Software-Modellierung und Verifikation
Informatik 2
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4. Exercise sheet *Compiler Construction WS09/10*

Due to Wed. 18 Nov. 2009, at the begin of exercise course.

Exercise 4.1: 3 **points**

Consider the grammar G given by:

$$\begin{array}{lcl} S & \rightarrow & N * N \mid N * * N \\ N & \rightarrow & N0 \mid N1 \mid M \\ M & \rightarrow & 1 \end{array}$$

a) Show that $G \notin LL(1)$ by analysing the lookahead sets.

b) Construct $G' \in LL(1)$ with $\mathcal{L}(G) = \mathcal{L}(G')$.

c) Show that $G' \in LL(1)$, again by analysing the lookahead sets.

Exercise 4.2: 7 **points**

Consider the grammar G given by:

$$\begin{array}{lcl} S' & \rightarrow & S \\ S & \rightarrow & MR \\ M & \rightarrow & LM \mid m \\ L & \rightarrow & LL' \mid l \\ L' & \rightarrow & LL' \mid l' \\ R & \rightarrow & RR' \mid r \\ R' & \rightarrow & RR' \mid r' \end{array}$$

a) Show that $G \notin LR(0)$.

b) Give a grammar $G' \in LR(0)$ (and show that $G' \in LR(0)$) such that for $w \in \Sigma^*$, $a \in \Sigma$:

$$wa \in \mathcal{L}(G) \Leftrightarrow wm \in \mathcal{L}(G')$$

c) Compute an accepting run of $NBA(G')$ for input $lll'mrm$