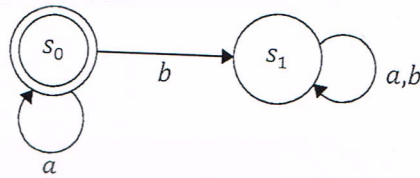


5.1

GD13
21.11.20
1/5

Automat 1:

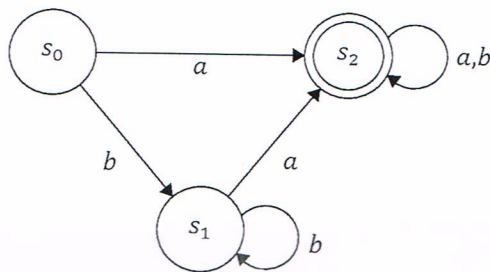


$$L = \{ a^n \mid n \in \mathbb{N}_0 \} = a^*$$

$$\mathbb{N} = \{ 1, 2, 3, \dots \}$$

$$\mathbb{N}_0 = \{ 0, 1, 2, \dots \} = \mathbb{N} \cup \{ 0 \}$$

Automat 2:

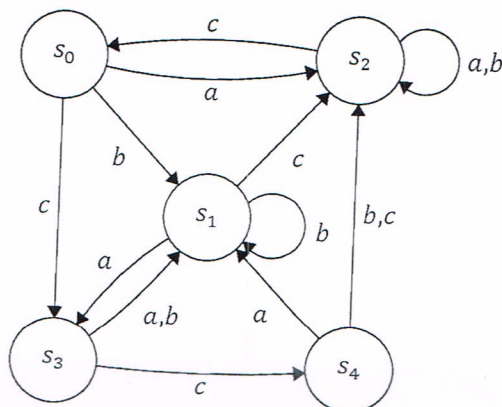


$$L = \{ a w \mid w \in \{ a, b \}^* \} \cup \{ \underbrace{b^{k+1}}_{b^{k+1}} \underbrace{a w}_{a w} \mid k \geq 0, w \in \{ a, b \}^* \}$$


$$\begin{matrix} b^{k+1} & k \geq 0 & k \in \mathbb{N}_0 \\ b^k & k \geq 1 & k \in \mathbb{N} \end{matrix}$$

$$= a(a/b)^* \mid b^+ a(a/b)^* = (a \mid b^+ a)(a/b)^*$$

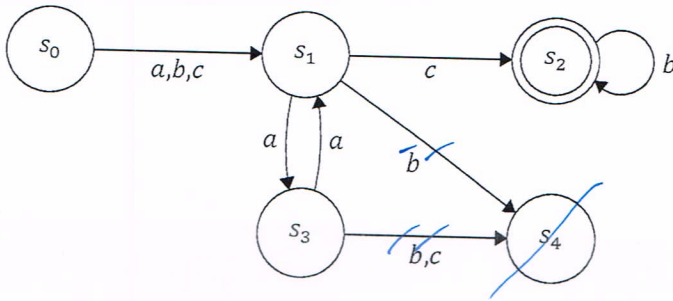
Automat 3:



$$L = \emptyset$$

ϵ leeres Wort
 $\{\epsilon\}$ 
 \emptyset leere Menge

Automat 4:



$$L = \{ x a^{2k} c b^n \}$$

$$\left. \begin{array}{l} | x \in \{a,b,c\}^+ \\ k \geq 0, n \geq 0 \end{array} \right\}$$

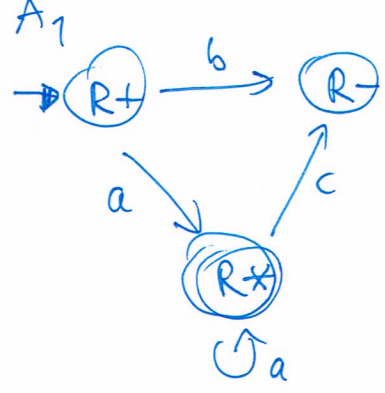
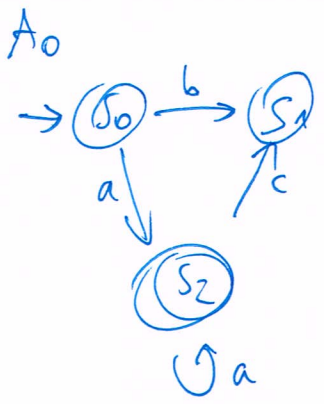
$$= (a|b|c)(aa)^* c b^*$$

$$= \{ x y c z \mid x \in \{a,b,c\}^+, y \in \{aa\}^*, z \in \{b\}^* \}$$

~~$$\{ a^* a x (aa)^* c b^* \mid x \in \dots \}$$~~ nein!

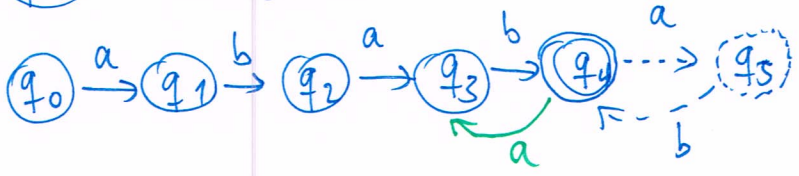
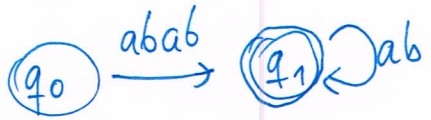
$$= \{ a a^{2k} c b^n \mid \dots \\ \cup \{ b a^{2k} c b^n \mid \dots \\ \cup \{ c a^{2k} c b^n \mid \dots$$

$$\left. \begin{array}{l} a(x^2 + 2x + 3y - z) \\ + b(x^2 + 2x + 3y - z) \\ + c(x^2 + 2x + 3y - z) \\ = (a+b+c)(x^2 + 2x + 3y - z) \end{array} \right\}$$

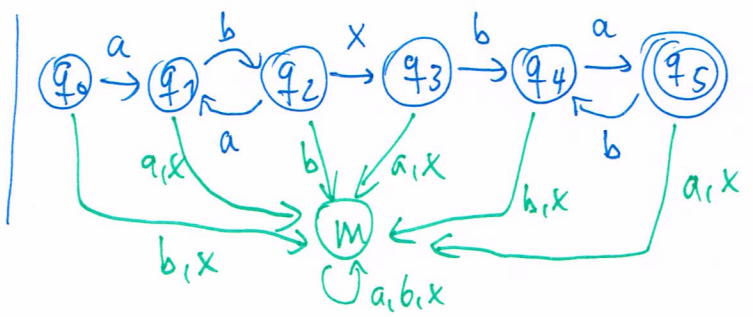
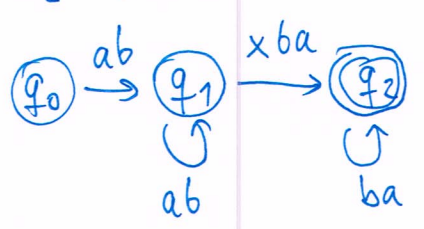


$L(A_0) = L(A_1)$

5.2 $L_1 = \{ (ab)^n \mid n \in \mathbb{N}, n \geq 2 \}$

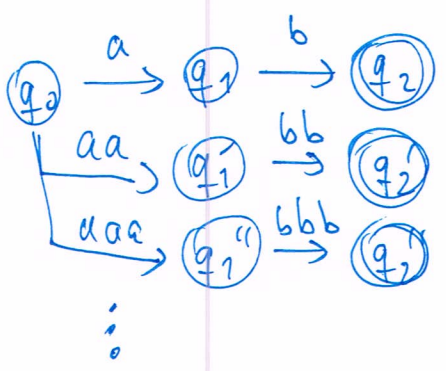


$L_2 = \{ (ab)^n x (ba)^m \mid n, m \in \mathbb{N} \}$



L_3 : geht nicht

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



\Rightarrow unendlicher def. Aut.

δ für L_2

δ	q_0	q_1	q_2	q_3	q_4	q_5	m
a	q_1	m	q_1	m	q_5	m	m
b	m	q_2	m	q_4	m	q_4	m
x	m	m	q_3	m	m	m	m

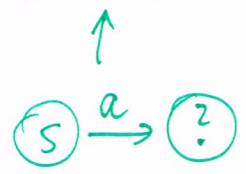
$m \notin F$
(kein Endzustand)

5.2

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

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

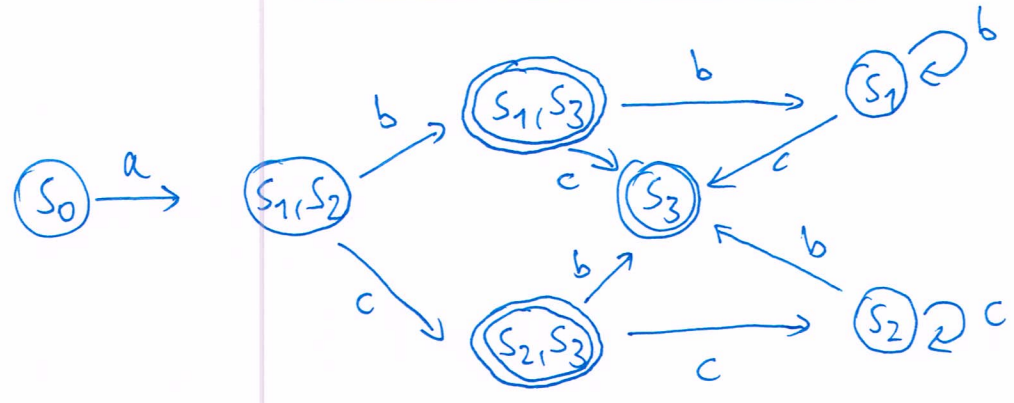
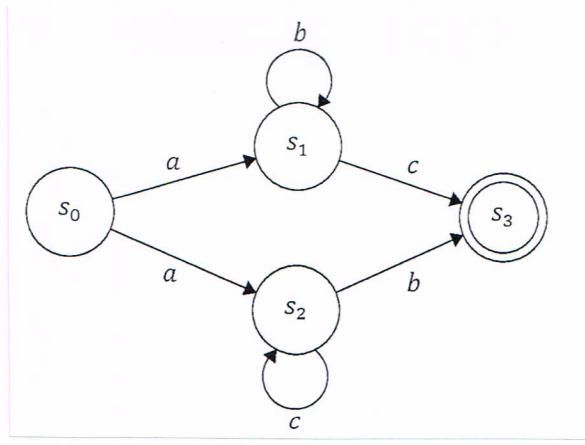
$| a \in \Sigma, w \in \Sigma^*$



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

Summe: $\sum_{k=1}^n a_k = a_1 + a_2 + \dots + a_{n-1} + a_n$

$$\left[\begin{aligned} \sum_{k=1}^n a_k &= a_1 + \sum_{k=2}^n a_k \\ \sum_{k=1}^1 a_k &= a_1 \end{aligned} \right.$$



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

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

$$= \{ 0000, 1000, 1100, 1110, 1111, 0100, 1010, 1101, 0010, 1001, 0101, 1011, 0001, 0110, 0011, 0111 \}$$