Chapter 2

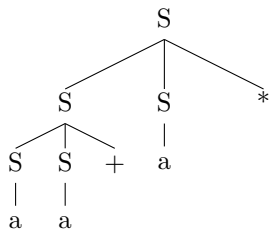
2.2.7 Excercises for Section 2.2

Excercise 2.2.1

a)

$$S \rightarrow S1\ S2\ *$$
$$S1 \rightarrow S3\ S4\ +$$
$$S2 \rightarrow a$$
$$S3 \rightarrow a$$
$$S4 \rightarrow a$$

b)



c) The language generated is the post-fix notation of numbers with multiplication and addition operands.

Excercise 2.2.2

a) The language created is 0^n1^n, where $n \in N^*$.

b) This language is the prefix notation of the addition and difference of the digit a.

c) The language is $[(^n)^n]^m$, where $m, n \in N$ and for every diffferent m the n is different, so closed parenthesis of any depth and length.

d) The language is $(a^n b^n)^m$, where $m, n \in N$ and for different m, the n is also different. So different sequences of a and b where both letter have the same number of appearances.

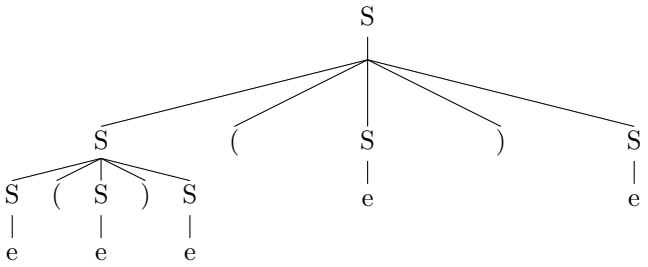
e) This is a grammar to create regular languages (Wikipedia link).

2.2.3

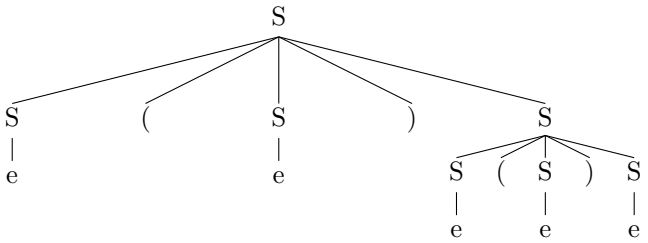
The grammars that are ambiguous are:

- Grammar c: Creating the string "()()" can be done in two ways

  Way A:

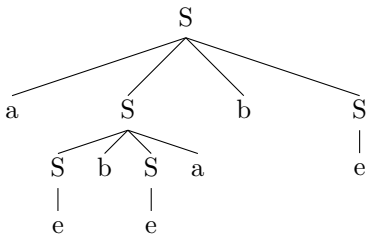


  Way B:

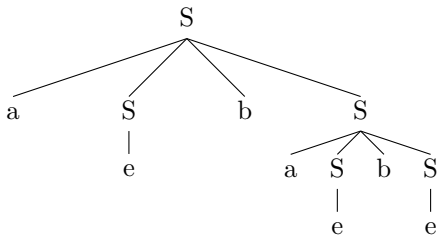


- Grammar d: Creating the string "abab" can be done in two ways:

  Way A:

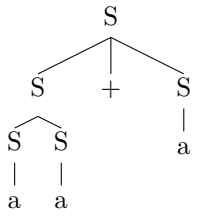


  Way B:

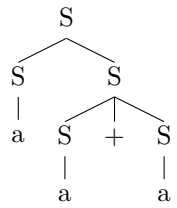


- Grammar e: Creating the string "a a+a" can be done in two ways:

  Way A:



  Way B:



Excercise 2.2.4

a) This is called reverse polish notation (Wikipedia Link)

$$expr \rightarrow expr\ expr\ \text{op} \mid \text{digit}$$

b)