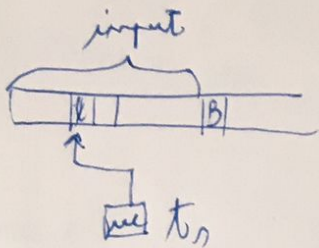


= triplet (L, E, E')

11. oct.

Calculabilitate și complexitate
(curs 2)



Mașina Turing: pagina 11

Def. $M = (Q, V, U, \delta, q_0, B, F)$

Q = mult. stărilor (finite)

V = alfabetul

U = alfabetul benzii $V \subseteq U$ (finite)

q_0 = starea inițială, $q_0 \in Q$

B = blank, $B \in U \setminus V$

F =

$\delta: (Q \setminus F) \times U \rightarrow Q \times U \times \{R, L\}$

$(A, b, R) \in \delta(q, a)$
 ↑ ↑ ↑
 intră în starea scrie în starea mută în dreapta
 (diapozitiv în acest caz)

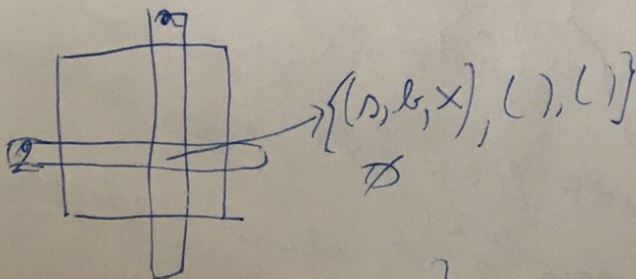
pt.

	a	b	c
q	(q, a)		
q		(q, b)	(q, c)
q ₀			
t			

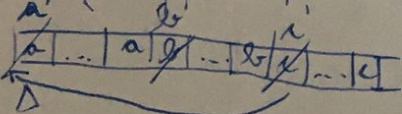
Restricții:

1) $(q, b, x) \in \delta(q, a)$
 $a \neq B$

$\Rightarrow b \neq B$ (nu este permis să scriem blanka peste simboluri care nu sunt blank)

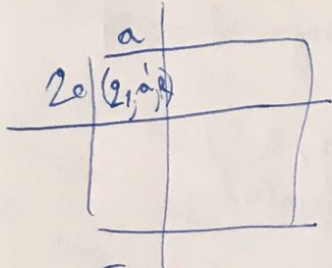


$L = \{a^m b^m c^m \mid m \geq 1\}$



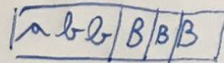
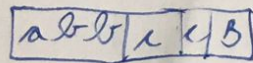
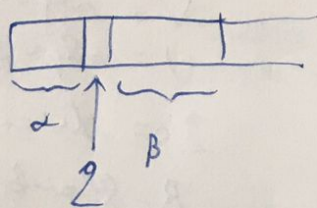
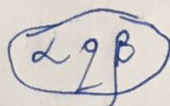
$\delta(q_0, a) = (q_1, a', R)$
 $\delta(q_1, a) = (q_1, a', R)$

$$\delta(q_1, b) = (q_2, b', r)$$



Transiții:

Configurații:



$$\Delta \begin{matrix} a b b a a b \\ a b b S a \end{matrix}$$

$$\Delta \begin{matrix} a b b B B B \\ a b b S \end{matrix}$$

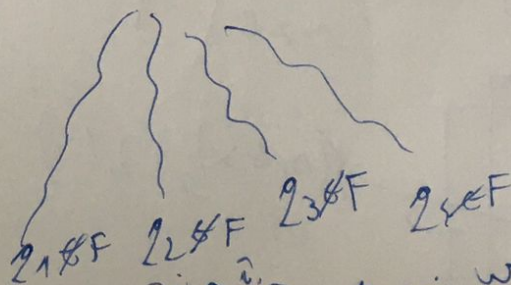
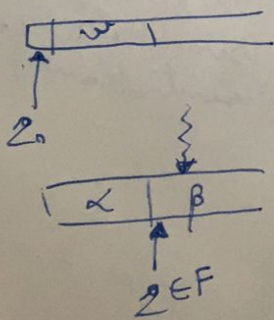
$$\alpha q a \beta \vdash \alpha b a \beta \text{ dacă } (s, b, R) \in \delta(q, a)$$

$$\alpha q \vdash \alpha b S \text{ dacă } (s, b, R) \in \delta(q, B)$$

$$\alpha a q b \beta \vdash \alpha s a a \beta \text{ dacă } (s, a, L) \in \delta(q, b)$$

$$\alpha a q \vdash \alpha s a b, \text{ dacă } (s, a, L) \in \delta(q, B)$$

M-dispozitiv de acceptare



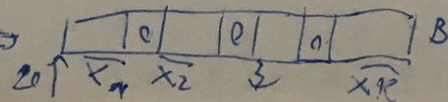
soia $q_i \in F$, atunci w este acceptat

$$L(M) = \{w \in V^* \mid q_0 w \vdash^* \alpha q \beta, \alpha, \beta \in (V \setminus \{q\})^*\}$$

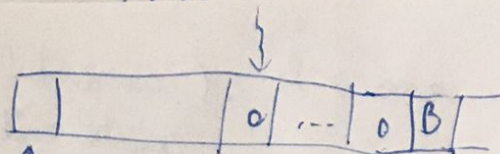
M ca dispozitiv de calcul: \rightarrow funcție calculată:

$$f: N^* \rightarrow N$$

$$f(x_1, \dots, x_n), f(x_1, \dots, x_n) = y \Rightarrow$$



$$\overline{x_k} = \underbrace{1 \dots 1}_{k+1 \text{ ori}}$$



Maxima Turing determinista (care nu poate face alegeri)

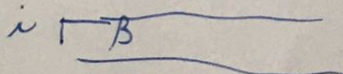
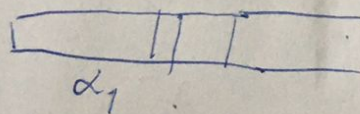
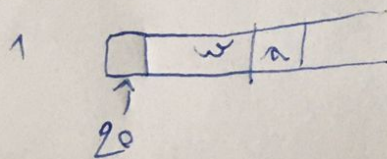
$$M = (Q, \Sigma, \Gamma, \delta, q_0, B, F), \delta(q, a) \leq 1 \quad \forall q \in Q, a \in \Sigma$$

algorithm = maxima Turing determinista care se poate pe fiecare intrare

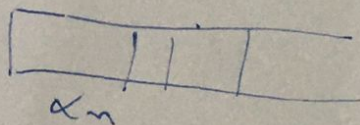
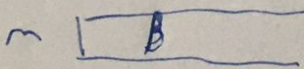
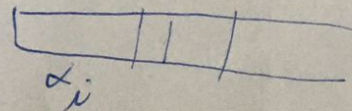
$$MTD \equiv MTN$$

MTD

si mai multe
benzi



~>



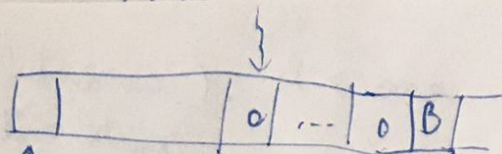
$$f_i(Q \times F \times U^m)$$

Teorema At. daca MTN M, \exists MTD, in 3 benzi m.a. $i. L(M) = L(M')$

Dem. $M = (Q, \Sigma, \Gamma, \delta, q_0, B, F)$

$$M' = (P, Q', \Sigma', \delta', q_0', B, F')$$

$$\overline{x_k} = \underbrace{1 \dots 1}_{k+1 \text{ ori}}$$



Maxima Turing determinista (care nu poate face alegeri)

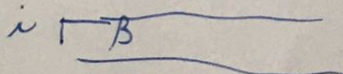
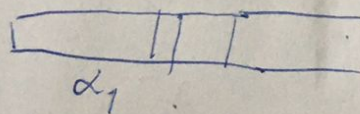
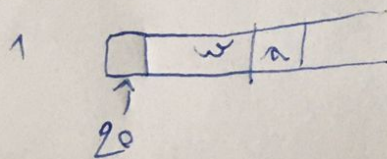
$$M = (Q, \Sigma, \Gamma, \delta, q_0, B, F), \delta(q, a) \leq 1 \quad \forall q \in Q, a \in \Sigma$$

algorithm = maxima Turing determinista care se poate pe fiecare intrare

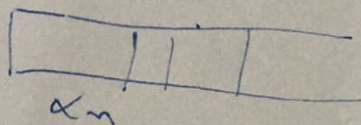
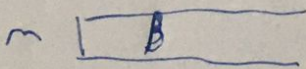
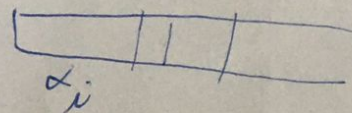
$$MTD \equiv MTN$$

MTD

si mai multe
benzi



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$$f_i(Q \times F \times U^m)$$

Teorema At. date MTN M, \exists MTD, m3 benzi m.a. i. $L(M) = L(M')$

$$M = (Q, \Sigma, \Gamma, \delta, q_0, B, F)$$

$$M' = (P, Q', \Sigma', \delta', q_0', B, F')$$