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Exercises for Section 2.2

Exercise 2.2.1 : Consider the context-free grammar

$$S \rightarrow S S + \mid S S * \mid \mathbf{a}$$

- a) Show how the string $\mathbf{aa+a^*}$ can be generated by this grammar.
- b) Construct a parse tree for this string.
- c) What language does this grammar generate? Justify your answer.

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Exercises for Section 2.3

Exercise 2.3.1: Construct a syntax-directed translation scheme that translates arithmetic expressions from infix notation into prefix notation in which an operator appears before its operands; e.g. , $-xy$ is the prefix notation for $x - y$. Give annotated parse trees for the inputs $9-5+2$ and $9-5*2$.

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Exercises for Section 2.4

Exercise 2.4.1 : Construct recursive-descent parsers, starting with the following grammars:

a) $S \rightarrow + S S \mid - S S \mid \mathbf{a}$