# Ling 566
# Oct 20, 2016

## Review

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# Overview

- Reading questions
- Homework tips
- SPR and COMPS
- Common mistakes
- Review answer to 4B (HW2)
- Analogies to other systems you might know



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# Reading Questions

- Does English have dative case?
- How do we know which NP has which semantic role?
- Why do we need separate SPR and COMPS lists?



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# Reading Questions

- How is it that the lexical entry for a word like "a" and the lexical entry for a word like "letter" have the same index? They can't communicate with each other to ensure that they point to the same individual so I was just wondering how that comes about in their lexical entries.



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# Reading Questions

- Why do nouns and their specifiers share an INDEX value?
- Why do prepositions and their complements share an INDEX value?



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# Reading Questions

- pp. 176 the RESTR of the VP "sent us a letter" is appears to denote a list of RESTR lists (look at RESTR D). Isn't it the case that by the principle of compositionality we create one RESTR list from the daughters? If this is the case, how should I read this RESTR list that looks to be composed of sub lists?

- Does it matter where in the feature structures of sentences we put just the tags (boxed numerals), and where we write out the details? How about for RESTR values?



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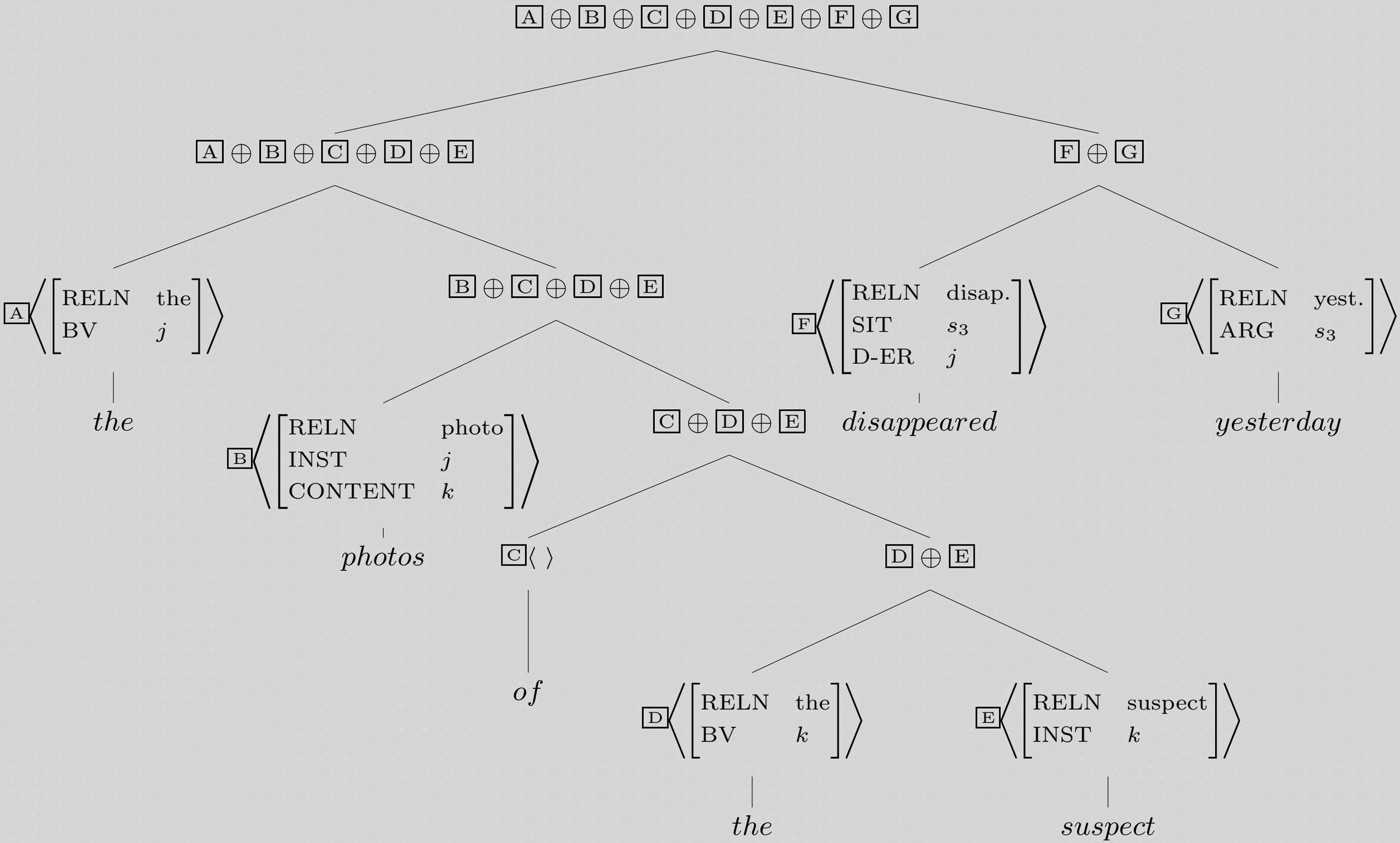
# RESTR Values and the SCP



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# Reading Questions

- Is there a list of possible RELN values & associated feature names somewhere?
- Does j in (14) refer to the whole group, and do the individuals within the group get their own letters?



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$$\begin{bmatrix}\text{RELN} & \textbf{group}\\ \text{INST} & i\end{bmatrix}, \begin{bmatrix}\text{RELN} & \textbf{send}\\ \text{SIT} & s_7\\ \text{SENDER} & i\\ \text{SENDEE} & j\\ \text{SENT} & k\end{bmatrix}, \begin{bmatrix}\text{RELN} & \textbf{group}\\ \text{INST} & j\end{bmatrix},$$

$$\begin{bmatrix}\text{RELN} & \textbf{speaker}\\ \text{INST} & l\end{bmatrix}, \begin{bmatrix}\text{RELN} & \textbf{member}\\ \text{SET} & j\\ \text{ELEMENT} & l\end{bmatrix}, \begin{bmatrix}\text{RELN} & \textbf{exist}\\ \text{BV} & k\end{bmatrix},$$

$$\begin{bmatrix}\text{RELN} & \textbf{letter}\\ \text{INST} & k\\ \text{ADDRESSEE} & m\end{bmatrix}$$



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# Reading Questions

- Are there any advantages to building trees bottom up/top down? Why do we need both to be possible?
- How is it that the nouns 'here' and 'there' can form PPs by themselves, as in the sentence "he sent it here"? PPs formed in this way have no P head daughter.



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# Homework tips/requests

- Type whenever possible
- Answer each part of each question separately
- Be sure to answer each part of each question, and follow the directions!
- Look over the problems early and ask questions
- Check your work
- Monitor Canvas discussions
- WORK TOGETHER



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# SPR value on AP/PP?

- Kim grew fond of baseball.
- Kim and Sandy ate lunch in the park.
- Kim and Sandy are in the park.



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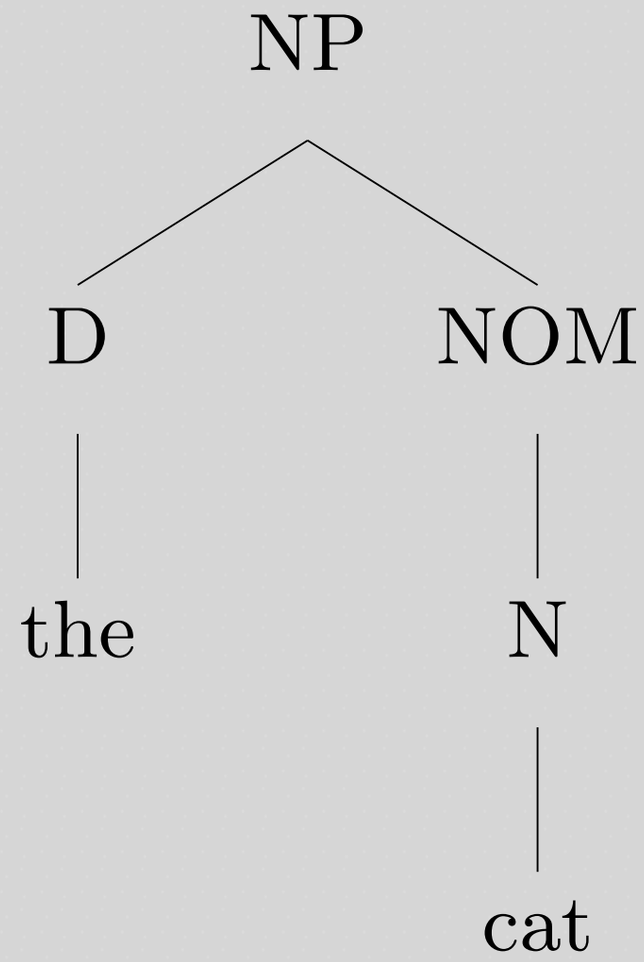
# Which grammar does this tree go with?



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# What's wrong with this?

$$\left\langle \text{out}, \left[\begin{array}{ll} \textit{word} & \\ \text{HEAD} & \textit{prep} \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \text{VP}\ \rangle \\ \text{COMPS} & \langle\ (\text{PP} \mid \text{NP})\ \rangle \end{array}\right] \end{array}\right] \right\rangle$$



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# What's wrong with this?

$$\left\langle \text{out}, \left[\begin{array}{ll} \textit{word} & \\ \text{HEAD} & \textit{prep} \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ (\text{NP})\ (\text{PP})\ \rangle \end{array}\right] \end{array}\right] \right\rangle$$



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# What's wrong with this?

$$\left\langle \text{out}, \left[\begin{array}{ll} word & \\ \text{HEAD} & prep \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\,\rangle \\ \text{COMPS} & (\ \text{NP} \mid \text{PP}\ ) \end{array}\right] \end{array}\right] \right\rangle$$



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# What's wrong with this?

$$\left\langle \text{grew}, \begin{bmatrix} word \\ \text{HEAD} & \begin{bmatrix} verb \\ \text{AGR} & 3sing \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \text{NP}\ \rangle \\ \text{COMPS} & \langle\ \text{AP}\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$



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# What's wrong with this?

$$\left\langle \text{out}, \left[\begin{array}{ll} \textit{word} & \\ \text{HEAD} & \textit{preposition} \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ (\ \text{NP} \mid \text{PP}\ )\ \rangle \end{array}\right] \end{array}\right] \right\rangle$$



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# What's wrong with this?

$$\left\langle \text{there}, \left[\begin{array}{ll} \textit{phrase} & \\ \text{HEAD} & \textit{prep} \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \end{array}\right] \right\rangle$$



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# Tags & lists

- What's the difference between these two?

$$\left[\text{SPR} \quad \boxed{1}\langle\ \text{NP}\ \rangle\right]$$

$$\left[\text{SPR} \quad \langle\ \boxed{1}\text{NP}\ \rangle\right]$$

- When does it matter?



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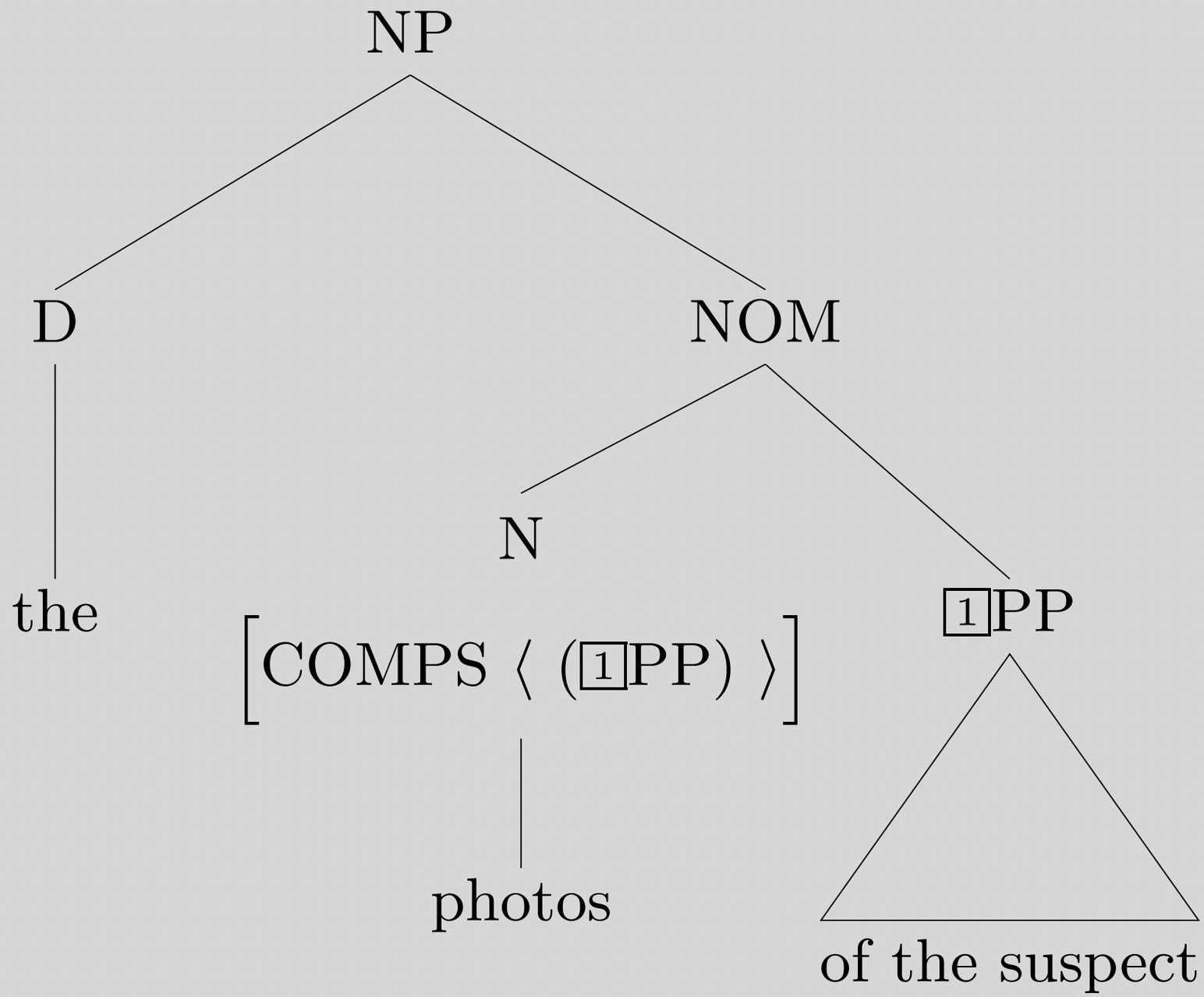
# What's wrong with this tree?



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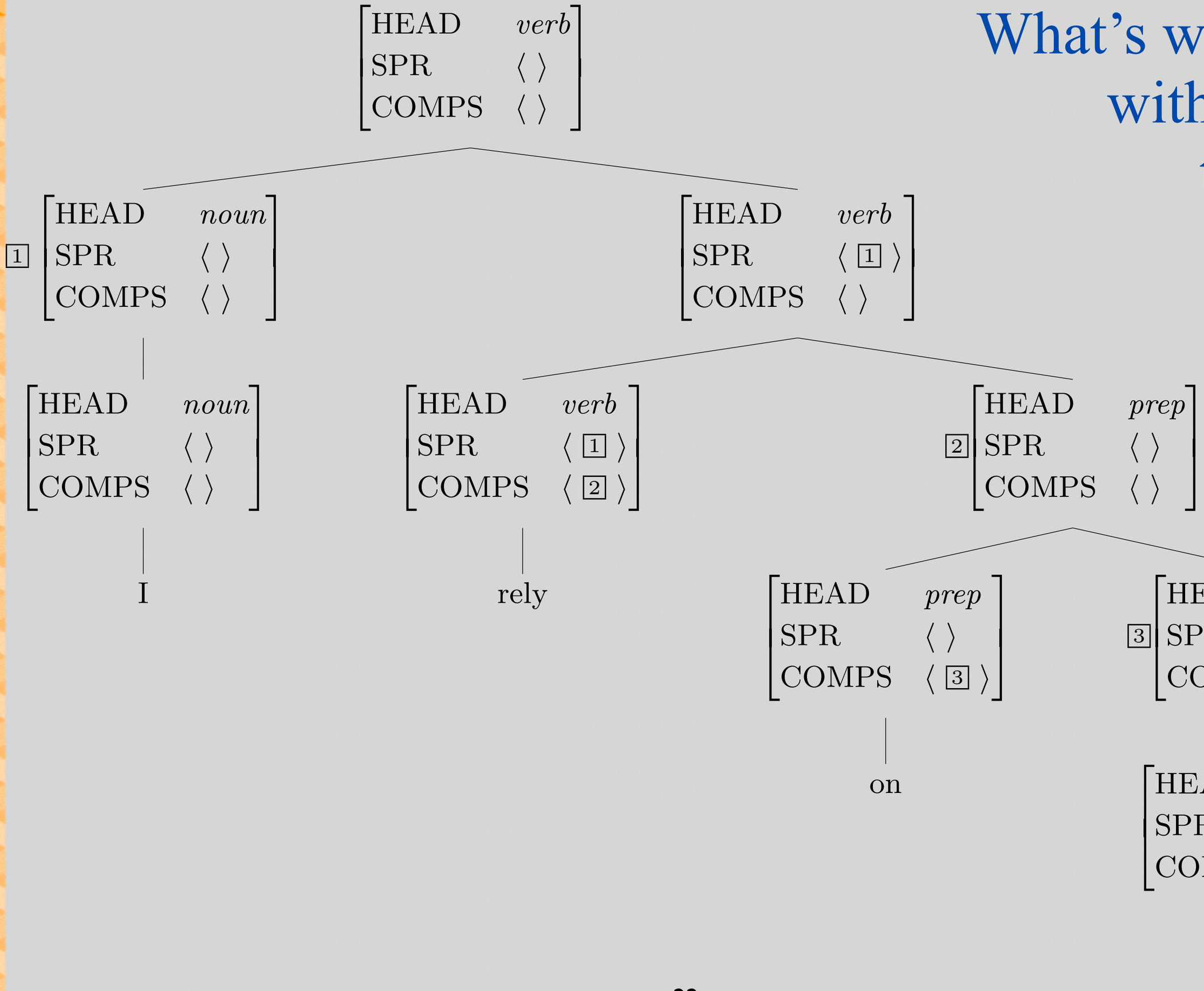




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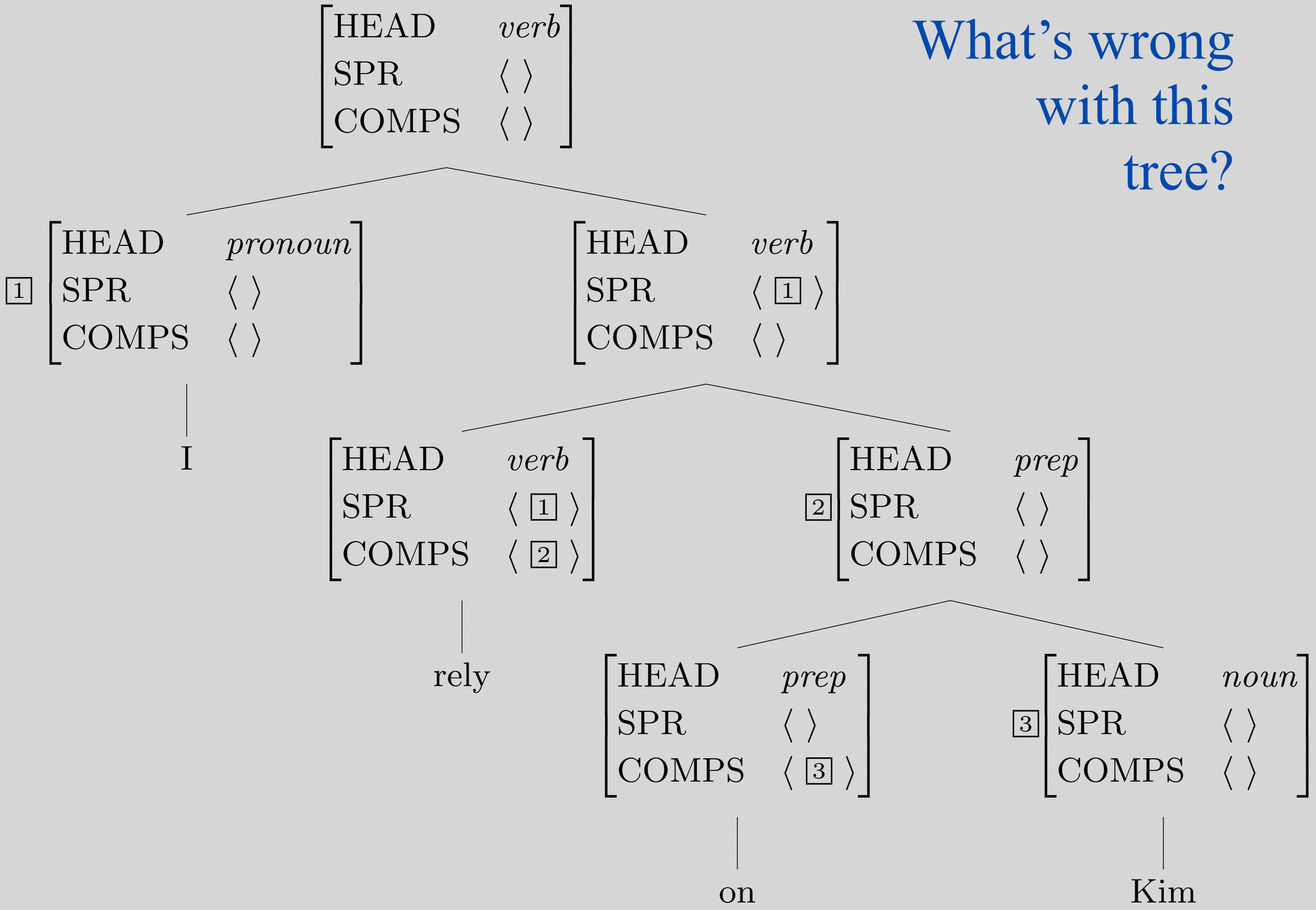




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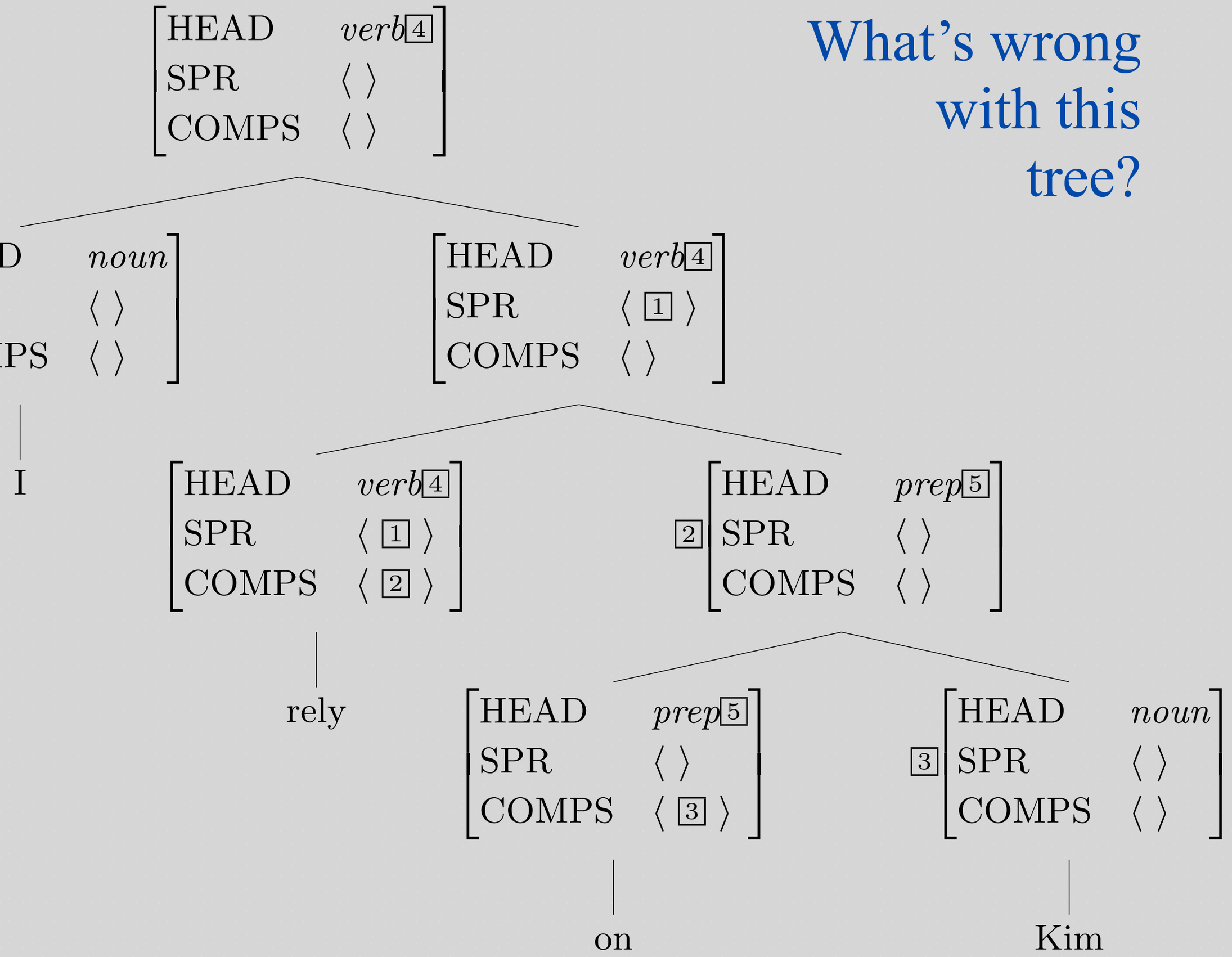




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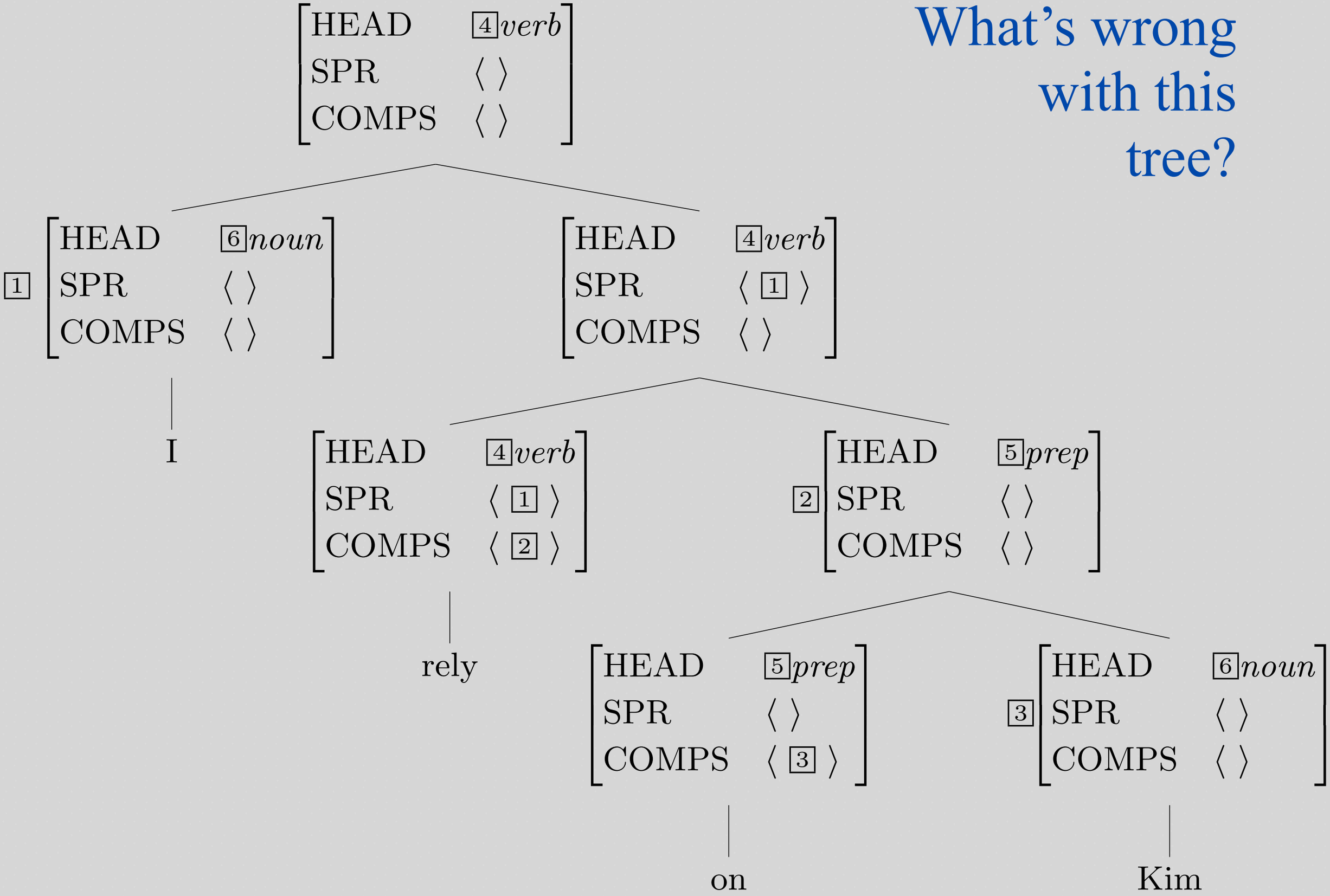




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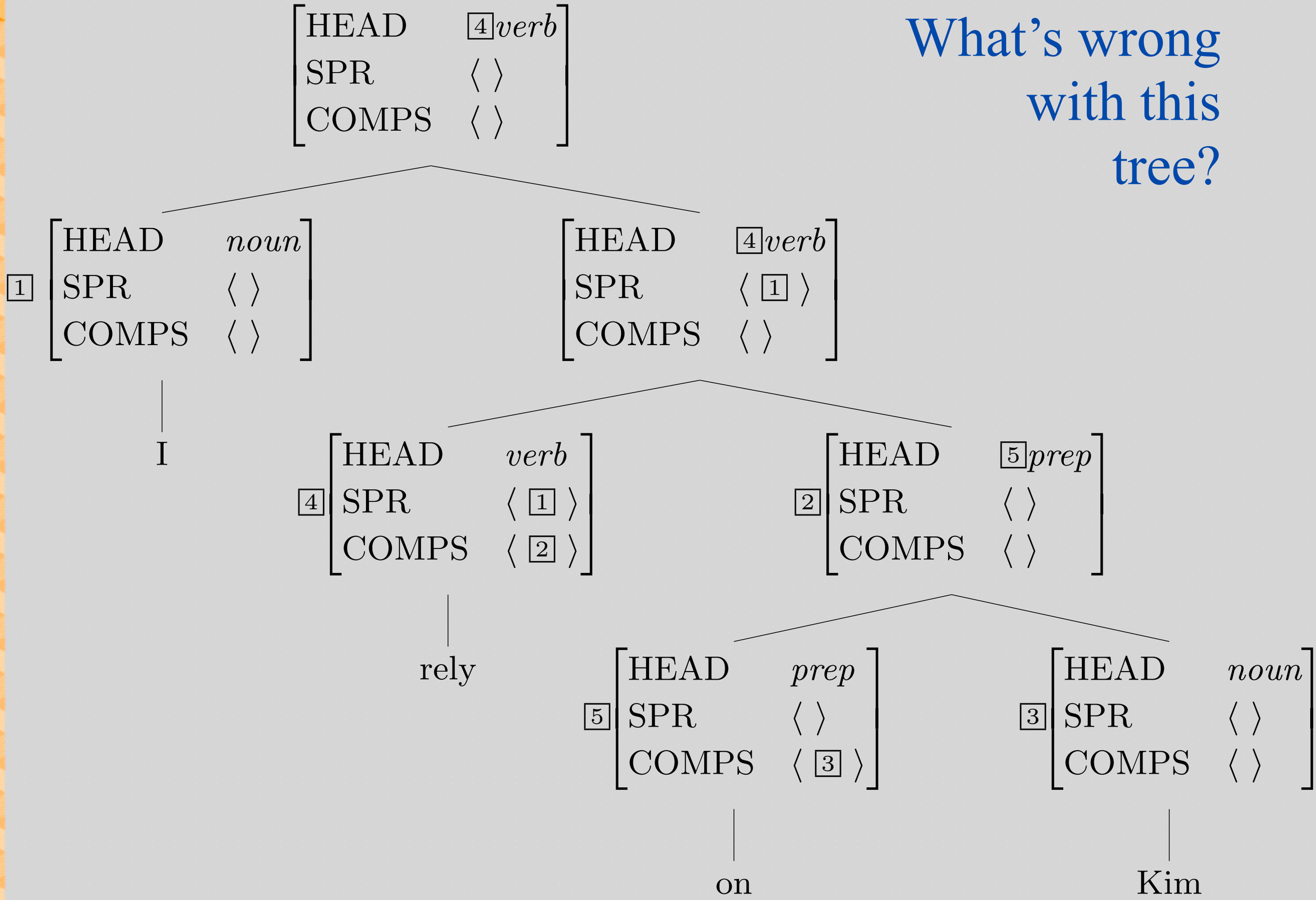




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# What's wrong with this?

$$\left\langle \text{hundred} \;,\; \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{number} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle \begin{bmatrix} \text{HEAD} & \textit{number} \\ \text{INDEX} & j \end{bmatrix} \rangle \\ \text{COMPS} & \langle \begin{bmatrix} \text{HEAD} & \textit{number} \\ \text{INDEX} & k \end{bmatrix} \rangle \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & m \\ \text{MODE} & \textit{ref} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \textit{hund-number} \\ \text{MULTIPLIER} & j \\ \text{ADDEND} & k \\ \text{HUND-VALUE} & m \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$



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# And this?

$$\left\langle \text{hundred} , \left[\begin{array}{ll} \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & \textit{number} \\ \text{VAL} & \left[\begin{array}{lll} \text{SPR} & \langle & \left[\text{HEAD} \quad \textit{number}\right] \rangle \\ \text{COMPS} & \langle & \left[\text{HEAD} \quad \textit{number}\right] \rangle \end{array}\right] \end{array}\right] \\ \text{SEM} & \left[\begin{array}{ll} \text{INDEX} & i \\ \text{MODE} & \textit{ref} \\ \text{RESTR} & \left\langle \left[\begin{array}{ll} \text{RELN} & \textit{times} \\ \text{RESULT} & k \\ \text{FACTOR1} & l \\ \text{FACTOR2} & m \end{array}\right], \left[\begin{array}{ll} \text{RELN} & \textit{constant} \\ \text{INST} & m \\ \text{VALUE} & \textit{100} \end{array}\right], \left[\begin{array}{ll} \text{RELN} & \textit{plus} \\ \text{RESULT} & i \\ \text{TERM1} & j \\ \text{TERM2} & k \end{array}\right] \right\rangle \end{array}\right] \end{array}\right] \right\rangle$$



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# How about this?

$$\left\langle \text{hundred} \;,\; \left[\begin{array}{ll}
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \textit{number} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \left\langle \left[\begin{array}{ll} \text{HEAD} & \textit{number} \\ \text{INDEX} & l \end{array}\right] \right\rangle \\
\text{COMPS} & \left\langle \left[\begin{array}{ll} \text{HEAD} & \textit{number} \\ \text{INDEX} & j \end{array}\right] \right\rangle
\end{array}\right]
\end{array}\right] \\
\text{SEM} & \left[\begin{array}{ll}
\text{INDEX} & m \\
\text{MODE} & \textit{ref} \\
\text{RESTR} & \left\langle \left[\begin{array}{ll} \text{RELN} & \textit{times} \\ \text{RESULT} & k \\ \text{FACTOR1} & l \\ \text{FACTOR2} & m \end{array}\right], \left[\begin{array}{ll} \text{RELN} & \textit{constant} \\ \text{INST} & m \\ \text{VALUE} & \textit{100} \end{array}\right], \left[\begin{array}{ll} \text{RELN} & \textit{plus} \\ \text{RESULT} & i \\ \text{TERM1} & j \\ \text{TERM2} & k \end{array}\right] \right\rangle
\end{array}\right]
\end{array}\right] \right\rangle$$

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# Better version

$$\left\langle \text{hundred}\ , \left[\begin{array}{ll}
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \textit{number} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \left\langle \left[\begin{array}{ll} \text{HEAD} & \textit{number} \\ \text{INDEX} & l \end{array}\right] \right\rangle \\
\text{COMPS} & \left\langle \left[\begin{array}{ll} \text{HEAD} & \textit{number} \\ \text{INDEX} & j \end{array}\right] \right\rangle
\end{array}\right]
\end{array}\right] \\
\text{SEM} & \left[\begin{array}{ll}
\text{INDEX} & i \\
\text{MODE} & \textit{ref} \\
\text{RESTR} & \left\langle \left[\begin{array}{ll} \text{RELN} & \textit{times} \\ \text{RESULT} & k \\ \text{FACTOR1} & l \\ \text{FACTOR2} & m \end{array}\right], \left[\begin{array}{ll} \text{RELN} & \textit{constant} \\ \text{INST} & m \\ \text{VALUE} & \textit{100} \end{array}\right], \left[\begin{array}{ll} \text{RELN} & \textit{plus} \\ \text{RESULT} & i \\ \text{TERM1} & j \\ \text{TERM2} & k \end{array}\right] \right\rangle
\end{array}\right]
\end{array}\right] \right\rangle$$

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# Overview

- Reading questions
- Homework tips
- SPR and COMPS
- Common mistakes
- Review answer to 4B (HW2)
- Analogies to other systems you might know



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# Type hierarchy analogies

- How is this formalism like OOP?
- How is it different?
- How is the type hierarchy like an ontology?
- How is it different?
- How is this formalism like the MP's formalism?
- How is it different?



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