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EXPERIMENT NO. 3.

Aim: write a program to implement the FIRST & FOLLOW set for the given grammar.

Theory:

First & Follow in compiler design are two grammatical function that helps in entry table entries. If the compiler knew ahead of time what the initial characters & follow up of the string produced when a production rule is applied. It might carefully choose which production rule to apply by comparing it to the current character or token in the i/p string.

First():

First is a function that specifies the set of terminals that starts a string derived from a production rule. It is the first terminal that appears on the right-hand side of the production.

Rules to find First():

1) If X is a terminal then first (X) is {X}
2) If X is a non-terminal & X tends $a\alpha$ is production ($X \rightarrow a\alpha$) then add 'a' to the first of X.
   If $X \rightarrow \epsilon$ then add NULL to the first(X)
3) If $X \rightarrow Y\tau$ then if first(Y) = ϵ, then first(X) = {first(Y) - ϵ} U first(τ)
4) If $X \rightarrow Y\tau$ then if first(X) = Y, then first(Y) = terminal but NULL then first(X) = first(Y) = terminals.

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Follow():

Follow is set of terminal symbol that can be displayed just to the right of the non-terminal symbol in any sentence format. If the first non-terminal appearing after the given non-terminal symbol on the right hand side of production.

Rule to find Follow():

1) $ is a Follow of 'S' (start symbol)
2) If $A \rightarrow \alpha B \beta$, $\beta \neq \epsilon$ then, first(β) is Follow(B)
3) If $A \rightarrow \alpha B$ or $A \rightarrow \alpha B \beta$ where first(β) = ϵ then everything in follow(A) is a follow(B)

Example:

Calculate first & follow functions for the given grammar:

$S \rightarrow aBDb$
$B \rightarrow cC$
$C \rightarrow bC / \epsilon$
$D \rightarrow EF$
$E \rightarrow g / \epsilon$
$F \rightarrow f / \epsilon$

First functions:

First(S) = {a}
First(B) = {c}
First(C) = {b, ε}
First(D) = {g, f, ε)
First(E) = {g, ε}
First(F) = {f, ε}

Follow functions.

Follow(S) = {$}
Follow(B) = {g, f, h}
Follow(C) = {g, f, h}
Follow(D) = {h}
Follow(E) = {f, h}
Follow(F) = {h}

A+ 18/3/24