„Semantic Theory“ SS 06 Exercise 4 (16/05/2005)

http://www.coli.uni-saarland.de/courses/semantics-06/

Note: Throughout this exercise, you are allowed (and encouraged) to abbreviate recurring terms appropriately, as long as it is clear what each abbreviation refers to. In particular, you don't have to spell out the meaning representations of the determiner and noun inside simple two-word noun phrases like "every student" or "some professors". You may (and should) also β-reduce expressions as much as possible as you go along.

1 Nested Cooper Storage and Prepositions

The following sentence contains a scope ambiguity involving three quantifiers.

$[_{NP}$ Every $[_{N'}$ researcher $[_{PP}$ of $[_{NP}$ a company]]]] sees a sample.

Use Nested Cooper Storage to derive all five readings of this sentence. Use the standard analyses of transitive verbs from the lecture and of the preposition from Exercise 3.

Do you think that all five formulas you can derive this way are plausible readings of the sentence?

2 Cooper Storage and Negation

One limitation of Nested Cooper Storage is that it can only deal with scope-bearing elements that are noun phrases, and not with adverbs, negation, etc. For instance, it will only derive one reading for the sentence "Every student didn't pass-the-exam" because it contains only one noun phrase which can ever be put in the quantifier store.

(a) Add new rules to Nested Cooper Storage that allow you to store and retrieve negations. You can analyse the word "didn't" syntactically as a VP modifier; its semantic representation should be of type $\langle t, t \rangle$.

(b) Use your extended Nested Cooper Storage to derive the two readings of the sentence "Every student didn't pass-the-exam."

3 Cooper Storage and Scope Islands

Another limitation of Nested Cooper Storage is that it is insensitive towards scope islands: It will derive three different readings for the sentence "Some professors believe-that all students are-intelligent," whereas the sentence arguably is not ambiguous.

(a) Pick a formula that is *not* a good semantic representation for this sentence, and show how to derive it with Nested Cooper Storage. Analyse "believe-that" as a sentence-embedding verb whose semantic representation has type $\langle t, \langle e, t \rangle \rangle$, and "some" simply as an existential quantifier.

(b) Fix the problem by modifying the rules of Nested Cooper Storage, in such a way that the quantifier store must be emptied (of all quantifiers and negations) at each sentence node. Then show that your analysis in (a) would not be possible with your modified rule system.

4 A shortcut

As a general rule, it is safe to always apply the Storage rule to the subject NP of a sentence and then forget the original semantic value of the subject.

That is, whenever you can derive a semantic value $\langle M, \emptyset \rangle$ for a sentence S by applying the original semantic value of the subject NP directly to that of the VP, you can also derive a semantic value $\langle M', \emptyset \rangle$ for S by applying the Storage rule to the subject and then applying the result of the Storage rule to the VP, in such a way that M' is $\alpha\beta\eta$-equivalent to M.

Explain as clearly as possible (preferrably in a formal proof) why this is the case. Is the reverse claim also true?

To be turned in by 23/05/2005, 11:15 am