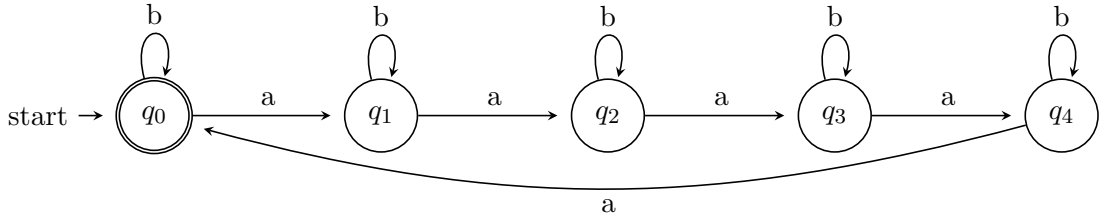
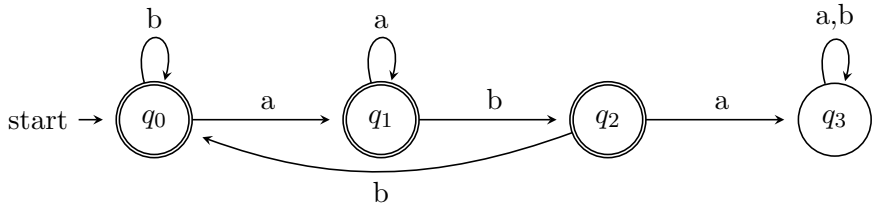
Automaten und Berechenbarkeit
4. Übungsserie

Aufgabe 1:

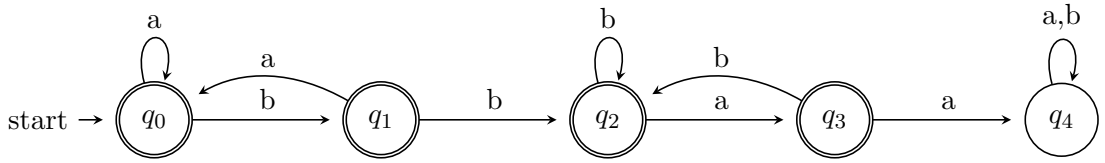
(a) $(b^*ab^*ab^*ab^*a)^*$



(b) $(b^*aa^*bb)^* \mid ((b^*aa^*bb)^*aa^*) \mid ((b^*aa^*bb)^*aa^*b)$



(c) $a^* \mid (a^*ba)^* \mid ((a^*ba)^*b) \mid ((a^*ba)^*bb^*) \mid ((a^*ba)^*b(b^*ab)^*) \mid ((a^*ba)^*b(b^*ab)^*a)$



Aufgabe 2:

1. $N_{Sp} = (Q \cup \{q_0'\}, \Sigma, \delta', q_0', F'), F' = \{q_0\}, \delta'(q,x) := \begin{cases} F & \text{falls } q = q_0', x = \lambda \\ p & \text{falls } \delta(p,x) = q, q \in Q, p \in Q, x \in \Sigma_\lambda \\ \emptyset & \text{sonst} \end{cases}$

   wobei $Q \cap \{q_0'\} = \emptyset$

2.
$$\begin{aligned} Sp(L(N)) &= \{Sp(w) \mid w \in L(N)\} \\ &= \{Sp(w) \mid \delta^*(q_0, w) \in F\} \\ &= \{Sp(w) \mid \delta'^*(F, Sp(w)) = q_0\} \\ &= \{w \mid \delta'^*(q_o', w) \in F'\} \\ &= \underline{\underline{L(N_{Sp})}} \end{aligned}$$

Aufgabe 3: