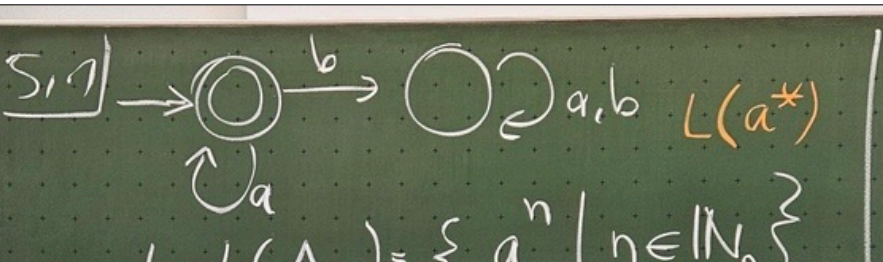
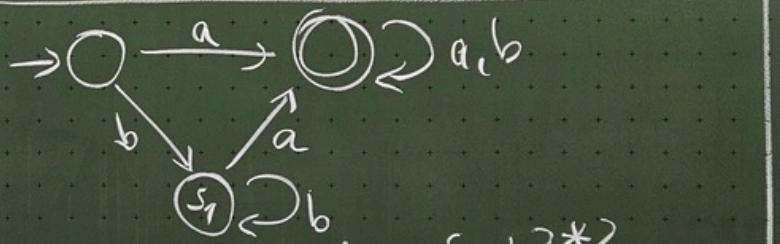
S.1.1



$L(a^*)$

$L = L(A_1) = \{ a^n \mid n \in \mathbb{N}_0 \}$



$L(A_2) = \{ aw \mid w \in \{a,b\}^* \} \cup \ldots$

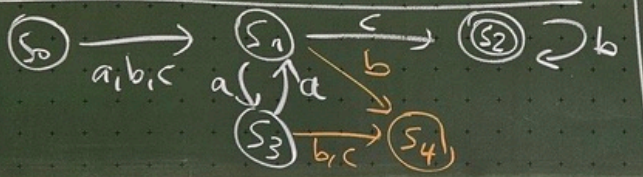
$\ldots \cup \{ b^n aw \mid w \in \{a,b\}^*, n \in \mathbb{N} \}$

$= \{ x^n aw \mid x \in \{b, \varepsilon\}, w \in \{a,b\}^* \}$

$= L((b^+)? a(a|b)^*)$ $(n \in \mathbb{N}$

A_3 hat keine Endzustände

$\Rightarrow L(A_3) = \emptyset$



$L(A_4) = \{ x a^{2n} c b^m, x \in \{a,b,c\}, n \in \mathbb{N}_0, m \in \mathbb{N}_0 \}$

Notation:

$n \in \mathbb{N}_0$: $n \geq 0$

$n \in \mathbb{N}$: $n > 0$, $n \geq 1$

$L((a|b|c)(aa)^* c b^*)$

$M^0 = \{\varepsilon\}$

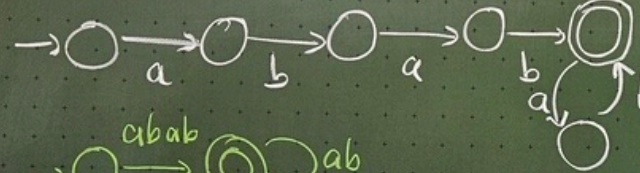
$M^n = M \cdot M^{n-1}$

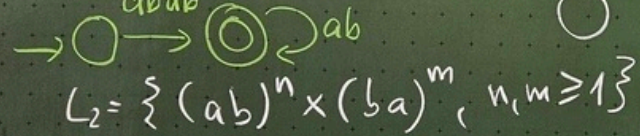
$A \cdot B = \{ ab \mid a \in A, b \in B \}$

$M^* = \bigcup_{i=0}^{\infty} M^i$

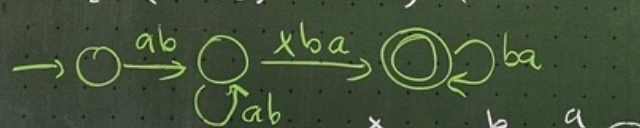
S.1.2

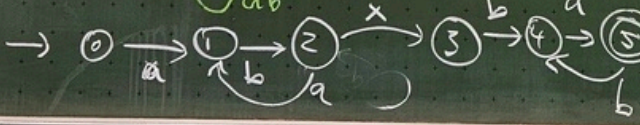
$L_a = \{ (ab)^n \mid n \geq 2 \}$





$L_2 = \{ (ab)^n x (ba)^m, n,m \geq 1 \}$





$L_3 = \{ (ab)^n x (ba)^n, n \geq 1 \}$

geht nicht, kann nicht zählen

4) formale Beschreibung von A_2

$A_2 = (\Sigma, S, \delta, s_0, F)$ mit

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

$S = \{s_0, s_1, s_2, s_3, s_4, s_5\}$

$F = \{s_5\}$

δ siehe Tabelle

$\{(ba)^n, n \geq 1\}$

kann nicht zählen

weitung von A_2

$, S_1, \delta, s_0, F)$ mit

$b, x\}$

$, s_1, s_2, s_3, s_4, s_5\}$

$\}$

Tabelle

δ:

	s_0	s_1	s_2	s_3	s_4	s_5	m
a	s_1	m	s_4	m	s_5	m	m
b	m	s_2	m	s_4	m	s_4	m
x	m	m	s_3	m	m	m	m

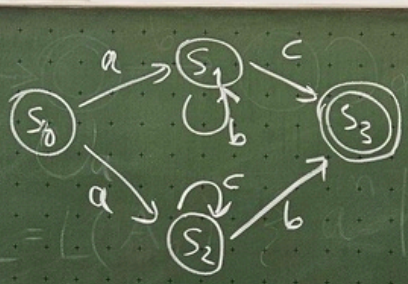
5.3 δ^* verarb. ganze Worte

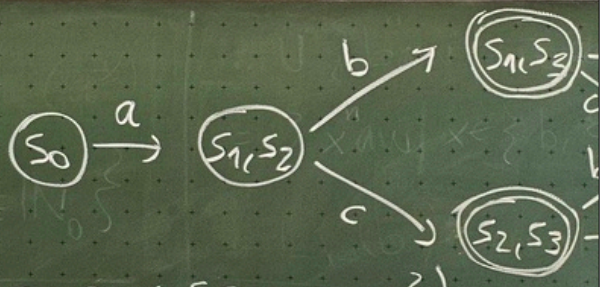
δ^*, δ' unterscheiden sich wie

$\sum_{i=1}^{n} a_i = a_1 + a_2 + \ldots + a_n$

$= a_1 + \sum_{i=2}^{n} a_i$

5.4





M $\quad |M|$

$|PotM| = 2$

$2^M = PotM$

$S = Pot(\{s_0, s_1, s_2, s_3\})$

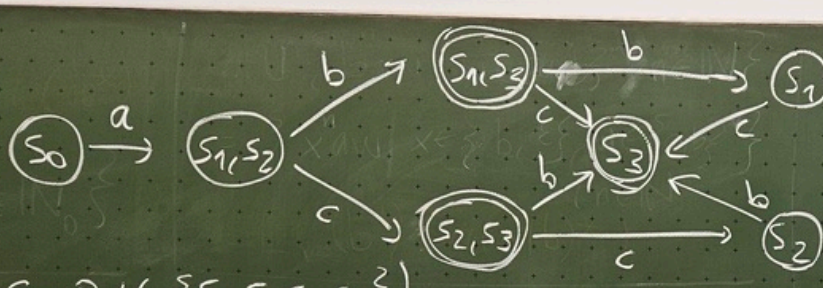
$= \{ \emptyset,$

$\{s_0\}, \{s_1\}, \{s_2\}, \{s_3\},$

$\{s_0, s_1\}, \{s_0, s_2\}, \{s_0, s_3\},$

$\{s_1, s_2\}, \{s_1, s_3\}, \{s_2, s_3\},$

$\{s_0, s_1, s_2\}, \{s_0, s_1, s_3\}, \{s_0$



$\delta(M, a) = \{s \mid$ es gibt $q \in M, q \xrightarrow{a} s\}$

$S = Pot(\{s_0, s_1, s_2, s_3\})$

$= \{ \emptyset,$

$\{s_0\}, \{s_1\}, \{s_2\}, \{s_3\},$

$\{s_0, s_1\}, \{s_0, s_2\}, \{s_0, s_3\},$

$\{s_1, s_2\}, \{s_1, s_3\}, \{s_2, s_3\},$

$\{s_0, s_1, s_2\}, \{s_0, s_1, s_3\}, \{s_0, s_2, s_3\}, \{s_1, s_2, s_3\}$

$\{s_0, s_1, s_2, s_3\}$

$\{0000, 1111,$

$1000, 0100, 0010, 0001,$

$1100, 1010, 1001,$

$0110, 0101, 0011,$

$1110, 1101, 1011, 0111\}$

$16 = 2^4$