

Chapter 0

Exercises

Course “Compiler Construction”

Martin Steffen

Spring 2022



Section

Exercises 04

3.1: LL(1)
3.2: Ambiguity (and assoc, precedence . . .)
3.3: Ambiguity (assoc . . .)

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3.3: Ambiguity (assoc . . .)

4.1 Another grammar for well-balanced parentheses

$$S \rightarrow S\,(\,S\,) \mid \epsilon$$





Exercises 03

3.1: LL(1)

3.2: Ambiguity (and assoc, precedence . . .)

3.3: Ambiguity (assoc . . .)

4.2: And another grammar (LR(1) parsing)

$$A \rightarrow \mathbf{a}A\mathbf{a} \mid \boldsymbol{\epsilon}$$

1. Show: it's not LR(1)!
2. is it ambiguous or not?





Exercises 03

3.1: LL(1)

3.2: Ambiguity (and assoc, precedence . . .)

3.3: Ambiguity (assoc . . .)

4:3 Still another grammar for well-balanced parentheses

$$A \rightarrow AA \mid (\ A\ ) \mid \epsilon \tag{1}$$

1. yacc (or CUP or similar) does the job or not? Why (not)?
2. reorder the rules?





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3.1: LL(1)

3.2: Ambiguity (and assoc, precedence . . .)

3.3: Ambiguity (assoc . . .)

4.4: Ambiguous expression grammar (ambiguous)

$$
\begin{array}{rcl}
exp' & \rightarrow & exp \\
exp & \rightarrow & exp + exp \mid exp * exp \mid exp \uparrow exp \mid \mathbf{n}
\end{array}
$$

do the expected associativities+precendences by resolving conflicts in the LR-parse table.



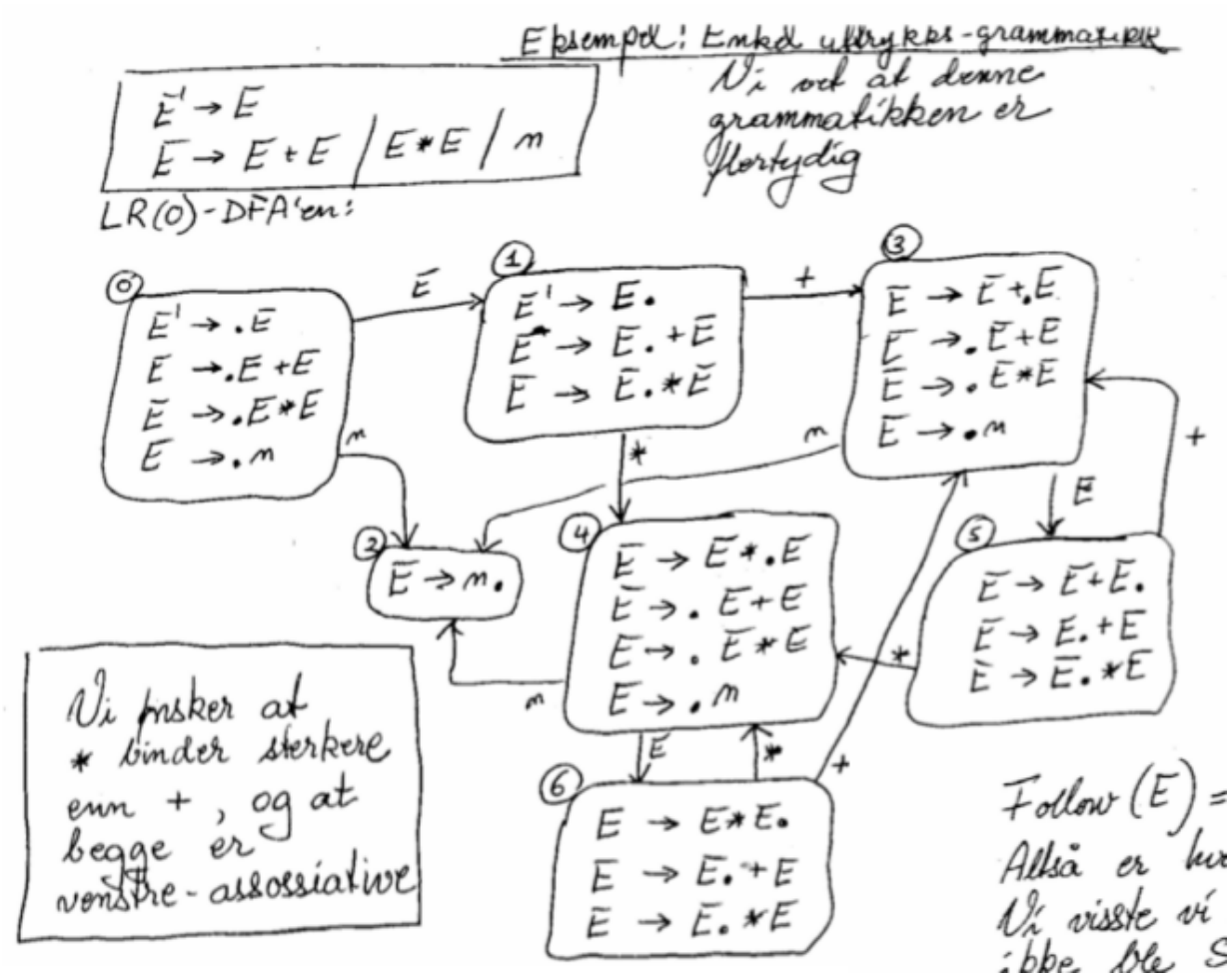
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3.1: LL(1)

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4:4: LR(0)-DFA (without expon.) (semi-solution)





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4.5 Artificial grammar

$$
\begin{array}{lcl}
S & \rightarrow & T\ S \\
S & \rightarrow & T \\
T & \rightarrow & \#\,T \\
T & \rightarrow & \mathbf{a}
\end{array}
$$

Full LR-package

- first & follow
- what's $\mathcal{L}(G)$?
- Is $\mathcal{L}(G)$ regular?
- Add $S' +$ do the LR(0)-DFA.
- parsing table of the correct format
- parse $\mathbf{a}\,\#\,\mathbf{a}$



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