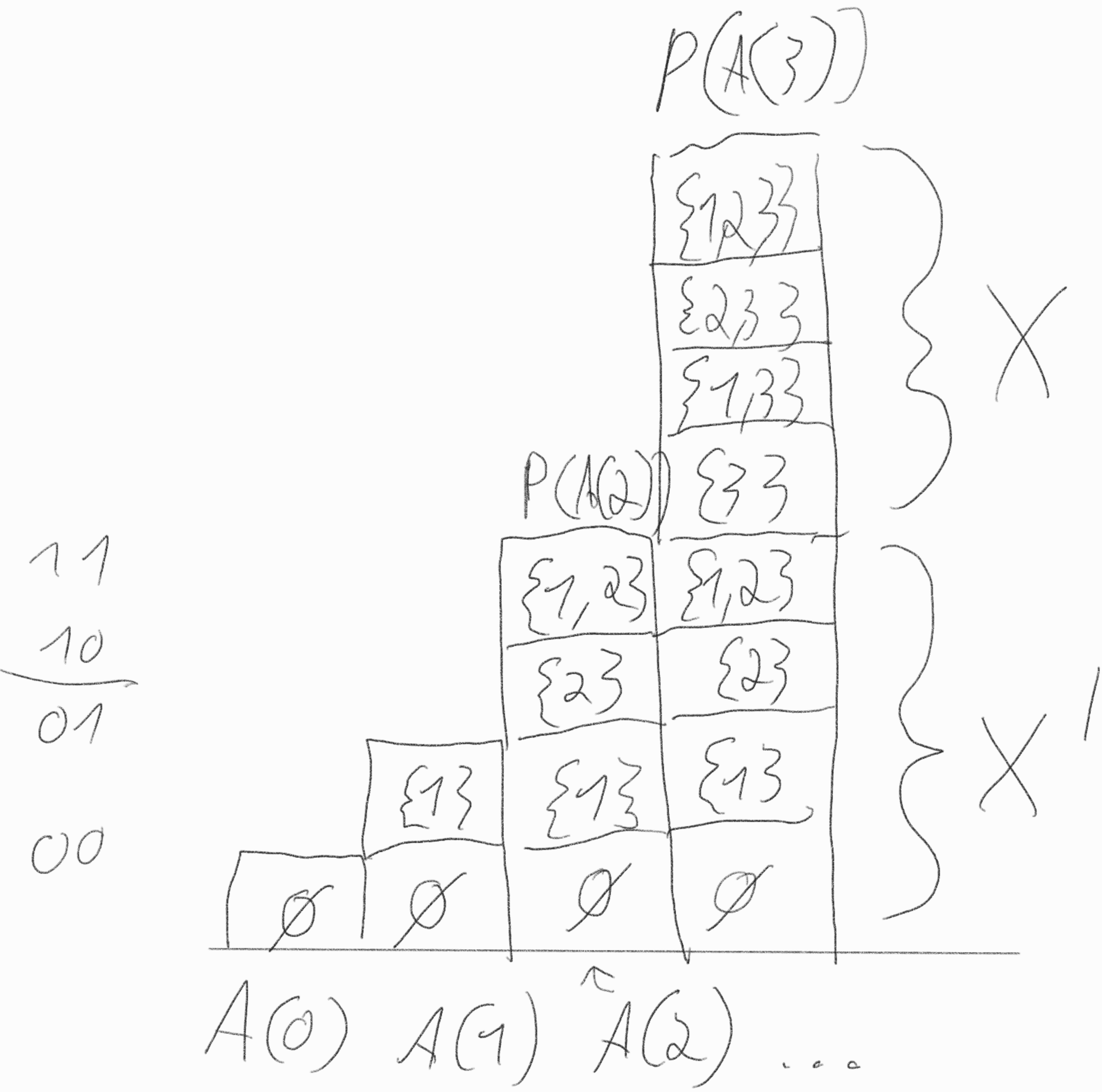
$\# A = n \to \# P(A) = 2^n$

<u>Def:</u>

(IA) $A(0) =_{def} \{\overset{\text{Element}}{\emptyset}\}$

(IS) $A(n+1) =_{def} A(n) \cup$

$\{x \mid x' \cup \{n+1\}, x' \in A(n)\}$


P(A(3))
{1,2,3}
{2,3}
{1,3}
{3}
X
P(A(2))
{1,2}
{2}
{1}
∅
X'
11
10
01
00
A(0)
A(1)
A(2)
...

Beweis:

(IA) $\#(A(0)) = 1 = 2^0$

(IV) $\#(A(n)) = 2^n$

(IS) $n \to n+1$

$$A(n+1) = P(\{1, 2, \dots, n+1\})$$

$$= P(\{1, 2, \dots, n\})$$

$$\cup \{X \mid X = X' \cup \{n+1\}$$

$$X' \in P(\{1, \dots, n\})\}$$

$$= 2 \cdot \# P(\{1, \dots, n\})$$

$$= 2 \cdot A(n)$$

$$A(n+1) = 2 \cdot A(n)$$

$$\overset{(IV)}{=} 2 \cdot 2^n = 2^{n+1}$$

2)

$$\Sigma = \{a, \dots, z, A, \dots, Z, 0, \dots, 9\}$$

$$N = \{B'\}$$

$$S = \{S'\}$$

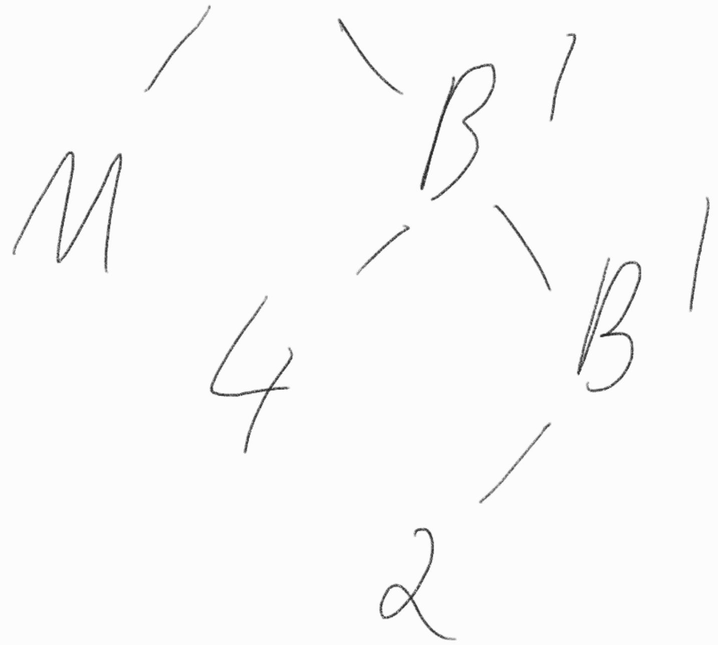
$$P = \bigcup \{ S' \to x_1 B', \; S' \to x_1 \}$$

$$x \in \{a, \ldots z, A, \ldots, Z\}$$

$$\cup \bigcup \{ B' \to x_2 B', B' \to x_2 \}$$

$$x \in \Sigma$$

ii)



3) 1) $N' = \{R_A\}$

$S = S'$

$S' \to R_A$

$A \to w$

Wobei, dass das Terminal-symbol $a \in \Sigma$ beinhaltet

$R_A \to a$ zu P'

hinzufügen

$\in N'$

$\in \Sigma$

$$A \to a$$

ii)

Jede Regel

$A \to B_1, B_2, B_3, \ldots, B_k$

$k \geq 3$

wird durch

$A \to B_1 C_1$

$C_1 \to B_2 C_2$

$C_2 \to B_3 C_3$

$\vdots$

$C_{k-1} \to B_k C_k$, wobei $C_1, \dots, C_{k-1}$ neue Nichtterminalsymbole sind, d.h. $C_1, \dots, C_{k-1} \notin N$ aber $C_1, \dots, C_k \in N'$

4) $L_7 =_{def} \{a^n b^m c^{n+m} \mid n,m \geq 0\}$

$S' \to \varepsilon$

$S' \to aS'c$

$S' \to T'$

$T' \to bT'c$

$T' \to \varepsilon$

$L_2 = \{ w\#w^R \mid w \in \{a,b\}^* \}$

$S \to \#$

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

$S \to aSa$

$S \to bSb$

$S \to aa$

$S \to bb$