编译原理第五次作业

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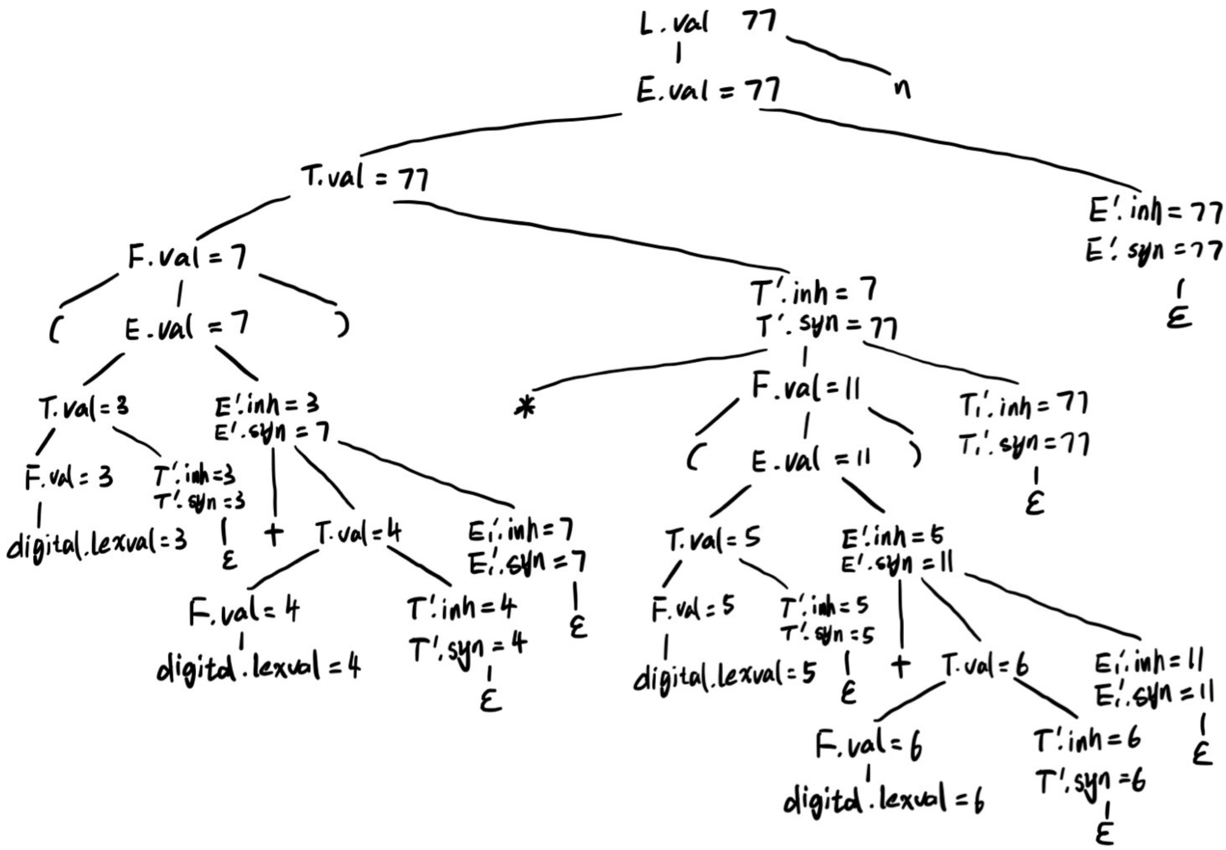
Ex. 5.1.2

	产生式	语义规则
(1)	$L \rightarrow En$	$L.val = E.val$
(2)	$E \rightarrow TE'$	$E'.inh = T.val$ $E.val = E'.syn$
(3)	$E' \rightarrow +TE'_1$	$E'_1.inh = E'.inh + T.val$ $E'.syn = E'_1.syn$
(4)	$E' \rightarrow \epsilon$	$E'.syn = E'.inh$
(5)	$T \rightarrow FT'$	$T'.inh = F.val$ $T.val = T'.syn$
(6)	$T' \rightarrow *FT'_1$	$T'_1.inh = T'.inh * F.val$ $T'.syn = T'_1.syn$
(7)	$T' \rightarrow \epsilon$	$T'.syn = T'.inh$
(8)	$F \rightarrow (E)$	$F.val = E.val$
(9)	$F \rightarrow \mathbf{digit}$	$F.val = \mathbf{digit}.lexval$

Ex. 5.1.3 (1)

(1)



Ex. 5.2.3 (2)

(2)

(i) 由于 SDD 存在继承属性 $A.i$, $B.i$, $D.i$, 因此它不符合 S 属性定义的要求.

(ii) 由于 $A.s = B.i + C.s$ 的左侧是综合属性 $A.s$, 而 $D.i = A.i + B.s$ 中的 $D.i$ 依赖于 A 的继承属性 $A.i$ 和左边符号 B 的属性 $B.s$ 且不依赖于自身的其他属性, 因此满足 L 属性定义的要求.

(iii) 由于其满足 L 属性定义的要求, 因此存在和这些规则一致的求值过程.

Ex. 5.2.4

	产生式	**语义规则**
(1)	$S \to L_1.L_2$	$L_1.side = \text{Left}$ $L_2.side = \text{Right}$ $S.val = L_1.val + L_2.val$
(2)	$S \to L$	$L.side = \text{Left}$ $S.val = L.val$

	产生式	语义规则
(3)	$L \to L_1 B$	$L_1.side = L.side$ $L.len = L_1.len + 1$ $L.val = (L.side == \text{Left})?(2 * L_1.val + B.val) : (L_1.val + B.val * 2^{-L.len})$
(4)	$L \to B$	$L.len = 1$ $L.val = (L.side == \text{Left})?B.val : B.val/2$
(5)	$B \to 0$	$B.val = 0$
(6)	$B \to 1$	$B.val = 1$

Ex. 5.3.1 (1)

(1)

	产生式	语义规则
(1)	$E \to E_1 + T$	$E.type = (E_1.type == \text{float} \| \| T.type == \text{float})?\text{float} : \text{int}$
(2)	$E \to T$	$E.type = T.type$
(3)	$T \to \text{num.num}$	$T.type = \text{float}$
(4)	$T \to \text{num}$	$T.type = \text{int}$

Ex. 5.4.3

原来的 SDT 为:

```
B -> B_1 0 { B.val = 2 x B_1.val }
  |  B_1 1 { B.val = 2 x B_1.val + 1 }
  |  1 { B.val = 1 }
```

提取左公因子得

```
B -> B_1 D { B.val = 2 x B_1.val + D.val }
  |  1 { B.val = 1 }

D -> 0 { D.val = 0 }
  |  1 { D.val = 1 }
```

消除左递归后得

```
B -> 1 { B.val = 1 }

B -> 1 { A.i = 1 } A { B.val = A.s }

A -> D { A_1.i = 2 x A.i + D.val } A_1 { A.s = A_1.s }
  |  ε { A.s = A.i }

D -> 0 { D.val = 0 }
  |  1 { D.val = 1 }
```

化简得

```
B -> 1 { A.i = 1 } A { B.val = A.s }

A -> D { A_1.i = 2 x A.i + D.val } A_1 { A.s = A_1.s }
  |  ε { A.s = A.i }

D -> 0 { D.val = 0 }
  |  1 { D.val = 1 }
```