Compilers

CMPT 432

Lab 9

Goals

Manipulating Grammars

Notes

It’s good to have a nice grammar that’s easily (?!) parsed in a top-down manner because it’s LL(1). But not all grammars come to us in that way. Thus, we may have to be manipulative and change them. Let’s practice.

Resources

Crafting a Compiler

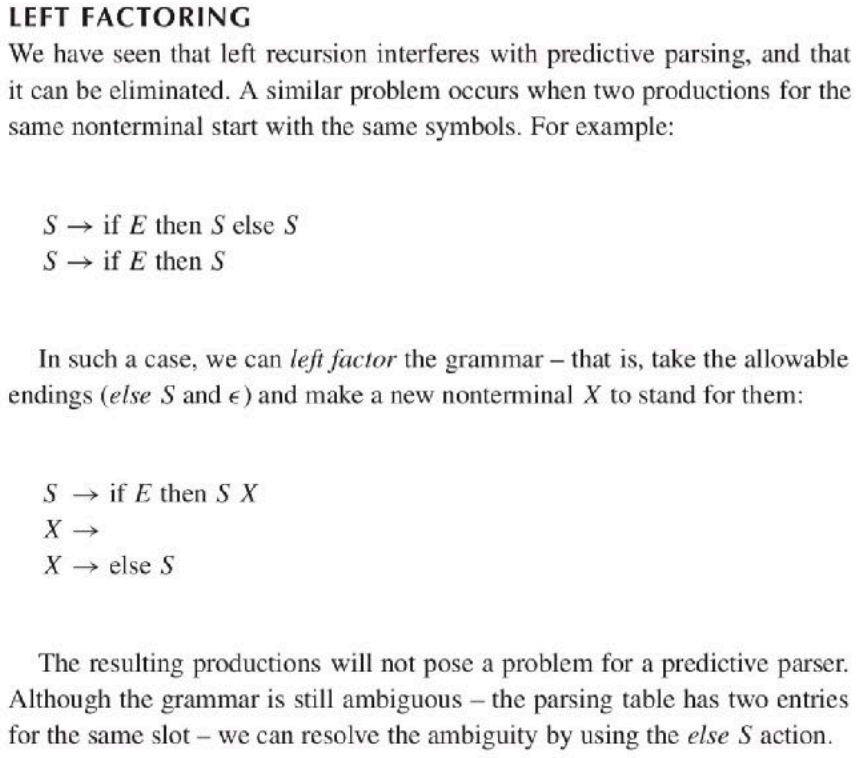
- Read chapters 5.5 and 6.1-2
- Do exercise 5.5.

Dragon

- Read chapters 2.4.5, 4.5-6, and 4.8
- Do exercise 4.5.3

Submitting

Commit a PDF of your work to your GitHub repository and I’ll take a look at it.



LEFT FACTORING

We have seen that left recursion interferes with predictive parsing, and that it can be eliminated. A similar problem occurs when two productions for the same nonterminal start with the same symbols. For example:

$$S \rightarrow \text{if } E \text{ then } S \text{ else } S$$
$$S \rightarrow \text{if } E \text{ then } S$$

In such a case, we can *left factor* the grammar – that is, take the allowable endings (*else* S and ϵ) and make a new nonterminal X to stand for them:

$$S \rightarrow \text{if } E \text{ then } S\ X$$
$$X \rightarrow$$
$$X \rightarrow \text{else } S$$

The resulting productions will not pose a problem for a predictive parser. Although the grammar is still ambiguous – the parsing table has two entries for the same slot – we can resolve the ambiguity by using the *else S* action.

from *Modern Compiler Implementation in Java* by Andrew Appel