Seminar 8

Automate push-down (APD)

1. Construiti APD care accepta urmatoarele limbaje dupa criteriul stivei vide:

a) $L = \{a^n b^{2n} \mid n>=0\}$
b) $L = \{a^n b^m \mid m,n >=0\}$
c) $L = \{a^n b^m \mid n >= m >= 0\}$
d) $L = \{a^m b^n \mid n >= m >= 0\}$
e) $L = \{ww^{tilda} \mid w \in \{a,b\}^*, w^{tilda}$ este inversul lui w$\}$
f) $L = \{w \mid w \in \{a, b\}^*, nr_a(w) = nr_b(w)\}$
g) $L = \{a^{2n} b^{2n} \mid n>=0\}$

h) $L = \{a^n b^n \mid n>=0\} \cup \{b^n a^n \mid n>=0\}$
i) $L = \{a^n b^n \mid n>=0\} \cup \{a^n b 2^n \mid n>=1\}$
j) $\{w\ x \mid w^{tilda}$ is a substring of x, where $x \in \{a, b\}^*, w \in \{a, b\}^*, |w|>=1\}$

2. Pentru limbajul de la punctul **f**, dati o gramatica independenta de context (GIC) ce il genereaza. Construit APD echivalent cu GIC data (aplicand algoritmul de constructie).

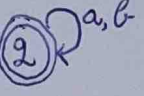
3. Pentru APD de la punctele **e** si **f**, dati APD care accepta acelasi limbaj dupa criteriul starii finale.

LFTC - SEMINAR 8

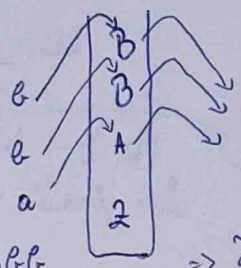
1 Construiți automatul push down care acceptă următoarele limbaje după criteriul stivei vide:

e) $L = \{ w \tilde{w} \mid w \in \{a, b\}^*, \tilde{w}$ - oglinditul lui $w \}$ ex: abb bba $\in L$

Limbaj similar regular: $L' = \{ w \mid w \in \{a, b\}^* \}$

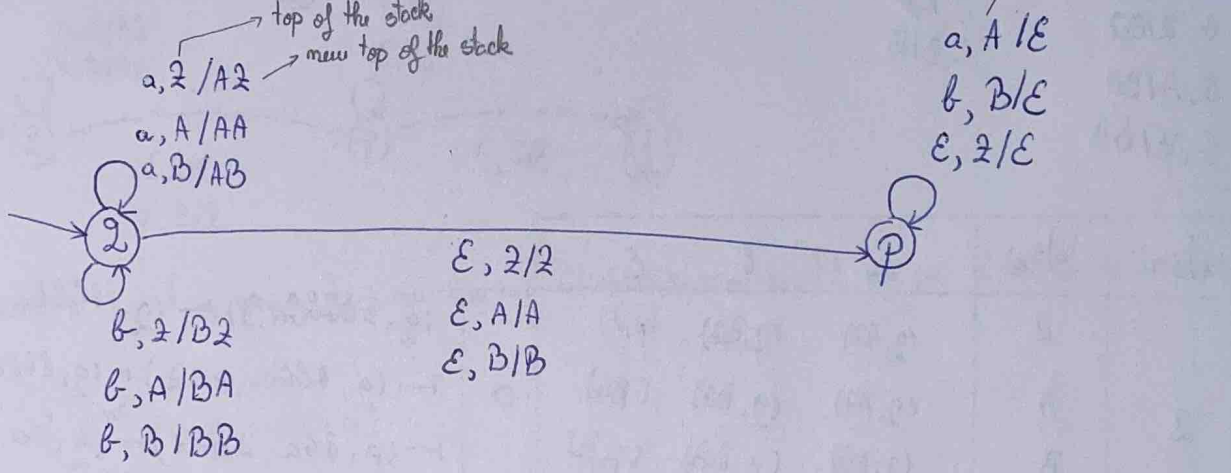


ex:



$w = abb \Rightarrow \tilde{w} = bba$

Z - simbolul de start al stivei



- CRITERIUL STIVEI VIDE (repr. tabelară)

stări	stiva	a	b	ε
q	Z	(q, AZ)	(q, BZ)	(p, Z)
	A	(q, AA)	(q, BA)	(p, A)
	B	(q, AB)	(q, BB)	(p, B)
p	Z	—	—	(p, ε)
	A	(p, ε)	—	—
	B	—	(p, ε)	—

Cum îl folosim?

$(q, \underline{a}bbbba, \underline{Z}) \vdash (q, bbbba, AZ) \vdash (q, bbba, BAZ) \vdash (q, \varepsilon bba, BBAZ)$

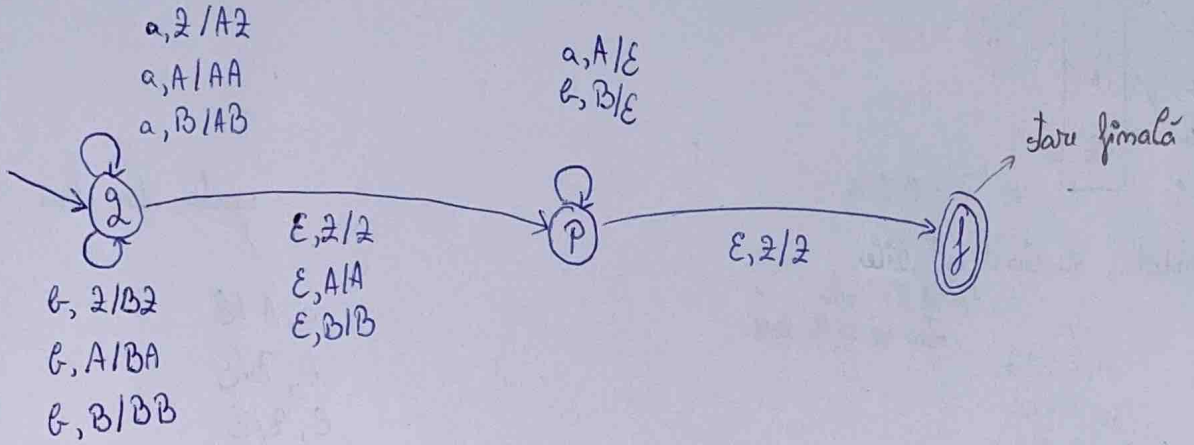
$\vdash (p, bba, BBAZ) \vdash (p, ba, BAZ) \vdash (p, a, AZ) \vdash (p, \varepsilon, Z) \vdash (p, \varepsilon, \varepsilon)$

am ajuns la mijloc

banda de intrare s-a golit
stiva e goală

$\Rightarrow abbbba \in L_\varepsilon(M)$

- MODIFICĂM SĂ AVEM CRITERIUL STĂRII FINALE

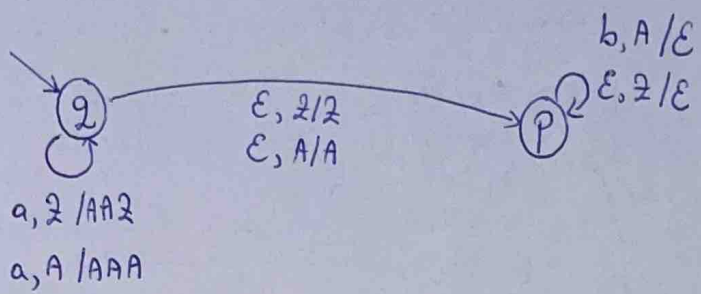


stare	stivă	a	b	ε	
q	Z	(q, AZ)	(q, BZ)	(p, Z)	0
	A	(q, AA)	(q, BA)	(p, A)	
	B	(q, AB)	(q, BB)	(p, B)	
p	Z	—	—	(f, ε)	0
	A	(p, ε)	—	—	
	B	—	(p, ε)	—	
f	Z	—	—	—	1
	A	—	—	—	
	B	—	—	—	

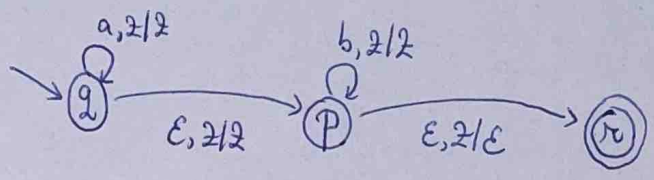
$(q, abbbba, Z) \vdash (q, bbbba, AZ)$
$\vdash (q, bbba, BAZ) \vdash (q, \varepsilon bba, BBAZ)$
$\vdash (p, bba, BBAZ) \vdash (q, ba, BAZ)$
$\vdash (p, a, AZ) \vdash (p, \varepsilon, Z) \vdash (f, \varepsilon, Z)$

am ajuns în stare finală, stiva nu trb. să fie neapărat goală

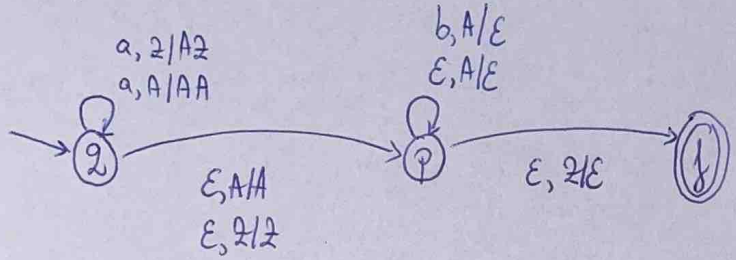
a) $L = \{a^m b^{2m} \mid m \geq 0\}$



b) $L = \{a^m b^m \mid m, m >= 0\}$

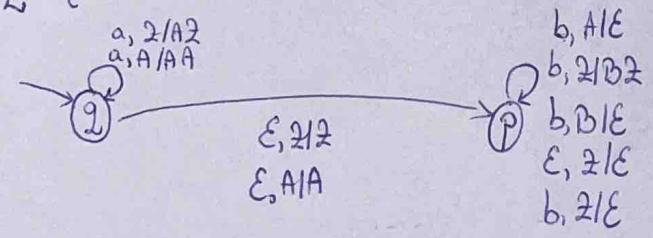


c) $L = \{a^n b^m \mid n >= m \geq 0\}$



fiecare b îl scot cu un a, dacă nu mai am b-uri, dar mai sunt A-uri pe stivă, le scot cu ε

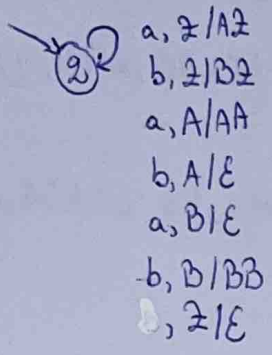
d) $L = \{a^m b^n \mid n \geq m \geq 0\}$



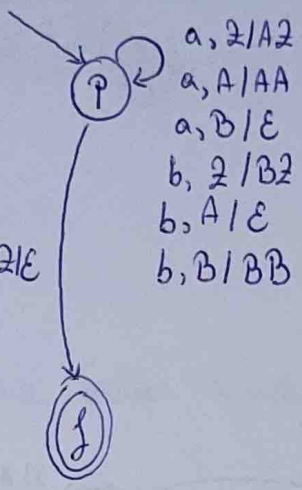
fiecare a îl scot cu un b, după a se termină a-urile nu mă prea interesează câte b-uri mai sunt

f) $L = \{ w \mid w \in \{a,b\}^*, nr_a(w) = nr_b(w) \}$

• CRITERIUL STIVEI VIDE



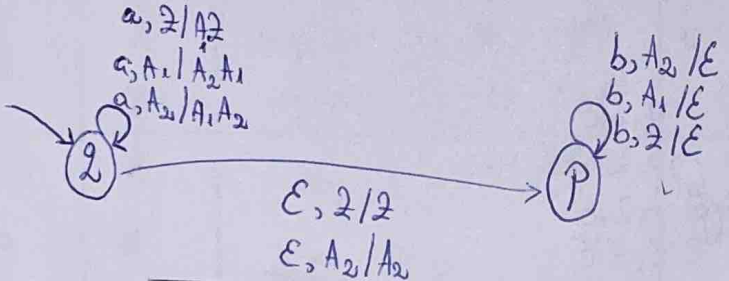
• CRITERIUL STĂRII FINALE (ȘI STIVA VIDĂ)



$S \to \varepsilon$
$S \to aSb$
$S \to bSa$
$S \to SS$
g.i.c.

stări	stivă	a	b	ε
q	S	—	—	(q, ε), (q, aSb), (q, bSa), (q, SS)
	a	(q, ε)	—	—
	b	—	(q, ε)	—

g) $L = \{ a^{2n} b^{2n} \mid n \geq 0 \}$



		a	b	ε
q	Z	(q, (A1, Z))		(p, Z)
	A1	(q, (A2, A1))		
	A2	(q, (A1, A2))		(p, A2)
p	Z	—		(p, ε)
	A1	—	(p, ε)	
	A2	—	(p, ε)	