Software-Modellierung und Verifikation
Informatik 2
Prof. J.-P. Katoen
RWTH Aachen

Priv.-Doz. T. Noll   noll@cs.rwth-aachen.de
Ch. Jansen   christina.jansen@cs.rwth-aachen.de

0. Exercise sheet *Compiler Construction 2010*
Due Wed., 20 October 2010, *before* the exercise course begins.

Exercise 0.1: (2 points)

Which of the following statements are true? Give explanations to your results.

- $abba \in [\![b^*a^*b^*a^*]\!]$

- $[\![a^*b^*c^*]\!] \cup [\![b^*c^*a^*]\!] = [\![a^* \vee b^*c^*]\!]$

- $[\![a^*ba^*]\!] \cap [\![cb^*c]\!] = \emptyset$

- $aabbc \in [\![(a(bc)^*)^*c]\!]$

Exercise 0.2: (6 points)

Consider the following grammar:

$$
\begin{aligned}
S &\rightarrow A \mid C \\
A &\rightarrow a + S \mid b \\
C &\rightarrow S * c \mid b
\end{aligned}
$$

a) Give a derivation tree for the grammar and find all derivations of $a + b * c$.

b) Give the language defined by the grammar.

c) Find an equivalent grammar in Greibach normal form (without formal proof).

d) Construct a deterministic finite automaton recognizing the language.

e) Construct a push-down automaton recognizing the language.

f) Give one run in the push-down automaton from e) accepting $a + b * c$.