CKY Parsing

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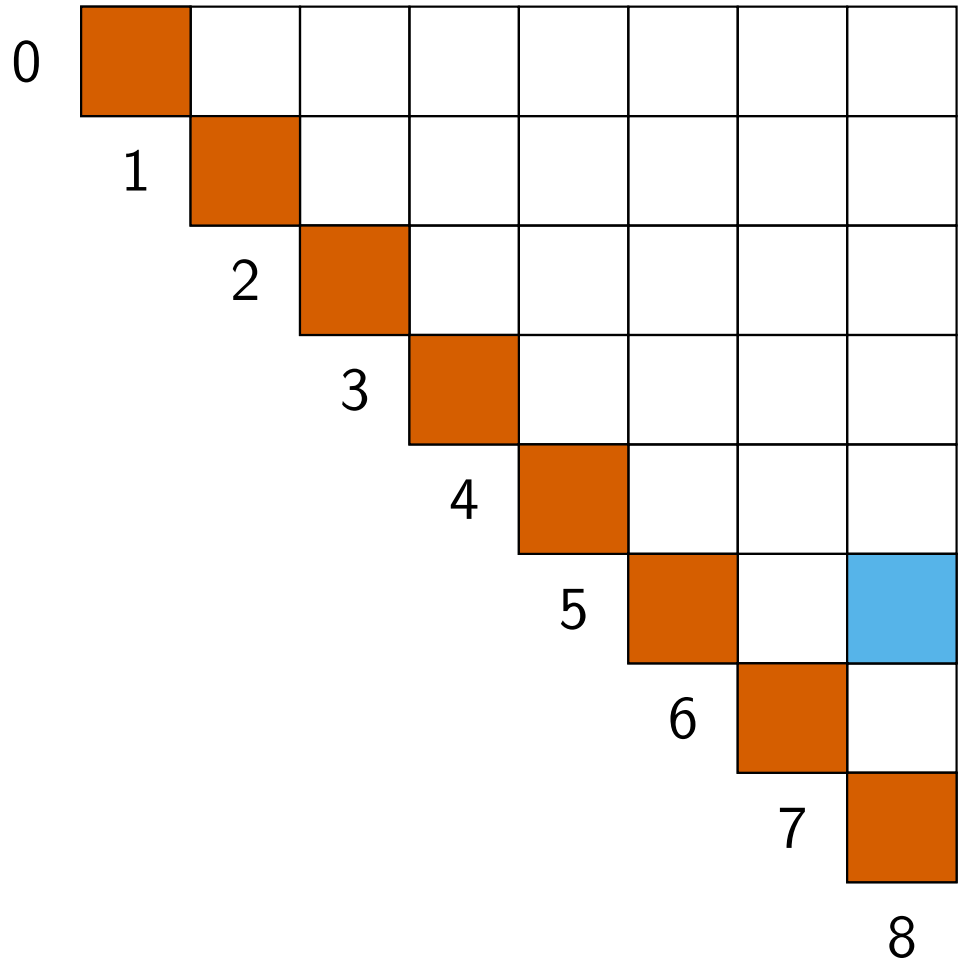
Overview

- Begin with a CFG in CNF
- Fill a table

Productions	**Lexicon**
S $\rightarrow$ DP VP	D $\rightarrow$ the
DP $\rightarrow$ DP PP	NP $\rightarrow$ binoculars
DP $\rightarrow$ D NP	NP $\rightarrow$ crow
PP $\rightarrow$ P DP	NP $\rightarrow$ girl
VP $\rightarrow$ VP PP	P $\rightarrow$ with
VP $\rightarrow$ V DP	V $\rightarrow$ saw

The Table

$_0$the$_1$girl$_2$saw$_3$the$_4$crow$_5$with$_6$the$_7$binoculars$_8$



Fill in the Lexicon

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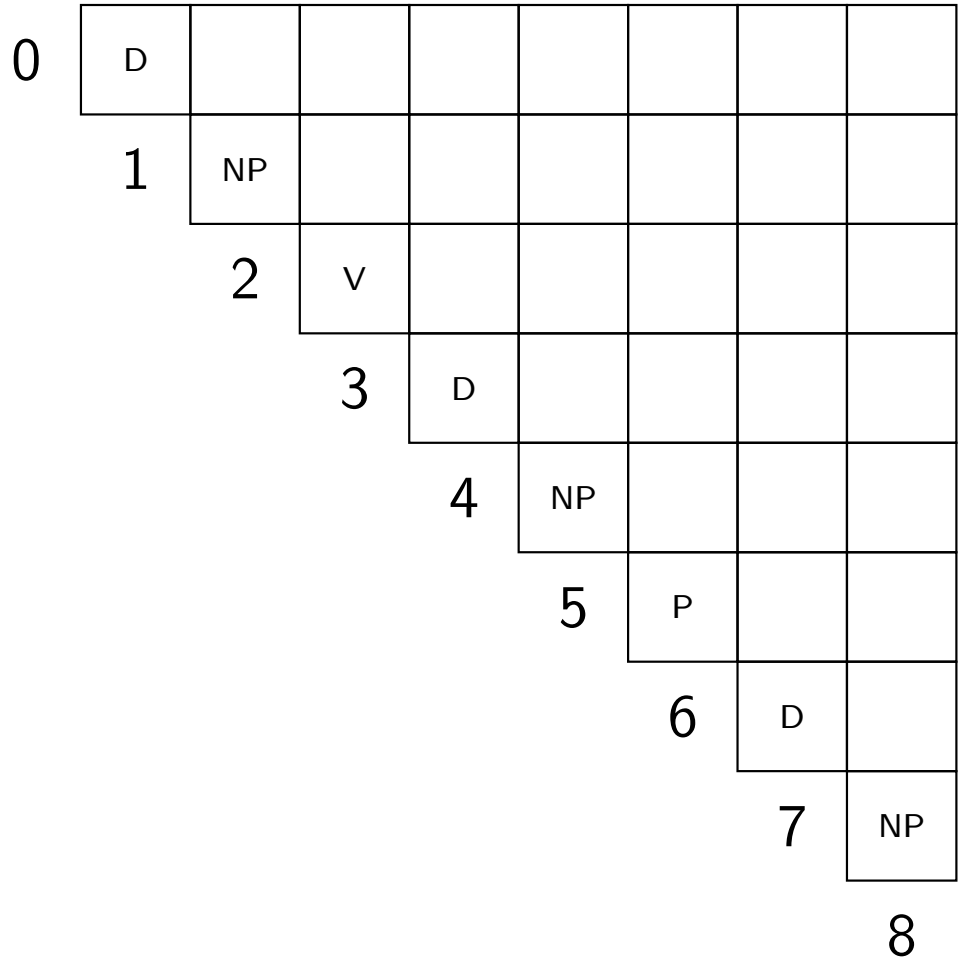

Productions

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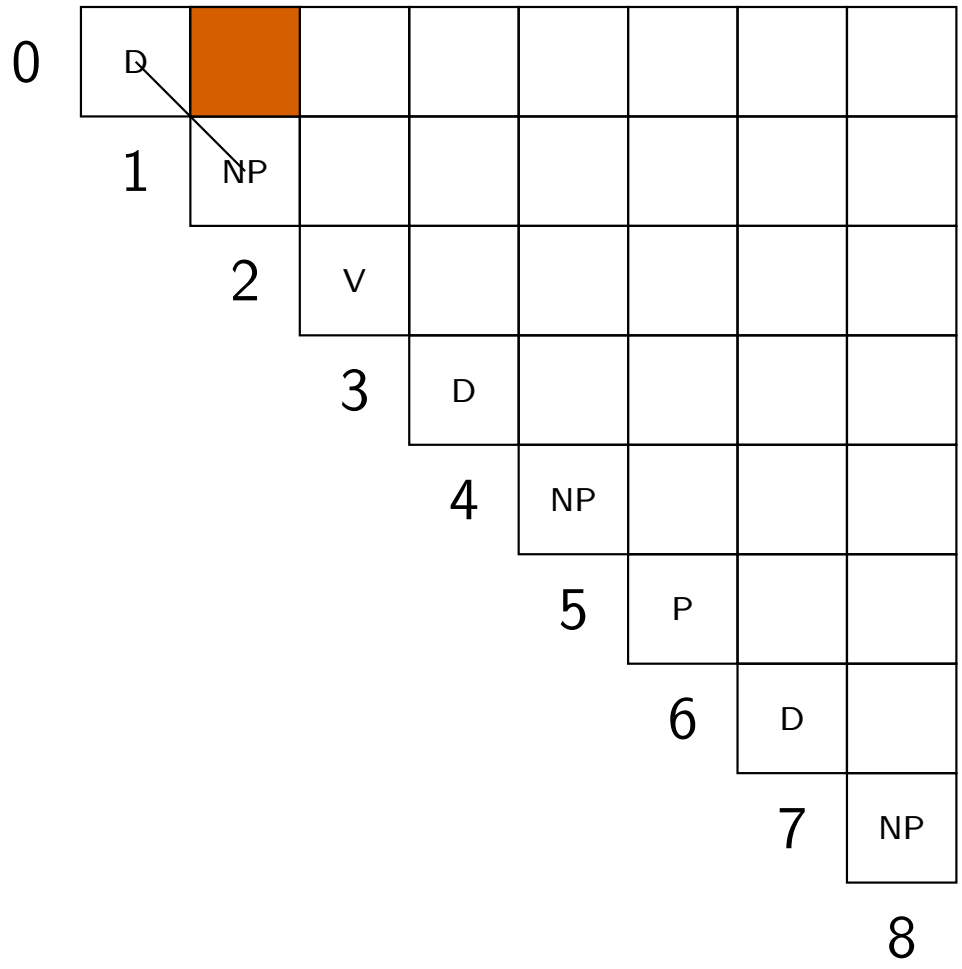

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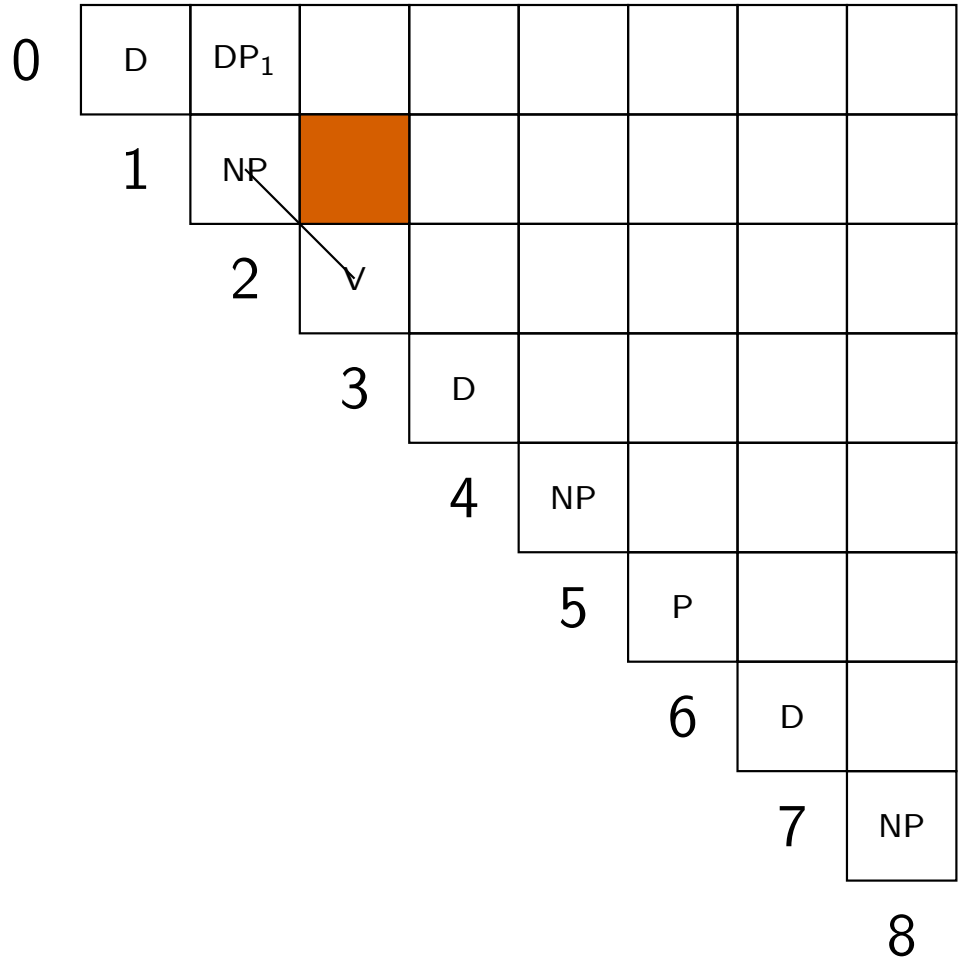

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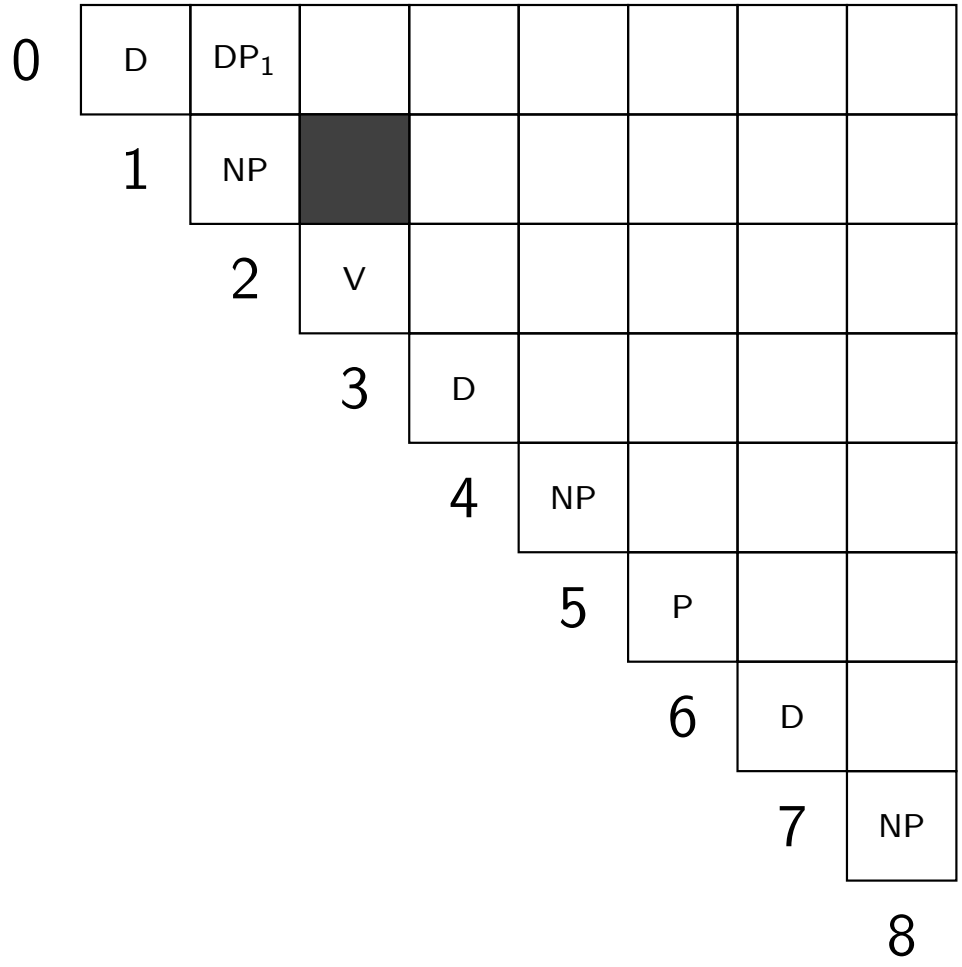

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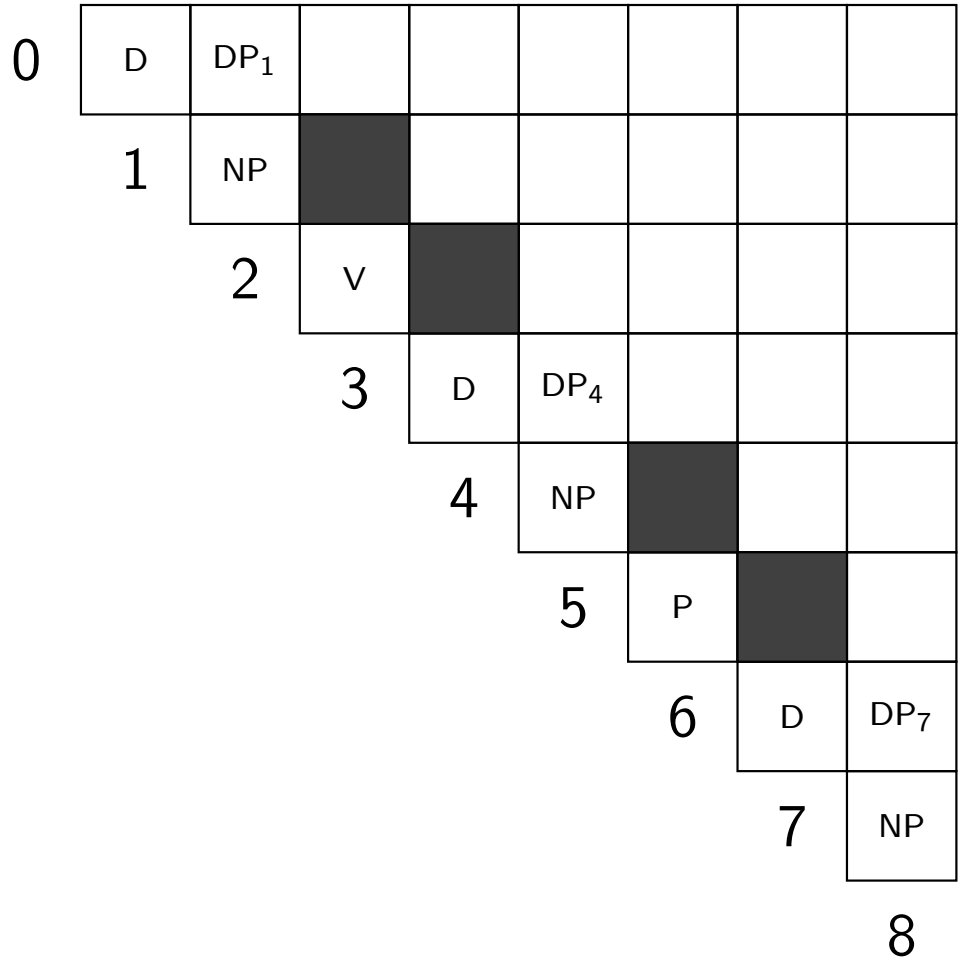

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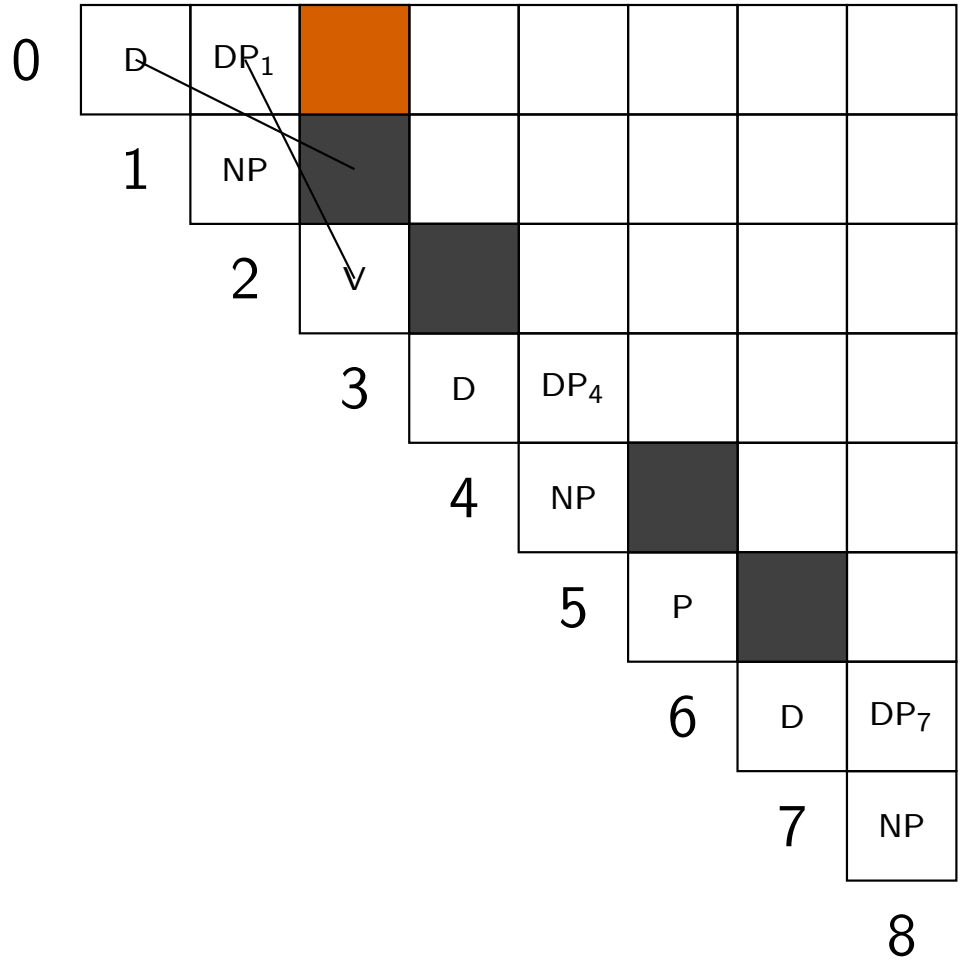

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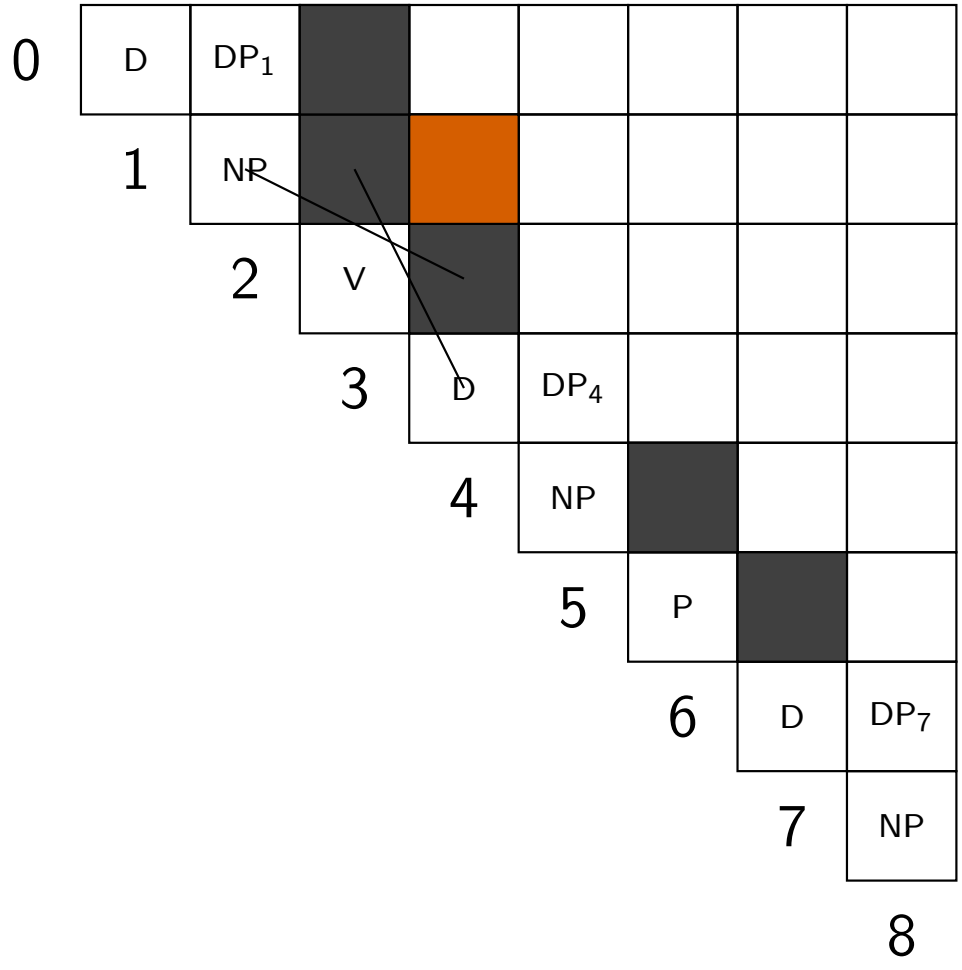

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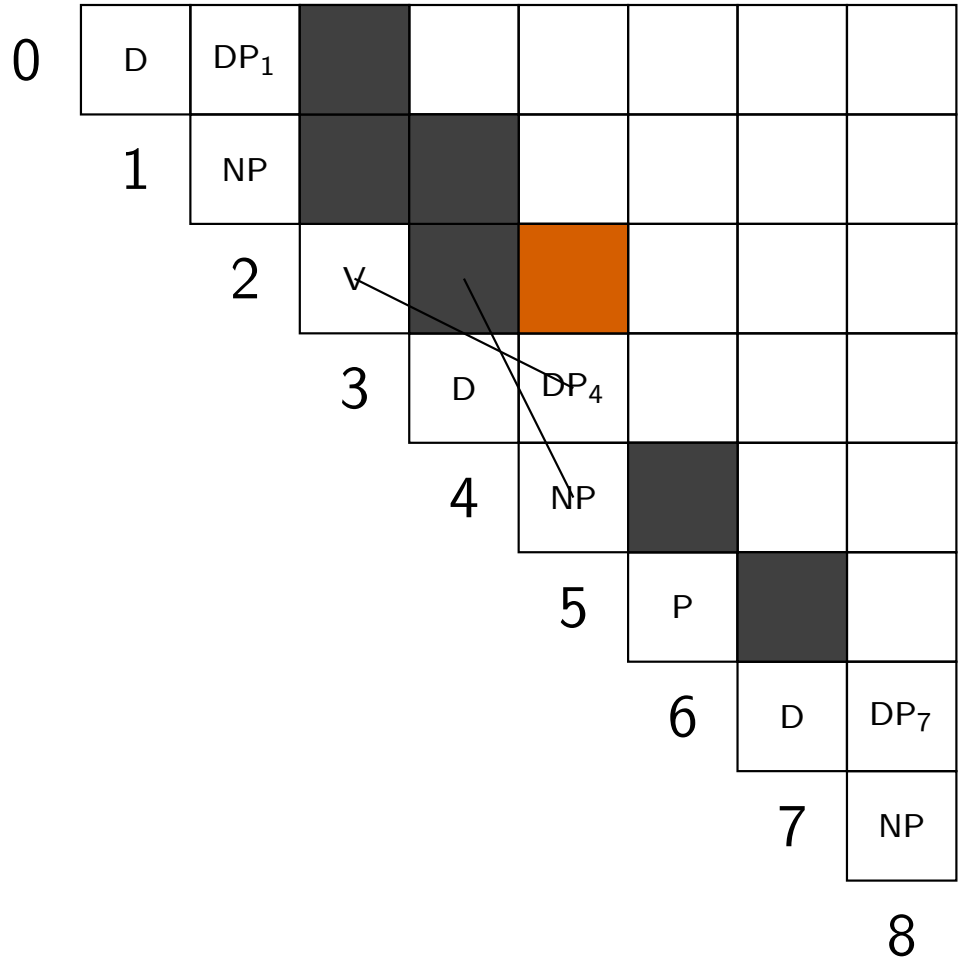

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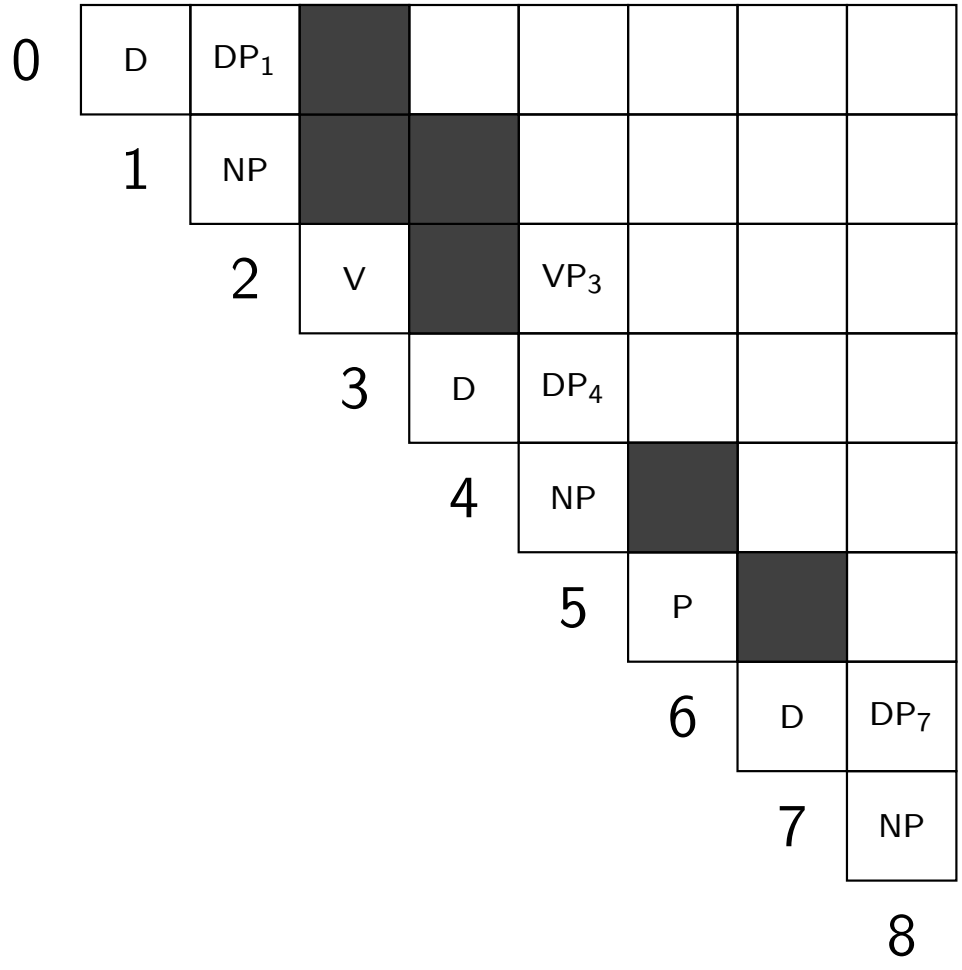

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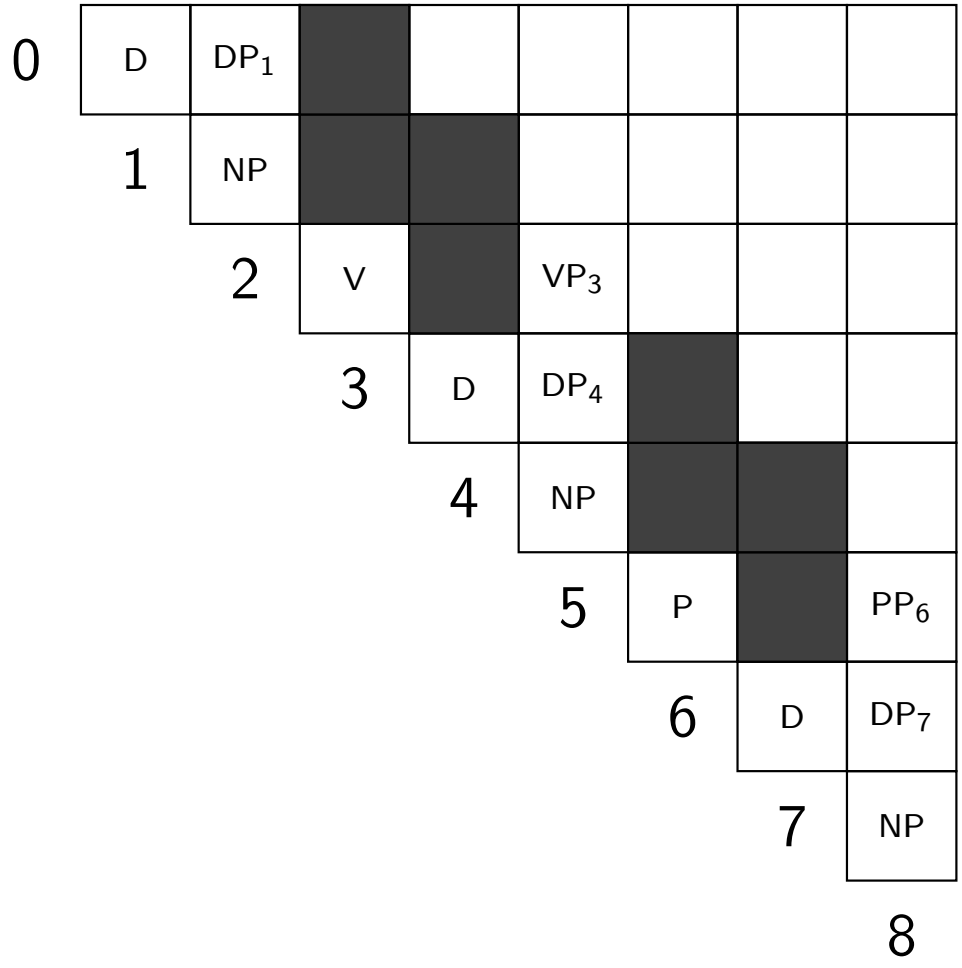

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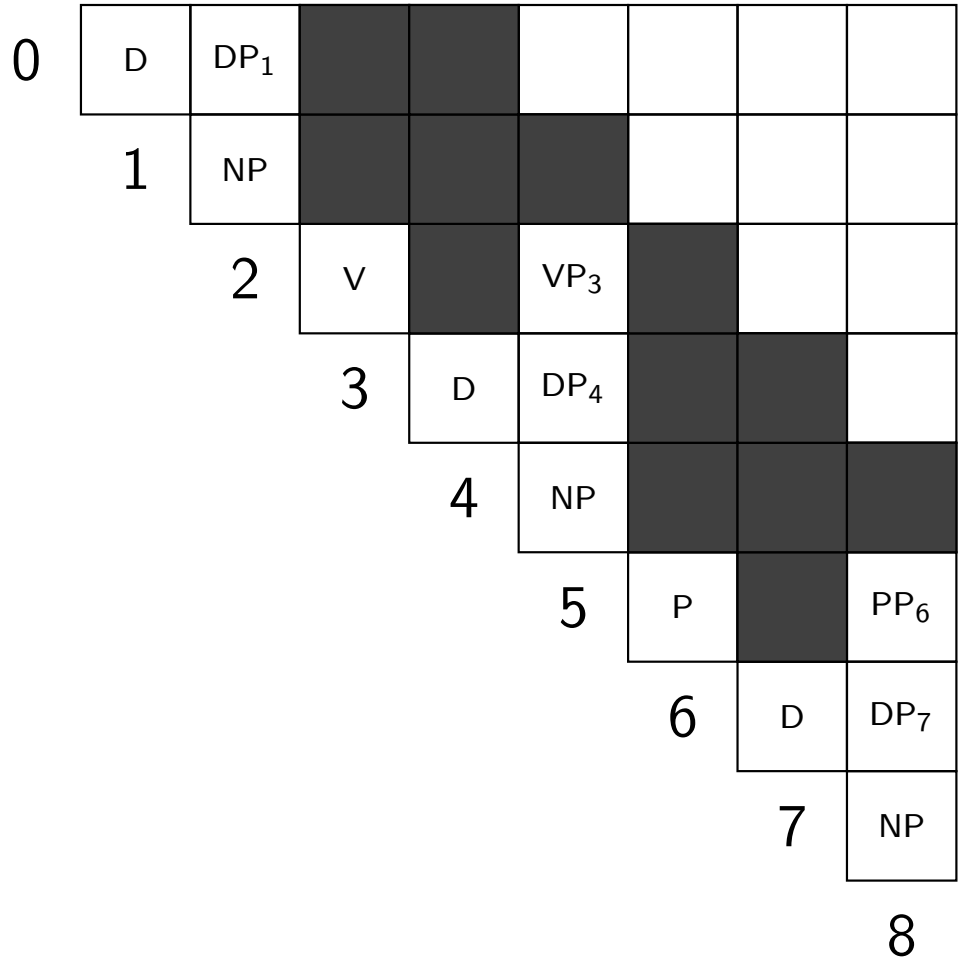

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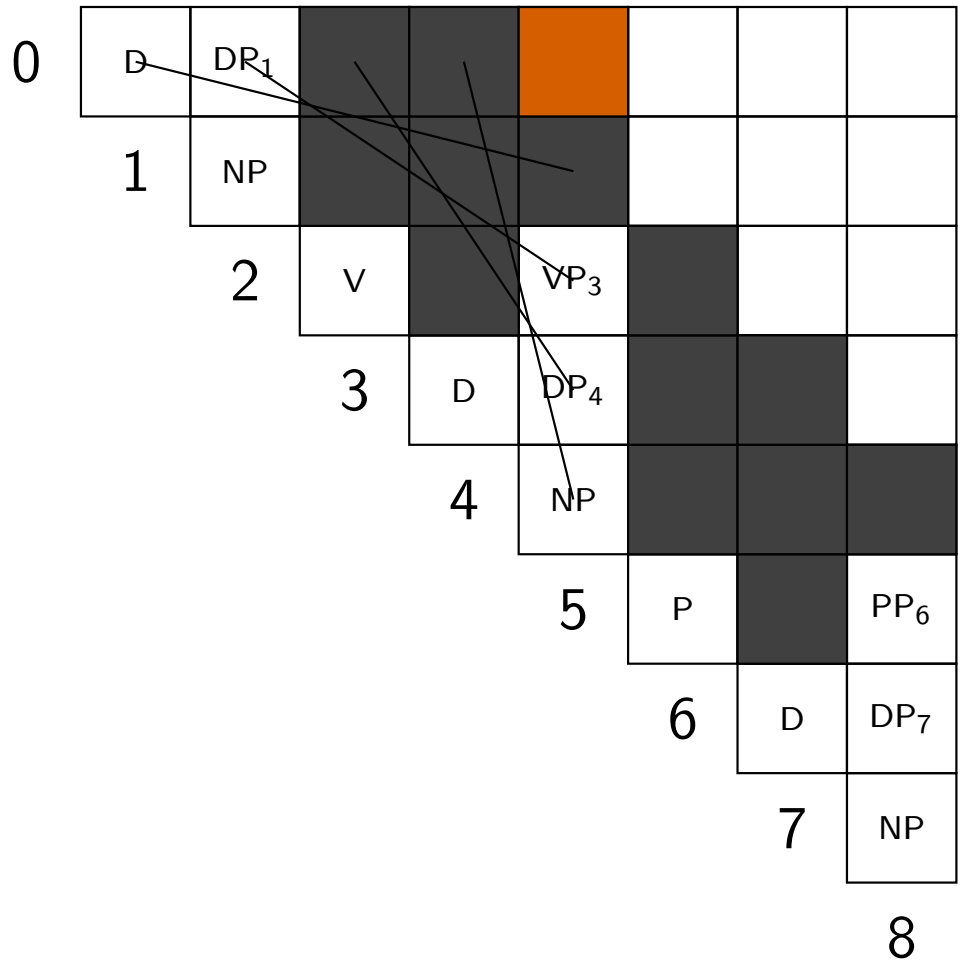

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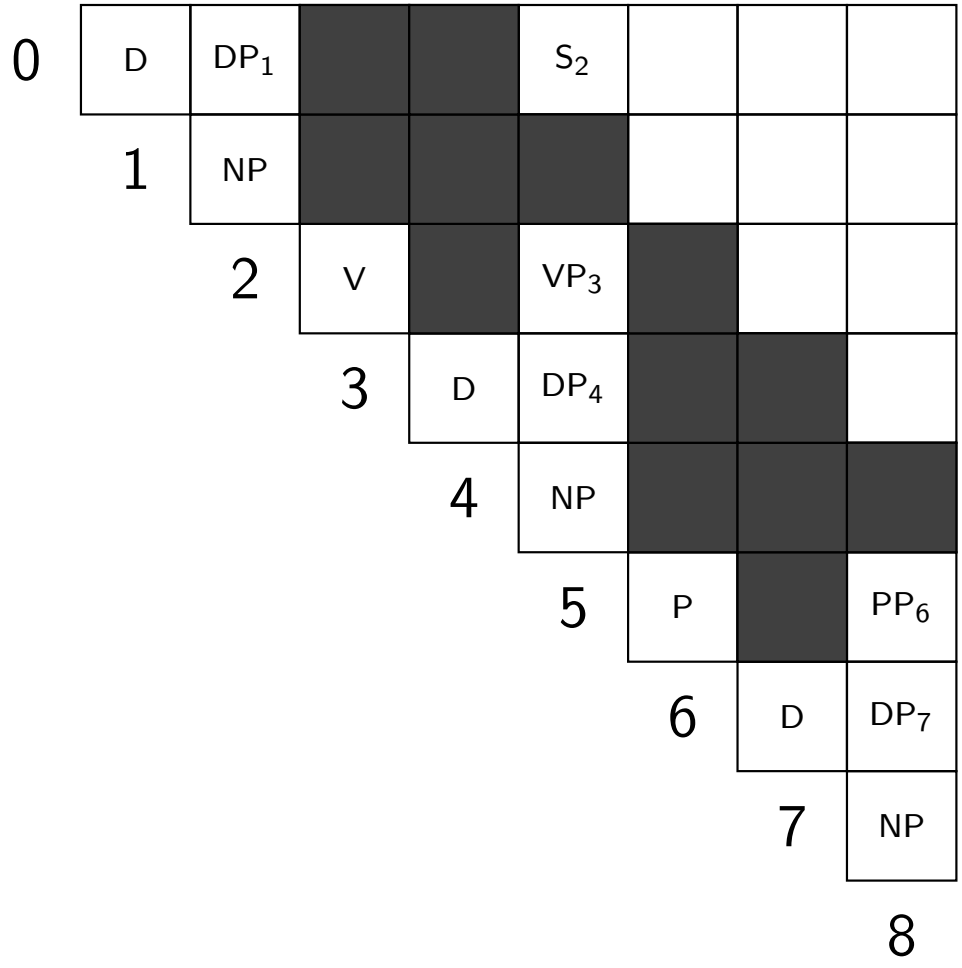

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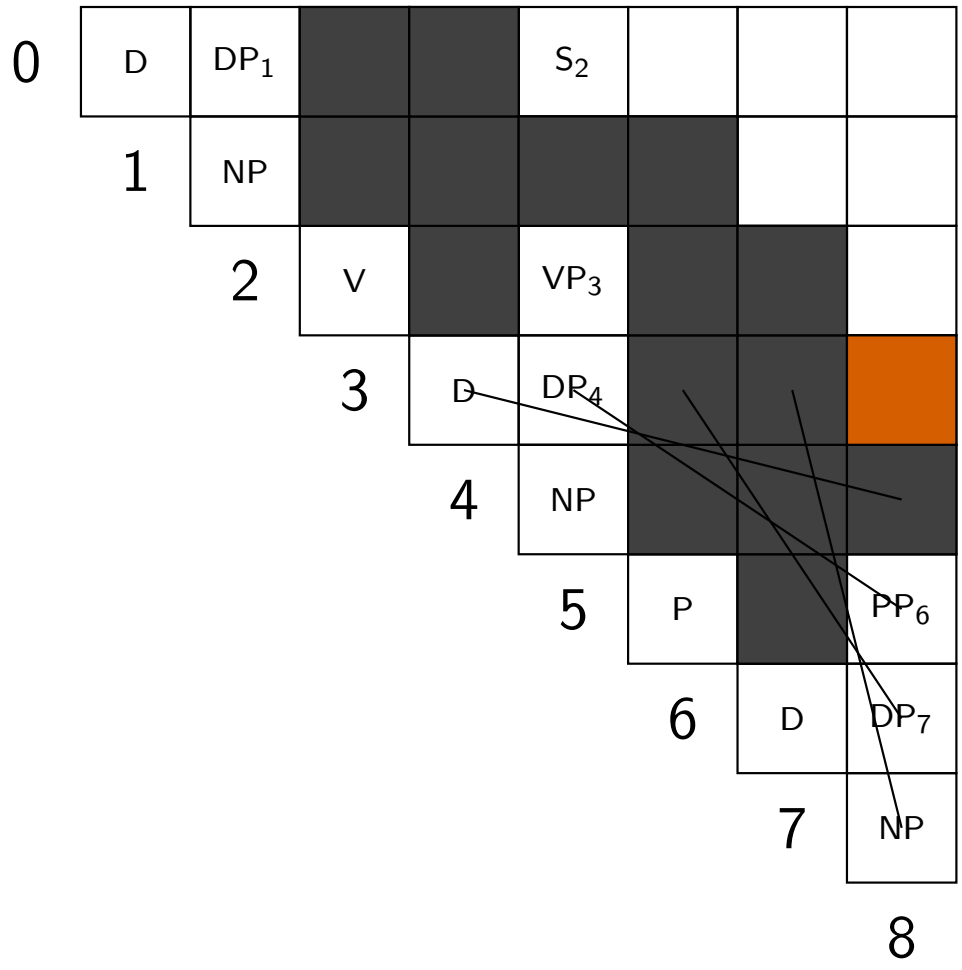

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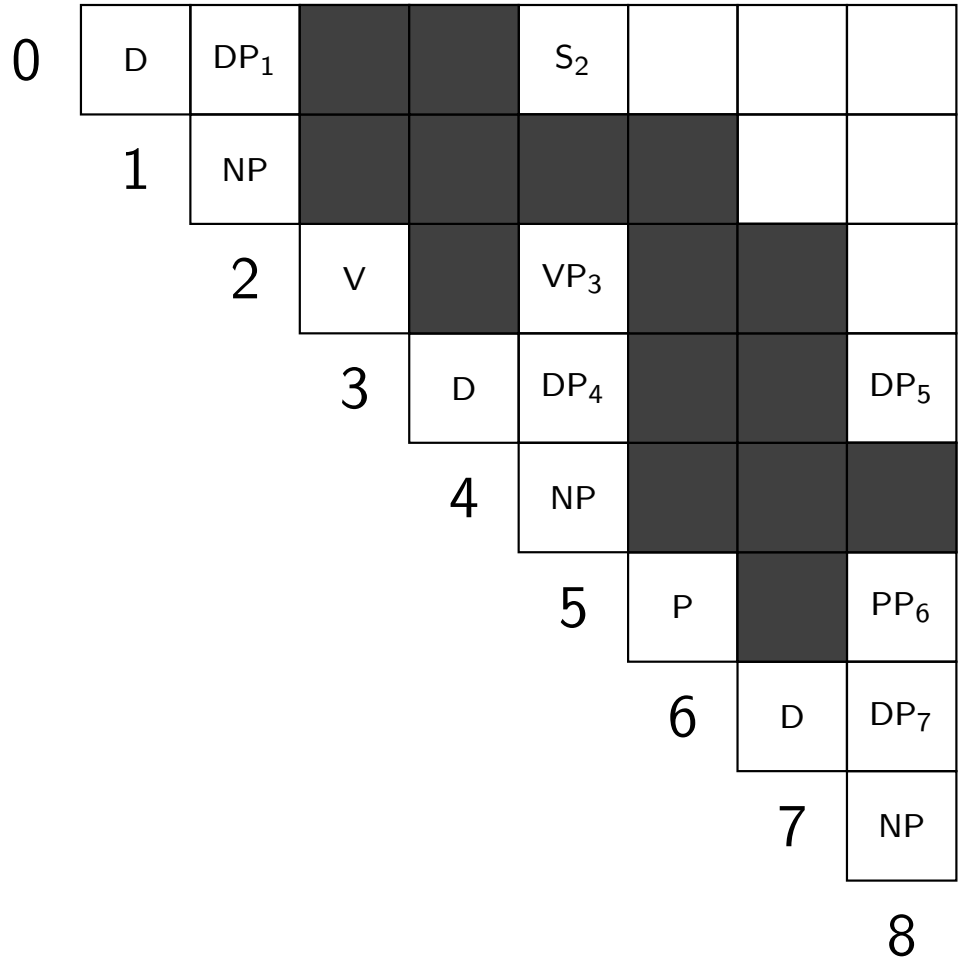

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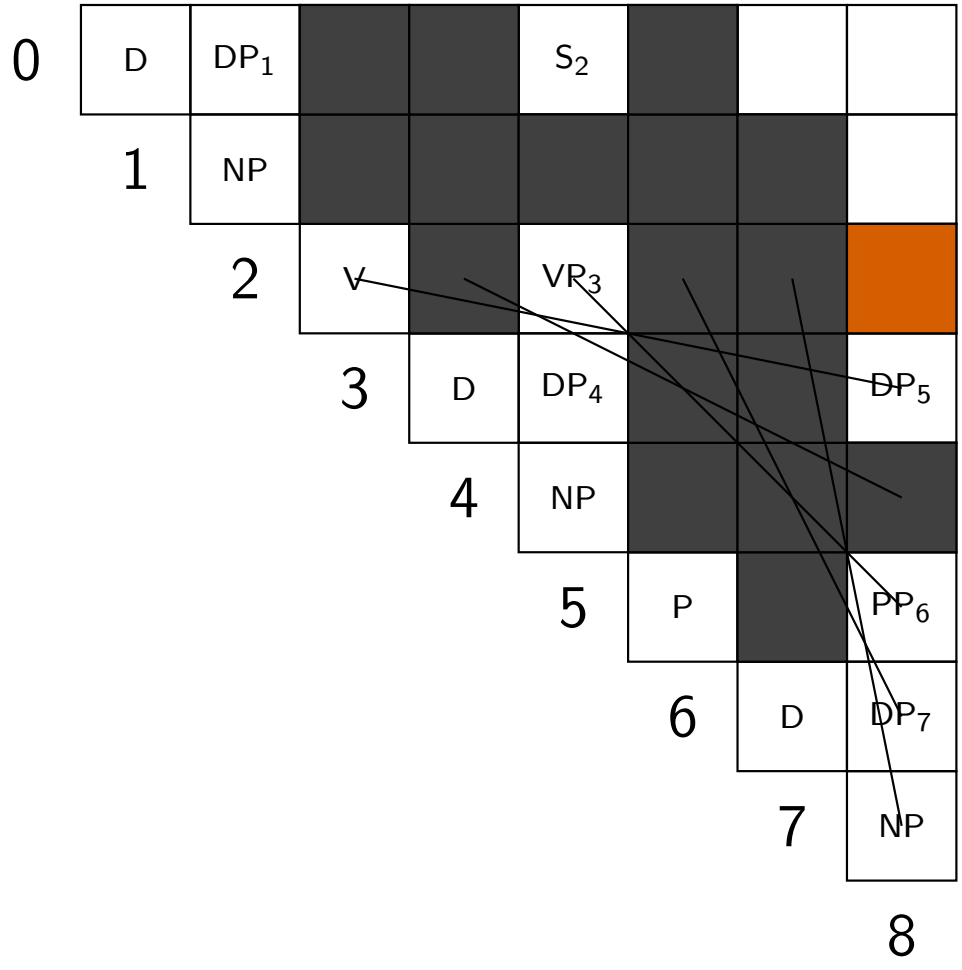

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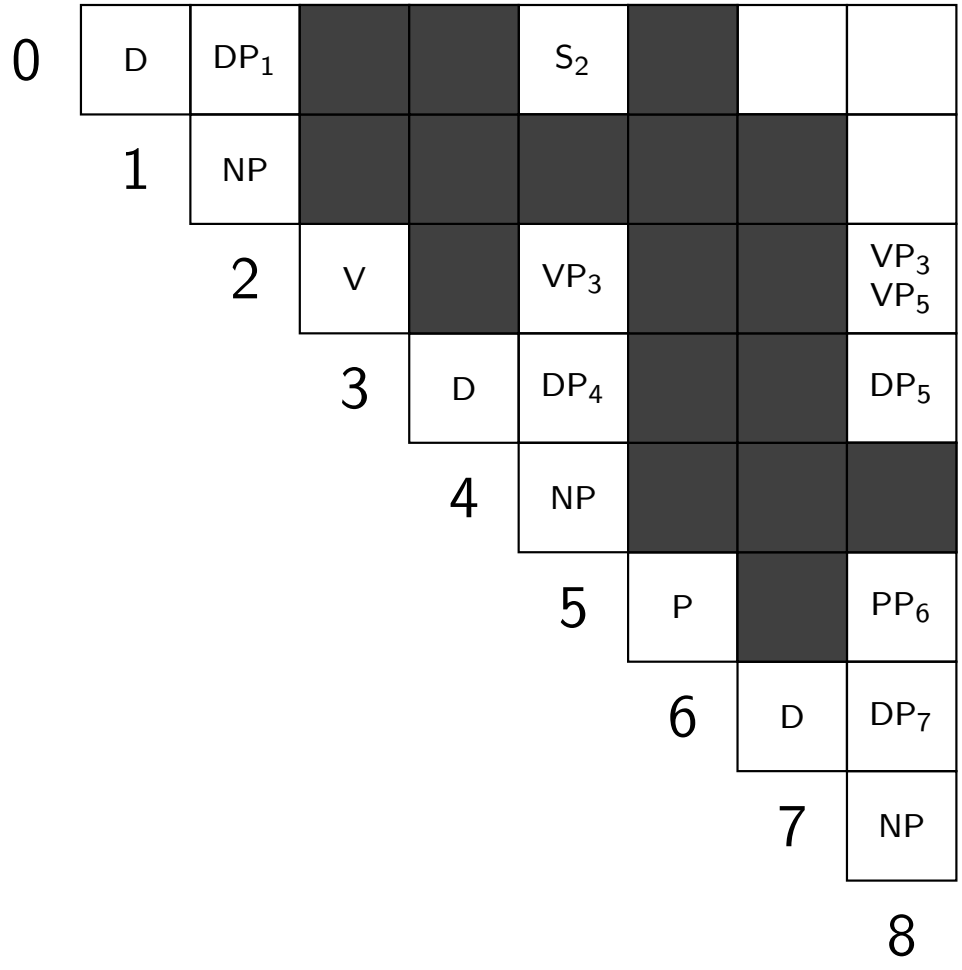

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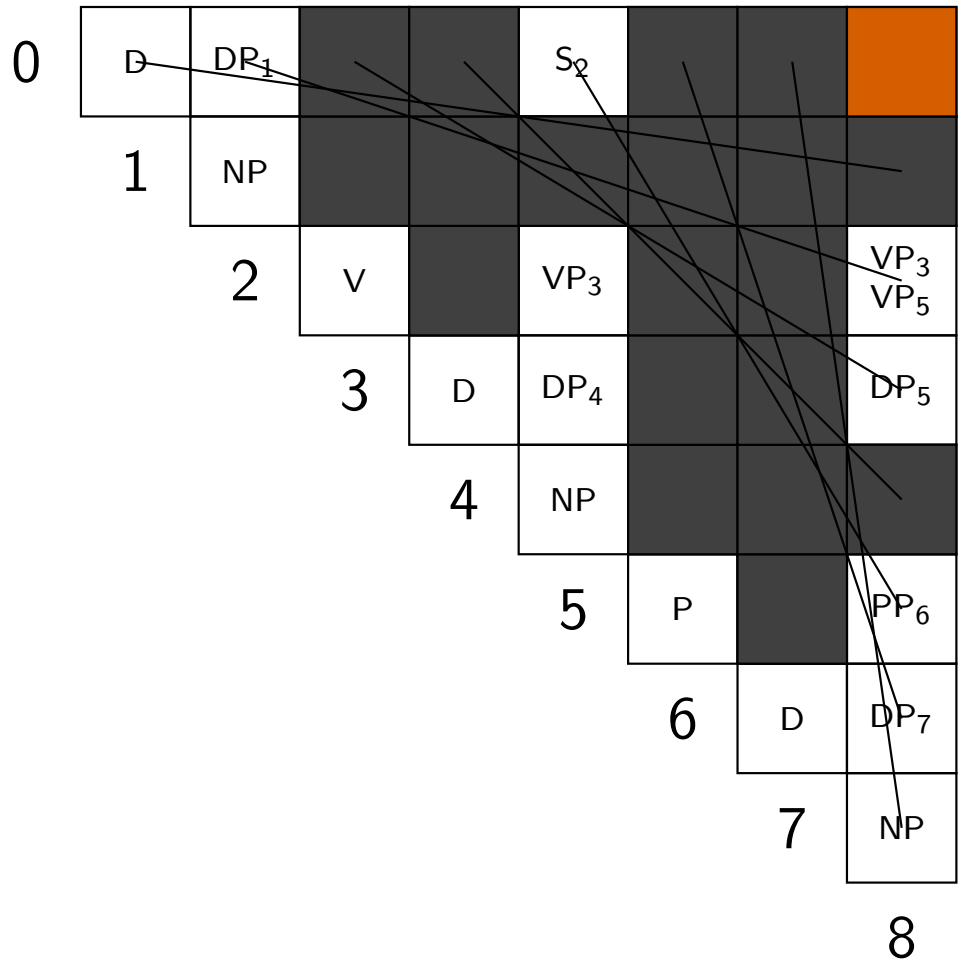

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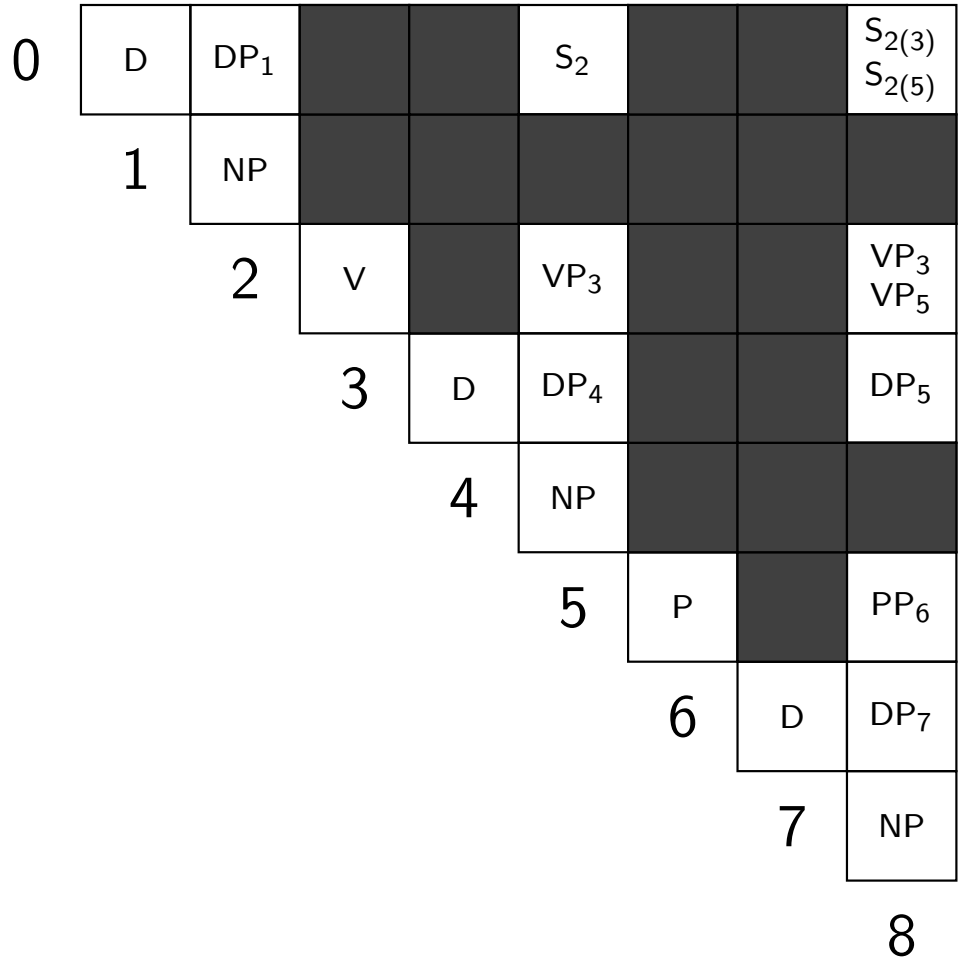
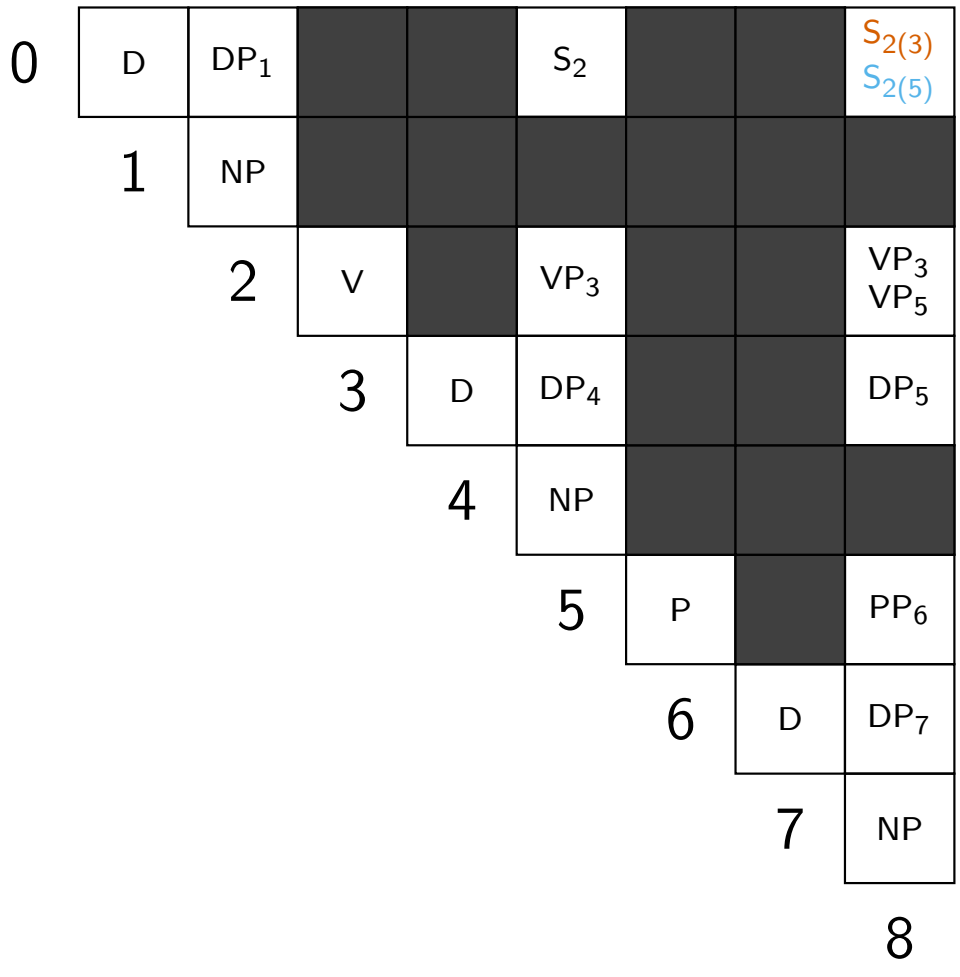


Examining the Output

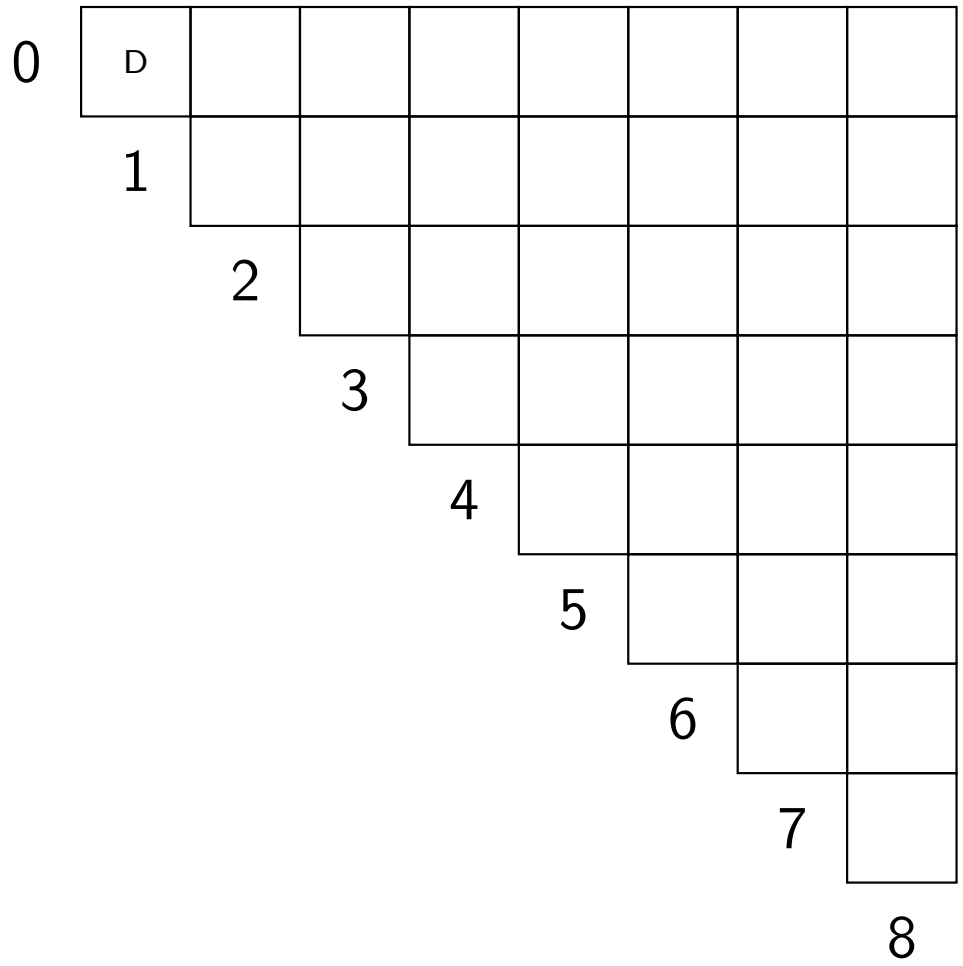


$[_0\text{the}_1\text{girl}]_2[[\text{saw}]_3[\text{the}_4\text{crow}_5\text{with}_6\text{the}_7\text{binoculars}_8]]$ — DP adjunct

$[_0\text{the}_1\text{girl}]_2[[\text{saw}_3\text{the}_4\text{crow}]_5[\text{with}_6\text{the}_7\text{binoculars}_8]]$ — VP adjunct

Online Parsing

$_0\text{the}_1\text{girl}_2\text{saw}_3\text{the}_4\text{crow}_5\text{with}_6\text{the}_7\text{binoculars}_8$



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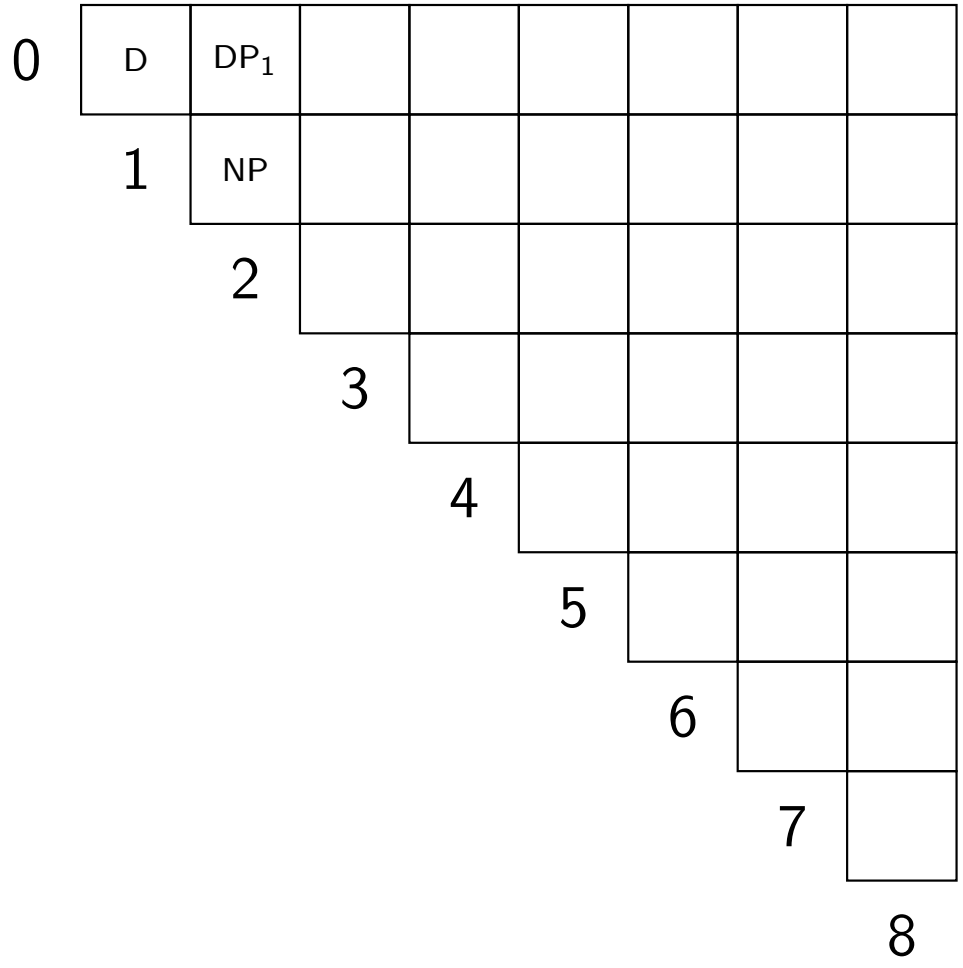

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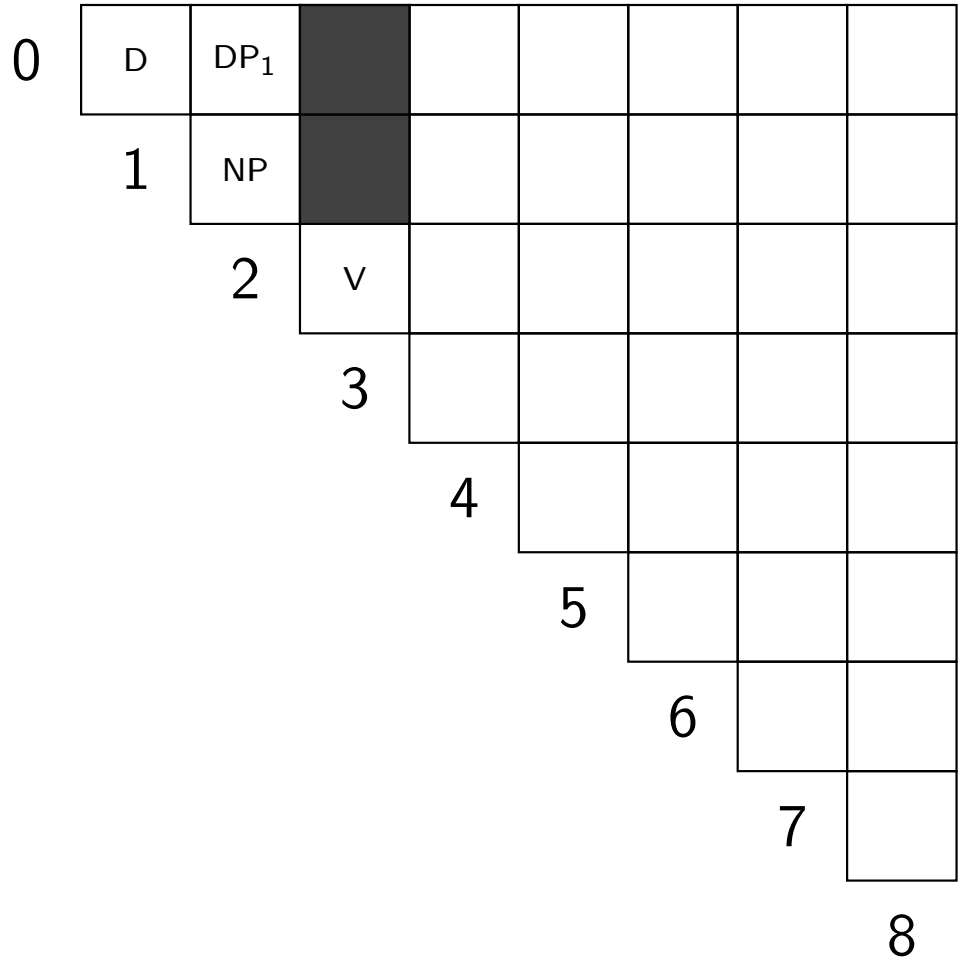

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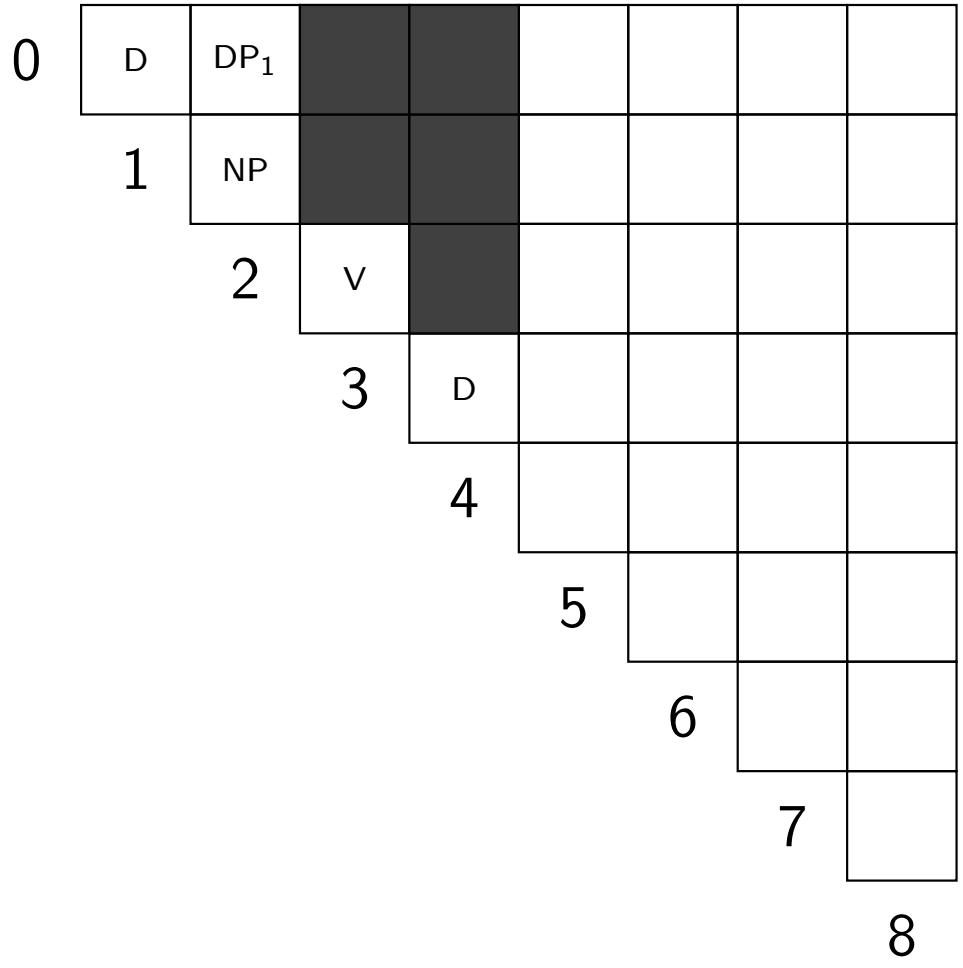

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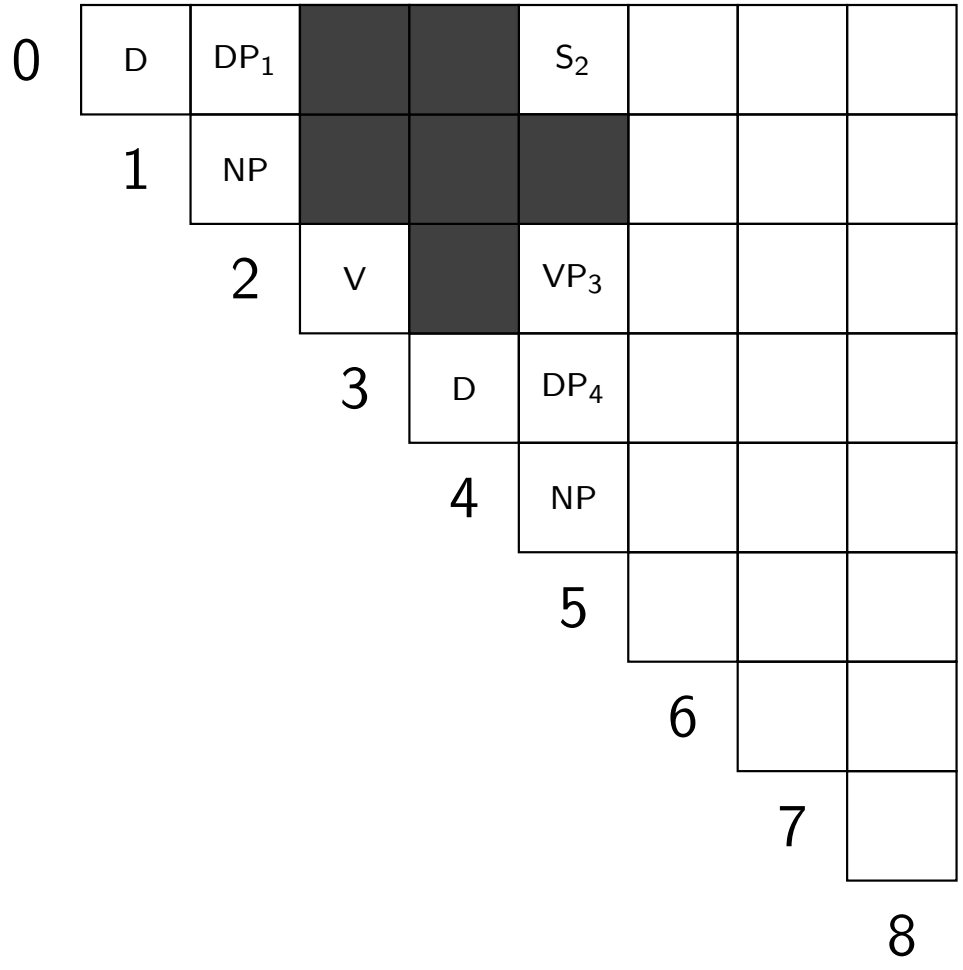

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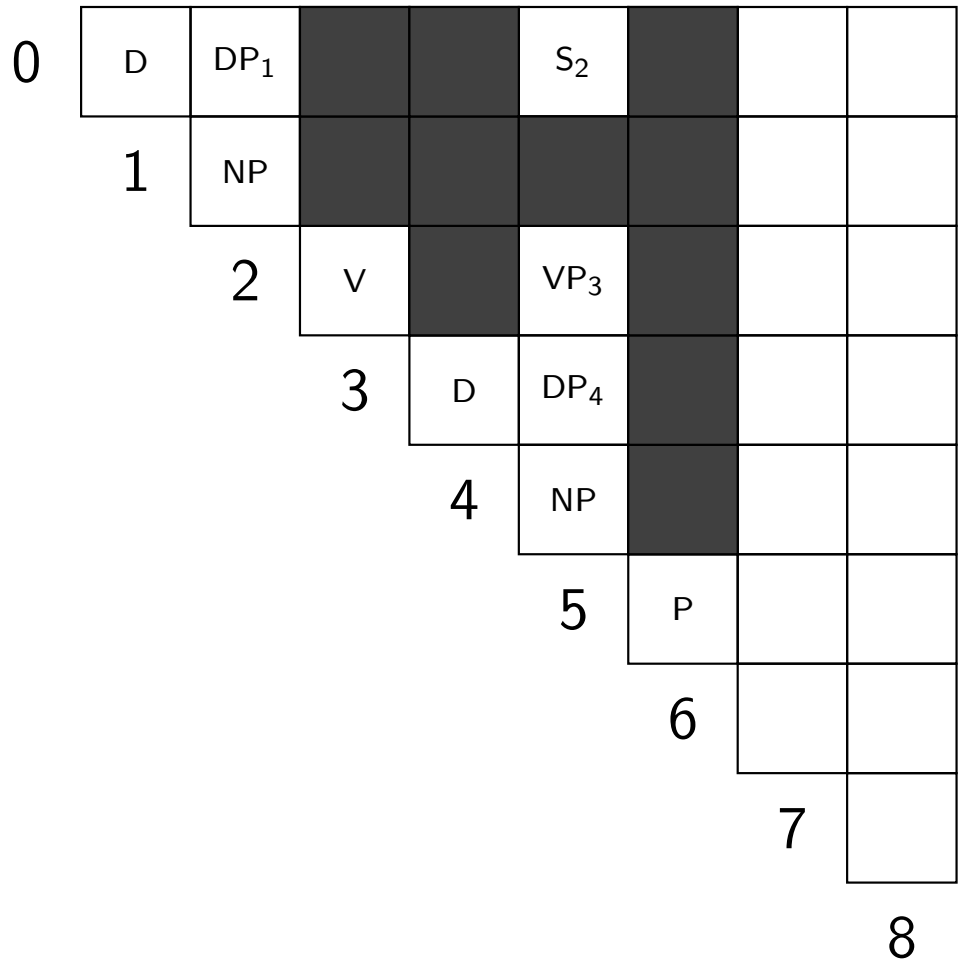

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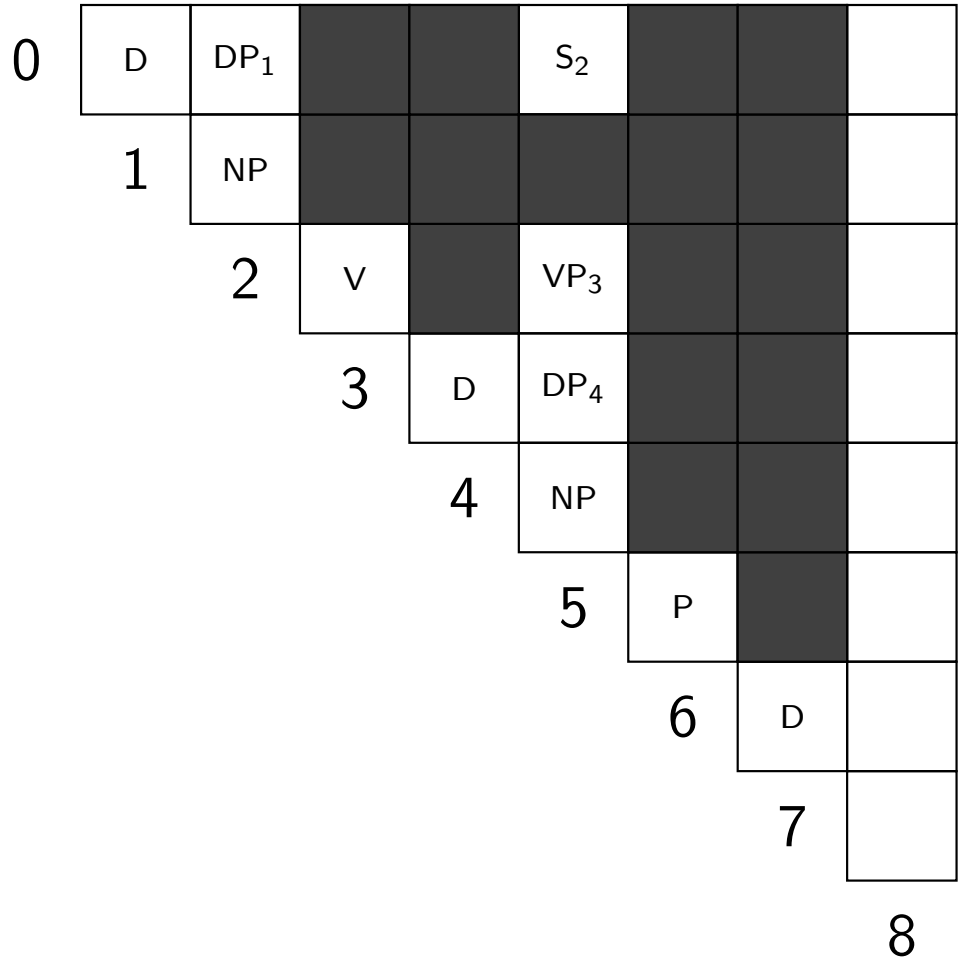

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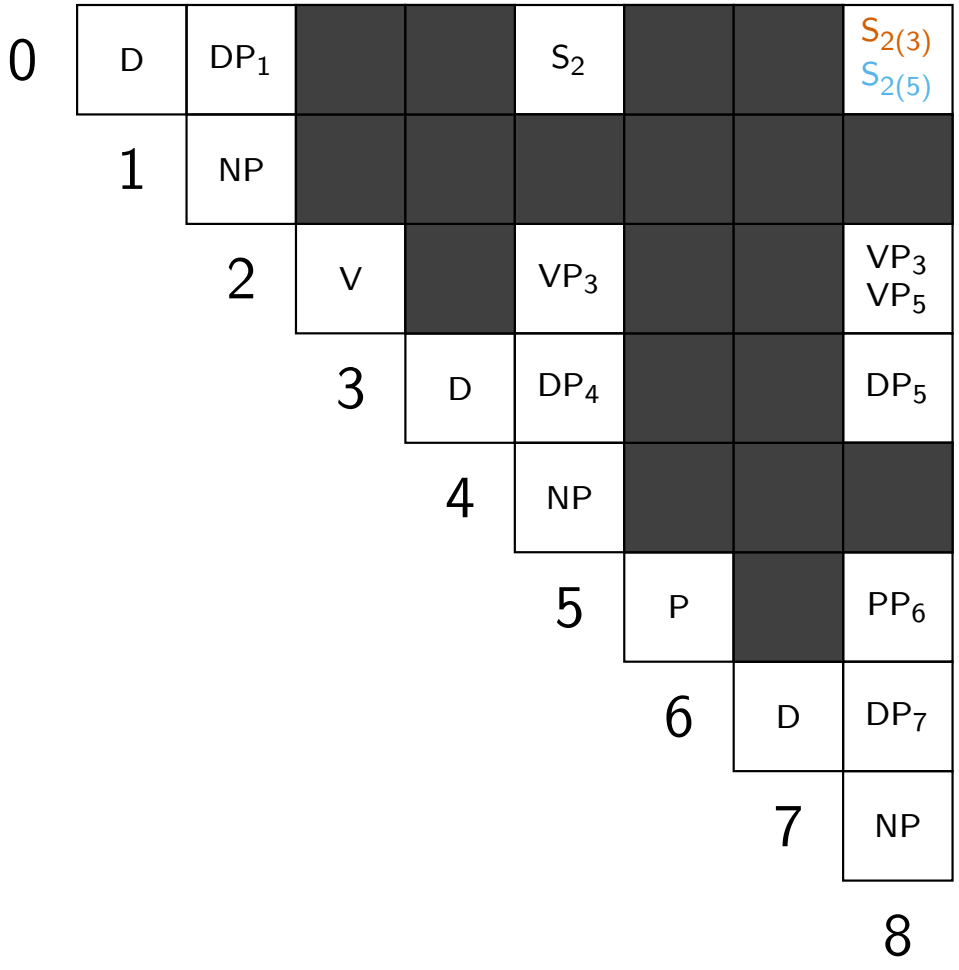

Probabilistic Stuff

Lexicon and productions have associated weights (probabilities).

If $[a, b]$ has category X_1 and weight p_1,

$[b, c]$ has category X_2 and weight p_2,

and $X \rightarrow X_1 X_2$ has weight p,

then $[a, c]$ has category X and weight $p \cdot p_1 \cdot p_2$

Top-Down vs Bottom-Up

Top-down parsers:

- Only generate S trees
- Generate before even looking at the input

Bottom-up parsers:

- Account for the input first
- Might generate non-S trees