Grammatiche libere dal contesto

$$G = (\Lambda, V, S, P)$$

$$F \rightarrow AB$$

$$A \rightarrow a \mid aA$$

$$B \rightarrow b \mid bB$$

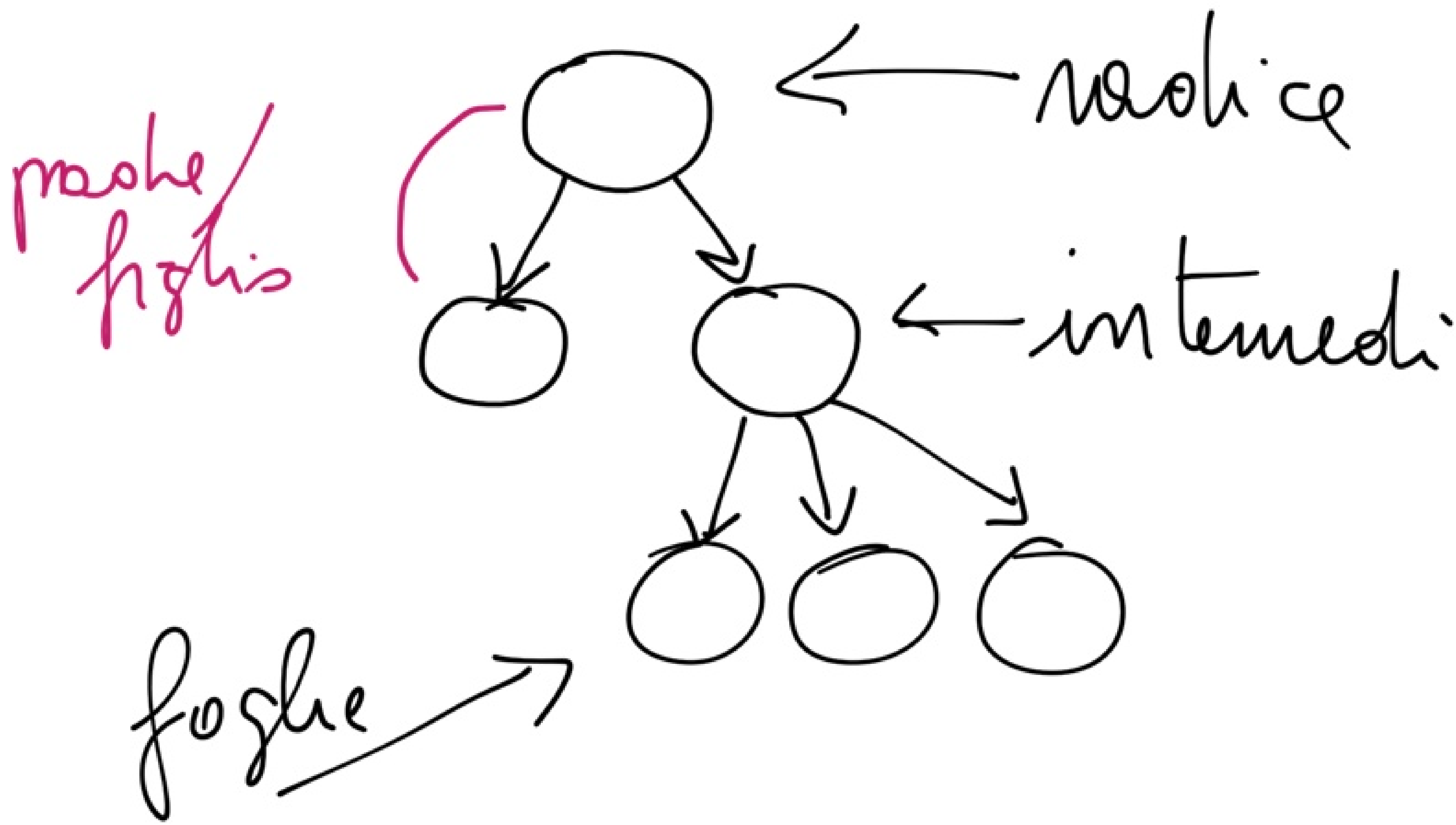
$$A \rightarrow a$$

$$A \rightarrow aA$$

$F \to AB$

$A \to a \mid aA$

$B \to b \mid bB$

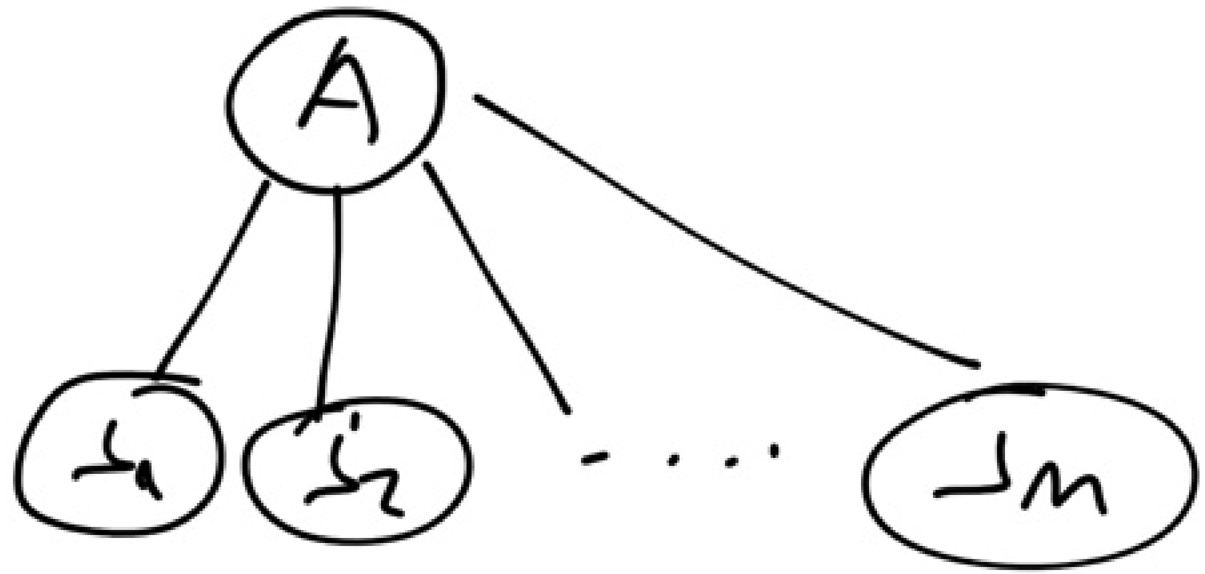


$F \to AB$
$A \to a \mid aA$
$B \to b \mid bB$

Albero di derivazione rispetto a una grammatica.

$G = \langle \Lambda, V, S, P \rangle$

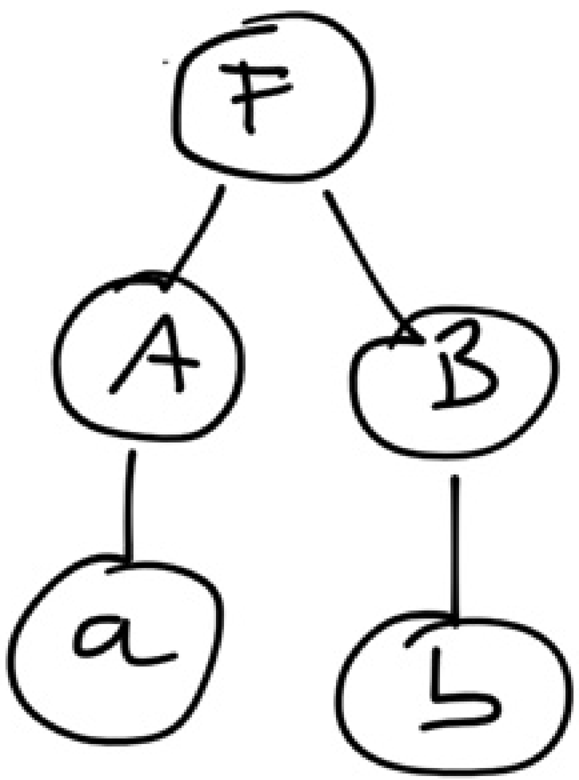
- la radice contiene S (cat. sint. iniziale)
- le foglie contengono simboli $\in \Lambda$



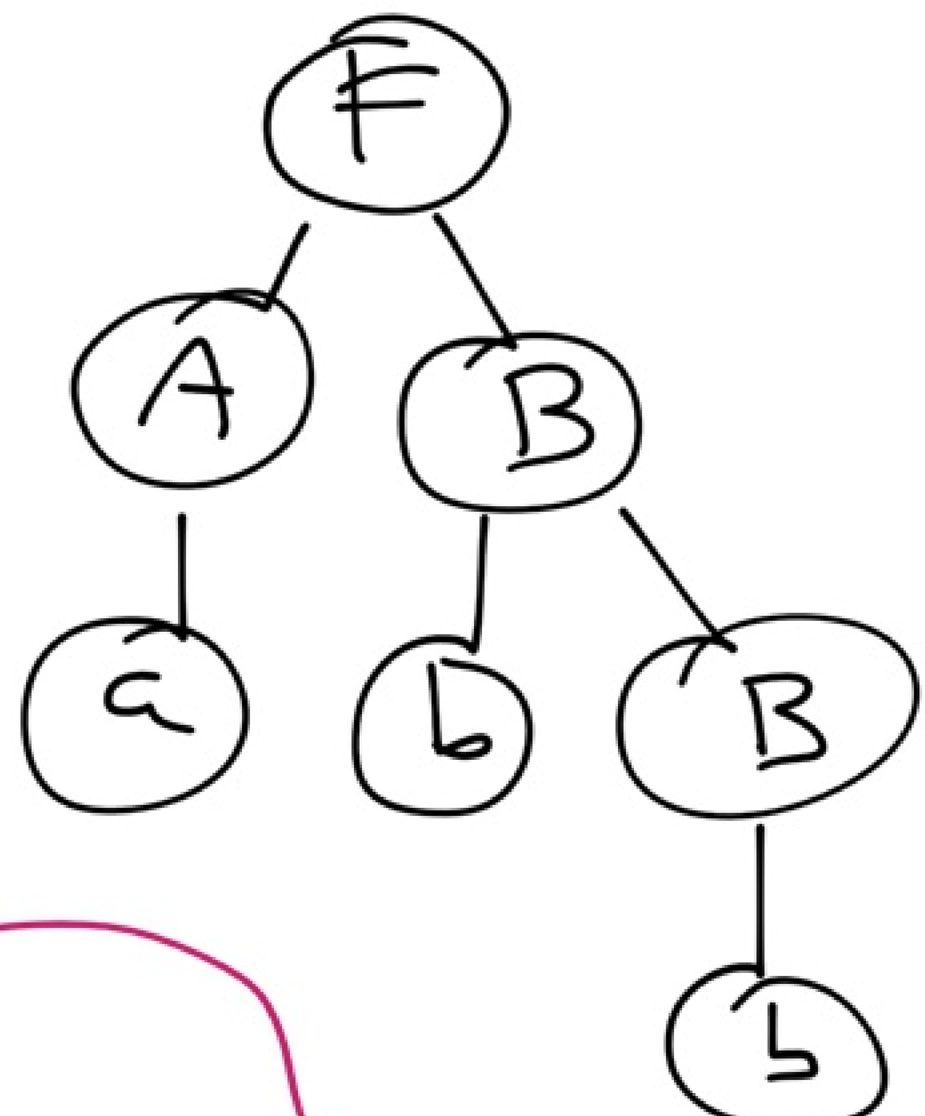
$\equiv$

$$A \to s_1 s_2 \dots s_m \in P$$

$$F \to AB$$
$$A \to a \mid aA$$
$$B \to b \mid bB$$



ab



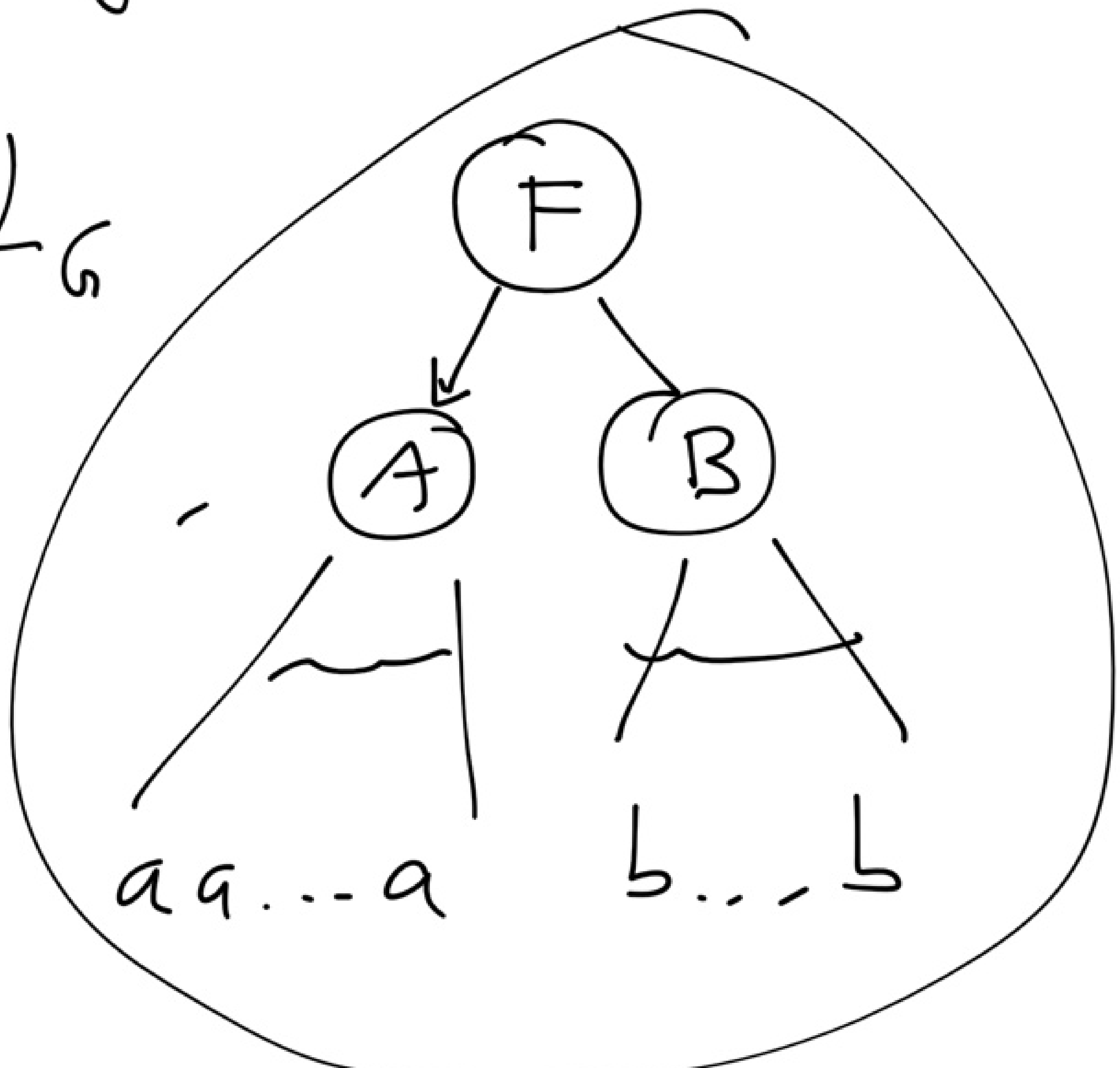
abb

L_G è generato da una grammatica $G = (\Lambda, V, S, P)$ se e solo se

L_G è l'insieme delle stringhe in Λ^* che hanno un albero di derivazione rispetto a G.

$$\left.\begin{aligned} F &\rightarrow AB \\ A &\rightarrow a \mid aA \\ B &\rightarrow b \mid bB \end{aligned}\right\} G$$

$aba \notin L_G$



$$L = \{ a^n b^n \mid n > 0 \}$$

$$\Lambda = \{a, b\} \qquad V = \{S\}$$

$$S$$

$$S \to ab \mid aSb$$

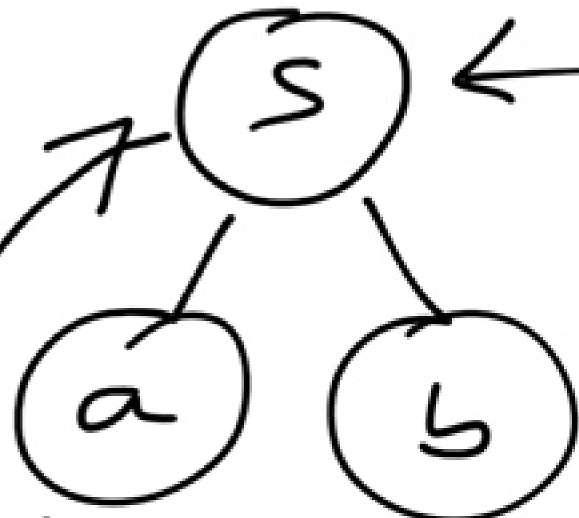
$S \to ab \mid aSb$

simboli minuscoli $\in \Lambda$

" maiuscoli $\in V$

Categ. sint. iniziale è quella della 1^a produzione

$$S \rightarrow \underset{1^a}{ab} \mid \underset{2^a}{aSb}$$

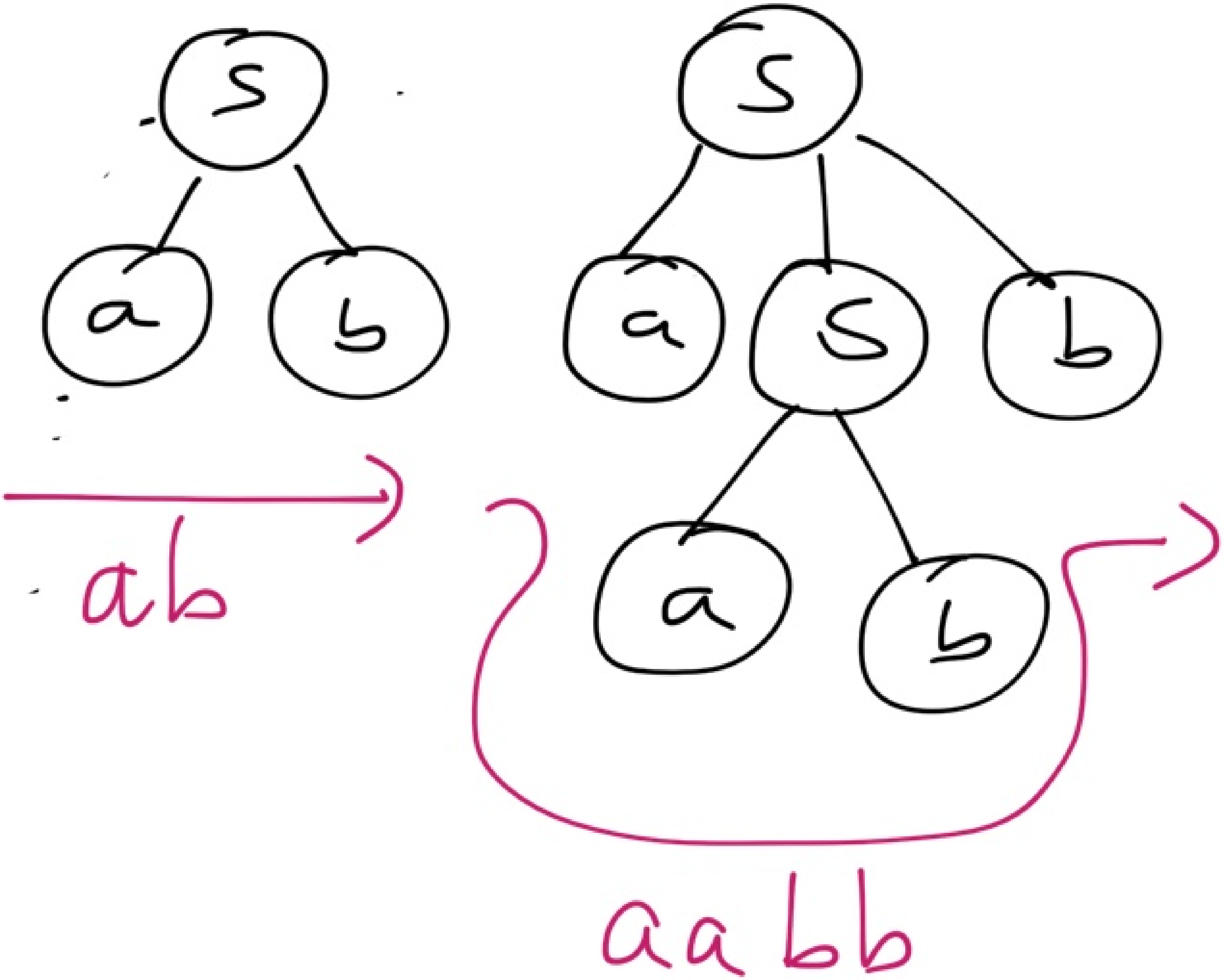


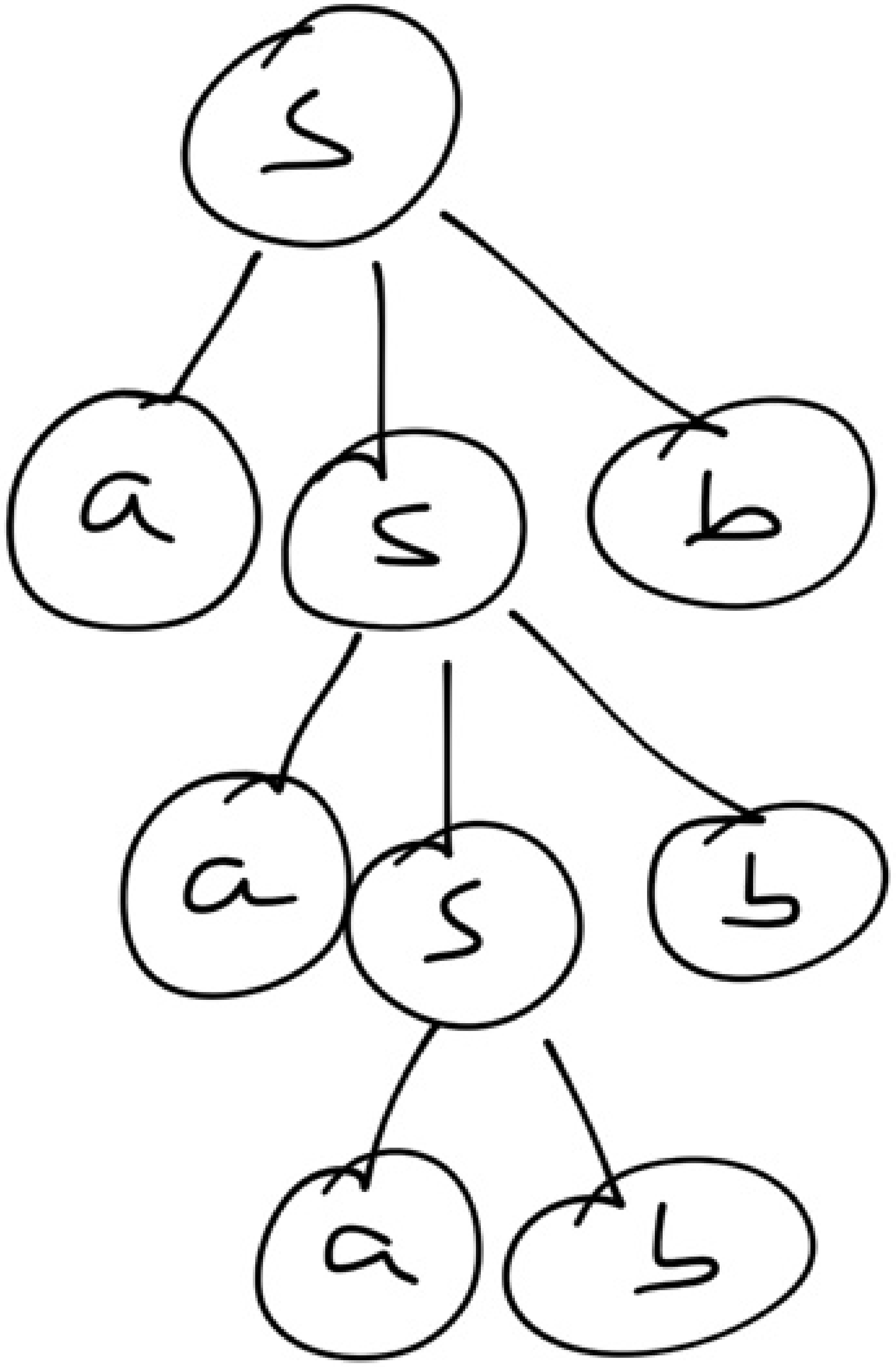
cat. sintatt. distinte

simboli terminali

// non terminali

$S \to \underset{1^a}{ab} \mid \underset{2^a}{aSb}$





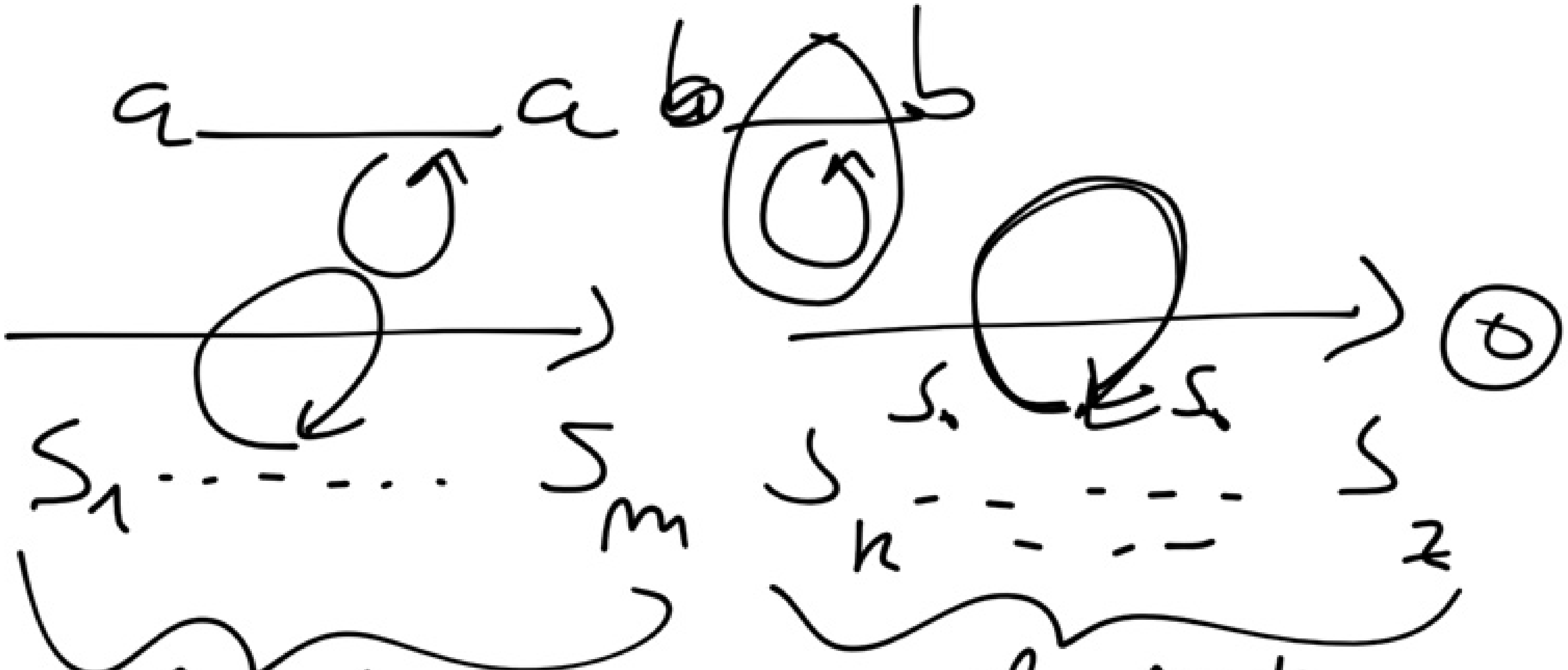
aaabbb

$$\Sigma = \{a, b, c\}$$

$$L = \{\underline{\underline{a^n b^n c^n}} \mid n > 0\}$$

Non esiste nessuna grammatica libera dal contesto che genera L

$$L = \{ \underline{a^n b^m} \mid n, m > 0 \text{ e } n > m \}$$



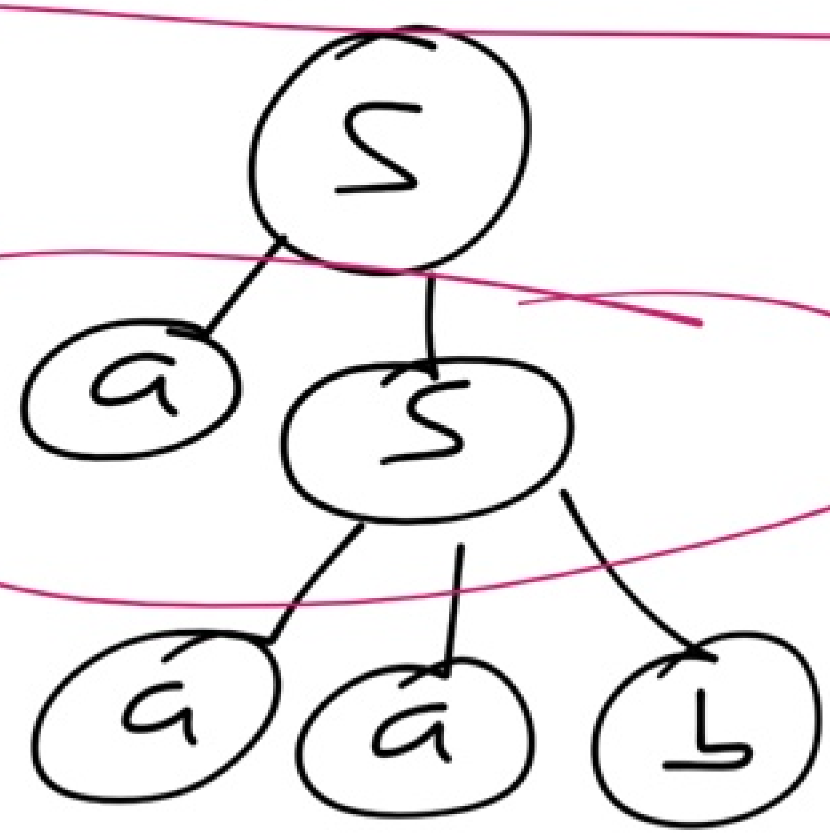
gli stati che attraverso per riconoscere le a

gli stati che attraverso per riconoscere le b

$$L = \{ a^n b^m \mid n,m > 0 \text{ e } n > m \}$$

$$S \to aab \mid aSb \mid aS$$

aaab



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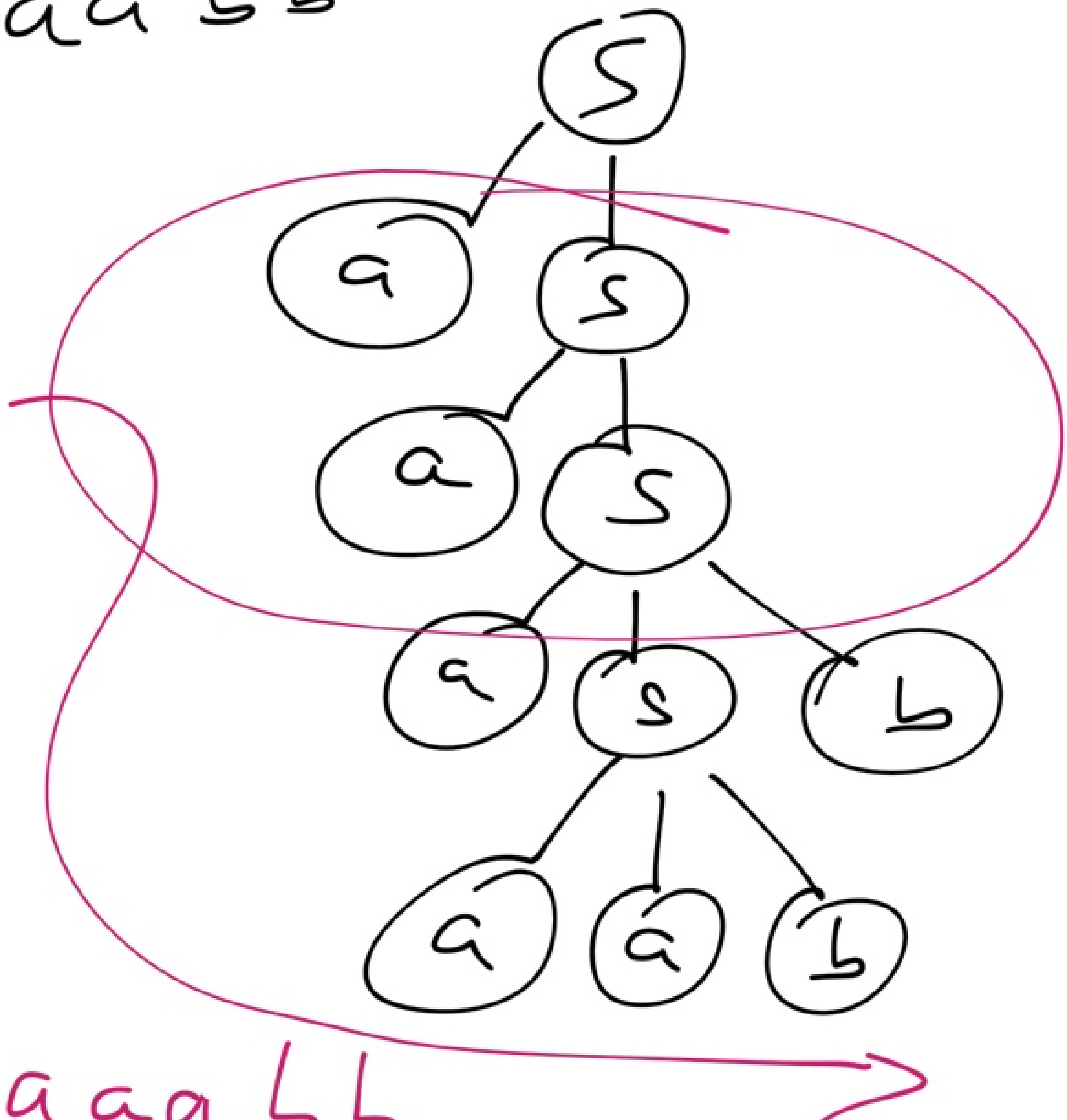
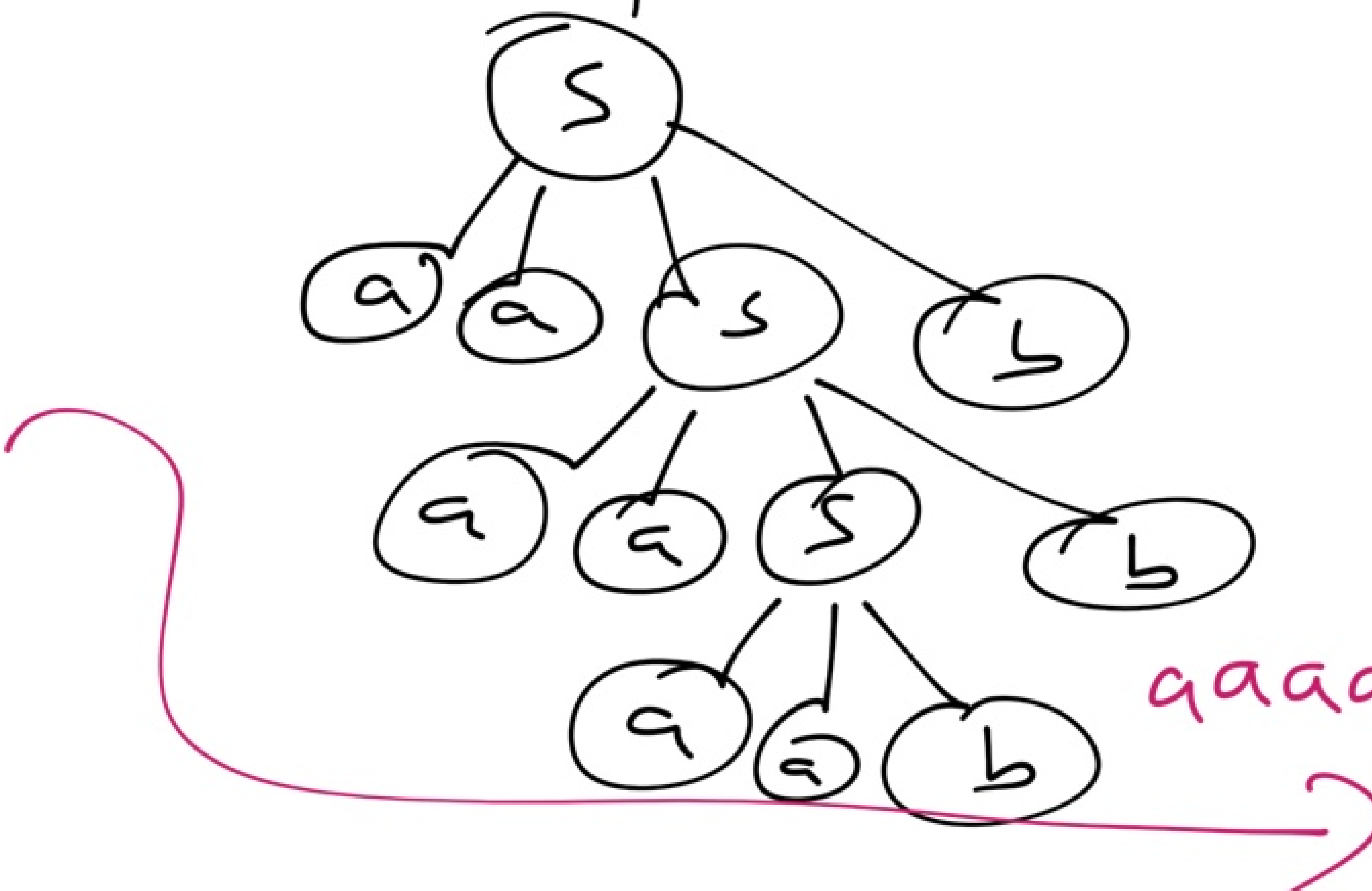


aaaaabb

$$L = \{ a^{2m} b^{m} \mid m > 0 \}$$

$$S \rightarrow aab \mid aaSb$$

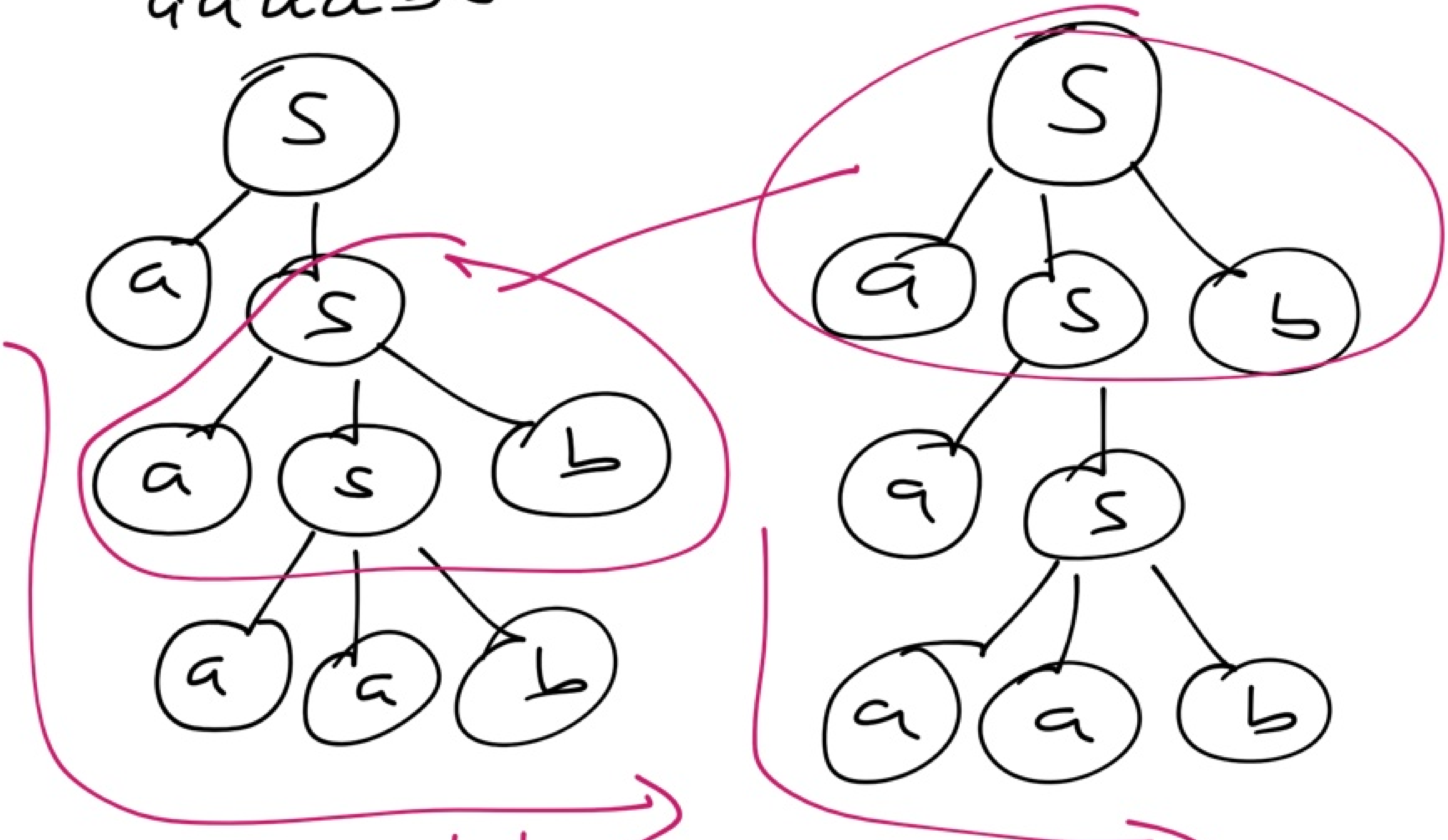


aaaaaabbb

$S \to aab \mid aSb \mid aS$

aaaabb

AMBIGUA



aaaabb aaaabb

Una grammatica G è <u>ambigua</u> se e solo se esiste una stringa che ha più di un albero di derivazione in G

Una grammatica per le espressioni sui naturali con operatori * e +.

$\Sigma = \{0, 1, \dots, 9, *, +\}$

$22 + 1 - 30$ $\quad$ 125

$22 + \emptyset$ $\quad$ $\emptyset$

$\cancel{3 + * 5}$

$\cancel{0125 + 3}$

$\cancel{+3}$ $\quad$ $0 + 3$

$$E \to N \mid E+E \mid E*E$$

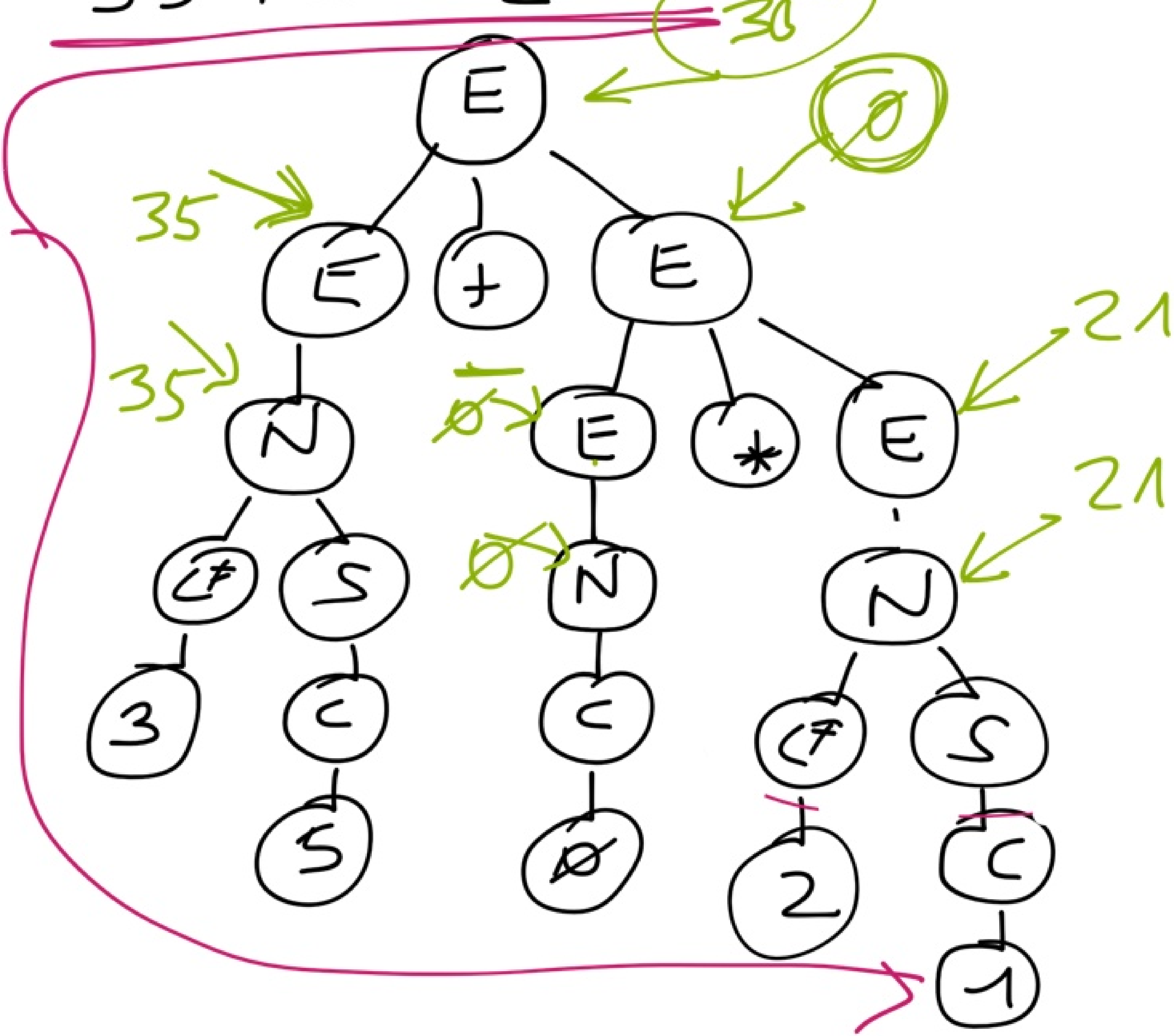
$$N \to C \mid C^{\neq} S$$

$$C^{\neq} \to 1 \mid 2 \mid 3 \mid \dots \mid 9$$

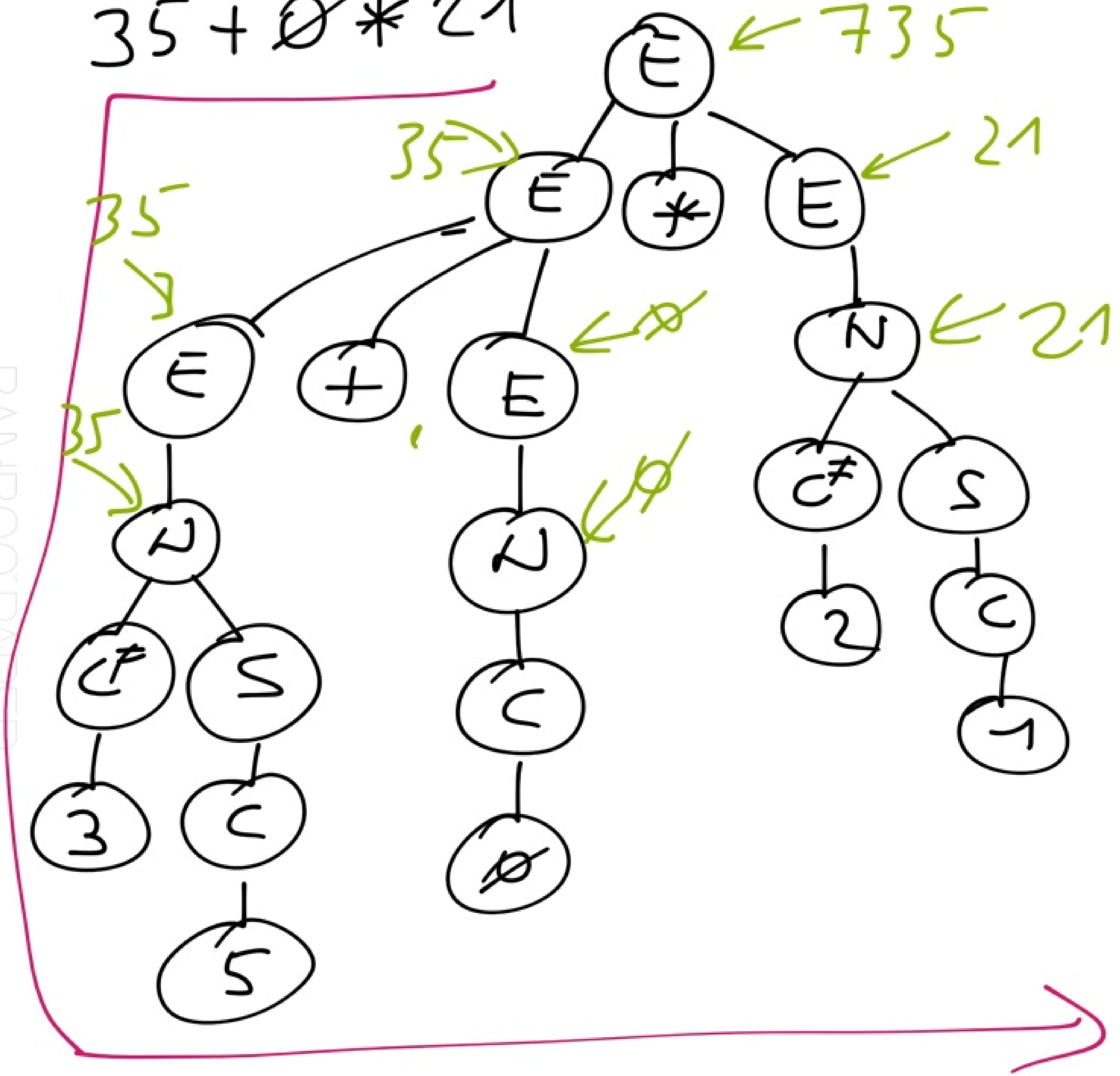
$$C \to 0 \mid 1 \mid 2 \mid 3 \mid \dots \mid 9$$

$$S \to C \mid CS$$

35 + 0 * 21



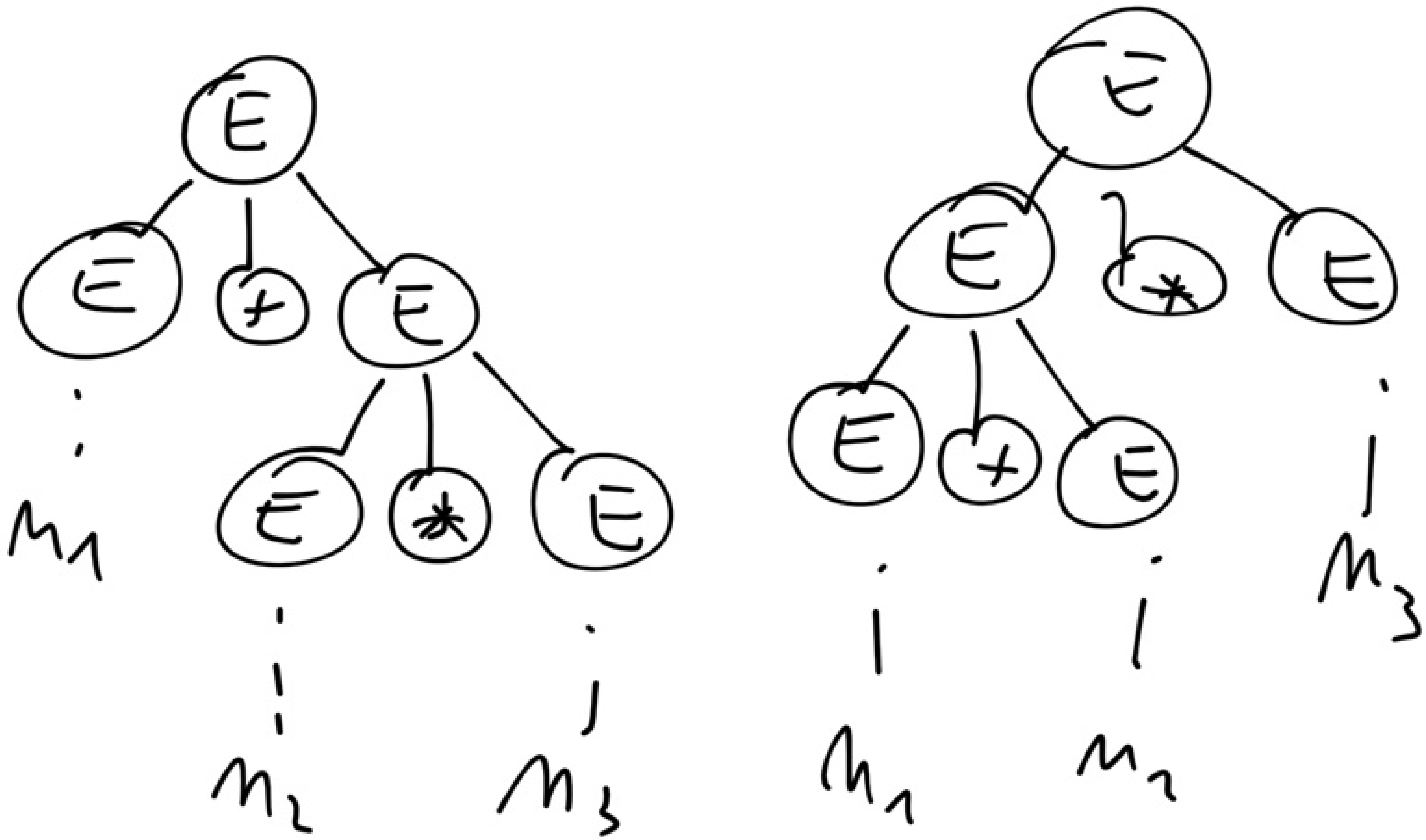
$35 + \emptyset * 21$



$E \to N \mid E+E \mid E*E$

$N \to \dots$

$n_1 + n_2 * n_3$

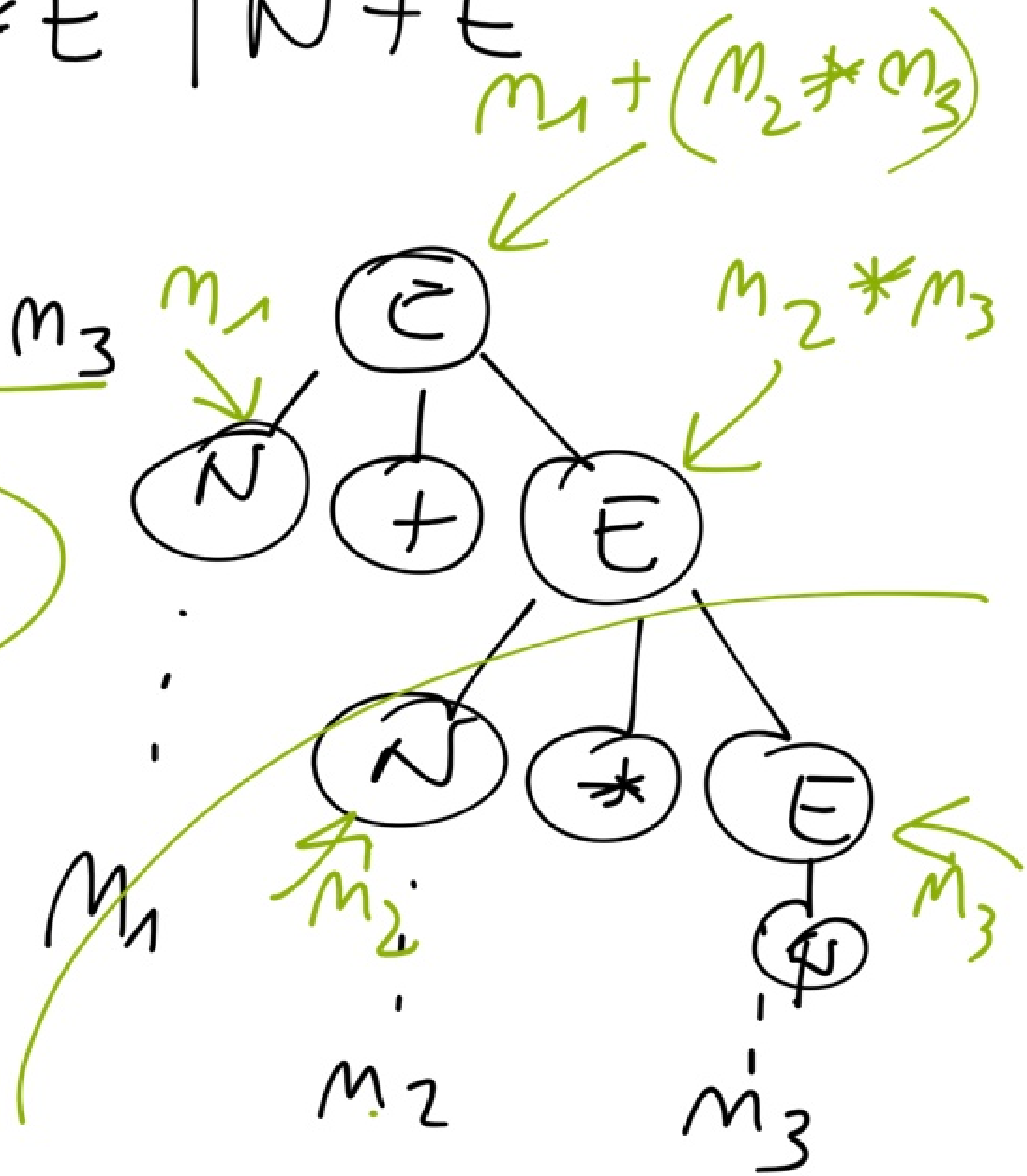


$E \to N \mid N * E \mid N + E$

$N \to \ldots$

$n_1 + n_2 * n_3$

$n_2 * n_3 + n_1$



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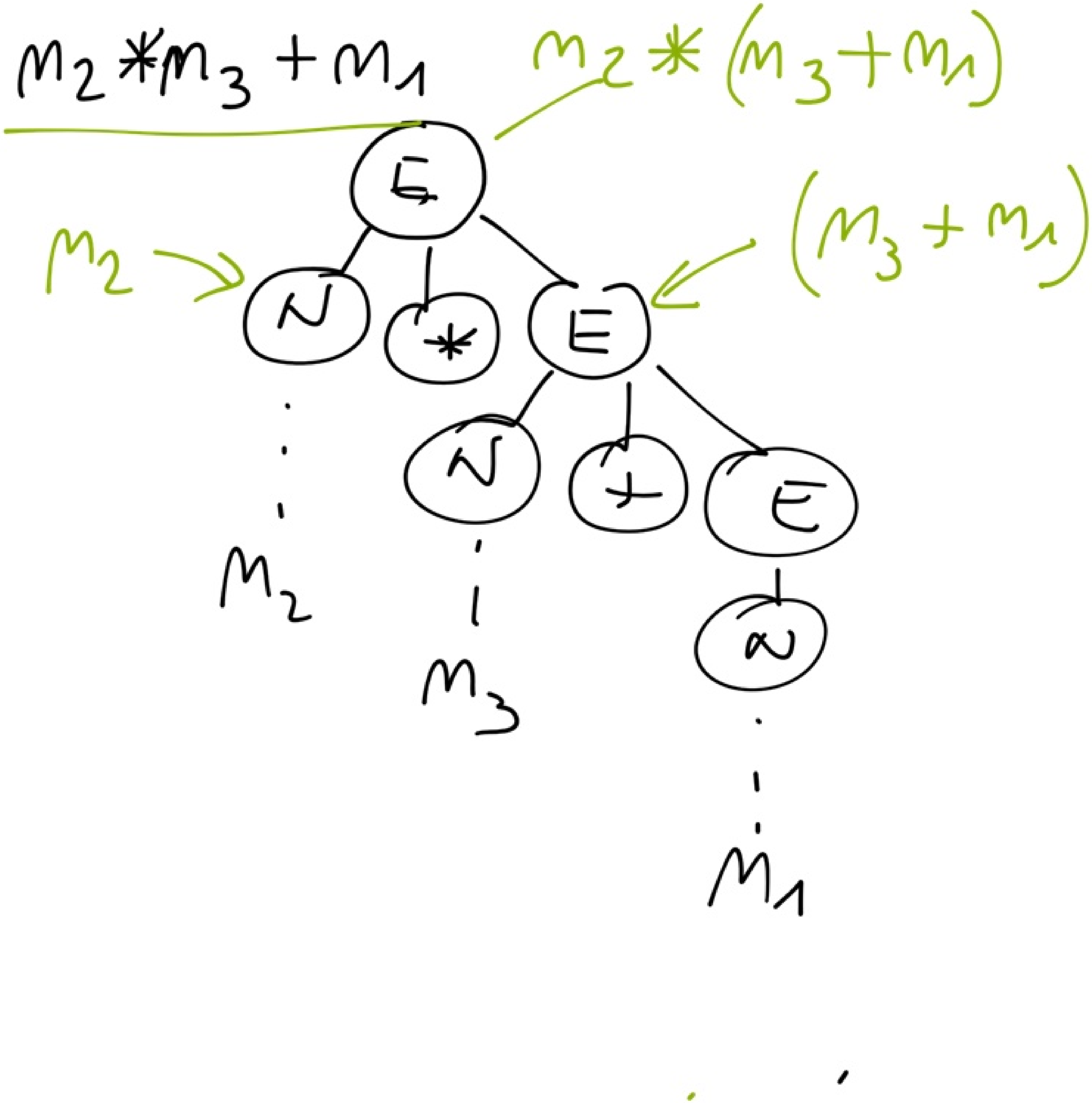
m2 * m3 + m1
m2 * (m3 + m1)
(m3 + m1)
m2
E
N
*
E
N
+
E
N
m2
m3
m1

$$E \to P \mid P + E$$

$$P \to N \mid N * P$$

$$N \to \dots$$

$m_1 + m_2 * m_3$

$m_2 * m_3 + m_1$