



Merge Sort & Inversion Count

Contents

- 1. Merge 2 Sorted Arrays**
- 2. Merge Sort Using Magic**
- 3. Merge sort complete recursion calls**
- 4. Time & Space Complexity Analysis**
- 5. Inversion Count Problem**
- 6. Homework**

Ques: Merge 2 Sorted Arrays

a

10	20	60	80	90	120
----	----	----	----	----	-----

i

b

30	40	50	70	100	110	130	140
----	----	----	----	-----	-----	-----	-----

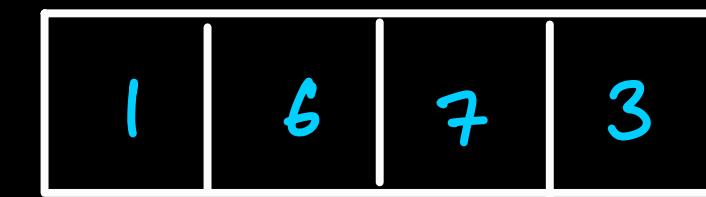
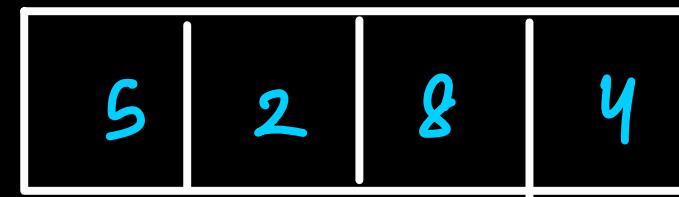
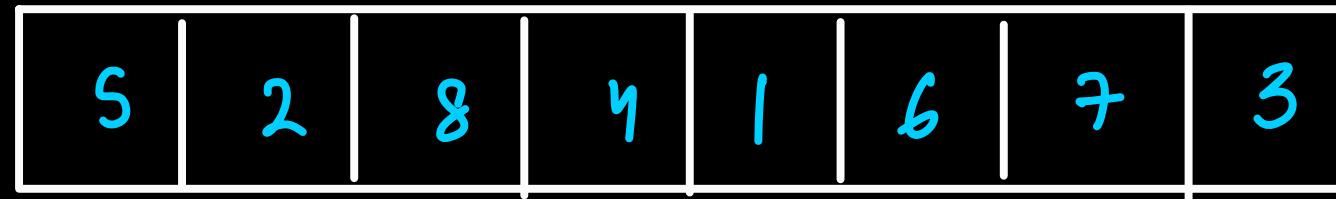
j

c

10	20	30	40	50	60	70	80	90	100	110	120	130	140
----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----

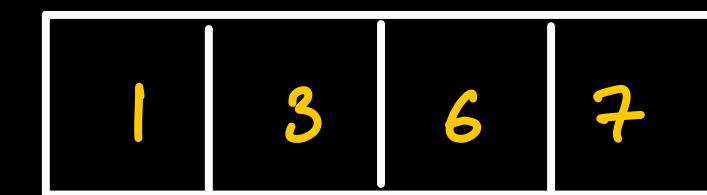
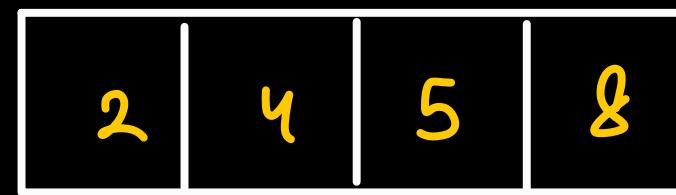
K

Merge Sort using Magic



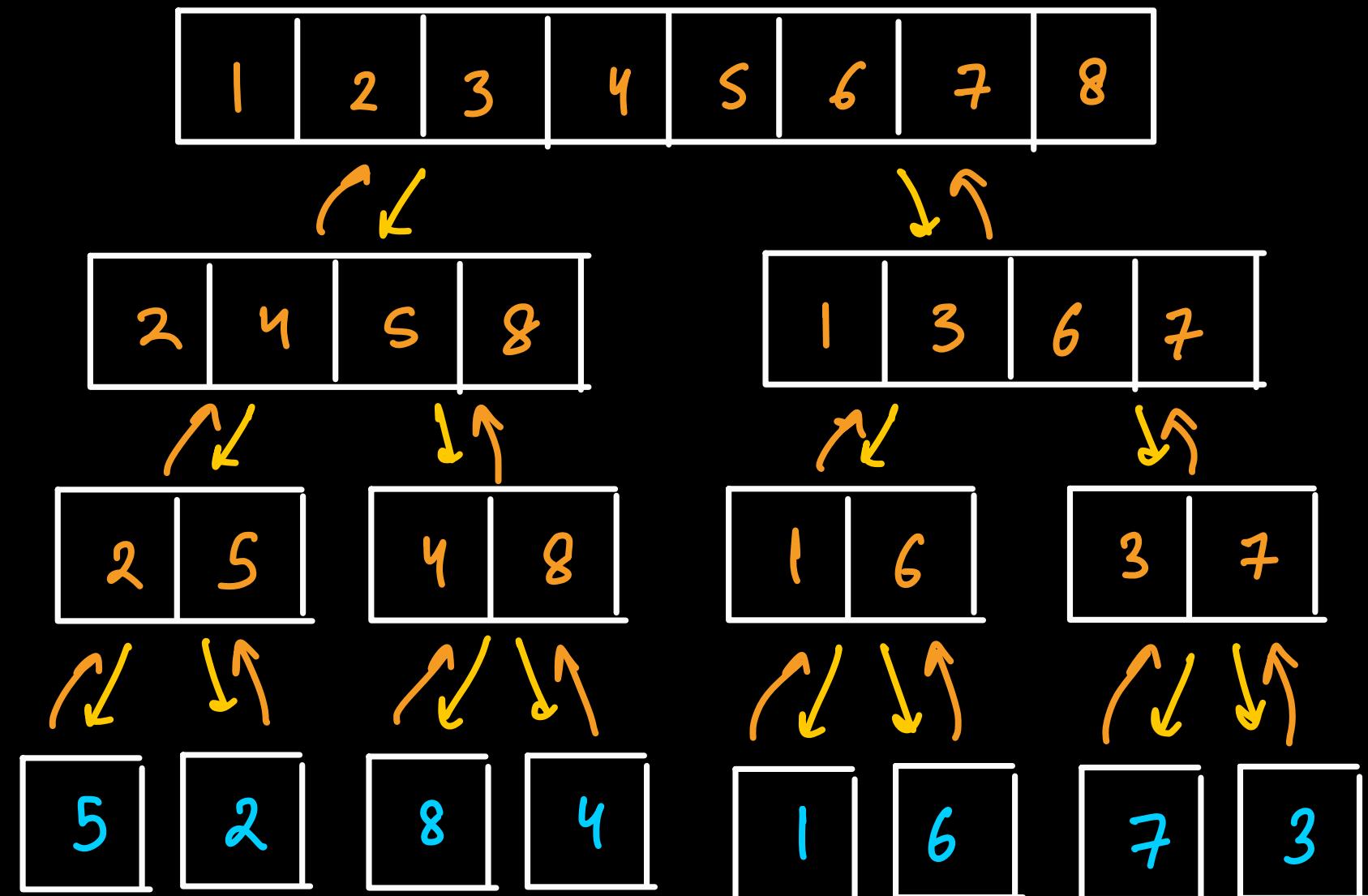
↓magic

↓magic

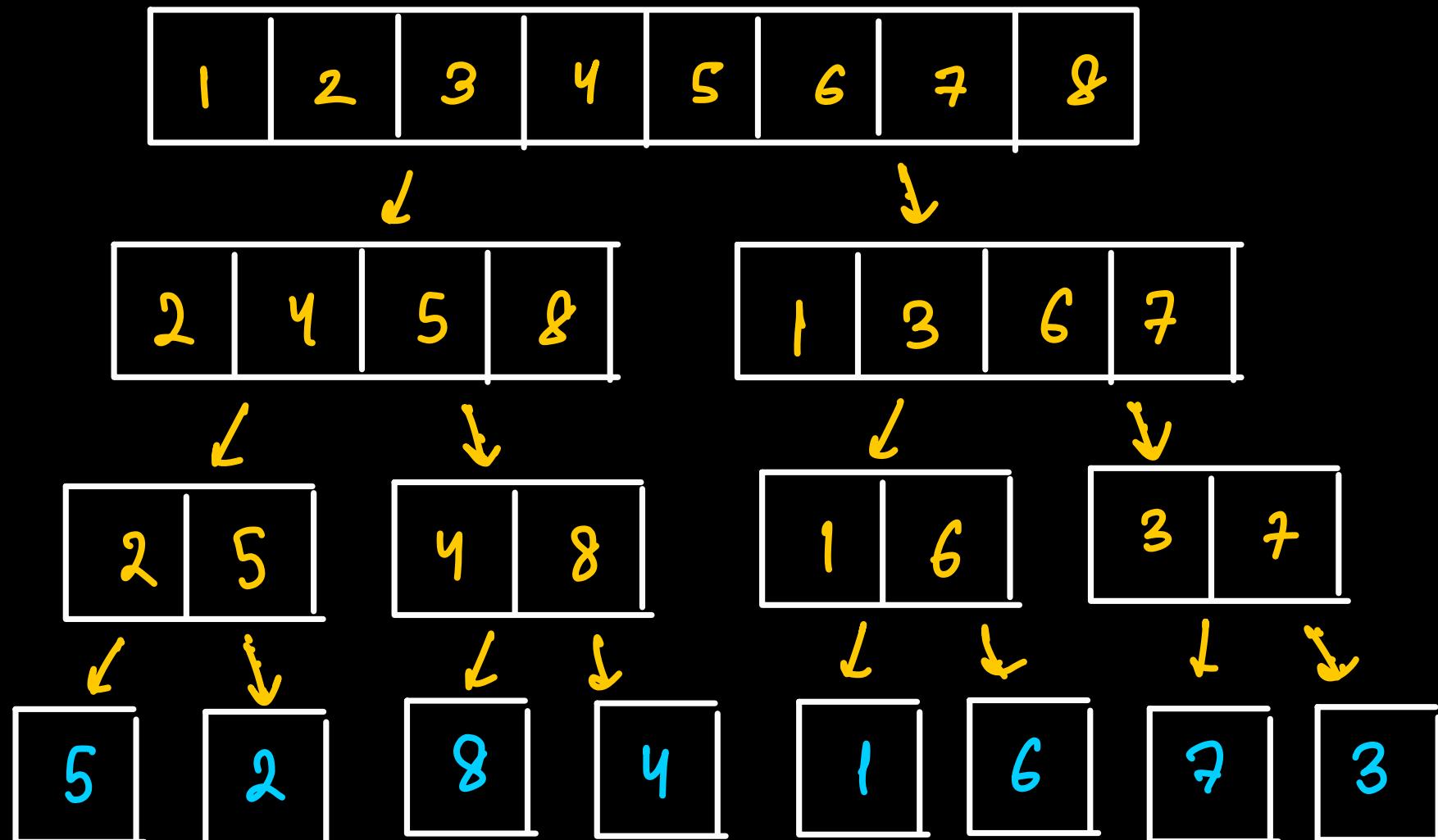


merge ↘



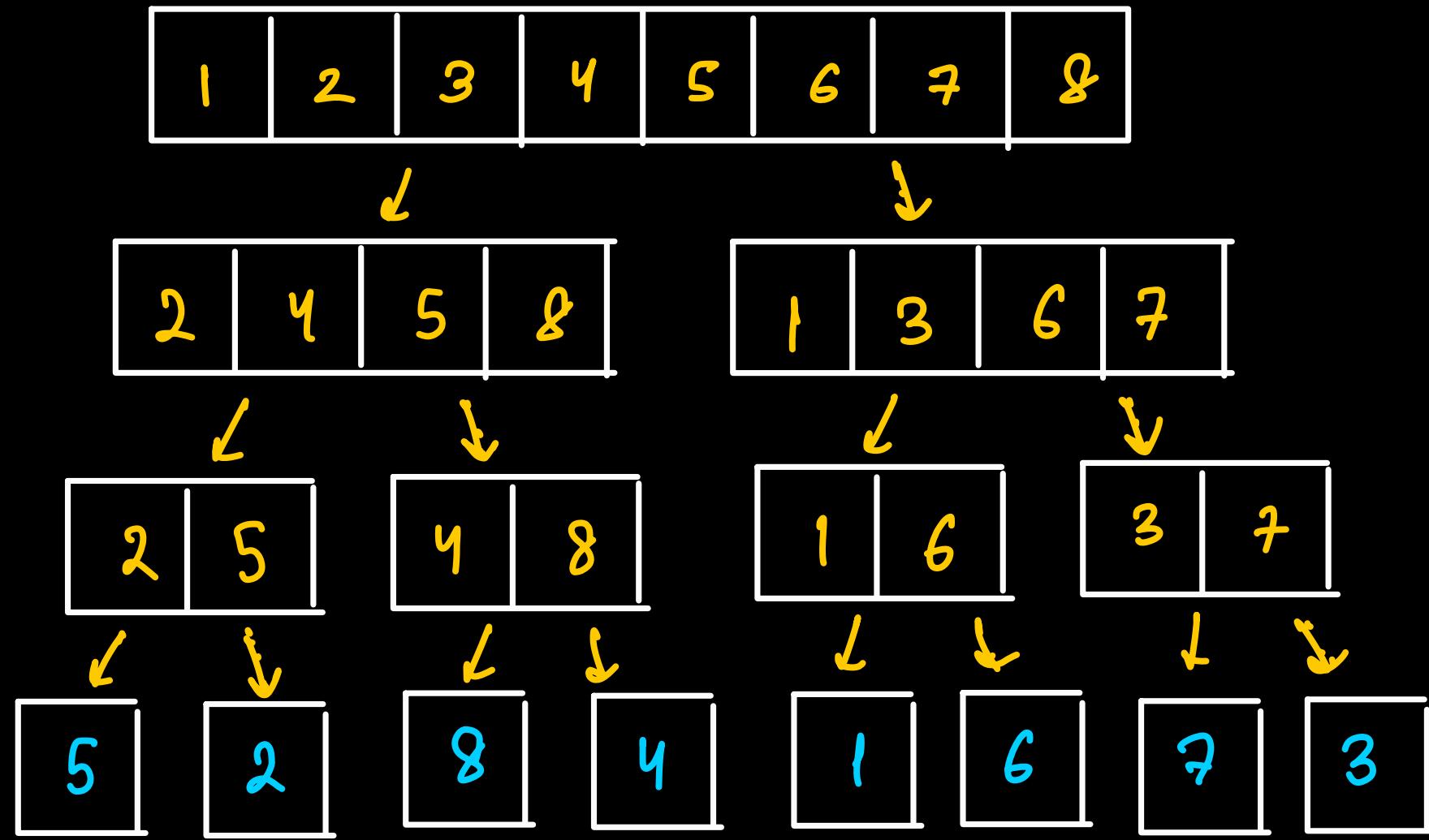


Merge Sort (Complete Recursion Calls)



Time & Space Analysis

$$\log_2 n = 3$$

 n

$$\frac{n}{2} + \frac{n}{2} = n$$

$$\frac{n}{4} + \frac{n}{4} + \frac{n}{4} + \frac{n}{4} = n$$

$$T.C. = O(n * \log n)$$

$$A.S. = O(n \log n) / O(n)$$

Ques: Inversions Count

$$a = \{ 2 \quad 3 \quad 5 \} \quad i$$
$$b = \{ 1 \quad 2 \quad 4 \} \quad j$$

$$\text{count} = 3 + 2 + 1 = 6$$

$\text{count} += (\text{a.length} - i)$

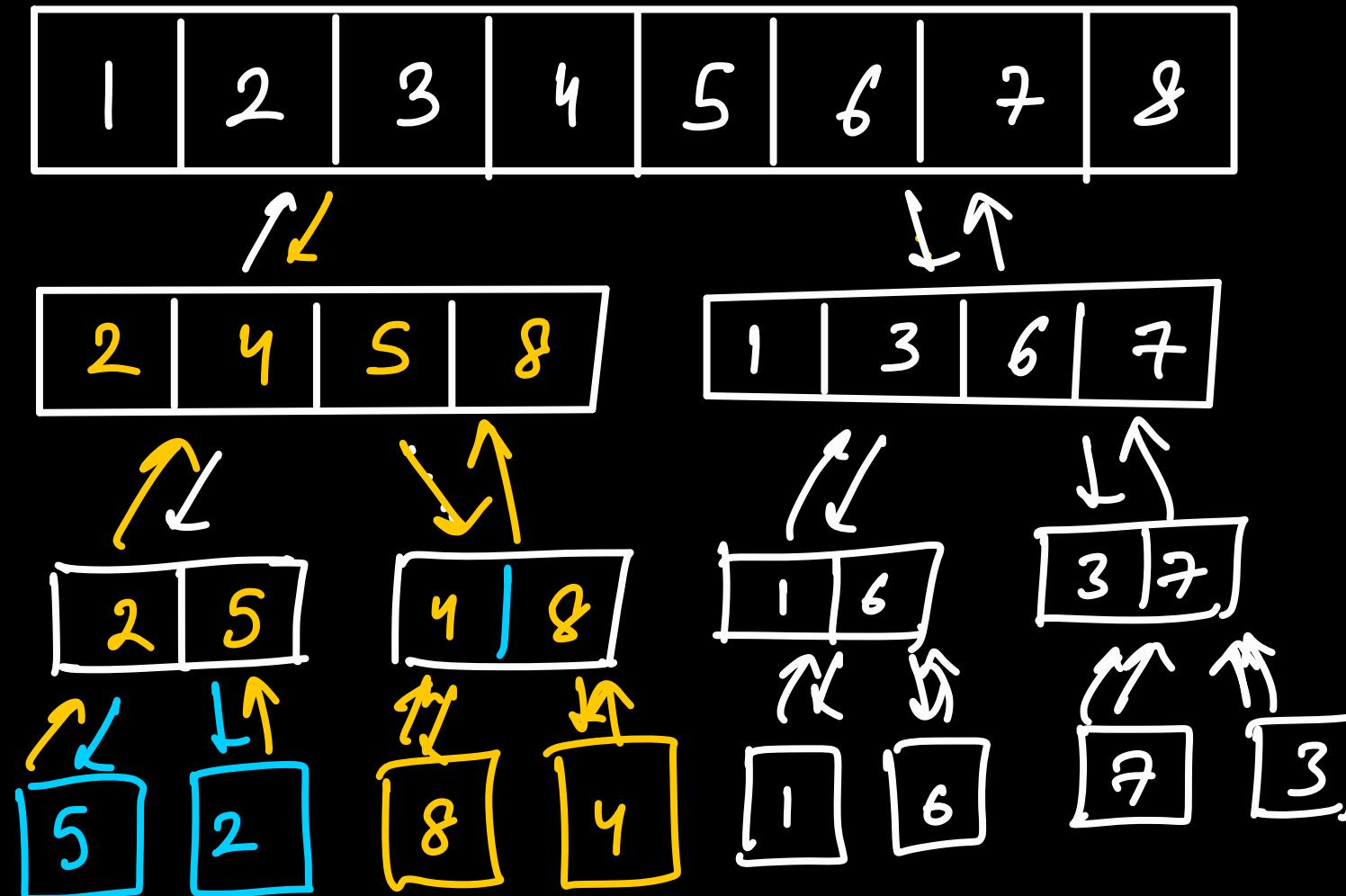
$a[i] > b[j]$

Ques: Inversions Count

Count

0 1 2 3 4 5 6 7 8 9 10

13 14



inversions
= 14



Ques: Reverse Pairs

Leetcode 493





THANKYOU
Cuties