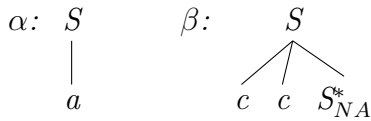


Parsing Beyond CFG

Homework 5: TAG parsing and TAG extraction

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Question 1 Consider a TAG with only the following two trees:



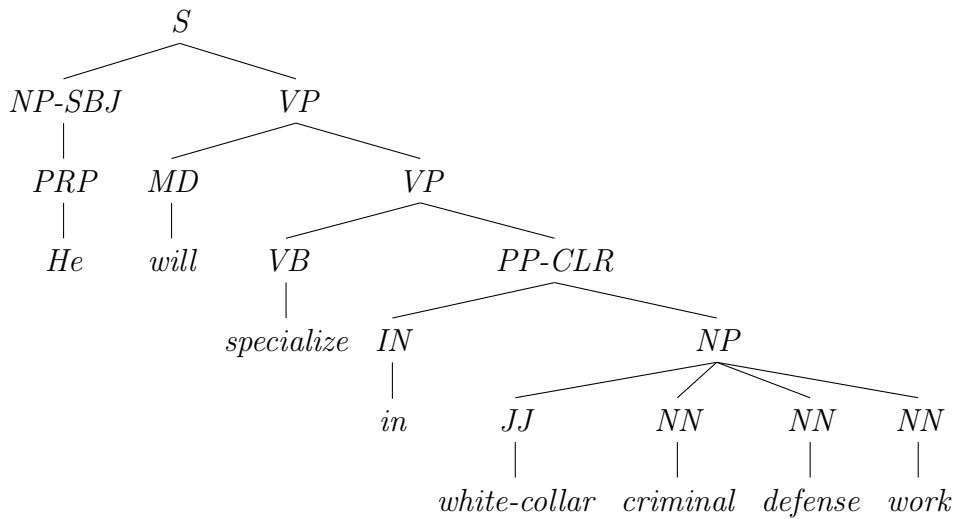
Fill in the missing items in the following trace of an Earley parsing of the input *cca* (only successful items).

<i>id</i>	<i>item</i>	<i>rule, antecedents</i>
1	$[\alpha, \varepsilon, la, 0, -, -, 0, 0]$	<i>initialize</i>
2		<i>predictAdjoinable 1</i>
3	$[\beta, \varepsilon, lb, 0, -, -, 0, 0]$	<i>predictNoAdj 2</i>
4	$[\beta, 1, la, 0, -, -, 0, 0]$	<i>MoveDown 3</i>
5		<i>ScanTerm 4</i>
6	$[\beta, 2, la, 0, -, -, 1, 0]$	<i>MoveRight 5</i>
7	$[\beta, 2, ra, 0, -, -, 2, 0]$	<i>ScanTerm 6</i>
8		<i>MoveRight 7</i>
9	$[\beta, 3, lb, 2, -, -, 2, 0]$	<i>PredictNoAdj 8</i>
10		<i>PredictAdjoined 9</i>
11	$[\alpha, 1, la, 2, -, -, 2, 0]$	<i>MoveDown 10</i>
12	$[\alpha, 1, ra, 2, -, -, 3, 0]$	<i>ScanTerm 11</i>
13	$[\alpha, \varepsilon, rb, 2, -, -, 3, 0]$	<i>MoveUp 12</i>
14		<i>CompleteFoot 9, 13</i>
15		<i>CompleteNode 14, 8</i>
16	$[\beta, \varepsilon, rb, 0, 2, 3, 3, 0]$	<i>MoveUp 15</i>
17	$[\beta, \varepsilon, ra, 0, 2, 3, 3, 0]$	<i>CompleteNode 16, 2</i>
18		<i>Adjoin 17, 13</i>
19		<i>CompleteNode 18, 1</i>

Solution:

<i>id</i>	<i>item</i>	<i>rule, antecedents</i>
1	$[\alpha, \varepsilon, la, 0, -, -, 0, 0]$	<i>initialize</i>
2	$[\beta, \varepsilon, la, 0, -, -, 0, 0]$	<i>predictAdjoinable 1</i>
3	$[\beta, \varepsilon, lb, 0, -, -, 0, 0]$	<i>predictNoAdj 2</i>
4	$[\beta, 1, la, 0, -, -, 0, 0]$	<i>MoveDown 3</i>
5	$[\beta, 1, ra, 0, -, -, 1, 0]$	<i>ScanTerm 4</i>
6	$[\beta, 2, la, 0, -, -, 1, 0]$	<i>MoveRight 5</i>
7	$[\beta, 2, ra, 0, -, -, 2, 0]$	<i>ScanTerm 6</i>
8	$[\beta, 3, la, 0, -, -, 2, 0]$	<i>MoveRight 7</i>
9	$[\beta, 3, lb, 2, -, -, 2, 0]$	<i>PredictNoAdj 8</i>
10	$[\alpha, \varepsilon, lb, 2, -, -, 2, 0]$	<i>PredictAdjoined 9</i>
11	$[\alpha, 1, la, 2, -, -, 2, 0]$	<i>MoveDown 10</i>
12	$[\alpha, 1, ra, 2, -, -, 3, 0]$	<i>ScanTerm 11</i>
13	$[\alpha, \varepsilon, rb, 2, -, -, 3, 0]$	<i>MoveUp 12</i>
14	$[\beta, 3, rb, 2, 2, 3, 3, 0]$	<i>CompleteFoot 9, 13</i>
15	$[\beta, 3, ra, 0, 2, 3, 3, 0]$	<i>CompleteNode 14, 8</i>
16	$[\beta, \varepsilon, rb, 0, 2, 3, 3, 0]$	<i>MoveUp 15</i>
17	$[\beta, \varepsilon, ra, 0, 2, 3, 3, 0]$	<i>CompleteNode 16, 2</i>
18	$[\alpha, \varepsilon, rb, 0, -, -, 3, 1]$	<i>Adjoin 17, 13</i>
19	$[\alpha, \varepsilon, ra, 0, -, -, 3, 0]$	<i>CompleteNode 18, 1</i>

Question 2 Consider the following tree, taken from the PTB.



Assume that we have the following head and modifier finding rules:

Head percolation table:

parent node	search direction	head candidates
s	left-to-right	vp
pp-clr	left-to-right	in
np	right-to-left	nn nns
vp	left-to-right	vp vb

If no head can be found, the leftmost child is chosen as a default.

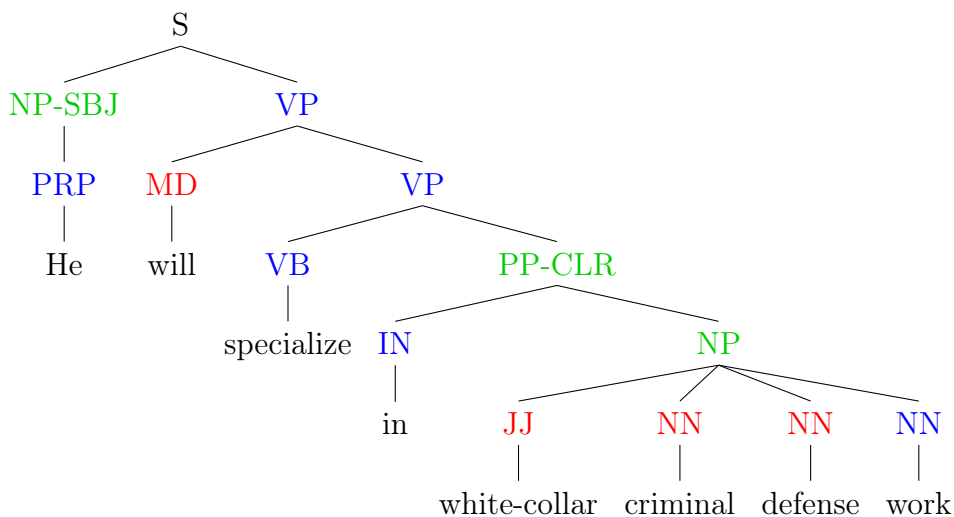
Modifier rules:

parent node	modifier nodes
s	pp pp-loc adv advp s-mnr
np	cc vbg jj jjs adjp nn np
vp	md
pp-clr	advp

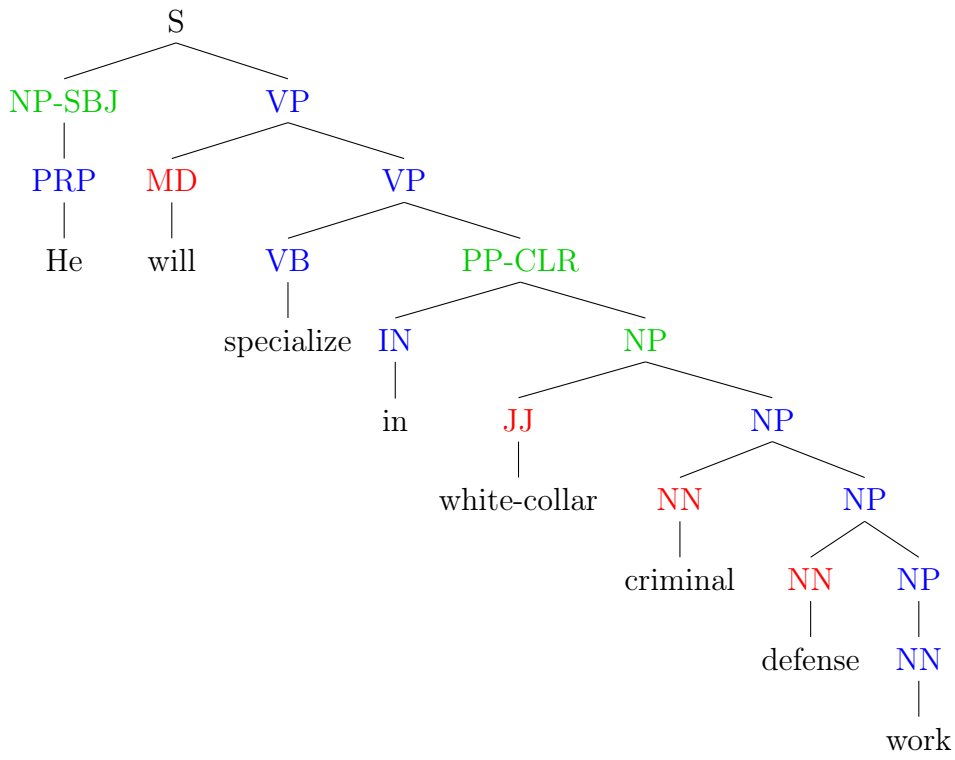
1. Mark *heads*, *modifiers* and *arguments* in the tree, based on these tables.
2. Add the further bracketings necessary for supertag extraction according to the algorithm based on Xia (1999).
3. Which are the supertags that we can then extract from this tree?

Solution:

1.



2.



3.

