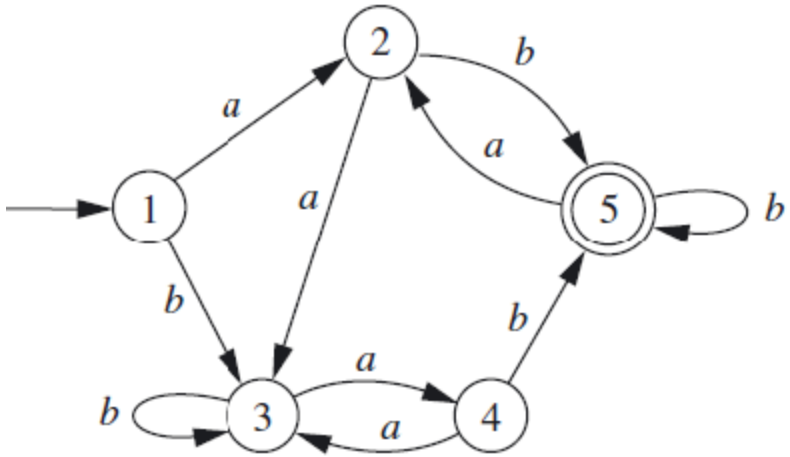
Az informatika számítástudományi alapjai gyakorlat

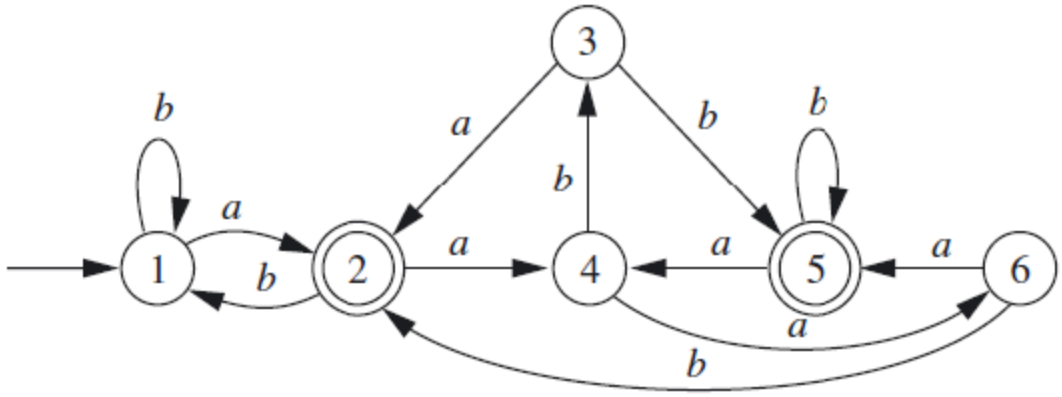
3. feladatsor

(beszéljük meg, hogy miként megy a minimalizálás algoritmusa, az előadáson nem szerepelt)

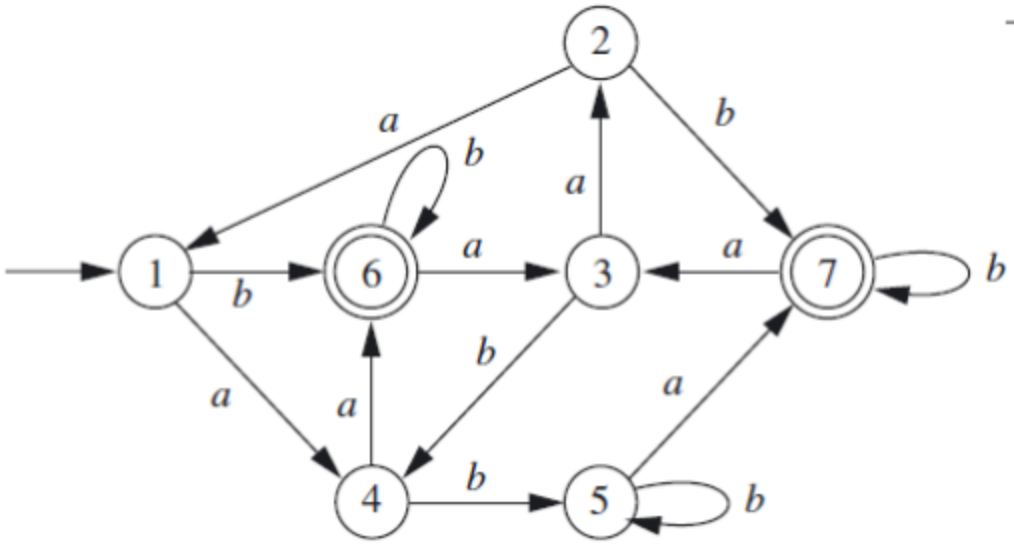
2.55. For each of the FAs pictured in Fig. 2.45, use the minimization algorithm described in Section 2.6 to find a minimum-state FA recognizing the same language. (It's possible that the given FA may already be minimal.)



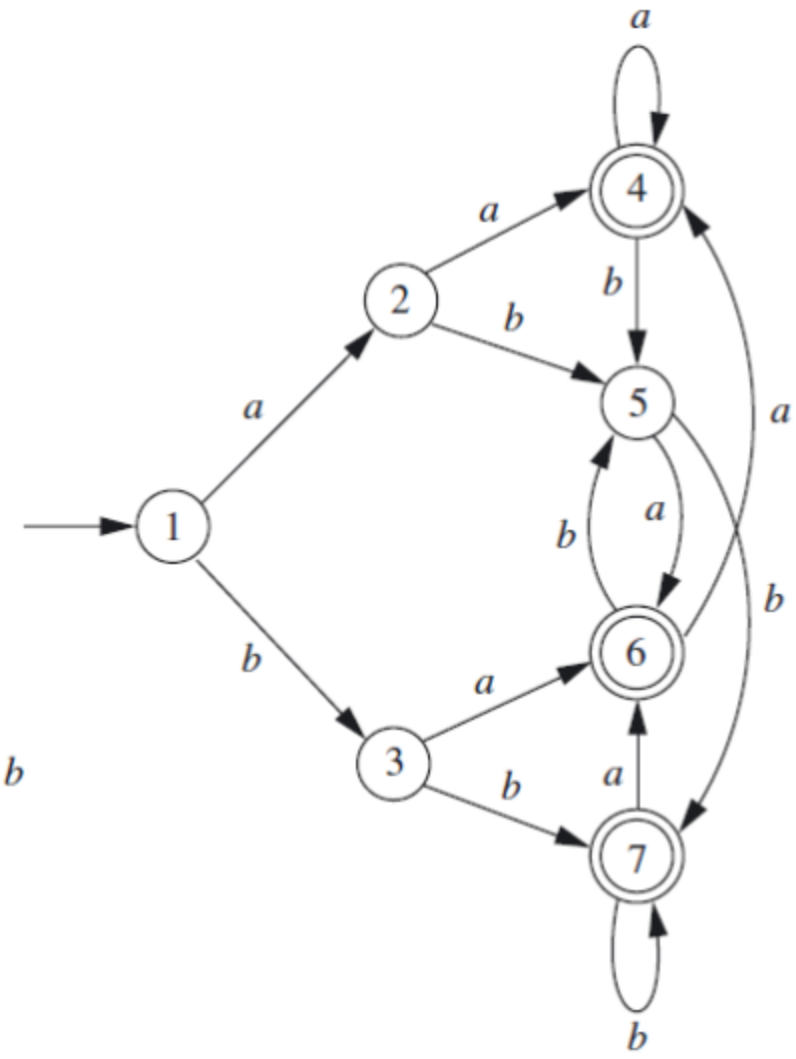
(a)



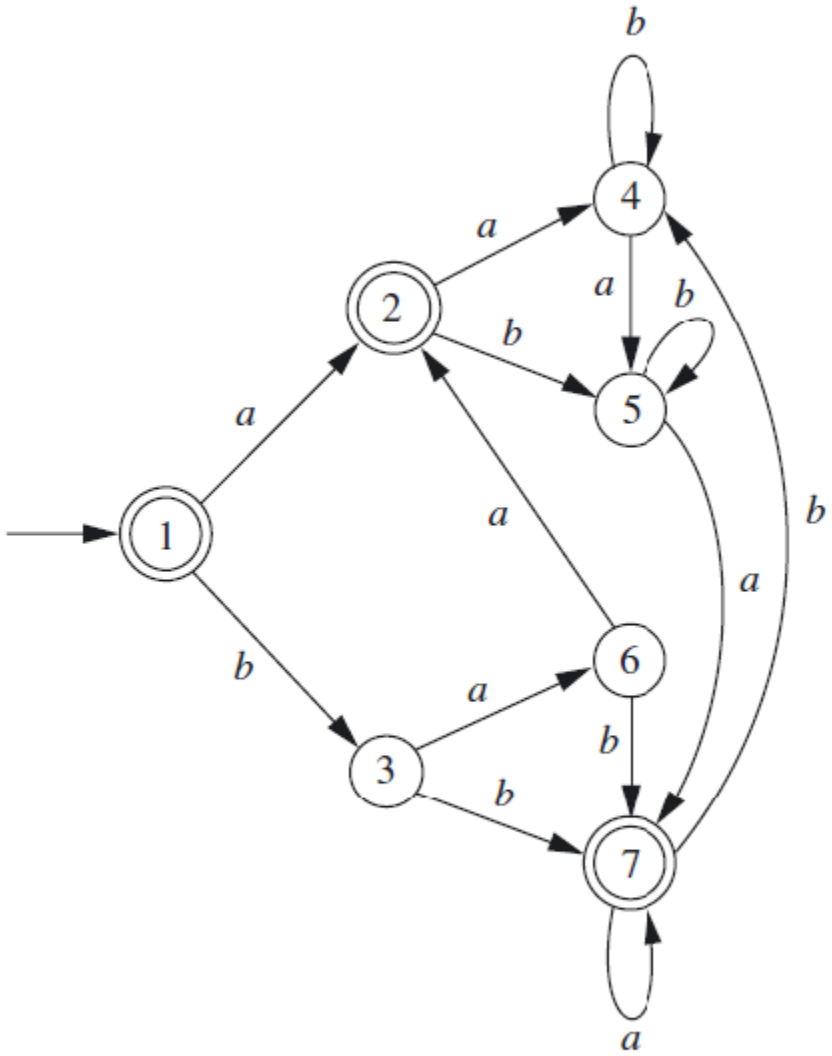
(b)



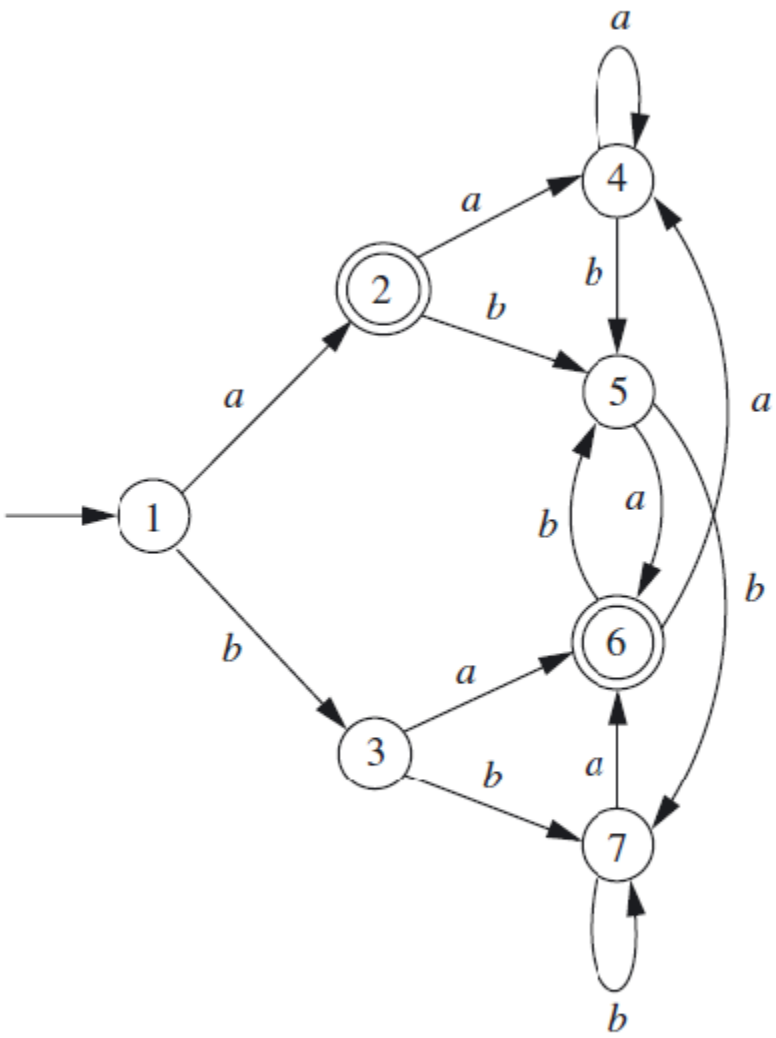
(c)



(d)



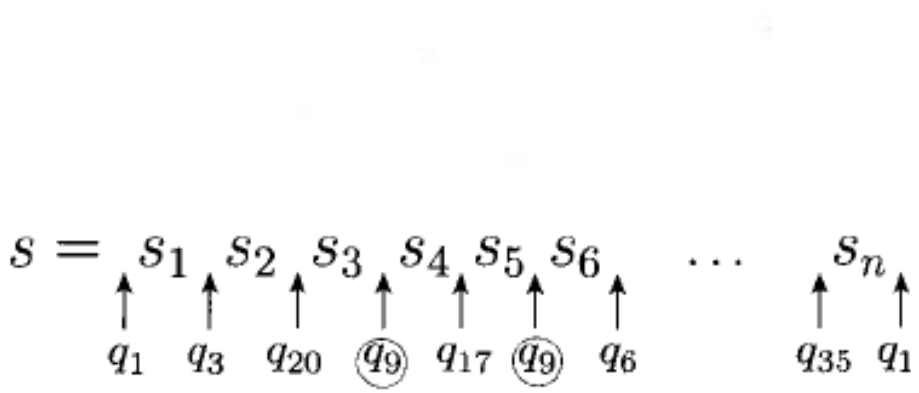
(e)

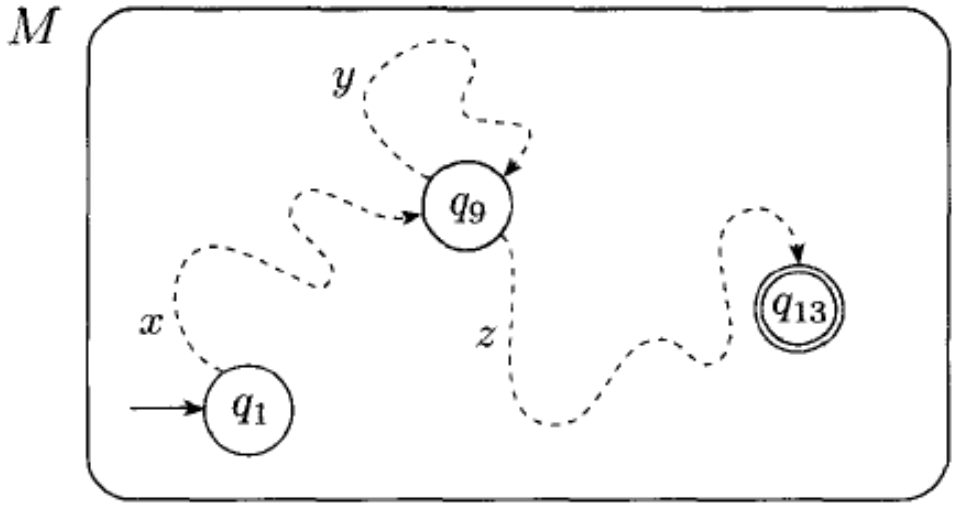


(f)

Pumpálási lemma

Ha egy véges automata által elfogadott nő végtelen, akkor az automata van olyan legalább egy állapotú körének, hogy





Azaz:

Ha $L \subseteq \Sigma^*$ nyelvet elfogadja $M = (Q, \Sigma, q_0, A, \sigma)$ véges automata és $n = |Q|$, akkor minden olyan $x \in L$ L-beli szóra, amelyre $|x| \geq n$, felírható

$$x = uvw$$

alakban, ahol:

1. $|uv| \leq n$
2. $|v| > 0$ (azaz $v \neq \lambda$)
3. Minden $i \geq 0$-ra, $uv^i w \in L$

2.22. For each of the languages in Exercise 2.21, use the pumping lemma to show that it cannot be accepted by an FA.

a. $L = \{a^n b a^{2n} \mid n \geq 0\}$

b. $L = \{a^i b^j a^k \mid k > i + j\}$

c. $L = \{a^i b^j \mid j = i \text{ or } j = 2i\}$

d. $L = \{a^i b^j \mid j \text{ is a multiple of } i\}$

e. $L = \{x \in \{a, b\}^* \mid n_a(x) < 2n_b(x)\}$

f. $L = \{x \in \{a, b\}^* \mid \text{no prefix of } x \text{ has more b's than a's}\}$

g. $L = \{a^{n^3} \mid n \geq 1\}$

h. $L = \{ww \mid w \in \{a, b\}^*\}$

2.29. For each statement below, decide whether it is true or false. If it is true, prove it. If it is not true, give a counterexample. All parts refer to languages over the alphabet $\{a, b\}$.

a. If $L_1 \subseteq L_2$, and L_1 cannot be accepted by an FA, then L_2 cannot.

b. If $L_1 \subseteq L_2$, and L_2 cannot be accepted by an FA, then L_1 cannot.

c. If neither L_1 nor L_2 can be accepted by an FA, then $L_1 \cup L_2$ cannot.

e. If L cannot be accepted by an FA, then L' cannot.

(L' az L komplementerét, vagyis az {a,b}*-L nyelvet jelenti.)