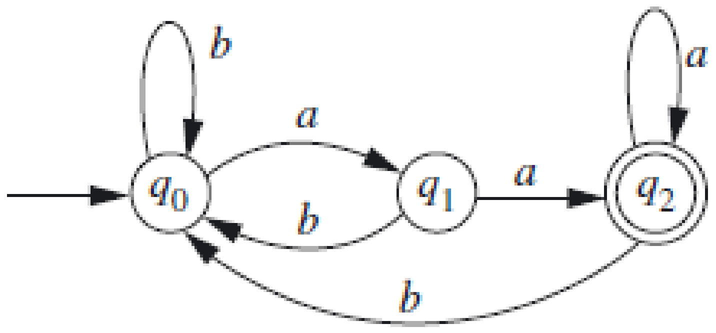
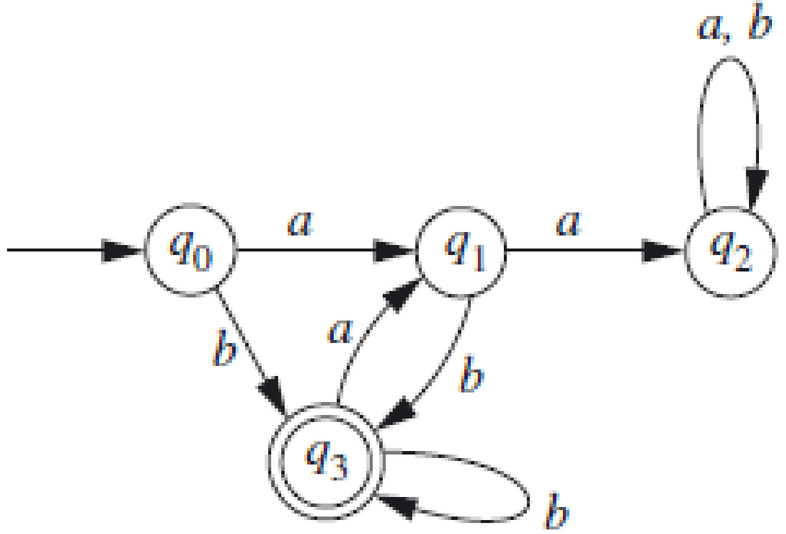
NFA ve NFA-Λ

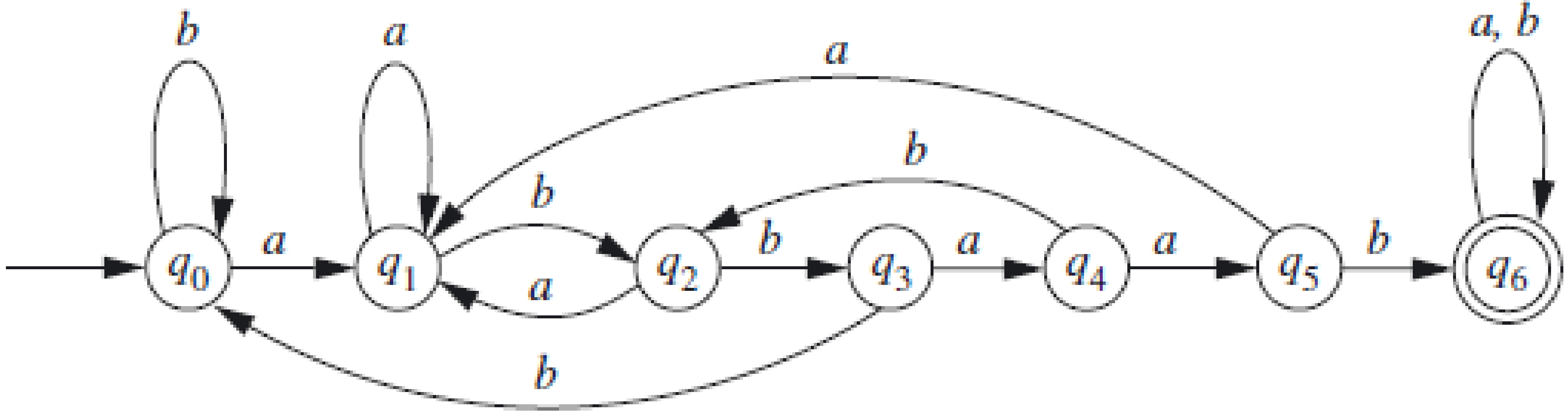
$L_1 = \{x \in \{a, b\}^* \mid x \text{ aa ile biter}\}$



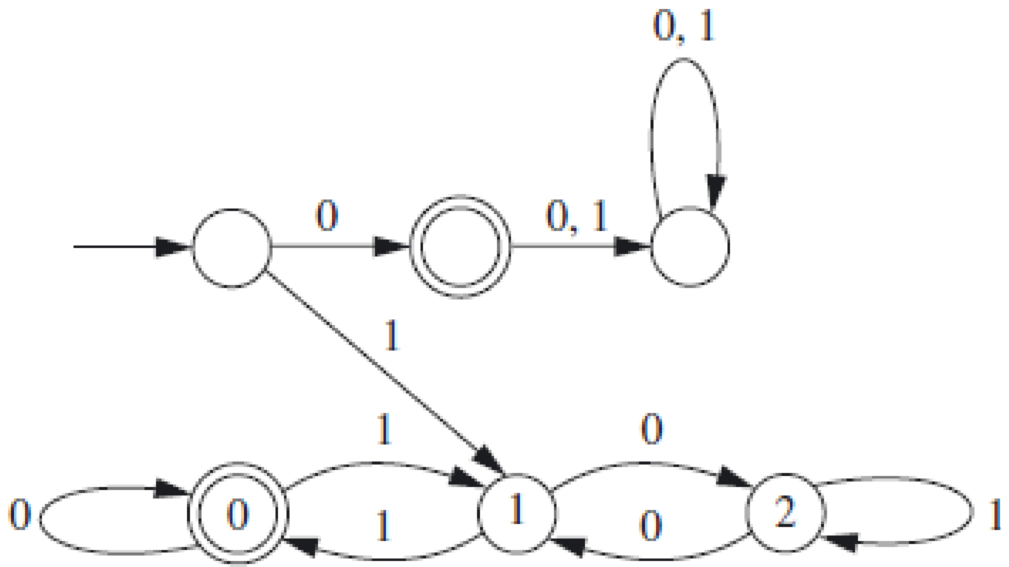
«b» ile biten «aa» altkatarını içermeyen katarlardan oluşan dili tanıyan DFA

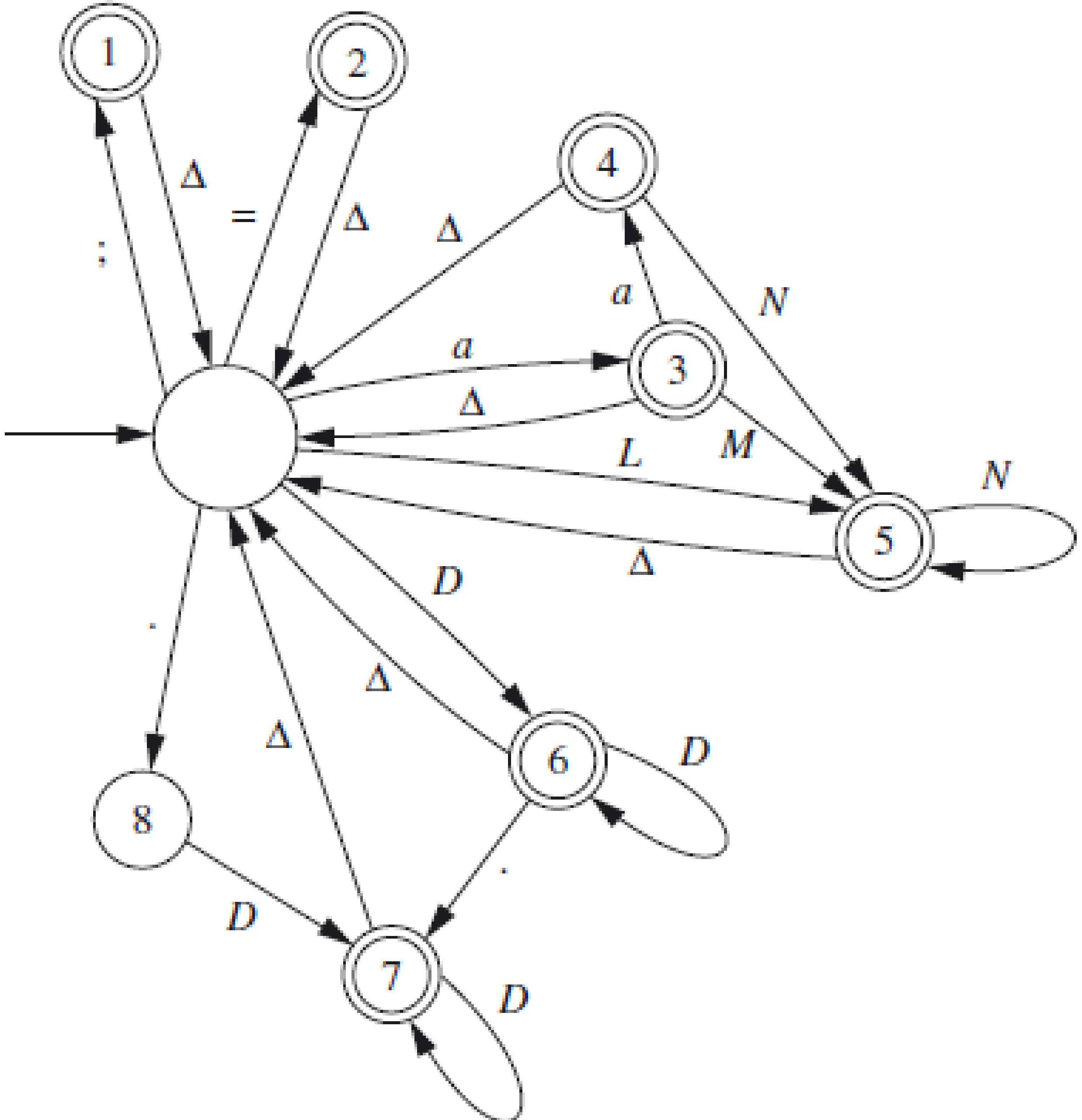


«abbaab» altkatarını içeren katarları kabul eden DFA'yı çiziniz.



3 ile bölünebilen tamsayıların ikili gösterimini kabul eden DFA makinesi:.

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$M_1 = (Q_1, \Sigma, q_1, A_1, \delta_1)$

$M_2 = (Q_2, \Sigma, q_2, A_2, \delta_2)$

$Q = Q_1 \times Q_2$

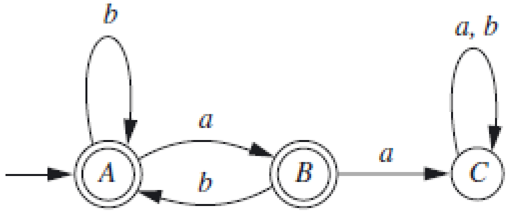
$q_0 = (q_1, q_2)$

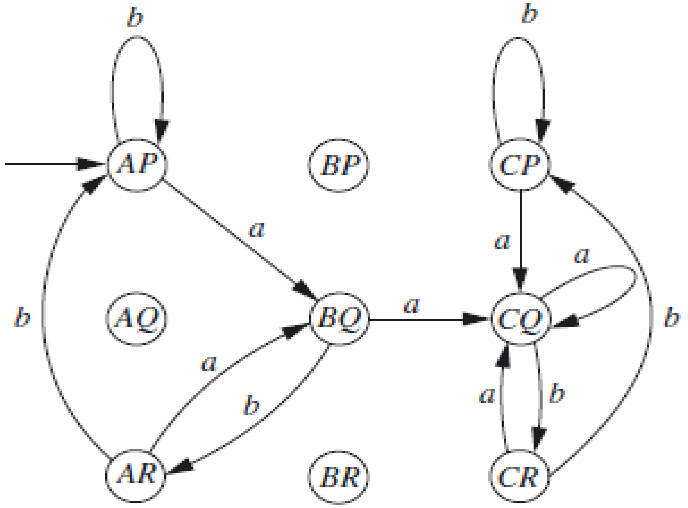
$\delta((p, q), \sigma) = (\delta_1(p, \sigma), \delta_2(q, \sigma))$

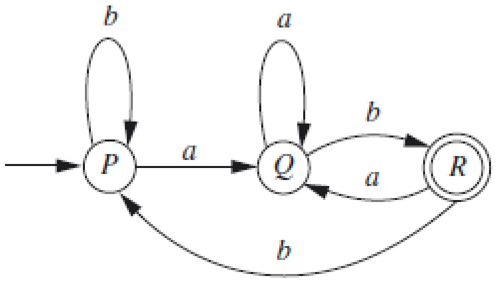
1. If $A = \{(p, q) \mid p \in A_1 \text{ or } q \in A_2\}$, M accepts the language $L_1 \cup L_2$.
2. If $A = \{(p, q) \mid p \in A_1 \text{ and } q \in A_2\}$, M accepts the language $L_1 \cap L_2$.
3. If $A = \{(p, q) \mid p \in A_1 \text{ and } q \notin A_2\}$, M accepts the language $L_1 - L_2$.

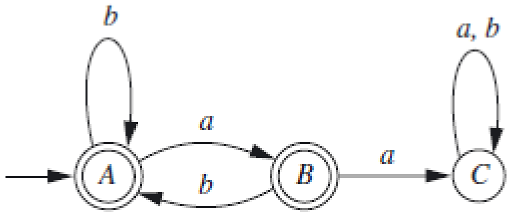
$L_1 = \{x \in \{a, b\}* \mid aa$, x'in altkatarı değildir.$\}$

$L_2 = \{x \in \{a, b\}* \mid x$, ab ile biter$\}$

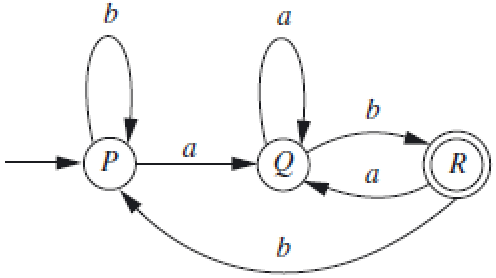






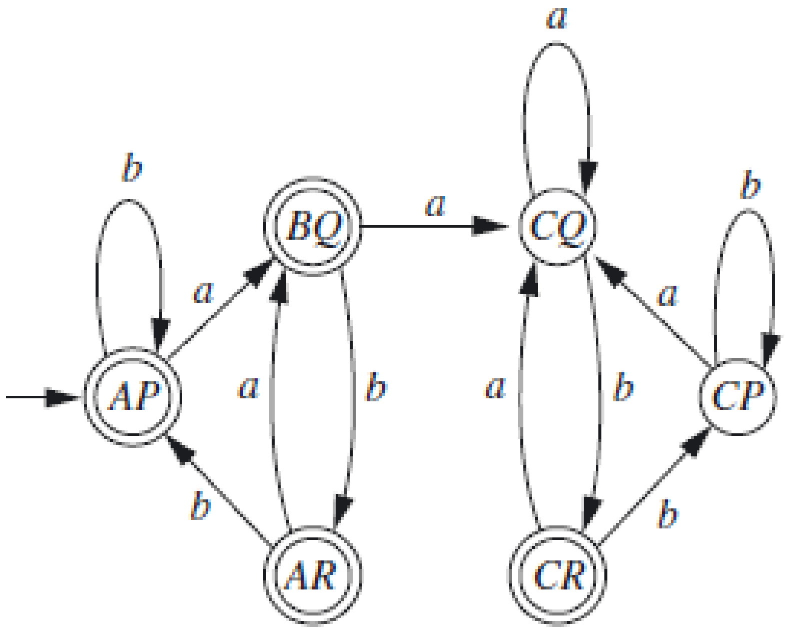


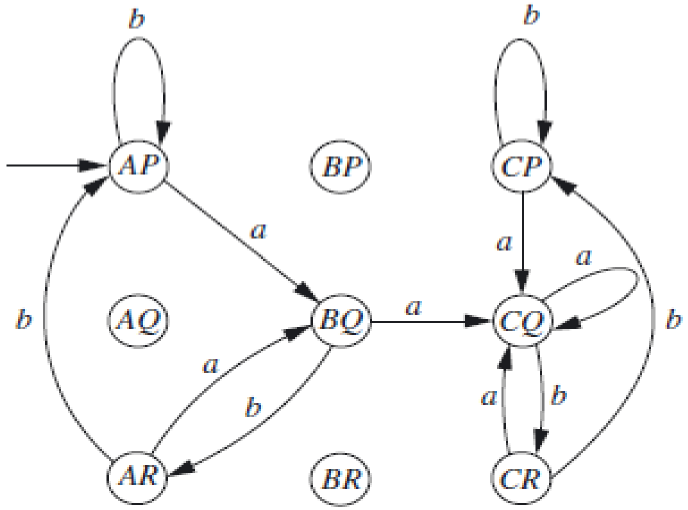
L_1



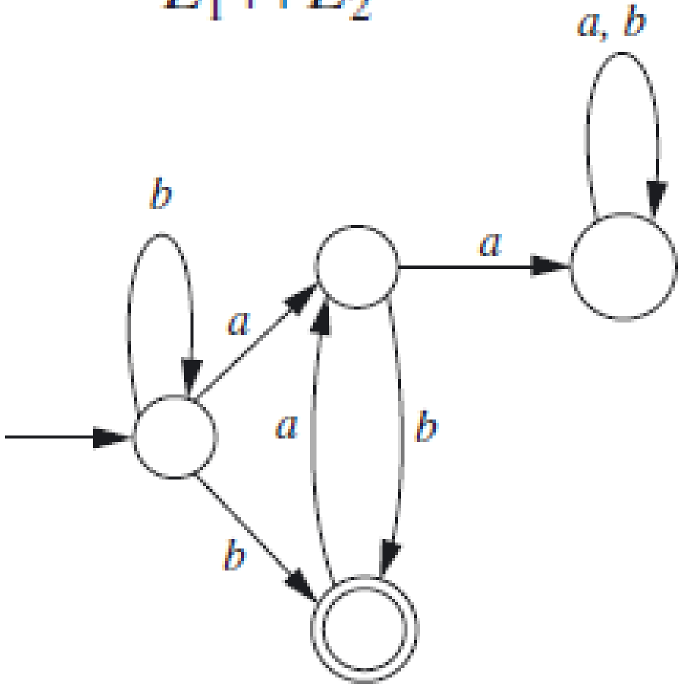
L_2

$L_1 \cup L_2$



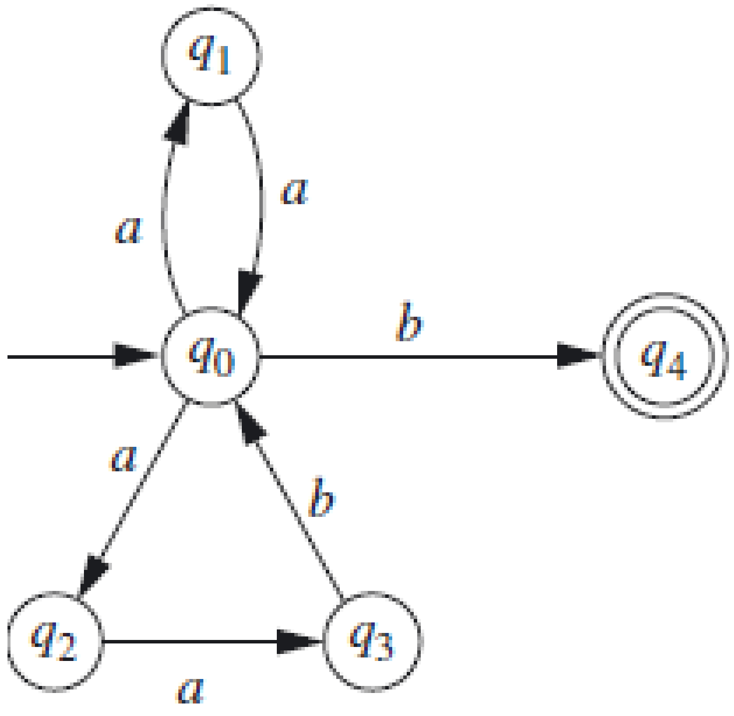


$L_1 \cap L_2$

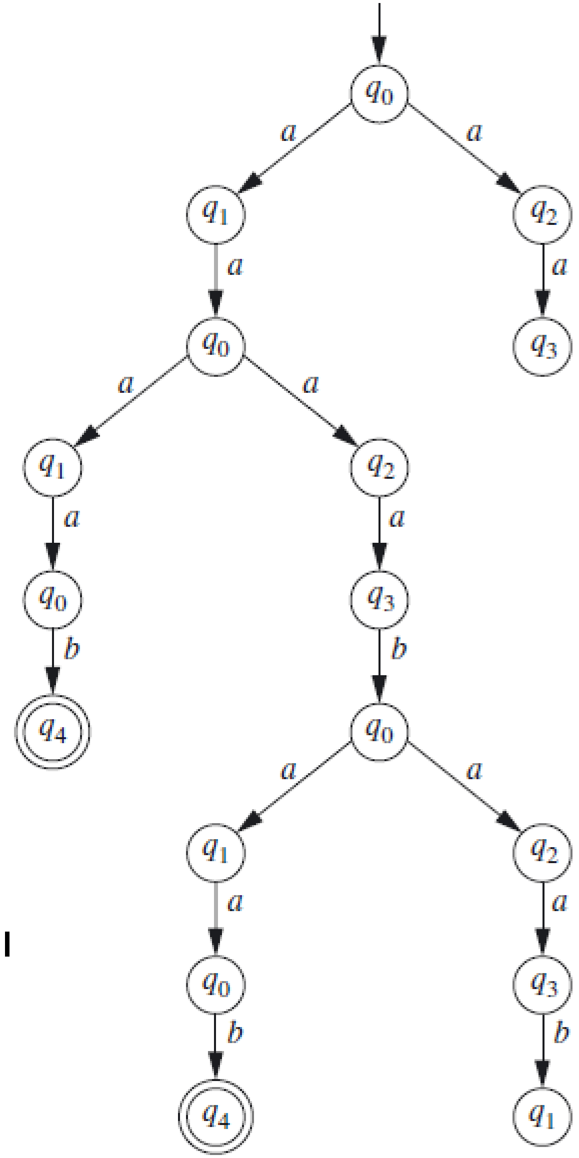


NFA-Λ

$\{aa,aab\}^*\{b\}$

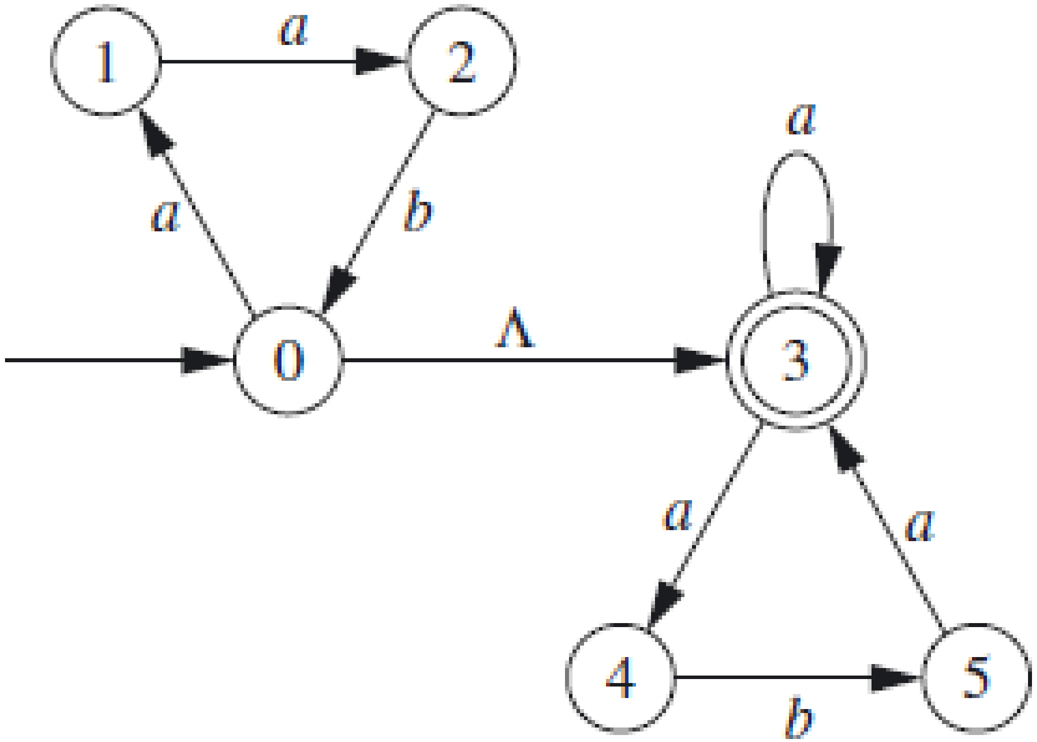


aaaabaab.

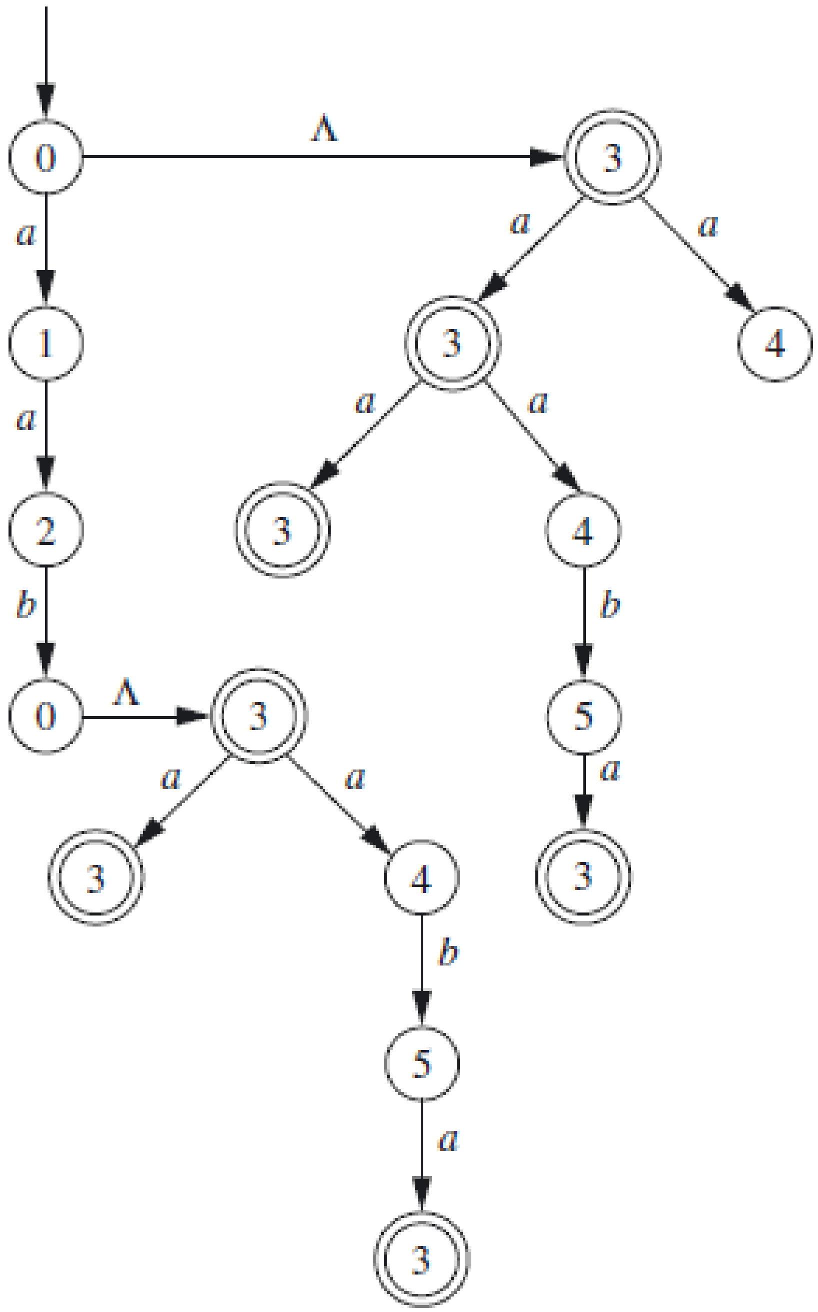


Hesaplama ağacı

$$(aab)^*(a + aba)^*.$$



aababa.



$q_0 \in Q$
$A \subseteq Q$
$\delta : Q \times (\Sigma \cup \{\Lambda\}) \to 2^Q$

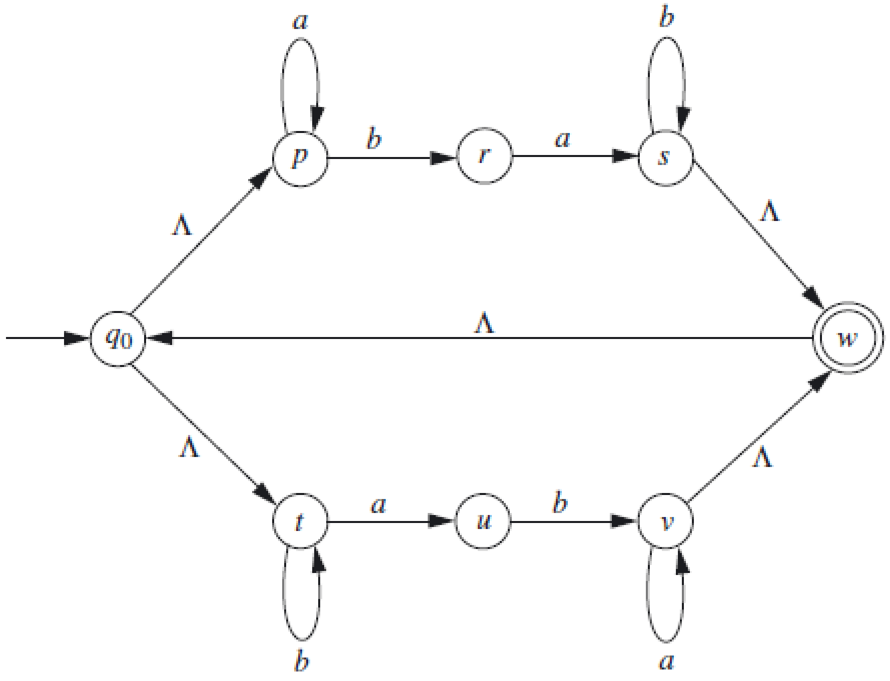
Let $M = (Q, \Sigma, q_0, A, \delta)$

$\delta^* : Q \times \Sigma^* \to 2^Q$

1. For every $q \in Q$, $\delta^*(q, \Lambda) = \Lambda(\{q\})$.
2. For every $q \in Q$, every $y \in \Sigma^*$, and every $\sigma \in \Sigma$,

$$\delta^*(q, y\sigma) = \Lambda\left(\bigcup\{\delta(p, \sigma) \mid p \in \delta^*(q, y)\}\right)$$

$x \in \Sigma^*$ is accepted by M if $\delta^*(q_0, x) \cap A \neq \emptyset$.

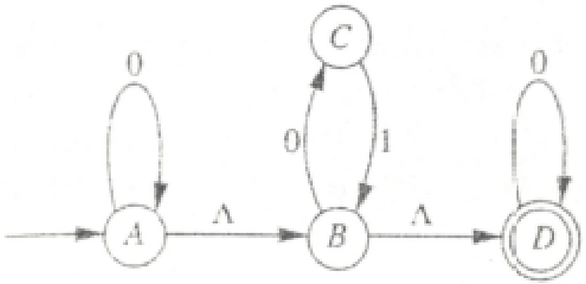


$$\begin{aligned}\delta^*(q_0, a) &= \Lambda\left(\bigcup\{\delta(k, a) \mid k \in \delta^*(q_0, \Lambda)\}\right)\\ &= \Lambda\,(\delta(q_0, a) \cup \delta(p, a) \cup \delta(t, a))\\ &= \Lambda\,(\emptyset \cup \{p\} \cup \{u\})\\ &= \Lambda(\{p, u\})\\ &= \{p, u\}\end{aligned}$$

$$\begin{aligned}\delta^*(q_0, ab) &= \Lambda\left(\bigcup\{\delta(k, b) \mid k \in \{p, u\}\}\right)\\ &= \Lambda(\delta(p, b) \cup \delta(u, b))\\ &= \Lambda(\{r, v\})\\ &= \{r, v, w, q_0, p, t\}\end{aligned}$$

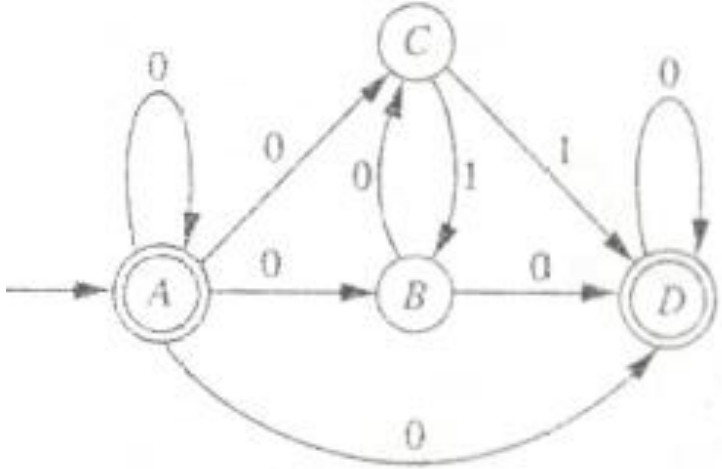
$$\begin{aligned}\delta^*(q_0, \Lambda) &= \Lambda(\{q_0\})\\ &= \{q_0, p, t\}\end{aligned}$$

$$\begin{aligned}\delta^*(q_0, aba) &= \Lambda\left(\bigcup\{\delta(k, a) \mid k \in \{r, v, w, q_0, p, t\}\}\right)\\ &= \Lambda(\delta(r, a) \cup \delta(v, a) \cup \delta(w, a) \cup \delta(q_0, a) \cup \delta(p, a) \cup \delta(t, a))\\ &= \Lambda(\{s\} \cup \{v\} \cup \emptyset \cup \emptyset \cup \{p\} \cup \{u\})\\ &= \Lambda(\{s, v, p, u\})\\ &= \{s, v, p, u, w, q_0, t\}\end{aligned}$$

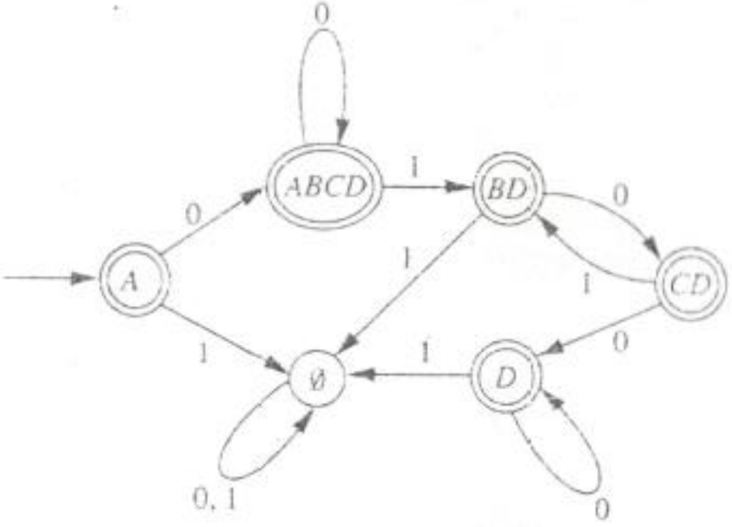


NFA-Λ

$\{0\}^*\{01\}^*\{0\}^*$



NFA

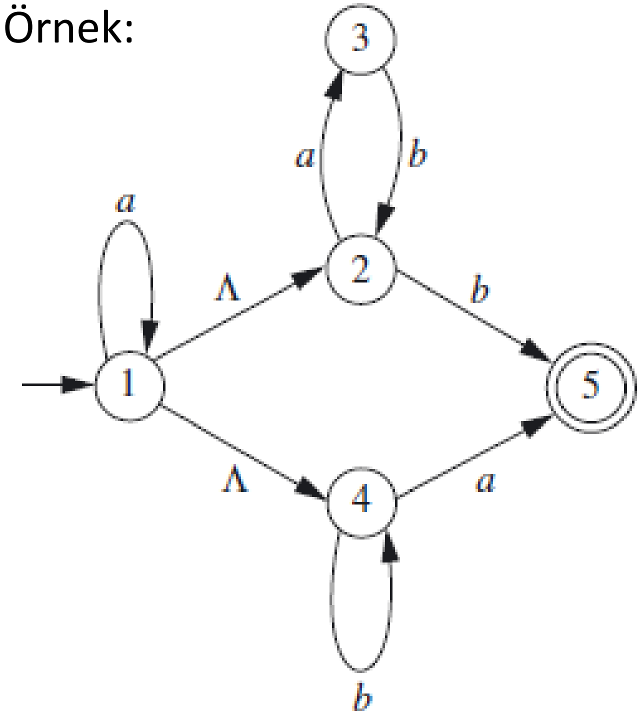


DFA

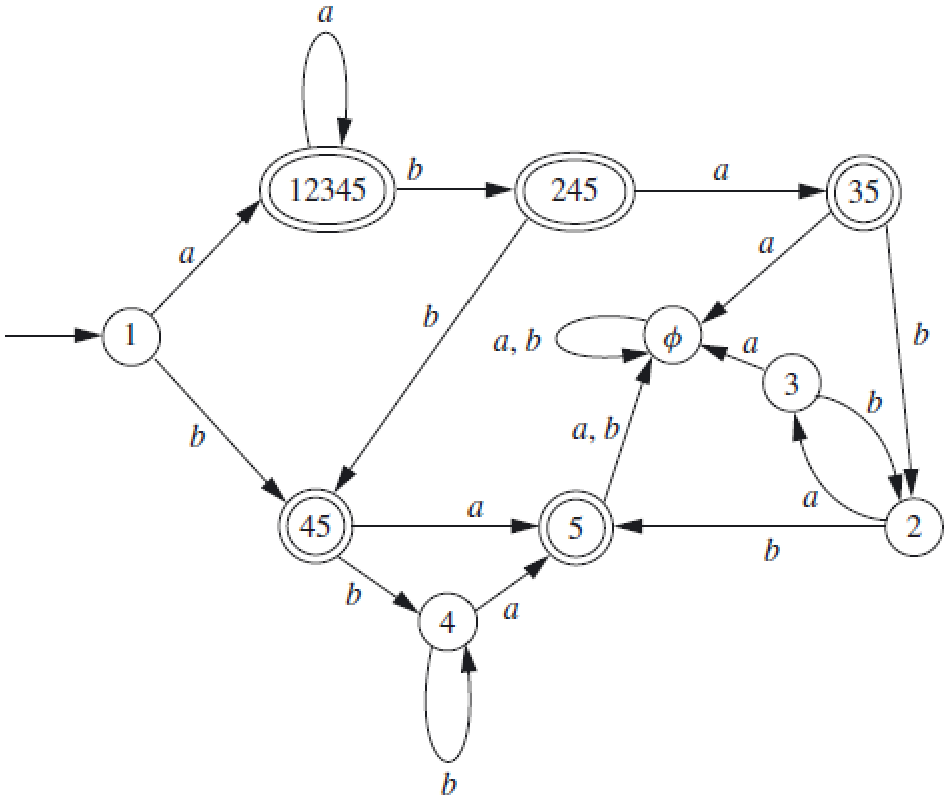
$$\delta^*(A, 0) = \Lambda\left(\bigcup_{p \in \Lambda(\{A\})} \delta(p, 0)\right)$$

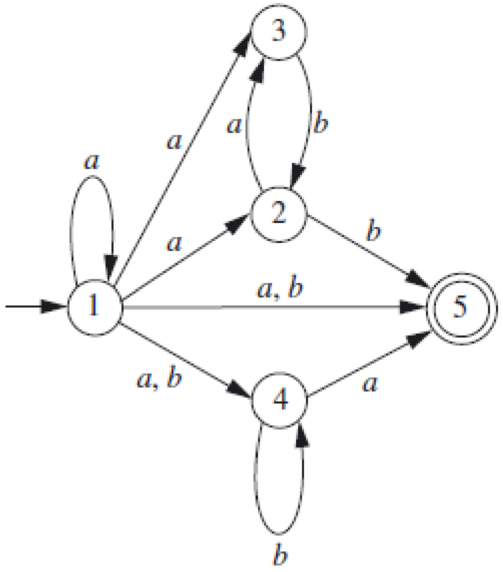
q	$\delta(q, \Lambda)$	$\delta(q, 0)$	$\delta(q, 1)$	$\delta^*(q, 0)$	$\delta^*(q, 1)$
A	$\{B\}$	$\{A\}$	$\emptyset$	$\{A, B, C, D\}$	$\emptyset$
B	$\{D\}$	$\{C\}$	$\emptyset$	$\{C, D\}$	$\emptyset$
C	$\emptyset$	$\emptyset$	$\{B\}$	$\emptyset$	$\{B, D\}$
D	$\emptyset$	$\{D\}$	$\emptyset$	$\{D\}$	$\emptyset$

Örnek:



q	$\delta(q, a)$	$\delta(q, b)$	$\delta(q, \Lambda)$	$\delta^*(q, a)$	$\delta^*(q, b)$
1	{1}	∅	{2, 4}	{1, 2, 3, 4, 5}	{4, 5}
2	{3}	{5}	∅	{3}	{5}
3	∅	{2}	∅	∅	{2}
4	{5}	{4}	∅	{5}	{4}
5	∅	∅	∅	∅	∅





$$((aa+b)^*(aba)^*bab)^*$$