

## Exercise 3

### 1 Computational Semantics

#### 1.1 Formal Semantics

1. First Order Predicate Logic is popular for representing the meaning of a sentence within computational linguistics. Why? What are the benefits of First Order Predicate Logic for Natural Language Processing?
2. Jurafsky and Martin present a Neo-Davidsonian approach to semantic representation in that they assume an event variable in the representations. Show what a representation for *Peter bought a book on logic in Konstanz*. would look like.

#### 1.2 DRT and the Boxer System

The English text we have been working with is repeated in (1).

- (1) At the age of one, Harry had somehow survived a curse from the greatest dark sorcerer of all time, Lord Voldemort, whose name most witches and wizards still feared to speak. Harry's parents had died in Voldemort's attack, but Harry had escaped with his lightning scar, and somehow — nobody understood why — Voldemort's powers had been destroyed the instant he had failed to kill Harry.  
[J.K. Rowling, *Harry Potter and the Chamber of Secrets*]

Try to process the above text semantically. For this, use Johan Bos' Boxer system. This is based on a CCG (Constraint-Based Categorical Grammar) and uses DRT

(Discourse Representation Theory) for its formal semantic representations. The system is usable on-line via the following website:

<http://gmb.let.rug.nl/webdemo/demo.php>

You can get some help on interpreting the DRSs (Discourse Representation Structures) on this page:

<http://svn.ask.it.usyd.edu.au/trac/candc/wiki/DRSs>

Note: make sure to replace the “—” with commas in the second sentence. The system works better.

1. Try to understand the DRSs as well as possible.
2. Do you think a Q&A system could be designed to answer the following questions based on the Boxer output? That is, is the necessary information in the DRSs and is it represented correctly?
  - Who died?
  - Whose power was destroyed?
  - Did Voldemort kill Harry?
  - Did Harry survive?
  - Whose name do most wizards and witches fear to speak?