Grammar Development in Constraint-Based Grammar Formalisms

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Exercise Sheet 1

1. In the directory `~dm/lehre/clark99/sample-grammars/2` you find a ConTroll grammar. Create a subdirectory `sample-grammars/2` under one of your directories. Copy the files `theory` and `signature` to your subdirectory `sample-grammars/2`. Then start Xtroll in that directory, compile the grammar and, using the commands on the ConTroll Reference Card, ask the following questions about the following four types: *sign*, *word*, *phrase* and *head*.

   (a) Which **immediate** subtypes does each of these four types have?

   (b) Which are the most specific subtypes for each of the four types?

   (c) What are **all of** the subtypes of each of the four types?

   (d) Which immediate supertypes does each of the four types have?

   (e) What are **all of** the supertypes of each of the four types?

   (f) Which attributes with which values are appropriate for each of the four types?

   (g) Which of the following descriptions are in accordance with the requirements of the signature? If a description is inconsistent, what causes the inconsistency?

      i. `(phon:ne_list, synsem:category:head:noun)`
      ii. `(synsem:cat:head:case:nom)`
      iii. `(phon:[john,laughs])`
      iv. `((context:backgr:  ([], e_list)))`
      v. `(~ noun)`
      vi. `(person:third, number:sign, gender:fem)`
      vii. `(synsem:context:backgr:[john,gender,head:vform:bse])`
      viii. `(phrase, phon:list, synsem:category:head:case:vform:bse, dtr1:phrase)`
      ix. `(word, synsem:head:noun, dtr1:synsem:category:head:noun)`
      x. `(synsem:category:head:noun, dtr1:dtr2:synsem:category:head:noun)`
      xi. `(synsem:  (category:head:verb, content:nom_obj))`

xii. `(synsem:category:head:verb, synsem:content:nom_obj)`

xiii. `(word, phon:walks)`

xiv. `(synsem:category:head:case:nom, synsem:category:head:verb)`

xv. `(synsem:category:head:(~ case:nom), synsem:category:head:verb)`

xvi. `(~ synsem:category:head:case:nom, synsem:category:head:verb)`

xvii. `(synsem:category:head:case:  (~ nom), synsem:category:head:verb)`

xviii. `(synsem:category:head:case:nom; synsem:category:head:verb)`

xix. `(synsem:category:head:  (noun ; verb))`

xx. `(arg1:Index,arg2:Index)`

xxi. `(X,phrase,dtr1:X)`

xxii. `([(X,number:sing),(X,person:third),(X,gender:masc),first])`

xxiii. `([(X,number:sing),(X,person:third),(X,gender:masc),index:X])`

xxiv. `[backgr:X,phon:X]`

xxv. `[(backgr:X,phon:X)]`

xxvi. `[backgr:X,phon:X,([],X)]`

2. In preparation for the following two exercises please create a subdirectory `sample-grammars/ex1.2` under one of your directories.

   Then please copy the files `theory` and `signature` from the directory `~dm/lehre/clark99/sample-grammars/2` to your subdirectory `sample-grammars/ex1.2`. The files copied are a simple grammar licensing sentences which consist of intransitive verbs, such as *walks*, and simple nominative NPs such as *she*.

   (a) Please extend the grammar so that it licenses sentences with first-person, singular pronouns, such as *I walk*.

   This will require you to specify lexical entries for *I* and *walk*. Note that in ConTroll you have to use lower key *i* as phonology.

   (b) Please extend the grammar in such a way that transitive verbs such as *loves* can be combined with simple accusative NPs such as *him* to form VPs, which can in turn be combined into sentences with nominative NPs such as *she*.

   As in the first exercise, you have to specify new lexical entries, for *him* and *loves*. In addition you need to add an ID-rule for licensing VPs and extend the signature.