

INSERTION SORT

MERGE SORT

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QUICKSORT

09.03.

2021.

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# INSERTION SORT

$\langle 3, 1, 7, 2, 0, 1 \rangle = \langle \overbrace{3}^{\text{sorted}} \mid \overbrace{1, 7, 2, 0, 1}^{\text{unsorted}} \rangle \rightarrow \langle 1, 3 \mid 7 \mid 2, 0, 1 \rangle$

$\rightarrow \langle 1, 2, 3, 7 \mid 0, 1 \rangle \rightarrow \langle 0, 1, 2, 3, 7 \mid 1 \rangle \rightarrow \langle 0, 1, 1, 2, 3, 7 \rangle$

$WT(n) \in \Theta(n) \wedge MT(n) \in \Theta(n^2)$

Stable sort

0	1	2	3	7	1
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 $\rightarrow x=1$

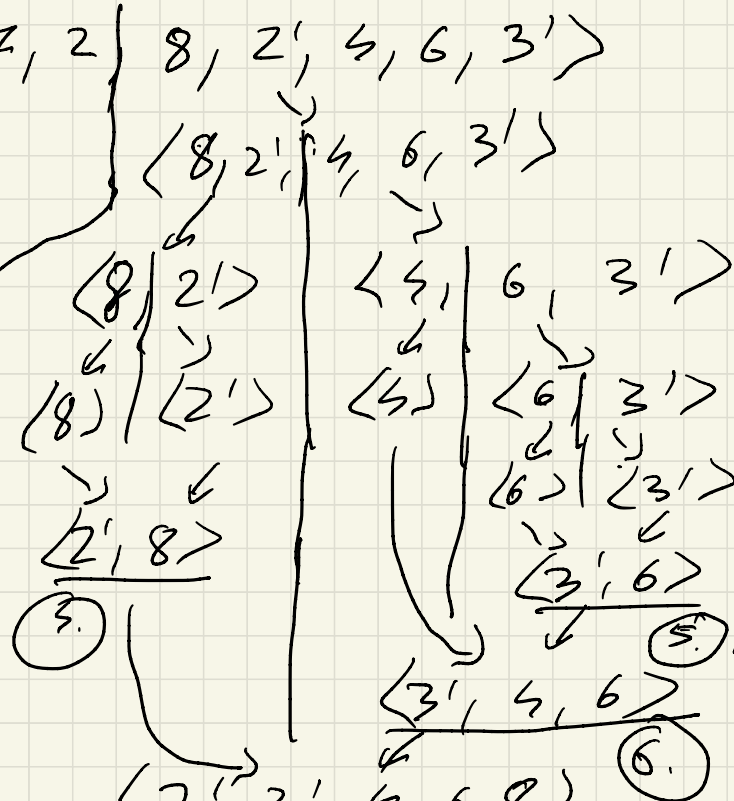
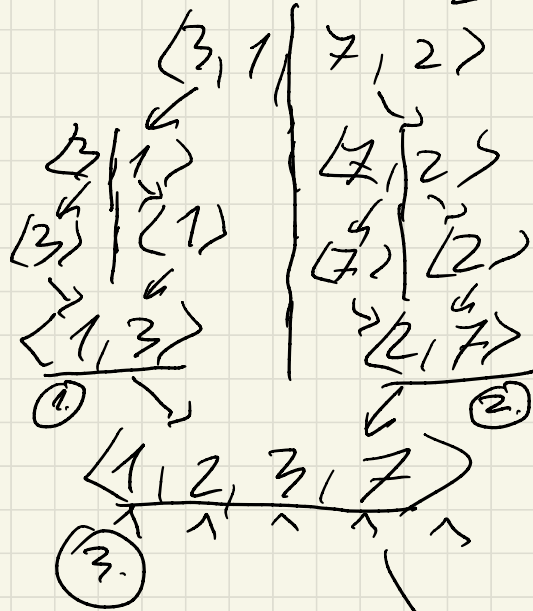
0	1	2	3	7	
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 $\swarrow \quad \searrow \quad \swarrow$   
 $3. \quad 2. \quad 1.$

0	1	1	2	3	7
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 $x=1$

MERGE SORT  $\langle 3, 1, 7, 2 \mid 8, 2', 4, 6, 3' \rangle$



STABLE SORT  $\langle 1, 2, 2', 3, 3', 4, 6, 7, 8 \rangle$   $\left\{ \begin{array}{l} mT(n) \\ 14T(n) \end{array} \right\} \in O(n \cdot \log n)$

# QUICKSORT

## PARTITIONING

$\langle \textcircled{5}, 2, 7, 1, 3, 8, 4 \rangle$

PIVOT = 5

$\langle 4, 2, 7, 1, 3, 8, \textcircled{5} \rangle$

$\langle 4, 2, 1, 7, 3, 8, \textcircled{5} \rangle$

$\langle 4, 2, 1, 3, 7, 8, \textcircled{5} \rangle$

①

$\langle 4, 2, 1, 3 | \textcircled{5} | 8, 7 \rangle$

$\langle \textcircled{4}, 2, 1, 3 \rangle$

2.  $\langle 3, 2, 1 | \textcircled{4} \rangle$

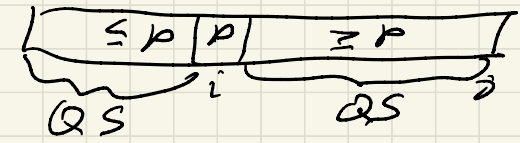
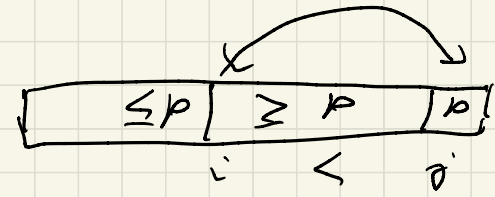
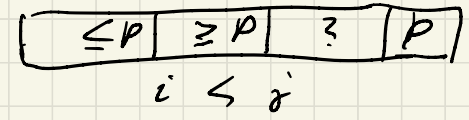
$\langle 3, \textcircled{2}, 1 \rangle$

$\langle \textcircled{3}, 1, \textcircled{2} \rangle$

$\langle 1, 3, \textcircled{2} \rangle$

$\langle \textcircled{7}, 8 \rangle$   
④

$\langle 1, 2, 3, 4, 5, 7, 8 \rangle$



$\left. \begin{matrix} MT(n) \\ AT(n) \end{matrix} \right\} \Theta(n \cdot \log n)$

$MT(n) \in \Theta(n^2)$

UNSTABLE

③

$\langle 1, \textcircled{2}, 3 \rangle$

$$\langle \textcircled{1}, 2 \rangle$$

$$\langle \overset{\curvearrowright}{1}, \textcircled{1} \rangle$$

$i \quad j$

$$\langle \textcircled{1}, 2 \rangle$$

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$$\langle \underset{\cdot}{1}, \textcircled{2} \rangle$$

$\bar{x} \quad \bar{z}$