

Concepts of Programming Languages, CSCI 305, Fall 2021
Writing an LL(1) Grammar, Oct. 20

Section 2.3.2 Writing an LL(1) Grammar, pages 79-82

Consider the grammar for a restricted kind of real decimal number. Fix the rules so that an LL(1) parser can be used:

$$\begin{aligned} S &\rightarrow - N \\ S &\rightarrow N \\ N &\rightarrow L \\ N &\rightarrow L.L \\ L &\rightarrow D \\ L &\rightarrow D L \\ D &\rightarrow 0 \\ D &\rightarrow 1 \\ &\dots \\ D &\rightarrow 9 \end{aligned}$$

No left recursion problems.

Two cases of common prefixes, both L and D.

$$\begin{aligned} S &\rightarrow - N \\ S &\rightarrow N \\ N &\rightarrow L \\ N &\rightarrow L.L \\ N &\rightarrow L R \\ R &\rightarrow \varepsilon \\ R &\rightarrow . L \\ L &\rightarrow D \\ L &\rightarrow D L \\ L &\rightarrow D R' \\ R' &\rightarrow L \\ R' &\rightarrow \varepsilon \\ D &\rightarrow 0 | 1 | \dots | 9 \end{aligned}$$

Legal LL(1) grammar:

$$\begin{aligned} S &\rightarrow - N \\ S &\rightarrow N \\ N &\rightarrow L R \\ R &\rightarrow \varepsilon \\ R &\rightarrow . L \\ L &\rightarrow D R' \\ R' &\rightarrow L \\ R' &\rightarrow \varepsilon \\ D &\rightarrow 0 | 1 | \dots | 9 \end{aligned}$$