Übung 3

November 19, 1999

This week you will be doing more paper and pencil work than programming. You will be writing a context free phrase structure grammar for a small fragment of English, along the lines of the Affix Hopping Grammar presented in lecture.

I said that this Übung didn't involve much programming, but that is not quite correct. You should code up your grammar in the Definite Clause Grammar formalism (restricted to atomic category symbols) so that you can test it online.

Remember that the DCG formalism is very convenient, but it restricts you to doing top-down recognition. Which means you must be careful about writing left recursive rules like:

```
np --> np, ['\'s'], n.  % e.g., [the queen of england]'s dogs
```

Attempting to recognize sentences with a grammar like this will lead to infinite proof searches.

Subject Verb Agreement Assume for the moment that the only verb in our fragment is *be*. In particular, copular *be*, not the progressive or passive auxiliary. You can use the catch-all category `complement` to cover all the things that can follow the copula (noun phrases, adjectives, prepositional phrases). Then feel free to expand `complement` directly into terminal strings, as in

```
complement --> [a,doctor].
complement --> [tired].
complement --> [luckier,than,he,is,wise].
%%% etc.
```

We will worry about parsing such expressions some other day.

Assume also that all of our sentences are in the present (non-perfective, non-progressive, active). So you need not worry for the moment about the grammar of the English modal-auxiliary complex.

Calculating the number of the subject noun phrase requires parsing it. Consider the following examples:

(1) *a boy*

(2) *three boys*

(3) *the boy*

(4) *the boys*

(5) *three sheep*

(6) *the sheep*

The point is that there is a sort of number agreement within the noun phrase that holds between the determiner and the noun. However, which of the two actually determines the number of the whole phrase can vary. Agreement assures that (a) redundant information may exist in the sentence and (b) it is reliable.

Combining Grammars Now consider how you would combine the Agreement Grammar you just wrote with the Affix Hopping Grammar I presented in class. First, of course, you have to decide how to fit the copula into that grammar. Note in particular that it seems to co-occur with the progressive without any problems.

(7) *She is being difficult today.*

But I cannot think of an example of a "passive copular construction."

(8) $*$*A doctor was been by John for most of his life.*

Implement as much of the combined grammar as you can. Observe how the number of categories increases, and how that in turn forces an increase in the number of rules.