

MergeSort

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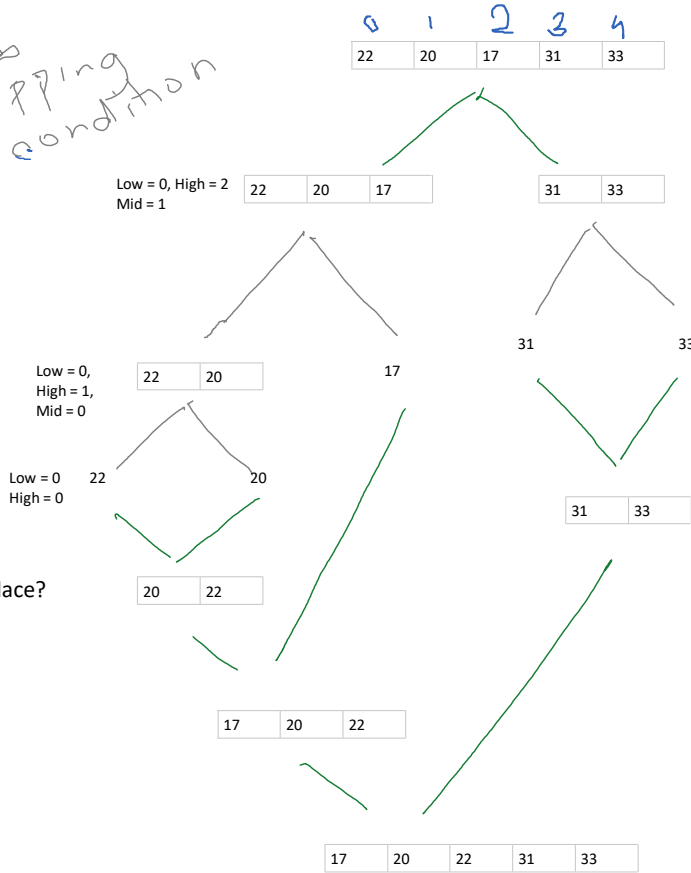
How MergeSort Works? (Simulation)

Pseudocode

```

MergeSort(Arr[], low, high){
  Mid = (low+high)/2
  If (low >= high){
    return Arr[low]
  }
  B = MergeSort(Arr[], low, mid)
  C = MergeSort(Arr[], mid+1, high)
  A = Merge(b,c)
  Return A
}
    
```

Stopping condition



Low = 0; High = 4
Mid = 2

Is MergeSorting Inplace or Outplace?

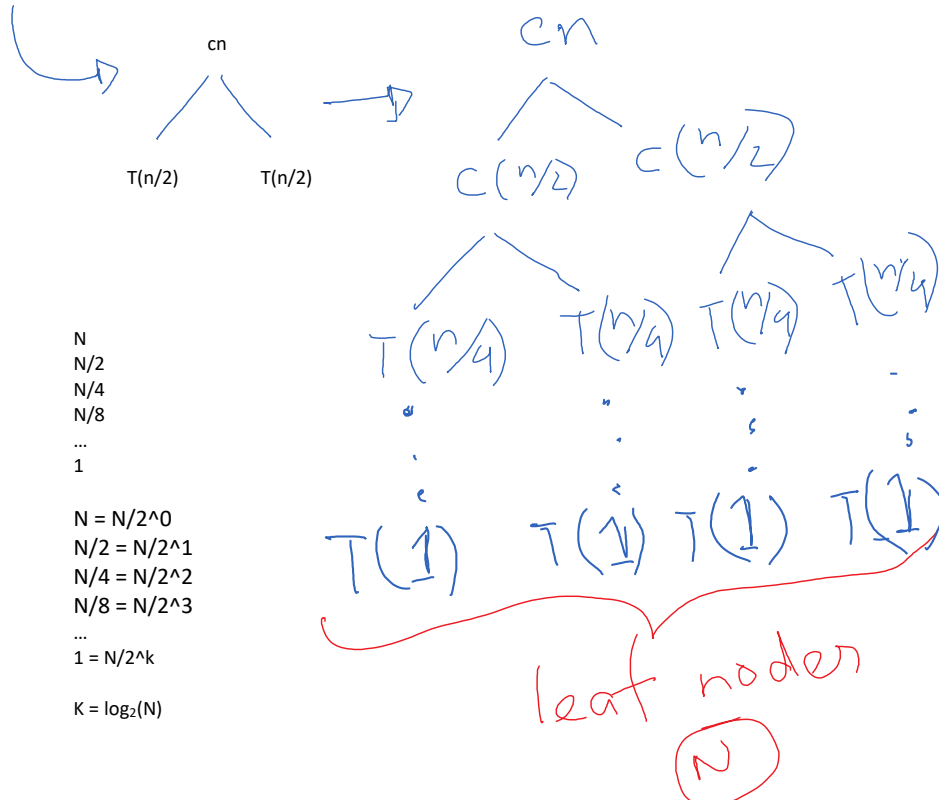
-> OUTPLACE

Recurrence Formula:

$$T(N) = T(N/2) + T(N/2) + O(N)$$

Calculating the time complexity using the recursive tree method:

$$T(N) \Rightarrow 2T(N/2) + cn$$



Time Complexity = No. of Leaves * Height
= $N * \log_2(N)$

Let's compare the time complexity of MergeSort with BubbleSort.
Which is better?

BubbleSort Time Complexity = $O(N^2)$
MergeSort is actually better.



$$K = 10\log_2(N)$$

1201

2

