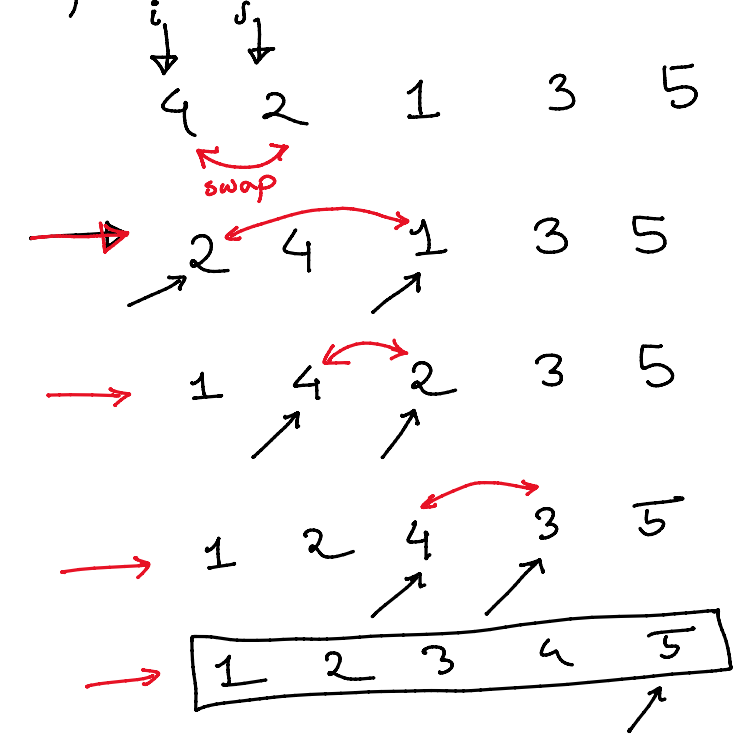
Class 10

Monday, January 24, 2022 9:08 PM

Sorting

Comparison-based sorting



$i < j$

$4 \not< 2$

$2 \leq 4$

Inv:

Counting Sort

$7! = 7 \cdot 6 \cdot 5!$

$N \leftarrow 2$

$^{N}C_2 \rightarrow \frac{N!}{(N-2)!\,2!}$

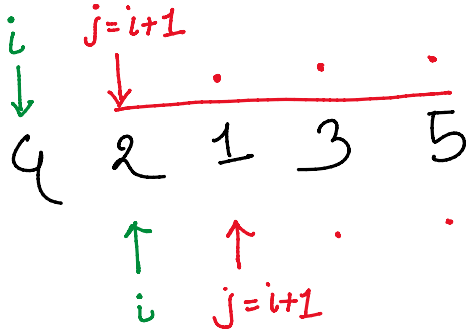
$\rightarrow \frac{N(N-1)(N-2)!}{(N-2)!\,2}$

$\rightarrow \frac{N(N-1)}{2}$

$\approx N^2$

Bubble Sort! $\rightarrow O(N^2)$

$i < j$

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for(i = 0 ..... n-1)
    for(j = i+1 .... n-1)
        if(arr[i] > arr[j])
            swap(arr[i], arr[j]);
```

Intro Sort $\rightarrow$ Hybrid

Heap/Quicksort

Intro Sort → Hybrid

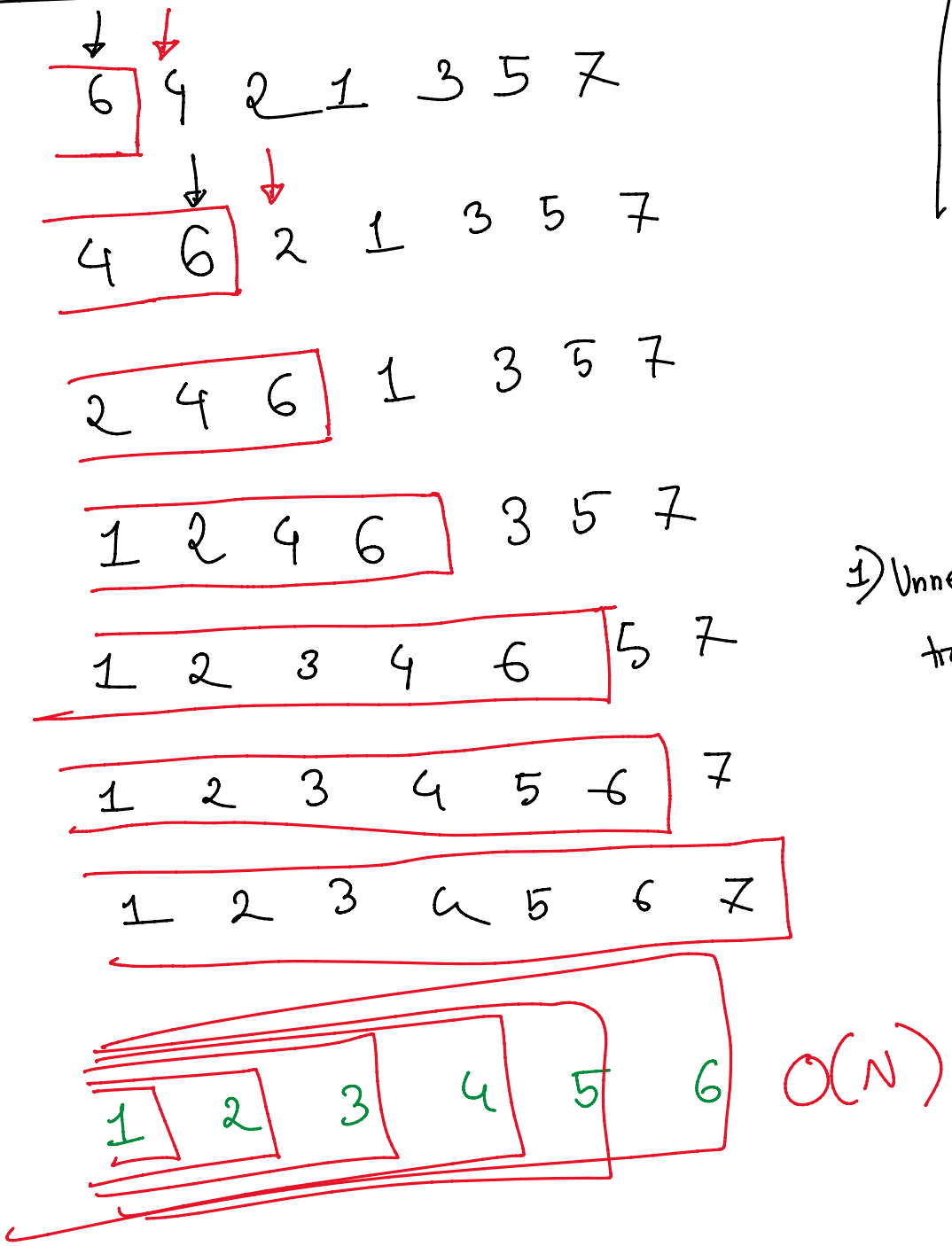
Merge, Insertion, Heap/Quicksort

— o —

Quick
Merge
Heap

O(NlogN)

Insertion Sort



1) Unnecessary traversal नहीं!

1 3 5 10 15 20 100

O(N·K)

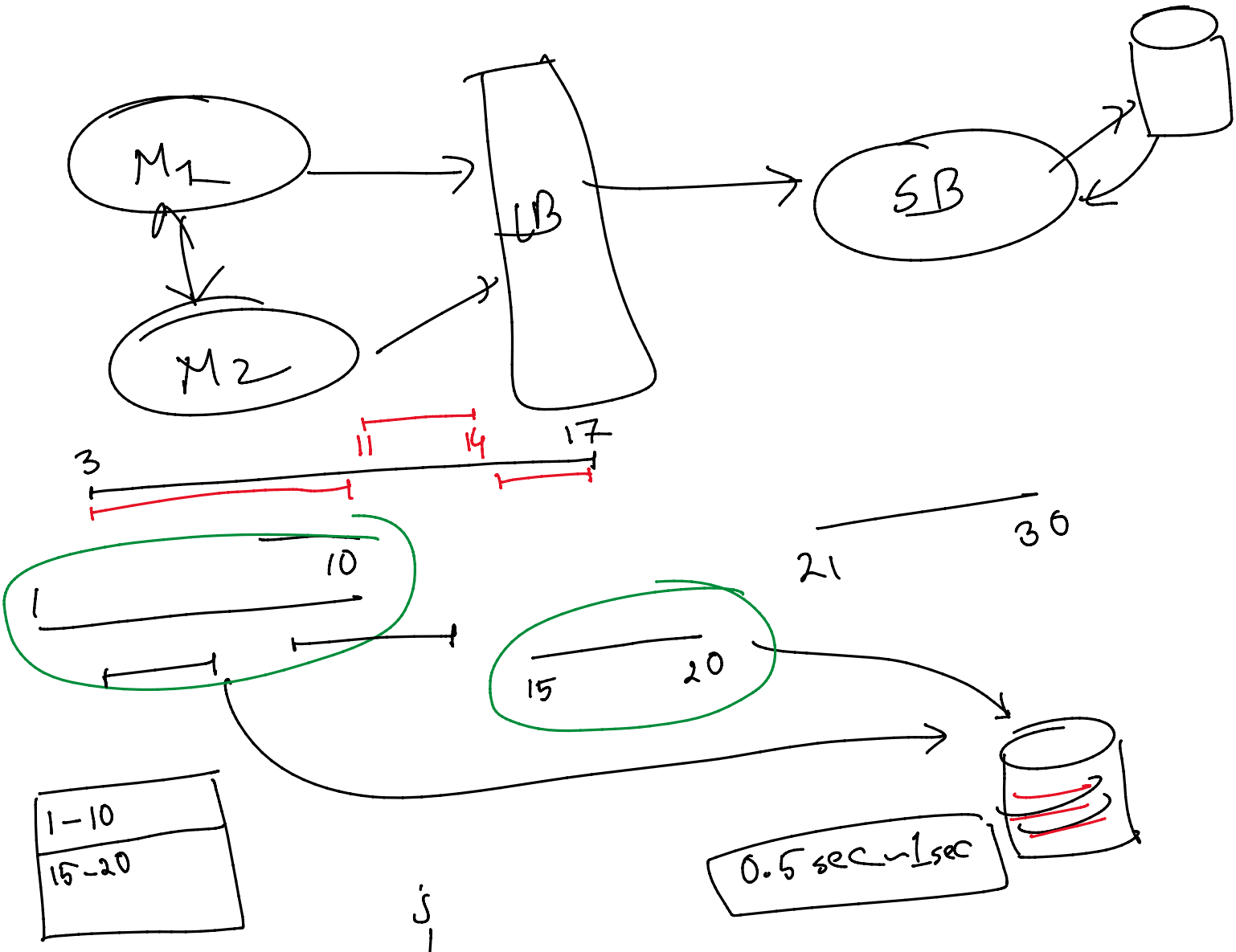
N+N+N+....

NK

n=7

40~50

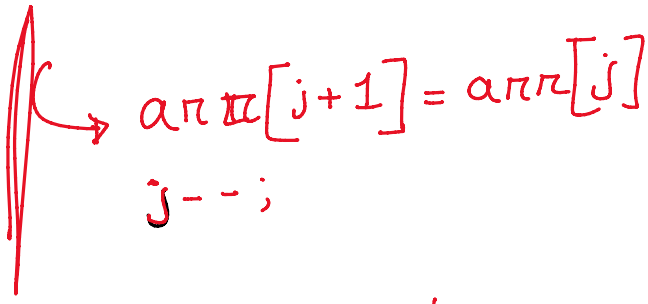
𝍸 |||| → 9



j

1 2 3 4 5

key = 4



arr[j] > key

arr[j+1] = key