**Applied Automata Theory** (WS 2013/2014) Technische Universität Kaiserslautern

# Exercise Sheet 11

Jun.-Prof. Roland Meyer, Georgel Calin Due: Tue, Jan 21

## Exercise 11.1 NHA for Regular Languages

Similarly to ranked trees, for an unranked tree $t$ we can also define the word obtained by reading the leaves from left to right to be the yield of $t$. Inductively, $\text{Yield}(a) = a$ and $\text{Yield}(a(t_1 \dots t_n)) = \text{Yield}(t_1) \dots \text{Yield}(t_n)$. Let $L \subseteq \Sigma^*$ be a regular word language.

Construct an NHA accepting the language $\{t \in \mathcal{T}_\Sigma \mid \text{Yield}(t) \in L\}$.

## Exercise 11.2 XML Validation

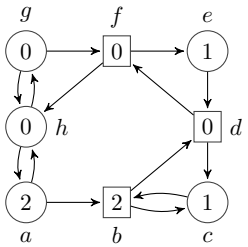
Create an XML document with information about a collection of 3 cars. A car has the following attributes: *brand*, *model*, *year*, *engine*, and (1 or more) *add-ons*. We want to store information about a brand's *owning compani(es)*, *foundation year*, and *headquarters*. Finally, each add-on has a *name* and can be *electronic* or *non-electronic*.

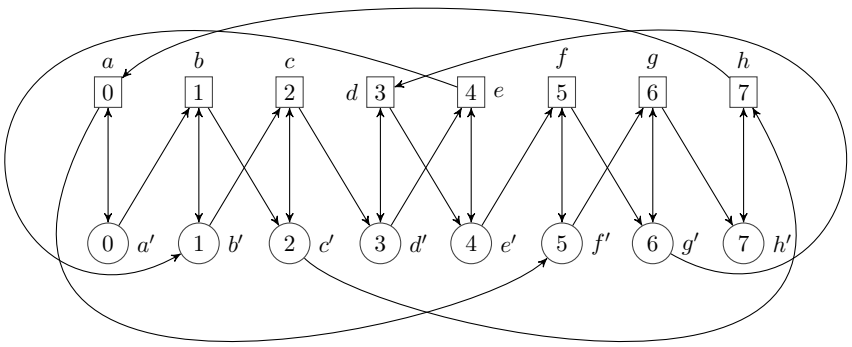
Give a DTD specification for car collections and use it to validate your document.

## Exercise 11.3 Parity Game Attractors

(a) Compute the attractor of $\{a, b\}$ for player $A$ in the game depicted below on the left.

(b) Compute the attractor of $\{c, c'\}$ for player $A$ in the game depicted on the right.




*Reminder: positions of $A$ are ◯s and positions of $P$ are □s.*

## Exercise 11.4 Parity Games Strategies

(a) Give a positional strategy of $P$ winning from $a$ in the **11.3** right hand side game.

(b) Give a positional strategy of $A$ winning from $b$ in the **11.3** right hand side game.