

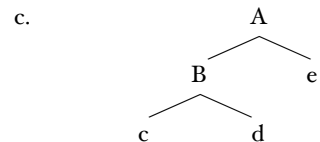
Homework Assignment IX
Due: Wednesday, November 29, 2006 (beginning of class)

Tree Structures

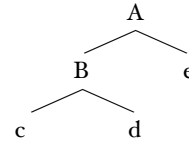
Convert the following bracket structure representations to tree representations, or vice versa:

a. $[_A \text{ b } [_C \text{ d e }]]$

b. $[_A [_B \text{ c } [_D \text{ e f }]] [_G [_H \text{ i }] [_K \text{ l m }]]]]$



Are the statements below true or false of this tree:



- a. c precedes e
- b. A immediately dominates c
- c. A dominates c
- d. e dominates d
- e. d immediately dominates B
- f. B precedes e

The current state of MiniEnglish

Currently we have the following rules in our little grammar:

Lexicon

- N → dog | cat | elephant | bear | raccoon | house | apple | tail
(and their plural versions)
- V → run | sleep | chase | eat | live | sneeze
(and their past tense versions, as well as 3rd person present tense (+s))
- A → small | fast | witty | scared | uncomfortable | old
- DAdv → very | quite | slightly | somewhat
- Adv → quietly | quickly
- Det → the | some
- P → in | into | through | behind | with

Phrase Structure Rules

- AP → (DAdv) A PP → P NP
- NP → (Det) N'
Det is optional only if the head N is plural or mass.
- N' → AP N' N' → N' PP
- N' → N S → NP VP
- VP → VP PP
- VP → V (NP) (NP)
Optionality of NPs depends on the subcategory of V.

i. *Tree Structures*

Give the tree structure for the following sentence, according to the MiniEnglish grammar on the left.

The very small cat scared some elephants.

2. For the following sentences, figure out whether the grammar above can or cannot produce them. ('Yes' or 'No' will do as an answer, but if you're not sure, just start drawing the tree and see whether you can get all the way from the words to the 'S' root node with the rules of MiniEnglish.)
- a. Dogs run.
 - b. The dogs run through the house.
 - c. Witty raccoons chase scared elephants.
 - d. Dogs with tails are fast.
 - e. Some cat sleeps.
 - f. Elephants think that dogs run.
 - g. Dogs run fast.
 - h. The cat sleeps in the house.
 - i. The cat sleeps in the house and the bear sleeps behind the house.
 - j. The house sleeps quietly.
3. Pick one of the examples from 2. above that the grammar of MiniEnglish cannot produce, and propose a rule that we could add so that the grammar of MiniEnglish can produce that sentence.

4. Extra credit:
Can you find an example of overgeneration that is caused either by your proposed rule, or by the grammar of MiniEnglish we have in place?

That is, find an example that MiniEnglish (with or without your rule) can produce, but shouldn't (assuming we want to model 'real' English with MiniEnglish).

5. (not extra credit ☺)
Structural Ambiguities

The following sentence can correspond to two trees according to our rules of MiniEnglish.

The dog scared the cat with the tail.

- a. Draw the two trees.
- b. The sentence actually also has two meanings. Paraphrase the meanings and say which one corresponds to which tree.