Challenge 4: Grammars

1

Extend the simple English grammar $G_3$ given in class to account also for adjectives and prepositional phrase. Your grammar must recognize (and assign plausible structures to) sentences such as:

- The Englishman lives in the red house.
- The Spaniard owns the dog.
- Coffee is drunk in the green house.
- The Ukrainian drinks tea.
- The man in the yellow house smokes Chesterfields.
- The Japanese smoke Parliaments.

2

Extend the grammar of the previous section to account also for simple questions. Your grammar must recognize (and assign plausible structures to) interrogative sentences such as:

- Who owns the zebra?
- Who drinks water?
- What does The Norwegian smoke?
- What does the French own?
- Where is juice drunk?

Note that questions can refer to the subject or the object of the sentences.

3

Design a unification grammar for the language $\{a^n^2 \mid n > 0\}$. 
Submission

Implement the first two grammars with PATR. You may not be able to implement the third one due to problems with processing of unit rules by PATR. Submit:

- The full code of each of the grammars, including the lexicons;
- Printouts of the trees assigned by the first two grammars to the example sentences above;
- A list of sentences you used to check the first two grammars, for which the grammars produce plausible trees (no need to submit printouts);
- Any additional documentation recording the considerations you applied when designing the grammars (optional for the first two, mandatory for the third).