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 | 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.

Rezolvari

1. a) $L = \{a^n b^{2n} \mid n>=0\}$

		a	b	ε
q1	Z	(q1,AA)		(q3, ε)
	A	(q1,AA)	(q2, ε)	
q2	Z			
	A		(q2, ε)	

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

		a	b	eps
q0	Z	(q0, Z)	(q0, A)	(q0, eps)
	A		(q0, A)	(q0, eps)

e) $L = \{ww^{tilda} \mid w \in \{a,b\}^*, w^{tilda}$ este inversul lui w$\}$

		a	b	ε
q	Z	(q,A)	(q,B)	(r, ε)
	A	(q,AA)	(q,BA)	(r,A)
	B	(q,AB)	(q,BB)	(r,B)
r	Z			
	A	(r, ε)		
	B		(r, ε)	

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

		a	b	ε
q	Z	(q, BZ)	(q, AZ)	(q, ε)
	A	(q, ε)	(q, AA)	
	B	(q, BB)	(q, ε)	

2.

Gramatica data prin productiile:

S -> ε

S -> a S b S

S -> b S a S

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

Aplicand algoritmul, se obtine urmatorul APD echivalent :

		a	b	ε
q	S			(q, ε), (q, aSbS), (q, bSaS)
	a	(q, ε)		
	b		(q, ε)	

(criteriul stivei vide)