

Ling 240

**Homework #4: Constituents, PS rules and transformation (3 pages); total 10 points**

This homework should be typed (or handwritten VERY neatly) and handed in **TOMORROW!!!**

**Part A: Constituency Tests** (2 points total)

Determine whether the underlined strings are constituents by applying constituency tests. For each example, say whether the string is a constituent or not and show **at least one constituency test** which supports your answer.

(0.5 point each)

1. Sandy admired the tall woman with the purple coat.
2. Sandy admired the tall woman with the purple coat.
3. Sandy admired the tall woman with the purple coat.
4. Lee read the book in the library. (where the location of reading is the library)

**Part B: Phrase Structure Trees** (1 point total)

Draw complete phrase structure trees for the following sentences. Make sure that all nodes are labeled with their syntactic category (lexical or phrasal). You can draw these by hand, but they should be neat and presentable (copied over from scratch).

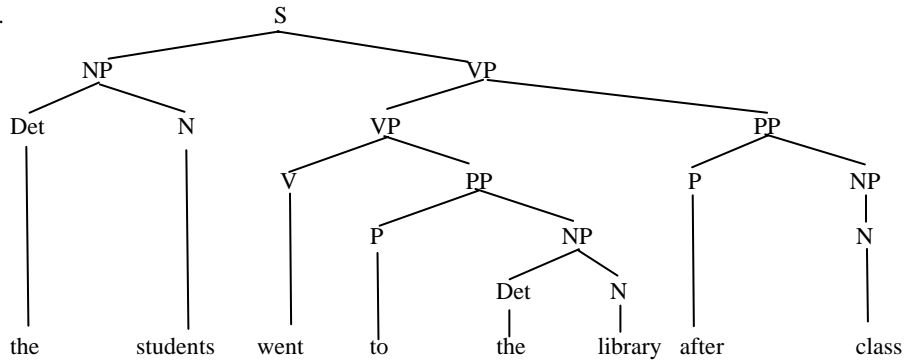
(0.5 point each)

5. Sandy admired the tall woman with the purple coat.
6. Lee read the book in the library. (where the location of reading is the library)

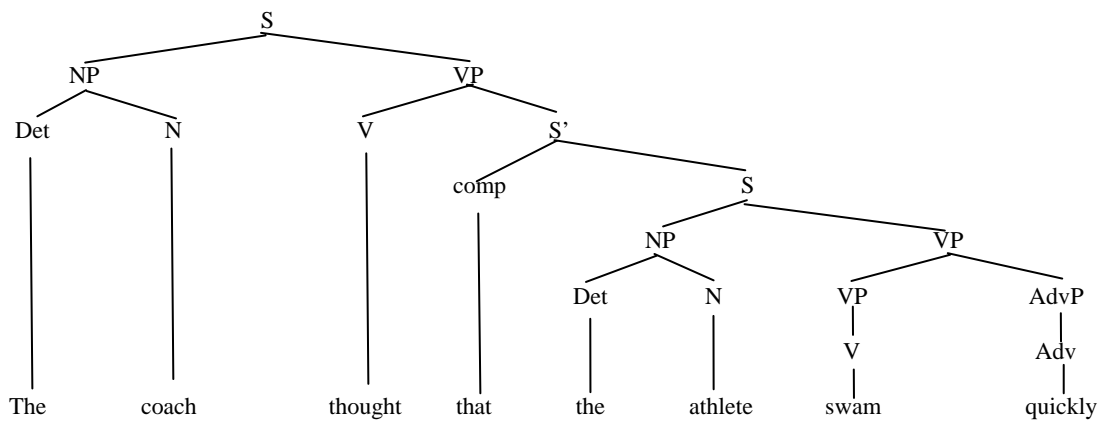
**Part C: Phrase Structure Rules (4 points total)**

Consider the following phrase structure trees:

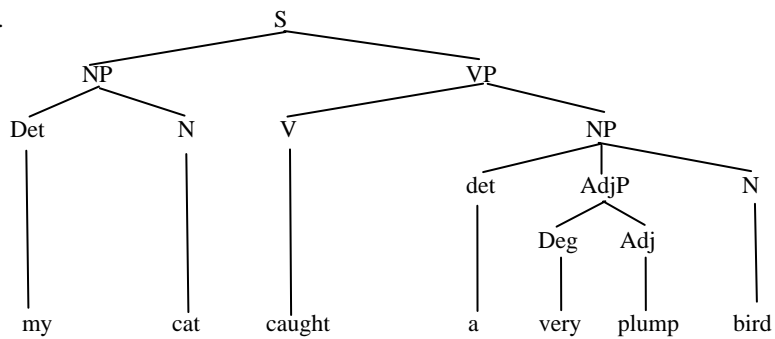
7.



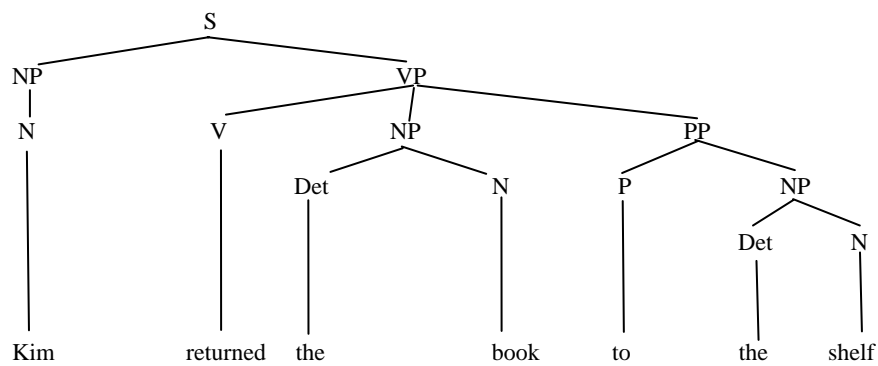
8.



9.



10.



a. Give a set of phrase structure rules that will generate the four sentences in (7-10) above. Make sure to give one set of rules that is an accurate generalization for all of the trees, rather than giving a different set of rules for each tree. (For example, the rule  $S \rightarrow NP VP$  should only be listed once in your answer, not four times!) Use parentheses to allow you to collapse several rules into one. (Parentheses indicate an optional element in the rule.) But make sure that your rules do not overgenerate! If you need to use more than one rule for VP in order to generate all and only the possible sentences, make sure that you do so! Your rules should only account for these sentences (and closely related sentences). You do NOT need to think of other example sentences to base your rules on.  
(2 points)

b. Draw two more trees that your rules in Part C can generate. Draw the trees from the rules starting with S, and then fill in words in the lexical categories. The sentences do not have to make sense (but they should be grammatical if your rules were correct to begin with).  
(0.5 point each)

c. Now give two sentences that your rules in Part C do NOT generate. Draw a tree for them, and explain what part of the tree is inconsistent with your rules.  
(0.5 point each)

**Part D: Transformation** (3 points total)

a. The following sentences were generated by applying certain transformation rules. For each sentence, a) identify what the transformation was, and b) draw the deep structure tree prior to the application of the transformation.  
(0.5 point each)

- i. The rabbits were chased by the cats.
- ii. Will the journalist finish the article?
- iii. What should the janitor clean?

b. These transformational rules look very similar to what we did in the constituency tests. Explain why transformation can reveal the constituency of natural language sentences (Note: Make sure you refer to a universal property of transformational rules in natural languages).  
(1.5 point)