

Induction step: $k \geq 9$

$$l(t_k) = l(t_{left}) + l(t_{right}) + \text{size}(t_k)$$

$$= l(t_{k-1}) + l(t_{k-2}) + F_{k-1}$$

$$\leq F_{k-1} \cdot (k-5) + F_{k-2} \cdot (k-6) + F_{k-1}$$

$$= F_k \cdot (k-6) + F_{k-1} + F_{k-1}$$

$$= F_k \cdot (k-5) + F_{k-1}$$

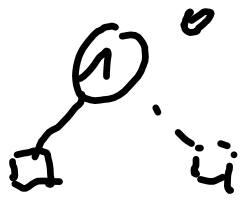
$$\leq F_k \cdot (k-5) + F_k = F_k \cdot (k-4)$$

□

$$D(t) = \frac{l(t)}{\text{size}(t)} \leq \frac{F_k \cdot (k-4)}{F_{k-2}}$$

$$h = k+2 \xrightarrow{\text{large } k \rightarrow \infty} h-2 \quad k-4$$

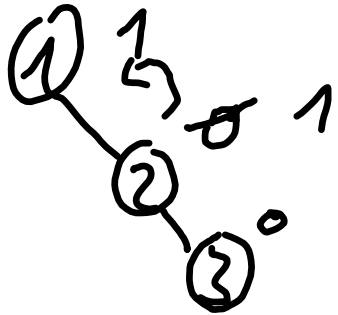
2.1



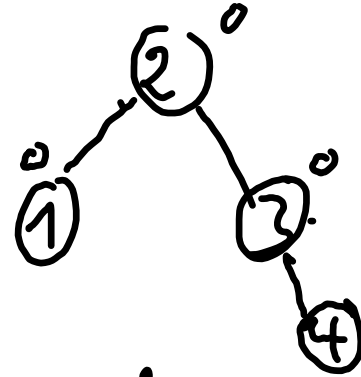
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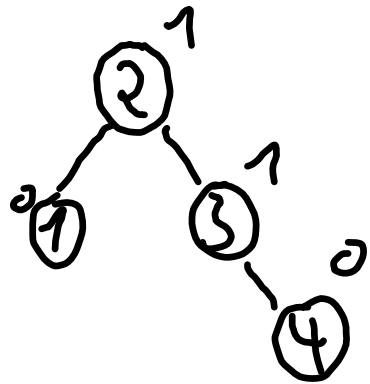
3.



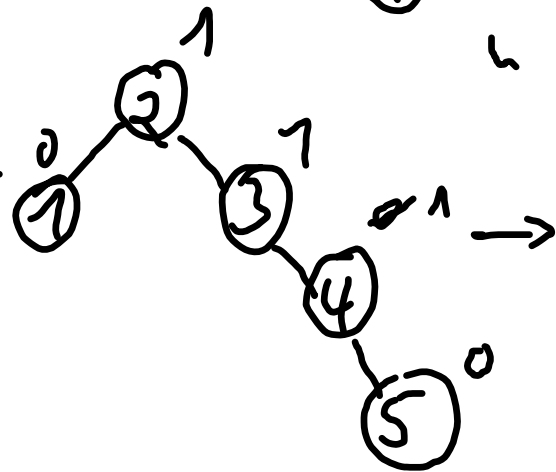
3.1



4.



5.



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