

1. Převést do CNF (algoritmy) gramatiky s více

úrovněmi pravidel a start. symbol. S:

- S → a T b | a S M | T
- M → a O M | O → a b
- D → a T → ε | T S | a

CNF:
 $A \rightarrow BC$
 $A \rightarrow a$
 (příp. $S \rightarrow \epsilon$
 a souvislá
 převedení)

a) Převést na vl. gramatiku (bez zbyř. symbol. bez ε-pravidel, bez cyklů)

i) odstranění úrovn. úsp. věty

- $N_{\epsilon} = \{ A \in N \mid A \xrightarrow{+} w \in \Sigma^+ \}$

- $N_{\epsilon}^0 = \emptyset, N_{\epsilon}^1 = \{ O, P, T \}, N_{\epsilon}^2 = \{ O, P, T, S \}$
 $= N_{\epsilon}^3 = N_{\epsilon}$

- odstranění úrovně $\geq N \setminus (N_{\epsilon} \cup \{ S \})$ a pravidla závislá na odstr. symbol.
- $N = \{ S, O, P, T \}$ + pravidla:

ii) odstranění úrovn. symbolů

$N_{\epsilon}^0 = \emptyset$
 $N_{\epsilon}^{i+1} = \{ A \in N \mid \exists (A \rightarrow \alpha) \in P, \alpha \in (N_{\epsilon}^i \cup \Sigma)^* \}$
 $\alpha \in (N_{\epsilon}^i \cup \Sigma)^* \Rightarrow \exists \alpha \in N_{\epsilon}^i$

v tomto případě nové úrovně, N_{ϵ}^i se mění

zpravidla $\epsilon^{(i+1)}$ - úroveň

$N_{\epsilon}^0 = \emptyset$
 $N_{\epsilon}^1 = \{ A \in N \mid \exists (A \rightarrow \alpha) \in P, \alpha \in (N_{\epsilon}^0 \cup \Sigma)^* \}$
 $N_{\epsilon}^1 = \{ O, P, T \}$
 $N_{\epsilon}^2 = \{ O, P, T, S \}$
 $N_{\epsilon}^3 = N_{\epsilon}$

Pravidla:
 $S \rightarrow a T b \mid T$ $O \rightarrow a b$
 $D \rightarrow a T \rightarrow \epsilon \mid T S \mid a$

- $V = \{ X \in NUZ \mid S \stackrel{\#}{\sim} \alpha X \beta, \alpha, \beta \in (NUZ)^+ \}$
- $V^0 = \{ S \}$

$$V^{i+1} = \{ X \in NUZ \mid (\exists (A \rightarrow \alpha X \beta) \in P, A \in V^i, \alpha, \beta \in (NUZ)^+ \exists \cup V^i \text{ zlozila}) \}$$

- $V^0 = \{ S \}, V^1 = \{ S, T, a, b \} = V^2 = V$



- Astronávi udeš. syč. a prnidel u uich zál.

$$N = \{ S, T \}, \Sigma = \{ a, b \}, P = \{ S \rightarrow aTb \mid T \rightarrow \varepsilon \mid TS \mid a \}$$

iii) Astronávi ε -prnidel (u uich prnidel $S \rightarrow \varepsilon$)

- $N_\varepsilon = \{ A \in N \mid A \stackrel{\#}{\sim} \varepsilon \}$

- $N_\varepsilon^0 = \emptyset, N_\varepsilon^{i+1} = \{ A \in N \mid \exists (A \rightarrow \alpha) \in P, A \in (N_\varepsilon^i)^+ \} \cup N_\varepsilon^i$

- $N_\varepsilon^0 = \emptyset, N_\varepsilon^1 = \{ T \}, N_\varepsilon^2 = \{ T, S, S \} = N_\varepsilon^3 = N_\varepsilon$

- úprava prnidel: $S^1 \rightarrow S \mid \varepsilon$ (poboré $S \in N_\varepsilon$)

$$A \rightarrow x_1 x_1 x_2 x_2 \dots x_n x_n x_{n+1}$$

$\{ (x_1, x_2, \dots, x_n) \in N_\varepsilon \}$
 2^n prnidel, žle $x_i \xrightarrow{A} x_i$

$S \rightarrow a b \mid a T b \mid T$
 $T \rightarrow \varepsilon \mid S \mid T S \mid T \mid \varepsilon \mid a$



reproduktive V^i ufaungrupp (Nurde et prnidel $S \rightarrow a S u b$ gje udeš. prnidel)

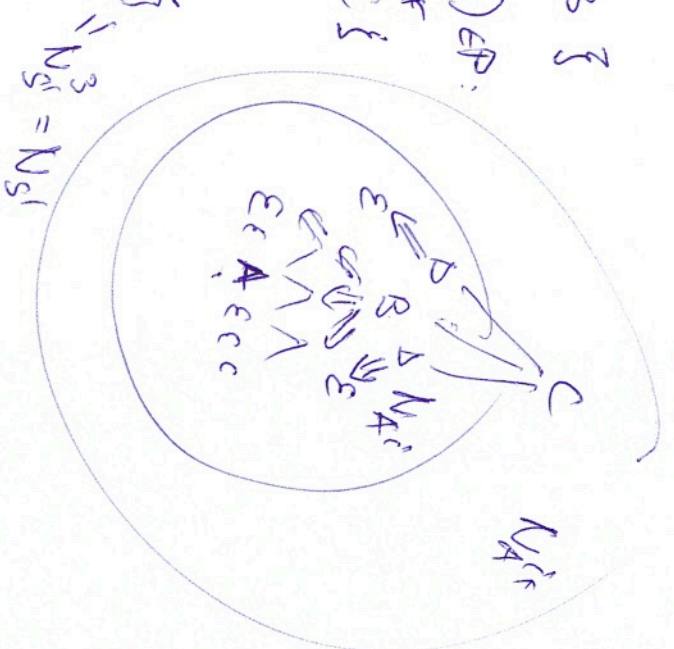
iv)

Odstranění jedu prvků neboť \leftarrow gr. je stále cyklus (např. $S \Rightarrow T \Rightarrow S$).

- $\forall A \in N: N_A = \{ B \in N \mid A \stackrel{*}{\rightarrow} B \}$

- $N_A^0 = \{ A \}$ $N_A^{i+1} = \{ C \in N \mid (C \rightarrow_{\alpha} B \beta) \in P, B \in N_A^i, \alpha, \beta \in N \setminus \{ \epsilon \} \}$

$\cup N_A^i$



- $N_\epsilon = \{ S \}$

$N_S^0 = \{ S \}$, $N_S^1 = \{ S \mid S \}$, $N_S^2 = \{ S \mid S, T \}$

$N_S^3 = \{ S \}$, $N_S^4 = \{ S, T \}$ = $N_S^2 = N_S$

$N_T^0 = \{ T \}$, $N_T^1 = \{ T, S \}$ = $N_T^2 = N_T$

- úprava prvků:

$S' \rightarrow ab|aTb|TS|a|b$

$S \rightarrow ab|aTb|TS|a$

$T \rightarrow ab|aTb|TS|a$

b) PF množ. de CIF

- $\alpha \rightarrow X_1 X_2 \dots X_n$

$\rightsquigarrow X \rightarrow X_1 < X_2 \dots X_n >$

$< X_2 \dots X_n > \rightarrow X_2 < X_3 \dots >$

- $S' \rightarrow \langle a \rangle \langle b \rangle \mid \langle a \rangle \langle T b \rangle \mid T S \mid a \mid \varepsilon$

$\langle a \rangle \rightarrow a$ $\langle b \rangle \rightarrow b$

$\langle T b \rangle \rightarrow T \langle b \rangle$

$S \rightarrow \langle a \rangle \langle b \rangle \mid \dots$
 \vdots

2. Sehtanle beed. gr. a ZA pro Dyblin jazyk

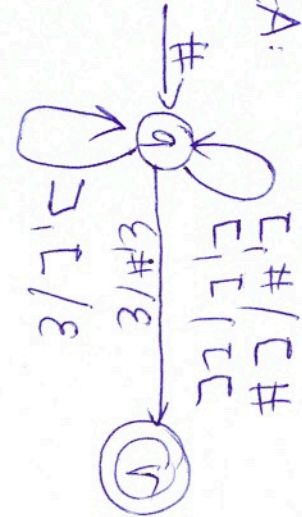
S jazykiv typem zavred:

$\{ \varepsilon, \tau \}$, $\varepsilon \tau \tau \tau$, \dots , $\tau \tau \tau$, $\tau \tau \tau \tau \tau$, \dots }

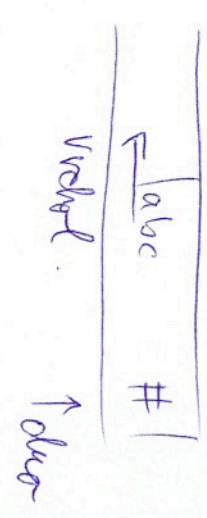
a) $G = (\{ S \}, \{ \tau, \tau \tau, \tau \tau \tau \}, S)$

$P: S \rightarrow [S] \mid \varepsilon \mid SS$ (alternativno $S \rightarrow [S] S \mid \varepsilon$)

b) ZA:



Zugabe

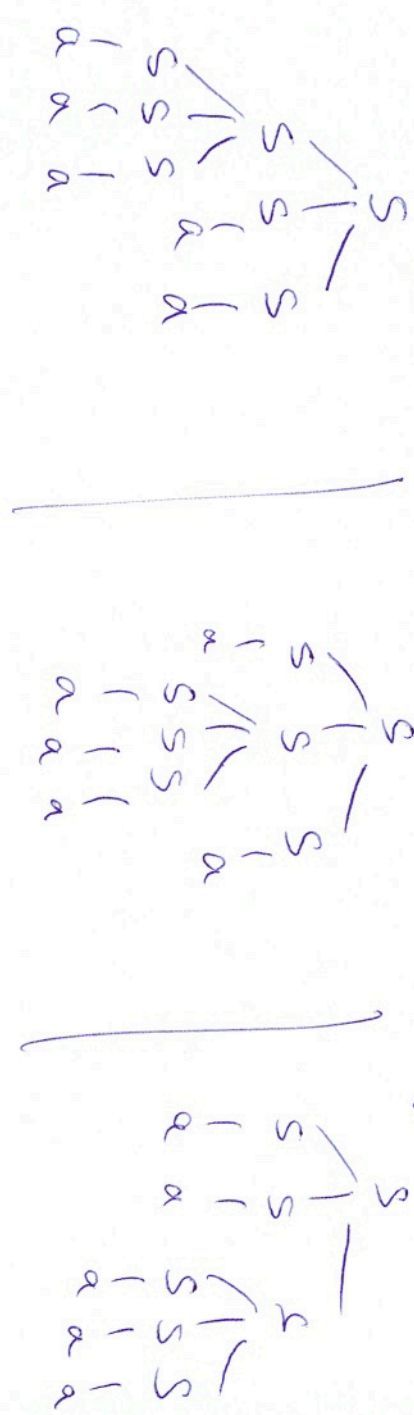


$(q_1, [\tau \tau \tau \tau \tau, \#]) \vdash \dots$

3-a) Paskelbė, kad gramatika $G = (\{S, A, B, C, S \rightarrow SSS|aA|S, S\}$ yra judesiuoju 1 praitė judu dar. s. pr. bazėnu vėtu |.

b) Paskelbė (zda $L(G)$) yra judesiuoju |.

ad a) Nauj judesiuoju, prabė napr. z vėle aaaa
 bae vygenered nice (z) dar strny:



ad b) - $L(G) = \{ a^{2m+1} \mid m \geq 0 \}$

- bae genered gr. s pravitly $S \rightarrow aAS$ (a, b, c, a) angtrafi praitė 1 dar. strny pr bazėnu vėtu |.



- $L(G)$ yra judesiuoju |.

- DISJOSE

1. Def. jiz. jseu p'churavine' -
 be p'ri'gival DVA a h' be
 si'valene' p'rovailen

2. Jazyk DVA jseu ravnost
 p'churavine'

3. Ex. jizy, b'lezi jseu
 b'ed'ne' fone' p'churavine', all
 u'jseu p'ri'g' and DVA : n'p'n, p'ol'str'ng, i'wuf' l'we'q, h'3^4

4. Ex'ishyn' b'ed. jizy, b'lezi jseu i'chere'kne
 n'p'churavine' - n'p'n: { a^m_1 b^m_2 c^m_3 | m_1 = m_2 \vee m_2 = m_3 }

5. N'be' alg. r'ok'ed'ne', z'la' d'ed' B' j' p'churavine'!

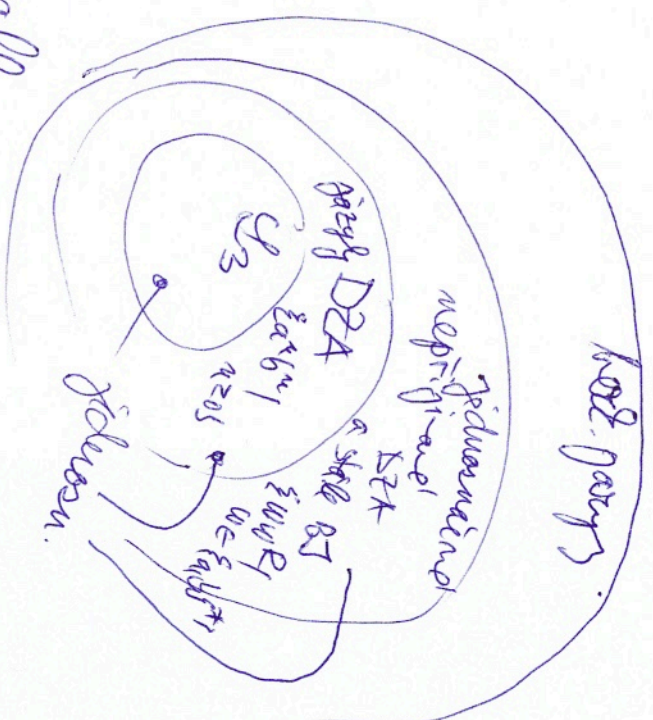
- p'ri'klad' z' p'axe' p'ogr. jizy'ka' b'lezi' n'ef'u' v'ed' n'a
 n'p'churavine'.

- if ... then ... else ...

if C then ... else ...

if C then ... else ...

C then ...



if (...) then ... else ...
 n'a p'roblem!
 if (...) then ... else ...
 n'a p'roblem!

if (C) then ... else ...

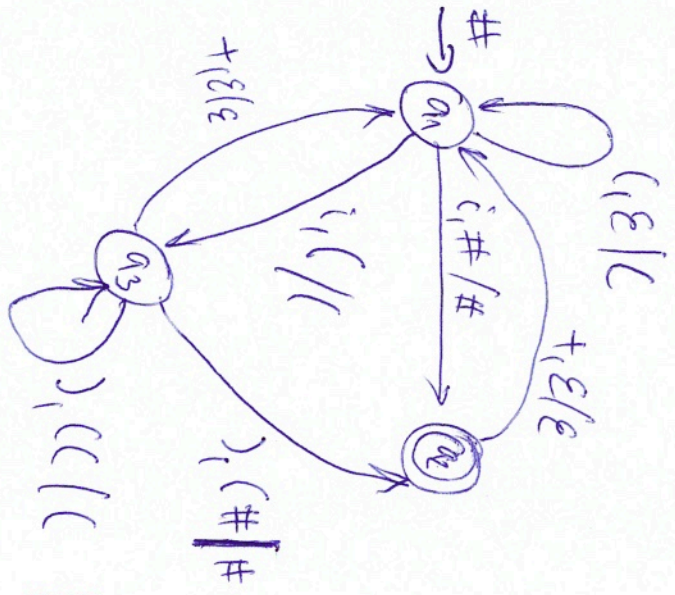
- anitideli' mykasy $E \rightarrow E + E \mid E * E \mid (E)$
 muni'sta $E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow i \mid (E)$

$E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow i \mid (E)$

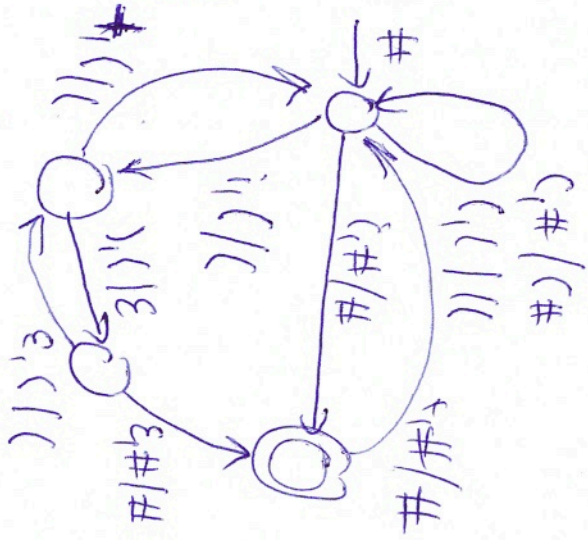
4. Sozanda DZEA a nasledne' i DZA
 part jazyk generirany' gr. s sl. sykhala E
 a pravilny' $E \rightarrow E + T \mid T$
 $T \rightarrow (E) \mid i$

DZA - idelno za
 determiniruvan

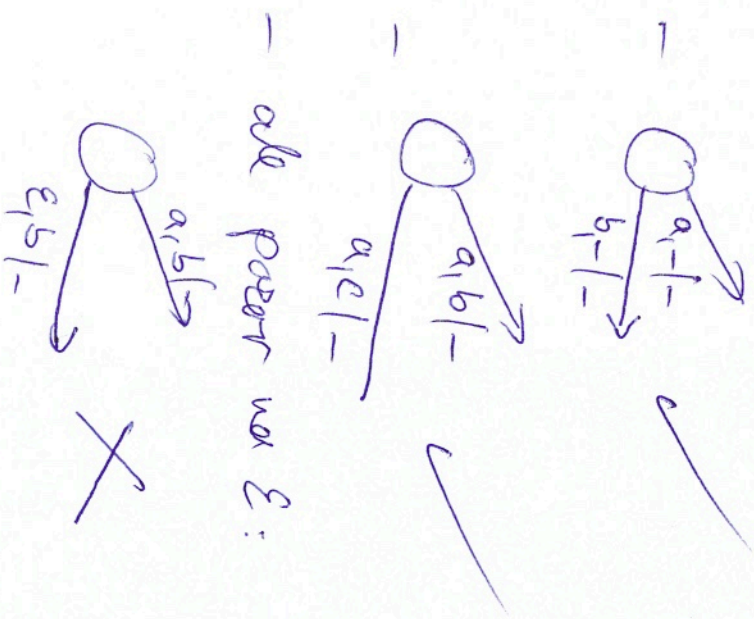
DZEA



DZA



POZOR - udel
 ϵ / ϵ
 udel' na
 JESTENNY' ISHUS



5. Píra BG s pravidly

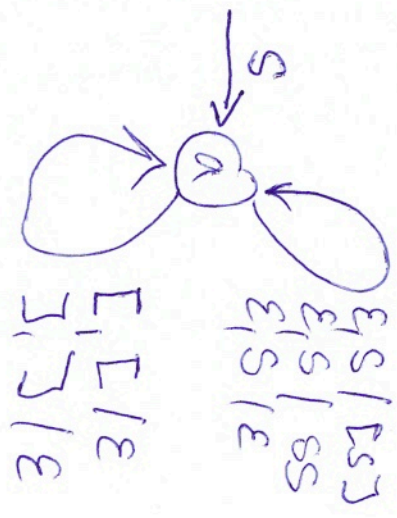
$$S \rightarrow [S] | SS | \epsilon$$

sezobte (a) ZA přitř-opřai vppnř zasobruřu
 a uveluňřai S.A. šera dluř a (b) DZA
 uveluňřai S.A. žlra uakru.

DZEA

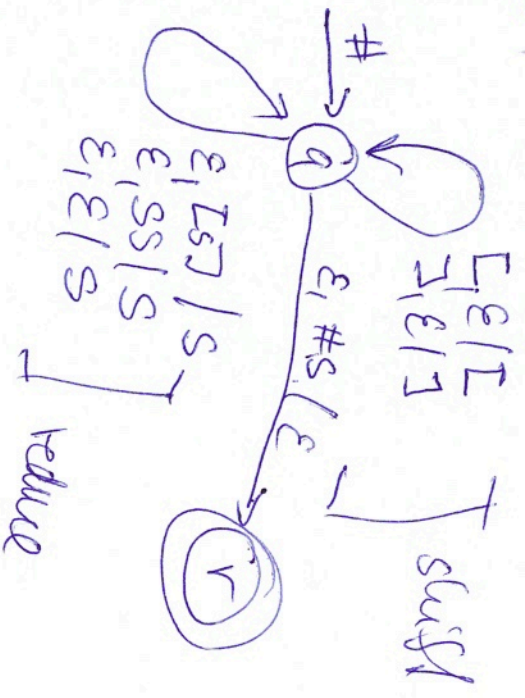


a)



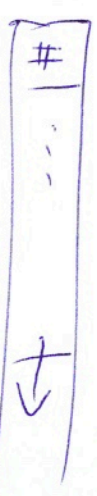
denřez | přitř vppnřřduřiu zasobruřu
 (q, [C][C][C], S) + ...

b)



(q, [C][C][C], #) + ...

zuyblad - vředř vppnřř



ale řle se žlra-dopřnřř