

Mergesort

Mergesort($S = \{s_1, s_2, \dots, s_n\}$)

If $n=1$ return(S)

Else

$S_1 = \text{Mergesort}(s_1, \dots, s_{n/2})$

$S_2 = \text{Mergesort}(s_{n/2+1}, \dots, s_n)$

Return Merge(S_1, S_2)

Work Tree for Mergesort

Input Size: 1



Work Tree for Mergesort

Input Size: 2



Work Tree for Mergesort

Input Size: 4



Work Tree for Mergesort

Input Size: $n=2^m$

A root with two subtrees

- Root

- Input Size: n

- Work: cn

- Each child

- Roots a work tree with Input Size 2^{m-1}

Work Tree for Mergesort

Input Size: $n=2^m$

Properties of nodes at level i :

- Input size:

- Work:

Properties of level i :

- Number of nodes at level i :

- Total work of nodes at level i :

Property of tree:

- Number of levels:

- Total work: