

$$G: \begin{cases} S \rightarrow SQ | S1 | S2 | AB \\ A \rightarrow 00A | 000 \\ B \rightarrow B0 | 1B | \lambda \end{cases}$$

1) Tipul $n: G \approx G$ para sb. string recursive
Tipul 2 $X \rightarrow \alpha_1 | \dots | \alpha_n | X\beta_1 | X\beta_2 | \dots | X\beta_k$

$$G': \begin{cases} S \rightarrow AB | ABT \\ Y \rightarrow 01 | 12 | 0T | 1T | 2T \\ A \rightarrow 00A | 000 \\ B \rightarrow 1B | \lambda | 1B5 | 5 \\ S \rightarrow 0 | 0S \\ "A \rightarrow 1" \end{cases}$$

2)

$$G'': \begin{cases} S \rightarrow SX_0 | SX_1 | SX_2 | AB \\ X_0 \rightarrow 0 \\ X_1 \rightarrow 1 \\ X_2 \rightarrow 2 \\ A \rightarrow X_0 X_0 A | X_0 X_0 X_0 \\ B \rightarrow BX_0 | X_1 B | \lambda \end{cases}$$

$$L(G) = ?$$

$$A \stackrel{*}{\Rightarrow} 0^{2n} A \Rightarrow 0^{2n+3} = 0 \quad n \geq 0$$

$$B \Rightarrow B0 \Rightarrow B00 \Rightarrow 1B00 \stackrel{*}{\Rightarrow} 1^m 0^k, m, k \geq 0$$

$$S \stackrel{*}{\Rightarrow} w \Rightarrow ABw \stackrel{*}{\Rightarrow} 0^{2n+3} 1^m 0^k w, w \in \{0, 1, 2\}^*$$

$$L(G) = \{ 0^{2n+3} 1^m 0^k w \mid n, m, k \geq 0, w \in \{0, 1, 2\}^* \}$$

$$(a|c)^* \mid b(a|c)^* \mid (a|c)^*bb$$

$$L_1 = (a|c)^* = \{a, c\}^*$$

$$L_2 = b(a|c)^* = \{bw \mid w \in \{a, c\}^*\}$$

$$L_3 = (a|c)^*bb = \{wbb \mid w \in \{a, c\}^*\}$$

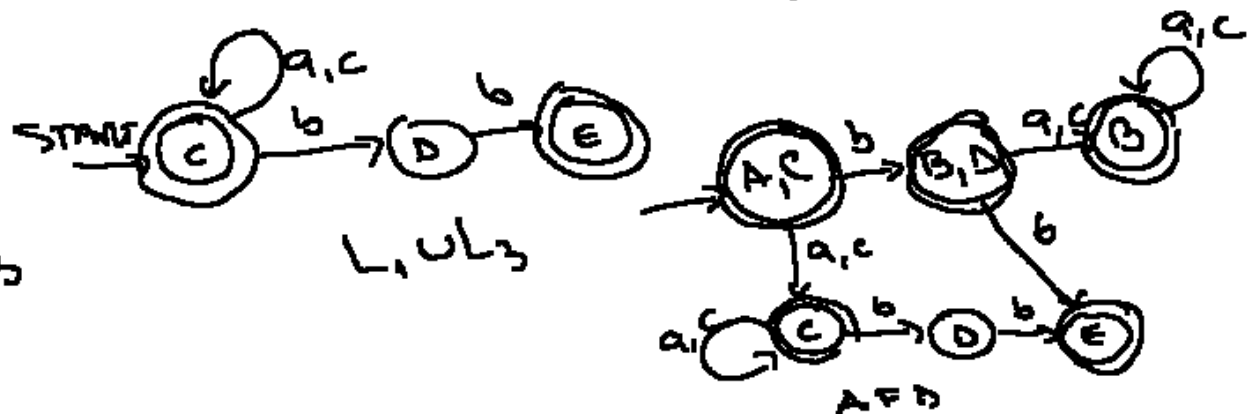
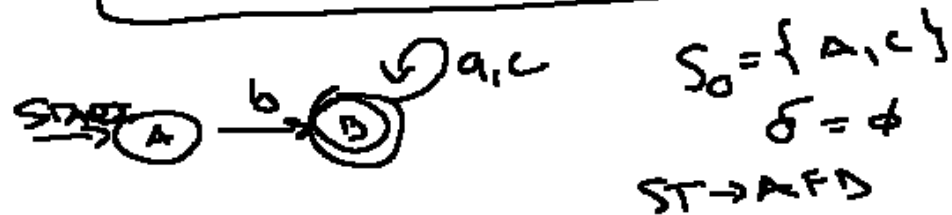
$$L = L_1 \cup L_2 \cup L_3$$

2. AF ai $L(AF) = L$



$$L = \{w, bw, wbb \mid w \in \{a, c\}^*\}$$

$= \{w \in \{a, b, c\}^* \mid w \text{ este un șir arbitrar de litere } a \text{ și } c, \text{ sau urmează } w \text{ precedată de } b \text{ sau succedată de } bb\}$



$$(a|c)^* \mid b(a|c)^* \mid (a|c)^* b b$$

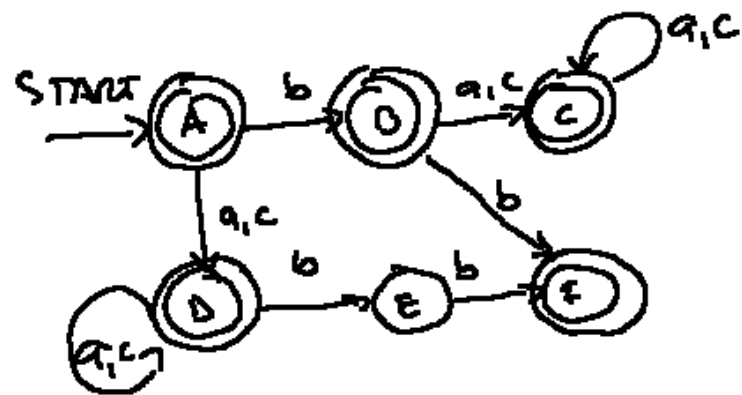
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$$L = L_1 \cup L_2 \cup L_3$$

2. AF cu $\widehat{L(AF)} = L$



Gr. neambipua:

$A \rightarrow bB \mid b \mid aD \mid a \mid cD \mid c$
 $B \rightarrow aC \mid a \mid cC \mid c \mid bF \mid b$
 $C \rightarrow aC \mid a \mid cC \mid c$
 $D \rightarrow aD \mid a \mid cD \mid c \mid bE$
 $E \rightarrow bF \mid b$

neambipua!
cf [T] lb repetit

$\{ S \rightarrow X \mid bX \mid Xbb$
 $\mid X \rightarrow aX \mid cX \mid \lambda$

ambipuo?
neambipua?

$$L_1 = \{ b a^n b^{n-1} a^3 \mid n \geq 1 \} \quad b a^n b^{n-1} a^3 = \underbrace{b a^n}_{= b a^{n-1} b} b^{n-1} a^3 \quad n \geq 1$$

1) G. s.t. $L(G) = L_1$. G is f.n. CHOMSKY

$$\begin{cases} S \rightarrow b a X a^3 \\ X \rightarrow a X b \mid \lambda \end{cases}$$

$$\lambda \quad \begin{cases} S \rightarrow b a X a^3 \mid b a^4 \\ X \rightarrow a X b \mid a b \end{cases}$$

$$A \rightarrow \begin{cases} S \rightarrow X_b X_a X X_a X_a X_a \mid X_b X_a X_a X_a X_a \\ X_a \rightarrow a \\ X_b \rightarrow b \\ X \rightarrow X_a X X_b \mid X_a X_b \end{cases}$$

A → B — skip

Scantare

$$\begin{cases} S \rightarrow X_b Z_1 \mid X_b T_1 & X \rightarrow X_a T \mid X_a X_b \\ Z_1 \rightarrow X_a Z_2 & T \rightarrow X X_b \\ Z_2 \rightarrow X Z_3 \\ Z_3 \rightarrow X_a Z_4 \\ Z_4 \rightarrow X_a X_a \\ T_1 \rightarrow X_a T_2 \\ T_2 \rightarrow X_a T_3 \\ T_3 \rightarrow X_a X_a \\ X_a \rightarrow a \\ X_b \rightarrow b \end{cases}$$

f.n. CHOMSKY

$$L_1 = \{ b a^n b^{n-1} a^3 \mid n \geq 1 \} \quad b a^n b^{n-1} a^3 = \underline{b a} \underline{a^{n-1} b^{n-1}} \underline{a^3} \quad n \geq 1$$

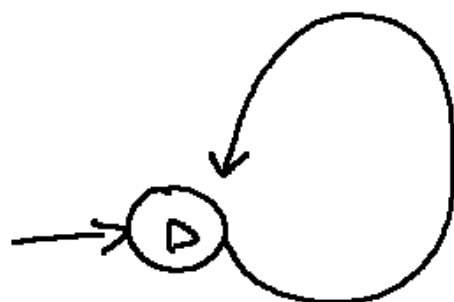
1) G. sei $L(G) = L_1$. G ist f.n. Chomsky

$$\begin{cases} S \rightarrow b a X a^3 \\ X \rightarrow a X b \mid \lambda \end{cases}$$

$$\begin{cases} S \rightarrow b a X a^3 \mid b a^4 \\ X \rightarrow a X b \mid a b \end{cases}$$

f.n. Greibach

$$\begin{cases} S \rightarrow b X_a X X_a^3 \mid b X_a^4 \\ X \rightarrow a X X_b \mid a X_b^4 \\ X_a \xrightarrow{5} a \\ X_b \xrightarrow{6} b \end{cases}$$



$$b, S / X_a X X_a X_a \quad 1$$

$$b, S / X_a X_a X_a X_a \quad 2$$

$$a, X / X X_b \quad 3$$

$$a, X / X_b \quad 4$$

$$a, X_a / a \quad 5$$

$$b, X_b / b \quad 6$$

$$p = b a^4 \quad |p| = 5$$

$$\begin{aligned} (1, b a a a a, S) &\xrightarrow{2} (1, a a a a, X_a X_a X_a X_a) \xrightarrow{5} \\ &\xrightarrow{5} (1, a a a, X_a X_a X_a) \xrightarrow{5} (1, a a, X_a X_a) \xrightarrow{5} \\ &\xrightarrow{5} (1, a, X_a) \xrightarrow{5} (1, \lambda, \lambda) \end{aligned}$$

