READ

```
{ READ    }  [{ ALL       }]  [MULTI-FETCH-clause] [RECORDS] [IN] [FILE] view-name
{ BROWSE  }  [{ (operand1) }]
             [PASSWORD=operand2]
             [CIPHER=operand3]
             [WITH REPOSITION]
             [sequence/range-specification]
             [STARTING WITH ISN=operand4]
             [WHERE  logical-condition]
             statement ...
END-READ     (structured mode only)
[LOOP]       (reporting mode only)
```

This chapter covers the following topics:

- Function
- Syntax Description
- System Variables Available with READ
- Examples

For an explanation of the symbols used in the syntax diagram, see *Syntax Symbols*.

Related Statements: ACCEPT/REJECT | AT BREAK | AT START OF DATA | AT END OF DATA | BACKOUT TRANSACTION | BEFORE BREAK PROCESSING | GET TRANSACTION DATA | DELETE | END TRANSACTION | FIND | HISTOGRAM | GET | GET SAME | LIMIT | PASSW | PERFORM BREAK PROCESSING | RETRY | STORE | UPDATE

Belongs to Function Group: *Database Access and Update*

Function

The READ statement is used to read records from a database. The records can be retrieved in physical sequence, in Adabas ISN sequence, or in the value sequence of a descriptor (key) field.

This statement causes a processing loop to be initiated.

See also *READ Statement* in the *Programming Guide*.

Syntax Description

Operand Definition Table:

Operand	Possible Structure					Possible Formats												Referencing Permitted	Dynamic Definition
operand1	C	S						N	P	I		B *						yes	no
operand2	C	S				A												yes	no
operand3	C	S						N										yes	no
operand4	C	S						N	P	I		B *						yes	no

* Format B of *operand1* and *operand4* may be used with a length of less than or equal to 4.

Syntax Element Description:

Syntax Element	Description

operand1	**Number of Records to be Read:**
	
	The number of records to be read may be limited by specifying *operand1* (enclosed in parentheses, immediately after the keyword READ) - either as a numeric constant (0 - 4294967295) or as a variable, enclosed within parentheses, immediately after the keyword READ. For example:
	
	`READ (5) IN EMPLOYEES ...`
	
	`MOVE 10 TO CNT(N2)`
	`READ (CNT) EMPLOYEES ...`
	
	For this statement, the specified limit has priority over a limit set with a LIMIT statement.
	
	If a smaller limit is set with the profile or session parameter LT, the LT limit applies.
	
	Notes:
	
	1. If you wish to read a 4-digit number of records, specify it with a leading zero: (0*nnnn*); because Natural interprets every 4-digit number enclosed in parentheses as a line-number reference to a statement.
	2. *operand1* is evaluated when the READ loop is entered. If the value of *operand1* is modified within the READ loop, this does not affect the number of records read.

ALL	**ALL Option:** To emphasize that *all* records are to be read, you can optionally specify the keyword ALL.
MULTI-FETCH-clause	**MULTI-FETCH Clause:** See *MULTI-FETCH Clause* below.

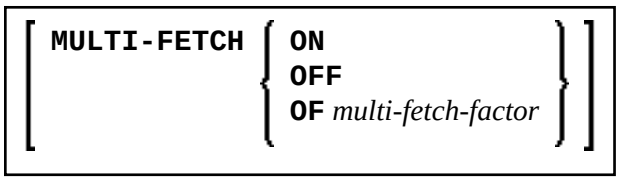
Syntax Element	Description
view-name	**View Name:** As *view-name*, you specify the name of a view, which must have been defined either within a DEFINE DATA statement or outside the program in a global or local data area. In reporting mode, *view-name* is the name of a DDM if no DEFINE DATA LOCAL statement is used.
PASSWORD CIPHER	**PASSWORD and CYPHER Clauses:** These clauses are applicable only to Adabas databases. They cannot be used with Entire System Server. The PASSWORD clause is used to provide a password when retrieving data from a file which is password-protected. The CIPHER clause is used to provide a cipher key when retrieving data from a file which is enciphered. See the statements FIND and PASSW for further information.
WITH REPOSITION	**WITH REPOSITION Option:** This option is used to make the READ statement sensitive for repositioning events. See *WITH REPOSITION Option*.
sequence/range-specification	**Sequence/Range Specification:** This option specifies the sequence and/or the range of retrieval. See *Sequence/Range Specification*.

Syntax Element	Description
`STARTING WITH ISN=`*`operand4`*	**STARTING WITH ISN Clause:** This clause applies only to Adabas databases. **Access to Adabas** This clause can be used in conjunction with a READ statement in physical or in logical (ascending/descending) sequence. The value supplied (*operand4*) represents an Adabas ISN (Internal Sequence Number) and is used to specify a definite record where to start the READ loop. • **Logical Sequence** Even if documented with an equal character (=), the READ statement does not return only those records with exactly the start value in the corresponding descriptor field, but starts a logical browse in ascending or descending order, beginning with the start value supplied. If some records have the same contents in the descriptor field, they will be returned in an ISN-sorted sequence. The `STARTING WITH ISN` clause is some kind of a "second level" selection criterion that applies only if the start value matches the descriptor value for the first record. All records with a descriptor value that is the same as the start value and an ISN that is "less equal"("greater equal" for a descending READ) than the start ISN are ignored by Adabas. The first record returned in the READ loop is either ○ the first record with descriptor = start value and an ISN "greater" ("less" for a descending READ) than the start ISN, ○ or if such a record does not exist, the first record with a descriptor "greater" ("less" for a descending READ) than the start value. • **Physical Sequence** The records are returned in the order in which they are physically stored. If a `STARTING WITH ISN` clause is specified, Adabas ignores all records until the record with the ISN that is the same as the start ISN is reached. The first record returned is the next record following the ISN=start ISN record. **Examples** This clause may be used for repositioning within a READ loop whose processing has been interrupted, to easily determine the next record with which processing is to continue. This is particularly useful if the next record cannot be identified uniquely by any of its descriptor values. It can also be useful in a distributed client/server application where the reading of the records is performed by a server program while further processing of the records is performed by a client program, and the records are not processed all in one go, but in batches. For an example, see the program REASISND below.
`WHERE` *`logical-condition`*	**WHERE Clause** See *WHERE Clause* below.

Syntax Element	Description
END-READ	**End of READ Statement:** The Natural reserved keyword END-READ must be used to end the READ statement.

MULTI-FETCH Clause

Note:
This clause can only be used for Adabas databases.



Note:
[MULTI-FETCH OF *multi-fetch-factor*] is not evaluated for database types ADA and ADA2. The default processing mode is applied; see profile parameter MFSET. When used in conjunction with database type ADA2, the Multi-Fetch Clause is ignored completetly; see *Database Management System Assignments* in the *Configuration Utility* documentation.

For more information, see the section *Multi-Fetch Clause* (Adabas) in the *Programming Guide*.

WITH REPOSITION Option

Note:
This option can only be applied if the underlying database is Adabas.

With a WITH REPOSITION option, you can make a READ statement sensitive for repositioning events. This allows you to reposition to another start value within an active READ loop. Processing of the READ statement then continues with the new start value.

A repositioning event is triggered by one of two ways when you use a READ statement with the WITH REPOSITION option:

1. When an ESCAPE TOP REPOSITION statement is executed. At execution of an ESCAPE TOP REPOSITION statement, Natural makes an instant branch to the loop begin and performs a restart; that is, the database repositions to a new record in the file according to the current content of the search value variable. At the same time, the loop-counter *COUNTER is reset to zero.

2. When a READ loop tries to fetch the next record from the database and the value of the system variable *COUNTER is 0.

   Note:
   If *COUNTER is set to 0 within the active READ loop, processing of the current record is continued; no instant branch to the loop begin is performed.You cannot trigger a reposition event in this fashion on Natural for Windows, UNIX and OpenVMS. This functionality has only been retained for compatibility reasons with Natural Version 3.1 for Mainframes. Therefore, it is not recommended that you use this process.

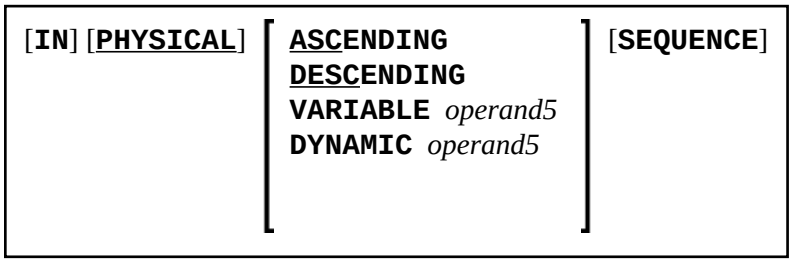
Functional Considerations

- If the READ statement has a loop-limit (e.g. `READ (10) EMPLOYEES WITH REPOSITION ..`) and a restart event was triggered, the loop gets another 10 new records, no matter how many records where already processed until the repositioning takes place.
- If an `ESCAPE TOP REPOSITION` statement is executed, but the innermost loop is not capable of repositioning (since the `WITH REPOSITION` keyword is not set in the READ statement or the posted loop statement is anything else but a READ), a corresponding runtime error is issued.
- Since the `ESCAPE TOP` statement does not allow a reference, you can only initiate a reposition event if the innermost processing loop is a `READ ..WITH REPOSITION` statement.
- A reposition event does not trigger the execution of the `AT START OF DATA` section, nor does it trigger the re-evaluation of the loop-limit operand (if it is a variable).
- If the search value was not altered, the loop repositions to the same record like at initial loop start.

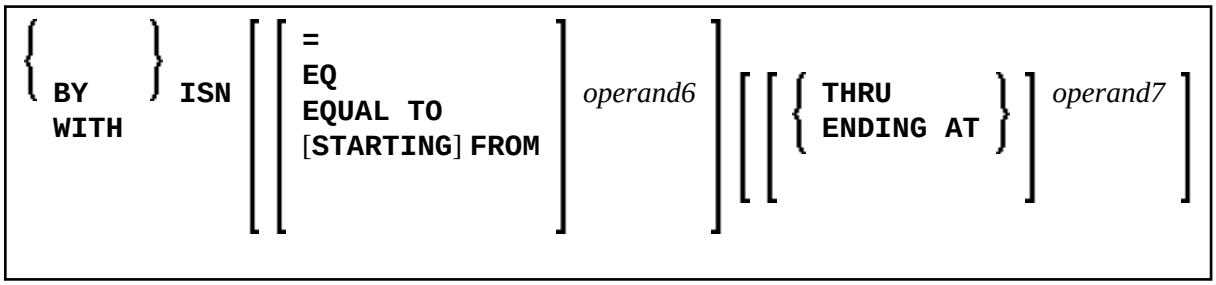
Sequence/Range Specification

Three syntax options are available to specify the sequence and/or the range of retrieval.

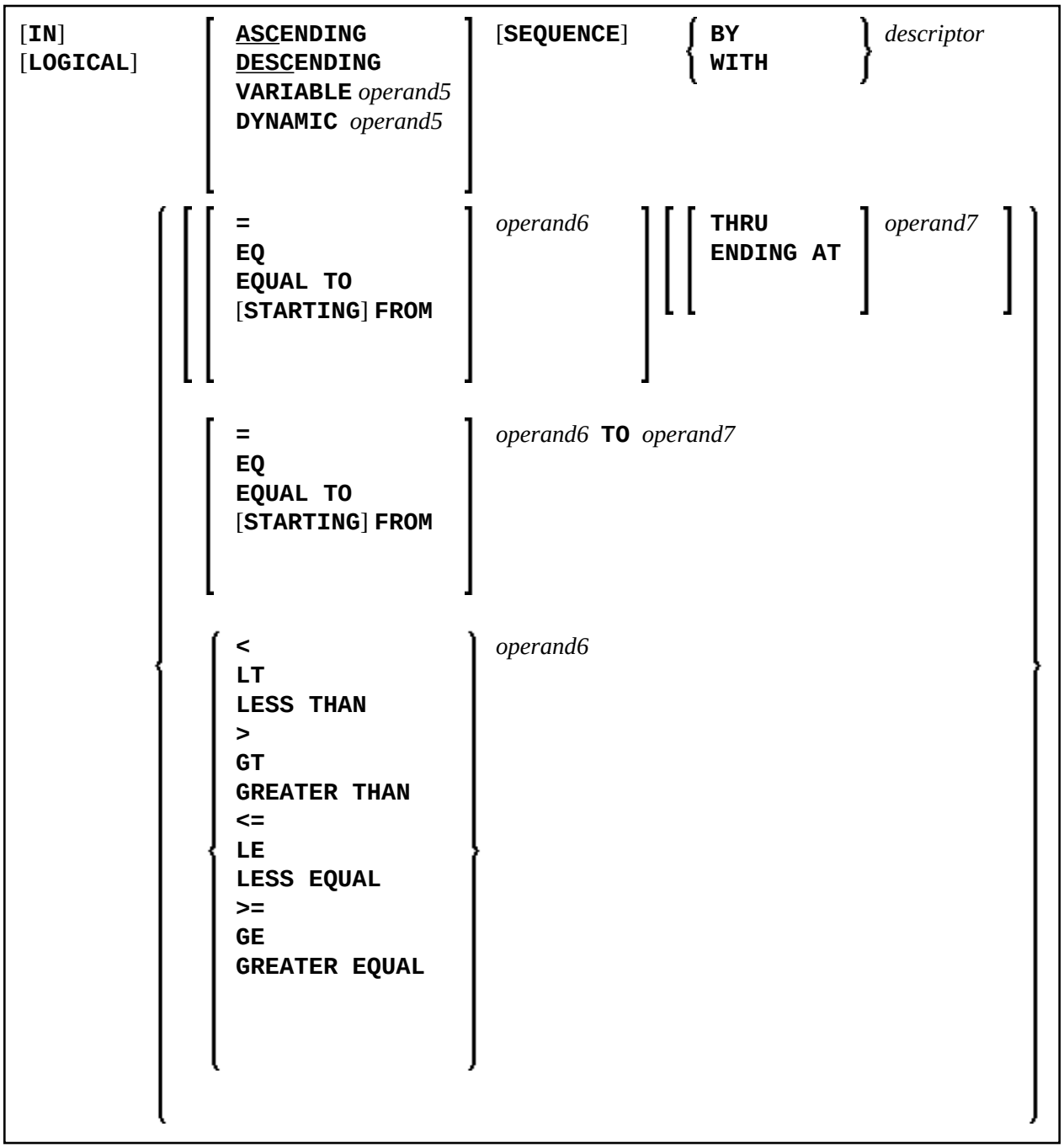
Syntax Option 1:



Syntax Option 2:



Syntax Option 3:



Notes:

1. The syntax options [2] and [3] are not available with Entire System Server.
2. If the comparators of Diagram 3 are used, the options `ENDING AT`, `THRU` and `TO` may not be used. These comparators are also valid for the `HISTOGRAM` statement.

Operand Definition Table:

Operand	Possible Structure					Possible Formats													Referencing Permitted	Dynamic Definition
operand5		S				A													yes	no
operand6	C	S				A		N	P	I	F	B *	D	T	L				yes	no
operand7	C	S				A		N	P	I	F	B *	D	T	L				yes	no

* Format B of *operand6* and *operand7* may be used only with a length of less than or equal to 4.

Syntax Element Description:

Syntax Element	Description
`READ IN PHYSICAL SEQUENCE`	**Read in Physical Sequence:** This option is used to read records in the order in which they are physically stored in a database. `PHYSICAL` is the default sequence.
`READ BY ISN`	**Read by ISN:** This option is used to read records in the order of Adabas ISNs (internal sequence numbers). (Instead of using the keyword `BY`, you may specify the keyword `WITH`, which would have the same effect). `READ BY ISN` can only be used for Adabas databases. **Note:** For XML databases: `READ BY ISN` is used to read XML objects according to the order of Tamino object IDs.

Syntax Element	Description
`READ IN LOGICAL SEQUENCE`	**Read in Logical Sequence:** This option is used to read records in the order of the values of a descriptor (key) field. If you specify a descriptor, the records will be read in the value sequence of the descriptor. A descriptor, subdescriptor, superdescriptor or hyperdescriptor may be used for sequence control. A phonetic descriptor, a descriptor within a periodic group, or a superdescriptor which contains a periodic-group field cannot be used. If you do not specify a descriptor, the default descriptor as specified in the DDM (field `Default Sequence`) will be used. If the descriptor used for sequence control is defined with null-value suppression (Adabas only), any record which contains a null value for the descriptor will not be read. If the descriptor is a multiple-value field (Adabas only), the same record will be read multiple times depending on the number of values present. **Note:** `READ IN LOGICAL SEQUENCE` is also discussed in the *Programming Guide*; see *Statements for Database Access*, *READ Statement*.

Syntax Element	Description
ASCENDING | DESCENDING | VARIABLE | DYNAMIC SEQUENCE	**Ascending/Descending Order:** This clause only applies to Adabas, XML databases and SQL databases. In a READ PHYSICAL statement, it can only be applied to DB2 databases. With this clause, you can determine whether the records are to be read in ascending sequence or in descending sequence. ● The default sequence is ascending (which may, but need not, be explicitly specified by using the keyword ASCENDING). ● If the records are to be read in descending sequence, you specify the keyword DESCENDING. ● If, instead of determining it in advance, you want to have the option of determining at runtime whether the records are to be read in ascending or descending sequence, you either specify the keyword VARIABLE or DYNAMIC, followed by a variable (*operand5*). *operand5* has to be of format/length A1 and can contain the value A (for "ascending") or D (for "descending"). ○ If keyword VARIABLE is used, the reading direction (value of *operand5*) is evaluated at start of the READ processing loop and remains the same until the loop is terminated, regardless if the *operand5* field is altered in the READ loop or not. ○ If keyword DYNAMIC is used, the reading direction (value of *operand5*) is evaluated before every record fetch in the READ processing loop and may be changed from record to record. This allows to change the scroll sequence from ascending to descending (and vice versa) at any place in the READ loop. **Notes:** 1. For XML databases: DYNAMIC SEQUENCE is not available.

Syntax Element	Description
STARTING FROM ... ENDING AT/TO	**STARTING FROM/ENDING AT Clauses:** The STARTING FROM and ENDING AT clauses are used to limit reading to a set of records based on a user-specified range of values. The STARTING FROM clause (= or EQ or EQUAL TO or [STARTING] FROM) determines the starting value for the read operation. If a starting value is specified, reading will begin with the value specified. If the starting value does not exist in the file, the next higher (or lower for a DESCENDING read) value will be used. If no higher (or lower for DESCENDING) value exists, the loop will not be entered. In order to limit the records to an end-value, you may specify an ENDING AT clause with the terms THRU, ENDING AT or TO, that imply an inclusive range. Whenever the read descriptor field exceeds the end-value specified, an automatic loop termination is performed. Although the basic functionality of the TO, THRU and ENDING AT keywords looks quite similar, internally they differ in how they work.
THRU/ENDING AT	**THRU/ENDING AT Option:** If THRU or ENDING AT is used, only the start-value is supplied to the database, but the end-value check is performed by the Natural runtime system, after the record is returned by the database. If the read direction is ASCENDING, you have to supply the lower value as the start-value and the higher-value as the end-value, since the start-value represents the value (and record) returned first in the READ loop. However, if you invoke a backwards read (DESCENDING), the higher value has to appear in the start-value and the lower-value in the end-value. Internally, to determine the end of the range to be read, Natural reads one record beyond the end-value. If you have left the READ loop because the end-value has been reached, be aware that this last record is in fact not the last record within the demanded range, but the first record beyond that range (except if the file does not contain a further record after the last result record). The THRU and ENDING AT clauses can be used for all databases which support the READ or HISTOGRAM statements.

Syntax Element	Description
TO	**TO Option:** If the keyword TO is used, both the start-value and the end-value are sent to the database, and Natural does not perform checks for value ranges. If the end-value is exceeded, the database reacts the same as when "end-of-file" is reached, and the database loop is exited. Since the complete range checking is done by the database, the lower-value (of the range) is always supplied in the start-value and the higher-value filled into the end-value, regardless if you are browsing in ASCENDING or DESCENDING order. The TO option is only applicable if the underlying database is Adabas Version 3.1.1 on UNIX, OpenVMS or Windows, Adabas Version 7 (or above) on mainframes, Tamino or an SQL database.

Notes on Functional Differences between THRU/ENDING AT and TO

The following list describes the functional differences between the usage of the THRU/ENDING AT and TO options.

THRU/ENDING AT	TO
When the READ loop terminates because the end-value has been reached, the view contains the first record "out-of-range".	When the READ loop terminates because the end-value has been reached, the view contains the last record of the specified range.
If a end-value variable is modified during the READ loop, the new value will be used for end-value check on next record being read.	The end-value variable will only be evaluated at READ loop start. All further modifications during the READ loop have no effect.
An incorrect range (for example, `READ .. = 'B' THRU 'A'`) does not cause a database error, but just returns no record.	An incorrect range results in a database error (for example, Adabas RC=61), because a value range must not be supplied in descending order.
If a `READ .. DESCENDING` is used with start- and end-value, the start value is used to position in the file, whereas the end-value is used by Natural to check for "end-of-range". Therefore the start-value is higher than (or equal to) the end-value.	Since both values are passed to the database, they have to appear in ascending order. In other words, the start-value is lower than (or equal to) the end-value, no matter if you are reading in ascending or descending order.
In order to check for range overflow, the descriptor value has to appear in the underlying database view; that is, it must be returned in the record buffer.	The descriptor is not required in the record fields returned.
The end-value check for an Adabas multi-value field (MU-field) or a sub-/super-/hyper-descriptor is not possible and leads to syntax error NAT0160 at program compilation.	You may specify an end-value for MU-fields and sub-/super-/hyper-descriptors.
Can be used for all databases.	Can only be used for Adabas Version 3.1.1 on Windows, UNIX or OpenVMS, Adabas Version 7 (or above) on mainframes, Tamino or an SQL database.

WHERE Clause

WHERE *logical-condition*

The WHERE clause may be used to specify an additional selection criterion (*logical-condition*) which is evaluated *after* a value has been read and *before* any processing is performed on the value (including the AT BREAK evaluation).

The syntax for a *logical-condition* is described in the section *Logical Condition Criteria* in the *Programming Guide*.

If a LIMIT statement or a processing limit is specified in a READ statement containing a WHERE clause, records which are rejected as a result of the WHERE clause are not counted against the limit.

System Variables Available with READ

The Natural system variables *ISN and *COUNTER are available with the READ statement.

The format/length of these system variables is P10. This format/length cannot be changed.

The usage of the system variables is illustrated below.

*ISN	The system variable *ISN contains the Adabas ISN of the record currently being processed.
*COUNTER	The system variable *COUNTER contains the number of times the processing loop has been entered.

Examples

- Example 1 - READ Statement
- Example 2 - READ WITH REPOSITION
- Example 3 - Combining READ and FIND Statements
- Example 4 - DESCENDING Option
- Example 5 - VARIABLE Option
- Example 6 - DYNAMIC Option
- Example 7 - STARTING WITH ISN Clause

Example 1 - READ Statement

```
** Example 'READEX1S': READ (structured mode)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 PERSONNEL-ID
  2 NAME
1 VEHIC-VIEW VIEW OF VEHICLES
  2 PERSONNEL-ID
  2 MAKE
END-DEFINE
*
LIMIT 3
*
WRITE 'READ IN PHYSICAL SEQUENCE'
READ EMPLOY-VIEW IN PHYSICAL SEQUENCE
  DISPLAY NOTITLE PERSONNEL-ID NAME *ISN *COUNTER
END-READ
*
WRITE / 'READ IN ISN SEQUENCE'
READ EMPLOY-VIEW BY ISN STARTING FROM 1 ENDING AT 3
  DISPLAY         PERSONNEL-ID NAME *ISN *COUNTER
END-READ
*
WRITE / 'READ IN NAME SEQUENCE'
```

```
READ EMPLOY-VIEW BY NAME
  DISPLAY         PERSONNEL-ID NAME *ISN *COUNTER
END-READ
*
WRITE / 'READ IN NAME SEQUENCE STARTING FROM ''M'''
READ EMPLOY-VIEW BY NAME STARTING FROM 'M'
  DISPLAY         PERSONNEL-ID NAME *ISN *COUNTER
END-READ
*
END
```

Output of Program REAEX1S:

```
PERSONNEL         NAME            ISN         CNT
   ID
--------- -------------------- ----------- -----------

READ IN PHYSICAL SEQUENCE
50005800  ADAM                          1           1
50005600  MORENO                        2           2
50005500  BLOND                         3           3

READ IN ISN SEQUENCE
50005800  ADAM                          1           1
50005600  MORENO                        2           2
50005500  BLOND                         3           3

READ IN NAME SEQUENCE
60008339  ABELLAN                     478           1
30000231  ACHIESON                    878           2
50005800  ADAM                          1           3

READ IN NAME SEQUENCE STARTING FROM 'M'
30008125  MACDONALD                   923           1
20028700  MACKARNESS                  765           2
40000045  MADSEN                      508           3
```

Equivalent reporting-mode example: REAEX1R.

Example 2 - READ WITH REPOSITION

```
DEFINE DATA LOCAL
1 MYVIEW VIEW OF ...
  2 NAME
1 #STARTVAL (A20) INIT <'A'>
1 #ATTR     (C)
END-DEFINE
...
SET KEY PF3
...
READ MYVIEW WITH REPOSITION BY NAME = #STARTVAL
INPUT (IP=OFF AD=O) 'NAME:' NAME /
    'Enter new start value for repositioning:' #STARTVAL (AD=MT CV=#ATTR) /
    'Press PF3 to stop'
  IF *PF-KEY = 'PF3'
    THEN STOP
  END-IF
  IF #ATTR MODIFIED
    THEN ESCAPE TOP REPOSITION
  END-IF
END-READ
...
```

```
DEFINE DATA LOCAL
1 MYVIEW VIEW OF ...
  2 NAME
1 #STARTVAL (A20) INIT <'A'>
1 #ATTR     (C)
END-DEFINE
...
SET KEY PF3
...
READ MYVIEW WITH REPOSITION BY NAME = #STARTVAL
  INPUT (IP=OFF AD=O) 'NAME:' NAME /
    'Enter new start value for repositioning:' #STARTVAL (AD=MT CV=#ATTR) /
    'Press PF3 to stop'
  IF *PF-KEY = 'PF3'
    THEN STOP
  END-IF
  IF #ATTR MODIFIED
    THEN RESET *COUNTER
  END-IF
END-READ
...
```

Example 3 - Combining READ and FIND Statements

The following program reads records from the EMPLOYEES file in logical sequential order based on the values of the descriptor NAME. A FIND statement is then issued to the VEHICLES file using the personnel number from the EMPLOYEES file as search criterion. The resulting report shows the name (read from the EMPLOYEES file) of each person read and the model of automobile (read from the VEHICLES file) owned by this person. Multiple lines with the same name are produced if the person owns more than one automobile.

```
** Example 'REAEX2': READ and FIND combination
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 PERSONNEL-ID
  2 FIRST-NAME
  2 NAME
  2 CITY
1 VEH-VIEW VIEW OF VEHICLES
  2 PERSONNEL-ID
  2 MAKE
END-DEFINE
*
LIMIT 10
*
RD. READ EMPLOY-VIEW BY NAME STARTING FROM 'JONES'
  SUSPEND IDENTICAL SUPPRESS
  FD. FIND VEH-VIEW WITH PERSONNEL-ID = PERSONNEL-ID (RD.)
    IF NO RECORDS FOUND
      ENTER
    END-NOREC
    DISPLAY NOTITLE (ES=OFF IS=ON ZP=ON AL=15)
            PERSONNEL-ID (RD.)
            FIRST-NAME (RD.)
            MAKE (FD.) (IS=OFF)

  END-FIND
END-READ
END
```

Output of Program REAEX2:

```
PERSONNEL      FIRST-NAME         MAKE
      ID
-------------- -------------- --------------

20007500        VIRGINIA        CHRYSLER
20008400        MARSHA          CHRYSLER
                                CHRYSLER
20021100        ROBERT          GENERAL MOTORS
20000800        LILLY           FORD
                                MG
20001100        EDWARD          GENERAL MOTORS
20002000        MARTHA          GENERAL MOTORS
20003400        LAUREL          GENERAL MOTORS
30034045        KEVIN           DATSUN
30034233        GREGORY         FORD
11400319        MANFRED
```

Example 4 - DESCENDING Option

```
** Example 'READSCND': READ (with DESCENDING SEQUENCE)
************************************************************************
DEFINE DATA LOCAL
1 EMPL VIEW OF EMPLOYEES
  2 NAME
  2 FIRST-NAME
  2 BIRTH
END-DEFINE
*
READ (10) EMPL IN DESCENDING SEQUENCE BY NAME FROM 'ZZZ'
  DISPLAY *ISN NAME FIRST-NAME BIRTH (EM=YYYY-MM-DD)
END-READ
END
```

Example 5 - VARIABLE Option

```
** Example 'REAVSEQ':  READ  (with VARIABLE SEQUENCE)
************************************************************************
DEFINE DATA LOCAL
1 EMPL VIEW OF EMPLOYEES
  2 NAME
  2 FIRST-NAME
  2 BIRTH
*
1 #DIR        (A1)
1 #STARTVALUE (A20)
END-DEFINE
*
SET KEY PF7 PF8
*
INPUT 'Select READ direction'
   // 'Press' 08T 'PF7' (I)                 21T 'to read backward'
    /         08T 'PF8' (I) 'or' 'ENTER' (I) 21T 'to read forward'
*
IF *PF-KEY = 'PF7'
  MOVE 'D'   TO #DIR
  MOVE 'ZZZ' TO #STARTVALUE
ELSE
  MOVE 'A' TO #DIR
  MOVE 'A' TO #STARTVALUE
```

```
END-IF
*
READ (10) EMPL IN VARIABLE #DIR SEQUENCE
               BY NAME FROM #STARTVALUE
  DISPLAY *ISN NAME FIRST-NAME BIRTH (EM=YYYY-MM-DD)
END-READ
END
```

Example 6 - DYNAMIC Option

```
DEFINE DATA LOCAL
1 #DIRECTION (A1) INIT <'A'>   /* 'A' = ASCENDING
1 #EMPVIEW VIEW OF EMPLOYEES
2 NAME
...
END-DEFINE
...
READ #EMPVIEW IN DYNAMIC #DIRECTION SEQUENCE BY NAME = 'SMITH'
   INPUT (AD=O) NAME
       / 'Press PF7 to scroll in DESCENDING sequence'
       / 'Press PF8 to scroll in ASCENDING  sequence'
   ..
   IF *PF-KEY = 'PF7' THEN MOVE 'D' TO #DIRECTION END-IF
   IF *PF-KEY = 'PF8' THEN MOVE 'A' TO #DIRECTION END-IF
END-READ
...
```

Example 7 - STARTING WITH ISN Clause

```
** Example 'REASISND': READ  (with STARTING WITH ISN)
************************************************************************
DEFINE DATA LOCAL
1 EMPL VIEW OF EMPLOYEES
  2 NAME
  2 FIRST-NAME
  2 BIRTH
*
1 #DIR      (A1)
1 #STARTVAL (A20)
1 #STARTISN (N8)
END-DEFINE
*
SET KEY PF3 PF7 PF8
*
MOVE 'ADKINSON' TO #STARTVAL
*
READ (9) EMPL BY NAME = #STARTVAL
  WRITE *ISN NAME FIRST-NAME BIRTH (EM=YYYY-MM-DD) *COUNTER
  IF *COUNTER = 5 THEN
    MOVE NAME TO #STARTVAL
    MOVE *ISN TO #STARTISN
  END-IF
END-READ
*
#DIR := 'A'
*
REPEAT
 READ EMPL IN VARIABLE #DIR  BY NAME = #STARTVAL
            STARTING WITH ISN = #STARTISN
    MOVE NAME TO #STARTVAL
    MOVE *ISN TO #STARTISN
    INPUT NO ERASE  (IP=OFF AD=O)
```

```
        15/01 *ISN  NAME  FIRST-NAME  BIRTH (EM=YYYY-MM-DD)
          //  'Direction:' #DIR
          //  'Press PF3 to stop'
          /   '      PF7 to go step back'
          /   '      PF8 to go step forward'
          /   '      ENTER to continue in that direction'
    /*
    IF *PF-KEY = 'PF7' AND #DIR = 'A'
      MOVE 'D' TO #DIR
      ESCAPE BOTTOM
    END-IF
    IF *PF-KEY = 'PF8' AND #DIR = 'D'
      MOVE 'A' TO #DIR
      ESCAPE BOTTOM
    END-IF
    IF *PF-KEY = 'PF3'
      STOP
    END-IF
  END-READ
  /*
  IF *COUNTER(0290) = 0
    STOP
  END-IF
END-REPEAT
END
```