USER'S MANUAL FOR THE FRANS INTERACTIVE
USER-FRIENDLY INTERFACE

AUTOMATIC SYSTEMS FOR THE PHYSICAL SCIENCES
REPORT NUMBER 15

Technical Report CSE-89-09

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September 18, 1989
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Report No. 15 of the Series: Automatic
Systems for the Physical Sciences,
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15/April/1988
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**Keywords:** User Manual, Expert Systems, User-Friendly Interfaces, Two Tier Interface, FRANS System.
I. INTRODUCTION

The role of the INTERACTIVE USER-FRIENDLY INTERFACE in the FRANS system is shown in Figure 1. It is a separate program that is intended to facilitate the construction and editing of the input decks that are processed by the USER INTERFACE of the FRANS system.

In this manual both the capabilities of the FRANS INTERACTIVE USER-FRIENDLY INTERFACE and important implementation details are presented. This manual does assume some familiarity with the operation of the FRANS systems. For those users needing more detailed information concerning the FRANS system, complete discussions may be found in [1,2]. Chapter IV of [2] contains many examples of input decks for the FRANS system.

II. INVOKING THE INTERACTIVE USER-FRIENDLY INTERFACE

Maintained versions of the FRANS system operate on the VAX 11/780 and the IBM PC/AT or clones. In this manual only the AT version will be considered.

The IBM PC/AT version has six modules that are stored in directory \FRANS\. The six modules are

CRINTERFACE - The Interactive User-Friendly Interface.
CRAMS - The first part of the FRANS system that contains USER INTERFACE, PREPROCESSOR, PREDICTOR, and COMPUTATION parts.
ACSORT - Sorts predictions so that the Redundancy Removal Algorithm [3] can be applied in POST4.
POST4 - The POSTPROCESSOR part that formats the output of the CRAMS and ACSORT modules.
Figure 1. Schematic flow chart for the FRANS system. The INTERACTIVE USER FRIENDLY INTERFACE is a separate program that can be easily used to construct the input decks that are processed by the FRANS system.
ZCLEAN - Assembles the output generated by the POST4 modules for display by the DPRINT module.

DPRINT - This part displays the output of POST4 as assembled by ZCLEAN.

The INTERACTIVE USER-FRIENDLY INTERFACE can be invoked in the following two ways.

1. Type \FRANSL or \FRANSD at the DOS prompt.
2. Type CRINTERF at the DOS prompt.

After the INTERACTIVE USER-FRIENDLY INTERFACE has been invoked, the user will be presented with a directory of all user-specified problems (i.e. FRANS input decks) and be given the options to create a new input deck (i.e. enter a new problem), edit an existing input deck (i.e. alter an existing problem), view current SYSTEM parameter values, and exit either to FRANS, if invoked by the first way, or to DOS, if invoked by the second way. Each of these options is discussed below.

III. CREATING A NEW INPUT DECK:

This main-menu option allows the user to create a new input deck (i.e. define a new problem). Once the user has selected this option, the user is prompted for a filename (1 - 8 characters, no extension is allowed). If a file by that name already exists, then an error condition is raised; otherwise, the user is presented with a secondary menu which allows the user to create the following data-sets: COMMENTS, SYSTEM, EQUATIONS, CONSTANTS, INITIAL CONCENTRATIONS, REINITIALIZE, ADDITIONS, DEFINE, DATA, SELECTOR, POSTPROCES-
SOR, and SOLVER. For a complete discussion of these data-sets, see reference [2].

The SYSTEM data-set is created by allowing the user to browse and possibly alter the value of a SYSTEM parameter. When the user chooses this option, a list of all SYSTEM parameters is displayed and the user is prompted for the name of a SYSTEM parameter. After the user selects a SYSTEM parameter, a screen is displayed which performs the following functions:

(1) informs the user of both the current and default values of the parameter
(2) contains a brief description of the parameter
(3) provides the user the opportunity to change the current parameter value.

If the user changed one or more SYSTEM parameter values, these changes are included in the SYSTEM data-set; otherwise, SYSTEM parameter default values are assumed.

All remaining data-sets (i.e. COMMENTS, EQUATIONS, CONSTANTS, INITIAL CONCENTRATIONS, REINITIALIZE, ADDITIONS, DEFINE, DATA, SELECTOR, POSTPROCESSOR, and SOLVER data-sets) are created by selecting the appropriate menu option and using a simple line editor. The use of this line editor is discussed in a following section entitled "Line Editing". After the user has finished editing the newly created input deck, the input deck is saved upon exit.

IV. EDITING AND EXISTING INPUT DECK:

This main-menu options allows the user to alter (i.e. edit) an existing input deck (i.e. a problem which has previously been
defined). After the user has selected this option, the user is prompted for the name of an existing deck (1 - 8 characters, no extension is allowed). If a file by this name does not exist, an error condition is raised; otherwise, the deck is read. After the deck is read, the user may edit any data-set. A data-set is edited in the same manner in which it is created (see "Creating A New Input Deck"). After the user has finished editing the input deck, the input deck is saved upon exit.

V. BROWSING SYSTEM PARAMETER VALUES:

This main-menu option allows the user to sequentially view both the current and the default values of all SYSTEM parameters. When the user selects this option, the current value, the default value, and a brief description of the SYSTEM parameter is displayed. The user may then elect to either continue viewing the next SYSTEM parameter, or abort.

VI. EXITING THE INTERACTIVE USER-FRIENDLY INTERFACE:

This main-menu option allows the user to exit the FRANS INTERACTIVE USER-FRIENDLY INTERFACE. If the interface was invoked with \FRANSL or \FRANSD the FRANS will be invoked next.

VII. LINE EDITING:

A simple line editor allows the user to either create or edit any one of the following data-sets: COMMENTS, EQUATIONS, CONSTANTS,
INITIAL CONCENTRATIONS, REINITIALIZE, ADDITIONS, DEFINE, DATA, SELECTOR, POSTPROCESSOR, and SOLVER. The function of each line-editor command is listed below.

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
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<tbody>
<tr>
<td>A</td>
<td>Add line to end of data-set</td>
</tr>
<tr>
<td>I</td>
<td>Insert line</td>
</tr>
<tr>
<td>E</td>
<td>Edit line</td>
</tr>
<tr>
<td>D</td>
<td>Delete line</td>
</tr>
<tr>
<td>Q</td>
<td>Exit</td>
</tr>
<tr>
<td>+</td>
<td>Scroll down</td>
</tr>
<tr>
<td>-</td>
<td>Scroll up</td>
</tr>
</tbody>
</table>

When the user selects the E editor command, the user is prompted for the number of the line he or she wishes to edit. The selected line is then displayed for the user, who may then use the arrow keys to position the cursor and simply retype the line as desired. For example, if the user wishes to merely add text to the end of the line, the user must use the right arrow key to position the cursor at the end of the line and then simply type the text to be added.

VIII. IMPLEMENTATION DETAILS:

This section contains discussions of the environment of the INTERACTIVE USER-FRIENDLY INTERFACE, major data-structures used by the interface, files maintained by the interface, and instructions for "building" the interface from source code.

VIII.1 Interface Environment:

Hardware requirements: IBM PC compatible, 640K

Software requirements: MS-DOS operating system, ANSI driver
The INTERACTIVE USER-FRIENDLY INTERFACE is coded in the C language. The interface is code-level compatible with both Borland’s Turbo C and MicroSoft’s C version 5.0. Because the interface is coded in a very portable fashion, it should be able to be easily ported to the VAX/VMS environment. All screen-management functions were implemented using ANSI standard escape sequences to ensure a high degree of portability.

VIII.2 Major Data Structures:

The FRANS INTERACTIVE USER-FRIENDLY INTERFACE maintains three major types of data-structures: text, system parameter, and data-set.

The text data-structure is simply a linearly ordered array of 80-byte records, which contains the descriptions of all SYSTEM parameters. These descriptions are used in both browsing and changing the values of SYSTEM parameters. The content of this data-structure is read from the file "TEXT" when the interface is invoked. Should a system administrator decide that a description should be changed, only the file "TEXT" need be edited -- the interface need not be rebuilt (i.e. recompiled).

The system parameter data-structure contains the name, the current value, and the default value of each SYSTEM parameter. Additionally, a "text pointer" is included which "points" to the beginning of the description (in the "text" data-structure) corresponding to the given parameter.
The data-set data-structure is simply a linearly ordered array of 80-byte records. The number of these 80-byte records is limited to no more than 64K (i.e. the Intel 8088/86 segment size).

**VIII.3 Files Maintained By The Interface:**

The FRANS INTERACTIVE USER-FRIENDLY INTERFACE maintains the following files:

<table>
<thead>
<tr>
<th>File</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEXT</td>
<td>Descriptions of SYSTEM parameters</td>
</tr>
<tr>
<td>DEFAULTS</td>
<td>Default values of SYSTEM parameters</td>
</tr>
<tr>
<td>*.INT</td>
<td>Internal representation of input deck</td>
</tr>
<tr>
<td>*.DAT</td>
<td>FRANS system representation of input deck</td>
</tr>
</tbody>
</table>

Note: the filename "*.INT" denotes all files with an extension of "INT"

**VIII.4 Building The Interface From Source Code:**

Should the FRANS user-interface need be rebuilt (i.e. recompiled), the following two-step procedure can be used:

1. Compile files MODUL1.C and MODUL2.C using either the Borland or MicroSoft C compiler. Make sure that the include file GRAPH.C is located in the current directory. The "huge" memory module should be used.

2. Link files MODUL1.OBJ and MODUL2.OBJ using the standard MS-DOS linker. DO NOT USE the Borland linker. During development of the interface, the Borland linker was discovered to have errors concerning the amount of static data allowed per module. The resulting .EXE file may be renamed to CFINT.EXE, if desired.
IX. REFERENCE:

