

Compilers, Spring Term 2022  
Assignment 1

Due on May 10, by 23:59

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In this assignment, you will need to do some (simple) research and read about *definite clause grammars*.<sup>1</sup> Using Prolog, write a parser for a definite clause grammar of *English-Light*. English-Light is a fragment of English (i.e., English-Light does not include any ungrammatical English sentences) which accounts for structures as those appearing in the following examples.

- a) The young boy pushed and stored a big box in the large empty room after school.
- b) The old woman and the old man gave the poor young man a white envelope in the shed behind the building.
- c) Every boy quickly climbed some big tree and every girl watched some boy whom she liked.
- d) Some brilliant students and many professors watched and admired talented lecturers and appreciated bright scientists and researchers.
- e) Who climbed the big tree?
- f) What did professors do?

Your lexicon should include all the words appearing in the examples above, at least twenty nouns, at least twenty verbs with the past tense or infinitive inflection (infinitive verbs only appear in interrogatives sentences like (f)), at least twenty adjectives, at least ten adverbs, at least ten prepositions, at least five determiners, the object pronoun “whom”, and the interrogative pronouns “who” and “what”.

Your grammar should contain *no*  $\varepsilon$ -rules and should have the symbol  $s$  as its start variable.

A successful parse should result in building a parse tree for the input; make sure your parser generates such a tree. We linearly represent a parse tree as follows:

- a)  $l$ , where  $l$  is the label of a leaf.
- b)  $p(l_1, l_2, \dots, l_n)$ , where  $p$  is a label of a parent node and  $l_i$  is the  $i^{\text{th}}$  sub-tree thereof, where left-to-right order is assumed.

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<sup>1</sup>Check out [https://en.wikipedia.org/wiki/Definite\\_clause\\_grammar](https://en.wikipedia.org/wiki/Definite_clause_grammar) as a starting point.

## Submission Guidelines

- This is an *individual* assignment. You are required to submit a single .pl using the following form <https://forms.gle/wWHmdGN3ktoTcQfy7>. The name of the file should be *only* your ID (Example: 43-1234.pl).
- The soundness and completeness of your grammar will be auto-tested. You need to make sure that queries are of the following format `s(T,[the,boy,pushed,a,box],[])`. run correctly.