

Phrases structure rules
(This is not a question, just some information you will need.)

You may assume the following phrase structure rules for English when answering the questions in this homework.

\[
\begin{align*}
S & \rightarrow \text{NP (Aux)} \ V P \\
CP & \rightarrow (C) \ S \\
VP & \rightarrow V \ (NP) \ (CP) \\
VP & \rightarrow VP PP \\
NP & \rightarrow (\text{Det}) \ \text{Adj*} \ N \\
NP & \rightarrow NP PP \\
PP & \rightarrow P \ NP
\end{align*}
\]

Remember that:

- The C in CP is a complementizer, like the word “that” in “John thinks that Bill is intelligent.”
- Auxiliaries (sometimes called “helping verbs”) are words like “has” in “John has left”, or “will” in “John will leave.”

Pronouns
We assume that pronouns are a kind of noun. So for example, him is an NP like this:

\[
\begin{align*}
\text{NP} & \\
\text{N} & \\
\text{him}
\end{align*}
\]
Question 1

[10 points]

Draw a single tree for each of the following English sentences under their most natural interpretations.

a. Mary touched Bill on the arm.

b. The man with a grey coat has seen the man with a blue coat.
c. Mary saw a man with a cake with white icing.

d. John thinks that the delicious ice-cream\(^1\) has melted.

\(^1\) You may assume that ice-cream is a single word.
Question 2
In English, simple yes/no questions are constructed by reversing the order of the subject and the auxiliary in a sentence. For example, we create the question in (B) by reversing the order of John (subject) and has (auxiliary) in (A):

(A) John has left.
(B) Has John left?

(There is also a change in the intonation of the sentence between (A) and (B), but we will be ignoring that for the purposes of this question.)

a. [5 points]
Mary proposes that in order to account for questions like (B), we should modify our phrase structure rule for S as follows:

\[ S \rightarrow (\text{Aux}) \text{NP} (\text{Aux}) \text{VP} \]

Draw trees for (A) and (B) using Mary’s new rule.
b. [5 points]
Unfortunately, Mary’s new rule overgenerates. In other words, when combined with the other phrase structure rules, the rule allows us draw trees which don’t correspond to acceptable English sentences. Give one such tree.

Bonus question (3 extra credit points)
Explain how we could generate questions such as (B) using a transformation without modifying our original phrase structure rule for S.
Question 3

[5 points]

In English, pronouns virtually always appear in the same place as other types of NP. For example, we can replace the NP “the man” in (i) with the pronoun “him,” as shown in (ii):

i. John saw the man.
ii. John saw him.

However, in Romance languages such as French, Spanish, Italian, etc., pronouns often appear in a different position from other NPs. Here are some Spanish examples:

a. Julio vio el auto
Julio saw the car

b. Julio lo vio
Julio it saw (= English “Julio saw it.”)

c. Julio ha visto el auto
Julio has seen the car

d. Julio lo ha visto
Julio it has seen (= English “Julio has seen it.”)

The English word order for these pronouns is bad in Spanish. For example, (e) and (f) are NOT acceptable Spanish sentences:

e. Julio vio lo *****BAD*****
I saw it

f. Julio ha visto lo *****BAD*****
Julio has seen it

Assuming that the phrase structure rules for Spanish are the same as those for English,² state a transformational rule which allows us to generate sentences (b) and (d) without modifying the phrase structure rules. This rule should involve moving the pronoun lo (“it”³) from one place to another. You don’t need to account for the position of any Spanish pronouns other than lo (which is the only pronoun in the data above).

² If we were looking at a wider variety of Spanish sentences, we would have to (i) change the NP rule to put adjectives after the noun rather than before the noun and (ii) make C obligatory rather than optional in the CP rule; but these changes wouldn’t make any difference to this question.

³ Lo can mean him as well as it, but this isn’t relevant to the question.