Meertens instituut

Research and documentation of Dutch language and culture

Surfacing Dutch syntactic parses

Erwin R. Komen
Erwin_komen@sil.org
CLIN-26
Amsterdam
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Pre-amble

What is surfacing??

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What is surfacing??

1. Reaching the surface level? → no…

Pre-amble

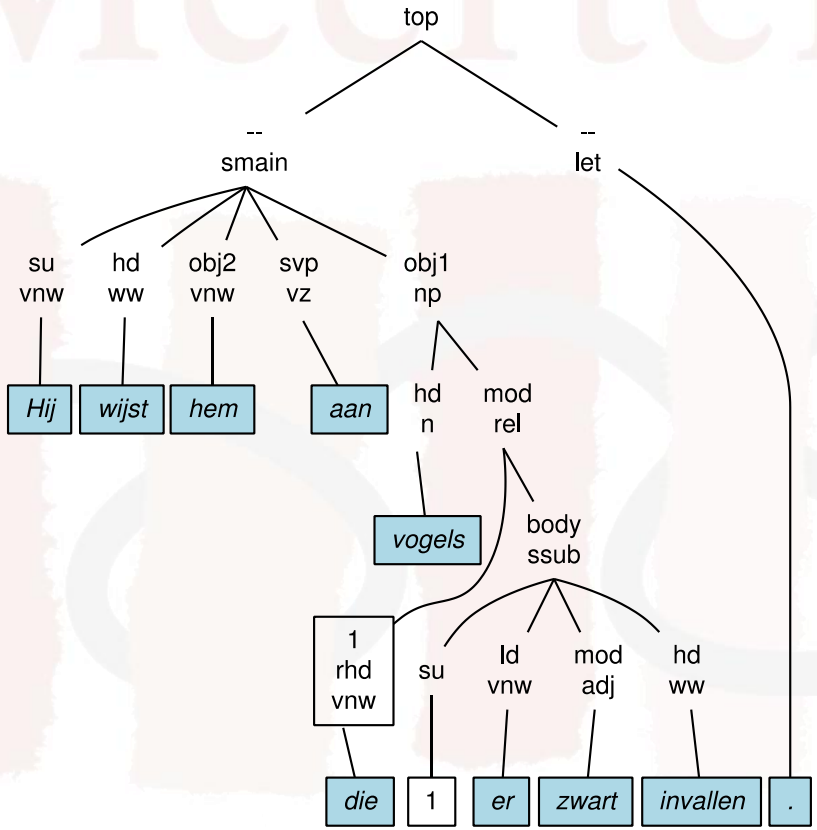
What is surfacing??

1. Reaching the surface level? → no…
2. Making a surface flat? → no…

Pre-amble

What is surfacing??

1. Reaching the surface level? → no…
2. Making a surface flat? → no…
3. Restoring ‘surface’ word order structure in a parsed sentence



YES

Pre-amble

What is surfacing??

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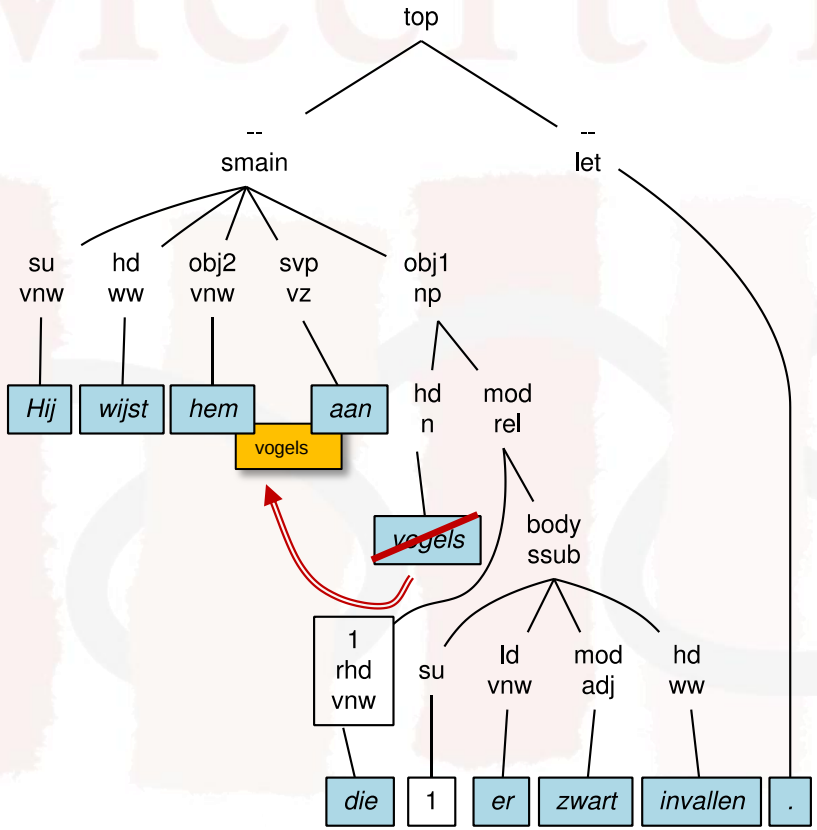

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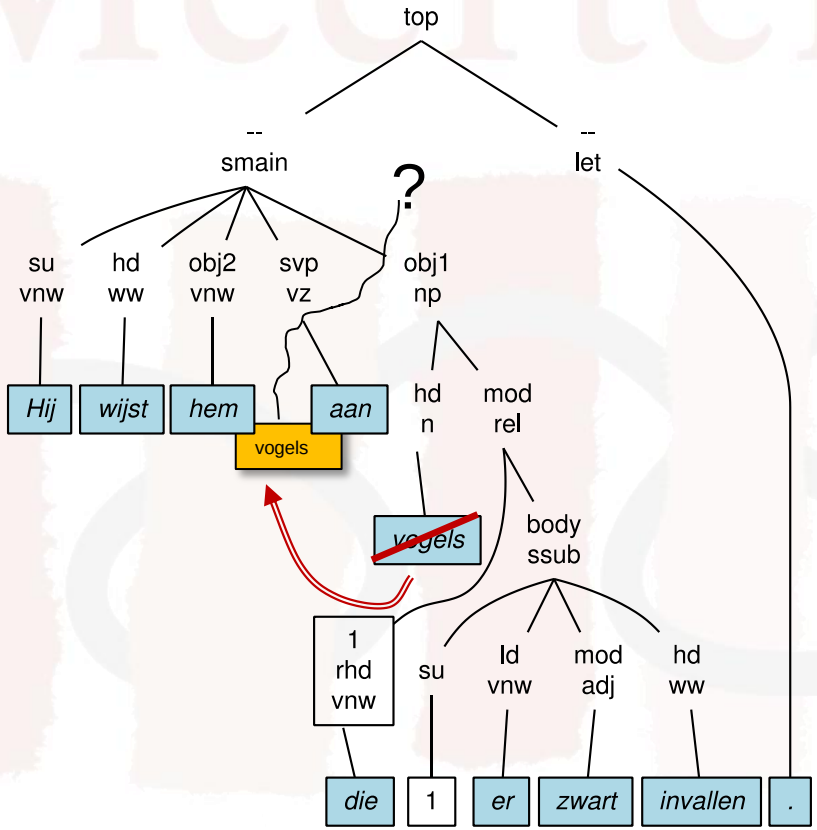
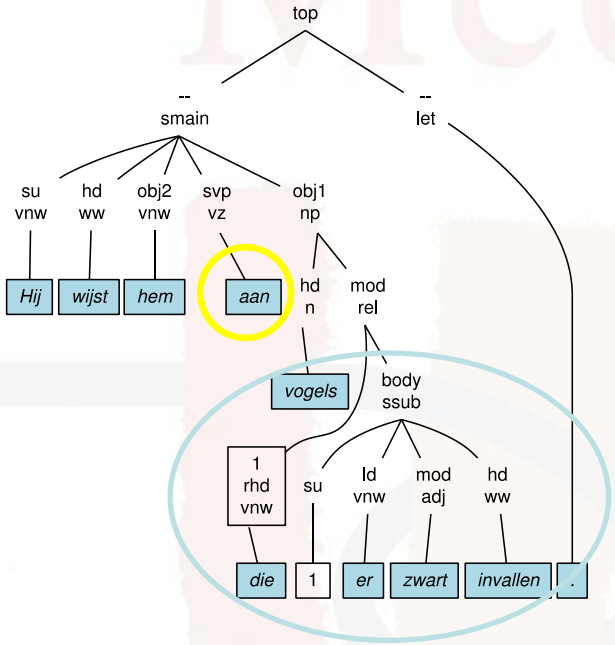


Pre-amble

What is surfacing??

1. Reaching the surface level? → no…
2. Making a surface flat? → no…
3. Restoring ‘surface’ word order structure in a parsed sentence
   a) Splitting discontinuous-constituents



VZ-SVP		NP-OBJ1			
aan		*vogels*	*die*	*er*	*zwart* *invallen*
5		4	6	7	8 9

Pre-amble

What is surfacing??

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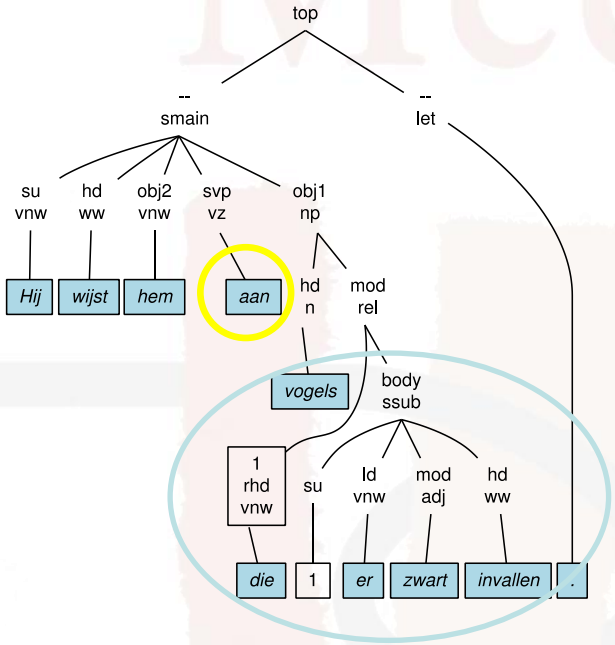

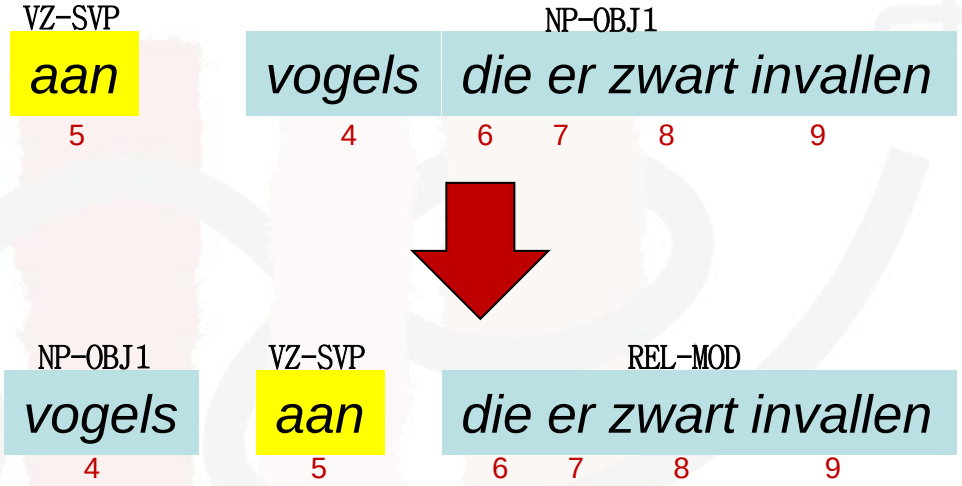

Contents

1. Why ‘surfacing’?
2. Our goal
3. The algorithm
4. Implementation
5. Discussion

Contents

1. Why ‘surfacing’?
2. Our goal
3. The algorithm
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5. Discussion

1 – Why surfacing?

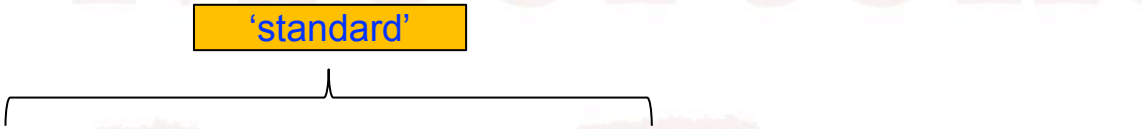
1. Linguists need surface word order
   a. Scrambling

De universiteit stelde hem aan als hoogleraar

De universiteit stelde hem als hoogleraar aan

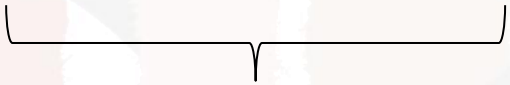
1 – Why surfacing?

1. Linguists need surface word order
   a. Scrambling
   b. Extraposition



De vogels die er zwart invallen zijn het onderwerp

Hij wijst hem de vogels aan die er zwart invallen



1 – Why surfacing?

1. Linguists need surface word order
   a. Scrambling
   b. Extraposition
   c. Information structure

New

Op het toneel verscheen een kleine man met een rugzak

Een kleine man met een rugzak verscheen op het toneel

New

1 – Why surfacing?

1. Linguists need surface word order
   a. Scrambling
   b. Extraposition
   c. Information structure
   d. First-constituent research

Natuurlijk **gaan we op zomervakantie**

We **gaan natuurlijk op zomervakantie**

Op zomervakantie **gaan we natuurlijk**

First constituent

1 – Why surfacing?

1. Linguists need surface word order
   a. Scrambling
   b. Extraposition
   c. Information structure
   d. First-constituent research
   e. Verb-cluster order

Ik zou dat gezien willen hebben

Ik zou dat willen hebben gezien

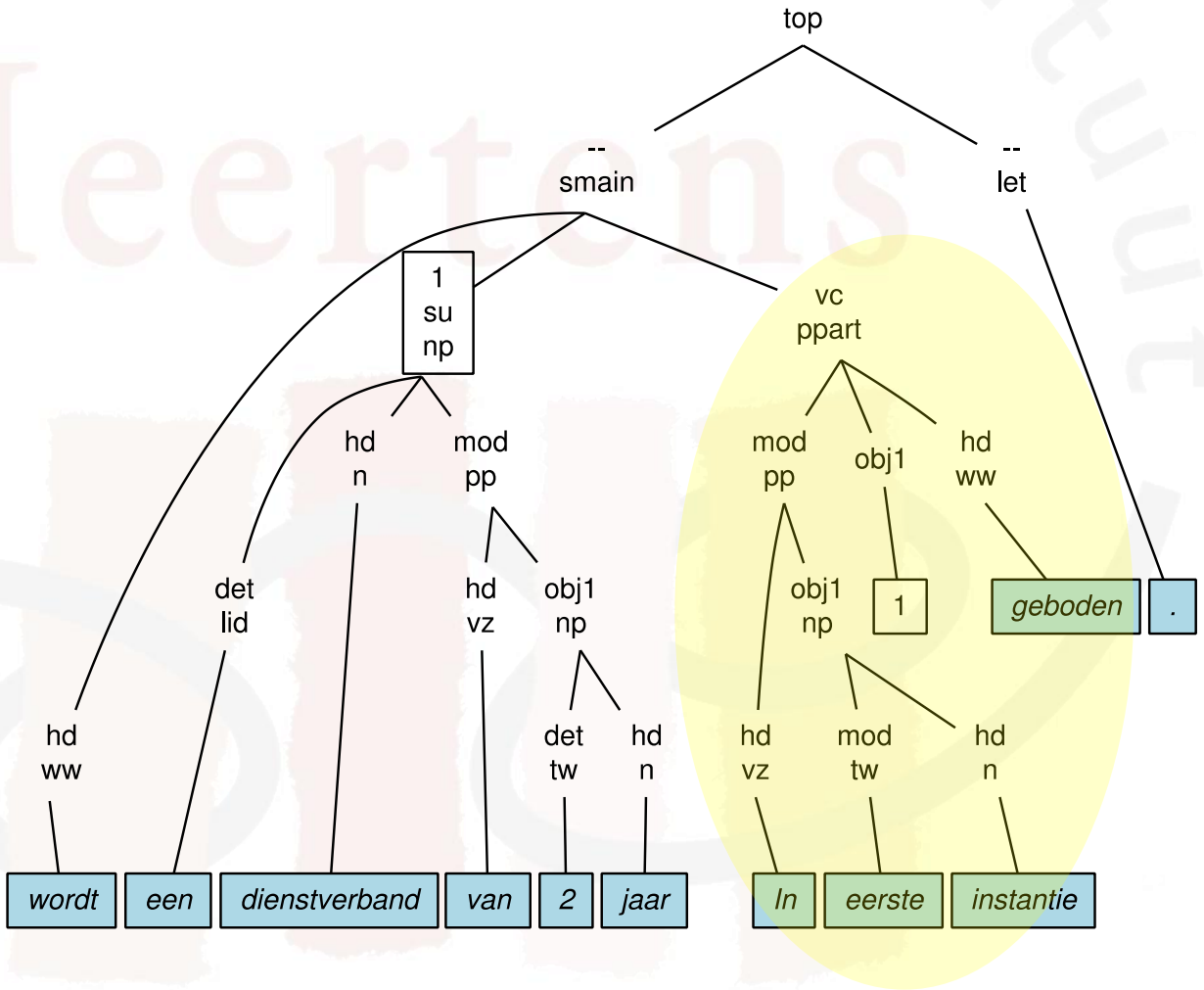
non-finite verb cluster

1 – Why surfacing?

1. Linguists need surface word order
   a. Scrambling
   b. Extraposition
   c. Information structure
   d. First-constituent research
   e. Verb-cluster order
2. Dependency structure sometimes obscures surface order
   a. Dependency → nice constituents
   b. Alpino: attributes for surface order
   c. Xpath/Xquery searches: huge challenge for linguists

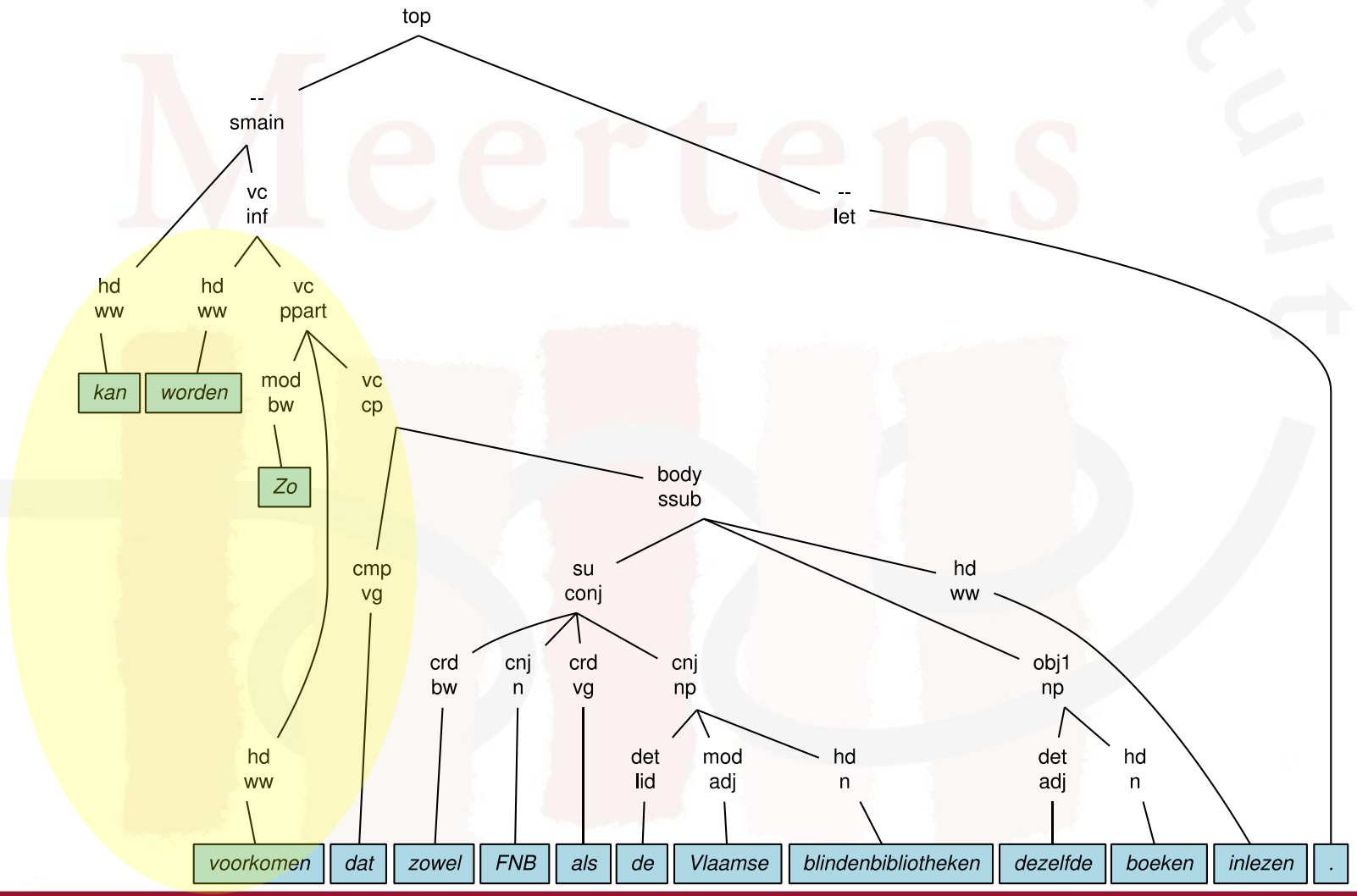
1 – Why surfacing?

Dependency structure obscures surface order:



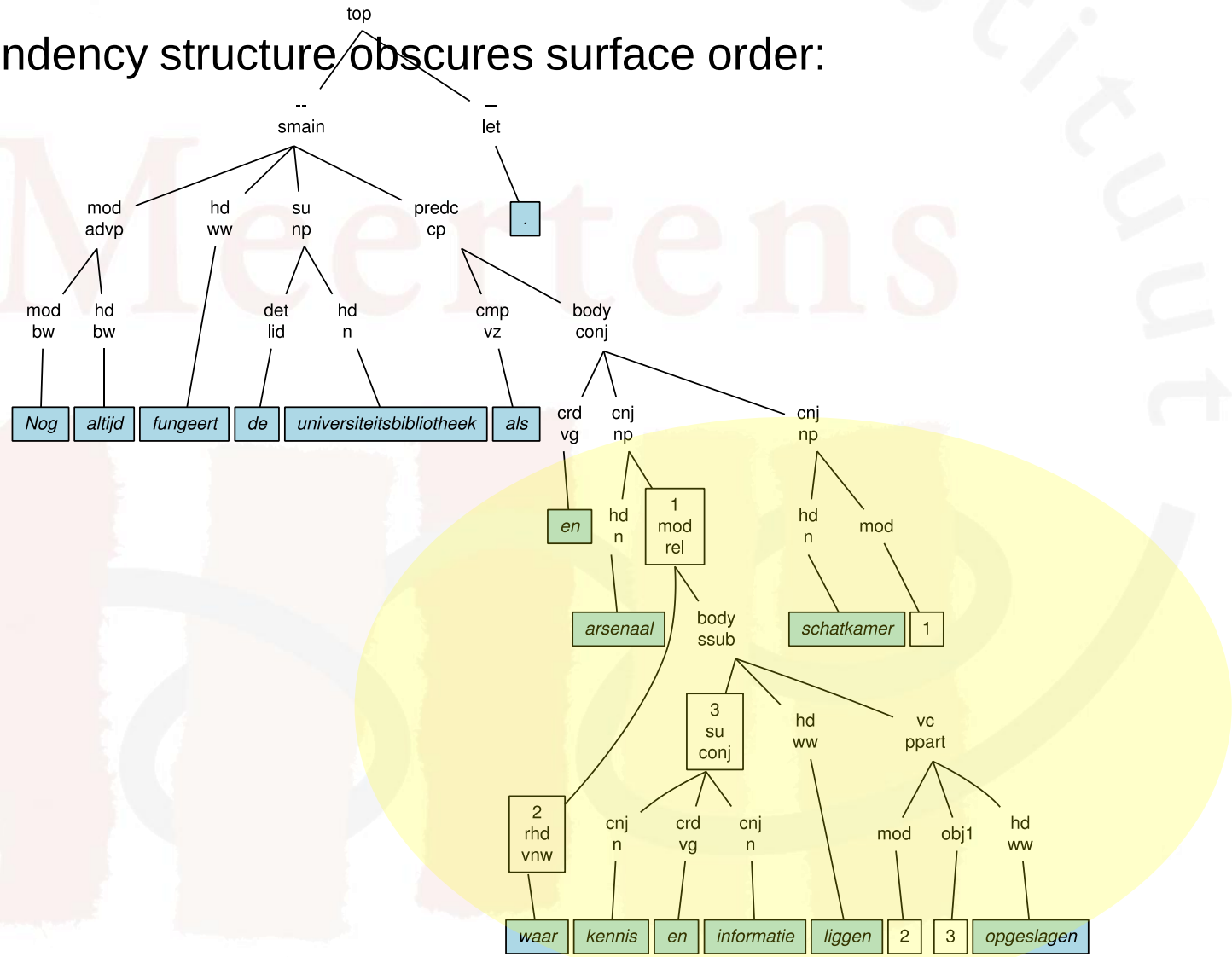
1 – Why surfacing?

Dependency structure obscures surface order:



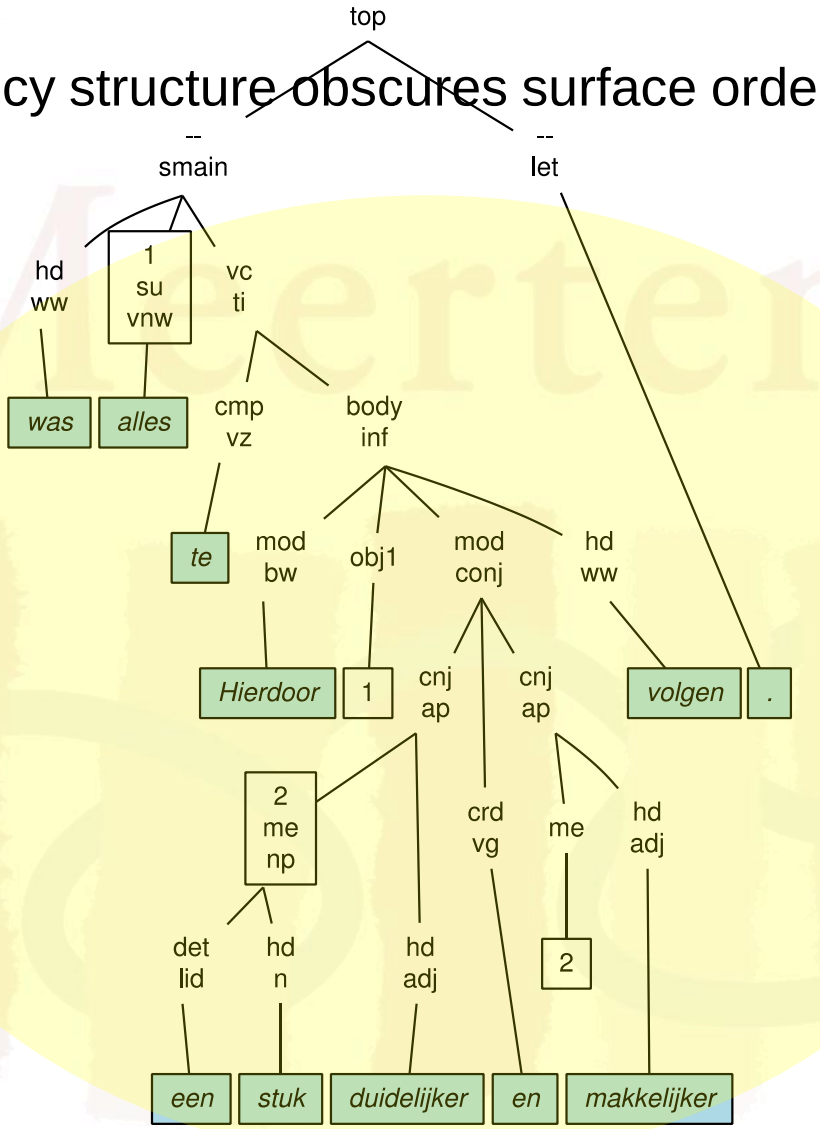
1 – Why surfacing?

Dependency structure obscures surface order:



1 – Why surfacing?

Dependency structure obscures surface order:



1 – Why surfacing?

1. Linguists need surface word order
   a. Scrambling
   b. Extraposition
   c. Information structure
   d. First-constituent research
   e. Verb-cluster order
2. Dependency structure obscures surface order
   a. Dependency → nice constituents
   b. Alpino: attributes for surface order
   c. Xpath/Xquery searches: huge challenge for linguists
3. Surfacing retains the dependency information
   a. Constituent-parse: surface order
   b. Split-constituents: retrievable

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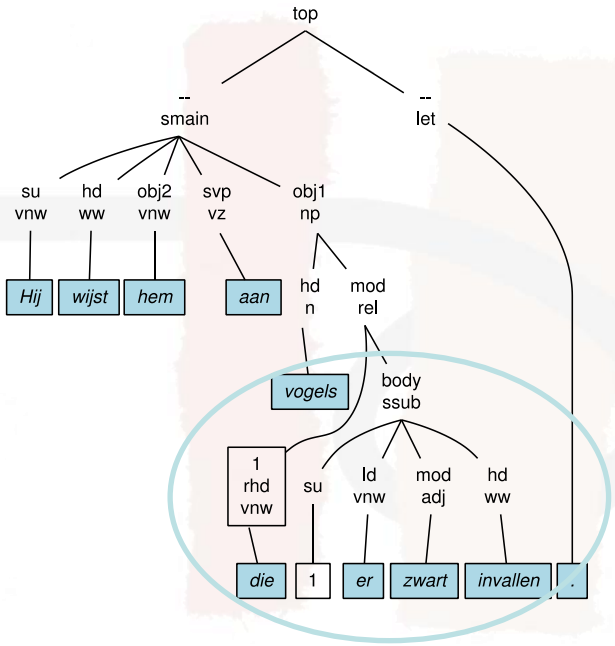
2 – Goal

1. Transform into surface-continuous constituents
   a. Split discontinuous constituents

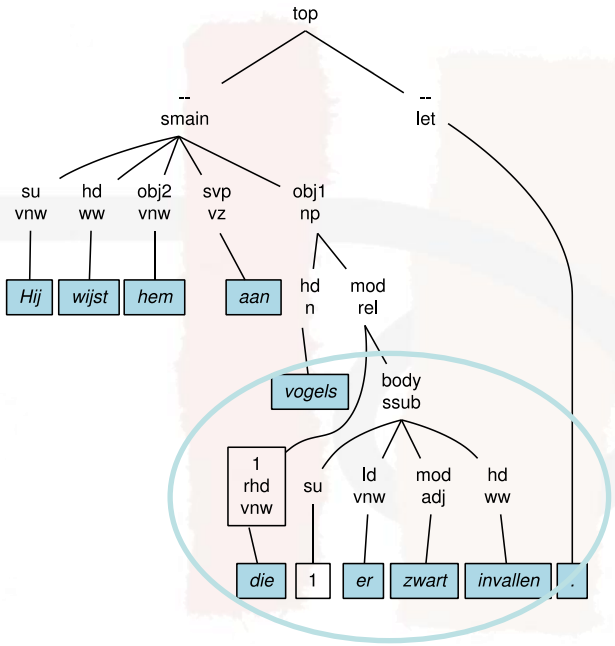


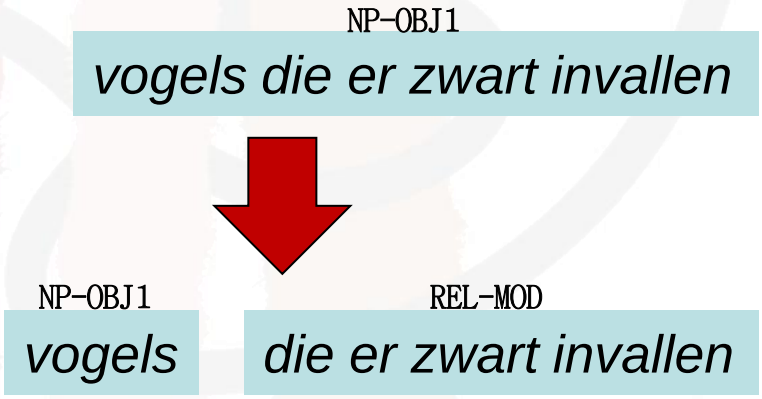
NP-OBJ1

vogels die er zwart invallen

2 – Goal

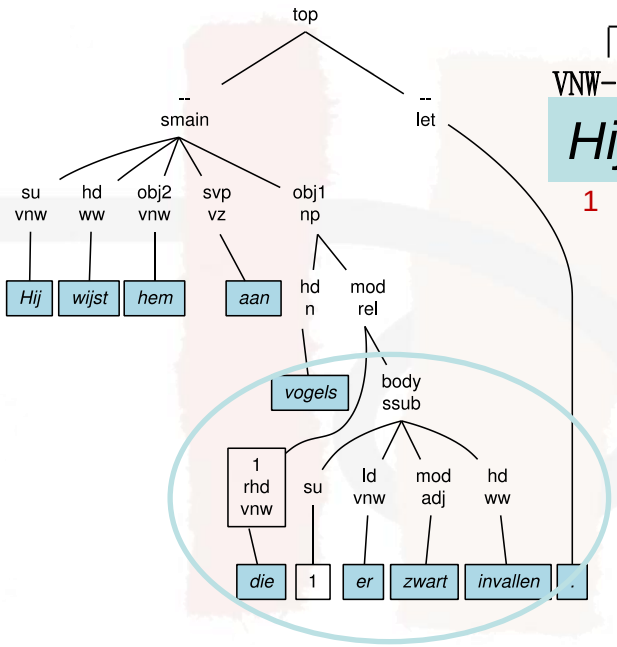
1. Transform into surface-continuous constituents
   a. Split discontinuous constituents
   b. Correct naming of parts

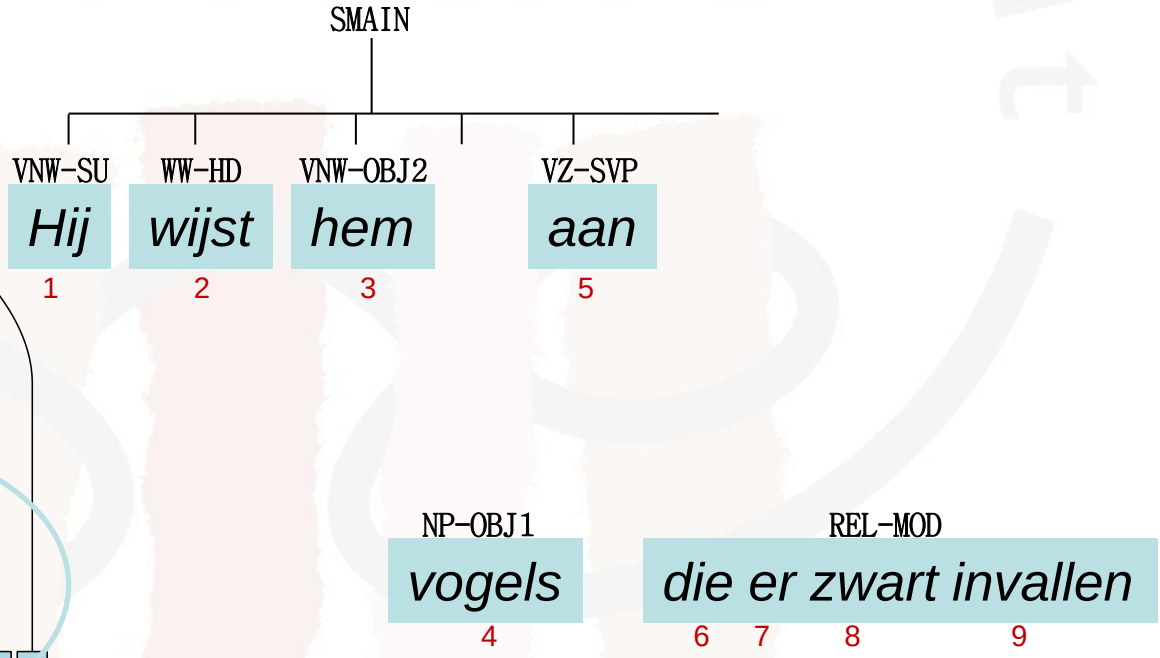




2 – Goal

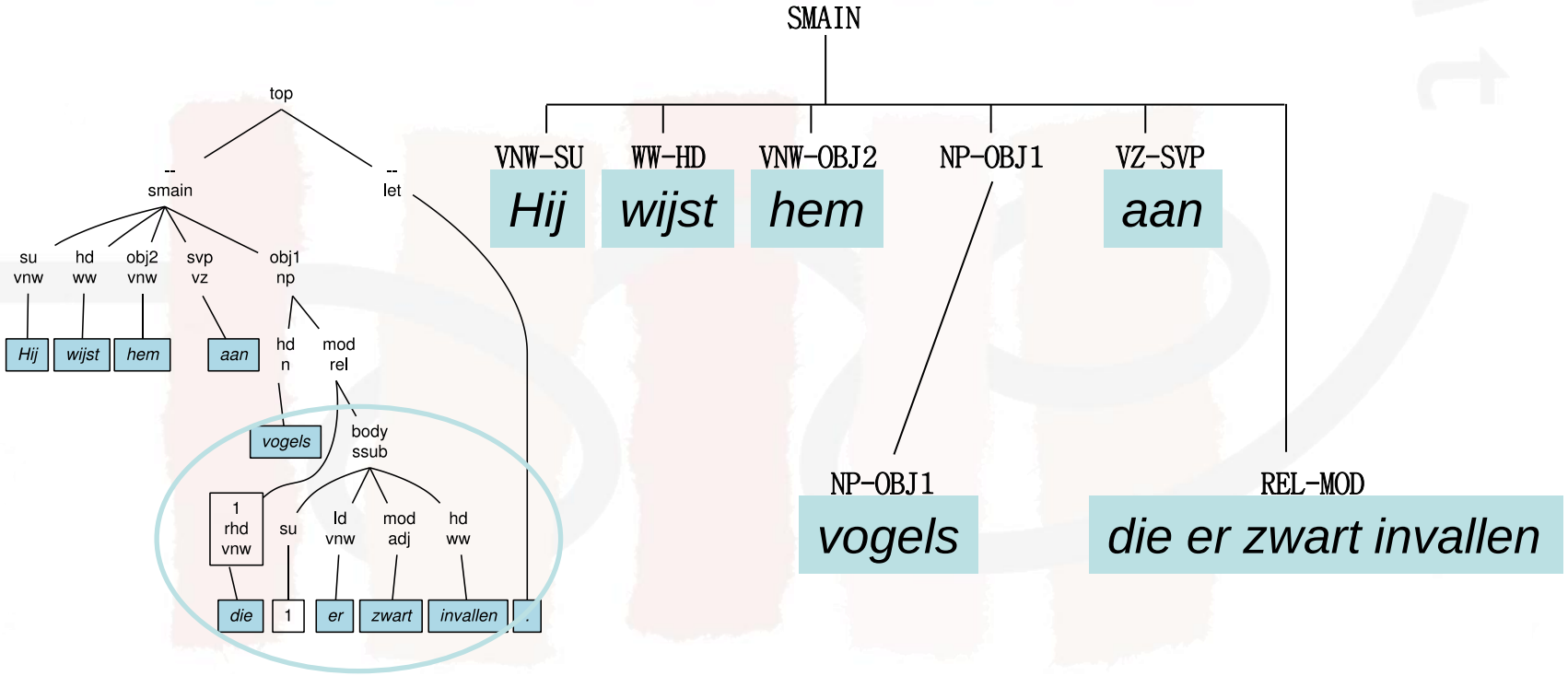
1. Transform into surface-continuous constituents
   a. Split discontinuous constituents
   b. Correct naming of parts
   c. Re-order parts





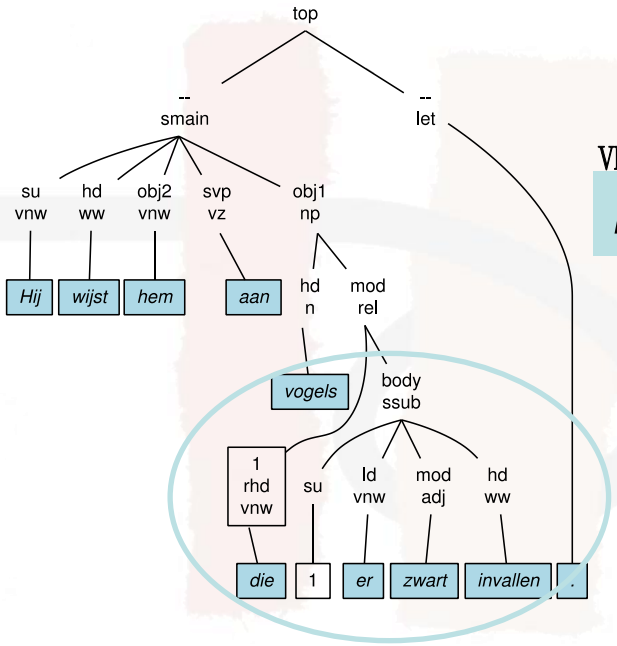
2 – Goal

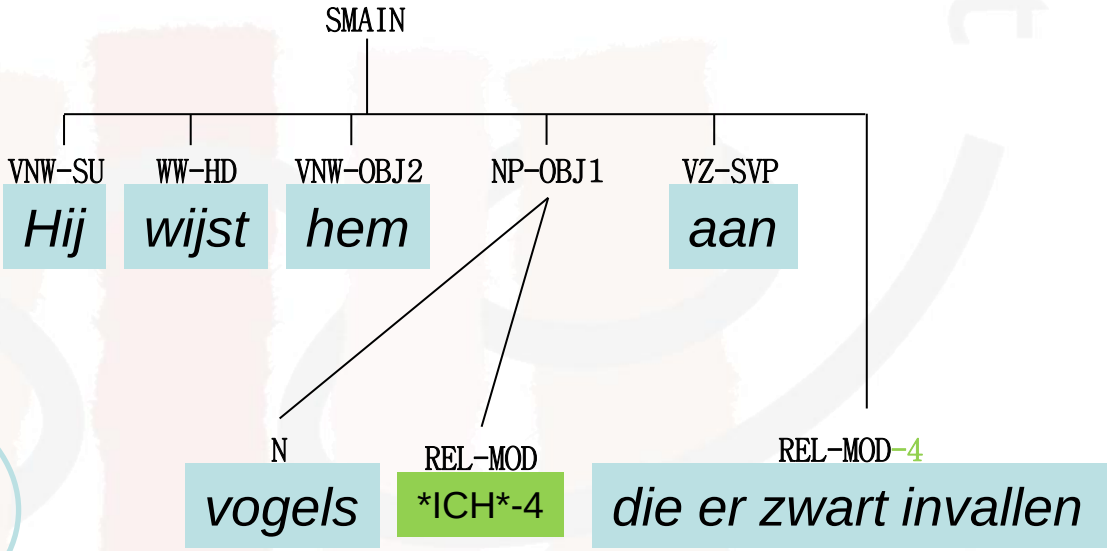
1. Transform into surface-continuous constituents
   a. Split discontinuous constituents
   b. Correct naming of parts
   c. Re-order parts
   d. Re-locate displaced parts



2 – Goal

1. Transform into surface-continuous constituents
   a. Split discontinuous constituents
   b. Correct naming of parts
   c. Re-order parts
   d. Re-locate displaced parts
   e. Leave markers in re-location and source





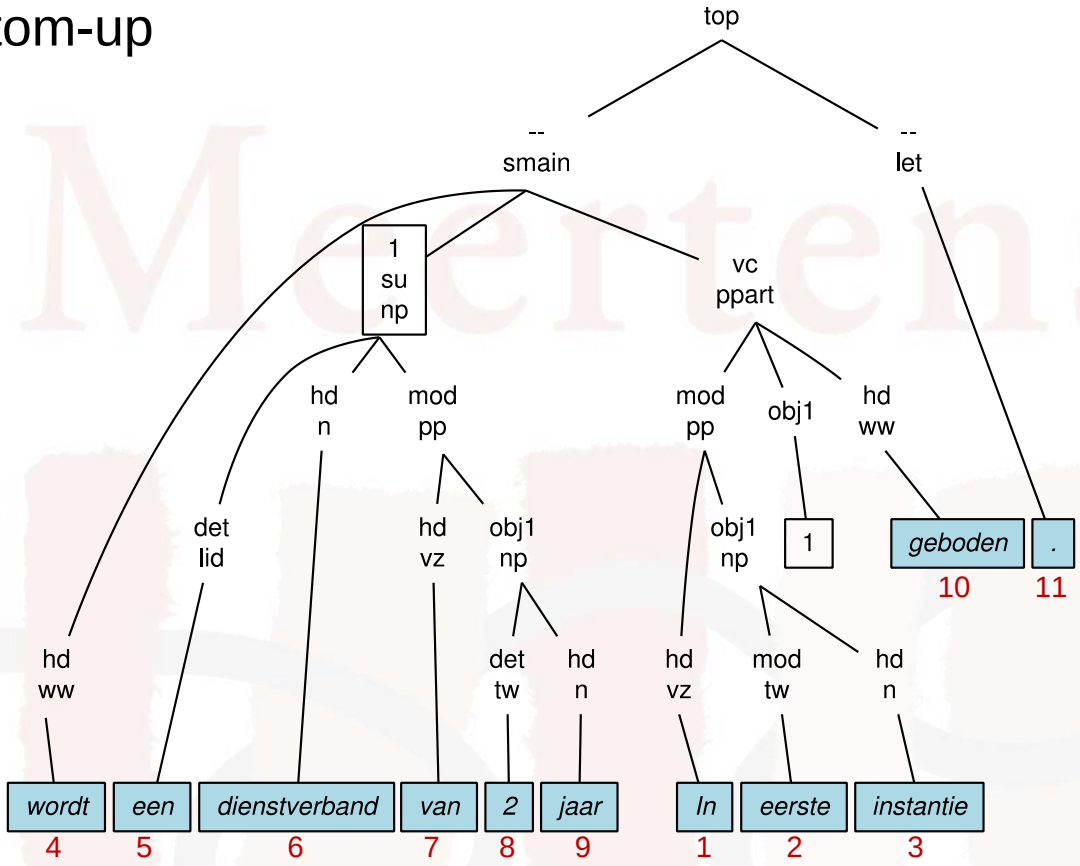
2 – Goal

1. Transform into uninterrupted constituents
   a. Split discontinuous constituents
   b. Correct naming of parts
   c. Re-order parts
   d. Re-locate displaced parts
   e. Leave markers in re-location sources
2. Retain dependency constituent information
   a. Referential link between re-location and source
   b. Re-located constituent: POS-*n*
   c. Source constituent: *ICH*-*n* child
      (Interpret Constituent Here)
      - Used successfully in historical English corpora
      - Allows retrieving the dependency constituents

Contents

3 – The algorithm

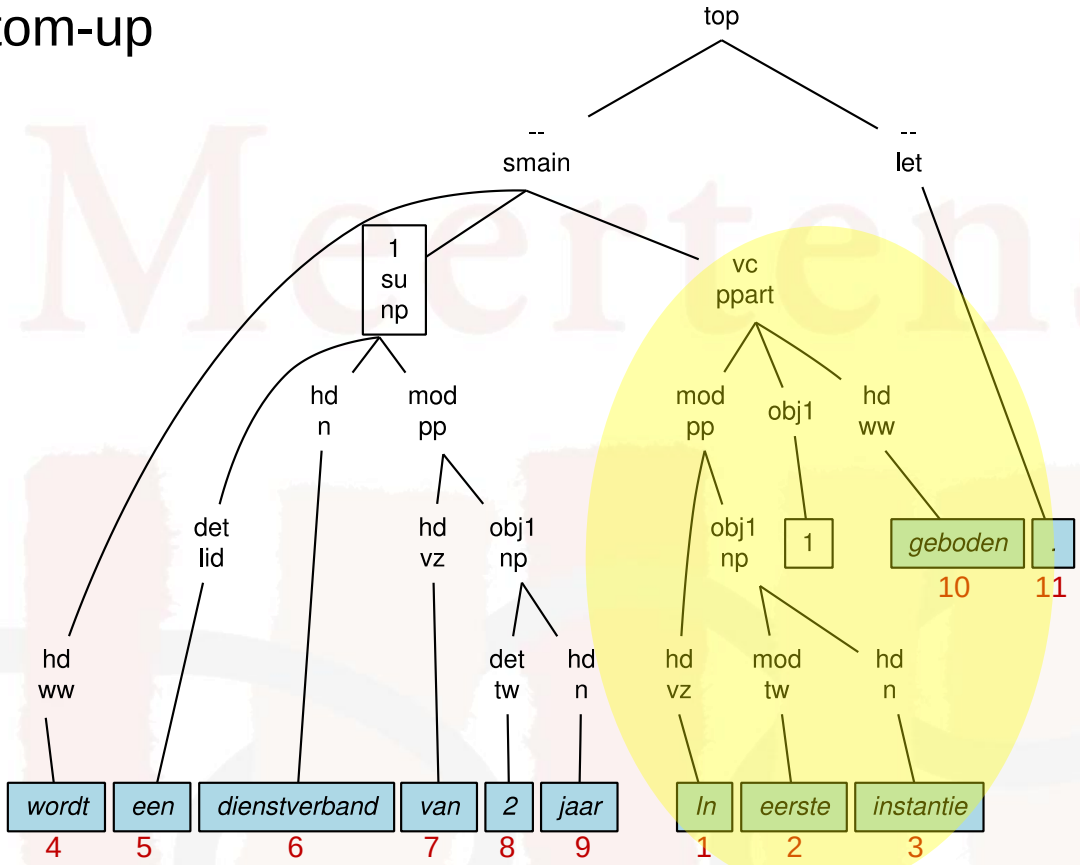
Bottom-up



in	eerste	instantie	wordt	een	dienstverband	van	2	jaar	geboden	.
1	2	3	4	5	6	7	8	9	10	11

3 – The algorithm

Bottom-up



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3 – The algorithm

Bottom-up

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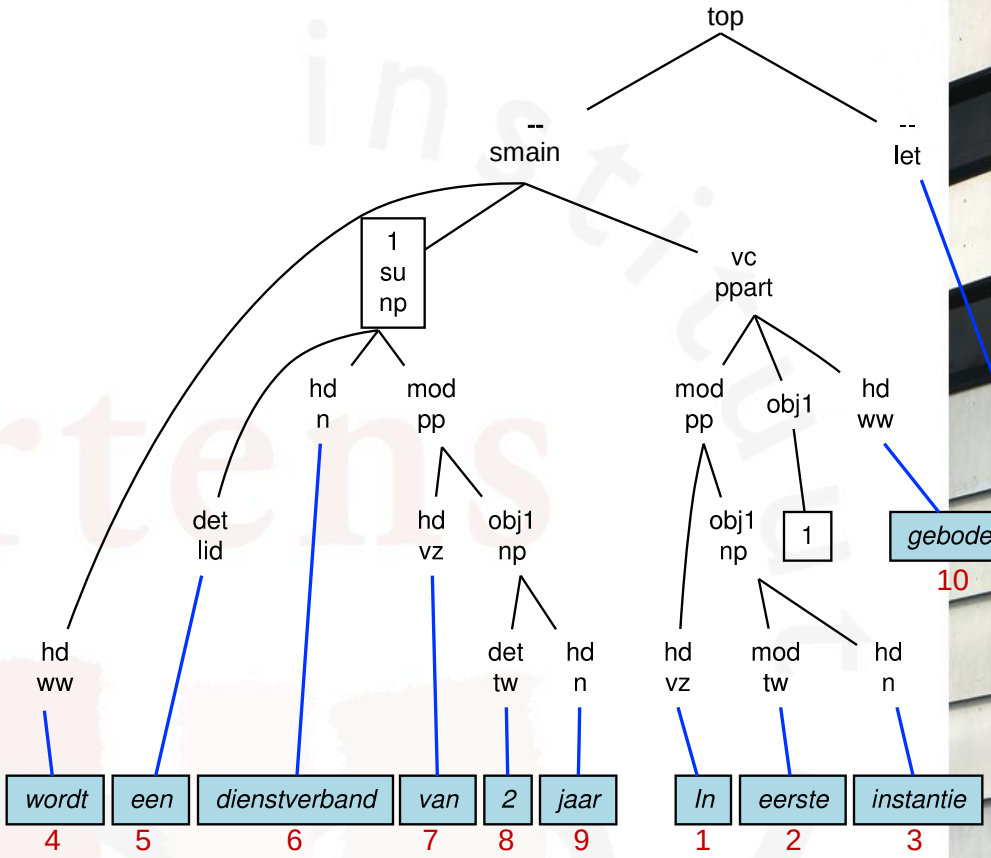
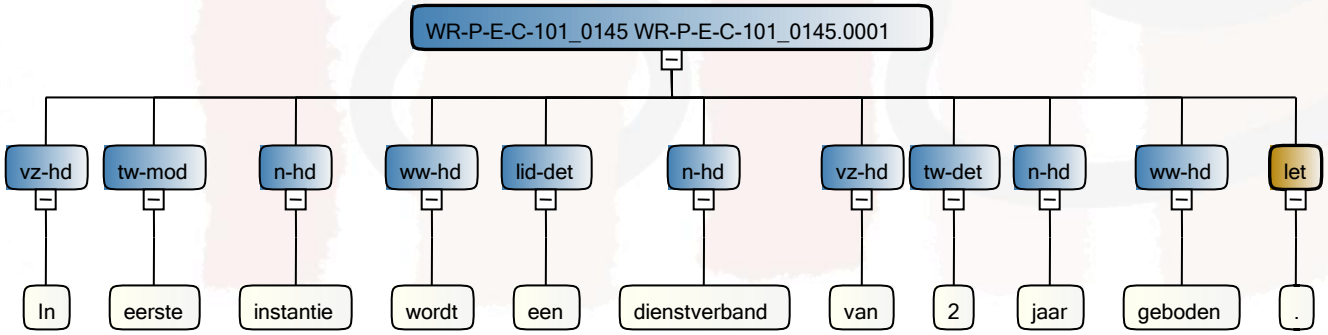


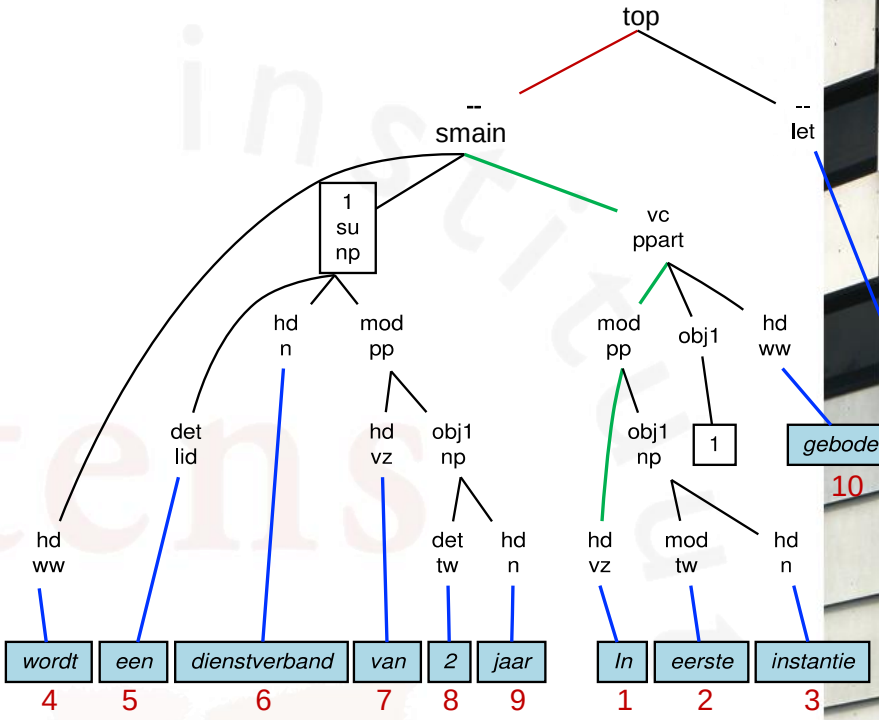


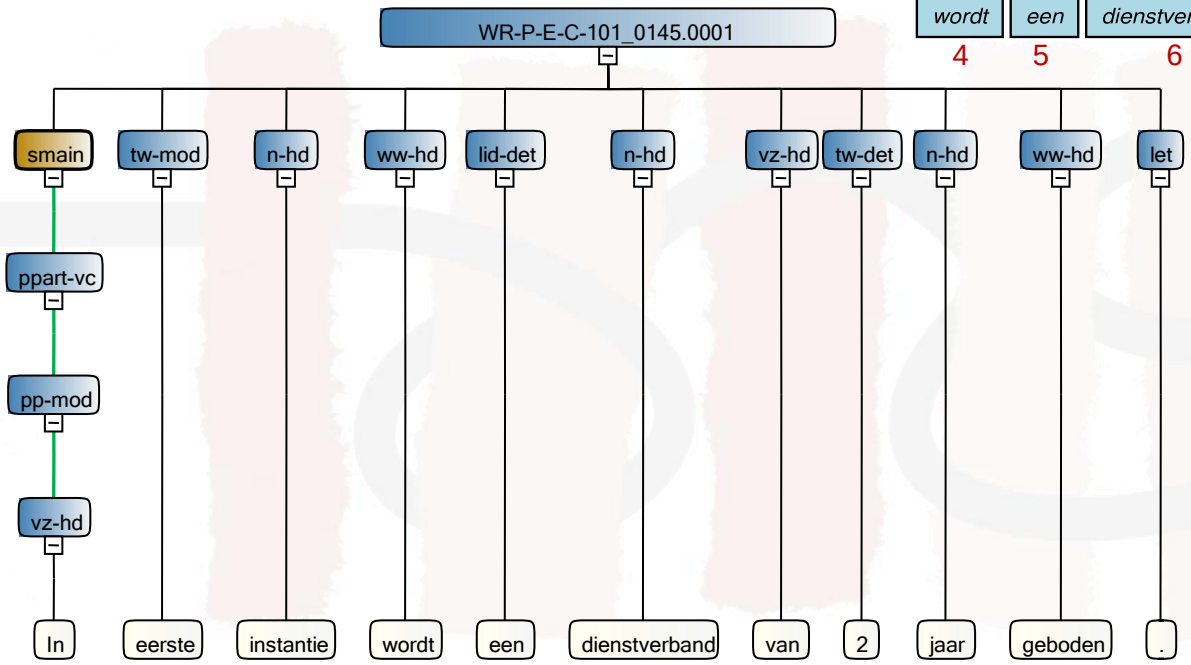
3 – The algorithm

Bottom-up

a. Copy + sort words

b. Treat word #1





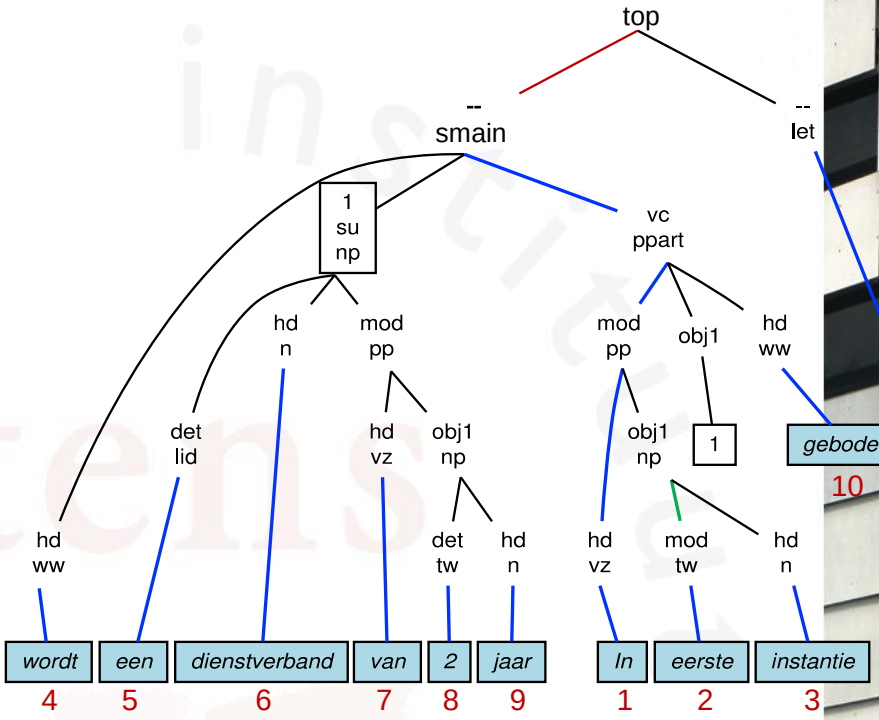
3 – The algorithm

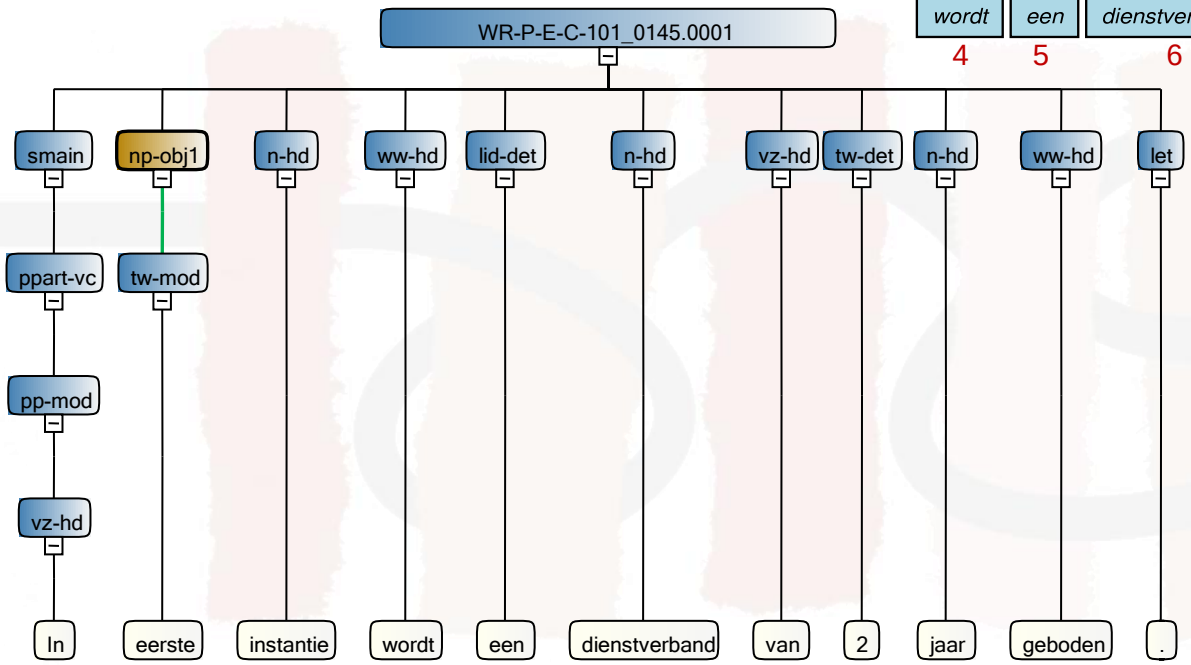
Bottom-up

a. Copy + sort words

b. Treat word #1, #2

#2: target parent [pp-mod]





3 – The algorithm

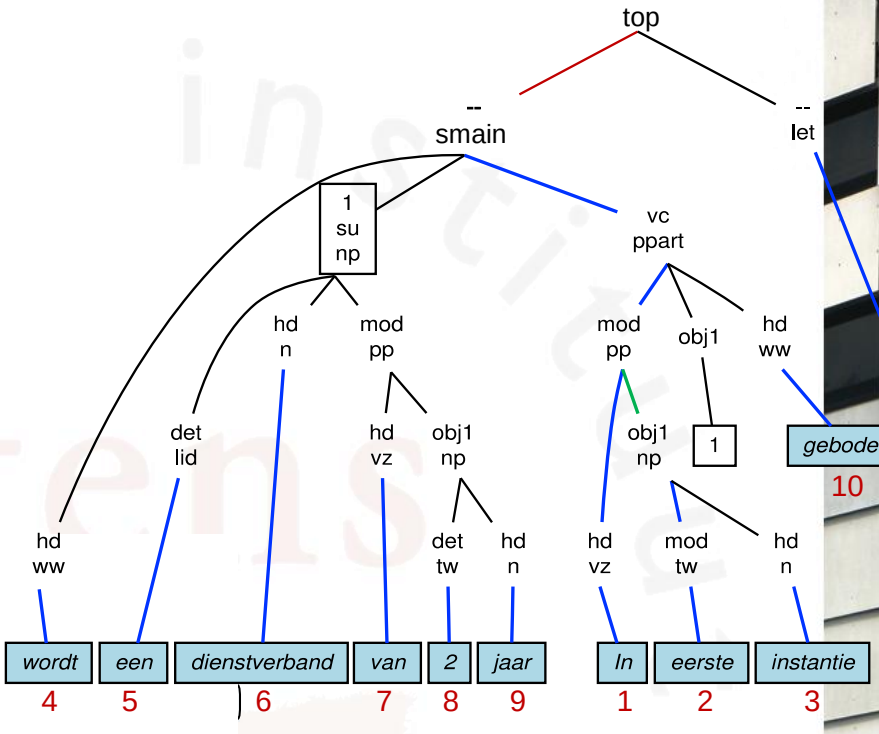
Bottom-up

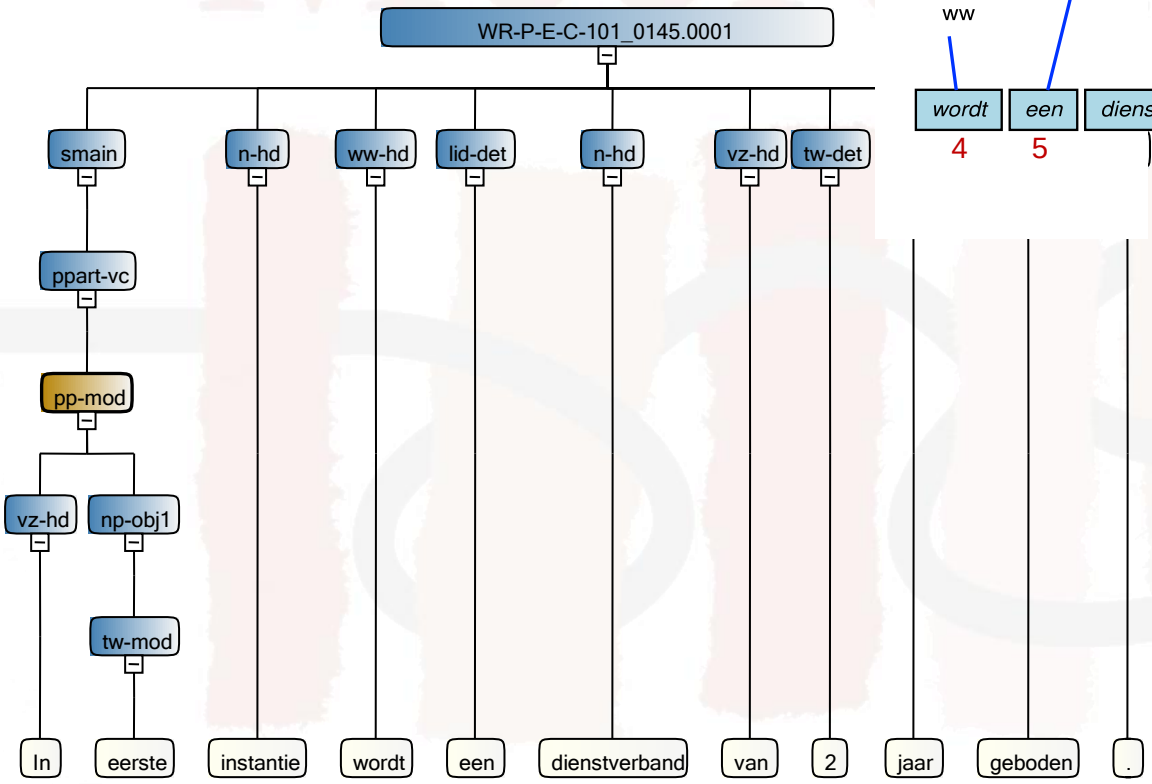
a. Copy + sort words

b. Treat word #1, #2

#2: target parent [pp-mod]

Chk: 1st word after target may not precede me



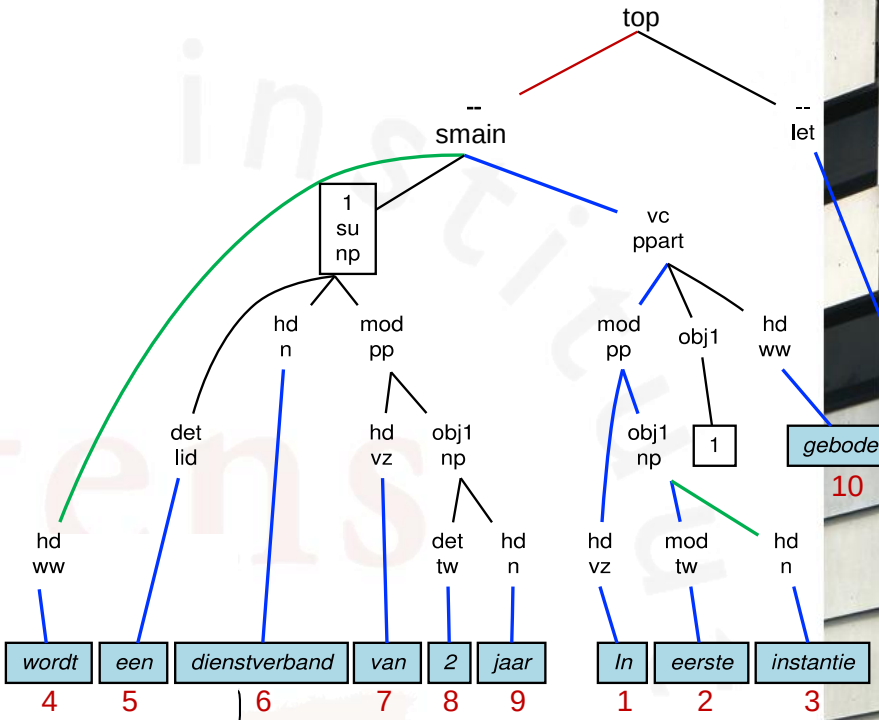


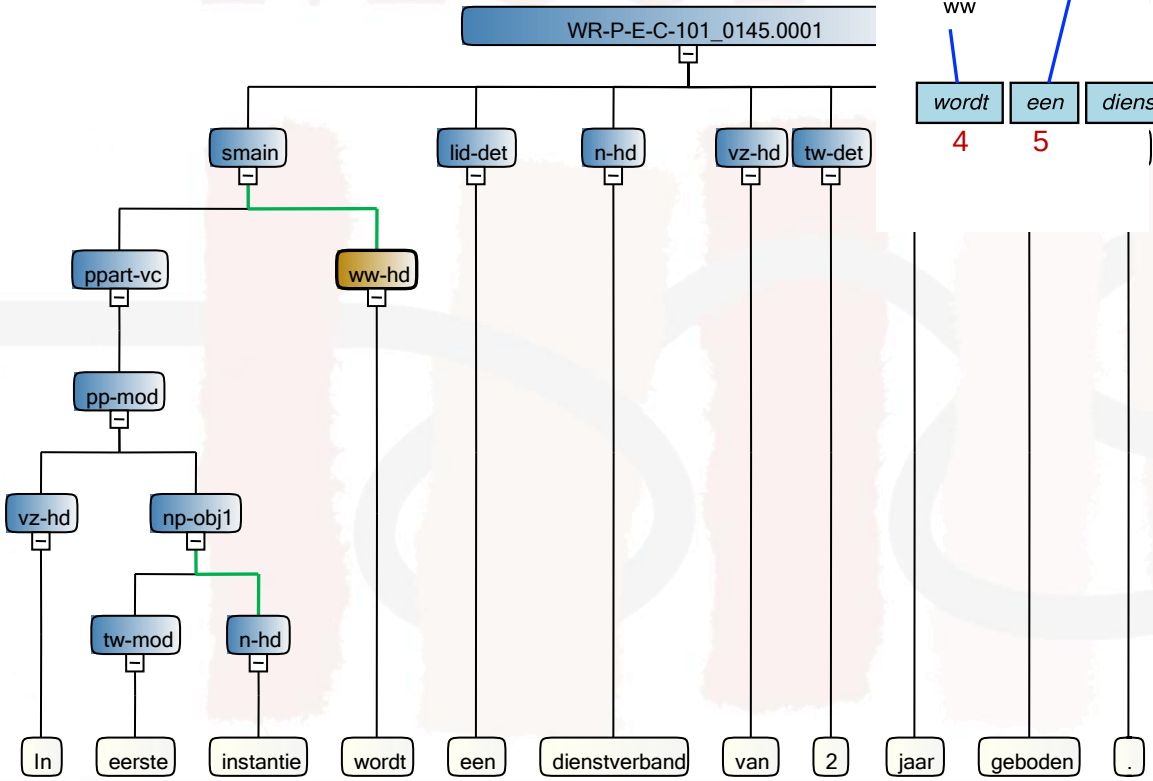
3 – The algorithm

Bottom-up

a. Copy + sort words

b. Treat word #1 … #4



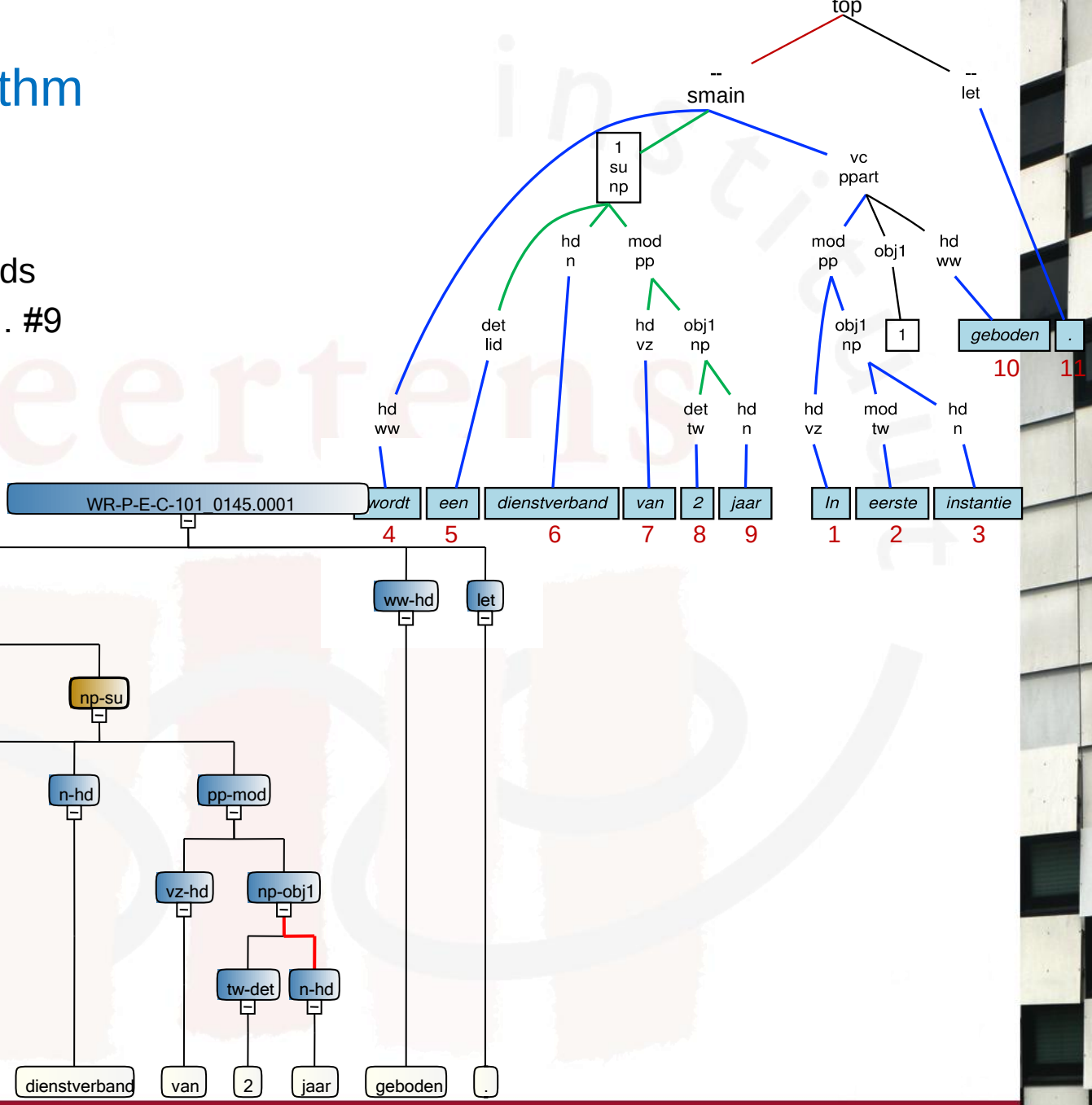


3 – The algorithm

Bottom-up

a. Copy + sort words

b. Treat word #1 … #9



3 – The algorithm

Bottom-up

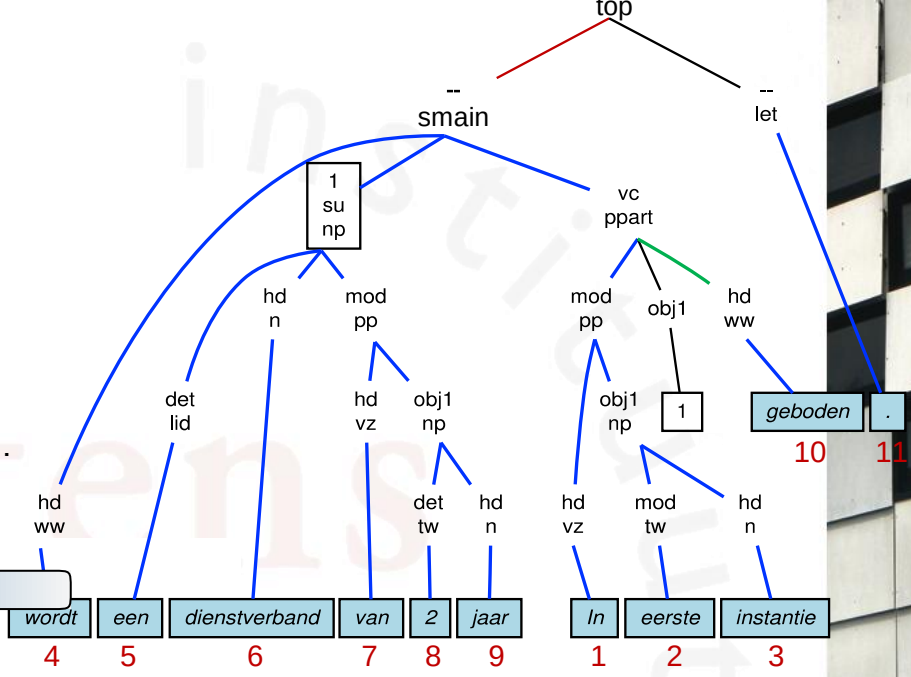
a. Copy + sort words, treat #1…#9

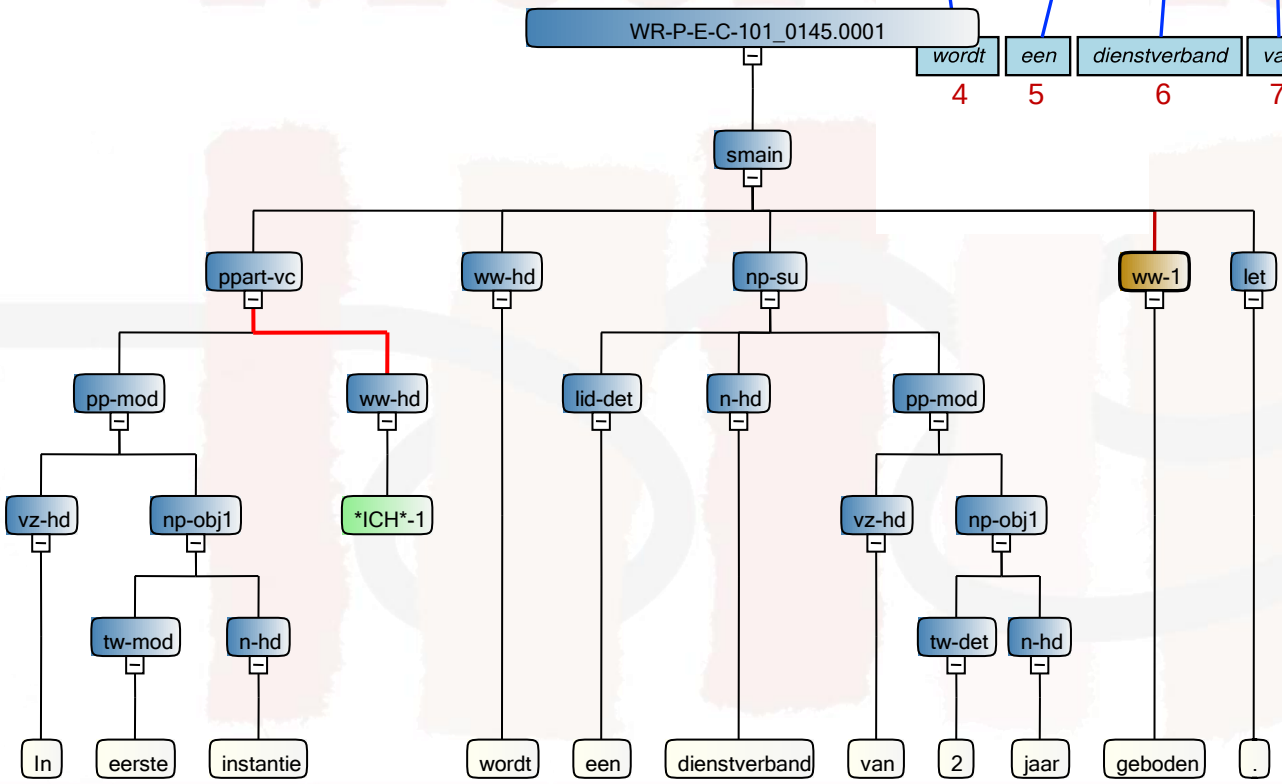
b. Word #10: under [ppart-vc]?

   a. Chk: 1st word after target may not precede me…

   b. Placeholder ICH-**1**

   c. Put [ww-**1**] 'lowest common ancestor'





3 – The algorithm

Bottom-up

a. Copy + sort words, treat #1…#9

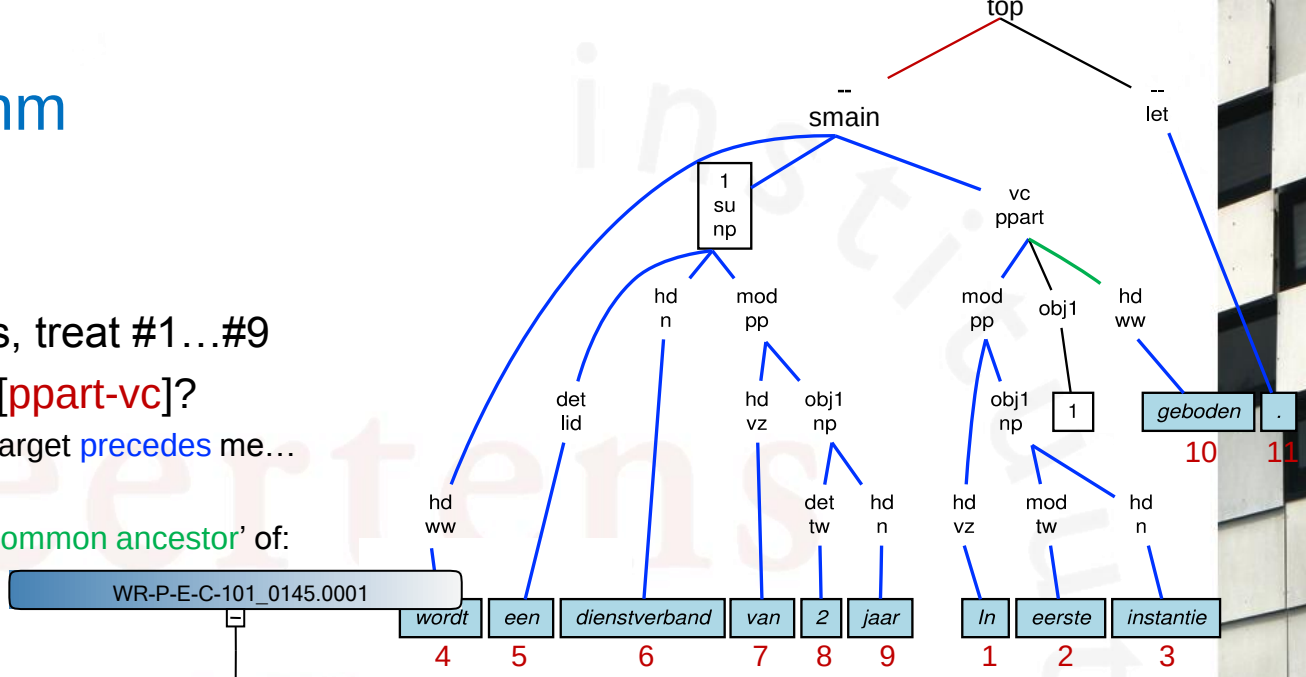
b. Word #10: under [ppart-vc]?

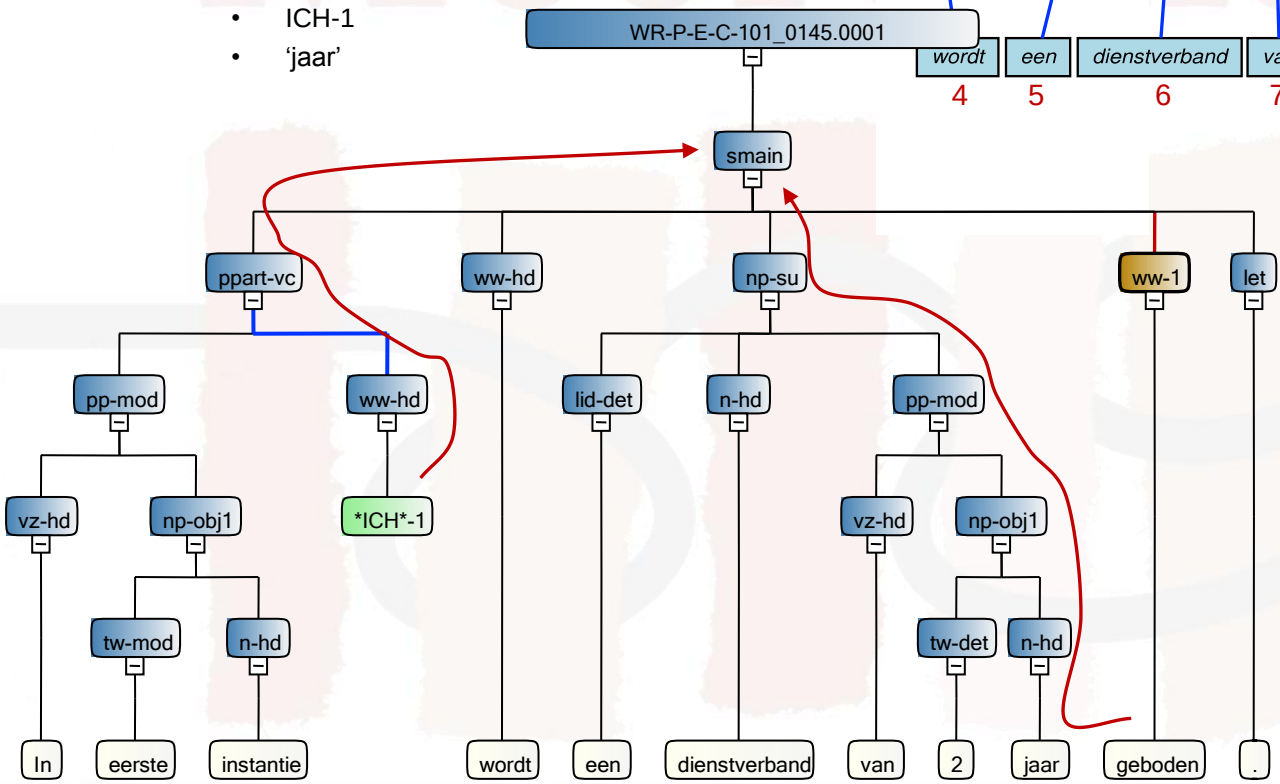
   a. Chk: 1st word after target precedes me…

   b. Placeholder ICH-**1**

   c. Put [ww-**1**] 'lowest common ancestor' of:

      - ICH-1
      - 'jaar'





3 – The algorithm

Bottom-up

a. Copy + sort words

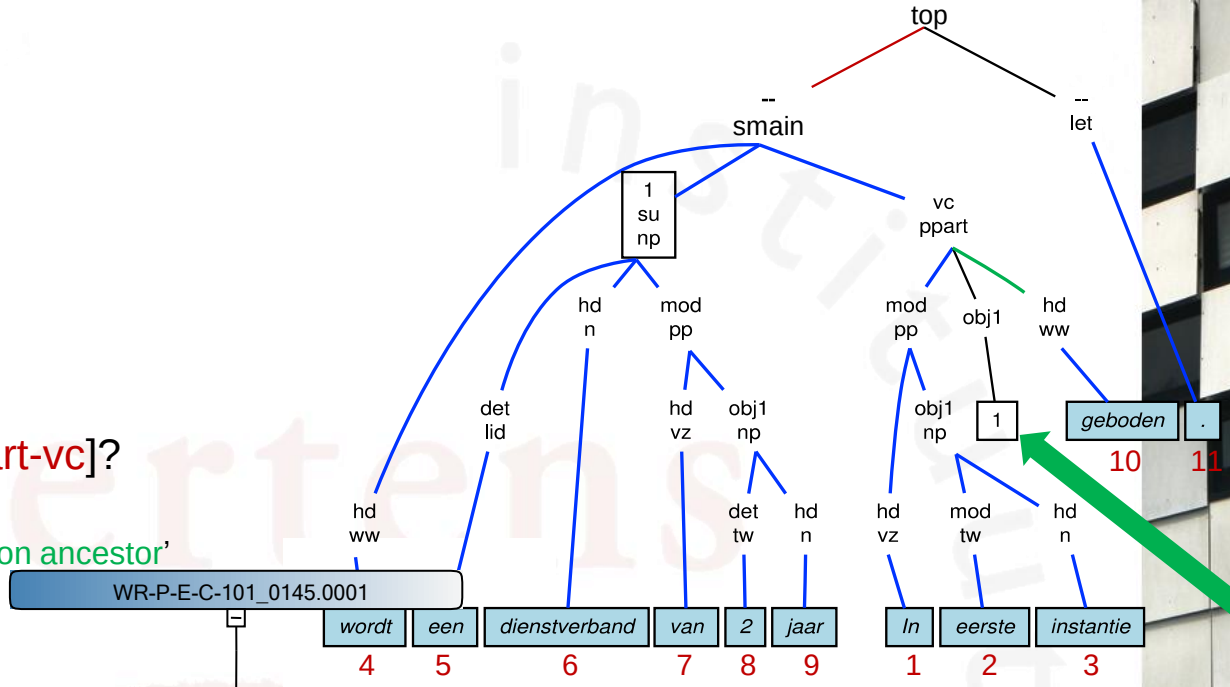
b. Treat word #1 … #9

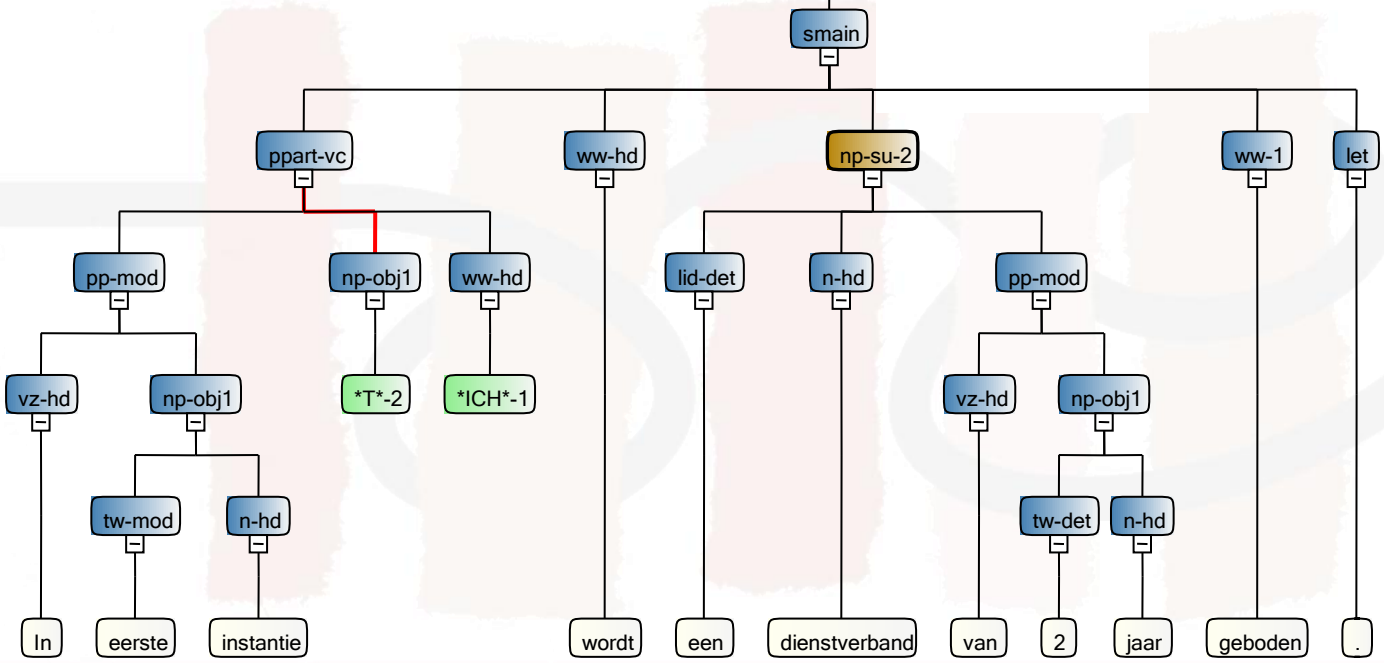
c. Word #10: under [ppart-vc]?

   a. Placeholder ICH-**1**

   b. Put [ww-**1**] 'lowest common ancestor'

d. Trace 'obj1' → 'np-su'





3 – The algorithm

Bottom-up: *summary*

1. Copy and sort words: source → destination
2. Mark non-words as "not done" in source
3. Treat each word in source:
    i. Consider each constituent above *source.word* (until but not including the *top*)
    ii. IF constituent has not been done yet
        i. Insert constituent above
        ii. Remember location of constituent in destination
    iii. ELSE
        i. target = corresponding parent of constituent in destination
        ii. IF "1st word after 'target' does not precede word"
            i. Append constituent under target
        iii. ELSE
            i. Append *ICH*-*n* placeholder under target
            ii. Append constituent under common ancestor of
                i. target and
                ii. last word in destination that precedes word
4. Treat all 'traces' (constituents not dominating a word)
5. Treat all punctuation

Contents

4 – The implementation

1. Alpino to Psdx conversion
   a. Part of “Cesax” → http://erwinkomen.ruhosting.nl

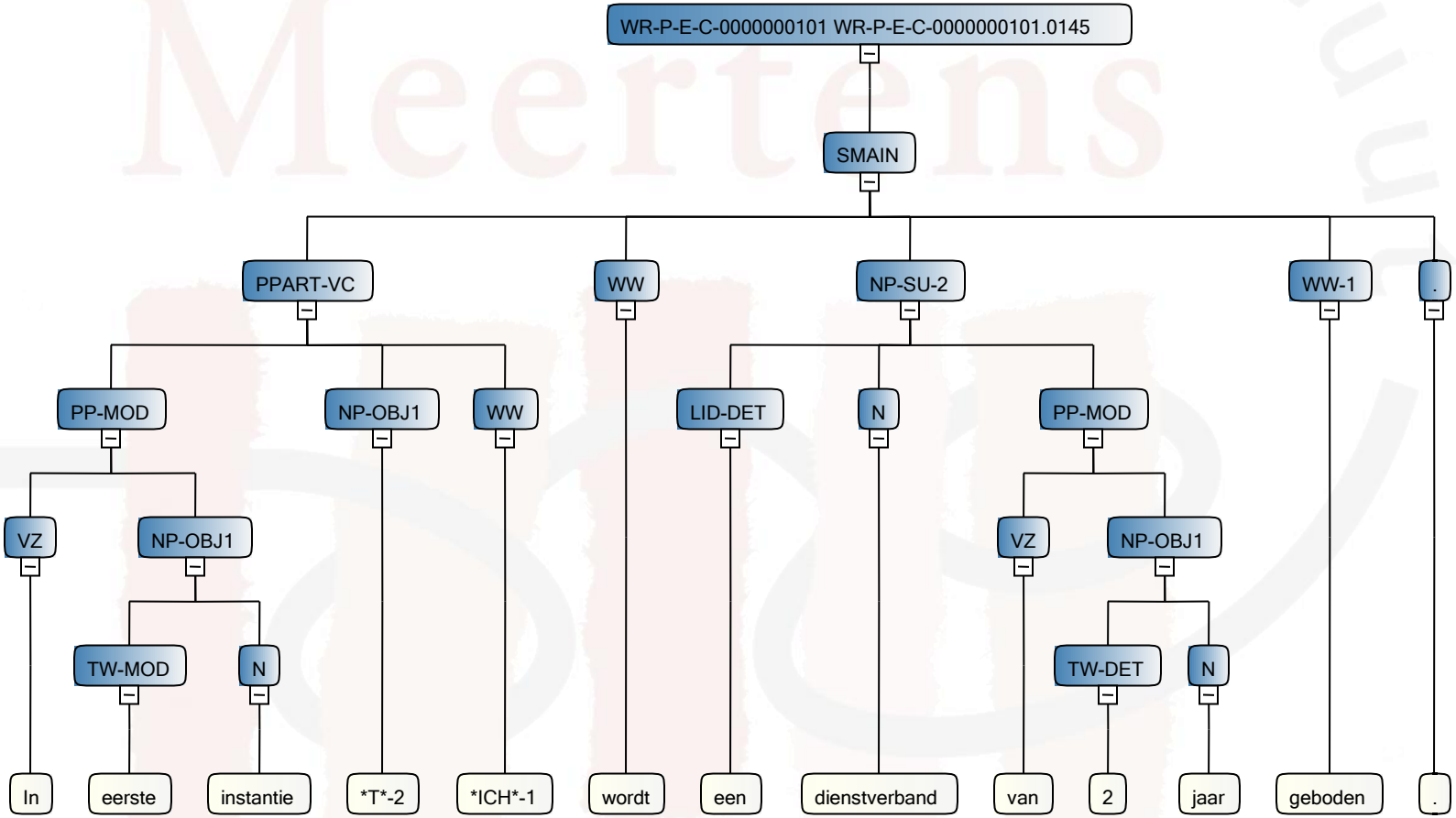
4 – The implementation

1. Alpino to Psdx conversion
   a. Part of “Cesax” → http://erwinkomen.ruhosting.nl
2. Alpino to FoLiA conversion
   a. Stand-alone C#
      - Run by ‘mono’ on Windows, Mac, Linux
      - Github → http://github.com/ErwinKomen/FoliaParse
   b. Alpino: Sonar500 part of Lassy-Groot
   c. FoLiA: standard for ‘Nederlab’
   d. Performance:

Part	Measure
Section	WR-P-E-C_e-magazines
Files	18875
Size tagged FoLiA	3.2 Gb
Processor	Intel Xeon 1.80 GHz, 128 Gb
Time	6 h, 24 m

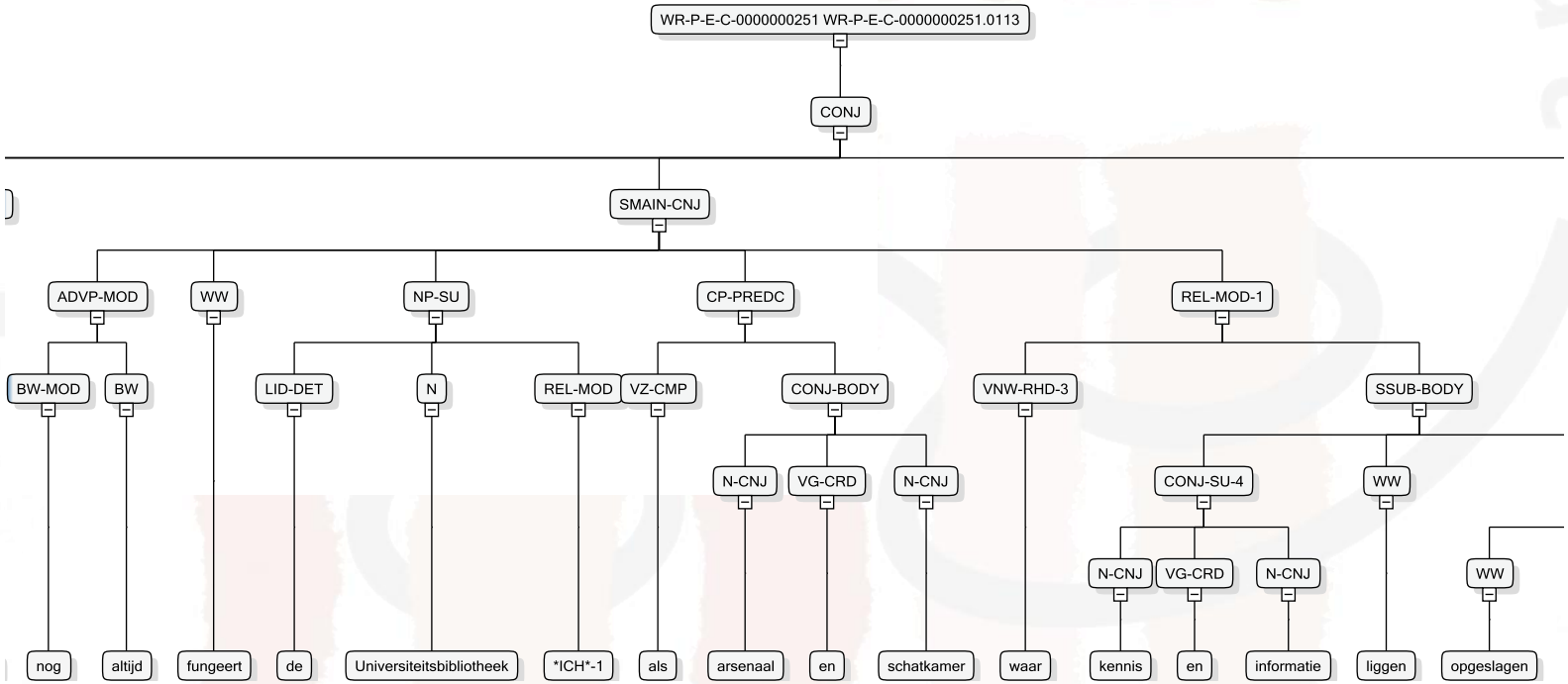
4 – The implementation

Resulting trees:



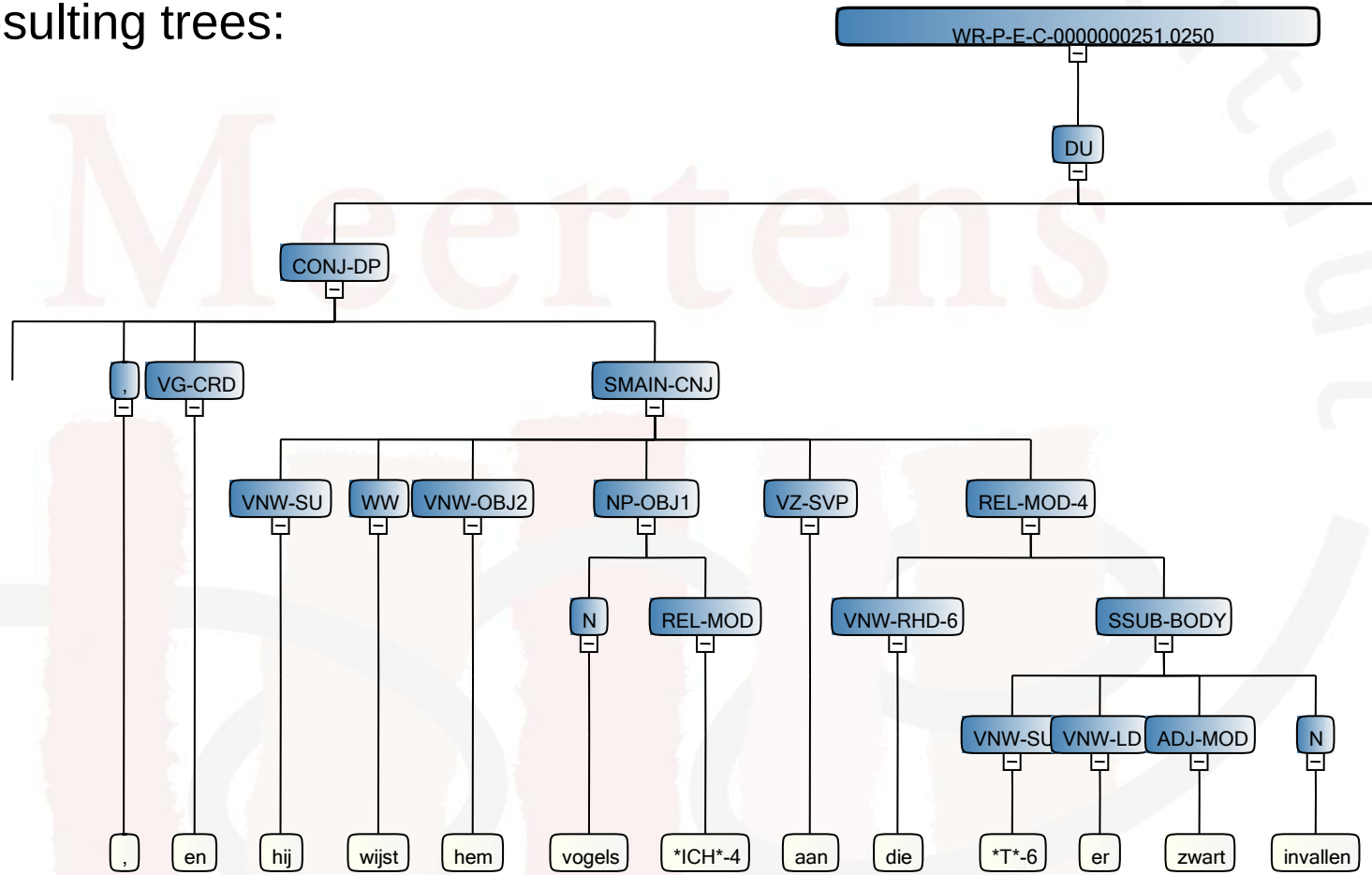
4 – The implementation

Resulting trees:



4 – The implementation

Resulting trees:



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      - First-constituent research
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