Sorting 2

Q1 ⇒ Given 2 arrays A[N] & B[M].
Count the no. of pairs i, j such that A[i] > B[j]

A: 7, 3, 5
B: 2, 0, 6

⇒ (7, 2), (7, 0), (7, 6)
(3, 2), (3, 0)
(5, 2), (5, 0)
⇒ o/p : 7

Quiz:
A: 3, 1, 6
B: 2, 4, 9

→ (3, 2)
(6, 2), (6, 4)
⇒ o/p : 3

Brute Force: O(m * n)

A: 3, 5, 7
B: 0, 2, 6

0 → 3
2 → 3
6 → 1

A: 7, 0, 2, 4 ⇒ 2, 4, 7, 0
B: 3, 5, 1, 10 ⇒ 1, 3, 5, 10

b [a, n-1]
(n-1)-a+1

b	B[b]	count
0	1	4
1	3	3
2	5	2
3	10	0
		9

n-a

Step 1 : Sort A , sort B

Step 2 : Fix 2 position : a → 0 , b → 0

```
if ( B[b] < A[a]
    count = count + (N-a)
    b++;
else
    a++;
```

TC : $O(N \log N + M \log M + N + M)$

$(N \log N + M \log M)$

SC : $O(N+M) \Rightarrow O(\text{Max}(N, M))$

Q ⇒ Inversion Count

Google
FB
Amazon
Netflix

Given an array of N elements
Count the no. of pairs i, j
s.t.

$i < j$
& $A[i] > A[j]$

0	1	2	3	4	5	6	7	8	9
10	3	8	15	6	12	2	18	7	1

A =

(10,3) (10,8) (10,6) (10,2), (10,7), (10,1)
(3,2) (3,1)
(8,6), (8,2), (8,7) (8,1)
(15,6), (15,2) (15,7) (15,1) (15,12)
(6,2) ,(6,1)
(12,2) (12,7) (12,1) o/p: 26
(2,1)
(18,7) (18,1)
(7,1)

Q ⇒ A: 3, 1, 2
(3,1), (3,2) ⇒ 2

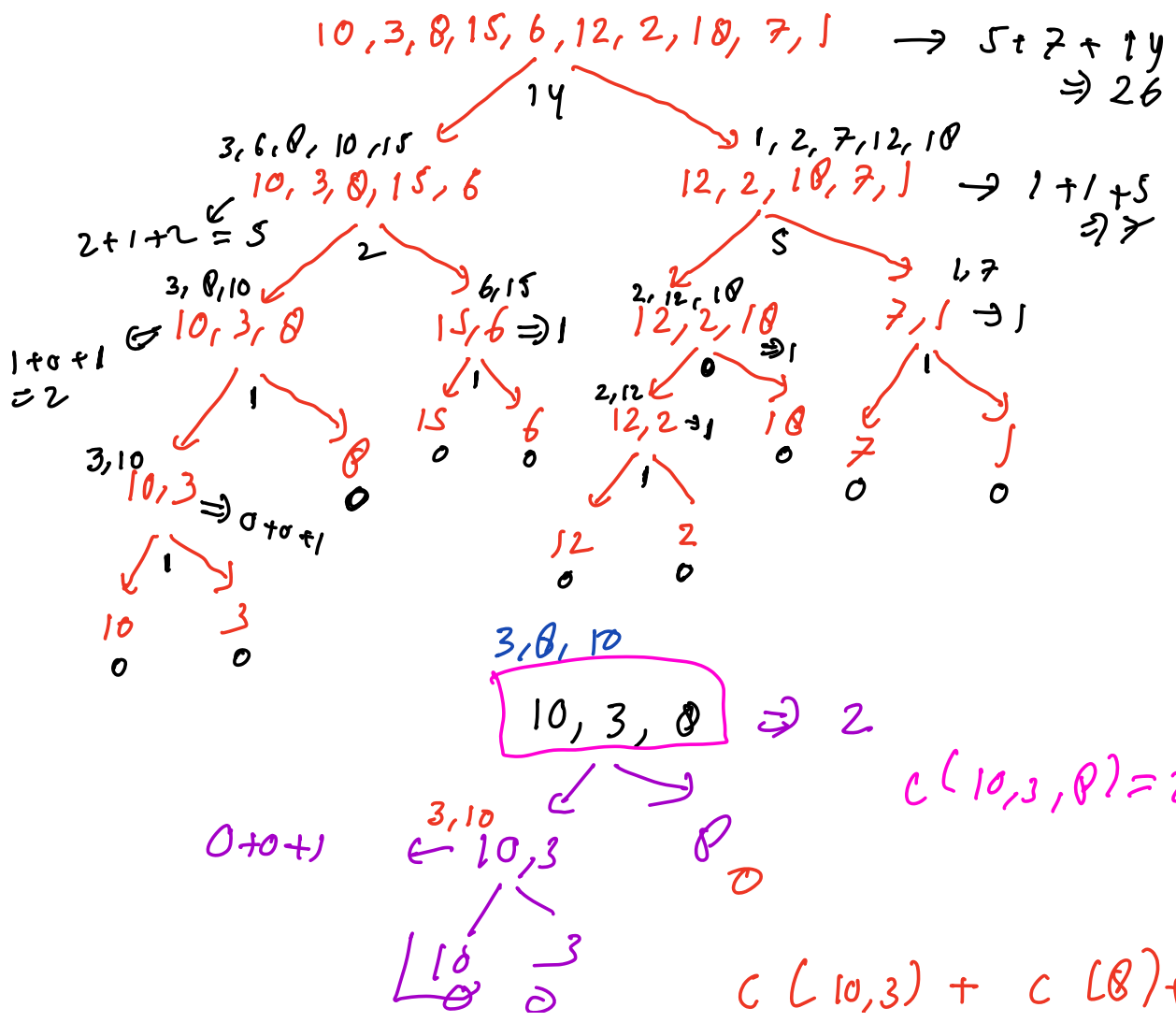
Q ⇒ A: 8, 4, 2, 1
(8,4), (8,2), (8,1)
(4,2) (4,1) → 6
(2,1)

A = 10, 3, 8, 15, 6, 12, 2, 18, 7, 1
(0 1 2 3 4 5 6 7 8 9)

A = 10, 3, 8, 15, 6 → A: 3, 6, 8, 10, 15

B = 12, 2, 18, 7, 1 → B: 1, 2, 7, 12, 18

Total Pair: Pair between A & B +
+ Pair in array A
+ Pair in array B



c ([10,3], 8])

A : 10, 3 ⇒ 3, 10

B : 8 1

Code : H/W

Break : 8:58 am

Google Q ⇒ Given an array . Find smallest sub array after sorting which in asc order the complete array will get sorted in asc order

A: 2, 6, 4, 8, 10, 9, 15

2, 4, 6, 8, 9, 10, 15

1 5

1, 4, 7, 5, 3, 2, 8, 10, 6, 14, 15

1, 2, 3, 4, 5, 6, 7, 8, 10, 14, 15 O(nlogn)

i j

⟶ A[i] < A[i+1]

⟵ A[i] > A[i-1]

1, 4, 10, 5, 3, 2, 8, 7, 6, 14, 15 O(N)

min = 2 max = ~~8~~ 10

```
find (A C]
{
    min = ∞
    for (i=0; i< (N-1); i++)
        if (A[i] > A[i+1])
            min = Math.min(min, A[i+1]);

    for( i = N-1; i>0; i--)
        if (A[i] < A[i-1])
            max = Math.max(max, A[i-1]);

int s, e;
  // find s & e  max
```