Technische Universität München — *Summer Semester 08*
Fakultät für Informatik — *Vesal Vojdani*
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Compiler Construction

Exercise Sheet 8

Deadline: 18. June 2008, at the lecture, in room 02.07.053, or by e-mail.

Exercise 1: *LR(0) grammars* — *6 Points*

Show which of the following grammars are LR(0).

a)
$$S \to A$$
$$A \to A; A \mid B$$
$$B \to x$$

b)
$$S \to A$$
$$A \to B; A \mid B$$
$$B \to x$$

c)
$$S \to A$$
$$A \to xB$$
$$B \to y \mid ; A$$

Exercise 2: *LR(k) grammars* — *4 Points*

Show which of the following grammars are LR(k).

a)
$$S \to C$$
$$C \to a\ A\ d \mid a\ B\ c \mid b\ A\ c \mid b\ B\ d$$
$$A \to e\ A \mid e$$
$$B \to e\ B \mid e$$

b)
$$S \to A\ b \mid B\ c$$
$$A \to A\ a \mid d$$
$$B \to B\ a \mid d$$

Exercise 3: *LR(0) parsing* — *10 Points*

Consider the grammar $G = (\{S, A\}, \{a, b\}, P, S)$ with productions $P =$

$$S \to A\ A$$
$$A \to a\ A \mid b$$

a) Construct the Shift-Reduce-Parser $M_G^{(1)}$.
b) Construct the LR(0) automaton.
c) Construct the LR(0) parser.

Exercise 4: *SLR* — *6 Points*

Show if the following grammar is SLR(1).

$$S \to A\,B$$
$$A \to A\,a\,A\,b \mid a$$
$$B \to B\,b\,B\,a \mid b$$

Exercise 5: *LALR, SLR* — *6 Points*

Show that the following grammar is LALR(1), but not SLR(1).

$$S \to A\,a \mid b\,A\,c \mid d\,c \mid b\,d\,a$$
$$A \to d$$