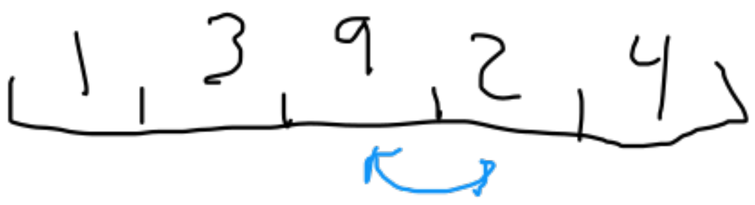
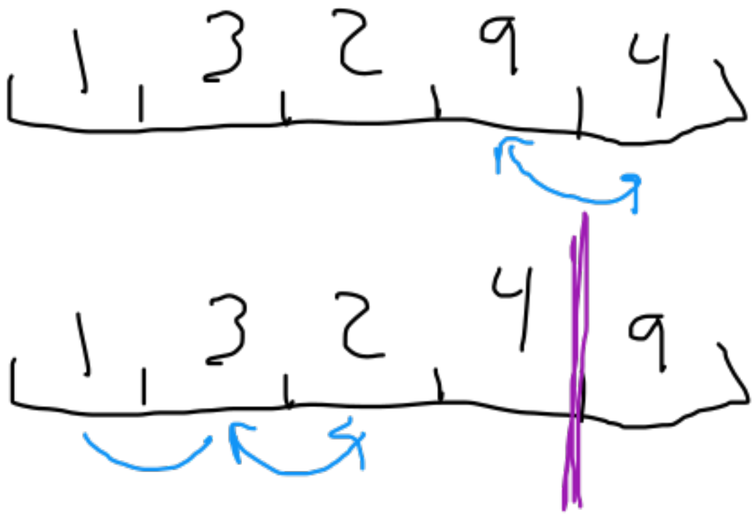
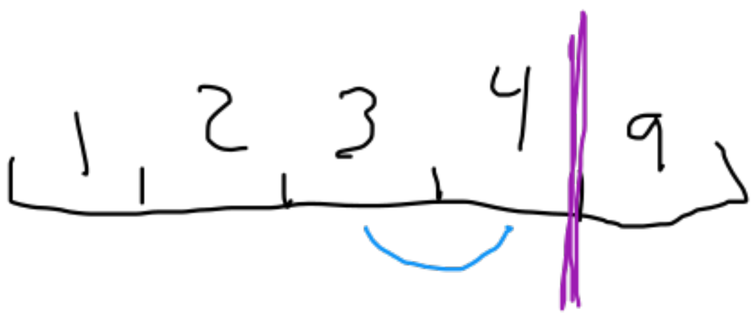
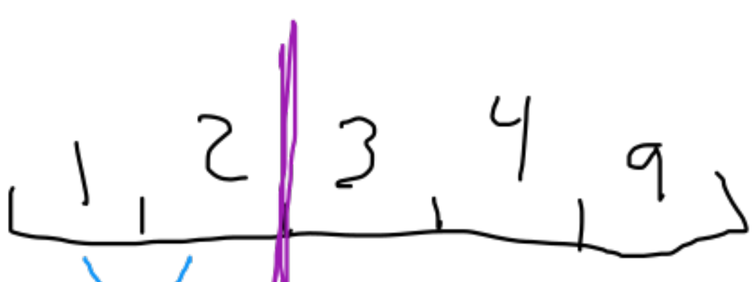
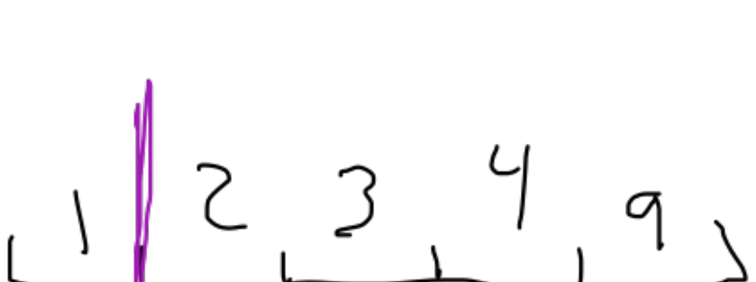
Bubble Sort











For size 5,

$4+3+2+1$ comparisons

and up to the same swaps

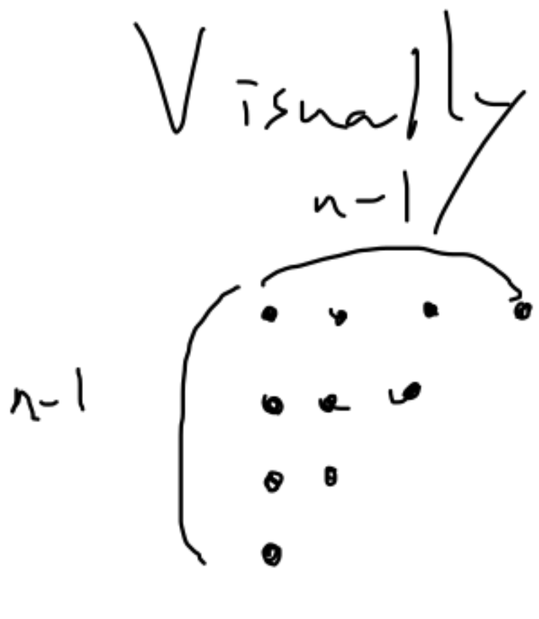
For size n

$(n-1)+(n-2)+\cdots+1$

$$\frac{n\cdot(n-1)}{2} = \frac{1}{2}n^2 - \frac{1}{2}n$$

$$= O(n^2)$$

Visually

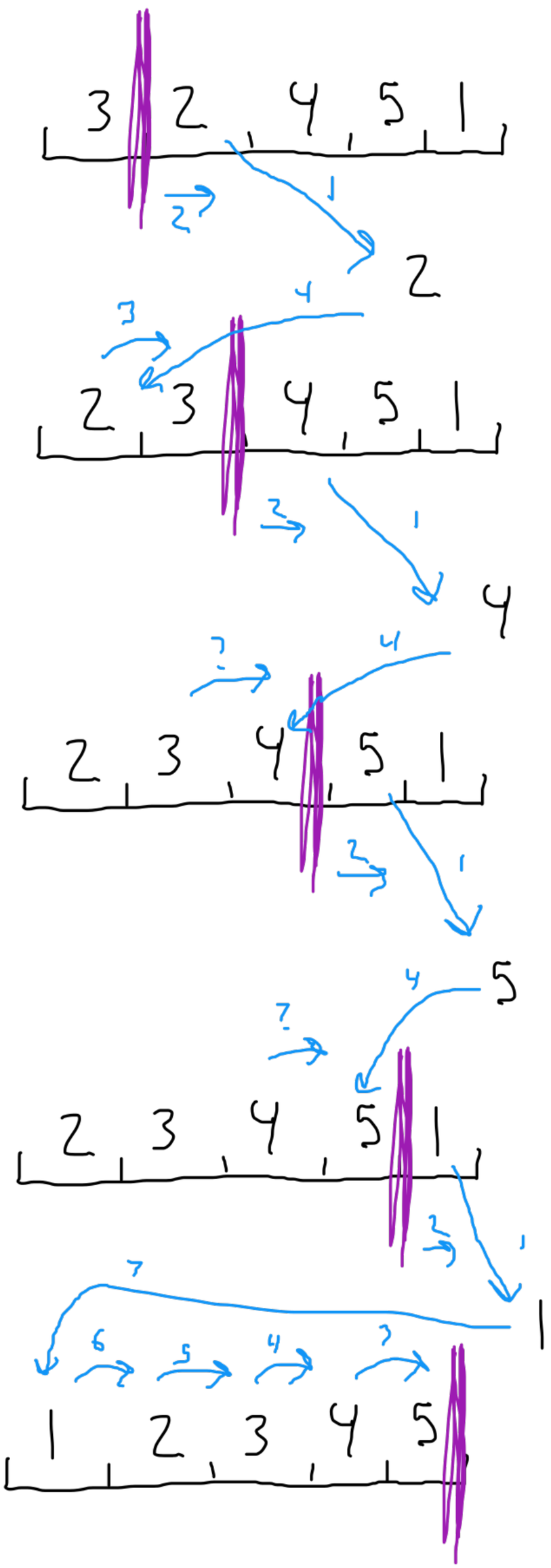


≈ a triangle

$$\frac{(n-1)(n-1)}{2} = O(n^2)$$

This is a stable

Insertion Sort



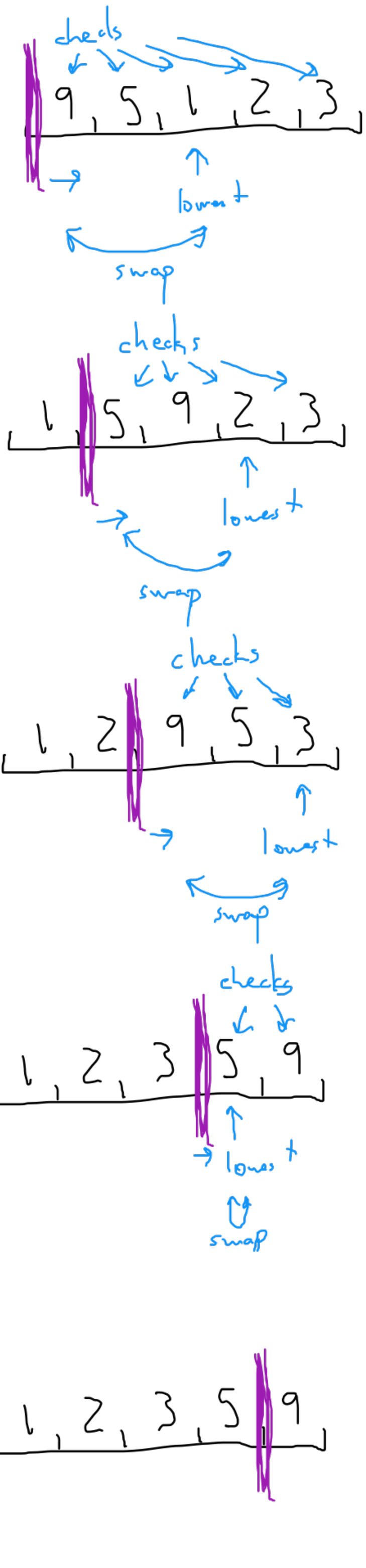
For 5 items, we do up to

$1 + 2 + 3 + 4 = 10$ moves

This is the same sequence in reverse, so $O(n^2)$

This is a stable sort

Selection Sort



For 5 items,
there are 4 swaps

$O(n)$

But there are

$(n-1)+(n-2)+\dots+1$

comparisons

This is $O(n^2)$

Due to the large swaps, this is not a stable sort.