Grammar 10

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The phrase structure rules of Grammar 9

Sentences:

$$\begin{bmatrix} \textit{phrase} \\ \text{SYNTAX} \quad \begin{bmatrix} \text{POS} & \textit{sentence} \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textit{word} \\ \text{SYNTAX} \quad \begin{bmatrix} \text{POS} & \textit{noun} \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \begin{bmatrix} \textit{sign} \\ \text{SYNTAX} \quad \begin{bmatrix} \text{POS} & \textit{verb} \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix}$$

Phrases:

$$\begin{bmatrix} \textit{phrase} \\ \text{SYNTAX} \quad \begin{bmatrix} \text{POS} & \boxed{P} \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textit{word} \\ \text{SYNTAX} \quad \begin{bmatrix} \text{POS} & \boxed{P} \\ \text{RIGHT} & \langle \boxed{1}, \ldots, \boxed{n} \rangle \end{bmatrix} \end{bmatrix} \begin{bmatrix} \textbf{\textit{sign}} \\ \text{SYNTAX} \quad \begin{bmatrix} \text{POS} & \boxed{1} \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \ldots \begin{bmatrix} \textbf{\textit{sign}} \\ \text{SYNTAX} \quad \begin{bmatrix} \text{POS} & \boxed{n} \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix}$$

These rules make sure that all phrases are complete on the right!

But, of course, phrases must also be complete on the left!

- A word like *Kim* is both complete on the left and on the right. Therefore, it can serve as the subject or the object of a verb by itself.
- But, count nouns like *student* need an article to their left in the syntax, before they can combine with the verb.

Subject position:

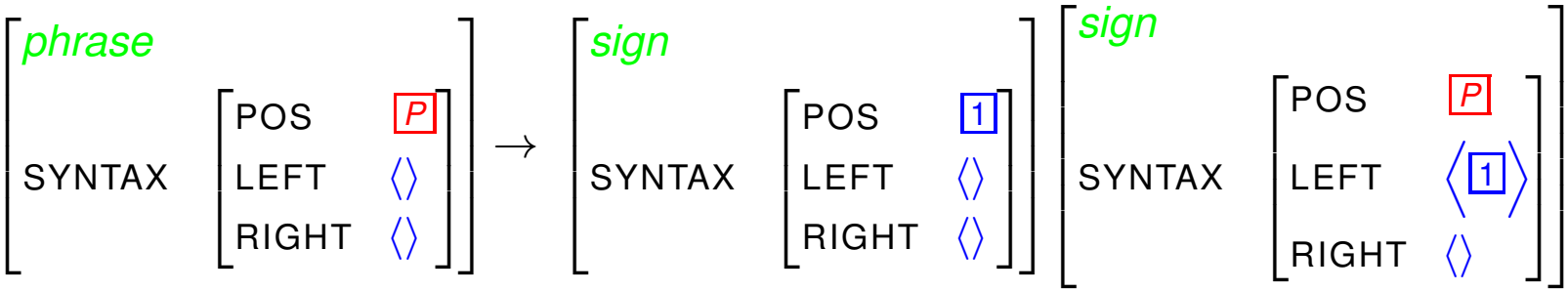
(1) a. Kim likes Robin
b. The student likes Robin
c. * Student likes Robin

Object position:

(2) a. Robin likes Kim
b. Robin likes the student
c. * Robin likes student

So, we need to add another rule that makes phrases that are complete on the left

Complete-on-the-left-rule:



The other two rules also need information about completeness on the left

Sentences:

$$\begin{bmatrix} \textit{phrase} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \textit{sentence} \\ \text{LEFT} & \langle\rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textit{sign} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \textit{noun} \\ \text{LEFT} & \langle\rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \begin{bmatrix} \textit{sign} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \textit{verb} \\ \text{LEFT} & \langle\rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix}$$

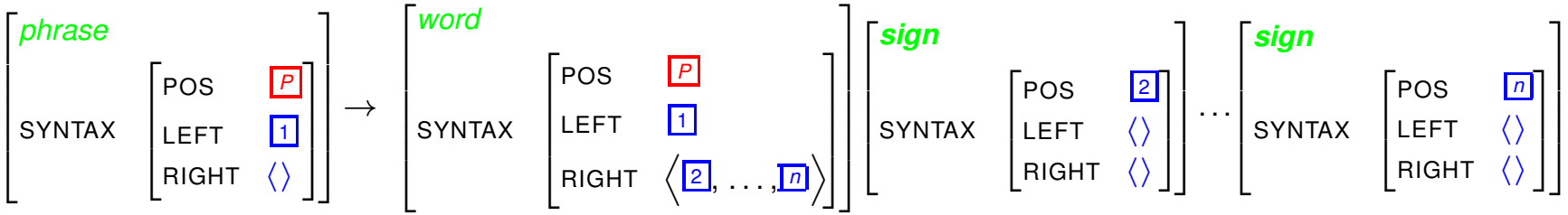
Complete-on-the-right-rule:

$$\begin{bmatrix} \textit{phrase} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{P} \\ \text{LEFT} & \boxed{1} \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textit{word} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{P} \\ \text{LEFT} & \boxed{1} \\ \text{RIGHT} & \langle \boxed{2}, \ldots, \boxed{n} \rangle \end{bmatrix} \end{bmatrix} \begin{bmatrix} \textbf{\textit{sign}} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{2} \\ \text{LEFT} & \langle\rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \ldots \begin{bmatrix} \textbf{\textit{sign}} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{n} \\ \text{LEFT} & \langle\rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix}$$

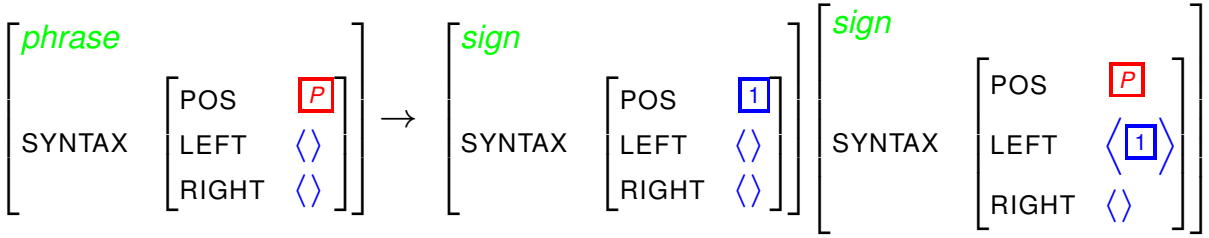
The phrase structure rules of Grammar 10

The rules appear in the order in which they apply, from the bottom of the tree to the top.

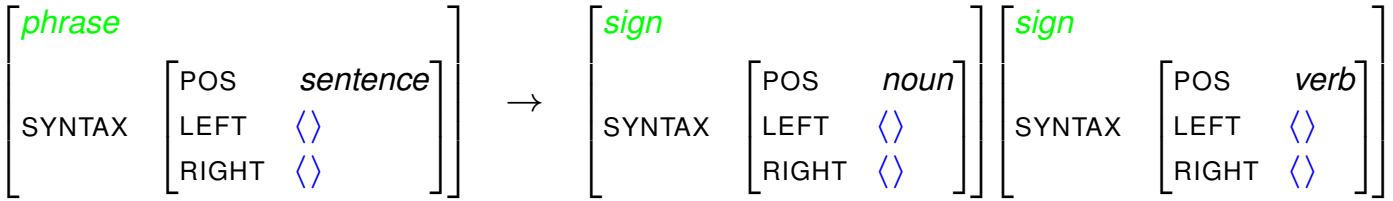
Complete-on-the-right-rule:



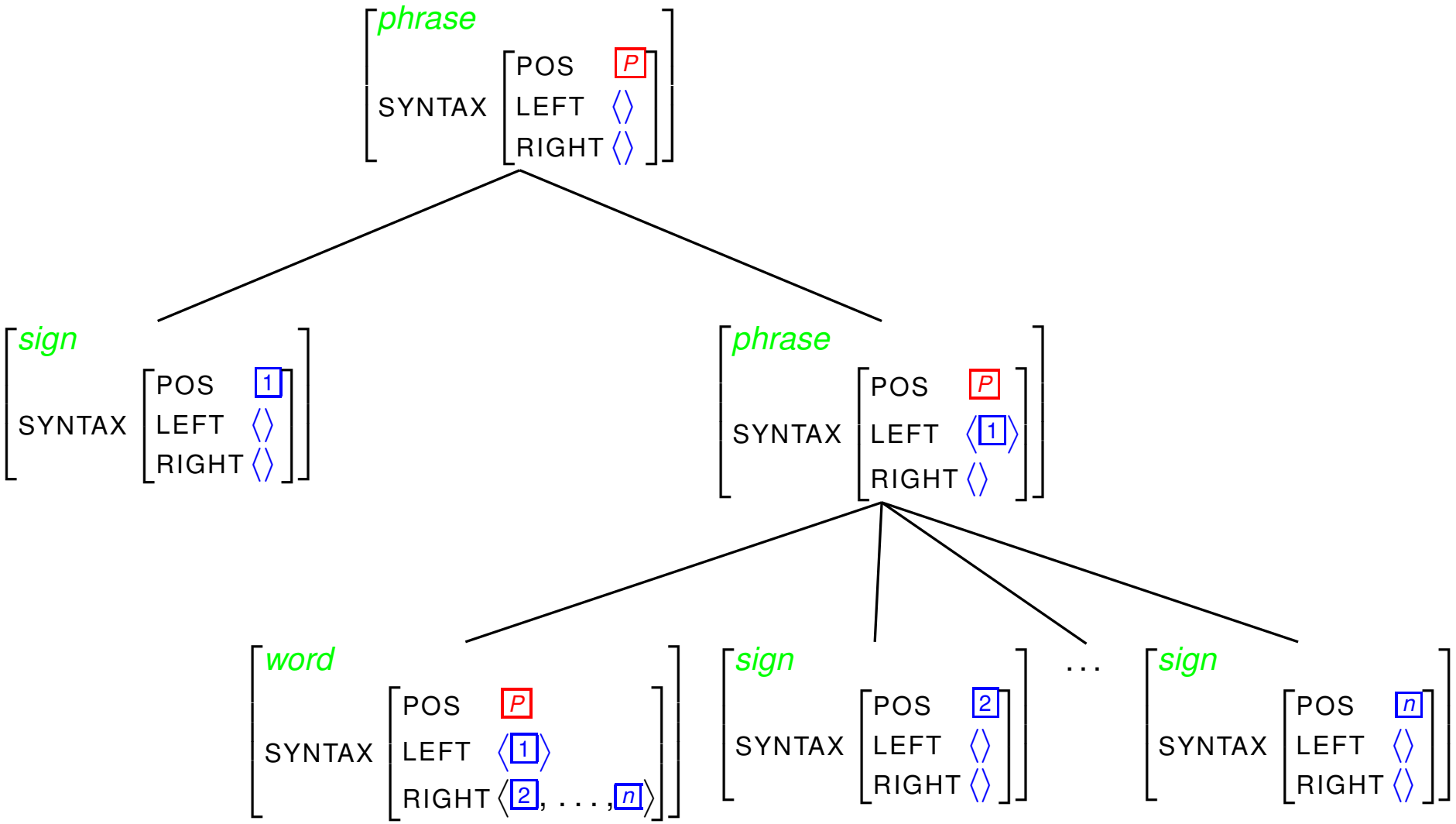
Complete-on-the-left-rule:



Sentences:



The general structure of phrases



Excercises

1. Parse test items test items (34)-(40) of Grammar 10 to see that this grammar can handle articles to the left of nouns and that it does not accept sentences where subjects or objects have an article missing.