Doubt Clearing Session

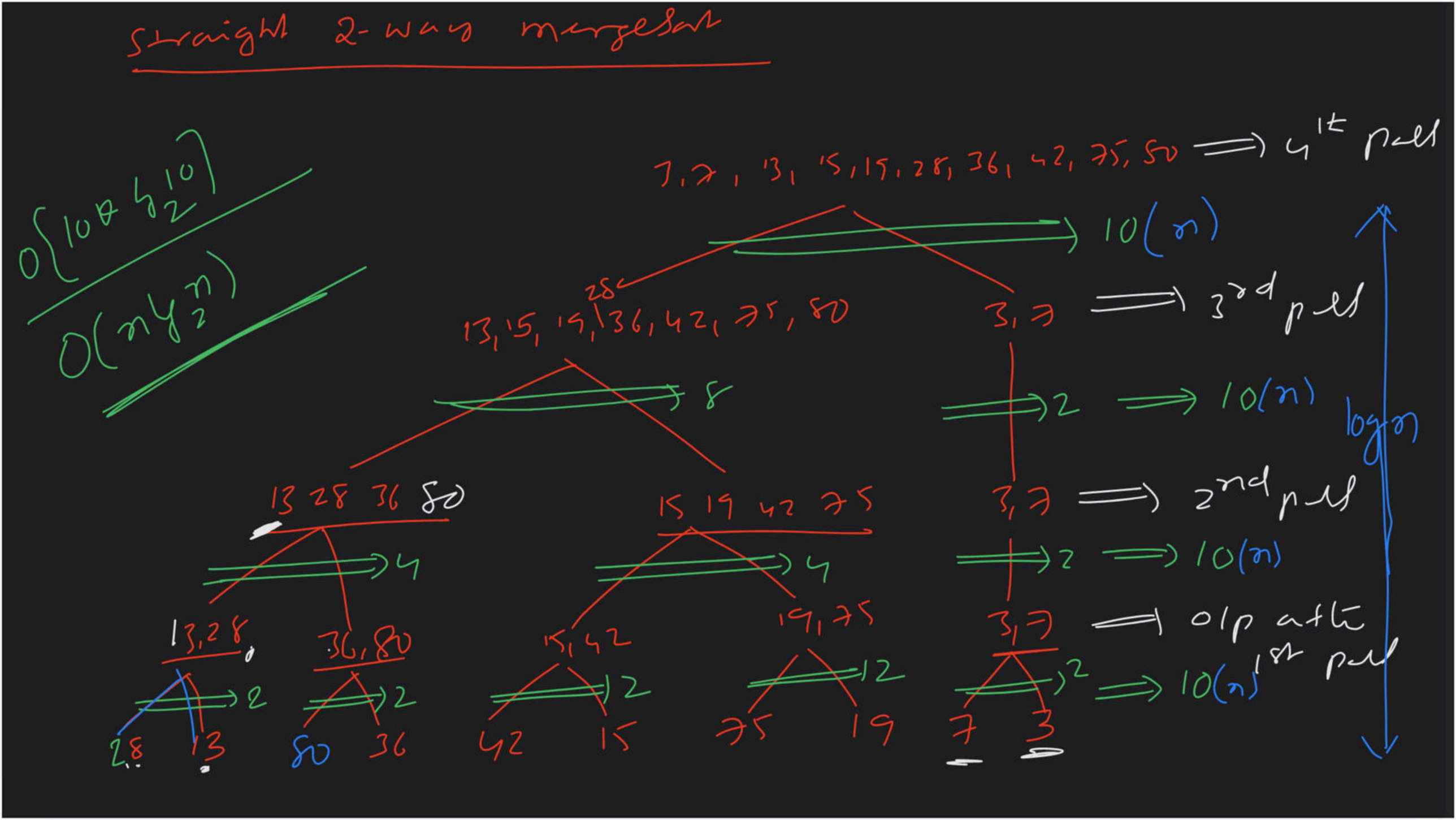
Complete Course on Algorithm for GATE - CS & IT

Subbarao Lingamgunta • Lesson 32 • Jan 7, 2023

Straight 2-way mergesort

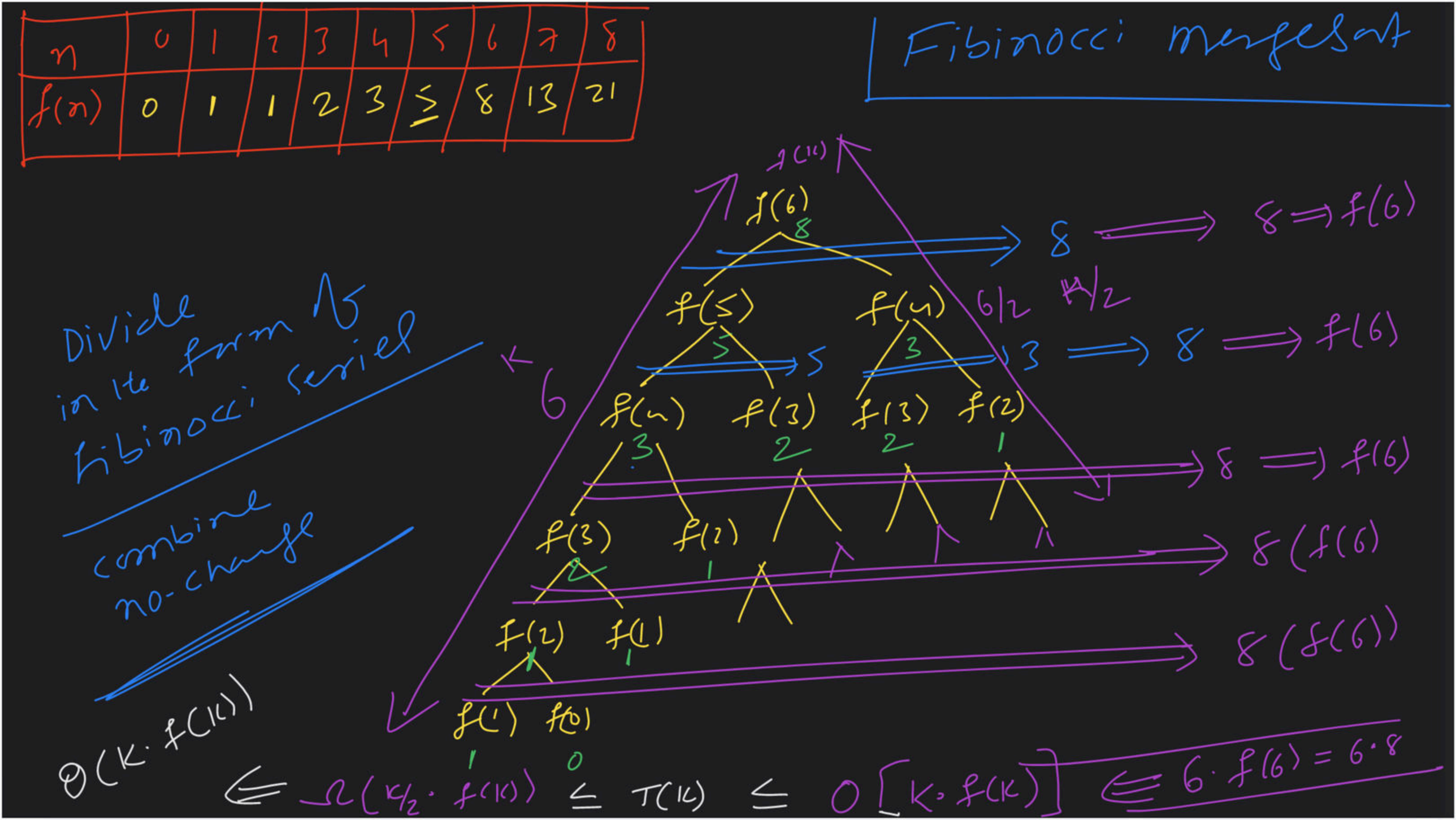
$O(10 * 4 * \log_2 10)$

$O(n \log_2 n)$



Fibinocci merges sort

n	0	1	2	3	4	5	6	7	8
f(n)	0	1	1	2	3	5	8	13	21



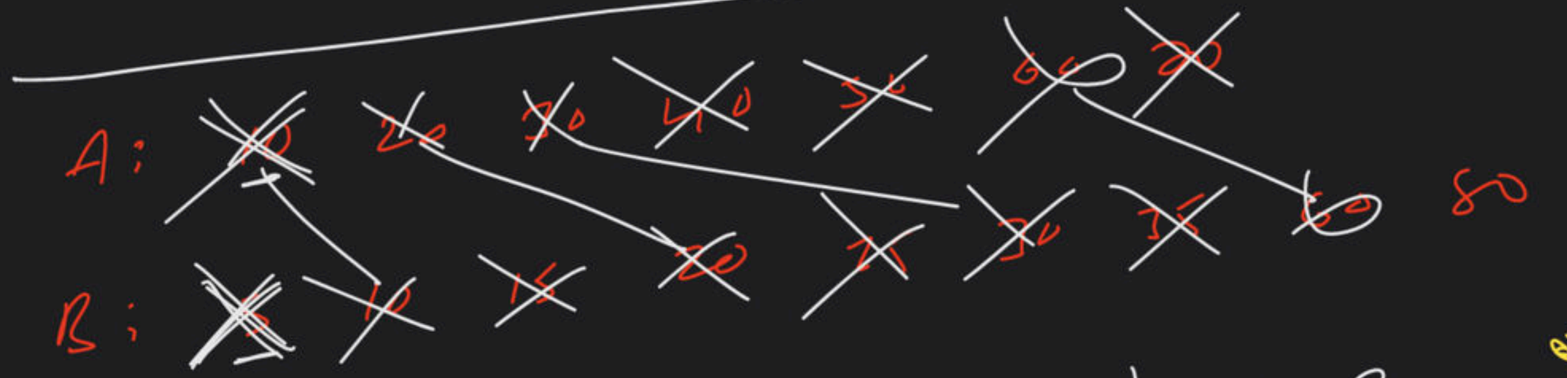
i/p: 2 ~~sorted~~ arrays

A — m - distinct ele 5, 10

B — n - distinct ele 5, 10, 20

o/p: Find $A \cap B$, $A \cup B$ Stable.

TC? [Best Algo, WC]



$A \cap B$

$m * LS(n)$

$m * n$

$O(mn)$ [WC]

$m * 3S(n)$

$m * \log n$

$O(m \log n)$ [WC]

$A \cap B$

modified merge algo

$\Rightarrow O(m+n)$

(or)

$O(2n) \Rightarrow O(n)$

A ∪ B

A: 10, 20, 30

B: 5, 8, 9, 10, 15, 20, 50

① LS

$O(n^2)$

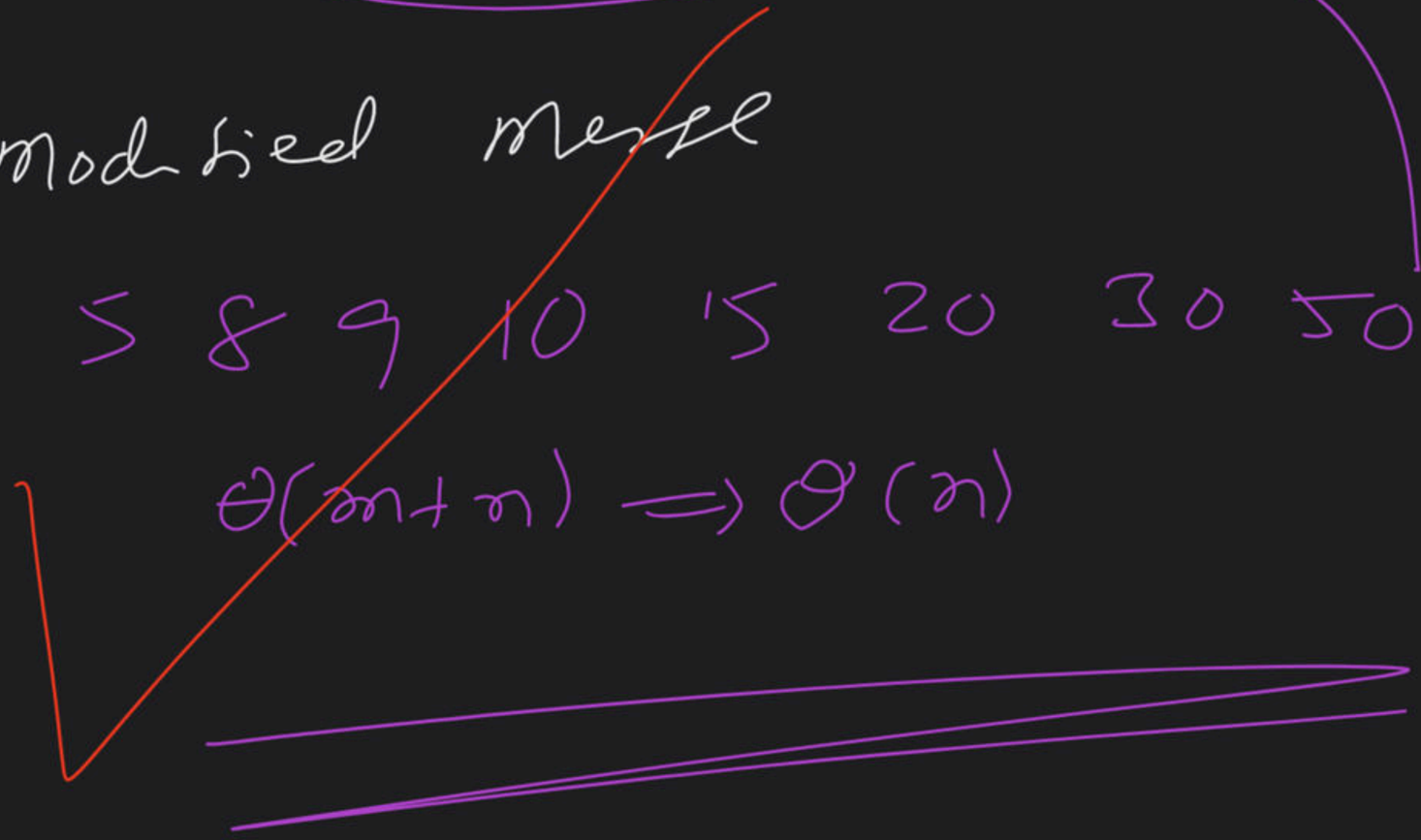
② BS

$O(n \log n)$

③ Modified Merge

5 & 9 10 15 20 30 50

$\theta(m+n) \Rightarrow \theta(n)$

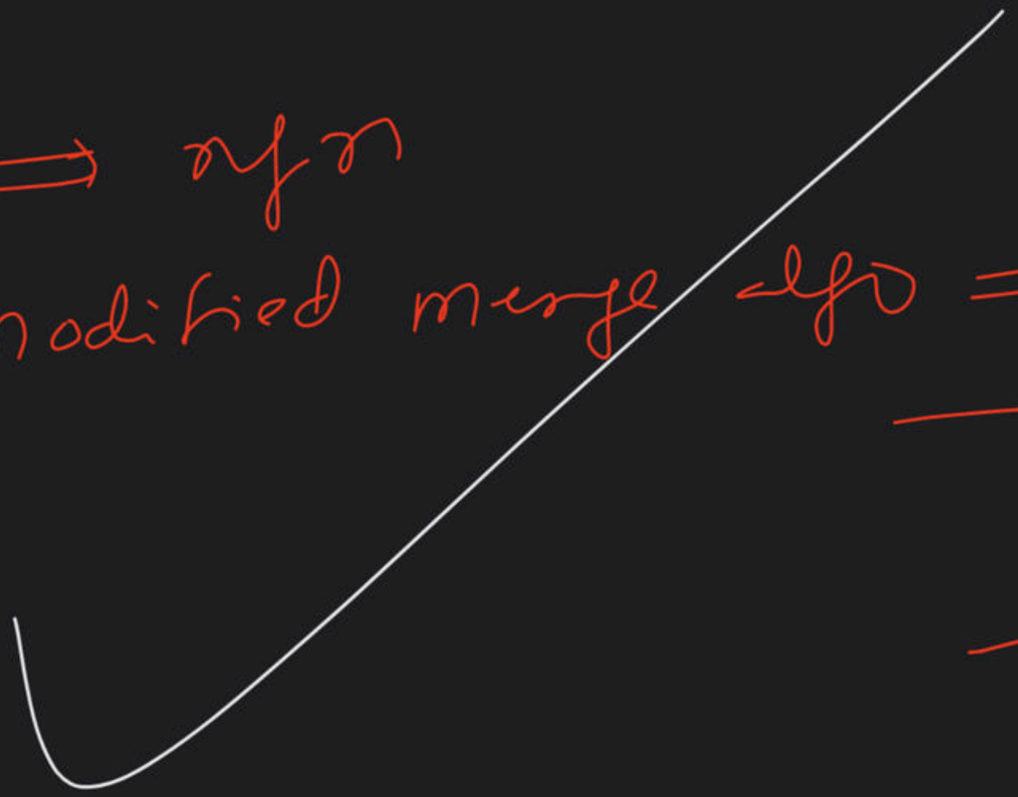


not Sorted

$A \cap B$, $A \cup B$

1. Sort $\Longrightarrow$ $n \log n$
2. Apply modified merge algo $\Longrightarrow n$

$\Theta(n \log n)$



i/p : 50, 10_a, 20, 10_b, 60 [stable]

o/p : 10_a 10_b 50 60 20

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o/p : 10_b 10_a 50 60 20 [not stable]

$A = 10, 20, 30 \Longrightarrow m$

$B = 10\ 20\ 40 \Longrightarrow n$

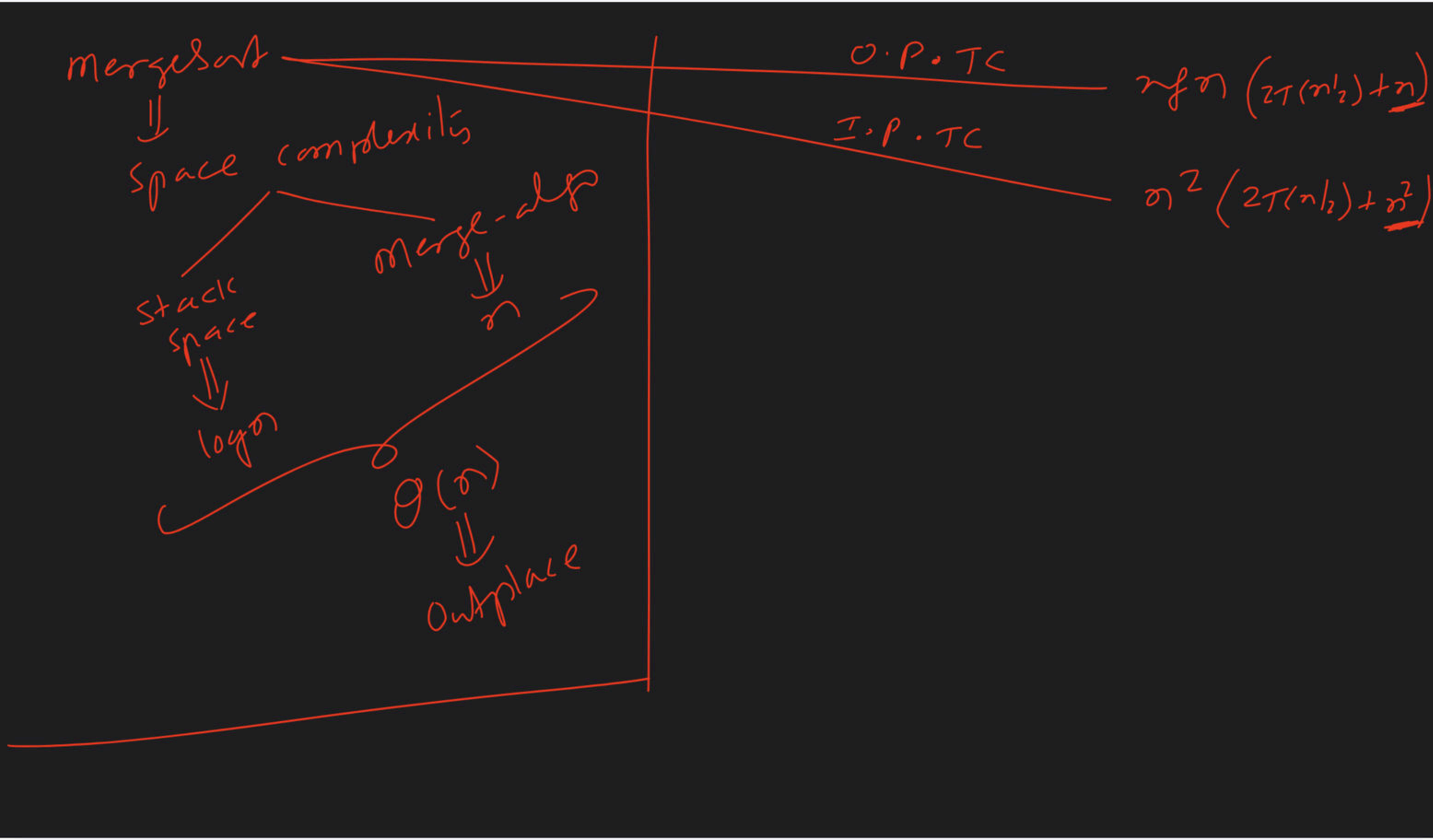
$A = 10, 20, 30, 40, 110, 200$

$B = 10, 200$

$A \cup B = 10, 20, 30, 40$ [max $\Rightarrow m+n$; min $\Rightarrow$ max(m,n)]

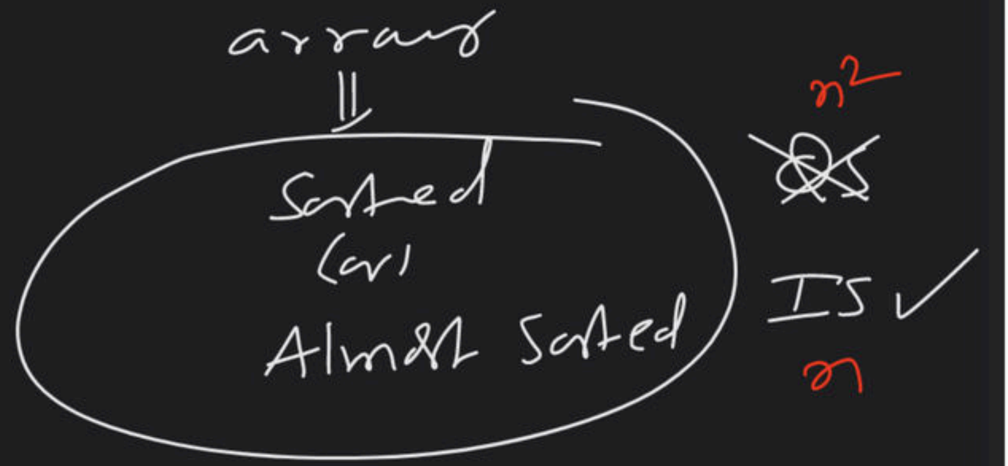
$A \uplus B = \{10\ 10\ 20\ 20\ 30\ 40\}$ always $m+n$

$A \cap B = \phi$ | min(m,n) | max | 10 20 30 40 / 10 40 / 10, 40


Mergesort
O·P·TC
nlogn (2T(n/2)+n)
II
Space complexity
I·P·TC
n^2 (2T(n/2)+n^2)
merge-algo
Static space
II
n
II
logn
θ(n)
II
Outplace

Quicksort

1. Not stable
2. In-place sorting algo
3. practical sorting algo



Partition - Algo