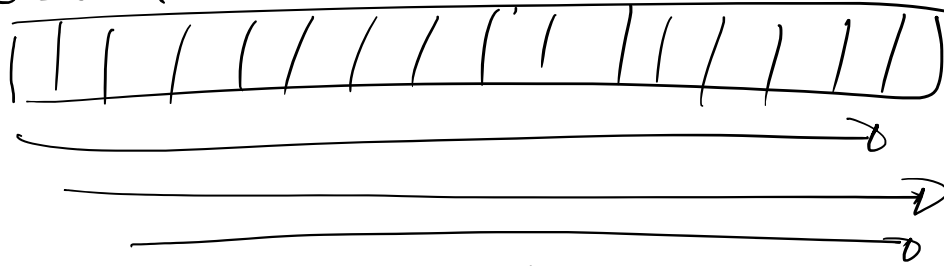


Informatik II - Klausuren

Freitag, 22. Juli 2016 14:05

Selection Sort



Best Case: $O(n^2)$

Sel. Sort, Bubble Sort, Insertion Sort
QS, MS

Ins. Sort \rightarrow versortet: $O(n)$



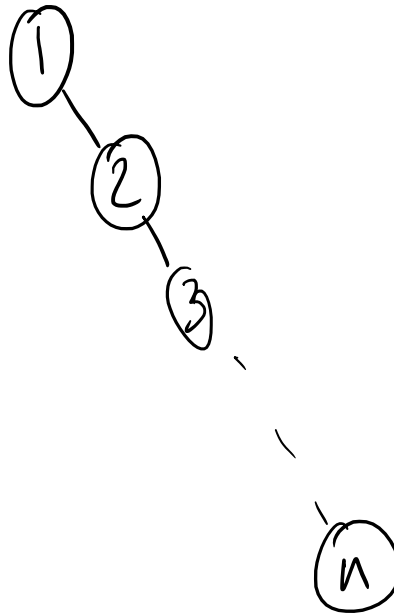
~~Tier~~ → Tor
↓
0
replace + delete

Maximum Sp. Tree

$$\underline{w'_e} = C - w(e)$$

$$\sum_{e \in T} w'_e = (n-1)C - \sum_{e \in T} w(e)$$

1, 2, 3, ..., 10, ..., n



$$O(f(n)) := \{g(n) \mid \exists c > 0, u_0 \geq 1 \forall n \geq u_0 : g(n) \leq c f(n)\}$$

$$\Omega(f(n)) := \{g(n) \mid \exists c > 0, u_0 \geq 1 \forall n \geq u_0 : g(n) \geq c f(n)\}$$

a) $\sqrt{n+7} \in O(\sqrt{n})$: korrekt

Beweis: $c = \frac{1}{2} 10$

$$\sqrt{n+7} \leq 10\sqrt{n}$$

$$n+7 \leq 100n \quad \forall n \geq \frac{7}{99} \quad u_0 = 1$$

$$\log(a^b) = b \cdot \log(a)$$

b) $\log(n^2) \in \Omega(\log(n)^2)$

$$\underbrace{\log(n^2)}_{= 2 \log(n)}$$

$$2 \log n \geq c \log^2 n$$

$$\frac{2}{c} \geq \log n$$

$$f(n) \in O(g(n)) : f(n) \leq g(n)$$

$$f(n) \in \Omega(g(n)) : f(n) \geq g(n)$$

$$f(n) \in \Omega(\log n), g(n) \in O(n) : f(n) \in \Omega(\log(g(n)))$$

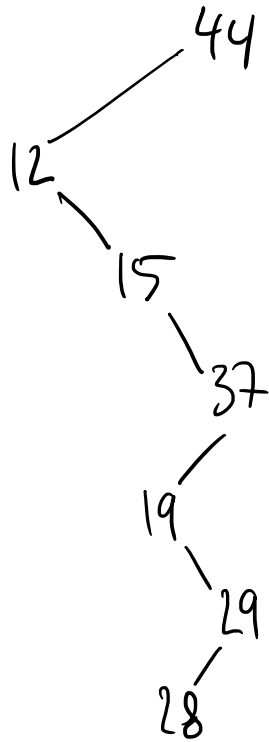
$$f(n) \geq \log n, \quad g(n) \leq n$$

$$\begin{array}{l} f(n) \geq \log(g(n)) \\ \log(n) \stackrel{!}{=} \end{array}$$

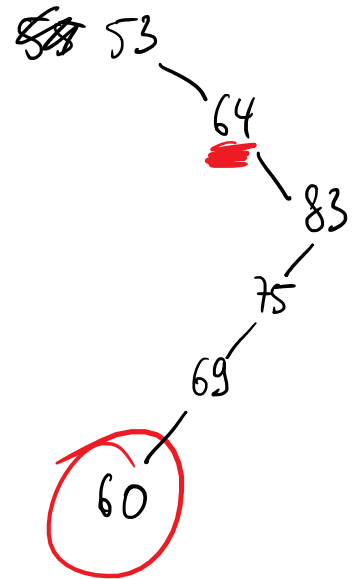
$$f(n) = O(g(n)) + O(h(n)) + O(n^2)$$

$$f(n) = O(n) \quad \left\{ \begin{array}{l} f(n) = n^2 + O(n) \end{array} \right.$$

44, 12, 15, 37, 19, 29, 28



53, 64, 83, 75, 69, 60, 66



5a) Rek-gleichung

$$T(n) = 2T(n/2) + O(1)$$

1, 3, ~~7~~, ~~8~~, 10, ~~12~~, 13, 14, 16, 20, ~~25~~, 26, ~~27~~

Handwritten annotations:
- Red numbers 5 and 4 above the crossed-out 7 and 8, with an arrow pointing from 5 to 4.
- Green circles around 8, 13, and 27.
- Red numbers 22 and 25 above the crossed-out 25 and 27.
- A green line connects the bottom of the circle around 8 to the bottom of the circle around 27.

