SS 06 29. Mai 2006

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Grammatikformalismen für die Computerlinguistik

Aufgabenblatt 4

Exercise 1. [3 points] Write up the following simple abstract feature structures, where $\mathbb{A}_1$, $\mathbb{A}_2$ and $\mathbb{A}_3$ are the examples from pages 55–56 of *Grammar Formalisms and Parsing*, by stating their basis set, their re-entrancy relation and their label function:

1. $\mathbb{A}_1$/LIKES-BEST (the LIKES-BEST reduct of $\mathbb{A}_1$),
2. $\mathbb{A}_2$/OWNER (the OWNER reduct of $\mathbb{A}_2$),
3. $\mathbb{A}_3$/LIKES-BEST (the LIKES-BEST reduct of $\mathbb{A}_3$.)

It might be useful to start with drawing the corresponding concrete feature structures in MoMo and then to think about their abstract counterparts.

Exercise 2. [4 points]

(a) We presuppose the signature of lists and animals first given in Section 2.1.2. How many simple abstract feature structures satisfy the following description?

`pet, color:~green.`

Create a MoMo file with an interpretation window that contains (MoMo counterparts of) all these feature structures. Using the link
`http://milca.sfs.uni-tuebingen.de/A4/Course/Momo/mmps/Section231/non-green-pets231.mmp`
you may download an mmp file that already contains the necessary signature.

(b) How many simple abstract feature structures satisfy the following description?

`pet *> color:~green.`

Add three examples to your mmp file (in a second interpretation window).

Exercise 3. [4 points] Translate the SPEC PRINCIPLE, page 62, and the CONTROL THEORY, page 63, into our syntax of descriptions (under Pollard and Sag's signature).
Recall that MoMo does not use the symbols $\exists$ and $\forall$ as quantifier symbols, since they do not belong to the standard symbols of keyboards. $\exists$ is written as `^`, and $\forall$ is written as `V` (capital V). $\exists X$ thus becomes `^X` and $\forall X$ is written as `VX`. Following the conventions of the Prolog computer language, variables are written with an initial capital letter and may consist of strings of letters. Some examples for variables in MoMo are: `H`, `Z`, `W`, `Head`, `Color`.
Please test the well-formedness of your translations in MoMo on the basis of an adequately large fragment of the signature of Pollard and Sag in MoMo. For the

purpose of this exercise, we have prepared an mmp-file,
`http://milca.sfs.uni-tuebingen.de/A4/Course/Momo/mmps/Section231/signature-fragment231.mmp`
that already contains the necessary fragment of Pollard and Sag's signature for downloading. You may notice that Pollard and Sag use sorts of the shape *list(synsem)* (so-called "parametric sorts"). For simplicity, we leave out the specification in brackets for now. Instead of "*list(synsem)*", we write "*list*".

Exercise 4. [3 points] Once again we presuppose the signature of lists and animals of Section 2.1.2. Consider the two descriptions shown in (a) and (b)

(a) `^X X:two`

(b) `VX X:two`

1. Draw two feature structures under our signature: The first one should satisfy the description (a), the second one the description (b).
2. Is there a feature structure with more than one node which satisfies (a)? If your answer is yes, give an example. If your answer is no, show why not.
3. Is there a feature structure with more than one node which satisfies (b)? If your answer is yes, give an example. If your answer is no, show why not.