Introduction to symbolic CL (684.01) OSU Linguistics
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Exercise sheet 4
(Due: Monday, 5. Feb at noon, in my email or mailbox)

1. We saw in class that the standard DCG implementation produces translations in a way exemplified by the following:

   ```
   s --> np, vp
   s(S0,S) :- np(S0,S1), vp(S1,S).
   ```

   and a DCG is used as a recogniser by giving goals such as:

   ```
   ?- s([john,smiled],[]).
   ```

   Consider a proposed alternative implementation that instead produced a translation of one of the following kinds:

   ```
   s(S0,S) :- np(S1,S), vp(S0,S1).
   s(S0,S) :- vp(S0,S1), np(S1,S).
   s(S0,S) :- vp(S1,S), np(S0,S1).
   ```

   Assuming that the same kind of query is to be presented,

   - Which of these are correct translations, given the meaning of the original phrase structure rule?
   - What sort of recognition behaviour do they produce?

2. It is cumbersome to distinguish verbs according to their subcategorization requirements and repeat this distinction in the rules realizing the head and its arguments:

   ```
   v(1) --> v(intrans), [].
   v(1) --> v(trans), n(2).
   v(1) --> v(ditrans), n(2), n(2).
   ```

   Can you think of a way of using the DCG meta-variable mechanism to get over this inconvenience? If so, write and test a simple grammar exemplifying your idea.

3. Write and test a DCG grammar which will recognize all sentences in the first column and reject all those in the second:

Mary has laughed.	*Mary has laughing.*
Mary is laughing.	*Mary are laughing.*
Paul is a duck.	*Paul is a ducks.*
We see three ducks leave.	*Paul is three ducks.*
We see her leave.	*We see her leaves.*

   and it should provide two distinct analyses for *Paul saw her duck.*