

Dialog Design

This chapter tells you how you can design character-based user interfaces that make user interaction with the application simple and flexible.

Note:

For information on the design of graphical user interfaces (GUI), refer to *Introduction to Event-Driven Programming*.

The following topics are covered:

- Field-Sensitive Processing
 - Simplifying Programming
 - Line-Sensitive Processing
 - Column-Sensitive Processing
 - Processing Based on Function Keys
 - Processing Based on Function-Key Names
 - Processing Data Outside an Active Window
 - Copying Data from a Screen
 - Statements REINPUT/REINPUT FULL
 - Object-Oriented Processing - The Natural Command Processor
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Field-Sensitive Processing

***CURS-FIELD and POS(*field-name*)**

Using the system variable `*CURS-FIELD` together with the system function `POS(field-name)`, you can define processing based on the field where the cursor is positioned at the time the user presses Enter.

`*CURS-FIELD` contains the internal identification of the field where the cursor is currently positioned; it cannot be used by itself, but only in conjunction with `POS(field-name)`.

You can use `*CURS-FIELD` and `POS(field-name)`, for example, to enable a user to select a function simply by placing the cursor on a specific field and pressing Enter.

The example below illustrates such an application:

```
DEFINE DATA LOCAL
1 #EMP (A1)
1 #CAR (A1)
1 #CODE (N1)
END-DEFINE
*
INPUT USING MAP 'CURS'
```

```

*
DECIDE FOR FIRST CONDITION
  WHEN *CURS-FIELD = POS(#EMP) OR #EMP = 'X' OR #CODE = 1
    FETCH 'LISTEMP'
  WHEN *CURS-FIELD = POS(#CAR) OR #CAR = 'X' OR #CODE = 2
    FETCH 'LISTCAR'
  WHEN NONE
    REINPUT 'PLEASE MAKE A VALID SELECTION'
END-DECIDE
END

```

And the result:

```

                                SAMPLE MAP

                                Please select a function

                                1.) Employee information  _
                                2.) Vehicle information  _ <== Cursor positioned
                                                                on field

                                Enter code:  _

To select a function, do one of the following:

- place the cursor on the input field next to desired function and press Enter
- mark the input field next to desired function with an X and press Enter
- enter the desired function code (1 or 2) in the 'Enter code' field and press
Enter

```

If the user places the cursor on the input field (#EMP) next to Employee information, and presses Enter, the program LISTEMP displays a list of employee names:

```

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                                NAME
                                -----

ABELLAN
ACHIESON
ADAM
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
AECKERLE
AFANASSIEV
AFANASSIEV
AHL
AKROYD

```

Notes:

1. In Natural for Ajax applications, *CURS-FIELD identifies the operand that represents the value of the control that has the input focus. You may use *CURS-FIELD in conjunction with the POS function to check for the control that has the input focus and perform processing depending on that condition.
2. The values of *CURS-FIELD and POS(*field-name*) serve for internal identification of the fields only. They cannot be used for arithmetical operations.

Simplifying Programming

System Function POS

The Natural system function POS(*field-name*) contains the internal identification of the field whose name is specified with the system function.

POS(*field-name*) may be used to identify a specific field, regardless of its position in a map. This means that the sequence and number of fields in a map may be changed, but POS(*field-name*) will still uniquely identify the same field. With this, for example, you need only a single REINPUT statement to make the field to be MARKed dependent on the program logic.

Note:

The value POS(*field-name*) serves for internal identification of the fields only. It cannot be used for arithmetical operations.

Example:

```

...
DECIDE ON FIRST VALUE OF ...
  VALUE ...
    COMPUTE #FIELDX = POS(FIELD1)
  VALUE ...
    COMPUTE #FIELDX = POS(FIELD2)
  ...
END-DECIDE
...
REINPUT ... MARK #FIELDX
...

```

Full details on *CURS-FIELD and POS(*field-name*) are described in the *System Variables* and *System Functions* documentation.

Line-Sensitive Processing

System Variable *CURS-LINE

Using the system variable *CURS-LINE, you can make processing dependent on the line where the cursor is positioned at the time the user presses Enter.

Using this variable, you can make user-friendly menus. With the appropriate programming, the user merely has to place the cursor on the line of the desired menu option and press Enter to execute the option.

The cursor position is defined within the current active window, regardless of its physical placement on the screen.

Note:

The message line, function-key lines and statistics line/infoline are not counted as data lines on the screen.

The example below demonstrates line-sensitive processing using the *CURS-LINE system variable. When the user presses Enter on the map, the program checks if the cursor is positioned on line 8 of the screen which contains the option `Employee information`. If this is the case, the program that lists the names of employees `LISTEMP` is executed.

```
DEFINE DATA LOCAL
1 #EMP (A1)
1 #CAR (A1)
1 #CODE (N1)
END-DEFINE
*
INPUT USING MAP 'CURS'
*
DECIDE FOR FIRST CONDITION
  WHEN *CURS-LINE = 8
    FETCH 'LISTEMP'
  WHEN NONE
    REINPUT 'PLACE CURSOR ON LINE OF OPTION YOU WISH TO SELECT'
END-DECIDE
END
```

Output:

Company Information
Please select a function
[] 1.) Employee information
2.) Vehicle information
Place the cursor on the line of the option you wish to select and press Enter

The user places the cursor indicated by square brackets [] on the line of the desired option and presses Enter and the corresponding program is executed.

Column-Sensitive Processing

System Variable *CURS-COL

The system variable *CURS-COL can be used in a similar way to *CURS-LINE described above. With *CURS-COL you can make processing dependent on the column where the cursor is positioned on the screen.

Processing Based on Function Keys

System Variable *PF-KEY

Frequently you may wish to make processing dependent on the function key a user presses.

This is achieved with the statement SET KEY, the system variable *PF-KEY and a modification of the default map settings (Standard Keys = Y).

The SET KEY statement assigns functions to function keys during program execution. The system variable *PF-KEY contains the identification of the last function key the user pressed.

The example below illustrates the use of SET KEY in combination with *PF-KEY.

```
...
SET KEY PF1
*
INPUT USING MAP 'DEMO&'
IF *PF-KEY = 'PF1'
  WRITE 'Help is currently not active'
END-IF
...
```

The SET KEY statement activates PF1 as a function key.

The IF statement defines what action is to be taken when the user presses PF1. The system variable *PF-KEY is checked for its current content; if it contains PF1, the corresponding action is taken.

Further details regarding the statement SET KEY and the system variable *PF-KEY are described in the *Statements* and the *System Variables* documentation respectively.

Processing Based on Function-Key Names

System Variable *PF-NAME

When defining processing based on function keys, further comfort can be added by using the system variable *PF-NAME. With this variable you can make processing dependent on the name of a function, not on a specific key.

The variable *PF-NAME contains the name of the last function key the user pressed (that is, the name as assigned to the key with the NAMED clause of the SET KEY statement).

For example, if you wish to allow users to invoke help by pressing either PF3 or PF12, you assign the same name (in the example below: INFO) to both keys. When the user presses either one of the keys, the processing defined in the IF statement is performed.

```
...
SET KEY PF3  NAMED 'INFO'
      PF12 NAMED 'INFO'
INPUT USING MAP 'DEMO&'
IF *PF-NAME = 'INFO'
  WRITE 'Help is currently not active'
END-IF
...
```

The function names defined with NAMED appear in the function-key lines:

Processing Data Outside an Active Window

Below is information on:

- System Variable *COM
- Example Usage of *COM
- Positioning the Cursor to *COM - the %T* Terminal Command

System Variable *COM

As stated in the section *Screen Design - Windows*, only *one* window is active at any one time. This normally means that input is only possible within that particular window.

Using the *COM system variable, which can be regarded as a communication area, it is possible to enter data outside the current window.

The prerequisite is that a map contains *COM as a modifiable field. This field is then available for the user to enter data when a window is currently on the screen. Further processing can then be made dependent on the content of *COM.

This allows you to implement user interfaces as already used, for example, by Con-nect, Software AG's office system, where a user can always enter data in the command line, even when a window with its own input fields is active.

Note that *COM is only cleared when the Natural session is ended.

Example Usage of *COM

In the example below, the program ADD performs a simple addition using the input data from a map. In this map, *COM has been defined as a modifiable field (at the bottom of the map) with the length specified in the AL field of the Extended Field Editing. The result of the calculation is displayed in a window. Although this window offers no possibility for input, the user can still use the *COM field in the map outside the window.

Program ADD:

```

DEFINE DATA LOCAL
1 #VALUE1 (N4)
1 #VALUE2 (N4)
1 #SUM3 (N8)
END-DEFINE
*
DEFINE WINDOW EMP
  SIZE 8*17
  BASE 10/2
  TITLE 'Total of Add'
  CONTROL SCREEN
  FRAMED POSITION SYMBOL BOT LEFT
*
INPUT USING MAP 'WINDOW'
*
COMPUTE #SUM3 = #VALUE1 + #VALUE2
*
SET WINDOW 'EMP'
INPUT (AD=0) / 'Value 1 +' /
              'Value 2 =' //
              ' ' #SUM3
*
IF *COM = 'M'
  FETCH 'MULTIPLY' #VALUE1 #VALUE2
END-IF
END

```

Output of Program ADD:

```

Map to Demonstrate Windows with *COM

CALCULATOR

Enter values you wish to calculate

Value 1: 12__
Value 2: 12__

+-Total of Add--+
!                 !
! Value 1 +      !
! Value 2 =      !
!                 !
!                24 !
!                 !
+-----+

Next line is input field (*COM) for input outside the window:

```

In this example, by entering the value M, the user initiates a multiplication function; the two values from the input map are multiplied and the result is displayed in a second window:

```

Map to Demonstrate Windows with *COM

                                CALCULATOR

                                Enter values you wish to calculate

                                Value 1: 12__
                                Value 2: 12__

+-Total of Add--+
!                 !
! Value 1 +      !
! Value 2 =      !
!                 !
!                24 !
!                 !
+-----+
!                 !
! Value 1 x      !
! Value 2 =      !
!                 !
!                144 !
!                 !
+-----+

Next line is input field (*COM) for input outside the window:
M

```

Positioning the Cursor to *COM - the %T* Terminal Command

Normally, when a window is active and the window contains no input fields (AD=M or AD=A), the cursor is placed in the top left corner of the window.

With the terminal command %T*, you can position the cursor to a *COM system variable outside the window when the active window contains no input fields.

By using %T* again, you can switch back to standard cursor placement.

Example:

```

...
INPUT USING MAP 'WINDOW'
*
COMPUTE #SUM3 = #VALUE1 + #VALUE2
*
SET CONTROL 'T*'
SET WINDOW 'EMP'
INPUT (AD=O) / 'Value 1 +' /
              'Value 2 =' //
              ' ' #SUM3
...

```

Copying Data from a Screen

Below is information on:

- Terminal Commands %CS and %CC
- Selecting a Line from Report Output for Further Processing

Terminal Commands %CS and %CC

With these terminal commands, you can copy parts of a screen into the Natural stack (%CS) or into the system variable *COM (%CC). The protected data from a specific screen line are copied field by field.

The full options of these terminal commands are described in the *Terminal Commands* documentation.

Once copied to the stack or *COM, the data are available for further processing. Using these commands, you can make user-friendly interfaces as in the example below.

Selecting a Line from Report Output for Further Processing

In the following example, the program COM1 lists all employee names from Abellan to Alestia.

Program COM1:

```
DEFINE DATA LOCAL
1 EMP VIEW OF EMPLOYEES
  2 NAME(A20)
  2 MIDDLE-NAME (A20)
  2 PERSONNEL-ID (A8)
END-DEFINE
*
READ EMP BY NAME STARTING FROM 'ABELLAN' THRU 'ALESTIA'
  DISPLAY NAME
END-READ
FETCH 'COM2'
END
```

Output of Program COM1:

```
Page      1                               2006-08-12  09:41:21
      NAME
-----
ABELLAN
ACHIESON
ADAM
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
AECKERLE
AFANASSIEV
AFANASSIEV
AHL
AKROYD
ALEMAN
ALESTIA
MORE
```

Control is now passed to the program COM2.

Program COM2:

```

DEFINE DATA LOCAL
1 EMP VIEW OF EMPLOYEES
  2 NAME(A20)
  2 MIDDLE-NAME (A20)
  2 PERSONNEL-ID (A8)
1 SELECTNAME (A20)
END-DEFINE
*
SET KEY PF5 = '%CCC'
*
INPUT NO ERASE 'SELECT FIELD WITH CURSOR AND PRESS PF5'
*
MOVE *COM TO SELECTNAME
FIND EMP WITH NAME = SELECTNAME
  DISPLAY NAME PERSONNEL-ID
END-FIND
END

```

In this program, the terminal command %CCC is assigned to PF5. The terminal command copies all protected data from the line where the cursor is positioned to the system variable *COM. This information is then available for further processing. This further processing is defined in the program lines shown in boldface.

The user can now position the cursor on the name that interests him; when he/she now presses PF5, further employee information is supplied.

```

SELECT FIELD WITH CURSOR AND PRESS PF5                                2006-08-12  09:44:25

      NAME
-----
ABELLAN
ACHIESON
ADAM <==  Cursor positioned on name for which more information is required
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
ADKINSON
AECKERLE
AFANASSIEV
AFANASSIEV
AHL
AKROYD
ALEMAN
ALESTIA

```

In this case, the personnel ID of the selected employee is displayed:

Page	1	2006-08-12	09:44:52
	NAME	PERSONNEL	
		ID	
	-----	-----	
	ADAM	50005800	

Statements REINPUT/REINPUT FULL

If you wish to return to and re-execute an INPUT statement, you use the REINPUT statement. It is generally used to display a message indicating that the data input as a result of the previous INPUT statement were invalid.

If you specify the FULL option in a REINPUT statement, the corresponding INPUT statement will be re-executed fully:

- With an ordinary REINPUT statement (without FULL option), the contents of variables that were changed between the INPUT and REINPUT statement will not be displayed; that is, all variables on the screen will show the contents they had when the INPUT statement was originally executed.
- With a REINPUT FULL statement, all changes that have been made after the initial execution of the INPUT statement will be applied to the INPUT statement when it is re-executed; that is, all variables on the screen contain the values they had when the REINPUT statement was executed.
- If you wish to position the cursor to a specified field, you can use the MARK option, and to position to a particular position within a specified field, you use the MARK POSITION option.

The example below illustrates the use of REINPUT FULL with MARK POSITION.

```

DEFINE DATA LOCAL
1 #A (A10)
1 #B (N4)
1 #C (N4)
END-DEFINE
*
INPUT (AD=M) #A #B #C
IF #A = ' '
  COMPUTE #B = #B + #C
  RESET #C
  REINPUT FULL 'Enter a value' MARK POSITION 5 IN *#A
END-IF
END

```

The user enters 3 in field #B and 3 in field #C and presses Enter.

#A	#B	3	#C	3
----	----	---	----	---

The program requires field #A to be non-blank. The REINPUT FULL statement with MARK POSITION 5 IN *#A returns the input screen; the now modified variable #B contains the value 6 (after the COMPUTE calculation has been performed). The cursor is positioned to the 5th position in field #A ready for new input.

```
Enter name of field
#A  _      #B      6 #C      0

Enter a value
```

This is the screen that would be returned by the same statement, without the FULL option. Note that the variables #B and #C have been reset to their status at the time of execution of the INPUT statement (each field contains the value 3).

```
#A  _      #B      3 #C      3
```

Object-Oriented Processing - The Natural Command Processor

The Natural Command Processor is used to define and control navigation within an application. It consists of two parts: The development part and the run-time part.

- The development part is the utility `SYSNCP`. With this utility, you define commands and the actions to be performed in response to the execution of these commands. From your definitions, `SYSNCP` generates decision tables which determine what happens when a user enters a command.
- The run-time part is the statement `PROCESS COMMAND`. This statement is used to invoke the Command Processor within a Natural program. In the statement you specify the name of the `SYSNCP` table to be used to handle the data input by a user at that point.

For further information regarding the Natural Command Processor, see *SYSNCP Utility* in the *Utilities* documentation and the statement `PROCESS COMMAND` as described in the *Statements* documentation.