

Step 3: Compute First & Follow's for all non terminal symbols.

$\uparrow$        $\uparrow$   
 two functions

\* First is the set of terminals that can arrive first in any string generated by the non-terminal.

\* Follow's is the set of terminals that can appear immediately after a string generated by the non-terminal.

$E' \rightarrow E$   
 $E \rightarrow E + T$   
 $E \rightarrow T$   
 $T \rightarrow T * F$   
 $T \rightarrow F$   
 $F \rightarrow id$   
 $F \rightarrow (E)$

For  $F \rightarrow id$ ,  $($  must be in First set of  $F$

For  $T \rightarrow *$  will follow something

include  $\epsilon$

First	
F	{id, (}
T	{id, (}
E	{id, (}
E'	{id, (}

$\rightarrow$  we don't have any terminal starting T's production rule.  
 But T can be F and F have id & (.  $\therefore$  Copy F's First for T.

bottom up approach

\* If we had :  $T \rightarrow \epsilon$

then  $T \rightarrow T * F$   
 $T \rightarrow \epsilon * F$

$\therefore T \rightarrow * F$   
 $\therefore *$  will also be in T's First

Follows  $\downarrow$  go top down

If we have:  
rule 1

$A \rightarrow \alpha B$

$\hookrightarrow$  what follows A follows B

$S$   
 $\vdots$   
 $A \alpha B$   
 $\downarrow$   
 $\alpha B \alpha B$

$A, B$  both followed by  $\alpha$

If we have:  
rule 2

$A \rightarrow \alpha B \beta$

Here  $\alpha, \beta$  means anything

$F \rightarrow (E)$   
 $\uparrow \quad \uparrow$   
 $\alpha \quad \beta$

follows of B include first of  $\beta$

$E \rightarrow E + T$   
 $\quad \quad \quad \uparrow$   
 $\quad \quad \quad \beta$

do not include  $\epsilon$

Follows	
$E'$	$\{ \$ \} \leftarrow$ indicating end of file
$E$	$\{ \underbrace{+, , , )}_{\text{rule 2}}, \underbrace{\$}_{\text{rule 1}} \}$
$T$	$\{ \underbrace{*, +, , , )}_{\text{rule 1}}, \$ \}$
$F$	$\{ \underbrace{*, +, , , )}_{\text{rule 1}}, \$ \}$

For rule 2:  $A \rightarrow \alpha B \beta$   $\hookrightarrow$  if  $\beta$  leads to  $\epsilon$

it will lead to rule 1  
which means copying  
A's follows