NEGRA

SFB 378

Ressourcenadaptive kognitive Prozesse

Projekt C3

Nebenläufige grammatische Verarbeitung

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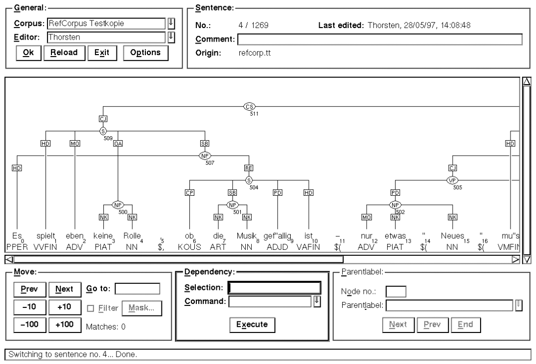
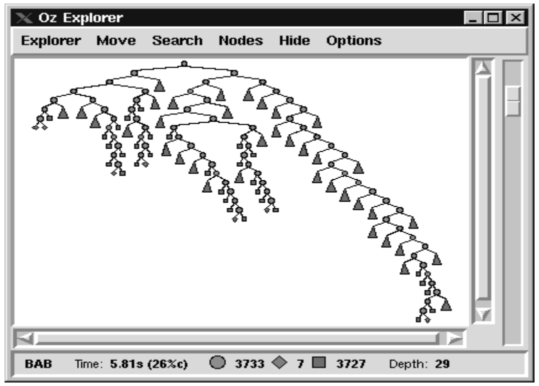
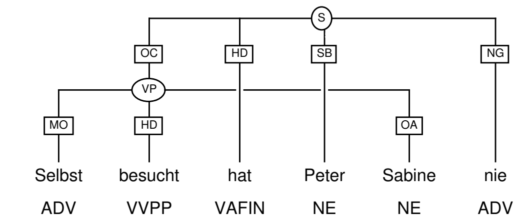
NEGRA

- Development of an Annotation Scheme for Free Word Order Languages

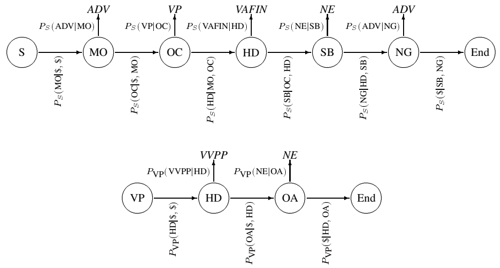


- Statistical and FS Parsing





- Annotation of a German Newspaper Corpus



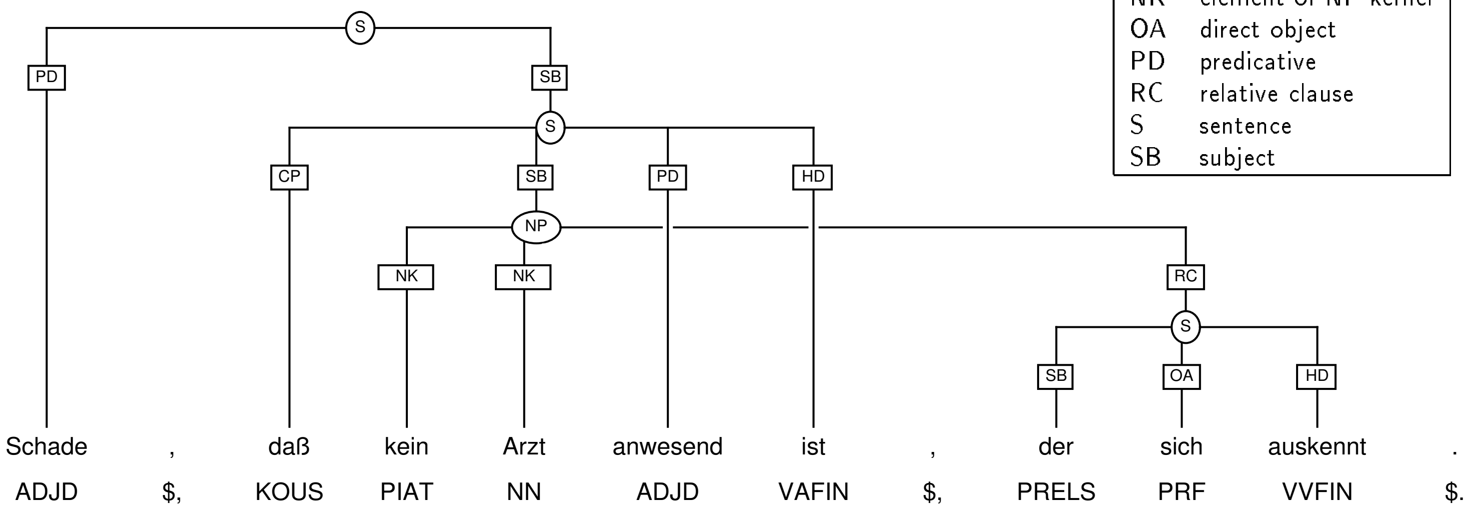
- Parsing in a Concurrent Constraint-Based Framework

- Performance Model of Grammar

Annotation Scheme

- Annotation of predicate-argument-structures
- Four representation levels:
  - argument structure
  - grammatical functions
  - syntactic categories
  - word order

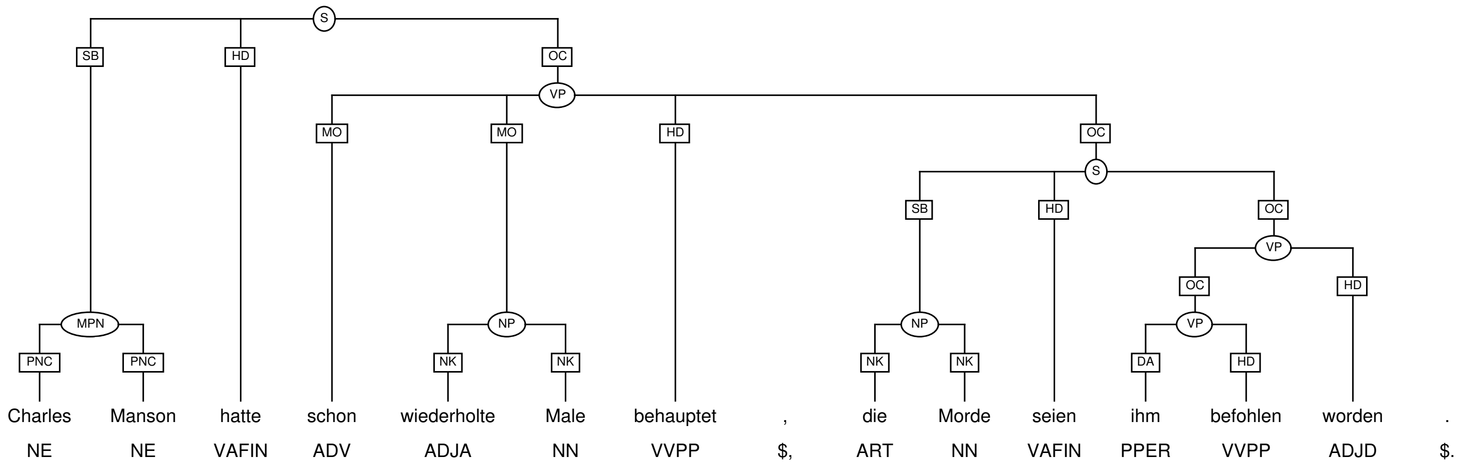
CP	complementizer
HD	head
NK	element of NP kernel
OA	direct object
PD	predicative
RC	relative clause
S	sentence
SB	subject



Annotation Scheme

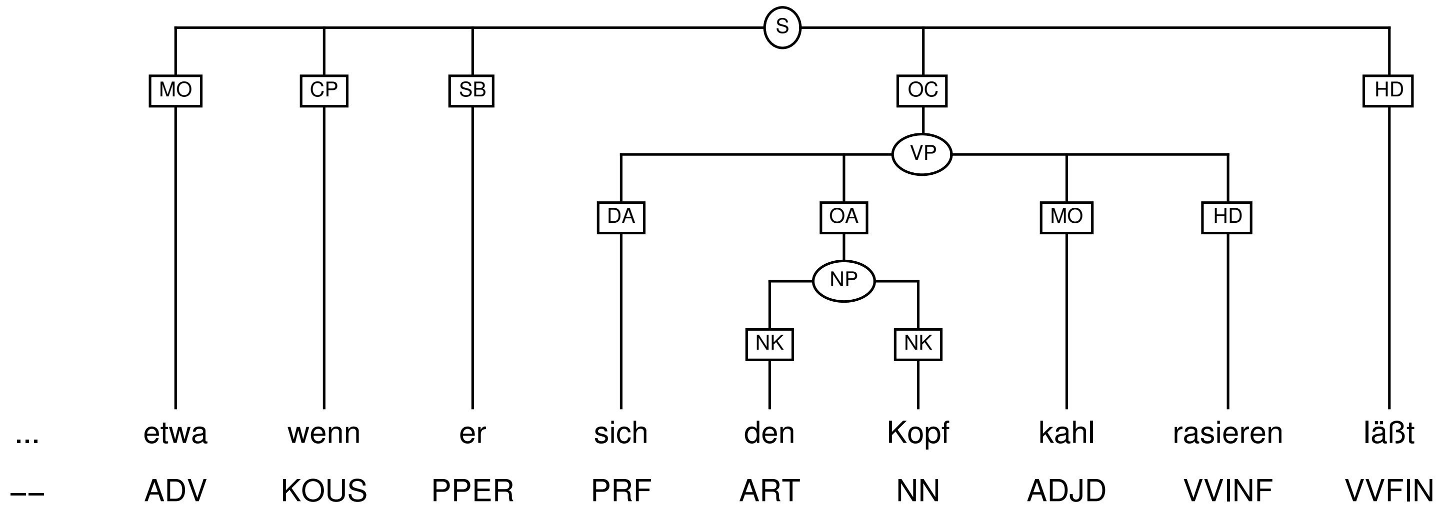
Selected phenomena:

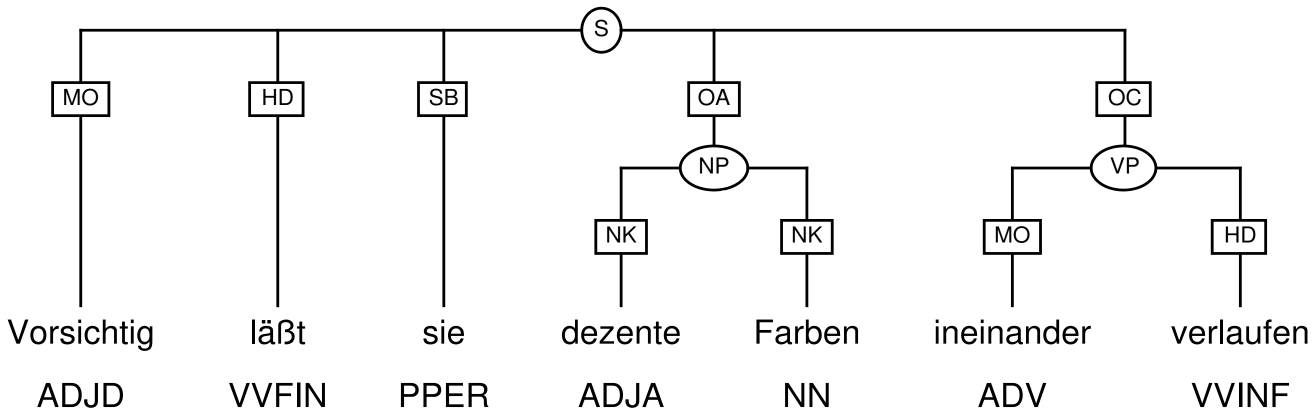
- Noun phrases:
  flat annotation: NP kernel, initial modifiers, pre- and postnominal genitives, appositions, relativ clauses
- Sentences and verb phrases:
  sentences contain finite verbs, VP's contain non-finite verbs as their heads
- Attachment ambiguities:
  Contextually appropriate attachment points are used
  Choose highest attachment point in case of unresolved ambiguities



[DA=dative; HD=head; MO=modifier; NK=NP kernel; OA=direct object; OC=clausal object; PNC=part of proper noun; SB=subject]

Complements of 'Lassen'

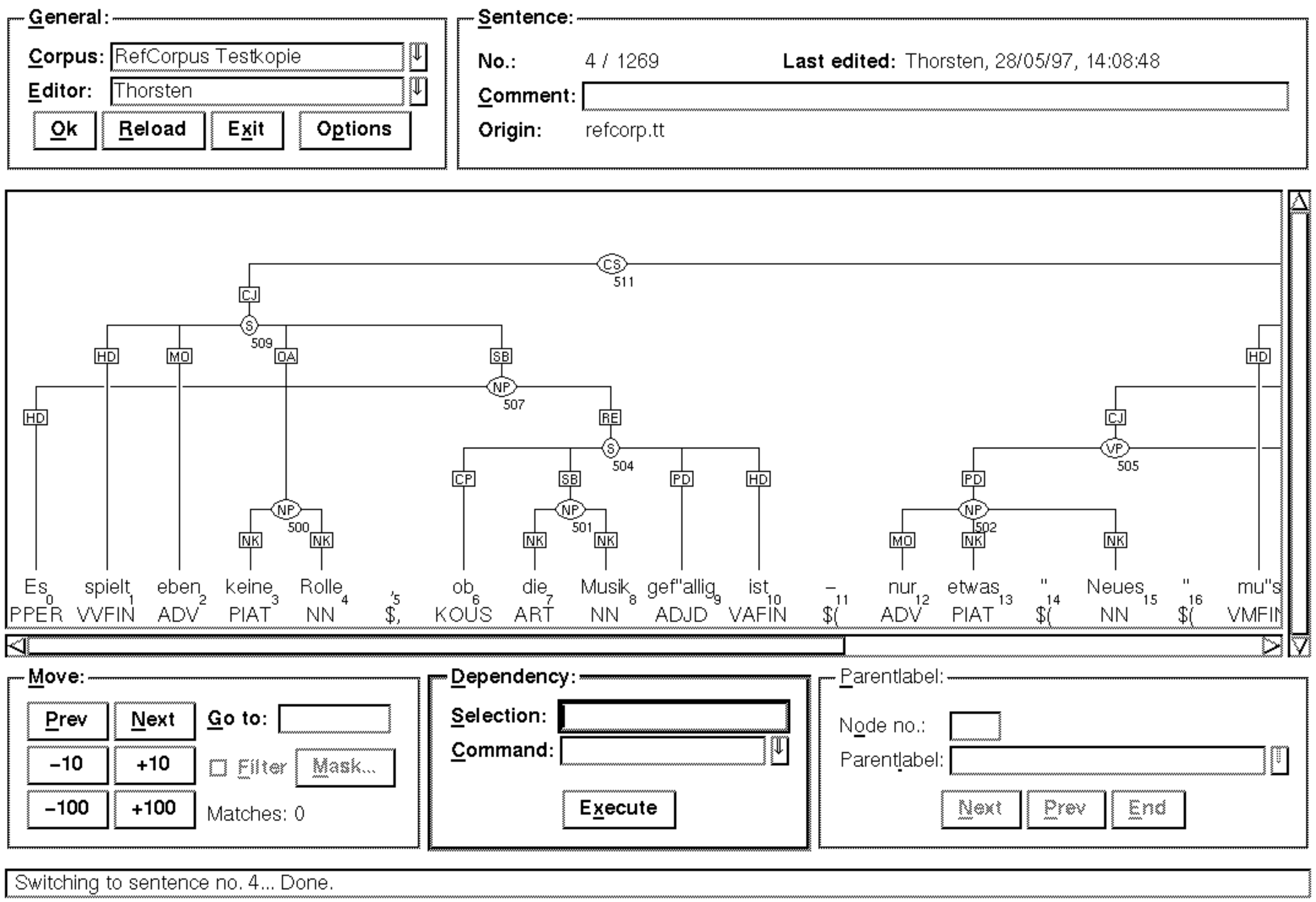




[CP=complementizer; DA=dative; HD=head; MO=modifier; NK=NP kernel; OA=direct object; OC=clausal object; SB=subject]

Annotation Tool

- Immediate graphical visualization
- Plausibility checks
- Interaction of human annotator and parser



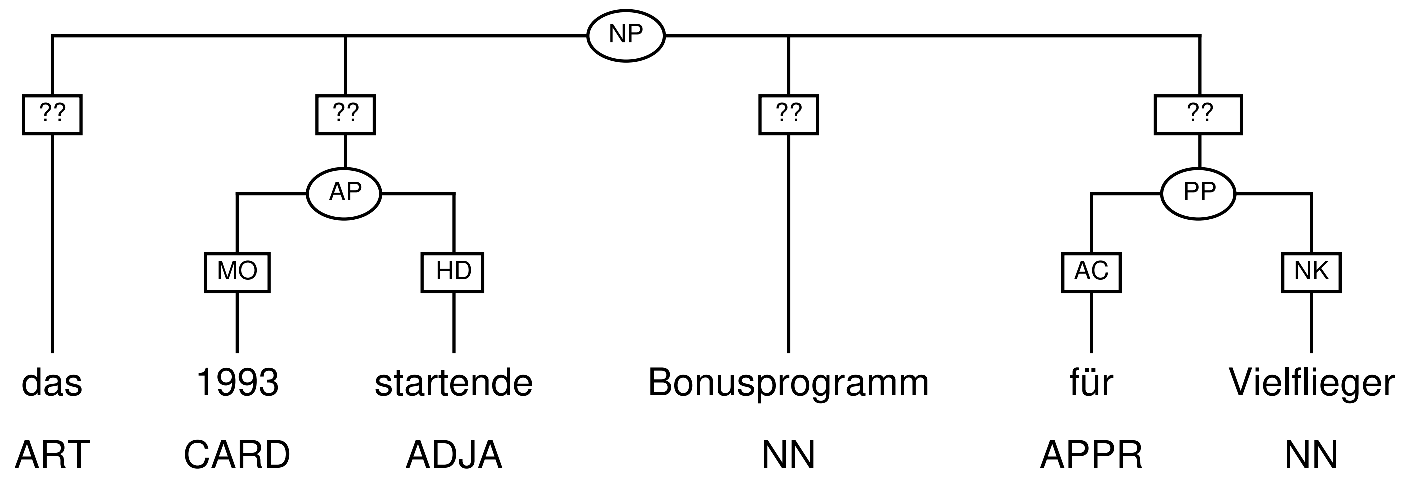
Automation

Levels of Automation:

0) Pure manual annotation
1) User: constituents and phrase categories
   Tool: grammatical functions
2) User: constituents
   Tool: phrase categories and grammatical functions
3) User: constituents without explicit marking of sub-phrases
   Tool: structures of fixed (small) depths, phrase categories, and gramm. functions
4) User: complex phrases
   Tool: simple phrases, phrase categories, and grammatical functions
5) User: revision
   Tool: complete structures

Level 1

User: constituents and phrase categories
Tool: grammatical functions

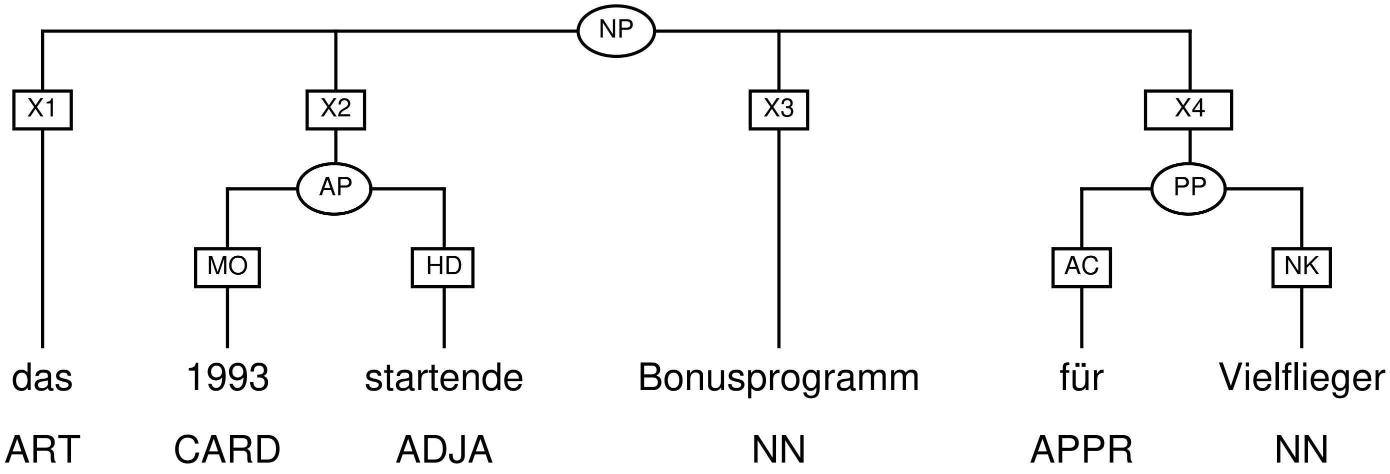


AP = adjective phrase, NP = noun phrase, PP = prepositional phrase

AC = adpositional case marker, HD = head, MO = modifier, NK = noun kernel element

ADJA = attribute adjective, APPR = proposition, ART = article, CARD = cardinal, NN = common noun,

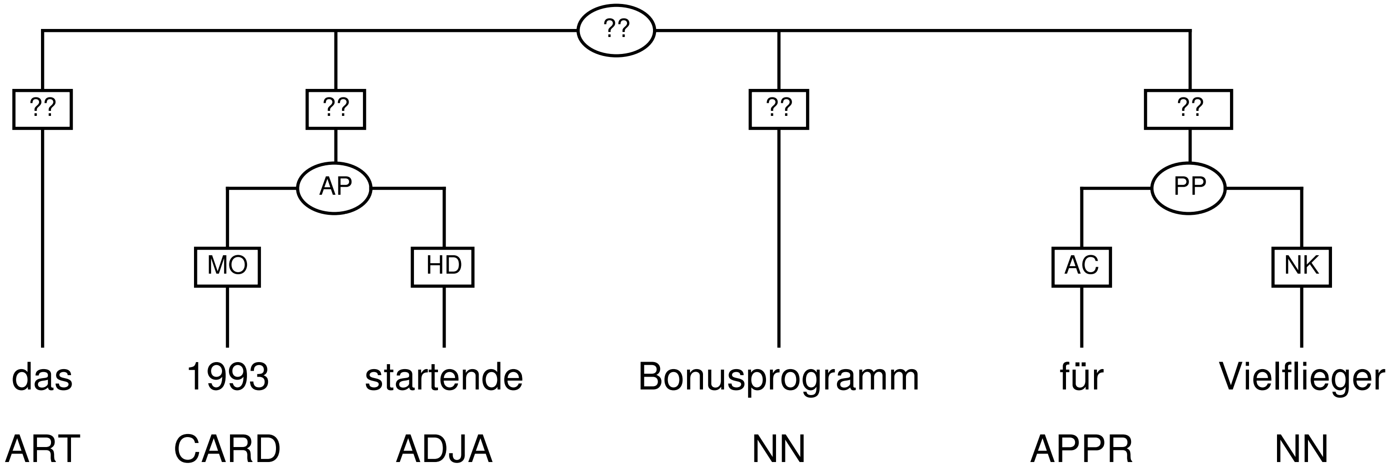
Assignment of Grammatical Functions



$$
\begin{aligned}
\mathrm{argmax}_{X_1,X_2,X_3,X_4} \;& P_{NP}(X_1|\$) \cdot P_{NP}(\mathsf{ART}|X1) \\
& \cdot P_{NP}(X_2|\$, X_1) \cdot P_{NP}(\mathsf{AP}|X_2) \\
& \cdot P_{NP}(X_3|X_1, X_2) \cdot P_{NP}(\mathsf{NN}|X_3) \\
& \cdot P_{NP}(X_4|X_2, X_3) \cdot P_{NP}(\mathsf{PP}|X_3) \\
& \cdot P_{NP}(\$|X_3, X_4)
\end{aligned}
$$

Level 2

User: constituents
Tool: phrase categories and grammatical functions



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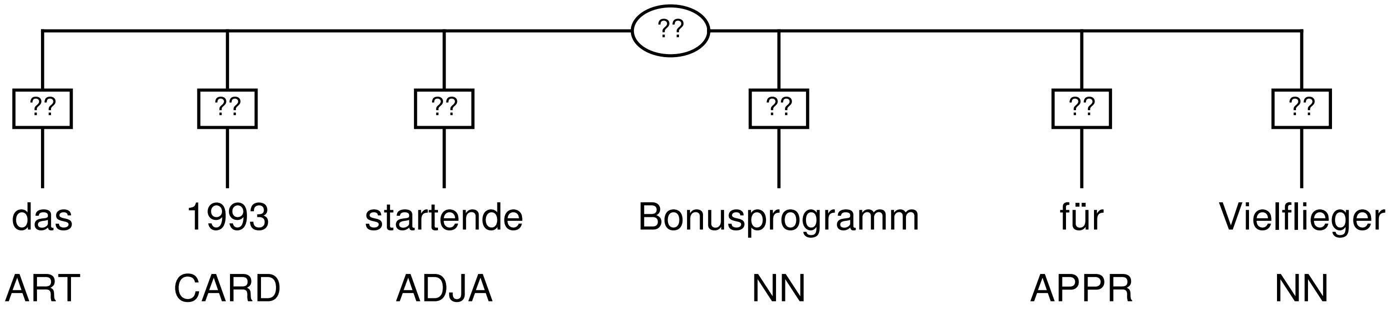
ADJA = attribute adjective, APPR = proposition, ART = article, CARD = cardinal, NN = common noun,

Level 3

User: constituents without explicit marking of sub-phrases
Tool: structures of fixed (small) depths, phrase categories, and gramm. functions



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Cascaded Finte State Parsing

- Grammar divided in strata/levels (chunks & clauses)
- Pipeline of finite-state recognizers/transducers