GROUND OPERATIONS
AEROSPACE LANGUAGE (GOAL)
SYNTAX DIAGRAMS HANDBOOK
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AEROSPACE LANGUAGE

(GOAL)

SYNTAX DIAGRAMS HANDBOOK

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GOAL SYNTAX DIAGRAMS HANDBOOK

This handbook contains an alphabetical arrangement of syntax diagrams used in the Ground Operations Aerospace Language (GOAL). Descriptive writeups for the syntax diagrams are not included in this handbook; they are included in the GOAL Textbook. For background information about GOAL, refer to the GOAL Overview Document which relates the historical development of GOAL and provides a summary of features and capabilities of the language.
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<td>Symbol</td>
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</tr>
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<td>36.</td>
<td>Hexadecimal Number</td>
<td>36</td>
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<td>81.</td>
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## FEEDBACK LETTERS VERSUS DIAGRAM CHART

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<tr>
<th>LETTER</th>
<th>PROPOSED VALUE</th>
<th>DIAGRAM I:AME</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>Declare Data Statement</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>Declare Data Statement</td>
</tr>
</tbody>
</table>
| C      |                | Record Data Statement  
|        |                | Request Data Statement |
| D      |                | Activate Table Statement  
|        |                | Inhibit Table Statement |
| E      |                | Apply Analog Statement  
|        |                | Issue Digital Pattern Statement |
|        |                | Set Discrete Statement |
| F      |                | Leave Statement  
|        |                | Perform Subroutine Statement |
| G      |                | Release Concurrent Statement |
| H      |                | Stop Statement |
| I      |                | Disable Interrupt Statement |
| J      |                | Begin Macro Statement  
<p>|        |                | Expand Macro Statement |
| K      |                | Begin Subroutine Statement |
| L      |                | Free Data Bank Statement |
|        |                | Use Data Bank Statement |
| M      |                | Specify Statement |
| N      |                | Specify Statement |
| P      |                | Character String |
| R      |                | Function Designator |
| S      |                | External Designator |
| T      |                | Name |
| W      |                | Macro Label |
| Y      |                | Revision Label |</p>
<table>
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<th>DIAGRAM NAME</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Step Number</td>
</tr>
<tr>
<td>AC</td>
<td></td>
<td>Numeric Formula</td>
</tr>
<tr>
<td>AD</td>
<td></td>
<td>Integer Number</td>
</tr>
<tr>
<td>AE</td>
<td></td>
<td>Binary Number</td>
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<tr>
<td>AF</td>
<td></td>
<td>Octal Number</td>
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<tr>
<td>AG</td>
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<td>Hexadecimal Number</td>
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DIMENSION TABLE  

Engineering units available for use in GOAL are listed in the following matrix.

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<th>$X10^3$</th>
<th>$X10^6$</th>
<th>$X10^{-3}$</th>
<th>$X10^{-6}$</th>
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<tr>
<td>volts ac/dc</td>
<td>volt</td>
<td>V</td>
<td>MV</td>
<td>UV</td>
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<td></td>
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<tr>
<td>current ac/dc</td>
<td>ampere</td>
<td>A</td>
<td>MA</td>
<td>UA</td>
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</tr>
<tr>
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<td>HZ</td>
<td>KHZ</td>
<td>MHZ</td>
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<tr>
<td></td>
<td>pulses per second</td>
<td>PPS</td>
<td>KPPS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>time</td>
<td>day</td>
<td>DAY</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>hour</td>
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<td>KOHM</td>
<td>MOHM</td>
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<td>MH</td>
<td>UH</td>
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<td>UFD</td>
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<td>KW</td>
<td>MW</td>
<td>UW</td>
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<td>percent</td>
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<td></td>
<td>pounds per square inch</td>
<td>PLS</td>
<td>PLIA</td>
<td>PSI</td>
<td></td>
<td></td>
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<tr>
<td>pressure</td>
<td>millimeters of mercury</td>
<td>MMHG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>inches of mercury</td>
<td>INHG</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>millibars</td>
<td>MB</td>
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<td>inch</td>
<td>IN</td>
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<tr>
<td></td>
<td>foot</td>
<td>FT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>meter</td>
<td>M</td>
<td>KM</td>
<td>MM</td>
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<td>mile</td>
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<td>ARCSSEC</td>
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<td>radian</td>
<td>RAD</td>
<td>MRAD</td>
<td></td>
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<td>degrees</td>
<td>DEGC</td>
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<td>centigrade</td>
<td>DEGF</td>
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<tr>
<td></td>
<td>degrees</td>
<td>DEGC</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>fahrenheit</td>
<td>DEGF</td>
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</table>

CAUTION - The writer must take necessary precautions to insure the consistent use of compatible dimensions.
Other allowable dimensions are:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>KILJOULTS (AC or DC)</td>
<td>KV</td>
</tr>
<tr>
<td>DECIBELS above one milliwatt</td>
<td>DBM</td>
</tr>
<tr>
<td>DECIBELS above one watt</td>
<td>DBW</td>
</tr>
<tr>
<td>KILOVOLT AMPERES</td>
<td>KVA</td>
</tr>
<tr>
<td>VOLT AMPERES REACTIVE</td>
<td>VAR</td>
</tr>
<tr>
<td>KILOVOLT AMPERES REACTIVE</td>
<td>KVAR</td>
</tr>
<tr>
<td>PICOFARADS</td>
<td>PFD</td>
</tr>
<tr>
<td>MASS (grams)</td>
<td>G</td>
</tr>
<tr>
<td>ACCELERATION</td>
<td>M/SEC/SEC</td>
</tr>
<tr>
<td></td>
<td>FT/SEC/SEC</td>
</tr>
</tbody>
</table>

If the full name of the basic unit DIMENSION is used, then either plural or singular will be allowed.
EXPLANATION OF GOAL SYNTAX DIAGRAMS

To illustrate the allowable variations of each GOAL statement, a presentation method using syntax diagrams was selected.

Syntax diagrams identify legal sequences of items in a GOAL statement, including alternate branches, optional entries, and feedback loops.

Some basic rules for using syntax diagrams are:

- Syntax diagrams are read from left to right except for feedback loops.
- Is a connecting path and indicates that the insertion of blanks and/or comments is allowed.
- Capital letters must be used as shown.
- Diagonal lines are alternate forward paths.
- A bubble indicates the start of a return (feedback) path.
- A numeral at the beginning of a return path indicates the maximum number of times a path may be taken.
- A letter at the beginning of a return path indicates the number will be assigned after a system is selected.
- Syntax notes provide semantical explanation.
- GOAL statements are terminated by a semi-colon.
- A syntax diagram reference number is placed in each syntax unit.

The following is an example of a syntax diagram illustrating a "READING STATEMENT."

![Diagram of a syntax diagram illustrating a "READING STATEMENT."](image)
This allows any of the following sentences to be written:

READ;
READ A BOOK;
READ A BOOK AND A MAGAZINE;
READ A MAGAZINE AND A BOOK;
READ A BOOK AND A BOOK;
READ A MAGAZINE AND A MAGAZINE;

If the use of "BOOK" and "MAGAZINE" appeared the same way in several diagrams and represented a logical grouping, then a new syntax unit could be created.

The above diagram would then become:

The dashed box represents a syntax unit. The syntax unit on the left is being defined in terms of "characters" and other syntax units.

To facilitate the location of any syntax diagram in this handbook, an INDEX OF SYNTAX DIAGRAMS on page "iii" lists the initial words of the diagram name, the number of the diagram, and the page where it is located. A FEEDBACK LETTERS VERSUS DIAGRAM CHART on pages "iv" and "v" list the letter annotations on diagram feedbacks and the appropriate definition of each letter. Page "vi" is a table of dimensions allowed when referenced by a syntax diagram.
By convention, when writing GOAL Statements, the letter "Ø" should be slashed and the numeral "0" should not be slashed. This convention is not shown in the Syntax Diagrams.
APPLY ANALOG STATEMENT

APPLY

SEND

APPLY

QUANTITY

INTERNAL NAME

PRESENT VALUE OF

EXTERNAL DESIGNATOR

EXTERNAL DESIGNATOR

EXTERNAL DESIGNATOR

EXTERNAL DESIGNATOR
ASSIGN STATEMENT

ASSIGN

PROCEDURAL STATEMENT PREFIX 57

INTERNAL STATE

STATE 72

EQUAL TO

INTERNAL NAME 39

MUST BE DECLARED AS STATE VALUES

ASSIGN STATEMENT 39

3

AVERAGE STATEMENT

AVERAGE

PROCEDURAL STATEMENT PREFIX 57

INTEGER NUMBER 38

READINGS OF 1

EXTERNAL DESIGNATOR 31

AND SAVE AS INTERNAL NAME 39

AVERAGE STATEMENT 4

4
CONCURRENT STATEMENT

CONCURRENT STATEMENT

PERFORM PROGRAM

DISPLAY PRINT RECORD

VERIFY EXTERNAL DESIGNATOR

COMPARISON TEST AND OUTPUT EXCEPTION

EXTERNAL DESIGNATOR TO

PRESENT-VALUE-OF

DEFUALTS TO SYSTEM DEVICE

PROGRAM NAME

REVISION LABEL

PROCEDURAL STATEMENT PREFIX

EVERY TIME VALUE

CONCURRENTLY 1

DATA BANK NAME

MUST BE DEFINED IN A BEGIN DATA BANK STATEMENT
DECLARE DATA STATEMENT

DECLARE 7

NUMBER

NAME 47

EQUAL TO

NUMBER 48

NUMBER PATTERN 49

QUANTITY

NAME 47

EQUAL TO

QUANTITY 59

STATE

NAME 47

EQUAL TO

STATE 72

TEXT

NAME 47

WITH-A-MAXIMUM-OF

INTEGER NUMBER 38

CHARACTERS

EQUAL TO

TEXT CONSTANT 79
DECLARE NUMERIC LIST STATEMENT

DECLARE NUMERIC LIST STATEMENT 18

DECLARE NUMERIC LIST STATEMENT 18

NAME 47

WITH

INTEGER NUMBER 38

DEFINES LIST NAME

1 ENTRIES

NUMBER 48

NUMBER PATTERN 49

FEEDBACK REQUIRED (NUMBER OF ENTRIES - 1)
DECLARE NUMERIC TABLE STATEMENT

DECLARE NUMERIC TABLE

DEFINES TABLE NAME

1. INTEGER NUMBER 38 ROWS AND INTEGER NUMBER 38 COLUMNS 2

TITLED NAME 47 WITH ENTRIES 3

FEEDBACK REQUIRED (NUMBER COLUMNS -1)

FUNCTION DESIGNATOR 33

NUMBER PATTERN 49

NUMBER 48

FEEDBACK REQUIRED (NUMBER COLUMNS -1)

FEEDBACK REQUIRED (NUMBER ROWS -1)

NUMBER OF COLUMNS MUST BE ZERO
DECLARE QUANTITY LIST STATEMENT

DECLARE QUANTITY LIST

NAME

WITH

INTEGER NUMBER

QUANTITY

DEFINED

LIST NAME

FEEDBACK REQUIRED (NUMBER OF ENTRIES - 1)

ENTRIES
DECLARE QUANTITY TABLE

- DECLARE QUANTITY TABLE STATEMENT
  - DECLARE QUANTITY TABLE
  - DEFINE TABLE NAME
    - NAME
    - WITH
      - INTEGER NUMBER
    - (NUMBER (NUMBER
      - QUANTITY
    - FEEDBACK FEEDSACK
    - REQUIRED
    - (NUMBER
    - NUMBER OF COLUMNS MUST BE ZERO

- DEPENDS ON ROWS AND COLUMNS

- TITLED
  - NAME
  - WITH
    - ENTRIES

- FUNCTION DESIGNATOR
  - QUANTITY
  - FEEDBACK REQUIRED
    - (NUMBER COLUMNS - 1)
  - FEEDBACK REQUIRED
    - (NUMBER ROWS - 1)

- NUMBER OF COLUMNS MUST BE ZERO
DECLARE STATE LIST STATEMENT

DECLARE STATE LIST

DEFINES LIST NAME

STATE

NUMBER

ENTRIES

FEEDBACK REQUIRED (NUMBER OF ENTRIES -1)
DECLARE STATE TABLE

DECLARE STATE TABLE

- DEFINES TABLE NAME
  - NAME
  - WITH
  - INTEGER NUMBER

- ROWS AND COLUMNS
  - ROWS
  - AND
  - COLUMNS

- TITLED
  - NAME
  - WITH
  - ENTRIES

- FUNCTION DESIGNATOR
  - STATE
  - FEEDBACK REQUIRED
    - NUMBER OF COLUMNS - 1
    - NUMBER OF ROWS - 1

NUMBER OF COLUMNS MUST BE ZERO
DECLARE TEXT LIST STATEMENT

DECLARE TEXT LIST

NAME

WITH

DEFINE LIST NAME

INTEGER NUMBER

ENTRIES

TEXT CONSTANT

FEEDBACK REQUIRED (NUMBER OF ENTRIES -1)

MUST BE USED IF AN UNDECLARED ENTRY IS LONGER THAN THE LONGEST DECLARED OR IF NO ENTRIES ARE DECLARED

WITH A MAXIMUM OF INTEGER NUMBER CHARACTERS
DECLARE TEXT TABLE STATEMENT

DECLARE TEXT TABLE STATEMENT

DEFINES TABLE NAME

NAME WITH INTEGER NUMBER ROWS

FEEDBACK REQUIRED (NUMBER ROWS - 1)

AND INTEGER NUMBER COLUMNS

COLUMNS TITLED NAME

WITH ENTRIES

FEEDBACK REQUIRED (NUMBER COLUMNS - 1)

FUNCTION DESIGNATOR

TEXT CONSTANT

WITH A MAXIMUM OF INTEGER NUMBER CHARACTERS

FEEDBACK REQUIRED (NUMBER COLUMNS - 1)

MUST BE USED IF AN UNDECLARED ENTRY IS LONGER THAN THE LONGEST DECLARED OR IF N3 ENTRIES ARE DECLARED

NUMBER OF COLUMNS MUST BE ZERO
DELAY STATEMENT

DELAY STATEMENT

PROCEDURAL STATEMENT PREFIX

DELAY

WAIT

TIME VALUE

OR

1

2

EXTERNAL DESIGNATOR

UNTIL

COMPARISON TEST

14

31

DIMENSION

DIMENSION TABLE ON PAGE VI

DISABLE INTERRUPT STATEMENT

DISABLE INTERRUPT STATEMENT

PROCEDURAL STATEMENT PREFIX

STEP NUMBER

MUST REFERENCE WHEN INTERRUPT STATEMENT ALL

17
FREE DATA BANK STATEMENT

FUNCTION DESIGNATOR
34
GOTO STATEMENT

35
HEXADECIMAL NUMBER

36
INDEX NAME

MUST BE A NUMERIC DECLARATION
INTERNAL NAME

USE ONLY IF TABLE NAME IS PREDEFINED IN STATEMENT AND REMAINS UNCHANGED

ROW DESIGNATOR

INDEX NAME

COLUMN NAME

INDEX NAME

INTEGER NUMBER

INTEGER NUMBER

INTERNAL NAME

LIST NAME

INDEX NAME

INTEGER NUMBER

TABLE NAME

ROW

INDEX NAME

INTEGER NUMBER

COLUMN

INDEX NAME

INTEGER NUMBER
LETTER

LIMIT FORMULA

FOR THE IF THEN OPTION OF THE VERIFY PREFIX

LIMIT FORMULA

INTERNAL NAME

QUANTITY

NUMBER

INTERNAL NAME

QUANTITY

NUMBER

INTERNAL NAME

IS

BEFORE

ARE

NOT

1

1
LIST NAME

MACRO LABEL

NAME

NUMBER
RELATIONAL FORMULA

FOR THE IF THEN OPTION
OF THE VERIFY PREFIX

1

EQUAL TO
NOT EQUAL TO
GREATER THAN
LESS THAN
GREATER THAN OR EQUAL TO
LESS THAN OR EQUAL TO

1

IS
ARE

2

NUMBER
NUMBER PATTERN
QUANTITY
INTERNAL NAME
TEXT
TEXT CONSTANT
STATE

3

48
49
59
39
79
72

32
REQUEST KEYBOARD STATEMENT

MUST BE DECLARED AS TEXT VALUES

FUNCTION DESIGNATOR 35
AND SAVE AS
INTERNAL NAME 39

REQUEST

END OF LINE INDICATOR
ENTRY

FROM

REQUEST KEYBOARD STATEMENT 66

PROCEDURAL STATEMENT PREFIX 57

TEXT CONSTANT 79
INTERNAL NAME 39
RESUME STATEMENT

REVISION LABEL

ROW DESIGNATOR

MUST BE UNIQUELY DEFINED IN TABLE DECLARATION STATEMENT
SPECIFY STATEMENT

DEFINES FUNCTION DESIGNATOR

LOAD

AS SENSOR

SYSTEM

ALSO AS TEXT CONSTANT

NUMBER PATTERN

TEXT CONSTANT

INTERNAL NAME, PROCEDURAL STATEMENT PREFIX AND FUNCTION DESIGNATOR INVALID

USING PERFORM SUBROUTINE STATEMENT

PERFORM

SUBROUTINE

STATEMENT

LETTER

NUMBER PATTERN

TEXT CONSTANT

STATE

CLOSED

FALSE

OFF

ON

OPEN

TRUE

STATE

72

71

REV 0

REV 1

37
STEP NUMBER

STEP NUMBER 73

STEP 57

NUMERAL 50

"S" WILL BE PRINTED AS "STEP"

STOP STATEMENT

STOP STATEMENT 74

PROCEDURAL STATEMENT PREFIX 57

MUST BE TAKEN IF THE ABBREVIATED DEFAULT OPTION OF THE VERIFY PREFIX IS USED

SYSTEM MESSAGE AND UNRESTRICTED RESTART

STOP AND INDICATE 1

1 restarting LABELS

STEP NUMBER 73

SUBROUTINE NAME

SUBROUTINE NAME 75

NAME 47

MUST BE PREDEFINED IN A BEGIN SUBROUTINE STATEMENT

38
SYMBOL

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ASTERISK
BLANK
COMMA
CURRENCY
EQUALS
LEFT ANGLE BRACKET
RIGHT ANGLE BRACKET
MINUS
LEFT PARENTHESES
RIGHT PARENTHESES
PERIOD
PLUS
SEMICOLON
SLASH

TABLE NAME

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MUST BE PREDEFINED IN A TABLE DECLARATION STATEMENT
TERMINATE STATEMENT

TEXT CONSTANT

TIME PREFIX
TIME VALUE

INTERNAL NAME

SINGLE TIME VARIABLE ONLY

NUMBER

DAY

DAYS

NUMBER

HR

HRS

NUMBER

MIN

MINS

NUMBER

SEC

SECS

NUMBER

MSEC

MSECS

USE DATA BANK STATEMENT

USE DATA BANK STATEMENT

DATA BANK NAME

REVISION LEVEL

USE
VERIFY PREFIX

EXTERNAL DESIGNATOR 31

COMPARISON TEST 14

WITHIN TIME VALUE 81

MUST BE TAKEN IF THE ABBREVIATED DEFAULT OPTION OF THE STOP STATEMENT IS USED

ELSE

OUTPUT EXCEPTION 53

AND

THEN

KEYWORD BRANCH NON SYNONYMOUS

NOTES:
WHEN INTERRUPT STATEMENT

PROCEDURAL STATEMENT PREFIX

WHEN INTERRUPT

FUNCTION DESIGNATOR

OCCURS 1

CONTROL RETURNED TO THE POINT OF INTERRUPTION

PERFORM SUBROUTINE STATEMENT

AND RETURN TO

STEP NUMBER

GO TO

STEP NUMBER

PROCEDURAL STATEMENT PREFIX AND STATEMENT TERMINATOR INVALID

WHEN INTERRUPT STATEMENT

RETURN