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**CHAPTER 2**

**BEGINNING WORK WITH INTAC**

# BEGINNING WORK WITH INTAC

## OVERVIEW

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To begin working with INTAC you must be able to log on and off the system. You should also be familiar with the use of the system's text editor and with procedures for naming, deleting, listing, and printing files. (See the Ross Systems EDITOR Manual and the appropriate Ross Systems users guide for the 11/70 or 11/780.)

## ENTERING INTAC

To start INTAC, type (at the system level) the command INT followed by a carriage return. The system responds with the Ross Systems INTAC banner and prompts for a command, as shown below:

```
Ready

INT
  TM
INTAC
Interactive Data Management and Retrieval - VERSION: APR-82
(c) COPYRIGHT 1979 BY ROSS SYSTEMS, INC.

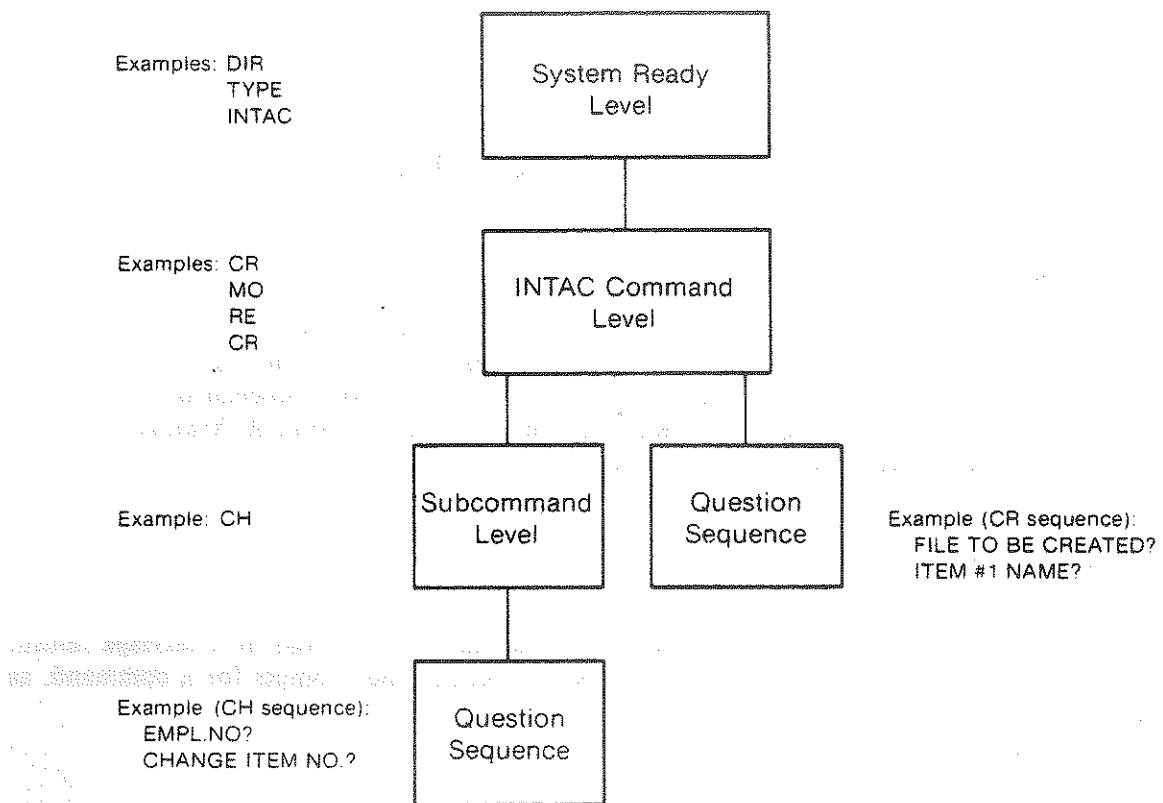
COMMAND?
```

You are now at the INTAC command level.

## INPUT TO INTAC

To enter an INTAC facility, respond to the COMMAND? prompt by entering the two letter abbreviation for a major INTAC command and a carriage return. The system prompts for the filename and for any further needed information or for subcommands.

The following diagram illustrates the relationships of the system level, the INTAC command level at which you enter a facility, and auxiliary levels.



## EXAMPLE OF PROMPTS

In the following example, the abbreviation ED is entered for the EDIT command. INTAC echoes the instruction and requests the name of the file to be edited. The user enters the filename and INTAC prompts for an EDIT subcommand. (See Chapter 3 for a complete description of the filename.)

```

COMMAND? ED
EDIT AN INTAC FILE
NAME OF FILE? ASSET
EDIT COMMAND?
  
```

## MAJOR INTAC COMMANDS

The following table lists the facility name, command, and function. These facilities, together with their subcommands and question sequences, are described in detail beginning in Chapter 3.

FACILITY	COMMAND	FUNCTION
CREATE	CR	creates an INTAC file definition
LIST	LI	lists an INTAC file definition
MODIFY	MO	modifies an INTAC file definition
REBUILD	RE	rebuilds an INTAC file
EDIT	ED	enters, changes, and shows data, as well as deletes data from an INTAC file
INQUIRE	IN	produces ad hoc reports from as many as three INTAC files
GENERATE	GE	generates a report program which produces complex reports from up to three INTAC files
TRANSACTION	TR	produces a transaction program which updates one or more INTAC files

## SPACES

Spaces are used between a command and its elements and between the elements of a command. Extra spaces between elements (except in quoted strings) have no significance and are ignored by INTAC.

For example, the following input lines are equivalent:

```
SELECT?  MANAGER = "JOHNSON"
SELECT? MANAGER="JOHNSON"
```

## CORRECTING MISTAKES IN AN INPUT LINE

The RUBOUT, ERASE, or DEL terminal key deletes the last character typed on a line. Continuing to press one of these keys causes preceding characters to be deleted. On some terminals, deleted characters are echoed between backslashes. For additional information, refer to your installation's system users guide.

## ERROR MESSAGES

Messages preceded by a question mark (?) or percent sign (%) are system level messages and indicate that the requested operation cannot be completed for some reason. After the message is displayed, INTAC may repeat the original prompt.

In the example below, the user attempts to edit a file that does not exist. INTAC displays an error message and prompts again for the file to be edited:

```
COMMAND? ED
EDIT AN INTAC FILE
NAME OF FILE? ASET
?Can't find file or account OPENING ASET.INT
NAME OF FILE?
```

## OBTAINING HELP

Typing the HELP command or a question mark (?) displays an explanation of the valid responses to a question or to a command prompt. The original question or prompt is repeated after the explanation prints.

## RETURNING TO A PREVIOUS QUESTION

The backslash (\) causes INTAC to cancel the current action and return to the previous question. This feature is helpful, for instance, when you are adding records to a file with the EDIT command and wish to correct a previous entry, as shown below:

```
COMMAND? ED
EDIT AN INTAC FILE
NAME OF FILE? ASSET
EDIT COMMAND? AD
DEPT.NO? 1234
ASSET.NO? \
DEPT.NO?
```

This section:

- describes the basic elements of INTAC, including the use of indexes. For purposes of clarity, the discussion of indexes is presented last.
- introduces a sample application
- lists step by step the design decisions appropriate to the sample application.

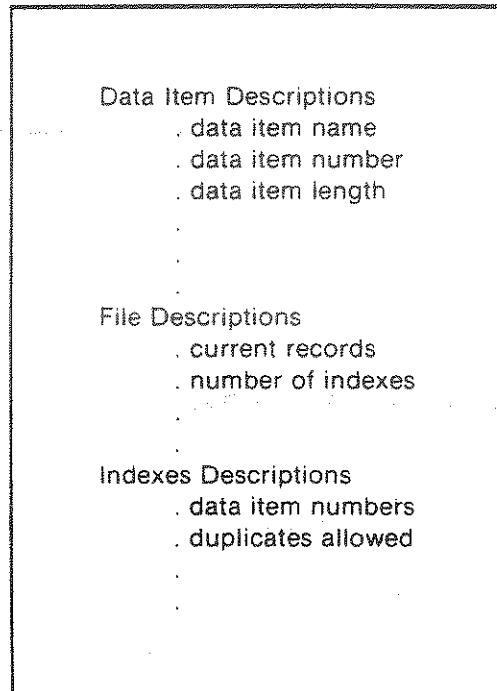
## BASIC ELEMENTS OF INTAC

### THE FILE DEFINITION

The first part of an INTAC file is the file definition. It is defined when the file is created with the CREATE command and is displayed on the user's terminal with the LIST command. These commands are explained in Chapters 3 and 4.

The file definition is the database structure that describes the file, the indexes, and the data records of a file, as shown in the next figure:

File Definition



The file definition includes such information as the number, name, type, and length of each data item in a record; the number of records and indexes in the file; and the names and numbers of the data items that comprise each index. It should not be confused with the data records of a file. The file definition is the framework that organizes and defines the data; it does not contain the actual data values.

## RETURNING TO COMMAND LEVEL

To return to INTAC command level from within a question sequence, type backslashes followed by carriage returns in response to prompts until the command level is reached.

In the following example, the user exits from a question sequence within the EDIT command:

```
COMMAND? ED
EDIT AN INTAC FILE
NAME OF FILE? ASSET
EDIT COMMAND? AD
DEPT.NO? 1234
ASSET.NO? \
DEPT.NO? \
```

```
EDIT COMMAND? \
COMMAND? \
```

Ready

## EXITING FROM INTAC

To return to the system Ready level from the INTAC command level, press carriage return in response to the COMMAND? prompt:

```
COMMAND?
END OF INTAC
```

Ready

## DESIGNING A DATABASE

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Most of the power and flexibility of the INTAC features described in Chapter 1 are made possible by the way data is stored and accessed within the database.

An INTAC database consists of one or more INTAC files. Each file is described in terms of three elements:

- the file definition
- indexes
- data records

As shown in the next drawing, you enter INTAC commands through the terminal to manipulate data that is stored in the files. Each file is independent, but can be related to another file with an index.

## THE DATA RECORDS

The third part of an INTAC file consists of the actual data records. Data is first added to a file with the EDIT command, after the file definition has been created. Data may also be added using INTAC's advanced transaction processing facility (see chapter 11, TR).

An INTAC file may contain an unlimited no. records. (The maximum number of blocks is 2<sup>32</sup>) The records are of a fixed length and have a single format. They are accessible by logical record number or by one or more indexes, as discussed in the next subsection.

Each record may contain a maximum of 97 user-defined data items. A data item is a variable, such as department number, asset code, or street address.

Three data items in every record are maintained automatically by the system. The system-defined RECORD NUMBER is always data item 0. The DATE OF LAST EDIT and the DELETE FLAG are always the last two data items in every record.

For example, if the user creates a file with six data items per record, INTAC assigns the items numbers 1 through 6. Data items 0, 7, and 8 are defined by INTAC, as shown below.

DATA RECORDS

Data Item 0	Data Item 1	Data Item 2	Data Item 3	Data Item 4	Data Item 5	Data Item 6	Data Item 7	Data Item 8
Record #1							Date of Last Edit	Delete Flag
Record #2							Date of Last Edit	Delete Flag
Record #3							Date of Last Edit	Delete Flag
Record #4	↓	↓	↓	↓	↓	↓	Date of Last Edit	Delete Flag

These system-defined items may be accessed in the same manner as user defined items. The values of the RECORD NUMBER and the DATE OF LAST EDIT may never be changed. The value of the DELETE FLAG may be changed, as discussed in Chapter 7, the ED Command.



## THE INDEXES

The second part of an INTAC file contains the indexes. The indexes are first specified when the file definition is created with the CREATE command. If you understand the purpose and use of INTAC indexes, you will be better able to take advantage of the system's capabilities.

### DEFINITION OF INDEX

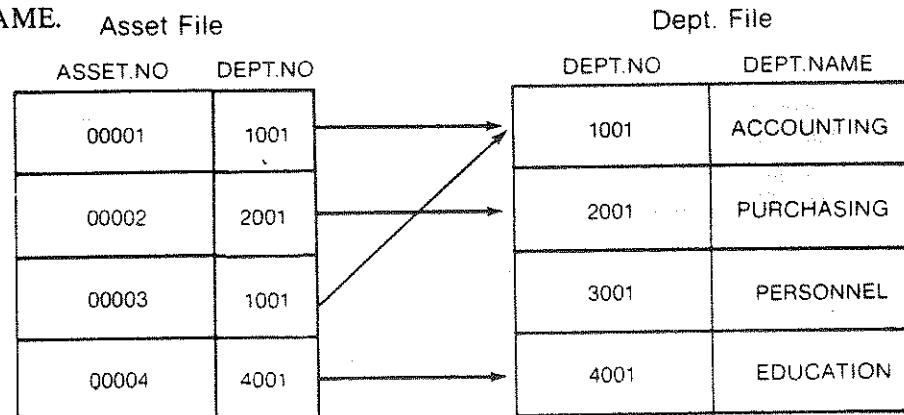
Within a single file, an index is a means to provide rapid access to data. Another use of an index is to relate one file to another, using common data items.

### EXAMPLE

Consider the following two simplified cases. In the first instance, data is stored sequentially in one large file. Notice that values for the data items DEPT.NO and DEPT.NAME are stored in each record and that several values are repeated.

Asset File			
	ASSET.NO	DEPT.NO	DEPT.NAME
Record 1	00001	1001	ACCOUNTING
Record 2	00002	2001	PURCHASING
Record 3	00003	1001	ACCOUNTING
Record 4	00004	4001	EDUCATION
Record 5	00005	3001	PERSONNEL
Record 6	00006	3001	PERSONNEL

In the next example, the same information is stored in two files, an asset file and a department file. The division of the data into separate files allows the stored information to be accessed in several ways, providing greater reporting and updating flexibility and eliminating the redundant storage required for DEPT.NAME.



An index is established to point to the appropriate values in the department file. By establishing an index on the department file, for DEPT.NO, associated values such as DEPT.NAME need be stored only one time. When the asset file needs data associated with DEPT.NO, it uses the index on the department file to find and retrieve appropriate records.

### PRIMARY AND SECONDARY INDEXES

An INTAC file can have a maximum of five indexes: one primary index, called INDEX 1, and four secondary indexes, designated INDEX2, INDEX3, INDEX4, and INDEX5. Each index may be composed of as many as six data items.

The primary index within each record must be comprised of unique values. During editing, INTAC rejects records containing duplicate index values.

Some files do not have any user-defined indexes. These files are accessed sequentially by the logical record number, previously defined as data item 0.

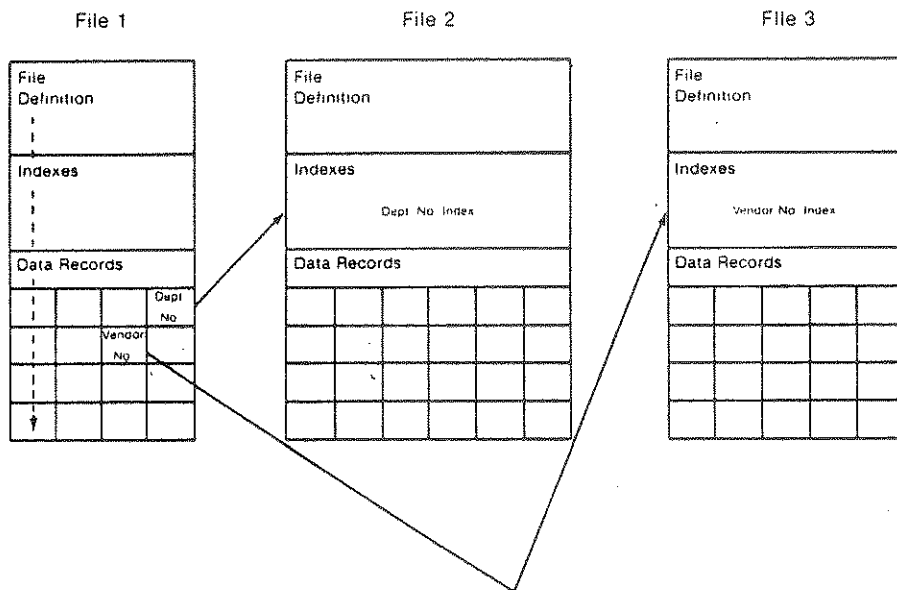
### PRACTICAL USES OF INDEXES

This section describes the three uses of an INTAC index and the considerations for creating an index. When designing an INTAC database, you should create an index to meet any of the following objectives.

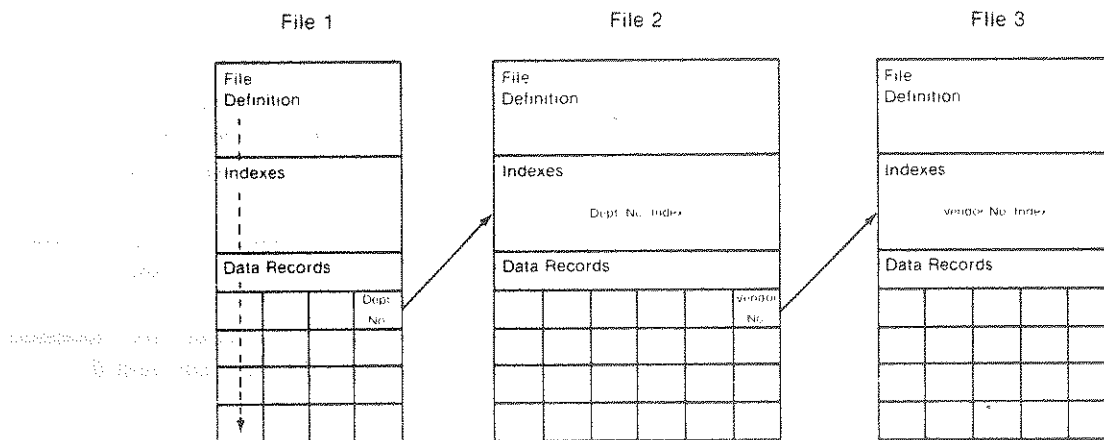
#### 1. To Link Files for Reporting and Updating

If you want to report from one file and look up values in a second and third file, use indexes to link the three files. Create the indexes on the secondary files and not necessarily on the primary file. INTAC can access the data in two ways.

The following drawing indicates that INTAC reads the primary file sequentially and uses the indexes from files 2 and 3 to access the appropriate records.



In next drawing, files 1 and 2 are linked by one index while files 2 and 3 are linked by a different index. File 1 is not directly related to file 3. In this case, INTAC reads the primary file sequentially and accesses the index in file 2. File 2 then uses the index in file 3 to retrieve the appropriate records.



## 2. To Limit the Range of an Operation

Consider the case where an international corporation maintains 10,000 records on depreciable assets located around the world. Financial analysts want to examine records describing office furnishings in the Far East region. If the file were accessed sequentially, without an index, all the records in the file would have to be read to extract the required information. To reduce the lookup field, an index is created for the data item REGION in the primary file, as shown below.

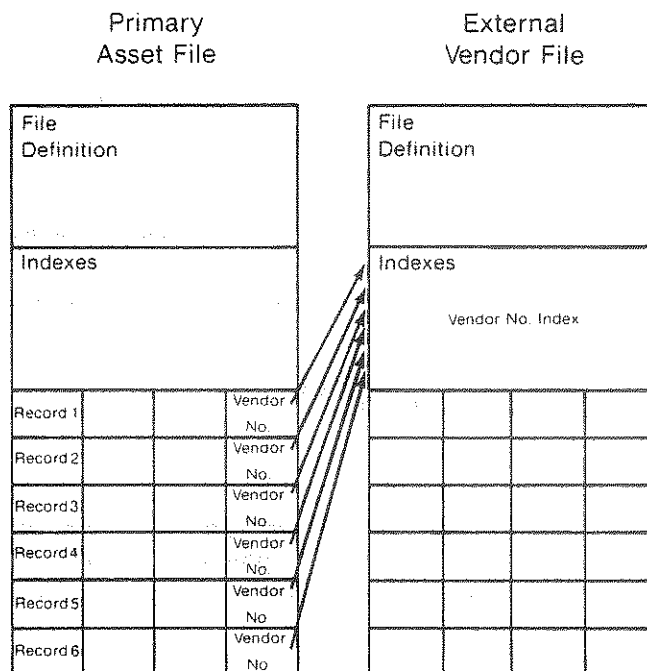
Asset File

File Definition											
Indexes											
Region index											
<table border="1"> <tr> <td>FE</td> <td>1</td> <td>FE</td> <td>2</td> <td>FE</td> <td>4</td> <td>FE</td> <td>6</td> <td>...</td> </tr> </table>			FE	1	FE	2	FE	4	FE	6	...
FE	1	FE	2	FE	4	FE	6	...			
RECORD No.	ASSET NO	REGION									
1	10401	FE									
2	10402	FE									
3	10403	US									
4	10404	FE									
5	10405	EU									
6	10406	FE									

Now, INTAC can retrieve records for a specified region directly, without reading every record in the database.

### 3. To Create an External Table for Validation Purposes

Assume a company maintains two files, an asset file and a vendor file. Each file contains the data item **VENDOR.NO**, a two digit number identifying the vendor from whom the asset was purchased. As new records are added to the primary asset file, the **VENDOR.NO** is verified against the same field in the external vendor file. To accomplish this, **VENDOR.NO** is established as an index on the referenced file. The relationship between the two files is characterized below:



Note that before newly entered records in a file can be validated, a file definition and data must exist for the external file.

### MULTIPLE INDEXES

Outlined above are three distinct reasons for using indexes. In each case, an index is established for only one purpose. However, in some applications, several criteria for establishing an index may exist. For example, you may want to limit the range of an operation and validate values against an external file. In this case, you can create several indexes for varying purposes.

## DESIGN DECISIONS

The first step in creating an INTAC database is to describe, from your own point of view, the reports that are needed and the data that is necessary to produce the reports. This description usually takes the form of answers to the following questions:

1. What reports are needed and how should each be laid out?
2. What data items are needed for the reports?
3. How should these data items be organized into files?
4. How many characters or digits are needed to represent each data item?
5. If the data item is a numeric field, what is the expected range of the field?
6. How will the data item be validated, if at all?
7. Based on the answers to questions 1,2, and 6, what indexes are needed.
8. If the files are to be related, what data items will each index be composed of?

## SAMPLE APPLICATION

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Currently, Tri-City Company maintains records on its depreciable assets with a manual system. It has found this approach time-consuming and prone to errors. The goal of the company's financial planners is to convert the system to a computerized INTAC database to improve accuracy, increase reporting and updating flexibility, and to gain access to timely information on an impromptu basis.

Discussions with internal accounting personnel confirm that four data files are available: an asset file, a department file, a vendor file, and an order file. The planners believe that the first step toward tracking the company's assets is to produce a listing of assets by department.