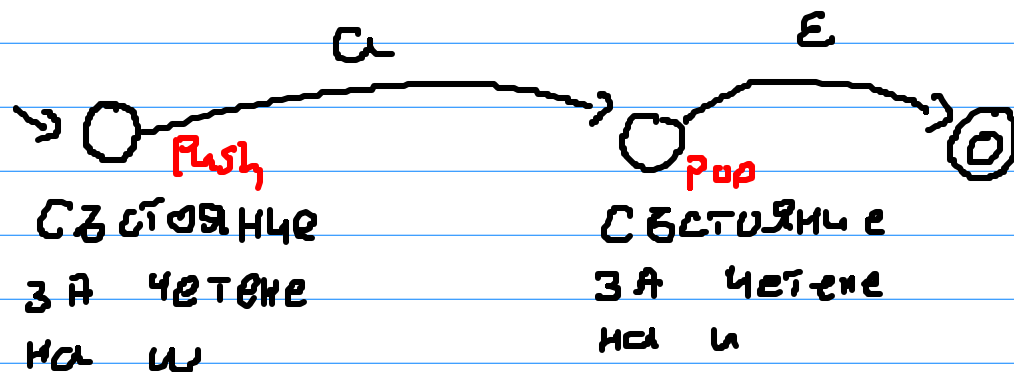


14

зад Постройте НСА за L

$$L = \{ w a u \mid w, u \in \{a, b\}^* \wedge |w| = |u| \}$$



$$Q_{\text{set}} = \{ p, q, f \}$$

$$q_{\text{start}} = p$$

$$\Gamma = \{ \#, x \}$$

$$q_{\text{final}} = f$$

$$\Delta(p, \emptyset, \#) = \{ (p, x\#) \}$$

$$\Delta(p, a, \#) = \{ (p, x\#), (q, \#) \}$$

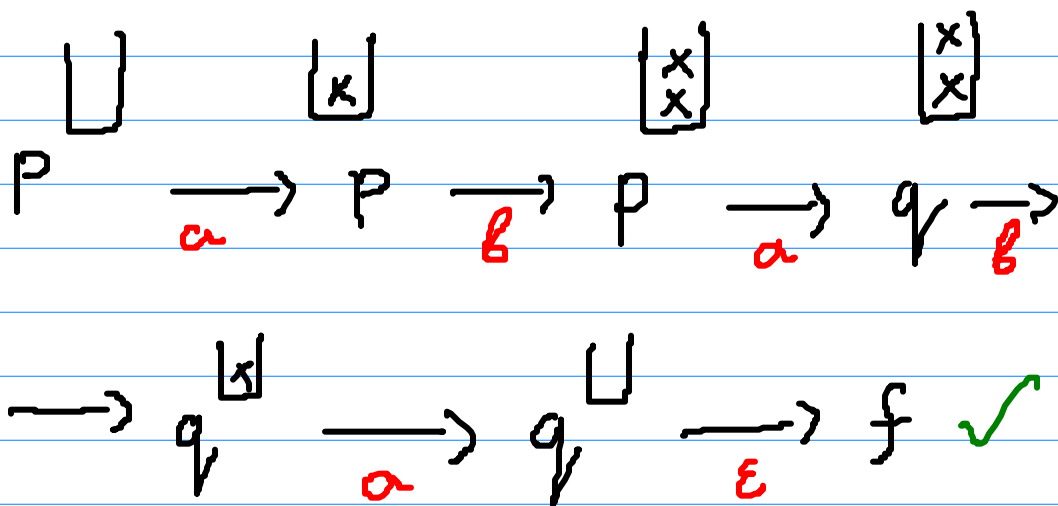
$$\Delta(p, b, x) = \{ (p, xx) \}$$

$$\Delta(p, a, x) = \{ (p, xx), (q, x) \}$$

$$\Delta(q, a/b, x) = \{ (q, \epsilon) \}$$

$$\Delta(q, \varepsilon, \#) = \{ \{f, \varepsilon\} \}$$

$ababab$



Th. Множеството от езиче, които

① се разпознават от НСА съвпада с м-вото на к.-с. езичи

1) Ако L е к.-с., то \exists НСА P :

$$L(P) = L$$

щом L е к.-с., то \exists к.-с. граматика

$$G : L(G) = L$$

Конструкция: грамматики \rightarrow ст. автомат.

$$G = \langle V, \Sigma, S, R \rangle$$

Требуем ст. автомат $P: L(G) = L(P)$

$$P = \langle Q, \Sigma, \Gamma, \#, q_{\text{start}}, q_{\text{accept}}, \Delta \rangle$$

$$Q = \{q_{\text{start}}, q, q_{\text{accept}}\}$$

$$\Gamma = \Sigma \cup V \cup \{\#\}$$

$$\Delta(q_{\text{start}}, \varepsilon, \#) = \{(q, S\#)\}$$

$$\Delta(q, \varepsilon, A) = \{(q, \alpha) \mid A \xrightarrow{G} \alpha\}$$

$$\Delta(q, a, \alpha) = \{(q, \varepsilon)\} \quad \forall a \in \Sigma$$

$$\Delta(q, \varepsilon, \#) = \{(q_{\text{accept}}, \varepsilon)\}$$

34g

Постройте стеклов автомат за:

$$G: S \rightarrow aSc \mid B$$

$$B \rightarrow bB \mid \epsilon$$

$$\{L(G) = \{a^n b^k c^n \mid n, k \in \mathbb{N}\}\}$$

$$\Delta(q_{start}, \epsilon, \#) = \{(q, S\#)\}$$

$$\Delta(q, \epsilon, S) = \{(q, aSc), (q, B)\}$$

$$\Delta(q, \epsilon, B) = \{(q, bB), (q, \epsilon)\}$$

$$\Delta(q, a, a) = \{(q, \epsilon)\}$$

$$\Delta(q, b, b) = \{(q, \epsilon)\}$$

$$\Delta(q, \epsilon, \#) = \{(q_{accept}, \epsilon)\}$$

a a b c c
| | | |



тв. Ако L_1 е к.-с. и L_2 е рег.,
то $L_1 \cap L_2$ е к.-с.

L_1 е к.с. $\Rightarrow \exists$ Н.с.А $P: L(P) = L_1$

L_2 е рег. $\Rightarrow \exists$ к.А. $A: L(A) = L_2$

$P = \langle Q', \Sigma, \Gamma, \#, q_s, q_f, \Delta \rangle$

$A = \langle Q'', \Sigma, s, F, \delta \rangle$

Твърдим $P': L(P') = L(P) \cap L(A)$

$P' = \langle Q' \times Q'', \Sigma, \Gamma, \#, \langle q_s, s \rangle, \{q_f\} \times F, \Delta' \rangle$

$\langle \langle p, r \rangle, \alpha \rangle \in \Delta'(\langle q, t \rangle, a, X) \Leftrightarrow$

$\delta(\Gamma, a) = t \wedge \Delta(q, a, X) \ni \langle p, \alpha \rangle$



К.-с. езици не са затворени
относно: $\cap, \bar{}$

L_1, L_2 - к.-с. $\Rightarrow L_1 \cap L_2$ е к.-с.

$\nRightarrow \bar{L}_1$ и \bar{L}_2 е к.-с.

def: Регулярна граматика.

$$G = \langle V, \Sigma, S, R \rangle \quad R \subseteq V \times (\Sigma \times V \cup \Sigma)$$

Всички правила са във вида:

$$A \rightarrow BV$$

$$A \rightarrow a$$

Езиците на рег. граматика
са регулярни.

Рез. граматика \rightarrow автомат

$$G = \langle V, \Sigma, S, R \rangle$$

!

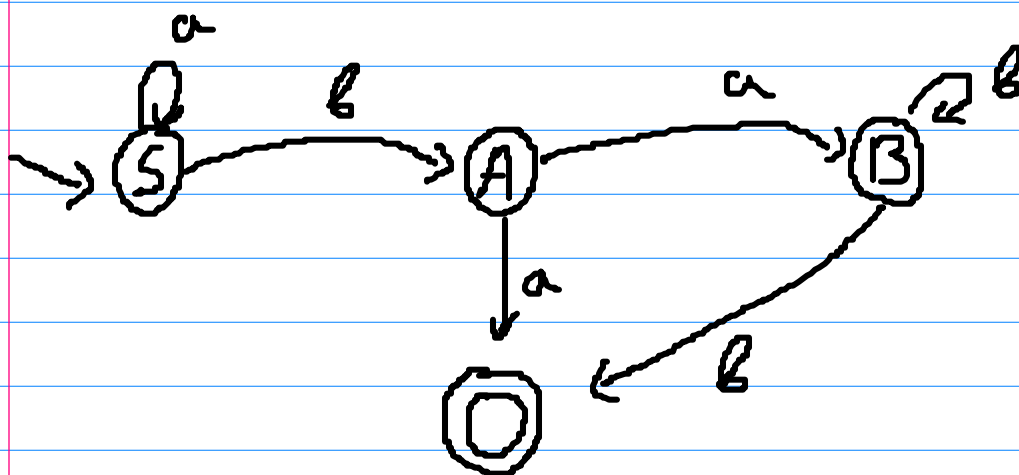
$$A = \langle V \cup \{f\}, \Sigma, S, \{f\}, \delta \rangle$$

$$\delta(A, a) = T \Leftrightarrow (A, aT) \in R \vee$$

$$f = T \wedge (A, a) \in R$$

Пример:

$$\begin{array}{l} S \rightarrow aS \mid bA \\ A \rightarrow aB \mid a \\ B \rightarrow bB \mid b \end{array}$$



автомат \rightarrow рез. грамматики

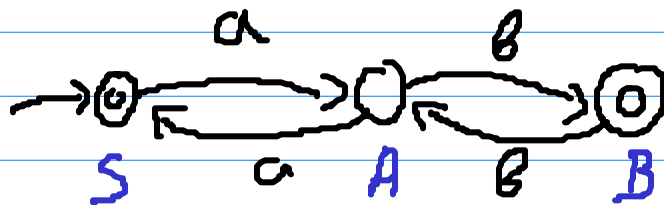
$$A = \langle Q, \Sigma, s, F, \delta \rangle$$

$$G = \langle Q, \Sigma, s, R \rangle$$

$$\forall A \in V \begin{cases} A \rightarrow a B \leftrightarrow \delta(A, a) = B \\ \forall a \in \Sigma \quad A \rightarrow a \leftrightarrow \delta(A, a) \cap F \neq \emptyset \end{cases}$$

$$S \rightarrow \varepsilon \leftrightarrow S \in F$$

Пример:



$$\begin{array}{l|l} S \rightarrow a A & \varepsilon \\ A \rightarrow a S & b B \mid a \mid \varepsilon \\ B \rightarrow b A & \end{array}$$