

★ 학습활동 ★ [선택] 연산자 우선순위 반영한 BNF 규칙 수정하기 실습

아래와 같은 BNF 규칙이 주어졌다고 할 때,  
*G1*:  $\langle EXP \rangle ::= \langle EXP \rangle + \langle EXP \rangle \mid \langle EXP \rangle * \langle EXP \rangle \mid \langle EXP \rangle ^ \langle EXP \rangle \mid \langle EXP \rangle \& \langle EXP \rangle \mid ( \langle EXP \rangle ) \mid a \mid b \mid c$   
아래 표와 같은 연산자 우선순위 (precedence)가 반영될 수 있도록, *G1*의 문법을 수정하라. (괄호는 우선순위가 최우선임)

Precedence (위 열이 우선 순위 높음)	Associativity
$\wedge$	Right-associative
$*$	Left-associative
$+$	Left-associative
$\&$	Left-associative

Initial *G1* rule

- $\langle \text{exp} \rangle ::= \langle \text{exp} \rangle + \langle \text{exp} \rangle \mid \langle \text{exp} \rangle * \langle \text{exp} \rangle \mid \langle \text{exp} \rangle ^ \langle \text{exp} \rangle \mid \langle \text{exp} \rangle \& \langle \text{exp} \rangle \mid ( \langle \text{exp} \rangle ) \mid a \mid b \mid c$

➔ Operator  $\&$  의 Precedence와 Associativity를 고려하면..

- $\langle \text{exp} \rangle ::= \langle \text{exp} \rangle \& \langle \text{plus-exp} \rangle \mid \langle \text{plus-exp} \rangle$
- $\langle \text{plus-exp} \rangle ::= \langle \text{plus-exp} \rangle + \langle \text{plus-exp} \rangle \mid \langle \text{plus-exp} \rangle * \langle \text{plus-exp} \rangle \mid \langle \text{plus-exp} \rangle ^ \langle \text{plus-exp} \rangle \mid ( \langle \text{plus-exp} \rangle ) \mid a \mid b \mid c$

➔ Operator  $+$  의 Precedence와 Associativity를 고려하면..

- $\langle \text{exp} \rangle ::= \langle \text{exp} \rangle \& \langle \text{plus-exp} \rangle \mid \langle \text{plus-exp} \rangle$
- $\langle \text{plus-exp} \rangle ::= \langle \text{plus-exp} \rangle + \langle \text{multi-exp} \rangle \mid \langle \text{multi-exp} \rangle$
- $\langle \text{multi-exp} \rangle ::= \langle \text{multi-exp} \rangle * \langle \text{multi-exp} \rangle \mid \langle \text{multi-exp} \rangle ^ \langle \text{multi-exp} \rangle \mid ( \langle \text{multi-exp} \rangle ) \mid a \mid b \mid c$

➔ Operator  $*$  의 Precedence와 Associativity를 고려하면..

- $\langle \text{exp} \rangle ::= \langle \text{exp} \rangle \& \langle \text{plus-exp} \rangle \mid \langle \text{plus-exp} \rangle$
- $\langle \text{plus-exp} \rangle ::= \langle \text{plus-exp} \rangle + \langle \text{multi-exp} \rangle \mid \langle \text{multi-exp} \rangle$
- $\langle \text{multi-exp} \rangle ::= \langle \text{multi-exp} \rangle * \langle \text{expon-exp} \rangle \mid \langle \text{expon-exp} \rangle$
- $\langle \text{expon-exp} \rangle ::= \langle \text{expon-exp} \rangle ^ \langle \text{expon-exp} \rangle \mid ( \langle \text{expon-exp} \rangle ) \mid a \mid b \mid c$

➔ (최종 답안) Operator  $^$ , 괄호 의 Precedence와 Associativity를 고려하면..

- $\langle \text{exp} \rangle ::= \langle \text{exp} \rangle \& \langle \text{plus-exp} \rangle \mid \langle \text{plus-exp} \rangle$
- $\langle \text{plus-exp} \rangle ::= \langle \text{plus-exp} \rangle + \langle \text{multi-exp} \rangle \mid \langle \text{multi-exp} \rangle$
- $\langle \text{multi-exp} \rangle ::= \langle \text{multi-exp} \rangle * \langle \text{expon-exp} \rangle \mid \langle \text{expon-exp} \rangle$
- $\langle \text{expon-exp} \rangle ::= \langle \text{root-exp} \rangle ^ \langle \text{expon-exp} \rangle \mid \langle \text{root-exp} \rangle$
- $\langle \text{root-exp} \rangle ::= ( \langle \text{root-exp} \rangle ) \mid a \mid b \mid c$