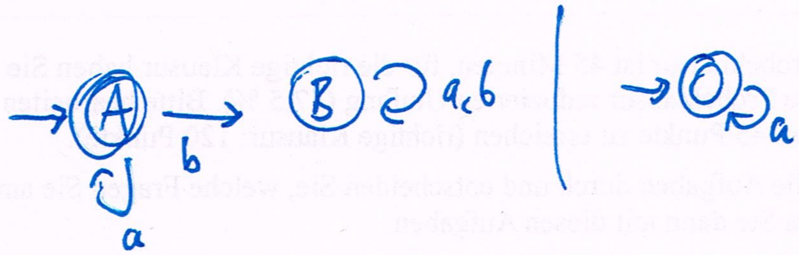
GDI3 16.11.19 (1)

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

5.1

1) 

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

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

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

2) $L = \{aw \mid w \in \{a,b\}^*\}$

$\cup \{b b^k a w \mid k \in \mathbb{N}_0, w \in \{a,b\}^*\}$

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

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

$a = b^0 a$

3) $L = \emptyset$

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

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

alternativ

$= \{a^n c b^m \mid n \text{ ungerade}, m \in \mathbb{N}_0\}$

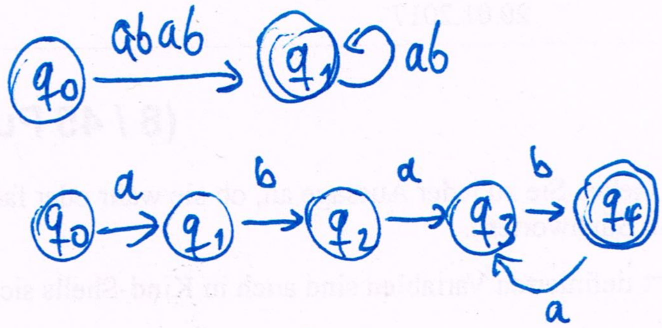
$\cup \{x a^n c b^m \mid x \in \{b,c\}, n \text{ gerade}, m \in \mathbb{N}_0\}$

~~Nicht so:~~

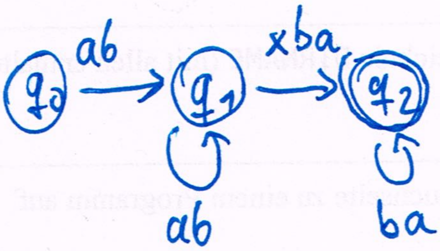
~~$L = \{ac, bc, cc, acb, bcb, ccb, \ldots$~~

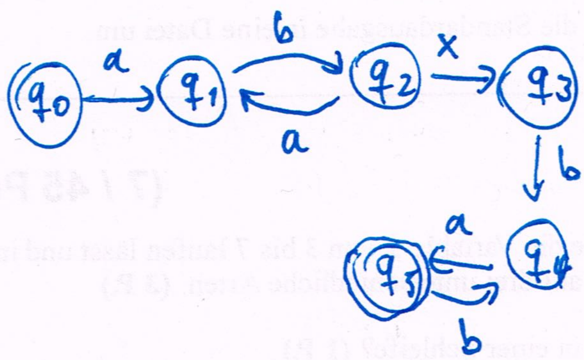
5.2

1)



2)





3) geht nicht

4) $L = (\Sigma, S, \delta, s_0, F)$

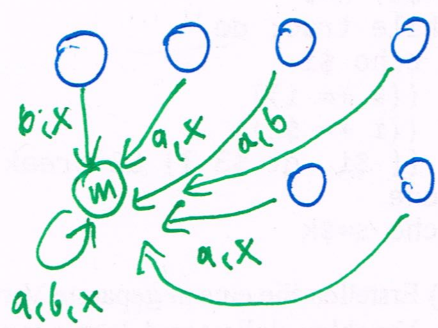
$\Sigma = \{a, b, x\}$

$S = \{q_0, q_1, q_2, q_3, q_4, q_5\}$

$F = \{q_5\}$

$s_0 = q_0$

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



$m \notin F$

Komplement $\Sigma^* \setminus L = \overline{L}$

$= \{w \in \Sigma^* \mid w \notin L\}$

5.3

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

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

$$\delta'(s,w) = \begin{cases} s, & w=\varepsilon \\ \delta(\delta(\ldots \underbrace{\delta(s,a_1)}, a_2, \ldots, a_n), \end{cases}$$

$$= \delta'(\delta(s,a_1), a_2 \ldots a_n)$$

Def. der Summe Σ

$$\sum_{k=1}^{0} a_k = 0$$

$$\sum_{k=1}^{n+1} a_k = a_{n+1} + \sum_{k=1}^{n} a_k$$

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

5.4

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

$= \{ \emptyset,$

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

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

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

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

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

$= \{ 0000,$

$1000, \quad 0100, \quad 0010, \quad 0001$

$1100, \quad 1010, \quad 1001, \quad 0110,$

$0101, \quad 0011,$

$1110, \quad 1101, \quad 1011, \quad 0111,$

$1111 \}$