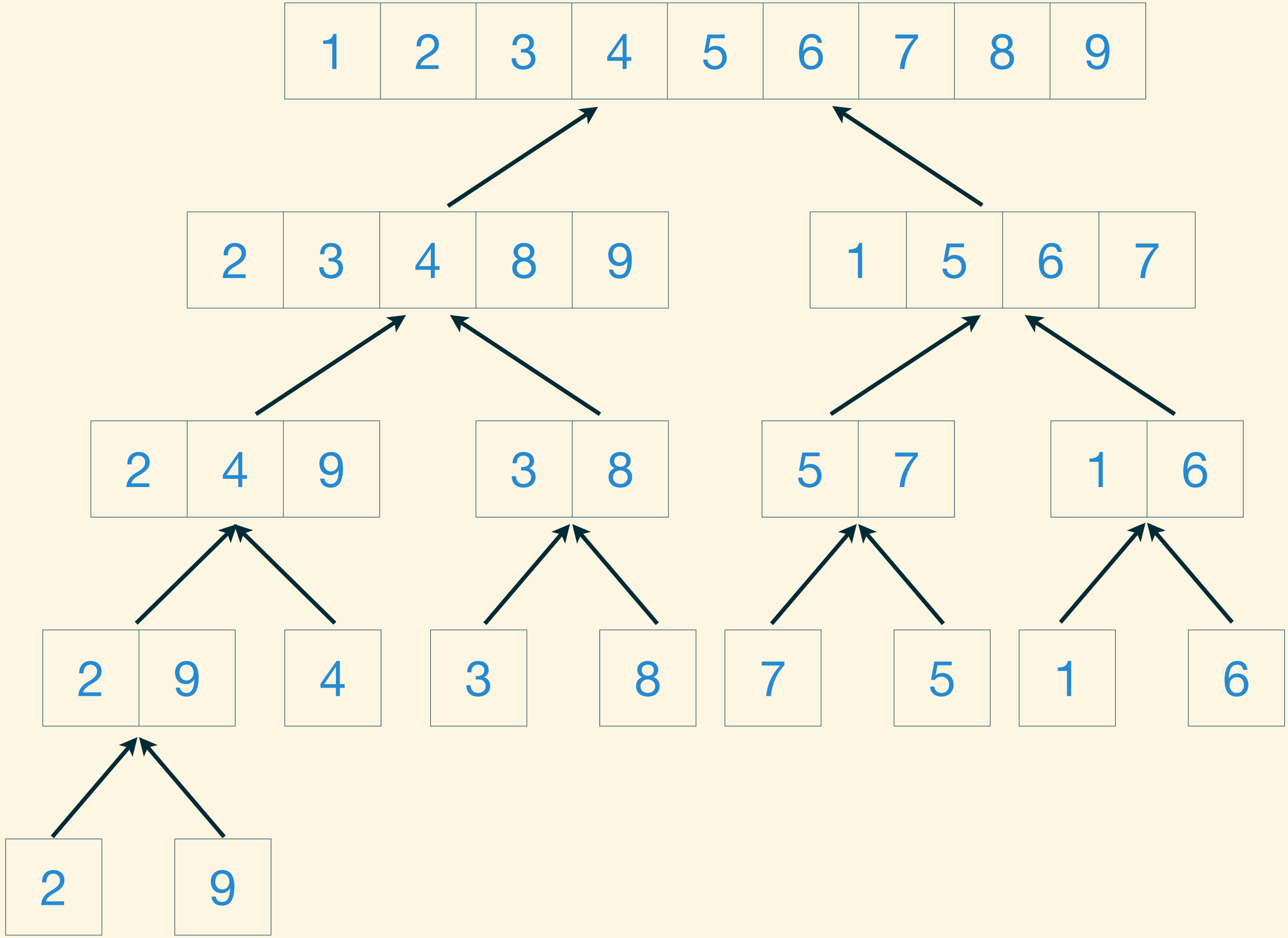


1	2	3	4	5	6	7	8	9


1 2 3 4 5 6 7 8 9
2 3 4 8 9
1 5 6 7
2 4 9
3 8
5 7
1 6
2 9
4
3
8
7
5
1
6
2
9

Natural Merge Sort

Key Point

利用數列中的有序數列片段，以減少切割次數！

有序數列片段

1	3	4	2	7	9	8	0	5

1	3	4	2	7	9	8	0	5

How to Divide

A

B

How to Divide

A

B

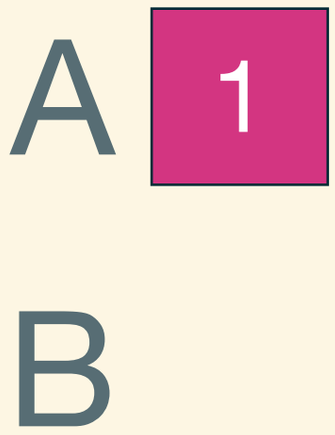
How to Divide

1	3	4	2	7	9	8	0	5

A 1

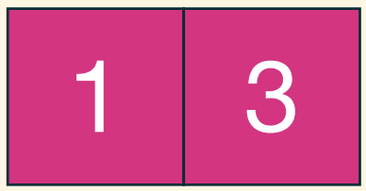
B

How to Divide



How to Divide

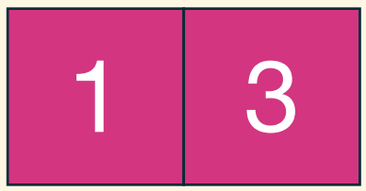
A



B

How to Divide

A



B

How to Divide

1	3	4	2	7	9	8	0	5

A

1	3	4

B

How to Divide

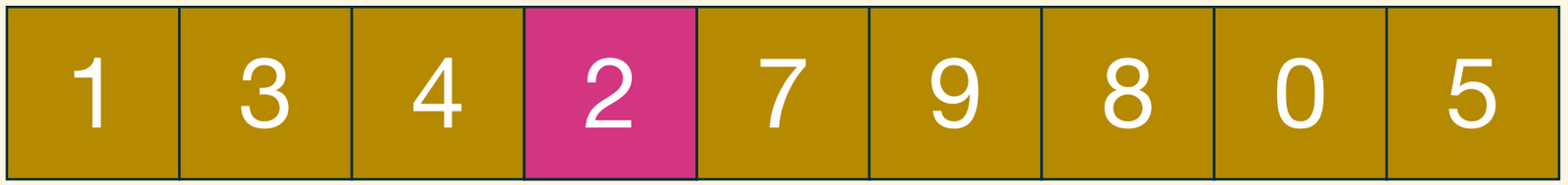
1	3	4	2	7	9	8	0	5

A

1	3	4

B

How to Divide



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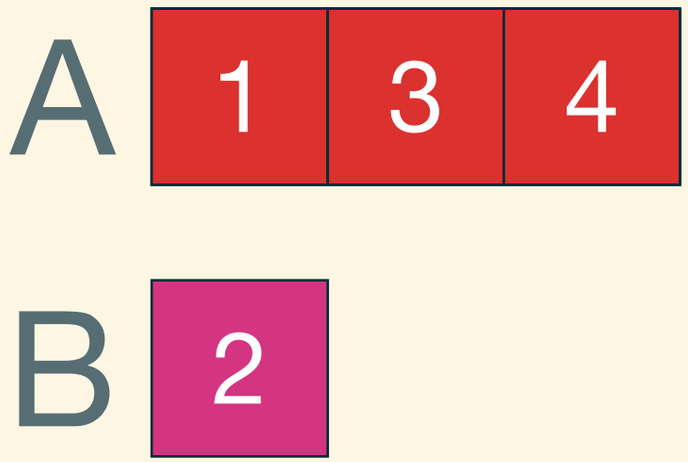

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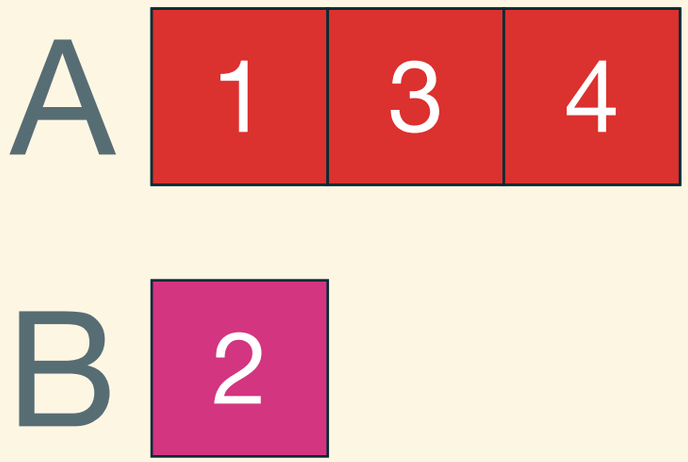

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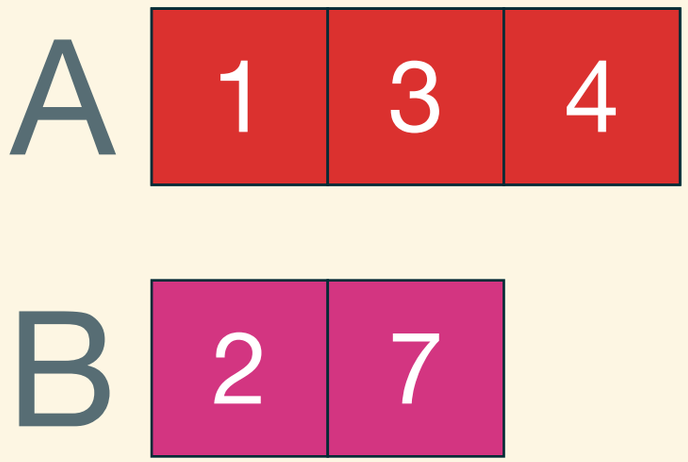

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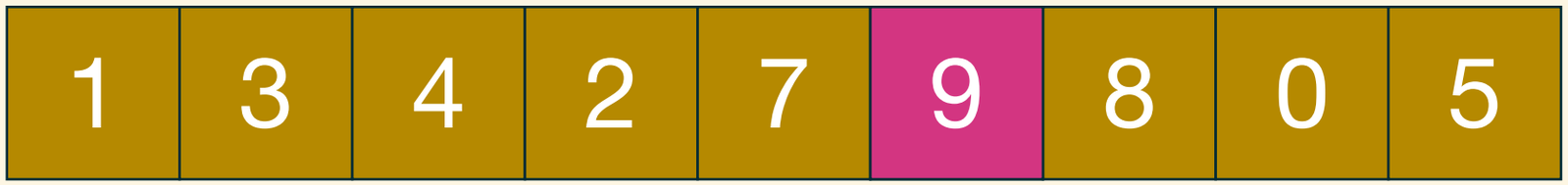
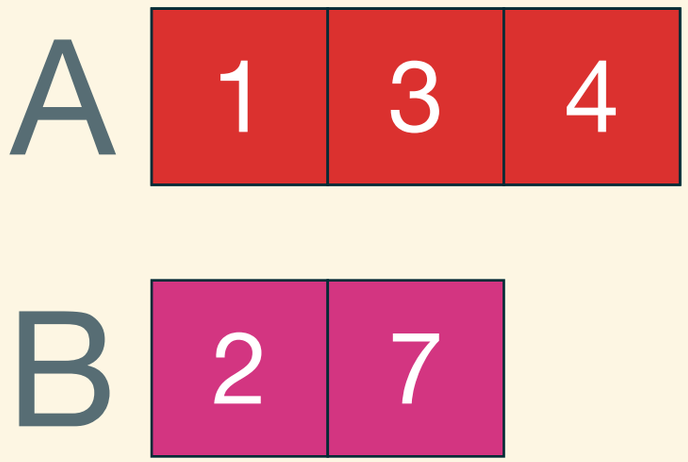
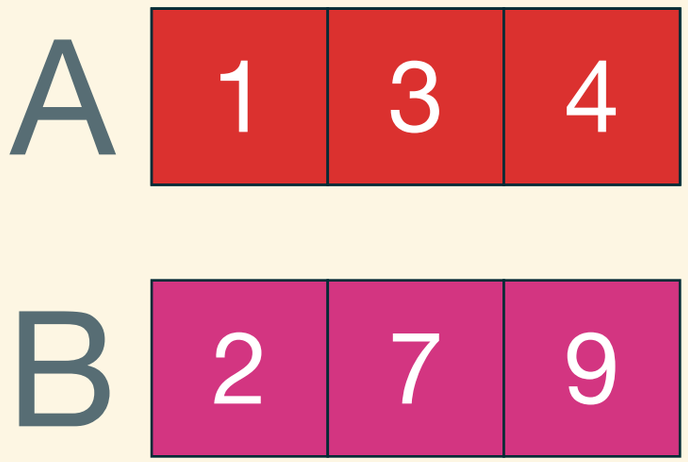
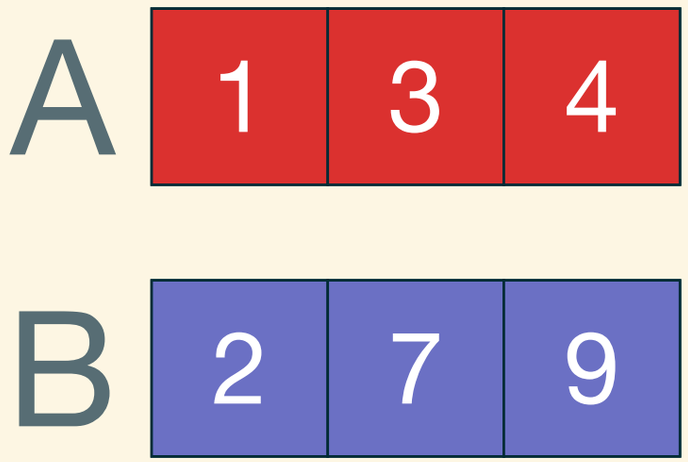




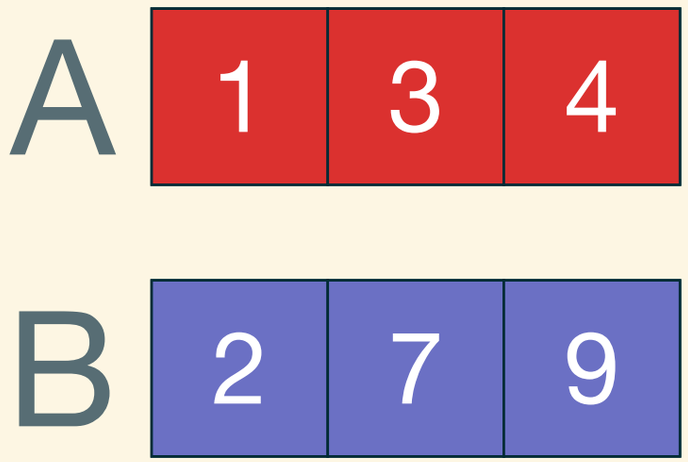
How to Divide



How to Divide



How to Divide



How to Divide

1	3	4	2	7	9	8	0	5

A

1	3	4	8

B

2	7	9

How to Divide

1	3	4	2	7	9	8	0	5

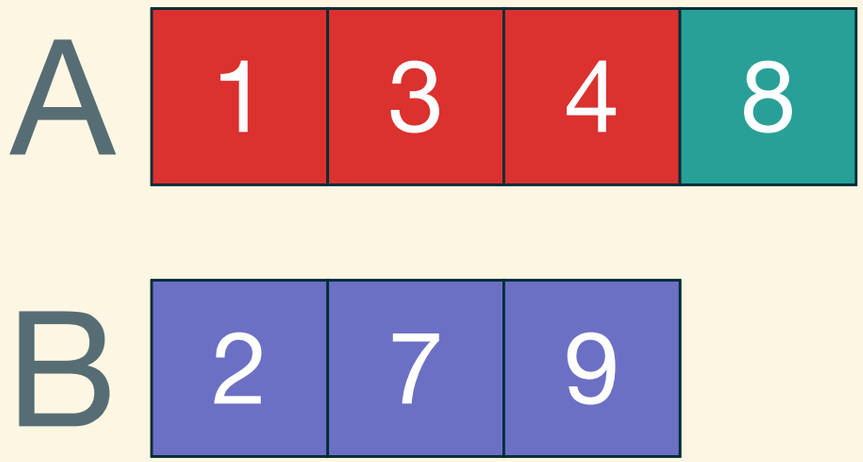
A

1	3	4	8

B

2	7	9

How to Divide



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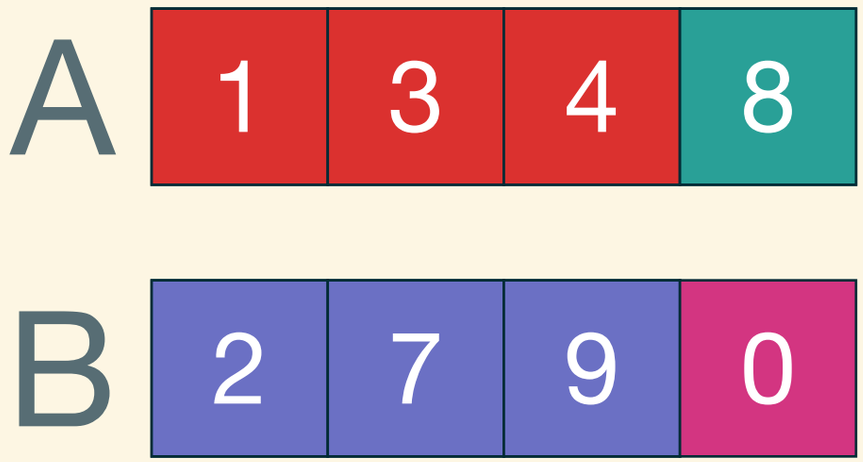

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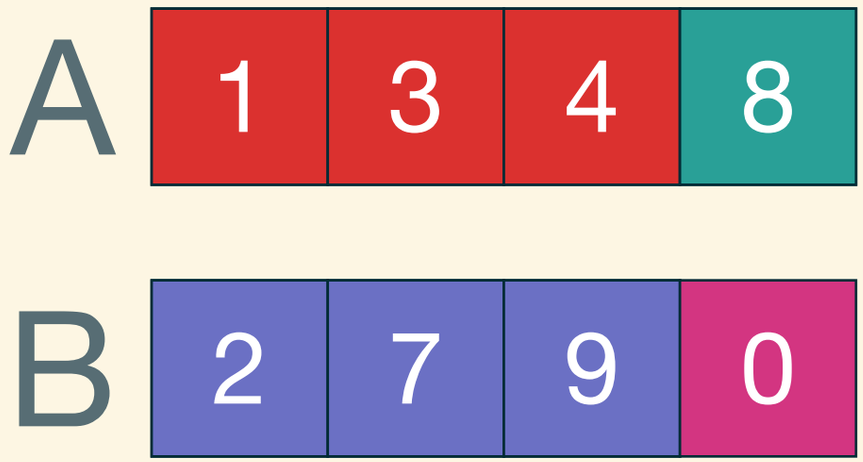

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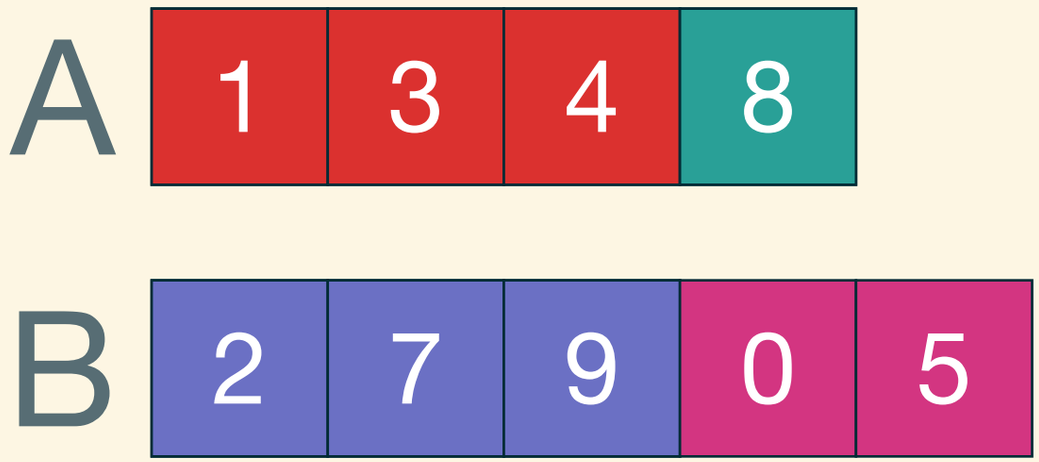

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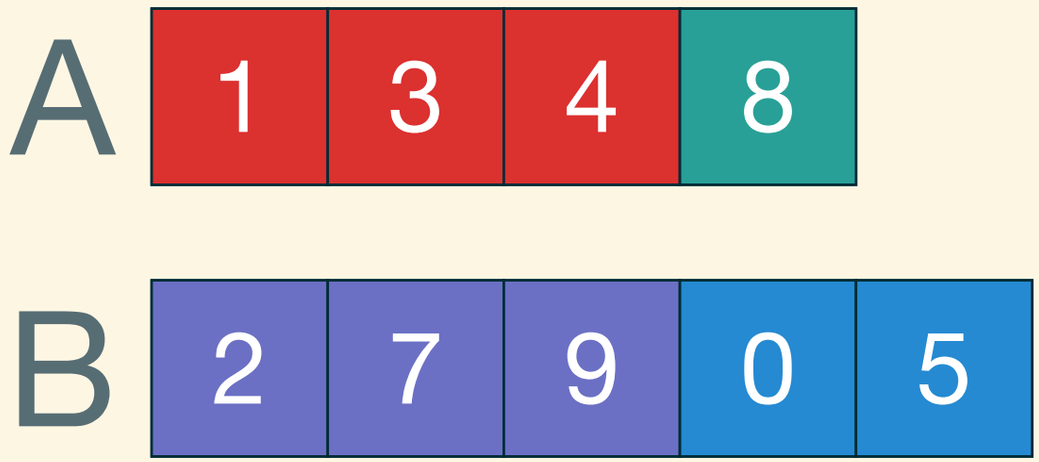

The merge operation is as same as traditional merge sort.

End