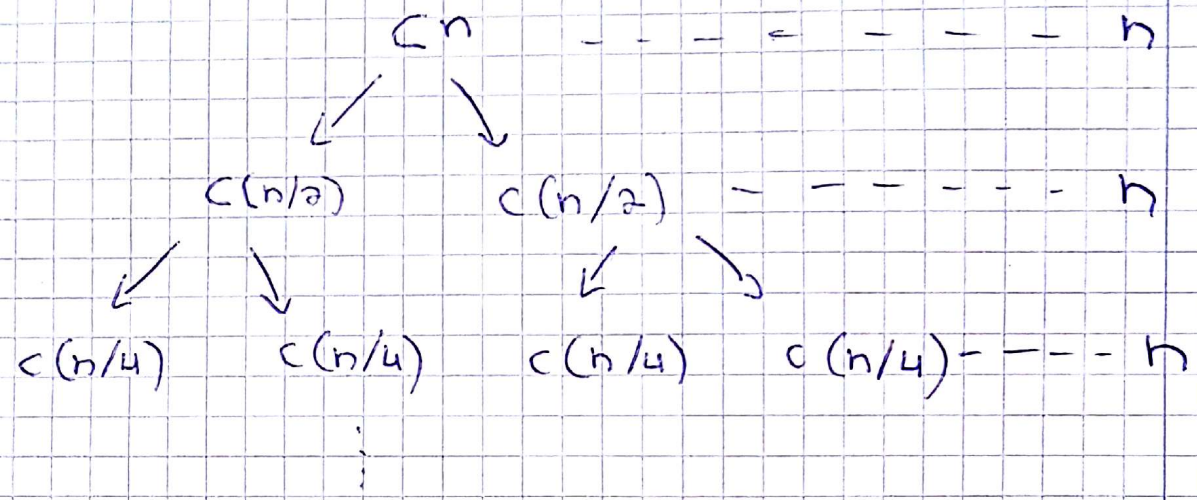
Assume that we have a recursive formula - we see if it's possible to display it as a recursion tree:

Merge-sort: $T(n) = 2T(n/2) + \Theta n$

Θn - means $c \cdot n$ (constant)



The process stops as: $n = 2^k$ for some k

and $k = \log_2(n)$. So we have $\log_2(n) = k$ divisions!

Each level has Θn work and we have in total k levels so that the complexity is $\Theta n \log(n)$

Θ means that worst case = best case = average case = $n \log(n)$

Note: every level does Θn work [there are some recursions where most of the work is done in the root, bottom etc...