

**procedure** firstSet(  $X\beta$ , set  $T$  )  
 $X, \beta$  is valid sequence of grammar elements  
(part of a rewrite's RHS), and  $T$  is an empty set on the  
first call of procedure.  
returns the set of terminals  $\{t \in \Sigma_{\$} | X\beta \Rightarrow t\pi\}$ ,  
and an updated set  $T$

Recall notationally:  $\Sigma_{\$} = \Sigma + \{\$ \}$ ;  $X \in N \cup \Sigma_{\$}$ ;  $\beta, \pi \in (N \cup \Sigma_{\$})^*$ ;  
 $P$  is the set of production rules of the grammar.

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if (  $X \in \Sigma_{\$}$  ) then (
    return  $\{X\}, T$ 
)

#  $F$  for the First Set
let  $F$  be a set
if (  $X$  not in  $T$  ) then (
    add  $X$  to set  $T$ 
    foreach (  $p \in P$  with  $X$  on LHS of  $p$  ) do (
        let  $R \leftarrow$  RHS of  $p$ 
        #  $I$  for ignorable
         $G, I \leftarrow$  firstSet( $R, T$ )
         $F \leftarrow F \cup G$ 
    )
)

if( derivesToLambda(  $X$  ) is true AND  $|\beta| > 0$  ) then (
     $G, I \leftarrow$  firstSet( $\beta, T$ )
     $F \leftarrow F \cup G$ 
)

return  $F, T$ 

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