10. Jan 1960. Ach group per porals

Naur Nr 6 12 pages

1

1. Simultaneous assignment statements:

To be inserted

1. Assignment statements
Form iii) \(\sim V_1 := V_2 := V_3 \cdots \cdot V_n := E

The expression after the last := defines a value which is assigned to each of the preceding variables. The form is equivalent to the following n assignment statements:

 $V_1 := E \qquad V_n := E$ $V_2 := 42 V_n \qquad V_{n-1} := V_n$ $V_n := 21 V_n$

a := b := c := b + g

For 8 Against 2

item 2. Modify section IIC 6c to read as follows:

"c. If B, and B, are expressions, the following are expressions:

β,	0	0	1. 1	1 1	
Bz	0	1	0	1	
B - 7 B ₁	1	1	0	0	
~ B ₁ ∧ B ₂	0	0	0	1	
B ₁ ∨B ₂	0	1	1	1	
~B¹.) B⁵	1	1	0	1	
~ B ₁ ≡B ₂	1	O	0	1	

The operators \neg , \land , \lor , \supset , \equiv have the interpretations not, and, or, materially implies, and equivalent. The order of execution of operations within Boolean expressions are determined by the precedence rule that each operator in the above list has narrower scope than those which follow it, and when this is not deciding by association to the left. Any other desired precedence must be indicated by the use of parentheses. A Boolean expression may occur as an arithmetic operand and will be regarded as having 0 (if false) or 1 (if true).

Examples: (X = 0) $(X>0) \lor (y>0)$ $p \land q \lor (x \neq y)$ "

The effects of these changes to ALGOL are as follows:

- 1. Boolean expressions occuring as arithmetic operands have values 0 (for false) or 1 (for true).
- 2. The Boolean operator) is included; B, ? B, means the same as B2 V 7 B1.
- 3. The order of execution of operations within Boolean expressions is determined the precedence rules: \urcorner has the narrowest scope, then \land , then \lor , then \supset then = .

Change: precedines

1tem 4.

Add section 7 to part IIC as follows "7. Conditional expressions have the form

 $E \rightarrow B_1$ yields E_1 else B_2 yields E_2 else ... else B_n yields E_n where B_1 and B_2 and ... and B_n are Boolean expressions and E_1 and E_2 and ... and E_n are expressions all of the same kind (arithmetic, Boolean, or designational), is an expression of the same kind as the E_1 's. The value of E is computed as follows: the E_1 's are evaluated from left to right until one is found which is true; let it be E_1 . The value of E is the value of E_1 . If no E_1 is true, E is undefined.

To avoid ambiguity, parentheses must be used when a conditional expression occurs as part of an arithmetic expression. Example: The conditional expression

X>0 yields -X else 1 yields X
may occur in the statement
y:= 2x (X>0 yields -X else 1 yields X) +3
and has value-21X1+3

Add to the examples under "go to statements".

"go to (X 4 0 yields HADES else X = 0 yields PURGATORY else X > 0 yields HEAVEN)"

The effect of this modification is to add a new way of forming expressions which allows many programs to be written more economically and naturally avoiding unnecessary branching.

The notation is required for writing recursive function definitions.

The fully one meany that the following many programs to be written more economically and naturally avoiding unnecessary branching.

The notation is required for writing recursive function definitions.

gaterman For 10 Against 2 Delete section II D5 and change section II D3 to read as follows:

"5. Conditional statements

A conditional statement is one which has the effect of selecting for execution one of a sequence of given statements according to prescribed conditions which exist when the conditional statement is executed.

Form: $\angle B_1$ yields $\angle B_2$ else B_3 yields $\angle B_4$ else B_4 yields $\angle B_4$

The effect of a conditional statement is to examine the B's until one is found that is true, say B; then £, is executed and control passes to the statement beyond £. If none of the B's is true control passes beyond & immediately. In order to avoid ambiguity such as that which might occur when a conditional statement occurs as a Z, in another conditional statement, parenthesization may be required. For this purpose begin and end as in compound statements are used so that the parenthesized conditional statement has the form:

begin B, yields & else ... else B, yields & end"

The effect of this change is to merge the if and alternative statements and to use a notation completely analogous to that used with conditional expressions.

Principle of thing Samebrowns

For 12 For 5.

Against & Against 3.

(7) function

to be inserted in

Part E 4: Function declarations

Form:

 $\triangle - function I_n(I,I,---,I) := y$

to be inserted in

Part B

d. declarators : function

recursive function

recursive procedure

Part IIIa

Declarators (\$\phi\$) function recursive

All functions will be declared by declarations introduced by function For 12 Against worre Forbidding neursve Junetos For 6 Against 5 item 11

part IIE, add section 7 as follows:

7. Constant declaration

Constant declarations serve to initialize the values of certain variables.

Form: $\triangle \sim \frac{\text{constant I:= N}}{\text{of the form:}}$ where I is a variable and N is

Examples:

constant p:= 3.17

constant begin A:= 5.12; G1:= -7; P:= 0 end

constant D [7,] := 1.5, 3.4

constant D[,] := 1.4,2.5,3.6,1.2,2.1,3.4

constant E [7,3] := 2.5

where previously there appeared

array (C,D,E [6,8:3,4])

For Many Against None

The vertical arrow \uparrow denotes exponentiation, where the leading expression is the base and the expression following the arrow is the exponent.

Examples:
$$2 \uparrow (2 \uparrow n)$$
 means $2(2^n)$ ($2 \uparrow 2) \uparrow n$ means $(2^2)^n$ ($2 \uparrow (2 \uparrow b)) \uparrow 2$ means $(a^2)^2$ 2 $2 \uparrow (n+1)$ means $2^{(n+1)}$.

.IID2: Change example

go to exit $(i \uparrow 2-j \uparrow 2+1)12$, where ----

IID3: Change example

Example: In the sequence of statements if (a>0); $c:=a+2 \times b+2$ if (a<0); c:=a+2 + b+2

IID6: Change examples

do 12A, ACB(X↑2 + 3/Y → A, ~~ -)

IIIa:

Brackets (6)~() [] begin end

IIIc: Change line starting "exponentiation" exponentiation arrow + raising of the line for the exponent.

For: 10 feganist: 1 18.

(x) Null statement. A null statement has no content and is of the form $\angle -$

yes

19 <u>END</u>(n)

To be inserted as last paragraph

In the case of nested compound statements which may require a sequence of <u>END</u> closing parenthesis, the following may be used:

END(n)
to mean
END ENDEND
a sequence of n ENDs.

(55)

Part E

1 7 Recursive functions and procedures

If a <u>function</u> or a <u>procedure</u> uses itself, then the form of the declaration shall be:

 $\triangle \sim \underline{\text{Recursive function}} \ \mathbb{I}(\mathbb{I},\mathbb{I} \sim -,\mathbb{I}) := \mathbb{E}$

or

 $\triangle \sim \text{Recursive procedure } I(I,I,--,I) := (I,I,---,I)$

Array declaration has the form:

where E,E refers to the lower and upper limit for each dimension of the array.

For pairs 12 Against

Change

34 Add to list of characters:

B 3b (Separaters) LJ
B 3c (Brackets) ()

Replace end of B:

.... However only three types of such strings are admissible:

- as in the original
- 3. Strings enclosed by string quote '. The contents of the quotes are string constants. Thus a string constant is represented by enclosing it within string quotes.

In most contexts \sqcup (space) will leave no formal significance, i. e. elimination or insertion of these characters will not alter the meaning of the program. There are two exceptional contexts. The first is within string quotes, so that "A_B" is distinct from "A_L_B" or "AB". The other is within COPY and REPLACE statements (see...).