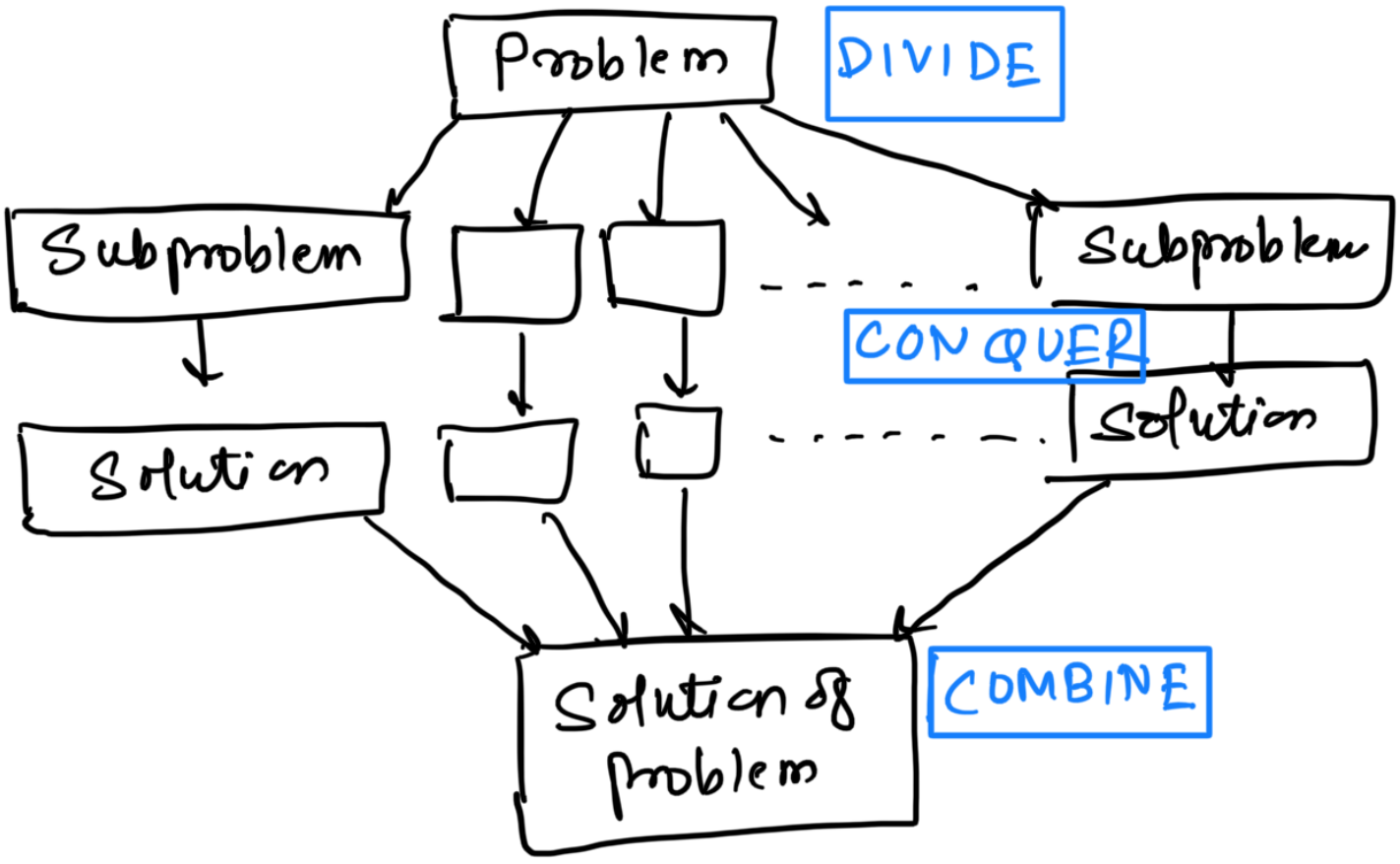
Sorting

1. Merge sort
2. Quick sort

} Divide & Conquer

Divide & Conquer



- breaks a problem into subproblem
  - ↓
  - Same as original problem (subproblem)
  - ↓
  - recursive method (soln for subproblem)
  - ↓
  - Combine all the solution

Divided into 3 parts

1. Divide the problem — dividing it into number of subproblems that are smaller instances of the same problem.

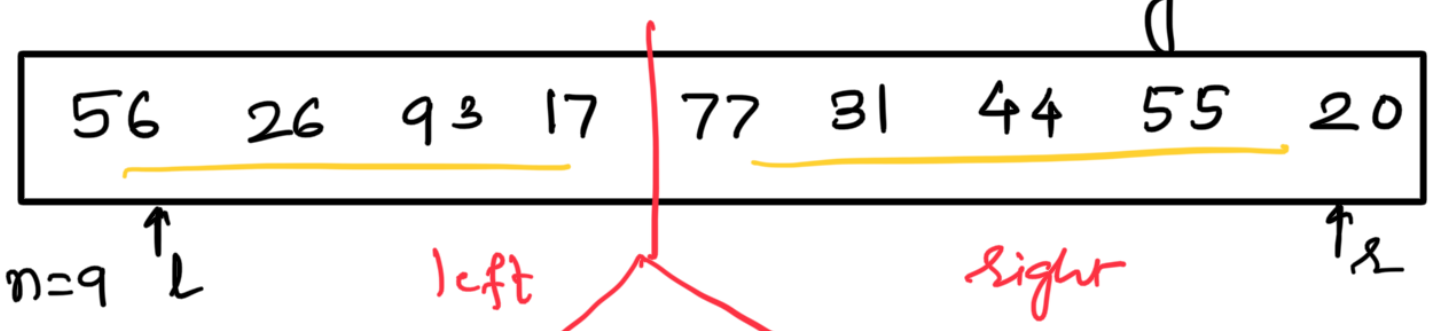
2. Conquer the subproblem - by solving them

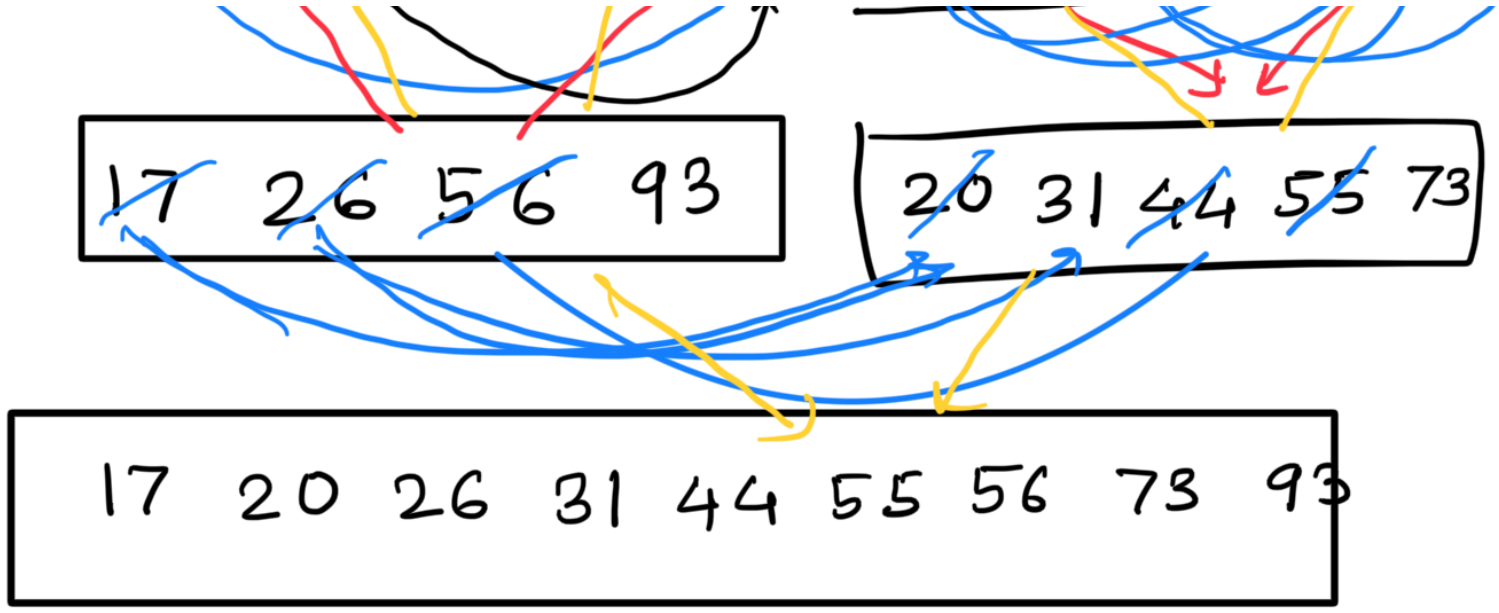
Terminate

3. Combine the solution - combined solution of subproblems will be the solution for the original problem.

Merge Sort

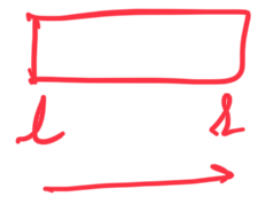
- technique divide & Conquer
  - full Problem: Sort an array
  - Sub problems: Sort a sub array





DIVIDE – CONQUER - COMBINE

Algorithm




```
Merge_sort (A, l, r)
{   if l < r
        mid = ⌊(l+r)/2⌋ ——— (1)
Left → Merge_sort (A, l, mid) ——— (2)
Right → Merge_sort (A, mid+1, r) ——— (3)
}
```