

Fundamental Algorithms 5

Exercise 1

Consider the Recursion Tree Method for the recurrence equality (compare lecture)

$$T(n) = T(\lfloor n/3 \rfloor) + T(\lceil 2n/3 \rceil) + O(n)$$

Show that the height of the recursion tree is in $O(\log(n))$. **Hint:** Which simplifying assumptions are reasonable to this end?

What could be a flaw using the recursion tree method for unbalanced trees? Show that the whole recursion is in $O(n \log(n))$ anyway, using the substitution method.

Exercise 2

Show whether $\log n$ is polynomially smaller than n^ϵ for any $\epsilon > 0$ or not.