Assignments for Syntactic and semantic parsing for natural language understanding 2017

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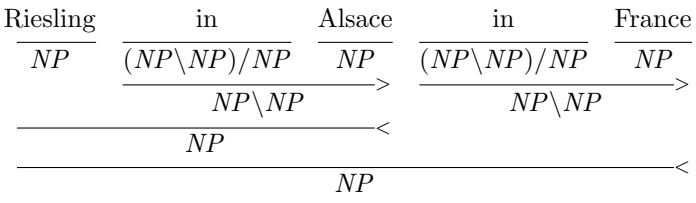
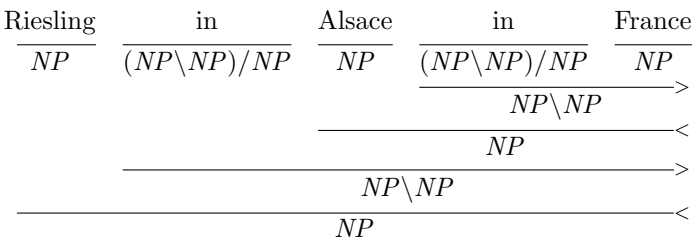
1 Submission

- Report due: January 31, 23:59 (JST)
- Format: Electronic file (pdf in A4 format)
- Language: English or Japanese
- Details: Send an e-mail attaching a pdf file to `noji@is.naist.jp`. The file may be generated either by scanning hand-written papers, or by some softwares such as LaTeX and Word. The last section shows some hint to produce a CCG derivation on LaTeX (Using LaTeX is **not** obligatory).
- Contact: If you have any questions, visit A705 **after** contacting me by an e-mail.

2 Problems



(a) One derivation.



(b) Another derivation.

As in the above figure, the phrase "Riesling in Alsace in France" can be analyzed in two different ways. Now answer the following questions.

Q1. Let us assume we have lexicon in Figure 1. Then, what is the logical form for the analysis of (b)? (Hint: The logical form of (a) becomes $in(in(R', A'), F')$.) (60 points)

Q2. There is another, third derivation on the supertag assignments of (a) and (b). Find and depict it. (Hint: use a composition rule) (20 points)

Q3. The logical form of the third derivation found in Q2 would be the same as the one of (a) or (b). Which one? Answer (a) or (b). (20 points)

Riesling	NP	R'
in	$NP\backslash NP/NP$	$\lambda x.\lambda y.in(y,x)$
Alsace	NP	A'
France	NP	F'

Figure 1: Lexicon. Tuples of (word, CCG category, logical form).

3 Producing CCG derivations on LaTeX

There are several LaTeX libraries for depicting a CCG derivation. The following style file is an example.

`https://github.com/jasonbaldridge/cg-latex/blob/master/ccg.sty`

Using this, the first CCG derivation on this file is generated with the following command:

```
...
\usepackage{ccg}
...
\begin{figure}[h]
\deriv{5}{
{\rm Riesling}&{\rm in}             &{\rm Alsace}&{\rm in}         &{\rm France} \\
\uline{1}     &\uline{1}            &\uline{1}   &\uline{1}        &\uline{1}    \\
\it NP        &\it (NP\bs NP)/NP    &\it NP      &\it (NP\bs NP)/NP&\it NP       \\
              &\fapply{2}           &\fapply{2}                                    \\
              &\mcc{2}{\it NP\bs NP}&\mcc{2}{\it NP\bs NP}                        \\
\bapply{3}                                                                       \\
\mcc{3}{\it NP}                                                                  \\
\bapply{5}                                                                       \\
\mcc{5}{\it NP}                                                                  \\
}
\end{figure}
```