

Grammar Exercises

$$\begin{aligned} r_{\text{expr}} &\rightarrow r_{\text{expr}} + r_{\text{term}} \mid r_{\text{term}} \\ r_{\text{term}} &\rightarrow r_{\text{term}} r_{\text{factor}} \mid r_{\text{factor}} \\ r_{\text{factor}} &\rightarrow r_{\text{factor}} * \mid r_{\text{primary}} \\ r_{\text{primary}} &\rightarrow \mathbf{a} \mid \mathbf{b} \end{aligned}$$

- a) Left factor this grammar.
- b) Does left factoring make the grammar suitable for top-down parsing?
- c) In addition to left factoring, eliminate left recursion from the original grammar.
- d) Is the resulting grammar suitable for top-down parsing?

1.-Left no common factor

2.-The grammar is not suitable, need to eliminate left recursion

3.-

$r_{\text{expr}} \rightarrow r_{\text{term}} A$
 $A \rightarrow + r_{\text{term}} A \mid \epsilon$
 $r_{\text{term}} \rightarrow r_{\text{factor}} B$
 $B \rightarrow r_{\text{factor}} B \mid \epsilon$
 $r_{\text{factor}} \rightarrow r_{\text{primary}} C$
 $C \rightarrow * C \mid \epsilon$
 $r_{\text{primary}} \rightarrow \mathbf{a} \mid \mathbf{b}$

4.-Yes