Introduction to Computational Linguistics

Context-Free Parsing Exercises

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1 Left-Corner Relation

Describe an algorithm to compute the (transitive closure of the) left-corner relation for a given CFG, which is needed in Left-Corner Parsing.

2 Extraction of parse trees

Describe an algorithm that extracts the *complete* parse trees from the chart of the CYK algorithm using the $\mathcal{C}$ and $\mathcal{B}$ arrays and the context-free productions.
Treat the construction of trees from grammar symbols and smaller trees as black boxes.

3 Parse-tree extraction – run time

What is the worst-case complexity of your parse-tree extraction algorithm?

4 Bottom-up vs. Earley/Left-Corner parsing

In what situation is it advantageous to use pure bottom up parsing, resp. predictive bottom up (aka Earley or Left-Corner). Why?

Literature

- Jay Earley (1970), *An efficient context-free parsing algorithm*, Communications of the ACM, Volume 15, Number 2, pp 94–102
  URL: search at http://portal.acm.org/

- Klaas Sikkel: *Parsing Schemata: A Framework for Specification and Analysis of Parsing Algorithms*, Springer, 1997

  Available in CoLi library, quite theoretical

- Klaas Sikkel: *Parsing of context-free languages*
  URL: http://wwwhome.cs.utwente.nl/ sikkel/papers/ps/amilp95.ps.gz

  Covers parts of the abovementioned book.