

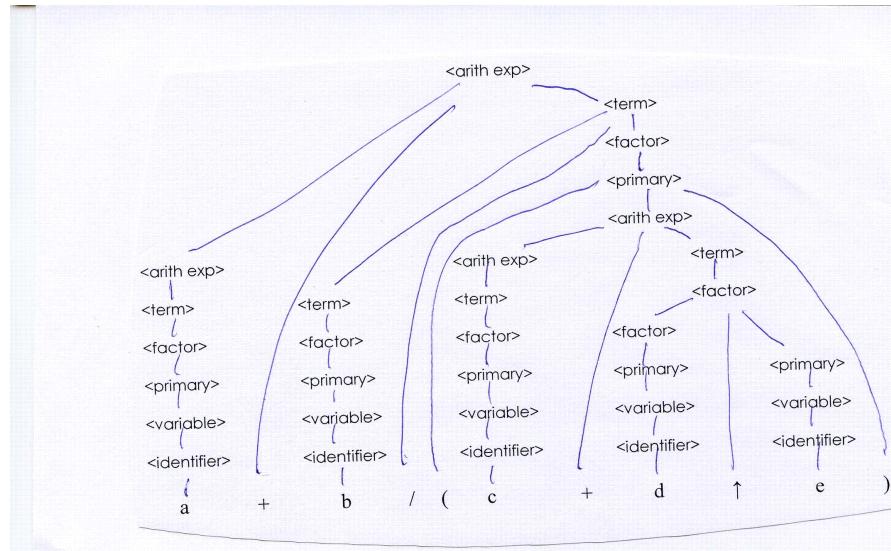


CSE6339 3.0 Introduction to Computational Linguistics  
Tuesdays, Thursdays 14:30-16:00 – South Ross 101  
Fall Semester, 2011

## BNF Example

$G_1$  is a (context free) BNF grammar for a simple programming language arithmetic expression.

$\langle \text{arithmetic expression} \rangle$	$\rightarrow$	$\langle \text{term} \rangle \mid \langle \text{arithmetic expression} \rangle + \langle \text{term} \rangle \mid$ $\langle \text{arithmetic expression} \rangle - \langle \text{term} \rangle$
$\langle \text{term} \rangle$	$\rightarrow$	$\langle \text{factor} \rangle \mid \langle \text{term} \rangle \times \langle \text{factor} \rangle \mid \langle \text{term} \rangle / \langle \text{factor} \rangle$
$\langle \text{factor} \rangle$	$\rightarrow$	$\langle \text{primary} \rangle \mid \langle \text{factor} \rangle \uparrow \langle \text{primary} \rangle$
$\langle \text{primary} \rangle$	$\rightarrow$	$\langle \text{variable} \rangle \mid \langle \text{number} \rangle \mid (\langle \text{arithmetic expression} \rangle)$
$\langle \text{variable} \rangle$	$\rightarrow$	$\langle \text{identifier} \rangle \mid \langle \text{identifier} \rangle [\langle \text{subscript list} \rangle]$
$\langle \text{subscript list} \rangle$	$\rightarrow$	$\langle \text{arithmetic expression} \rangle \mid \langle \text{subscript list} \rangle , \langle \text{arithmetic expression} \rangle$



The same language may be defined by many different grammars.

$G_2$  is another BNF grammar for a simple programming language arithmetic expression equivalent to grammar  $G_1$ .

$\langle \text{arithmetic expression} \rangle$	$\rightarrow$	$\langle \text{term} \rangle \mid \langle \text{arithmetic expression} \rangle \uparrow \langle \text{term} \rangle \mid$ $\langle \text{arithmetic expression} \rangle \times \langle \text{term} \rangle \mid$ $\langle \text{arithmetic expression} \rangle + \langle \text{term} \rangle$
$\langle \text{term} \rangle$	$\rightarrow$	$\langle \text{primary} \rangle \mid \langle \text{term} \rangle - \langle \text{primary} \rangle \mid \langle \text{term} \rangle / \langle \text{primary} \rangle$
$\langle \text{primary} \rangle$	$\rightarrow$	$\langle \text{variable} \rangle \mid \langle \text{number} \rangle \mid (\langle \text{arithmetic expression} \rangle)$
$\langle \text{variable} \rangle$	$\rightarrow$	$\langle \text{identifier} \rangle \mid \langle \text{identifier} \rangle [\langle \text{subscript list} \rangle]$
$\langle \text{subscript list} \rangle$	$\rightarrow$	$\langle \text{arithmetic expression} \rangle \mid \langle \text{arithmetic expression} \rangle , \langle \text{subscript list} \rangle$