Exercises to the lecture
Algorithmic Automata Theory
Sheet 5

Dr. Prakash Saivasan   Delivery until 21.05.2019 at 15:00

Exercise 5.1 (Language Concatenation)
Consider two regular languages L_1 and L_2 over the alphabet Σ such that for all $u, v, w \in \Sigma^*$ and $n \in \mathbb{N}$, $u.v^n.w \in L_i \iff u.v^{n+1}.w \in L_i$ for $i \in \{1, 2\}$. Prove that for any $u, v, w \in \Sigma^*$ and $n \in \mathbb{N}$, $u.v^n.w \in L_1.L_2 \iff u.v^{n+1}.w \in L_1.L_2$

Exercise 5.2 (Counting Languages)
Recall that a language L is counting iff

$$\forall n_0, \exists n \geq n_0, \exists u, v, w \in \Sigma^* : (uv^n w \in L \iff uv^{n+1} w \notin L)$$

Decide whether the following languages are counting:

- $b(abb)^*$

- $a(bbb)^* aa$

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