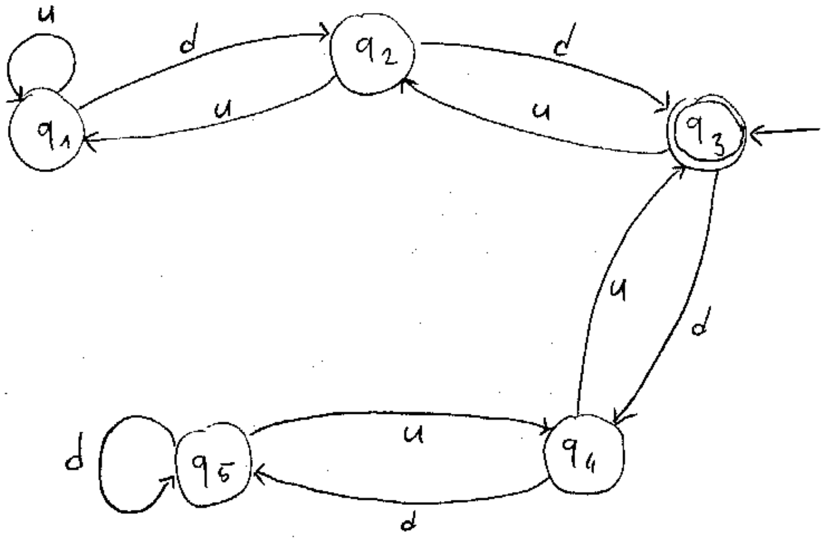
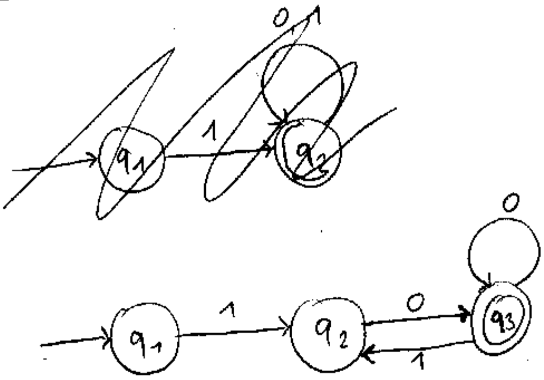
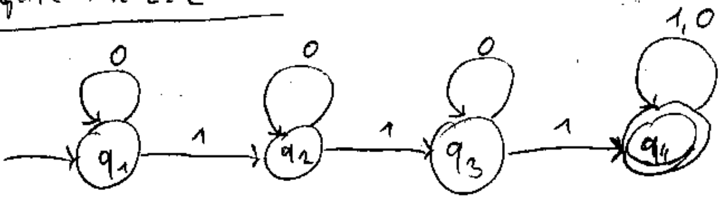
Aufgabe 1.1



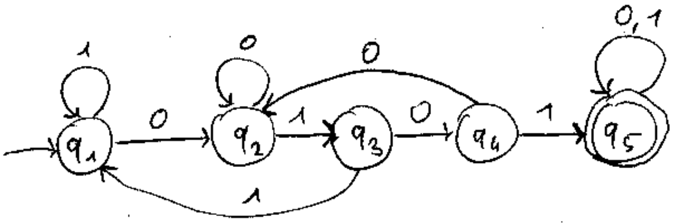
Aufgabe 1.2.1



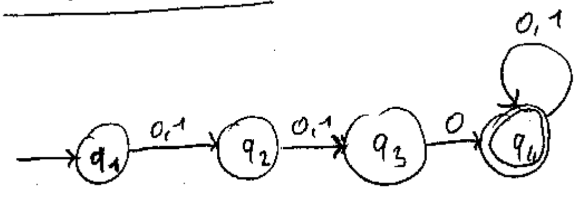
Aufgabe 1.2.2



Aufgabe 1.2.3

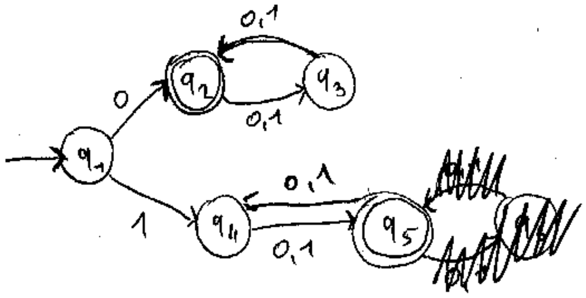


Aufgabe 1.2.4

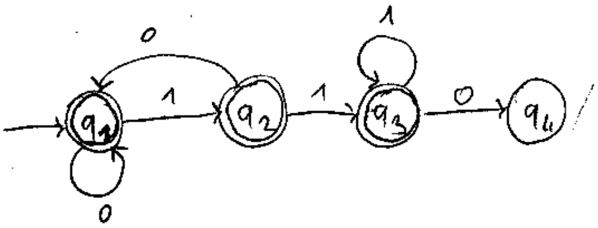


Aufgabe 1.2.5

$(0+1)\cdot\{0,1\}$



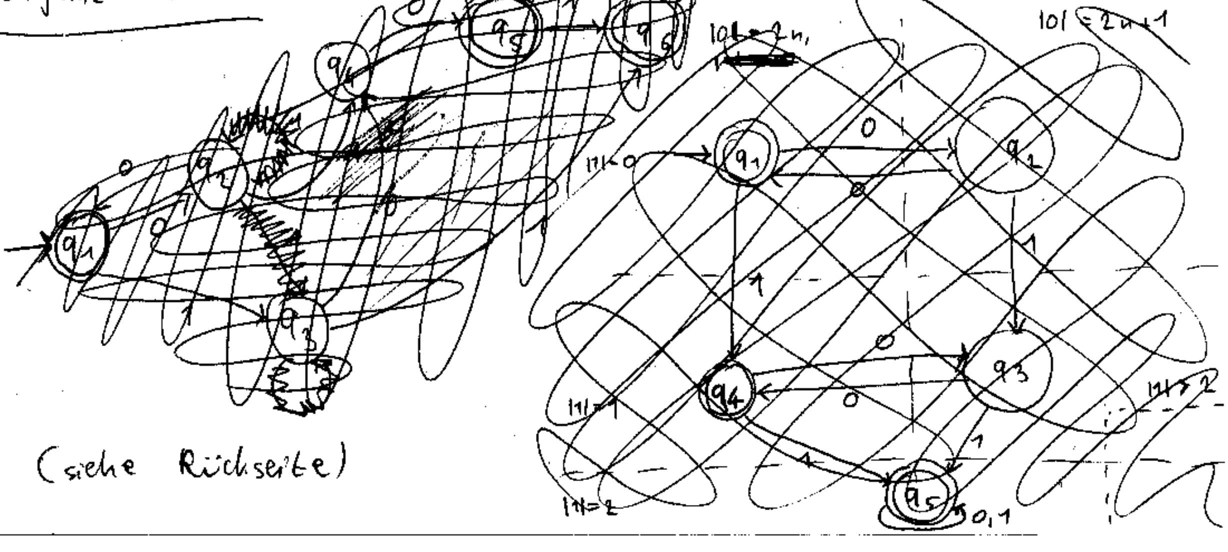
Aufgabe 1.2.6



Aufgabe 1.2.7

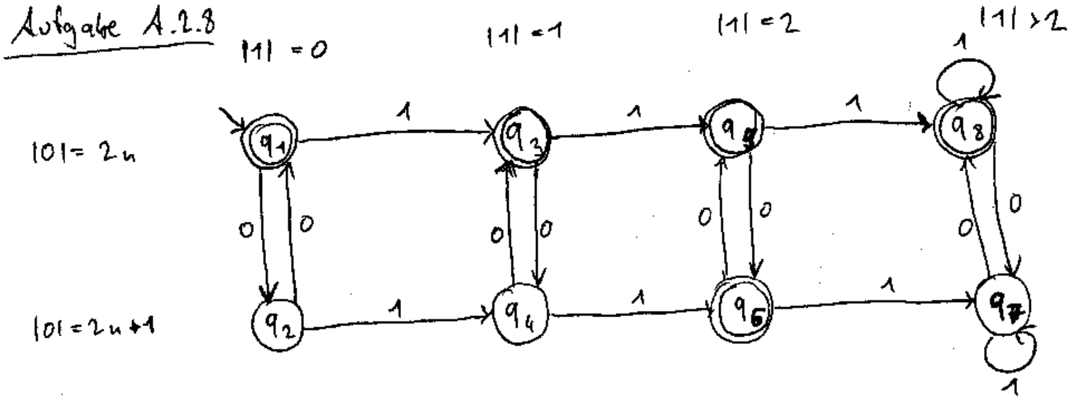
$L = \{0, \varepsilon\}$

Aufgabe 1.2.8



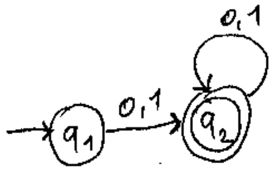
(siehe Rückseite)

Aufgabe A.2.8

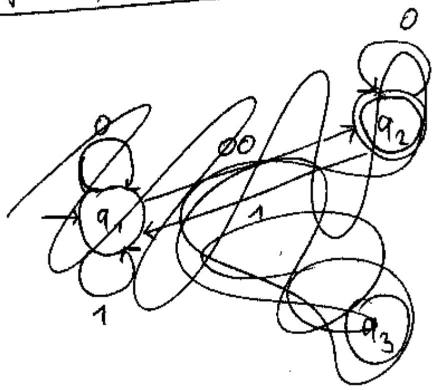


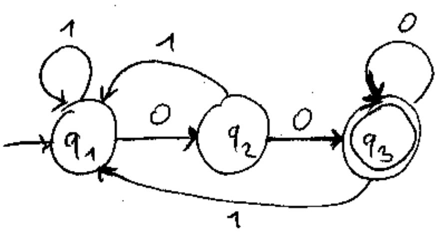
Aufgabe 1.2.9

Aufgabe 1.2.10



Aufgabe 1.4.1

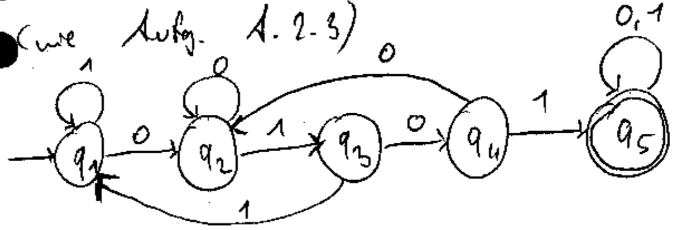




(ist ein DEA)

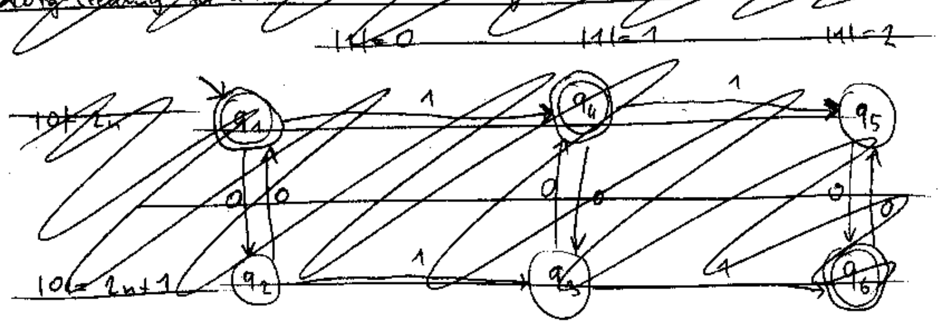
Aufgabe 1.4.2

(wie Aufg. 1.2.3)

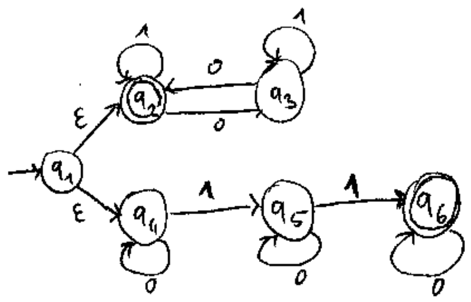


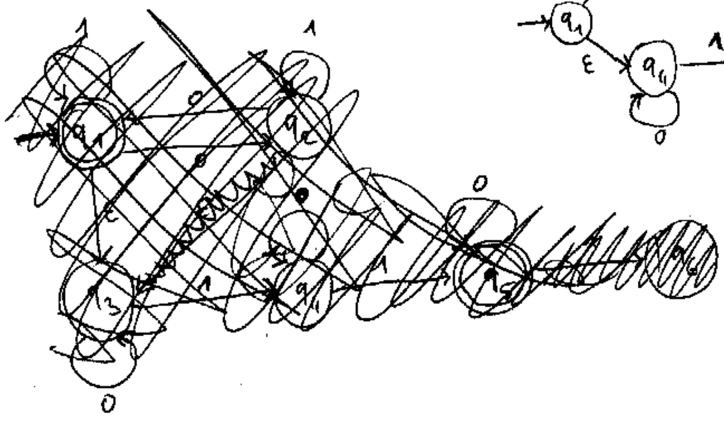
~~Aufgabe 1.4.3 (wie Aufg. 2.8, siehe dort)~~

~~(erkl. wie Aufg. 2.8 und damit nur 5 Zustände nötig. Hier wird angenommen, mit oder in der Aufg.stellung sei ein exklusives Oder gemeint. Nur dann sind 6 Zustände nötig.)~~

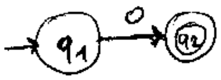


Aufgabe A.4.3





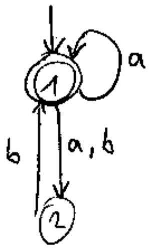
Aufgabe A.4.4.



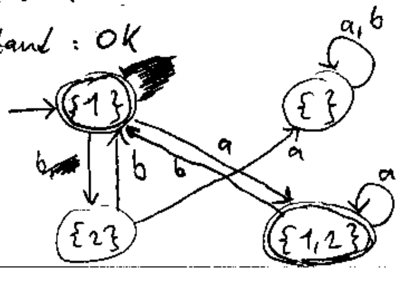
Aufgabe A.4.5

Aufgabe A.5.1

Schritt 0: der gegebene NEA



Schritt 1: Automat mit genau einem Startzustand : OK
Schritt 2: alphabetischer Automat mit einem Startzustand : OK
Schritt 3: buchstabierender Automat mit einem Startzustand : OK
Schritt 4: vollst. DEA (Potenzautomatenkonstruktion) :

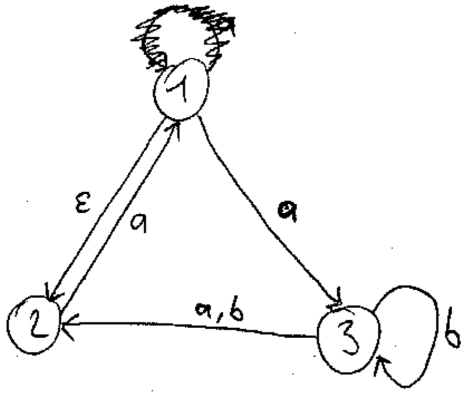


Aufgabe A.5.2

Gegeben ist A:

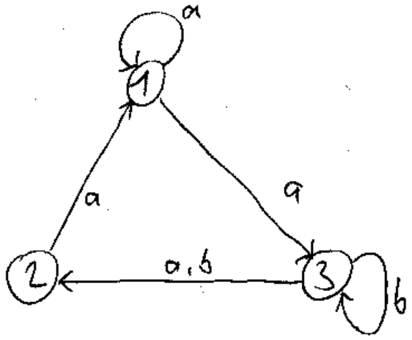
$Q = \{1,2,3\}$
$\Sigma = \{a,b\}$
$\delta =$ (s.u.)
$q_0 = 1$
$F = \{2\}$

δ	a	b	ε
1	$\{3\}$	$\emptyset$	$\{2\}$
2	$\{1\}$	$\emptyset$	$\emptyset$
3	$\{2\}$	$\{2,3\}$	$\emptyset$



~~Dann~~ Konstruktion von A': ε-Elimination

$\delta_{\bar{\varepsilon}}$	a	b	ε
1	$\{1,3\}$	$\emptyset$	$\emptyset$
2	$\{1\}$	$\emptyset$	$\emptyset$
3	$\{2\}$	$\{2,3\}$	$\emptyset$



Dann ist A': $A' = \{Q', \Sigma', \delta', q_0', F'\}$ mit

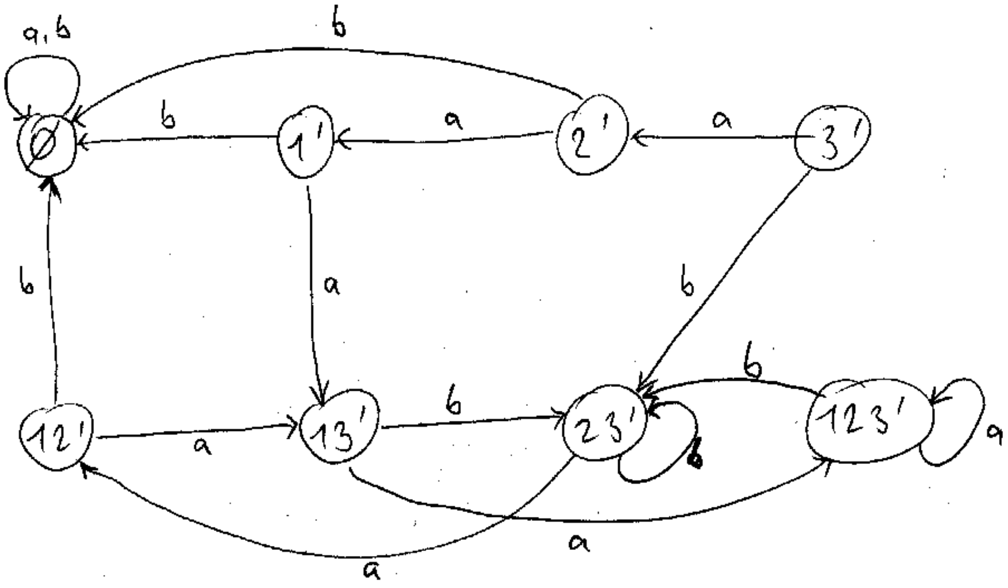
$Q' = 2^Q = \{\emptyset, \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\}\}$
$\Sigma' = \Sigma = \{a,b\}$
$\delta' =$ (s.u.)
$q_0' = \{q_0\} = \{1\} = 1'$
$F = \{\{2\}, \{1,2\}, \{2,3\}, \{1,2,3\}\} = \{2', 12', 23', 123'\}$

δ'	a	b
$\emptyset$	$\emptyset$	$\emptyset$
$\{1\}$	$\{1,3\}$	$\emptyset$
$\{2\}$	$\{1\}$	$\emptyset$
$\{3\}$	$\{2\}$	$\{2,3\}$
$\{1,2\}$	$\{1,3\}$	$\emptyset$
$\{1,3\}$	$\{1,2,3\}$	$\{2,3\}$
$\{2,3\}$	$\{1,2\}$	$\{2,3\}$

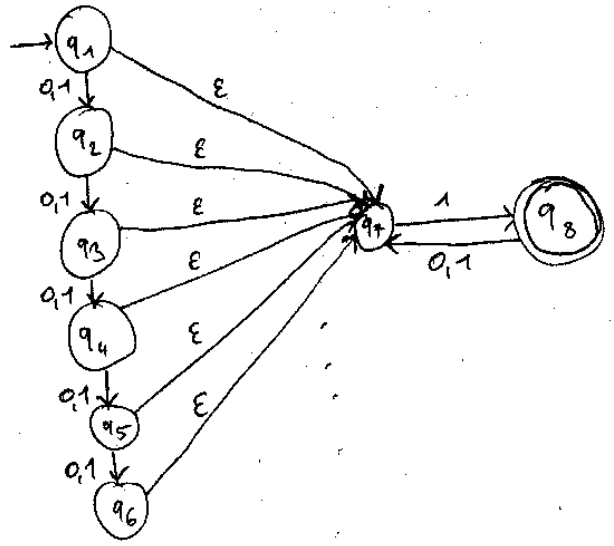
(Fortsetzung):

δ'	a	b
$\{1,2,3\}$	$\{1,2,3\}$	$\{2,3\}$

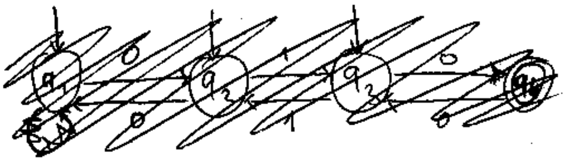
Aufgabe A.5.2 (Forts.)

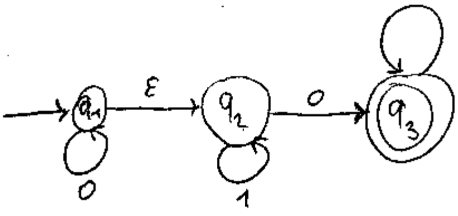


Aufgabe A.6

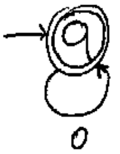


Aufgabe A.7.1





Aufgabe 1.7.2



Aufgabe 17.1

$L = \{a^n b^n \mid n \geq 0\}$, $\overline{L} = \{a^n b^m \mid n, m \geq 0,\ n \neq m\}$

~~$S \to aS \mid Sb$~~

- $S \to$ ~~$A \mid B$~~ $CE \mid ED$

  ~~a-Überschuss~~

  ~~$A \to CE$~~

  ~~b-Überschuss~~

  ~~$B \to ED$~~

  $C \to aC \mid a$

  $D \to bD \mid b$

  $E \to aEb \mid \varepsilon$

- $$A = (\overset{Q}{\{q\}}, \overset{\Sigma}{\{a,b\}}, \overset{\Gamma}{\{S, C, E, D\}}, \overset{\delta}{\delta}, \overset{q_0}{q}, \overset{z_0}{S}, \overset{F}{\emptyset})$$

mit $\delta = \{ ((q, a, B), (q, \alpha)) \mid B \to a\alpha \in P \}$

$= \{ ((q, \varepsilon, S), (q, CE)),$

$((q, \varepsilon, S), (q, ED)),$

$((q, a, C), (q, C)),$

$((q, b, D), (q, D)),$

$((q, \ , E), (q, E)) \}$ ← Grammatik war nicht in Greibach-Normalform, deshalb Automat noch nicht korrekt.

$$M = (\underbrace{\{s_0\}}_{Q}, \underbrace{\{a, b\}}_{\Sigma}, \underbrace{\{a, b, S, C, D, E\}}_{\Gamma}, \underbrace{\delta}_{\delta}, \underbrace{s_0}_{q_0}, \underbrace{S}_{z_0}, \underbrace{\{s_0\}}_{F})$$

$$\delta = \{ \left.\begin{array}{l} ((s_0, \varepsilon, S), (s_0, CE)), \\ ((s_0, \varepsilon, S), (s_0, ED)), \\ ((s_0, \varepsilon, C), (s_0, aC)), ((s_0, \varepsilon, C), (s_0, a)), \\ ((s_0, \varepsilon, D), (s_0, bD)), ((s_0, \varepsilon, D), (s_0, b)), \\ ((s_0, \varepsilon, E), (s_0, aEb)), \end{array}\right\} (1)$$

$$\left.\begin{array}{l} ((s_0, a, a), (s_0, \varepsilon)), \\ ((s_0, b, b), (s_0, \varepsilon)) \; \} \end{array}\right\} (2)$$

besser zu schreiben als (bei Formalisierung von δ als Funktion):

$$\delta(s_0, \varepsilon, S) = \{(s_0, CE), (s_0, ED)\}$$

$$\cancel{\delta((s_0, \varepsilon, S) = (s_0, ED))}$$

$\vdots$