Gyak5

Thursday, March 11, 2021 11:53 AM

Előző órán: - véges automaták

Véges automaták determinizálása

$A = (Q, T, \delta, q_0, F)$ nem determinisztikus

$A' = (Q', T, \delta', q_0', F')$ determinisztikus

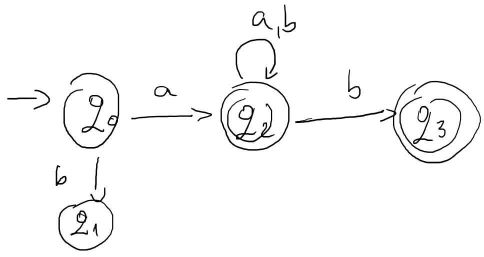
$L(A) = L(A')$

Konstrukció

$Q' = \mathcal{P}(Q)$ $\quad q_0' \in q_0$ $\quad F' = \{q' \in Q' \mid q' \cap F = \emptyset\}$

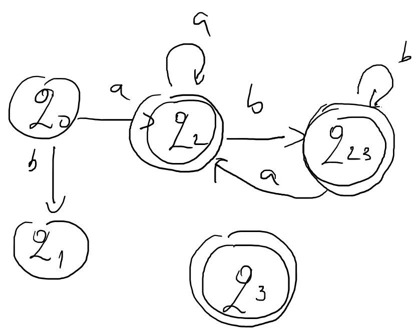
$\delta(q_0, a) = \{\underbrace{q_1, q_2, q_3}_{q_{123}}\}$

1.

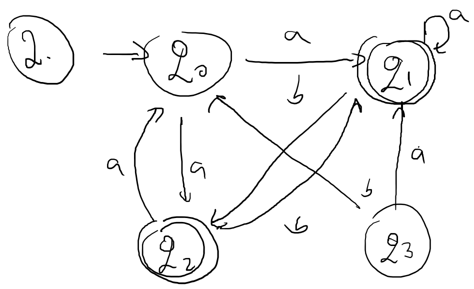


	a	b
$\rightarrow q_0$	q_2	q_1
q_1	$\emptyset$	$\emptyset$
$\leftarrow q_2$	q_2	$\{q_2, q_3\}$
$\leftarrow q_3$	$\emptyset$	$\emptyset$

	a	b
$\rightarrow q_0$	q_2	q_1
q_1	$\emptyset$	$\emptyset$
$\leftarrow q_2$	q_2	q_{23}
$\leftarrow q_3$	$\emptyset$	$\emptyset$
$\leftarrow q_{23}$	q_2	q_{23}

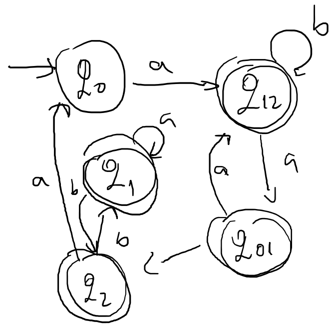


2.



	a	b
$\to q_0$	$\{q_1, q_2\}$	$\emptyset$
$\leftarrow q_1$	q_1	q_2
$\leftarrow q_2$	q_0	q_1
q_3	q_1	q_3

	a	b
$\to q_0$	q_{12}	$\emptyset$
$\leftarrow q_{12}$	q_{01}	q_{12}
$\leftarrow q_{01}$	q_{12}	q_2
$\leftarrow q_2$	q_0	q_1
$\leftarrow q_1$	q_1	q_2



3.

	a	b
$\to q_0$	$\{q_0, q_1\}$	$\{q_0, q_2\}$
q_1	q_3	$\emptyset$
q_2	$\emptyset$	q_4
$\leftarrow q_3$	q_3	q_3
$\leftarrow q_4$	q_4	q_4

	a	b
$\to q_0$	q_{01}	q_{02}
q_{01}	q_{013}	q_{02}
q_{02}	q_{01}	q_{024}
$\leftarrow q_{013}$	q_{013}	q_{023}
$\leftarrow q_{024}$	q_{014}	q_{024}
$\leftarrow q_{023}$	q_{013}	q_{0234}
$\leftarrow q_{014}$	q_{0134}	q_{024}
$\leftarrow q_{0234}$	q_{0134}	q_{0234}
$\leftarrow q_{0134}$	q_{0134}	q_{0234}

Elérhető állapot $A = (Q, T, \delta, q_0, F)$ v.d.a.

A $q \in Q$ állapot a kezdőállapotból elérhető ha létezik

$$q_0 x \overset{*}{\underset{A}{\Rightarrow}} q \quad , \text{ahol } x \in T^*$$

Összefüggő automata: egy v.d.a. összefüggő, ha $\forall$ állapota elérhető

Lépések ($\to$ összefüggő v.d.a)

Lépések (-> összefüggő v.d.a)

1) Határozzuk meg a H halmazt

$H_0 = \{q_0\}$

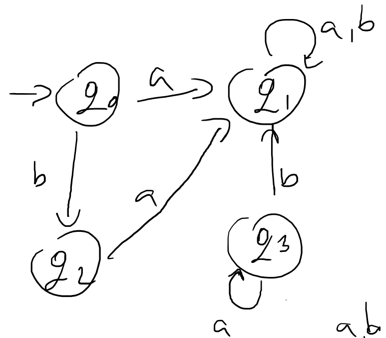
$H_{i+1} = H_i \cup \{ p \mid \delta(q,a) = p \wedge q \in H_i, a \in T \}$

$H_n = H_{n+1} := \underline{\underline{H}}$

2.) $A' = (Q', T, \delta', q_0, F')$

- $Q' = H$
- $F' = F \cap H$
- $\delta' : H \times T \to H$ és $\delta'(q,a) = \delta(q,a) \quad q \in H$

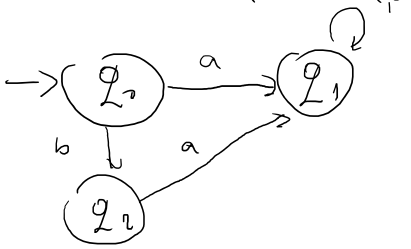
pl:



$H_0 = \{q_0\}$

$H_1 = H_0 \cup \{q_1, q_2\} = \{q_0, q_1, q_2\}$

$H_2 = H_1 \cup \{\} = H_1 = H$



3-as típusú grammatika

$A \to uB \qquad A, B \in N$

$A \to u \qquad u \in T^*$

3-as normál forma (3NF)

$A \to aB \qquad A, B \in N$

$A \to \varepsilon \qquad a \in T$

Lépések:

1) Hosszredukció: a) $A \to a_1 a_2 \dots a_n B \quad n \geq 2$

$A \to a_1 Z_1$

$Z_1 \to a_2 Z_2$

$\vdots$

$Z_{n-1} \to a_n B$

b) $A \to a_1 a_2 \dots a_n \quad n \geq 1$

$A \to a_1 X_1$

$X_1 \to a_2 X_2$

$\vdots$

$X_{n-1} \to a_n X_n \qquad X_n \to \varepsilon$

2) Lánctalanítás

- Minden $A \in N$ esetén meghatározzuk $U(A)$-t

$U_1(A) = \{A\}$

$U_{i+1}(A) = U_i(A) \cup \{B \mid B \to Z \in P \wedge Z \in U_i(A)\}$

$U_n(A) = U_{n+1}(A) = U(A)$

$A \in U(B) \Leftrightarrow A \overset{*}{\Rightarrow} B$

pl: $\left.\begin{matrix} A \to B \\ B \to a \end{matrix}\right\} \Rightarrow A \to a$

① $\boxed{\begin{matrix} S \to abS \mid B \\ B \to bB \mid V \\ V \to aa \mid b \end{matrix}}$

3NF: $A \to aB \quad A, B \in N$
$A \to \varepsilon \quad a \in T$

1) Hosszredukció

$S \to a Z_1 \mid B$

$B \to bB \mid V$

2) Lánctalanítás

Lánctáblázat: $S \to B$, $B \to V$

$U_1(B) = \{B\}$

$U_2(B) = U_1(B) \cup \{S\} = \{B, S\}$

$B \to bB \mid V$

$V \to aZ_2 \mid bZ_3$

$Z_1 \to bS$

$Z_2 \to aZ_3$

$Z_3 \to \varepsilon$

$U_1(B) = \{B\}$

$U_2(B) = U_1(B) \cup \{S\} = \{B, S\}$

$U_3(B) = U_2(B) \cup \{\} = \{B, S\} = U(B)$

$U_1(V) = \{V\}$

$U_2(V) = U_1(V) \cup \{B\} = \{V, B\}$

$U_3(V) = U_2(V) \cup \{\} = \{V, B\} = U(V)$

$S \to aZ_1 \mid bB \mid aZ_2 \mid bZ_3$

$B \to bB \mid aZ_2 \mid bZ_3$

(3NF)

$$\left(\begin{array}{ll} A \to aB & A, B \in N \\ A \to \varepsilon & a \in T \end{array} \right)$$

$S \to aZ_1 \mid bB \mid aZ_2 \mid bZ_3$

$B \to bB \mid aZ_2 \mid bZ_3$

$Z_1 \to bS$

$Z_2 \to aZ_3$

$Z_3 \to \varepsilon$