

Translator PUSH-DOWN cu STIVA de Atribute = Tema 4

Atributele .p se memoreaza pe o stiva separata de atrbute.
 Intotdeauna in varful stivei se va afla ultimul atribut evaluat si cel de care avem nevoie/
Cu bold sunt actiunile de pe stiva.
 Functia newtemp() genereaza noi etichete/locatii temporare.

1. $E \rightarrow E_1 + T \{ E.p := \text{newtemp}();$
 $T.p = \mathbf{pop}(); E_1.p = \mathbf{pop}();$
 $\text{emit}(E.p := E_1.p + T.p); \mathbf{push}(E.p) \}$
11. $E \rightarrow E_1 - T \{ E.p := \text{newtemp}(); T.p = \mathbf{pop}(); E_1.p = \mathbf{pop}();$
 $\text{emit}(E.p := E_1.p - T.p); \mathbf{push}(E.p); \}$
2. $E \rightarrow T \{ \mathbf{T.p = pop}(); E.p = T.p; \mathbf{push}(E.p); \}$
3. $T \rightarrow T_1 * F \{ T.p := \text{newtemp}();$
 $F.p = \mathbf{pop}(); T_1.p = \mathbf{pop}();$
 $\text{emit}(T.p := T_1.p * F.p); \mathbf{push}(T.p); \}$
31. $T \rightarrow T_1 / F \{ T.p := \text{newtemp}(); F.p = \mathbf{pop}(); T_1.p = \mathbf{pop}();$
 $\text{emit}(T.p := T_1.p / F.p); \mathbf{push}(T.p); \}$
4. $T \rightarrow F \{ \mathbf{F.p = pop}(); T.p = F.p; \mathbf{push}(E.p); \}$
5. $F \rightarrow (E) \{ \mathbf{E.p = pop}(); F.p = E.p; \mathbf{push}(F.p); \}$
51. $F \rightarrow - (E) \{ F.p := \text{newtemp}(); E.p = \mathbf{pop}();$
 $\text{emit}(F.p := - E.p); \mathbf{push}(F.p); \}$
6. $F \rightarrow a \{ F.p := a; \mathbf{push}(F.p); \}$

Exemplu de traducere cu sirul de intrare: **a+a*a\$**

S-a folosit tabelul de Actiuni si Salt din Laborator 7 - Translator Push Down pt expresii aritmetice.pdf

P={ 1. $E \rightarrow E+T,$
 11. $E \rightarrow E-T,$
 2. $E \rightarrow T,$
 3. $T \rightarrow T^*F,$
 31. $T \rightarrow T/F,$
 4. $T \rightarrow F,$
 5. $F \rightarrow (E),$
 6. $F \rightarrow a,$
 51. $F \rightarrow - (E) \}$

un exemplu de expresie generata de aceata gramatica este : a+a*a

Pe baza acestei gramatici se poate genera, conform teoriei limbajelor independente de context de tip LR(k). Automatul Push Down (APD) care recunoaste siruri generate de gramatica G. Pentru gramatica care are doar productiile 1.2.3.4.5.6, APD va avea urmatoarele tabele de actiuni si salt:

Nr stare	Tabel de actiuni : TA						Tabel de salt : TS		
	a	+	*	()	\$	E	T	F
0	d ₅			d ₄			1	2	3
1		d ₆				a _{cc}			
2		r ₂	d ₇		r ₂	r ₂			
3		r ₄	r ₄		r ₄	r ₄			
4	d ₅			d ₄			8	2	3
5		r ₆	r ₆		r ₆	r ₆			
6	d ₅			d ₄				9	3
7	d ₅			d ₄					10
8		d ₆			d ₁₁				
9		r ₁	d ₇		r ₁	r ₁			
10		r ₃	r ₃		r ₃	r ₃			
11		r ₅	r ₅		r ₅	r ₅			

States APD	trans	Action	Result	Action	Cost intermediate
\$0	$a + \alpha * u$	d_5			
\$0.25	$\alpha * u$	$E \rightarrow TS(0, \epsilon)$			
\$0.53	$\alpha * u$	$T_1 \rightarrow TS(0, \epsilon)$	a	$push(a)$	
\$0.72	$\alpha * u$	T_2	a		
\$0.81	$\alpha * u$	d_6	a		
\$0.81+6T_2	$\alpha * u$	d_7	a		
\$0.81+6T_3	$\alpha * u$	$E \rightarrow TS(0, \epsilon)$	a	$push(a)$	
\$0.81+6T_3	$\alpha * u$	$T_3 \rightarrow TS(0, \epsilon)$	a	$push(a)$	
\$0.81+6T_3+T_2	$\alpha * u$	d_7	a		
\$0.81+6T_3+T_2	$\alpha * u$	d_8	a		
\$0.81+6T_3+T_2+T_1	$\alpha * u$	d_8	a		

1. $E \rightarrow E + T$
 2. $E \rightarrow T$
 3. $T \rightarrow T + T$ ($T = push(a)$)
 4. $T \rightarrow T$ ($T = pop()$)
 5. $E \rightarrow (E)$ ($E = T \wedge E$)
 6. $F \rightarrow a$ ($F = push(a)$)

States APD	trans	Action	Intermediate	Result	Cost
$S0E1+6T_2+T_3$	\$	$R_2 \rightarrow TS(0, \epsilon)$	$a \ a$	$push(a)$	
$S0E1+6T_2+T_3+F_1$	\$	$R_3 \rightarrow TS(0, \epsilon)$	$a \ a \ a$	$push(a)$	
$S0E1+6T_2$	\$	$R_1 \rightarrow TS(0, \epsilon)$	$a \ t_1$	$t_1 = a * u$	
$S0E1$	+	ACCEPT	t_2	$t_2 = a * t_1$	

$Type = maxHeap() = t_1$
 $F = push() = a$
 $T = pop() = a$
 $Unit(t_1 + a * u) = push(a)$
 $t_1 = a * u$
 $Type = maxHeap() = t_2$
 $T = push() = t_1$
 $E = pop() = a$
 $Unit(t_2 = a + t_1)$
 $push(t_2)$