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Data Structures and Algorithms — Assignment 1

Exercise class: Mo. 9 – 11, Room ABC 42
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Bonus points: _____

Exercise 1.1 *Examples*

a) We have $5n \leq n^2$ for $n \geq 5$, and $10 \leq n^2$ for $n \geq 4$ (in particular for $n \geq 5$). We choose $n_0 = 5$ and $c = 5$ and get

$$3n^2 + 5n + 10 \leq 3n^2 + n^2 + n^2 = 5n^2 = cn^2 \text{ for all } n \geq n_0 = 5 \tag{1}$$

Consequently, $3n^2 + 5n + 10 \in \mathcal{O}(n^2)$

b) Suppose that $n^{\frac{1}{2}} \in \mathcal{O}(n^{\frac{1}{3}})$ Then there exist constants $c > 0$ ...

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Exercise 1.2 *Simplifying Expressions in $\mathcal{O}$ Notation.*

a) $\mathcal{O}(2n + 14n^2) = \mathcal{O}(n^2)$

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