

Úlohy:

1. K daným gramatikám nájdite množiny *FIRST*, *FOLLOW* pre neterminálne symboly a *FIRST* pre reťazce  $\alpha$ .

$$S \rightarrow AB$$

$$A \rightarrow BA \mid a$$

$$B \rightarrow bB \mid Aa \mid \varepsilon$$

$$\alpha = AA, \alpha = BA, \alpha = BB, \alpha = bAA, \alpha = BaB$$

$$S \rightarrow bAa$$

$$A \rightarrow BB \mid cB$$

$$B \rightarrow aBa \mid \varepsilon$$

$$\alpha = AB, \alpha = BA, \alpha = AA, \alpha = BB$$

$$S \rightarrow AaB$$

$$A \rightarrow BbS \mid a$$

$$B \rightarrow SA \mid b$$

$$\alpha = AB, \alpha = BA, \alpha = AA, \alpha = BB$$

$$S \rightarrow aSb \mid bAa \mid Aa$$

$$A \rightarrow aS \mid SBa$$

$$B \rightarrow Ab \mid b$$

$$\alpha = AB, \alpha = BA, \alpha = AA, \alpha = BB$$

$$S \rightarrow ABCA$$

$$A \rightarrow AB \mid \varepsilon$$

$$B \rightarrow AC \mid a$$

$$C \rightarrow BA \mid b \mid \varepsilon$$

$$\alpha = AB, \alpha = BA, \alpha = AA, \alpha = BB$$

$E$  je počiatočný neterminál

$$E \rightarrow E + T \mid T$$

$$T \rightarrow T * F \mid F$$

$$F \rightarrow (E) \mid \mathbf{id}$$

$$\alpha = E + T, \alpha = T + E, \alpha = TT, \alpha = T * T$$

$E$  je počiatočný neterminál

$$E \rightarrow T \mid T\acute{E}$$

$$\acute{E} \rightarrow +T \mid +T\acute{E}$$

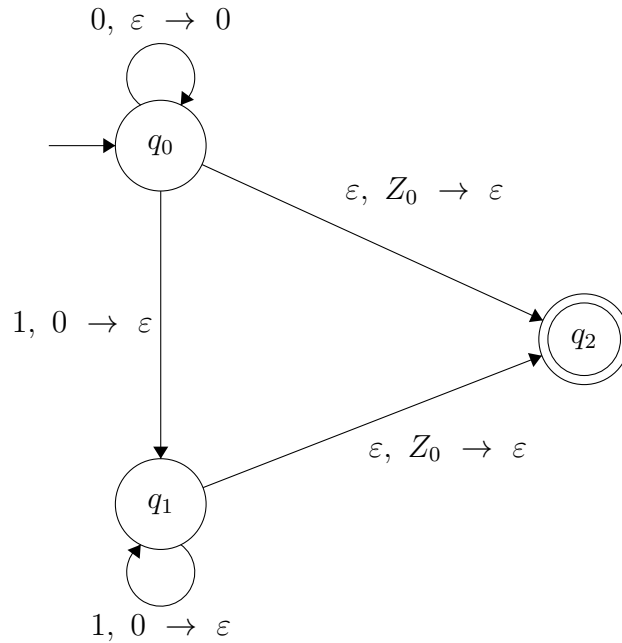
$$T \rightarrow F \mid F\acute{T}$$

$$\acute{T} \rightarrow *F \mid *F\acute{T}$$

$$F \rightarrow (E) \mid \mathbf{id}$$

$$\alpha = E + T, \alpha = T + E, \alpha = TT, \alpha = T * T$$

2. Simulujte činnosť zásobníkového automatu pre slová  $w$ .



$w \in \{\varepsilon, 0, 1, 00, 01, 10, 11, 000, 001, 010, 011, 100, 101, 110, 111, 0000, 0001, 0010, 0011, 0100, 0101, 0110, 0111, 1000, 1001, 1010, 1011, 1100, 1101, 1110, 1111\}$ .

Aký jazyk akceptuje uvedený zásobníkový automat?

3. Nájdite zásobníkový automat, ktorý rozpoznáva jazyk

- (a)  $L_1 = \{a^n b^n \mid n \in \{1, 2, \dots\}\}$
- (b)  $L_2 = \{a^n b^{n+1} \mid n \in \{0, 1, 2, \dots\}\}$
- (c)  $L_3 = \{ww^R \mid w \in \{a, b\}^*\}$
- (d)  $L_4 = \{w c w^R \mid w \in \{a, b\}^*\}$
- (e)  $L_5 = \{a^* b^*\}$
- (f)  $L_6 = \{b^n a^{n+m} \mid n \in \{0, 1, 2, \dots\}, m \in \{0, 1, 2, \dots\}\}$
- (g)  $L_7 = \{a b a^n b^n a \mid n \in \{1, 2, \dots\}\}$
- (h)  $L_8 = \{a^m b^n \mid m \geq n\}$
- (i)  $L_9 = \{w \mid w \in \{a, b\}^*, \#_a(w) = \#_b(w)\}$
- (j)  $L_{10} = \{w \mid w \in \{a, b\}^*, \#_a(w) < \#_b(w)\}$
- (k)  $L_{11} = \{w \mid w \in \{a, b\}^*, \#_a(w) > \#_b(w)\}$
- (l)  $L_{12} = \{w \mid w \in \{a, b\}^*, \#_a(w) \geq \#_b(w)\}$
- (m)  $L_{13} = \{w \mid w \in \{a, b\}^*, \#_a(w) \leq \#_b(w)\}$