

Ticket 10

Friday, 24 January 2025 17:25

$$\text{II } G = \{ S, A, B \}, \{ a, b \}, P_S$$

$$P: \begin{aligned} S &\rightarrow \epsilon | aA | bB \\ A &\rightarrow bA | bB \\ B &\rightarrow aA | aB | a \end{aligned}$$

$$\begin{cases} S = \epsilon + aA + bB \\ A = bA + bB \Leftrightarrow \\ B = aA + aB + a \end{cases} \quad x = ax + b \Leftrightarrow x = a^* b$$

$$\Rightarrow \begin{cases} S = \epsilon + aA + bB \\ A = b^* bB = b^+ B \Leftrightarrow \\ B = aA + aB + a \end{cases}$$

$$\hookrightarrow \begin{cases} S = \epsilon + aB^+ B + bB \\ A = b^+ B \\ B = aB^+ B + aB + a \end{cases} \quad \Leftrightarrow$$

$$\Leftarrow \begin{cases} S = \epsilon + aB^+ B + bB \\ A = b^+ B \\ B = (ab^+ a)B + a \end{cases} \quad \Leftrightarrow$$

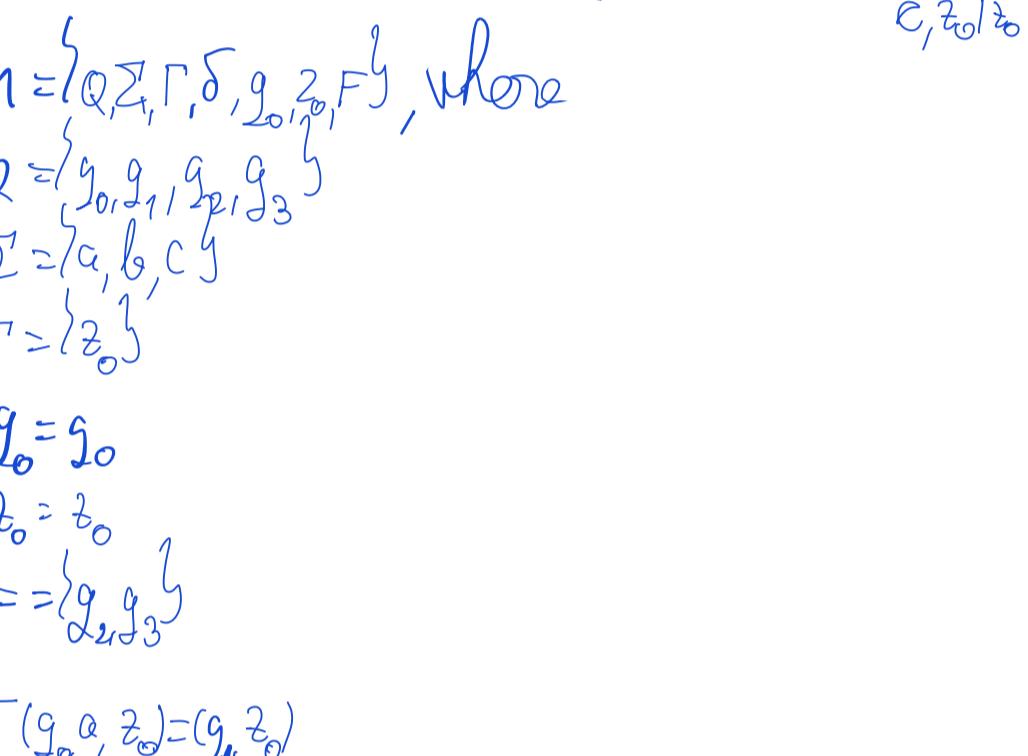
$$\Leftrightarrow \begin{cases} S = \epsilon + aB^+ B + bB \\ A = b^+ B \\ B = (ab^+ a)^* a \end{cases} \quad \Leftrightarrow$$

$$S = \epsilon + aB^+ (ab^+ a)^* a + b(ab^+ a)^* a$$

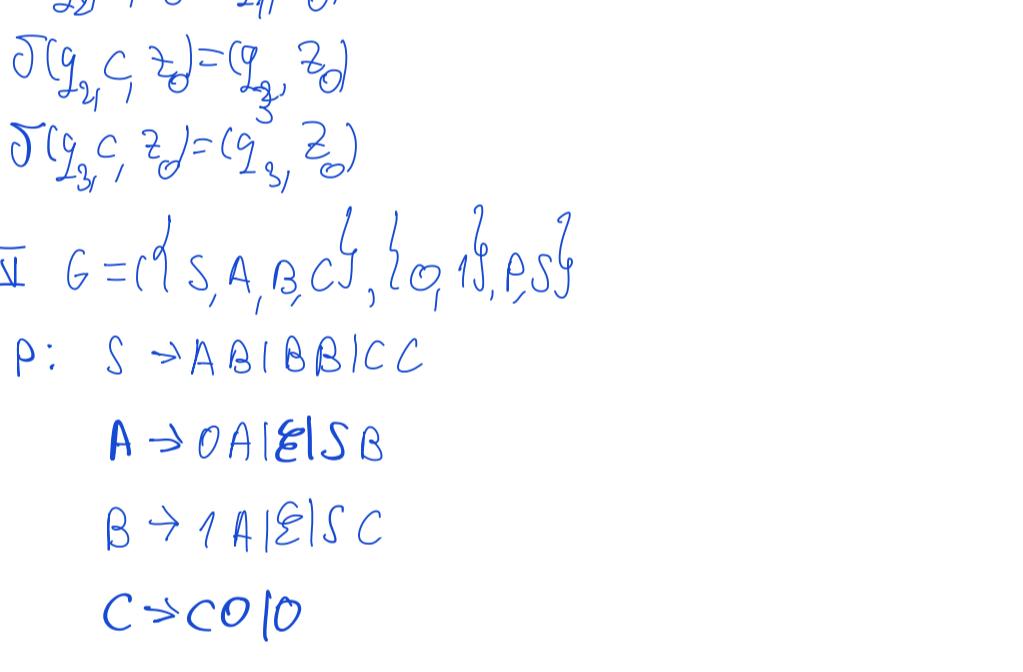
$$S = \epsilon + ab^+ (ab^+ a)^* a + b(ab^+ a)^* a$$

$$\underline{S = \epsilon + (ab^+ b)(ab^+ a)^* a}$$

PLG \Rightarrow FA



$$\text{III } L = \{ (ab)^n c^n \mid n > 0, n > 0 \}$$



$$N = \{ Q, \Gamma, \delta, q_0, q_f, F \}, \text{ where}$$

$$Q = \{ q_0, q_1, q_2, q_3 \}$$

$$\Sigma = \{ a, b, c \}$$

$$\Gamma = \{ z_0 \}$$

$$q_0 = q_0$$

$$z_0 = z_0$$

$$F = \{ q_3 \}$$

$$\delta(q_0, a) = (q_1, z_0)$$

$$\delta(q_1, b) = (q_2, z_0)$$

$$\delta(q_2, a) = (q_3, z_0)$$

$$\delta(q_3, c) = (q_0, z_0)$$

$$\delta(q_0, c) = (q_3, z_0)$$

$$\text{IV } G = \{ S, A, B, C \}, \{ 0, 1, \epsilon \}, P_S$$

$$P: \begin{aligned} S &\rightarrow AB | BB | CC \\ A &\rightarrow 0A | \epsilon | S \\ B &\rightarrow 1A | \epsilon | S \\ C &\rightarrow CO | O \end{aligned}$$

$$\text{I First}$$

S	\emptyset	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$
A	$\{0, \epsilon\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$
B	$\{1, \epsilon\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$
C	$\{0\}$	$\{0\}$	$\{0\}$

$$\text{First}(S) = \text{First}(A) \cup \text{First}(B) \cup \text{First}(C)$$

$$\text{First}(A) = \{0, \epsilon\} \cup \text{First}(S)$$

$$\text{First}(B) = \{1, \epsilon\} \cup \text{First}(S)$$

$$\text{First}(C) = \{0\}$$

$$\text{Follow}(C) = \{0, 1\}$$

$$\text{Follow}(C) = \{q_1, \epsilon\}$$

ABC ✓

ABC ✓

$$\text{Follow}(A) = \{q_2\} \cup \text{Follow}(B) \cup \text{Follow}(C)$$

$$\text{Follow}(B) = \{q_3\} \cup \text{Follow}(S) \cup \text{Follow}(C)$$

$$\text{Follow}(C) = \{q_2\} \cup \text{Follow}(B) \cup \text{Follow}(A)$$

$$\text{II Follow}(S) = \{\epsilon\} \cup \text{First}(B) \cup \text{First}(C)$$

$$\text{Follow}(A) = \text{First}(B) \cup \text{Follow}(B)$$

$$\text{Follow}(B) = \text{First}(B) \cup \text{Follow}(S) \cup \text{Follow}(C)$$

$$\text{Follow}(C) = \text{First}(C) \cup \text{Follow}(S) \cup \text{Follow}(B) \cup \{0\}$$

S	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$
A	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$
B	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$
C	$\{0\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$

S	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$
A	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$
B	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$
C	$\{0\}$	$\{0, 1, \epsilon\}$	$\{0, 1, \epsilon\}$

$$\text{index GP org1 org2 res}$$

$$1 := 1$$

$$2 > i \quad n \quad t_1$$

$$3 \text{ goto } t_1 \quad (20)$$

$$4 := 1 \quad j \quad i$$

$$5 > j \quad m \quad t_2$$

$$6 \text{ goto } t_2 \quad (17)$$

$$7 < i \quad j \quad t_3$$

$$8 \text{ goto } t_3 \quad (82)$$

$$9 + s \quad j \quad t_4$$

$$10 := t_4 \quad s$$

$$11 \text{ goto } \quad (14)$$

$$12 + s \quad i \quad t_5$$

$$13 := t_5 \quad s$$

$$14 + j \quad i \quad t_6$$

$$15 := t_6 \quad i$$

$$16 \text{ goto } \quad (5)$$

$$17 + i \quad i \quad t_7$$

$$18 := t_7 \quad i$$

$$19 \text{ goto } \quad (2)$$

$$20 := s \quad a$$