

1. Because we can write  $a, b, c$  this CFG

is ambiguous. Firstly  $a, b, c$  are all expressions but before we parse to find that out we are not with the dilemma: should we parse as  $so, (a, b), c$  with  $\langle a, b \rangle = \langle \text{expr} \rangle$  and  $c = \langle \text{expr} \rangle$  or should we parse as  $\langle a \rangle, \langle b, c \rangle$  with  $b, c$  being the expression that's together.

2. To get rid of ambiguity we can make an expression list

↓

$\langle id \rangle ::= a | b | c | \dots | z$

$\langle dig \rangle ::= 0 | 1 | 2 | \dots | 9$

$\langle \text{expr} \rangle ::= \langle s \rangle | \langle dig \rangle | \langle id \rangle | \langle + \rangle \langle \text{expr} \rangle | \langle \text{expr} \rangle \langle * \rangle \langle \text{expr} \rangle |$

$\langle \text{exprlist} \rangle$

$\langle \text{Exprlist} \rangle ::= \langle \text{exprlist} \rangle, \langle \text{expr} \rangle | \langle \text{expr} \rangle | \text{begin} \langle \text{expr} \rangle \text{end}$

3. let  $x = 5$  in  $a, b, c$

We know that there will be no error because  $a$  will be looked at as the  $\langle \text{exprlist} \rangle$  and then the other two  $(b, c)$  will be the expression. This allows the code to work from left to right.