

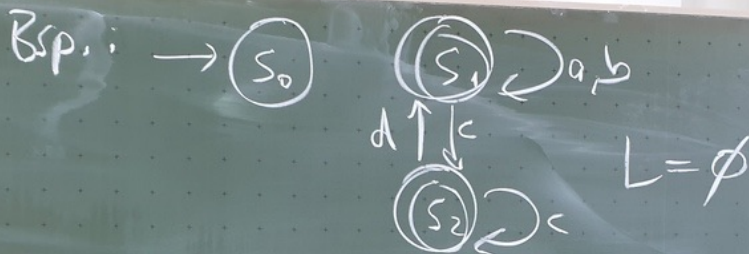
S. 1 | 1) $L = \{a^n \mid n \in \mathbb{N}_0\} = L(a^*)$

$$\begin{aligned} a^2 &= aa \\ a^n &= \underbrace{aa \dots a}_n \\ a^0 &= \varepsilon \\ \Sigma^* &= \bigcup_{n \in \mathbb{N}_0} \Sigma^n \end{aligned}$$

2) $L = \{aw \mid w \in \{a,b\}^*\} \cup \{b^n a w \mid n \geq 0, w \in \{a,b\}^*\}$
 $= L(a(alb)^*) \cup L(b^+ a(alb)^*)$
 $= L((\varepsilon | b^+) a (a|b)^*)$

3) $L = \emptyset$

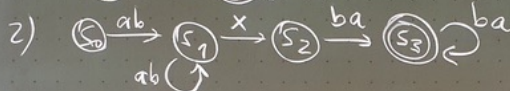
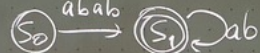
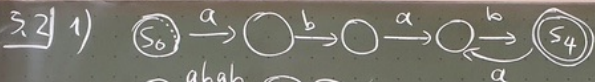
Bsp
4
11



$\{b\}^*$

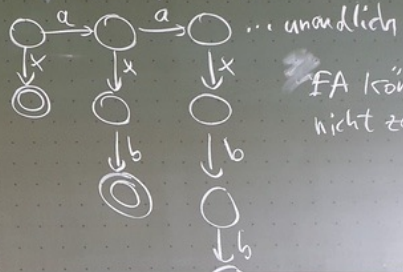
4) $L = \{x a^{2n} c b^m \mid x \in \{a,b,c\}, n,m \geq 0\}$
 $= \{a^{2n+1} c b^m \mid n,m \in \mathbb{N}_0\} \cup \{b a^{2n} c b^m \mid n,m \in \mathbb{N}_0\} \cup \{c a^{2n} c b^m \mid n,m \in \mathbb{N}_0\}$

$\mathbb{N} = \{1, 2, 3, \dots\}$
 $\mathbb{N}_0 = \{0, 1, 2, \dots\}$
 $= L((a|b|c)(aa)^* c b^*)$

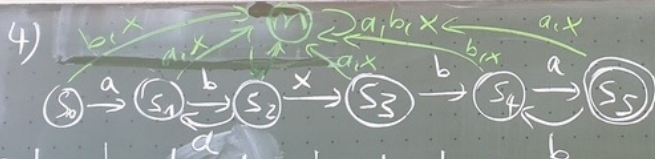


3) siehe Exkurs

$L = \{a^n x b^n \mid n \in \mathbb{N}_0\}$

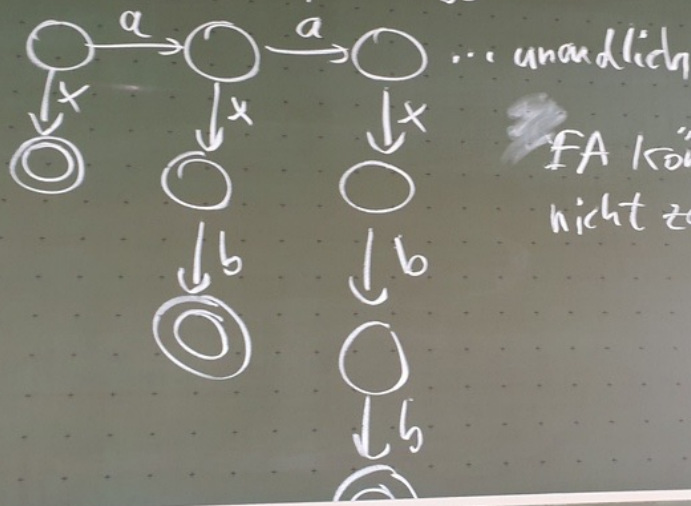


FA können nicht zählen



δ	S_0	S_1	S_2	S_3	S_4	S_5	M
a	S_1	M	S_1	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

$$L = \{a^n \times b^n \mid n \in \mathbb{N}_0\}$$



FA können nicht zählen

nicht zählen

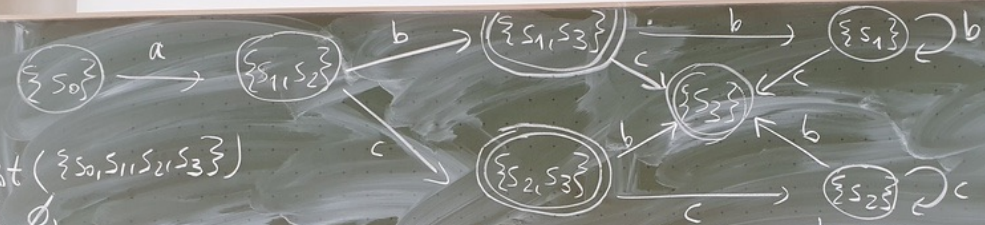
5.3 $\delta^*(s, \epsilon) = s$

$\delta^*(s, aw) = \delta^*(\delta(s, a), w)$

$\delta'(s, w) = \begin{cases} s, & w \in \epsilon \\ \delta(\dots \delta(\delta(s, a_1), a_2) \dots, a_n), & w = a_1 \dots a_n \end{cases}$

Bew.: $\delta^*(s, a_1 a_2 \dots a_n)$
 $= \delta^*(\delta(s, a_1), a_2 a_3 \dots a_n)$
 $= \delta^*(\delta(\delta(s, a_1), a_2), a_3 \dots a_n)$
 $= \delta(\delta(\dots (\delta(s, a_1), a_2) \dots), a_n) = \delta'(s, a_1 \dots a_n)$

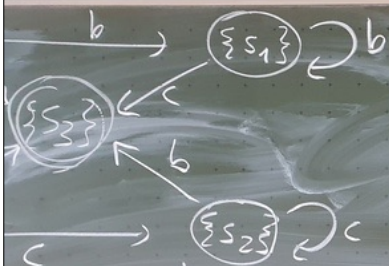
5.4



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

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

4) $\{a, b\}^* \rightarrow \{a, b\}^* \rightarrow \{a, b\}^* \rightarrow \{a, b\}^*$



$S = \text{Menge der Zustände}$

$$\text{Pot}(S) = 2^{|S|}$$

$$|\text{Pot}(S)| = 2^{|S|}$$

s_1	0000,
s_2	0001, 0010, 0100, 1000,
s_3	0011, 0101, 1001, 0110,
s_4	1010, 1100,
s_5	1110, 1101, 1011, 0111,
s_6	1111