

Ex. 3.1-4

$$2^{n+1} = O(2^n) \quad 2 \cdot 2^n \leq O, 2^n \quad O = 2 \quad 2^{n+1} = O(2^n)$$

$$2^{2n} \leq c \cdot 2^n \quad 2n \cdot \ln 2 \leq \ln c + n \cdot \ln 2 \quad n \leq \ln c \quad 2^{2n} = O(2^n)$$

Ex. 3.1-2

$$(n+a)^b = \Theta(n^b) \quad n+a \leq n+|a| \leq 2n$$

$$n \geq 2|a|$$

$$n+a \geq n-|a| \geq \frac{1}{2}n$$

$$0 \leq \left(\frac{1}{2}\right)^b \cdot n^b \leq (n+a)^b \leq (2^b) n^b$$

$$c_1 = \left(\frac{1}{2}\right)^b \quad c_2 = 2^b \quad \checkmark$$

Slide examples

$$\begin{array}{l} \text{for } (i=0; \overbrace{i \leq n}^{n+2}; \overbrace{i++}^{n+1}) \quad (2n+4) \\ \quad \text{for } (i=0; i \leq n; j++) \quad (2n+4) \\ \quad \quad \text{statement block;} \end{array} \quad \begin{array}{l} \text{for } (i=0; i \leq n; i++) \quad (2n+4) \\ \quad \text{for } (j=0; j \leq i; j++) \quad (2n+4) \\ \quad \quad \text{statement block;} \end{array}$$

$$\begin{array}{l} \text{for } (i=0; i \leq n; i++) \quad (n+1) \\ \quad \text{for } (j=0; j \leq i; j++) \quad (n+2) \\ \quad \quad \text{statement block;} \end{array} \quad \frac{(n+1) \cdot (n+2)}{2}$$

$$\begin{array}{l} \text{for } (i=0; i \leq n; i++) \quad \log_2^{n+1} \\ \quad \text{for } (j=1; j \leq n; j*=2) \quad (n+1) \\ \quad \quad \text{statement block;} \end{array} \quad \log_2^{n+1} \cdot (n+1) \in O(n \log n)$$

for ($i = 0$; $i \leq n$; $i++$)

for ($j = 1$; $j \leq i$; $j* = 2$)

statement block;

$$\sum_{i=0}^n \log_2^i + 1$$

for ($i = 1$; $i \leq n$; $i* = 3$)

for ($j = 1$; $j \leq n$; $j* = 2$)

statement block;

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