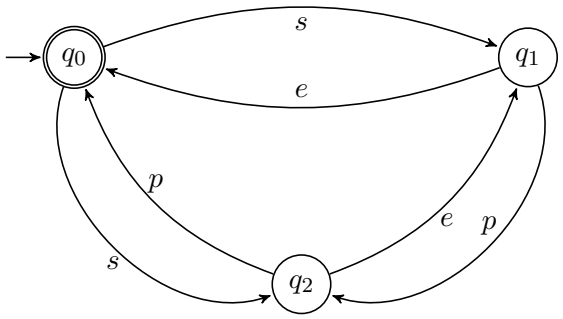
SS 2019 11.04.2019

Exercises to the lecture
Algorithmic Automata Theory
Sheet 1

Dr. Prakash Saivasan Delivery until 16.04.2019 at 15:00

Exercise 1.1 (Regular expression to NFA)
Transform the regular expression $a^*.b^+ \cup (a.b^*)^*$ into an NFA A without ε-transitions.

Exercise 1.2 (NFA to regular expression)
Find a regular expression for the language of the following automaton:



Exercise 1.3 (Arden's Lemma)
Consider the following extension of Arden's Lemma: If $U, V \subseteq \Sigma^*$ and $\varepsilon \in U$ then all solutions $L \subseteq \Sigma^*$ of the equation $L = UL \cup V$ are precisely the languages in the set $\mathcal{L} = \{U^*V' \mid V \subseteq V' \subseteq \Sigma^*\}$.

Prove the extension by solving a) and b) below:

a) Show that if L is a solution of $L = UL \cup V$ then $L \in \mathcal{L}$.

b) Show that every $L \in \mathcal{L}$ satisfies $L = UL \cup V$.

Delivery until 16.04.2019 at 15:00 into the box next to 343 or in the class