SS 2018 19.06.2018

Exercises to the lecture
Algorithmic Automata Theory
Sheet 8

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Peter Chini Delivery until 26.06.2018 at 12:00

Exercise 8.1 (Construction of NBAs)
Construct NBAs for the following languages over $\Sigma = \{a, b, c\}$.

a) $L_1 = \{v \in \Sigma^\omega \mid |v|_a = |v|_b < \omega\}$.

b) $L_2 = \{v \in \Sigma^\omega \mid |v|_a = \omega \wedge |v|_c = \omega\}$.

Hint: For L_2 you may use the product of NBAs from the lecture.

Exercise 8.2 (ω-regular languages and NBAs)
Show that a language is ω-regular if and only if it is recognized by an NBA.

Hint: For the first direction, prove the lemmas from the lecture. For the reverse direction, think of a run in an NBA. It has a finite prefix and eventually starts to loop.

Exercise 8.3 (Variant of Ramsey's Theorem)
Let $G = (V, E)$ be an infinite graph such that for each infinite set $X \subseteq V$ there are $v, v' \in X$ with $(v, v') \in E$. Prove that G contains an infinite complete subgraph.

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