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FOR STATEMENT

1 - SYNTACTIC

⟨EXPRESSION LIST ELEMENT⟩ : : = ⟨GENERAL EXPRESSION⟩
| ⟨GENERAL EXPRESSION⟩ STEP ⟨GENERAL EXPRESSION⟩ UNTIL ⟨GENERAL EXPRESSION⟩
| ⟨GENERAL EXPRESSION⟩ WHILE ⟨GENERAL BOOLEAN EXPRESSION⟩

⟨EXPRESSION LIST⟩ : : = ⟨EXPRESSION LIST ELEMENT⟩
| ⟨EXPRESSION LIST⟩, ⟨EXPRESSION LIST ELEMENT⟩

⟨FOR PREFIX⟩ : : = FOR ⟨VARIABLE⟩ : = ⟨EXPRESSION LIST⟩

⟨FOR CLAUSE⟩ : : = ⟨FOR PREFIX⟩ | ⟨FOR CLAUSE⟩ ⟨FOR PREFIX⟩

LOOP

⟨FOR STATEMENT⟩ : : = ⟨FOR CLAUSE⟩ ⟨COMPOUND STATEMENT⟩
| ⟨CONDITIONAL STATEMENT⟩ | ⟨statement⟩

2 - Examples

FOR I : = 1 STEP A UNTIL N LOOP A[I] : = B[I] ;

FOR I : = 1, V1 x 2 WHILE V1 < N FOR J : = A + B, L, 1 STEP 1 UNTIL N, C + D LOOP A[I, J] := B[1, J] ;

3-Semantics

a (page 3)

The expression list gives the rules for obtaining a sequence of values. The elements of the list may be :

1 - expressions (E)

2 - E_1 STEP E_2 UNTIL E_3 , to mean the following sequence

$V_0 := E_1$

$V_1 := V_0 + E_2$

.....

$V_n := V_{n-1} + E_2$

3-Semantics

A Recursive process may be described by a for statement in which the for clause causes the following statement to be executed several times. Each time the following statement is executed the value of the recursing variable is defined by the expression list and the number of times the statement is executed is also defined by the expression list.

The expression list gives the rules for obtaining a sequence of values. The elements of the list may be :

1 - expressions (E)

2 - E, STEP E_2 UNTIL E_3 , to mean the following sequence of expressions

$$V_0 := E_1$$
$$V_1 := V_0 + E_2$$
$$V_2 := V_1 + E_2$$
.....
$$V_n := V_{n-1} + E_2$$

This sequence is continued as long as the following condition is satisfied

$$(V_i - E_3) \times \text{sgn}(E_2) \leqslant 0$$

3 - E WHILE B , to mean the sequence of values defined by E as long as the value of B is TRUE

A for clause consisting of more than one for prefix will be interpreted as if for each FOR after the first, the FOR were replaced by LOOP BEGIN FOR and the for statement delimiter ; were replaced by END ;