MEDICAL INFORMATION MANAGEMENT SYSTEM (MIMS): AN AUTOMATED HOSPITAL INFORMATION SYSTEM


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ABSTRACT

This report describes an automated hospital information system that handles all data related to patient-care activities. The report is designed to serve as a manual for potential users—nontechnical medical personnel who will use the system. Examples of the system's operation, commentary on the examples, and a complete listing of the system program are included.
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MEDICAL INFORMATION MANAGEMENT SYSTEM (MIMS): AN AUTOMATED HOSPITAL INFORMATION SYSTEM

by

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BACKGROUND AND FUNCTION OF MIMS

The capability of hospitals to maintain medical records is vital to the improvement of medical services for the average American citizen. These records are essential to the diagnosis and treatment of patients and provide an essential base for comparative analysis for medical research and hospital administration.

The Medical Information Management System (MIMS) is a real-time hospital information system with teletype input. Its function is to handle all aspects of data related to patient care. Its prime benefits are (1) the ability to recall the record of a specific patient (or patients) in a matter of seconds, (2) the ability to search for specific types of data among patients' records, and (3) the ability to do medical research with a rich and readily available data base.

A computer program initially was developed at NASA/Houston to monitor the health status of astronauts and subsequently was continued by Dr. Tate Minckler at the Presbyterian Hospital in Denver. However, Dr. Minckler's program was not fully operational and lacked the documentation required by potential users. This past summer\(^2\), during the NASA/Morgan Workshop program conducted at GSFC, Prof. Ronald Schwarz of Federal City College updated the computer program so that it can be used by anyone and developed a users' manual containing complete, easy-to-follow instructions for operating the system. The MIMS package on which this users' guide is based is a redesigned and improved

\(^1\)Currently with Computing and Software, Inc.

\(^2\)June 15 through August 30, 1971.
model of the previous work of Dr. Minckler; also, the cost of running MIMS on a day-in, day-out basis (one of the problems with the earlier system) has been reduced. MIMS is written in FORTRAN in a version developed by United Computing Systems, Inc. In its present form, MIMS can be run only on a CDC 6400 computer because of the size of the internal word structure.

The package is a generalized information storage and retrieval system that enables the user to accomplish four basic functions:

- Definition of file structure to accommodate individual needs.
- Data entry.
- Data retrieval.
- Data revision and file maintenance.

ORGANIZATION OF MIMS

The MIMS package consists of six programs, each of which operates independently but all of which are connected by references to common file names in the system. The segments are—

HEADER: creates categories of data.

STORE: stores data under the categories from HEADER.

RETREVE: recalls desired configurations of data.

UPDATE: alters or deletes specific data items.

SORTER: rearranges related (data) records.

MERGE: combines two sets of records.

The discussion of each of the six program units and the related examples should clarify for the potential user the way in which MIMS is used as an automated hospital information system.

The system is user oriented. No technical training is needed to interact with the system, except the ability to read and understand this guide. All program segments are conversational, with the user responding to questions generated by the system.
This guide includes examples for almost every option available in MIMS. Explanation is provided in the text material. System commands—those key words or phrases that control activities such as the activation and deactivation of the programs—are illustrated, with user responses underlined. In addition, a complete listing of the program is provided in the appendix.

DEFINITIONS

Several basic terms are used throughout the discussion. For easy reference, we define them here:

- **Headings**: labels or categories of data which are created during the HEADER program.
- **Header file**: a group of headings corresponding to a particular data record.
- **Header-file name**: an acronym by which a header file is known, formed from the first three letters of the department name and the first four letters of the record.
- **Data field**: any group of letters, words, or numbers (or combinations of the three) that is a response to a heading.
- **Data record**: a logically related set of heading-data pairs for an arbitrary header file.
- **Data file**: a group of data records.
- **Data-file name**: the designation by which a set of data records is known; it is given during the STORE program.
- **ID items**: the first four data fields in a record, namely SOC SEC #, DEPT, RECORD, and DATE.

MIMS: THE SIX PROGRAM UNITS

**HEADER Program**

The HEADER program creates a file of headings or labels for data that will subsequently be placed under these headings. Headings may consist of from one to 24 (a theoretical maximum) alphabetic and/or numeric characters. As many as 160 headings are possible under a single file name.
To call the HEADER segment, the user types EXEC, OLD, HEADER\(^1\) (see Figure 1). After the teletype responds with READY, the user types RNH. This command initiates the running of the program.

To illustrate an unusual situation, let us assume that by coincidence a second user requests ADMINIT as the header file name for his set of headings after someone else has already used it. At the conclusion of this input, the second user will be informed that he can either place his headings under a new file name or replace the first header file with his own by typing an asterisk (Figure 2). In the former case, the user must be careful, in the future, to spell the name of the department and record in such a way that the creation of the seven-letter header file name matches the new one he has suggested.

If Instructions are Needed. New users may want to reply YES (or just Y) to the question DO YOU NEED OPERATING INSTRUCTIONS? In this case, a set of instructions on how to use HEADER is printed. The stop skip code (S) enables the user to skip selected headings when entering data later. (Figure 1).

Naming the Header File. A group of headings associated with a set of data must have a name by which the group can be identified. The name of a header file is formed from the first three letters of the department name and the first four letters of the record. Fewer letters are permissible as long as there is at least one letter from each. In the sample, ADMINIT is the name of the header file. It was created from ADMitting department and from an INITial visit record (Figure 1).

Level Codes and Headings. Each heading consists of a level code and a heading name. The level code, a number from zero to nine, specifies the degree of indentation of the heading. A colon must follow each heading for which a response is anticipated. Headings used for organizational purposes only, such as PULSE in the header file CARPULS (Figure 3), will not need a colon. [Caution: Because of spacing considerations, the higher the level code (that is, the greater the indentation of a heading) the fewer the characters available for that heading name.]

The user types an asterisk to indicate that all level codes and headings for a particular file have been supplied.

Four ID Items. The first four items in a file are used to identify individual records. These four entries uniquely identify the data associated with them.

\(^1\)For illustration purposes only, all underlined items in the figures indicate user responses. Nonunderlined items are machine generated.
This program will build a file of level codes and headings. Do you need operating instructions? Yes, ok, here's how it's done. When the first question mark appears, enter a level code (0-9). When the next question mark appears, enter the heading (from 1-24 characters) that corresponds to your level code. For headings that will normally have data following them, enter a colon after the heading. For blind headings (those which will not have data following them) do not enter the colon.

Repeat this process until you have no more headings—then enter an asterisk to terminate the program. If you wish to enter a stop skip code, enter an "S" instead of a level code. Then enter the level code and heading as usual following the next two question marks.

Enter 3 letters of dept., name and 4 letters of record ---enter fewer if 7 are not available? ADMINIT

BEGIN DATA INPUT.

? 0
? SOC SEC #
? 0
? DEPT:
? 0
? RECORD:
? 0
? DATE:
? 1
? NAME:
? 1
? AGE:
? 1
? SEX:
? 1
? ADDRESS:
? 2
? PHONE:
? 1
? COMMENTS:
? 2
"ADMINIT" HAS BEEN SAVED AS HEADER FILE.
END.

0.193 / 0.964 / 5

Figure 1. ADMINIT Created as Header File
EXEC, OLD, HEADER

READY.

PROGRAM: HEADER  DATE: 08/05/71  TIME: 15.12.12

THIS PROGRAM WILL BUILD A FILE OF LEVEL CODES AND HEADINGS. DO YOU NEED OPERATING INSTRUCTIONS? NO

ENTER 3 LETTERS OF DEPT. NAME AND 4 LETTERS OF RECORD --- ENTER FEWER IF 7 ARE NOT AVAILABLE? ADMINIT

BEGIN DATA INPUT.

? 0
? SOC SEC #
? 0
? DEPT:
? 0
? RECORD:
? 0
? DATE:
? 1
? NAME:
? 1
? EKG:
? 2
? HT:
? 2
? WT:
? 1
? HEART ATTACKS
? 2
? HOW MANY:
? 2
? DATE MOST RECENT:
? 2
? AVG DURATION:
? 2
? SEVERITY:
? 1
? PRESENT CONDITION:
? 2

FILE ALREADY PERMANENT. ENTER NEW FILENAME OR ENTER AN ASTERISK TO REPLACE CURRENT PERMANENT FILE? CARRHIST
"CARRHIST" HAS BEEN SAVED AS HEADER FILE.

END.

0.238 / 1.189 / 10

Figure 2. ADMINIT Has Been Created (Figure 1) and Is Already a Permanent Header File, so CARRHIST Is Used as the Header File.
EXEC, OLD, HEADER

READY.

RNH

PROGRAM: HEADER   DATE: 08/05/71   TIME: 15.02.11

THIS PROGRAM WILL BUILD A FILE OF LEVEL CODES AND
HEADINGS. DO YOU NEED OPERATING INSTRUCTIONS? N

ENTER 3 LETTERS OF DEPT. NAME AND 4 LETTERS OF RECORD
--- ENTER FEWER IF 7 ARE NOT AVAILABLE? CARPULS

BEGIN DATA INPUT.

? 0
 ? SOC SEC #:
? 0
 ? DEPT:
? 0
 ? RECORD:
? 0
 ? DATE:
? 1
 ? NAME:
? 1
 ? PULSE
? 2
 ? SITTING:
? 2
 ? STANDING:
? 2
 ? AFTER EXERCISE
? 3
 ? IMMED AFTER:
? 3
 ? TWO MINUTES AFTER:
? *
"CARPULS" HAS BEEN SAVED AS HEADER FILE.
END.

0.175 / 0.874 / 5

Figure 3. CARPULS Created as Header File

It is suggested, but not mandatory, that the first four items in all header files
be SOC SEC #, DEPT, RECORD, and DATE, all with level-code zero.

Nonrepetitive Use of HEADER. Once a file of headings has been created,
HEADER need no longer be called for that file. The name of a particular
header file, however, will be used regularly by other program segments to
call up that file of headings. The user, therefore, must remember the precise
spelling of the department and record under consideration so that the program can accurately recreate the appropriate header-file name and find the corresponding header file.

**RESTART Option in HEADER.** If while entering level codes and headings the user wishes to start over, he simply types RESTART, and the program will begin again without aborting.

**STORE Program**

The **STORE** program enables the user to enter data under a specific header file requested by the user. The program recreates the header-file name from the DEPT and RECORD names supplied by the user and uses it to find the header file associated with it.

To call **STORE**, the user types EXEC, OLD, STORE (or just OLD, STORE if he has run any other program directly before STORE). In response to READY, he types RNH.

**Naming the Data File.** The name of a data file is a string of one to seven characters given to a specific set of data records. Data file names already in use will ordinarily not be used. In the usual case, one wishes to add new records to an existing data file. One could call the set of new records a name such as NEWDATA. He could sort NEWDATA, if necessary, using SORTER and could then call MERGE to merge NEWDATA into the appropriate existing data file having such records. This procedure could be performed regularly, perhaps daily, as a standard updating technique. The file NEWDATA could be cleared by the user at the conclusion of MERGE by typing UNSAVE, NEWDATA. Thus the name NEWDATA would be available for repeated use in this context.

**Recalling the Proper Header File.** The user's responses to DEPT? and RECORD? enable **STORE** to locate the appropriate header file. If misspelling of the department and/or record leads to the formation of a nonexistent header-file name, the user is so informed and is asked to enter valid data.

**Data Entry: Proper Format.** Each data entry must be followed by an asterisk. For data items requiring more than one line, one hits the carriage return and waits until the end of the entire data item to affix the asterisk. Numerical data, except SOC SEC #, must be enclosed in parentheses to accommodate the ranging function of RETREVE (see the RETREVE program section).

There are other musts for entering data. The date must be in DAY MONTH YR* form where DAY and YR are two-digit numbers and MONTH is the first three letters of the month. (e.g., DATE ? 08 JUL 71*). Be sure to leave one
space between DAY and MONTH and one between MONTH and YR. Also, the names must be in the format LAST, FIRST, MIDDLE*, with a space between the comma and the first name and between the first and middle names. Initials may be used for both the first and middle names.

If Another Patient. When a new patient's data are being processed, the user replies YES (or Y), and the program returns to the first header entry of the header file being used (Figure 4).

If No New Patient But Another Record. For a new record for the same patient, the user supplies the record, and a new header-file name is created. The corresponding header file is then used to question the user, who enters data under the new record within the same department (Figure 5).

If No More Patients and Records. The user is informed that his data file has been saved under the data file name given when he indicates he has no more patients and records to enter (Figure 4). If, however, his name was already used, he can either supply a new name for his file or replace the other data file with his by entering an asterisk.

End of Program. At the end of the program, a message indicating that the data file has been saved under the proper name is printed.

RESTART Option in STORE. Typing RESTART at any point during data entry commands the program to return to the beginning of the program.

RETREVE Program

The ability to recall information when it is wanted is the heart of any information storage and retrieval system. The RETREVE program (the seven-letter limitation precludes using "RETRIEVE") enables the user to define a search on very specific or very general information. To call the program, one types EXEC, OLD, RETREVE, and responds with RNH, M=13500 after READY appears.

ID Items. Retrieval is conversational, consisting of machine interrogation and user response. In all retrievals, the user answers seven questions. The more specific the responses to the ID items, the more efficient and less costly the search. For instance, a search on a specific SOC SEC # yields all records for that person. The program does not have to "look at" the records of persons whose SOC SEC # differs from the one in question; it has only to compare the SOC SEC #s and pass on if no match is found.

CONDITION Question. If the search is defined by CONDITION (e.g., AGE: 70-75*), one might respond ALL* to the four ID items. Boolean connectors provide great
EXEC, OLD, STORE
READY.
RUN

PROGRAM: STORE DATE: 08/05/71 TIME: 15.17.48

IF AT ANY TIME YOU WISH TO START OVER, ENTER "RESTART".

ENTER NAME YOU WISH TO CALL THIS DATA FILE: ? ACTIVE

DEPT. ? ADMITTING
RECORD ? INITIAL

THIS PROGRAM WILL USE ADMINIT AS HEADER FILE.

BEGIN DATA INPUT.

SOC SEC # ? 111-11-1111*
DEPT ADMITTING
RECORD INITIAL
DATE ? 05 AUG 71*
NAME ? CABLE, JAMES A*
AGE ? (35) YRS*
SEX M*
ADDRESS ? 155 BRIDGE RD, ST. LOUIS*
PHONE ? 222-4444*
COMMENTS ? NEW PATIENT*

ANOTHER PATIENT ? Y
SOC SEC # ? 222-22-2222*
DEPT ADMITTING
RECORD INITIAL
DATE ? 05 AUG 71*
NAME ? ALICE A*
AGE ? (22) YRS*
SEX F*
ADDRESS ? RT 6, ROARING SPRINGS, PA*
PHONE ? 565-5656*
COMMENTS ? HAS NO INSURANCE*

ANOTHER PATIENT ? Y
SOC SEC # ? 999-99-9999*
DEPT ADMITTING
RECORD INITIAL
DATE ? 05 AUG 71*
NAME ? SABLE, ALEX V*
AGE ? (57) YRS*
SEX M*
ADDRESS ? 1015 VINE ST*
PHONE ? 987-6543*
COMMENTS ? EMERGENCY ROOM CASE*

Figure 4. ACTIVE Created as Data File
flexibility in specifying the CONDITION of the search. Parentheses can also be used to define a logical command. Figure 6 should give a feeling for the possibilities in defining a search.

**ACTION Options.** The response to ACTION defines the format of the data to be retrieved. The six options available are LIST, COUNT, TABULATE, TAB-SD, CROSSTAB, and COPY.

- **LIST** generates a copy of the data requested.
- **COUNT** gives the number of records fitting a given description.
- **TABULATE** generates the data asked for in WHAT according to the attributes in CONDITION. It also provides a count of all such cases.
- **TAB-SD** is identified with TABULATE but in addition generates statistical data such as mean, standard deviation, standard error, minimum data value, and maximum data value, as well as one and two standard-deviation confidence intervals.
- **CROSSTAB** generates a grid of data.

The COPY, TABULATE, TAB-SD, and CROSSTAB options enable the user to specify information he wants to file under a new data file name. Ordinarily after information is retrieved and displayed for the user, it is not saved; it must be retrieved again if needed at a later date.
EXEC, OLD, STORE

READY.

RNM

PROGRAM: STORE  DATE: 08/05/71  TIME: 15:28:28

IF AT ANY TIME YOU WISH TO START OVER, ENTER "RESTART".

ENTER NAME YOU WISH TO CALL THIS DATA FILE: ? NEWDATA

DEPT. ? CARDIOLOGY
RECORD  ? HISTORY

THIS PROGRAM WILL USE CARHIST AS HEADER FILE.

BEGIN DATA INPUT.

<table>
<thead>
<tr>
<th>SOC SEC #</th>
<th>DEPT</th>
<th>RECORD</th>
<th>DATE</th>
<th>NAME</th>
<th>EKG</th>
<th>HT</th>
<th>WT</th>
<th>HEART ATTACKS</th>
<th>HOW MANY</th>
<th>DATE MOST RECENT</th>
<th>AVG DURATION</th>
<th>SEVERITY</th>
<th>PRESENT CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>222-22-2222</td>
<td>CARDIOLOGY</td>
<td>HISTORY</td>
<td>05 AUG 71</td>
<td>ALICE A</td>
<td>NORMAL</td>
<td>6</td>
<td>140</td>
<td>(2)</td>
<td>22 MAR 71</td>
<td>(1) MINUTE</td>
<td>(60)</td>
<td>(140) LBS</td>
<td></td>
</tr>
<tr>
<td>999-99-9999</td>
<td>CARDIOLOGY</td>
<td>HISTORY</td>
<td>06 AUG 71</td>
<td>ALEX V</td>
<td>ERRATIC</td>
<td>185</td>
<td>(3)</td>
<td>28 JUL 71</td>
<td>(5) MINUTES</td>
<td>(72)</td>
<td>VERY SHARP PAINS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ANOTHER PATIENT ? Y

ANOTHER RECORD ? Y

Figure 5. NEWDATA Created as Data File
RECORD ? PULSE

THIS PROGRAM WILL USE CARPULS AS HEADER FILE.

BEGIN DATA INPUT.

SOC SEC # ? 222-22-2222*
DEPT CARDIOLOGY
RECORD PULSE
DATE ? 06 AUG 71*
NAME ? ABLE, ALICE A*
PULSE
SITTING ? (60)*
STANDING ? (62)*
AFTER EXERCISE
IMMED AFTER ? (90)*
TWO MINUTES AFTER ? (75)*

ANOTHER PATIENT ? N
ANOTHER RECORD ? N

"NEWDATA" HAS BEEN SAVED AS DATA FILE.
STOP.

0.928 / 7.423 / 64

Figure 5 (Concluded).

COPY is commonly used to transfer a copy of a patient's record to another file name. For example, suppose there is a file called ACTIVE for current patients and one called INACTIV (just seven letters allowed) for past patients. One wants to transfer the records of a newly released patient from ACTIVE to INACTIV. He calls RETREVE and specifies the COPY option under ACTION for the patient(s) involved. He attaches a name such as TRANSFER to this group of records and merges TRANSFER into the INACTIV file. TRANSFER could then be erased after the merge by typing UNSAVE, TRANSFER.

One of the seven questions put to the user is CONDITION. CONDITION can specify numerical data intervals such as AGE: 20-29, AGE: 30-39, or AGE: 40-49. WHAT specifies the kind of data one wishes to count according to CONDITION. For instance, if WHAT is SEX:M OR SEX:F, the output is a set of six numbers in grid form indicating the number of 20 to 29 year-old, 30 to 39 year-old, and 40 to 49 year-old males and females.

For research purposes also, it is often desirable to be able to work with duplicated data records. In fact, the entire set of records in the system could be duplicated in this manner.
EXEC.OLD.RETREVE

READY.
PRM.H.M=13500
PROGRAM: RETREIVE DATE: 08/06/71 TIME: 10:22:45

ENTER NAME OF DATA FILE: ? ACTIVE

SOC SEC # ? ALL*
DEPT ? ALL*
RECORD ? ALL*
DATE ? ALL*
CONDITIONS ? ALL*
ACTION ? COUNT*
WHAT ? ALL*

COUNT IS 7
***** THIS RETRIEVAL TOOK .333 SECONDS
SOC SEC # ? 111-11-1111
DEPT ? ALL*
RECORD ? ALL*
DATE ? ALL*
CONDITIONS ? ALL*
ACTION ? LIST*
WHAT ? ALL*

111-11-1111
ADMITTING 5AUG71
NAME CABLE, JAMES A
AGE (35) YRS
SEX M
ADDRESS 155 BRIDGE RD, ST. LOUIS
PHONE 222-4444
COMMENTS NEW PATIENT

******
***** THIS RETRIEVAL TOOK .427 SECONDS
SOC SEC # ? 111-11-1111
DEPT ? ADMITTING*
RECORD ? INITIAL*
DATE ? ALL*
CONDITIONS ? ALL*
ACTION ? LIST*
WHAT ? NAME AND COMMENTS*

111-11-1111
ADMITTING 5AUG71
NAME CABLE, JAMES A
COMMENTS NEW PATIENT

******
COUNT IS 1
***** THIS RETRIEVAL TOOK .410 SECONDS
SOC SEC # ? ALL*
DEPT ? ALL*
RECORD ? ALL*
DATE ? ALL*
CONDITIONS ? AGE: 20 TO 60*
ACTION ? TABULATE*
WHAT ? NAME AND AGE*

Figure 6. All Options in RETREVE
<table>
<thead>
<tr>
<th>NAME</th>
<th>AGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>111-11-1 5AUG71</td>
<td>CABLE, 35</td>
</tr>
<tr>
<td>222-22-2 5AUG71</td>
<td>ABE, A 22</td>
</tr>
<tr>
<td>222-22-2 6AUG71</td>
<td>ZABLE, 41</td>
</tr>
<tr>
<td>999-99-9 5AUG71</td>
<td>SABLE, 57</td>
</tr>
</tbody>
</table>

COUNT IS 4

DID YOU COPY OR TAB ANY INFO YOU WANT TO SAVE? NO

***** THIS RETRIEVAL TOOK .420 SECONDS

SOC SEC # ? ALL*
DEPT ? ALL*
RECORD ? ALL*
DATE ? ALL*
CONDITIONS ? AGE: 20 TO 60*
ACTION ? TAB-SD*
WHAT ? NAME AND AGE*

<table>
<thead>
<tr>
<th>NAME</th>
<th>AGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>111-11-1 5AUG71</td>
<td>CABLE, 35</td>
</tr>
<tr>
<td>222-22-2 5AUG71</td>
<td>ABE, A 22</td>
</tr>
<tr>
<td>222-22-2 6AUG71</td>
<td>ZABLE, 41</td>
</tr>
<tr>
<td>999-99-9 5AUG71</td>
<td>SABLE, 57</td>
</tr>
</tbody>
</table>

NO 4
MEAN 38
SD 12
SE 6
MAX 57
MIN 22
MEAN + 2SD 63
MEAN - 2SD 13

DID YOU COPY OR TAB ANY INFO YOU WANT TO SAVE? NO

***** THIS RETRIEVAL TOOK .481 SECONDS

SOC SEC # ? ALL*
DEPT ? ALL*
RECORD ? ALL*
DATE ? ALL*
CONDITIONS ? AGE: 20 TO 29 OR AGE: 30 TO 39 OR AGE: 40 TO 49*
ACTION ? CROSSTAB*
WHAT ? SEX: M AND SEX: F*

<table>
<thead>
<tr>
<th>SEX</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE 20-0-29</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AGE 30-0-39</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>AGE 40-0-49</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

COUNT IS 3

***** THIS RETRIEVAL TOOK .401 SECONDS

SOC SEC # ? ALL*
DEPT ? ALL*
RECORD ? ALL*
DATE ? 05 AUG 71*
CONDITIONS ? ALL*
ACTION ? COPY*
WHAT ? ALL*

COUNT IS 4

DID YOU COPY OR TAB ANY INFO YOU WANT TO SAVE? YES

WHAT NAME DO YOU WANT TO CALL IT? TRANSFER
TRANSFR HAS BEEN SAVED.
STOP.

4.131 / 57.833 / 1092

Figure 6 (Concluded).
WHAT Question. The seventh question, WHAT, can be used to specify what to LIST (e.g., ALL* or AGE AND HT*), or it can be used to specify the horizontal axis under TABULATE, CROSSTAB, and TAB-SD.

Format for Requesting Data. An asterisk must follow the response to each of the seven questions. Since spacing is important, one must use the identical spacing in RETREVE that was used in STORE while entering data such as NAME and DATE.

Data Not There. If a search is specified by CONDITION and no existing data matches this specification (see Figure 6), the program will respond NONE OF THE SPECIFIED RECORDS THE INFO. If a search is conducted on a non-existent SOC SEC #, DEPT, RECORD, or DATE, the program response is SPECIFIED RECORD IS NOT IN FILE. Thus, the system does provide a definite response when no data is found to match a request.

RESTART Option in RETREVE. If for any reason the user wishes to restart a search, he simply types RESTART.

Multiple Retrieval of Data. Once the user has supplied the name of the data file he wishes to search, he may conduct as many searches as he wishes. The command END OF REQUEST signals that he is finished. However, the user may wish to search a data file different from the original one. To do this, he simply types NEW FILE; the program will request the name of the other file, and additional searches can be performed. Again, only when the user supplies END OF REQUEST will the running of this program terminate.

UPDATE Program

The UPDATE program alters data files by (1) changing an entry in a data record, (2) adding to a data record, and/or (3) deleting a heading and its corresponding data (or deleting an entire record or records). To call UPDATE, one types EXEC, OLD, UPDATE, and then RNH, M=11000 after READY appears.

ID Items. As in RETREVE, the user specifies what he wishes to update by responding to seven questions. The ID responses should be obvious, depending on need. The user may answer with ALL* or with specifics.

ACTION, WHAT, and TO. ACTION may be CHANGE*, ADD*, or DELETE* (see Figure 7). In the first case, WHAT and TO are asked in that order. If ADD* is used, TO and WHAT are asked in that order. For DELETE*, only WHAT is asked. If ACTION is CHANGE*, WHAT must be answered by a specific heading followed by a colon, followed by the precise string of characters that presently occurs in that data field. The response to TO is simply the new data entry (Figure 7). For ADD, the user follows the same procedure.
EXEC: OLD; UPDATE

READY.
RNK: M=11000

PROGRAM: UPDATE   DATE: 08/06/71   TIME: 10:45:15

DO YOU WANT TO MAKE MORE THAN ONE CHANGE? YES
ENTER THE NAME OF THE FILE TO BE UPDATE? ACTIVE

SOC SEC #  ? 222-22-2222
DEPT  ? ADMITTING
RECORD  ? INITIAL
DATE  ? 05 Aug 71
ACTION  ? CHANGE
WHAT  ? ADDRESS: RT 8, ROARING SPRINGS, PA
TO  ? RT 7, FALLING ROCK, VA
MATCH ON 222-22-222 ADMITTING INITIAL

SOC SEC #  ? 222-22-2223
DEPT  ? ADMITTING
RECORD  ? INITIAL
DATE  ? 06 Aug 71
ACTION  ? DELETE
WHAT  ? COMMENTS
MATCH ON 222-22-222 ADMITTING INITIAL

SOC SEC #  ? 111-11-1111
DEPT  ? ADMITTING
RECORD  ? INITIAL
DATE  ? 05 Aug 71
ACTION  ? ADD
WHAT  ? COMMENTS
TO  ? IS BEING TRANSFERRED
MATCH ON 111-11-111 ADMITTING INITIAL

SOC SEC #  ? DONE
STOP

1 406 / 15 465 / 374

Figure 7. The Three UPDATE Options

RESTART Option in UPDATE. If the user wishes to begin again, he types RE-START*. (Note: In UPDATE only, an asterisk must be included in this command.)
Updating of Additional Data Files. To update additional data files, the user enters NEW FILE, and the system will request the name of the file. The user continues by updating records in the new file.

When Finished Updating. When the updating is completed, the user enters DONE to end the program. All changes will have been recorded on the permanent records.

SORTER Program

The SORTER program arranges records according to priorities given to the four ID items by the user. These priorities are indicated by typing 1, 2, 3, or 4 after each question mark, with no number used more than once. One also specifies if the records are to be sorted into ascending (A) or descending (D) order according to these priorities.

This segment is used to sort two data files prior to their merger and to enable the user to list data in a given order, i.e., by SOC SEC #, by alphabetical order of DEPT or RECORD, or by DATE. Observe that grouping of data records by DEPT and RECORD always takes precedence over grouping by SOC SEC # or DATE.

The user types EXEC, OLD, SORTER to call the program, and responds with RNH after the teletype communicates READY (Figures 8 and 9).

MERGE Program

The MERGE program merges two sorted data files (see the STORE program section, which discusses merging two data files). New records cannot be placed into an existing permanent data file directly. They must first be placed into a new data file which is then merged with (i.e., into) the related permanent file. The user can either save or erase this new data file.

In Figure 10, the response to the first question is the name of the permanent file: ACTIVE for current patients. NEWDATA is a file of records for new patients. Both files have been sorted into ascending (A) order. The user must again specify the priority of the ID items, as in SORTER. In the example, the user retains the merged data files under the name ACTIVE although a third file name could also have been given: To call MERGE, the user types EXEC, OLD, MERGE, and then types RNH, M=9000 after READY appears.
EXEC. OLD. SORTER

READY.

PROGRAM: SORTER DATE: 08/05/71 TIME: 15:43:19

DO YOU NEED OPERATING INSTRUCTIONS? N

ENTER NAME OF THE DATA FILE TO BE SORTED? ACTIVE

WILL THE DATA FILE BE SORTED INTO ASCENDING (A) OR DESCENDING (D) SEQUENCE? A

ENTER SORTING SEQUENCE HERE

? 1
? 3
? 4
? 2

SORT COMPLETED.
YOU HAVE SORTED 4 DATA RECORDS.
STOP.

0.632 / 5.055 / 104

Figure 8. ACTIVE is Sorted

EXEC. OLD. SORTER

READY.

PROGRAM: SORTER DATE: 08/05/71 TIME: 15:45:38

DO YOU NEED OPERATING INSTRUCTIONS? N

ENTER NAME OF THE DATA FILE TO BE SORTED? NEWDATA

WILL THE DATA FILE BE SORTED INTO ASCENDING (A) OR DESCENDING (D) SEQUENCE? A

ENTER SORTING SEQUENCE HERE

? 1
? 3
? 4
? 2

SORT COMPLETED.
YOU HAVE SORTED 3 DATA RECORDS.
STOP.

0.552 / 4.415 / 104

Figure 9. NEWDATA is Sorted
Figure 10. ACTIVE and NEWDATA are Merged Under the File Name ACTIVE
APPENDIX: LISTING OF THE SIX PROGRAMS IN MIMS

An introductory remark to several of these programs states that Paul Simmons is working at United Computing Systems, Inc., and Ronald Schwarz is with GSFC. This was true when these programs were developed. However, please note that Paul Simmons is currently working at Computing and Software, Inc., and Ronald Schwarz is now with Federal City College.
**"HEADER" -- CREATES MASTER HEADER RECORD FOR MIMS SYSTEM
07/30/71. 08.39.22.

00100C THIS PROGRAM WAS RE-DESIGNED AND DEVELOPED BY PAUL SIMMONS,
00110C UNITED COMPUTING SYSTEMS, INC., AND RONALD SCHWARZ, GODDARD
00120C SPACE FLIGHT CENTER. JULY, 1971.
00130C
00140C PROGRAM HEADER (INPUT, OUTPUT, TAPE4).
00150C DIMENSION IFORM(9), KODE(160), LCQ(160), LHEAD(3, 160)
00160C
00170C CARRIAGE CONTROL TO PRODUCE THE HIERARCHIAL EFFECT RELATED
00180C TO LEVEL CODES WHEN HEADING INPUT IS REQUESTED.
00190C
00200 DATA IFORM/5H(lXt), 5H(2Xt?), 5H(3Xt), 5H(4Xt), 5H(5Xt),
00210+5H 6Xt), 5H(7Xt), 5H(8Xt)5H(.9Xt)/
00220 CALL CLOCK(IX)
00230 CALL DATER(IS)
00240 PRINT 33, IS*IX
00250 3 PRINT, *THIS PROGRAM WILL BUILD A FILE OF LEVEL CODES AND*
00260 PRINT, *HEADING. DO YOU NEED OPERATING INSTRUCTIONS*.
00270 10 READ
00280 IF (IYORN.EQ.IHN) GO TO 30
00290 IF (IYORN.EQ.IHY) GO TO 20
00300 PRINT, *A SIMPLE YES OR NO WILL DO.*. Q GO TO 00010
00310C
00320C OPERATING INSTRUCTIONS.
00330C
00340C 20 PRINT, *OK, HERE'S HOW IT'S DONE. WHEN THE FIRST QUESTIO0
00350 PRINT, *MARK APPEARS, ENTER A LEVEL CODE (0-9). WHEN THE NEXT*
00360 PRINT, *QUESTION MARK APPEARS, ENTER THE HEADING (FROM 1-24*.
00370 PRINT, *CHARACTERS) THAT CORRESPONDS TO YOUR LEVEL CODE. FOR*
00380 PRINT, *HEADINGS THAT WILL NORMALLY HAVE DATA FOLLOWING THEM*
00390 PRINT, *ENTER A COLON AFTER THE HEADING. FOR BLIND HEADINGS*
00400 PRINT, *(THOSE WHICH WILL NOT HAVE DATA FOLLOWING THEM) DO NOT*
00410 PRINT, *ENTER THE COLON.*
00420 PRINT, *ENTER THE COLON.*
00430 PRINT, /*REPEAT THIS PROCESS UNTIL YOU HAVE NO MORE HEADINGS-THEN*
00440 PRINT, /*REPEAT THIS PROCESS UNTIL YOU HAVE NO MORE HEADINGS-THEN*
00450 PRINT, /*REPEAT THIS PROCESS UNTIL YOU HAVE NO MORE HEADINGS-THEN*
00460 PRINT, /*REPEAT THIS PROCESS UNTIL YOU HAVE NO MORE HEADINGS-THEN*
00470 PRINT, /*REPEAT THIS PROCESS UNTIL YOU HAVE NO MORE HEADINGS-THEN*
00480 PRINT, /*REPEAT THIS PROCESS UNTIL YOU HAVE NO MORE HEADINGS-THEN*
00490 30 PRINT, /*ENTER 3 LETTERS OF DEPT. NAME AND 4 LETTERS OF RECORD*
00500 PRINT, **ENTER FEWER IF 7 ARE NOT AVAILABLE**.
00510 READ 77, IFILE
00520 PRINT, /*BEGIN DATA INPUT.**/
00530C
00540C VARIABLE I IS COUNTER FOR NUMBER OF HEADINGS.
00550C
00560 I=0
00570 40 I = I + 1
00580 KODE(I) = 55B
00590 50 READ 200, LCQ(I)
** "HEADER" -- CREATES MASTER HEADER RECORD FOR MIMS SYSTEM
07/30/71. 08.39.22.

00600 IF (LCQ(I).EQ.7HRESTART) GO TO 3
00610 IF (LCQ(I).EQ.1H$) GO TO 5
00620 IF (LCQ(I).EQ.1H$) GO TO 60
00630C
00640C CONVERT LEVEL CODE FROM A1 FORMAT TO I1 FORMAT.
00650C
00660 LCQ(I) = (ISHIFT (LCQ(I),-54) - 33B) .AND. 77B
00670 IF ((LCQ(I).LT.0).OR.(LCQ(I).GT.9)) GO TO 99
00680 GO TO 00025
00690 5 KODECI) = 64B
00700 GO TO 00050
00710C
00720C DETERMINE WHICH FORMAT STATEMENT (CARRIAGE CONTROL)
00730C CORRESPONDS TO THE LEVEL CODE FOR THIS HEADING.
00740C
00750 25 NN = LCQ(I) + 1
00760 M = IFORM(NN)
00770 PRINT M
00780 READ 240, (LHEAD(J,I),J=1,3)
00790 IF CLHEAD(II).EQ.7HRESTART) GO TO 3
00800 GO TO 00040
00810 99 PRINT, *UNACCEPTABLE LEVEL CODE, TRY AGAIN*
00820 GO TO 00050
00830 I = I - 1
00840C
00850C WRITE I(THE NUMBER OF HEADINGS), KODE(I)(THE STOP SKIP
00860C CODES), LCQ(I)(THE LEVEL CODES), AND LHEAD(L,I),L=1,3)(THE
00870C HEADING DATA) TO FILE #4.
00880C
00890C WRITE (4,210) I
00900 DO 80 K=1,I
00910 WRITE (4,220) KODE(K),LCQ(K),(LHEAD(L,K),L=1,3)
00920 80 CONTINUE
00930C
00940C ATTEMPT TO SAVE NEWLY CREATED HEADER FILE.
00950C
00960 84 CALL PFUR(3HSAV,4,IFILE,O,ISTA)
00970 IOP = 5HSAVED
00980C
00990C IF FILE ALREADY EXISTS, SAVE UNDER NEW NAME, OR REPLACE
01000C EXISTING FILE.
01010C
01020 IF (ISTA .EQ. 4) GO TO 44
01030 IF (ISTA .EQ. 0) GO TO 92
01040 44 PRINT,*FILE ALREADY PERMANENT. ENTER NEW FILENAME OR*
01050 PRINT,*ENTER AN ASTERISK TO REPLACE CURRENT PERMANENT FILE:*
01060 IFILES = IFILE
01070 READ 77,IFILE
01080 IF (IFILE *EQ. 1H*) GO TO 66
01090C
01100C FILE IS TO BE SAVED UNDER ANOTHER FILE NAME.
01110C
** "HEADER" -- CREATES MASTER HEADER RECORD FOR MIMS SYSTEM
07/30/71 . 08. 39. 22.

01120  GO TO 00084
01130  66 IFILE = IFILES
01140C
01150C FILE IS TO BE REPLACED.
01160C
01170 CALL PFUR(3HREP4,IFILE,IISTA)
01180  IOP = SRREPLACED
01190  92 PRINT 88,IFILE,IOP
01200C
01210C FORMAT STATEMENTS.
01220C
01230  33 FORMAT (/PROGRAMI HE
01240  77 FORMAT (A7))
01250  88 FORMAT("**.A7,** HAS BEEN **.A8,** AS HEADER FILE**)
01260  200 FORMAT (A1)
01270  210 FORMAT (1X,I3)
01280  220 FORMAT (1X,02,1X,1X,1X,3(A10))
01290  240 FORMAT (3(A10))
01300  250 FORMAT (A7)
01310 END

- - - T H E  E N D - - -

24
** "STORE" -- CREATES DATA FILE ACCORDING TO HEADER FORMAT
  07/30/71. 09.57.12.

00100C THIS PROGRAM WAS RE-DESIGNED AND DEVELOPED BY PAUL SIMMONS,
00110C* UNITED COMPUTING SYSTEMS, INC., AND RONALD SCHWARZ, GODDARD
00120C SPACE FLIGHT CENTER, JULY, 1971.
00130C
00140C PROGRAM STORE (INPUT,OUTPUT,TAPE7,TAPE8,TAPE9)
00150C COMMON N,IAND,IOR,IBK,ITAG,ID(8,4),LHEAD(3,160)
00160C DIMENSION LCQ(160),IPNT(160),KODE(160),IDEPTS(4),IRECS(4),
00170+ IANS(7),JANS(1000)
00180 CALL CLOCK(IX)
00190 CALL DATER(IS)
00200 PRINT 79,IS,IX
00210 79 FORMAT(*PROGRAM: STORE*,4X,*DATE:*,A9,4X,*TIME:*,A9,///)
00220 PRINT,/,*IF AT ANY TIME YOU WISH TO START OVER, ENTER "RESTART".*
00230 PRINT, /
00240C NRD = NUMBER OF WORDS THAT CAN BE READ (4 FOR TELETYPE OR
00250C DATAPOINT 3300 CRT ETC)
00260 4 NRD = 5
00270 IBK = 055000000000000000000
00280 TWOMSK = 7777B
00290 MASK = 77B
00300 KOLN = 063680000000000000000
00310 ISEVN = 0000077777777777777777
00320 IAND = 077000000000000000000
00330 IOR = .NOT. IAND
00340 PRINT.*ENTER NAME YOU WISH TO CALL THIS DATA FILE:*,
00350 READ 78,IFILE
00360 78 FORMAT(A7)
00370 PRINT,/.
00380 19 PRINT.*DEPT.*.
00390 READ 550, (IDEPTS(I),I=1,4)
00400 5 PRINT.*RECORD*.
00410 READ 550, (IRECS(I),I=1,4)
00420 PRINT,*
00430 93 FORMAT(*THIS PROGRAM WILL USE *,A7,* AS HEADER FILE.*)
00440 GO TO 00013
00450 13 IDEPT = IDEPTS(1).AND.777777777777777777777777777777
00460 IREC = IRECS(1).AND.777777777777777777777777777777
00470 NAME = IDEPT.AND.7700000000000000000000000000000
00480 KKK = ISHIFT(IDEPT,-42).AND.77B
00490 IF (KKK.EQ.55B) GO TO 310
00500 NAME = IDEPT.AND.777777777777777777777777777777
00510 KKK = ISHIFT(IDEPT,-42).AND.77B
00520 IF (KKK.EQ.55B) GO TO 315
00530 NAME = (IDEPT.AND.777777777777777777777777777777).OR.ISHIFT(IREC,-18)
00540 GO TO 320
00550 310 NAME = NAME.OR.ISHIFT(IREC,-6)
00560 GO TO 320
00570 315 NAME = NAME.OR.ISHIFT(IREC,-12)
00580 320 CALL PFUR(3HRET.7,NAMEO,ISTA)
00590 IF(ISTA.EQ.5) GO TO 666
00600 PRINT 93,NAME
00610 PRINT,*/BEGIN DATA INPUT*/,
** "STORE" -- CREATES DATA FILE ACCORDING TO HEADER FORMAT

07/30/71. 09•57•12.

00620 10 DO 15 J=1,4
00630 15 IPNT(J) = 0
00640 JI = 5
00650 II = 1
00660 IDD = '2H1J
00670C SET FIRST WORD OF 4 ID ANSWERS TO:
00680 DO 20 J=1,4
00690 20 ID(1,J) = IDD
00700 IBLNK = '10H
00710C BLANK FINAL ANSWER ARRAY
00720 DO 22 J=1,1000
00730 22 JAN5(J) = IBLNK
00740 DO 23 J=1,160
00750 23 LHEAD1,J) = IBLNK
00760 IANDEX = 0
00770 IPT = 1
00780C READ HEADER FILE
00790 25 READ (7,510) IQNDEX
00800 DO 30 K=1,IQNDEX
00810 30 READ (7,630) KODE(K),LCQ(K),(LHEAD(L,K),L=1,3)
00820 DO 47 N=1,4
00830C ELIMINATE COLON IF THERE IS ONE
00840 CALL ECOLON
00850 47 CONTINUE
00860 CALL PRNT (LCQ(1),LHEAD(1,1),LHEAD(2,1),LHEAD(3,1))
00870 READ 550, (ID(L,1),L=2,5)
00880 51 IF (ID(2,1).EQ.7HRESTART) GO TO 5
00890 CALL PRNT (LCQ(2),LHEAD(1,2),LHEAD(2,2),LHEAD(3,2))
00900 ID(2,2) = IDEPTS(1)
00910 ID(3,2) = IDEPTS(2)
00920 ID(4,2) = IDEPTS(3)
00930 PRINT 500, (IDEPTS(I),I=1,3)
00940 CALL PRNT (LCQ(3),LHEAD(1,3),LHEAD(2,3),LHEAD(3,3))
00950 ID(2,3) = IRECS(1)
00960 ID(3,3) = IRECS(2)
00970 ID(4,3) = IRECS(3)
00980 PRINT 500, (IRECS(I),I=1,3)
00990 DO 55 L=2,8
01000 DO 55 J=1,3
01010 CALL ETERM(ID(L,J),MSWIT)
01020 55 CONTINUE
01030 CALL PRNT (LCQ(4),LHEAD(1,4),LHEAD(2,4),LHEAD(3,4))
01040C HANDLE DATE
01050 CALL DATE
01060C
01070C GUTS OF THE PROGRAM
01080C
01090 N = 5
01100 DO M=1
01110 ITAG = 0
01120 CALL ECOLON
01130 IF (ITAG .EQ. 1) GO TO 65
** "STORE" -- CREATES DATA FILE ACCORDING TO HEADER FORMAT
07/30/71. 09.57.12.**

01140 CALL PRNT (LCQ(N),LHEAD(1,N),LHEAD(2,N),LHEAD(3,N))
01150 PRINT, * *
01160 IPNT(JJ) = 0
01170 JJ = JJ + 1
01180 GO TO 00125
01190 65 CALL PRNT (LCQ(N),LHEAD(1,N),LHEAD(2,N),LHEAD(3,N))
01200 71 READ 550, (IANS(L),L=1,NRD)
01210 74 IF(IANS(1) .EQ. 7HRESTART) GO TO 5
01220 IF (IANS(1) .NE. 5HSKIP*) GO TO 75
01230 72 LHEAD(1,N) = IBLNK
01240 N = N+1
01250 IF (N .GT. IQNDEX) GO TO 126
01260 IF (KODE(N) .NE. 64B) GO TO 72
01270 GO TO 00060
01280 75 IF ((IANS(1) .EQ. IBLNK) .AND. (M .EQ. 1)) GO TO 76
01290 GO TO 00077
01300 76 LHEAD(1,N) = IBLNK
01310 GO TO 00125
01320 C IF NOT FIRST LINE OF ANSWER GO TO 100
01330 77 IF (M .NE. 1) GO TO 100
01340 NWD = IANS(1) .AND. IAND
01350 IF (NWD .EQ. 0510000000000000000000) GO TO 85,
01360 IPAD = KOLN
01370 DO 80 K=1,NRD
01380 NUSFT = IANS(K) .AND. TWOMSK
01390 IANS(K) = ISHIFT(IANS(K)-12)
01400 NUSFT = ISHIFT(NUSFT,48)
01410 IANS(K) = IANS(K) .AND. ISEVN
01420 IANS(K) = IANS(K) .OR. IPAD
01430 80 IPAD = NUSFT
01440 GO TO 00100
01450 C ANSWER IS A NUMBER ENCLOSED IN PARENS
01460 85 ICHANG = 0620000000000000000000
01470 IANS(1) = IANS(1) .AND. IOR
01480 IANS(1) = IANS(1) .OR. ICHANG
01490 MZ = 1
01500 ICHANG = 0630000000000000000000
01510 90 ITAG = 0
01520 DO 95 K=95,10
01530 IANS(MZ) = ISHIFT(IANS(MZ),6)
01540 NUSFT = IANS(MZ) .AND. IAND
01550 IF (NUSFT .NE. 0520000000000000000000) GO TO 95
01560 IANS(MZ) = IANS(MZ) .AND. IOR
01570 IANS(MZ) = IANS(MZ) .OR. ICHANG
01580 ITAG = 1
01590 95 CONTINUE
01600 IF (ITAG .NE. 0) GO TO 100
01610 MZ = MZ+1
01620 GO TO 00090
01630 C ELIMINATE TERMINATOR IF THERE IS ONE
01640 100 DO 105 K=1,NRD
01650 MSWIT = 0
** "STORE" -- CREATES DATA FILE ACCORDING TO HEADER FORMAT
07/30/71. 09.57.12.

01660 CALL ETERM(IANS(K), MSWIT)
01670 IF (IANS(K) .EQ. IBLNK .AND. MSWIT .EQ. 1) GO TO 120
01680C PUT ANSWER IN FINAL ANSWER ARRAY
01690 JANS(II) = IANS(K)
01700 IANS(K) = IBLNK
01710 II = II + 1
01720 M = M + 1
01730 IANDEX = IANDEX + 1
01740 IF (MSWIT .EQ. 1) GO TO 120
01750 105 CONTINUE
01760 PRINT 620
01770 GO TO 00071
01780 120 IPNT(JJ) = IPT
01790 IPT = IPT + M - 1
01800 JJ = JJ + 1
01810 125 N = N + 1
01820 IF (N .LE. IQNDEX) GO TO 60
01830 126 CONTINUE
01840C
01850C RESET LHEAD ARRAY FOR BLANK HEADINGS
01860 I = 1
01870 K = 2
01880 127 IF (LHEAD(1, I) .NE. IBLNK) GO TO 130
01890 DO 128 M = 1, 3
01900 128 LHEAD(M, I) = LHEAD(M, K)
01910 LCQ(I) = LCQ(K)
01920 LHEAD(I, K) = IBLNK
01930 129 K = K + 1
01940 IF (K .GT. IQNDEX) GO TO 131
01950 JUICE = 1
01960 GO TO 00127
01970 I = I + 1
01980 GO TO 00129
01990 130 IF (JUICE .NE. 1) K = K + 1
02000 JUICE = 0
02010 I = I + 1
02020 IF (K .LE. IQNDEX) GO TO 127
02030 DO 132 J = 1, IQNDEX
02040 131 DO 132 J = 1, IQNDEX
02050 132 CONTINUE
02060 GO TO 00134
02070 133 IQNDEX = J - 1
02080 134 CONTINUE
02090C
02100C
02110C WRITE OUTPUT
02120 WRITE (6, 560) IQNDEX, IANDEX
02130 DO 135 J = 1, 4
02140 135 WRITE (8, 530) (ID(I, J), I = 1, 7)
02150 DO 140 M = 1, IQNDEX
02160 140 WRITE (8, 530) (LHEAD(L, M), L = 1, 3)
02170 IF (IQNDEX .LE. 65) GO TO 145

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** "STORE" -- CREATES DATA FILE ACCORDING TO HEADER FORMAT
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02180 WRITE (8,520) (LCQ(K),K=1,65)
02190 WRITE (8,520) (LCQ(K),K=66, IQNDEX)
02200 GO TO 150
02210 145 WRITE (8,520) (LCQ(K)),K=66, IQNDEX)
02220 150 MPT = 22
02230 M = 1
02240 155 N = M + 21
02250 IF (IQNDEX - MPT) 165,165,160
02260 160 WRITE (8,590) (IPNT(K),K=M,N)
02270 M = N + 1
02280 MPT = MPT + 22
02290 GO TO 00155
02300 165 WRITE (8,590) (IPNT (K), K=M, IQNDEX)
02310 J = 1
02320 C COMPUTE HOW MANY LINES IT TAKES TO WRITE DATA
02330 IZAN = (IANDEX/6) + 1
02340 IPAN = (IZAN - 1)*6
02350 IF (IPAN = IQNDEX) IZAN = IZAN-1
02360 DO 170 M = 1,IZAN
02370 K = J + 5
02380 WRITE (8,530) (JANS(I),I=J,K)
02390 170 J=J+6
02400 REWIND 7
02410 PRINT/,**ANOTHER PATIENT**,
02420 175 READ 600, ICNT
02430 IF (ICONT.EQ.1HN) GO TO 180
02440 IF (ICONT.EQ.1HY) GO TO 10
02450 PRINT *,*A SIMPLE YES OR NO, PLEASE*
02460 GO TO 175
02470 180 PRINT,*ANOTHER RECORD*,
02480 185 READ 600, ICNT
02490 PRINT/,"PLEASE ANSWER YES OR NO*.
02500 IF (ICONT.EQ.1HN) GO TO 190
02510 IF (ICONT.EQ.1HY) GO TO 5
02520 PRINT, *PLEASE ANSWER YES OR NO*
02530 GO TO 00185
02540 190 CALL PFUR(3HSAV,8,IFILE,0,ISTA)
02550 IOP=5HSAVED
02560 IF (ISTA = 4) GO TO 44
02570 IF (ISTA = 0) GO TO 92
02580 44 PRINT,*FILE ALREADY PERMANENT. ENTER NEW FILENAME OR*
02590 PRINT,*ENTER ASTERISK TO REPLACE CURRENT PERMANENT FILE*.
02600 PRINT,*ENTER ASTERISK TO REPLACE CURRENT PERMANENT FILE*
02610 IFILES=IFILE
02620 78,IFILE
02630 66 IFILE=IFILES
02640 66 IFILE=IFILES
02650 CALL PFUR(3HREP,8,IFILE,0,ISTA)
02660 IOP=8HREPLACED
02670 92 PRINT 88,IFILE,IOP
02680 88 FORMAT(*"","A7,* HAS BEEN **AS DATA FILE*"*)
02690 500 FORMAT (3X,3A10)
** "STORE" -- CREATES DATA FILE ACCORDING TO HEADER FORMAT
07/30/71. 09.57.12.

02700 506 FORMAT (A7)
02710 510 FORMAT (1X,13)
02720 520 FORMAT (1X,65I1)
02730 530 FORMAT (1X,7A10)
02740 540 FORMAT (R2,1X,A3,1X,R2)
02750 550 FORMAT (7A10)
02760 560 FORMAT (1X,2I5)
02770 590 FORMAT (1X,2I3)
02780 600 FORMAT (A1)
02790 620 FORMAT (22X)
02800 630 FORMAT (1X,02,1X,I1,1X.3A10)
02810 667 FORMAT (*HEADER FILE "*,A7,*" NOT IN PERMANENT STORAGE.*)
02820 668 FORMAT (*ENTER CORRECT AND/OR VALID FILENAME.*)
02830 STOP
02840 666 PRINT 667,NAME
02850 PRINT 668
02860 GO TO 19
02870 STOP
02880 END
02890 SUBROUTINE ECOLON
02900 COMMON N,IAND, IOR, IBK, ITAG, ID(8,4), LHEAD(3,160)
02910 DO 10 J=1,3
02920 DO 10 I=1,10
02930 LHEAD(J,N) = ISHIFT(LHEAD(J,N),6)
02940 IWHAT = LHEAD(J,N) AND IAND
02950 IF (IWHAT .NE. 063000000000000000000) GO TO 10
02960 LHEAD(J,N) = LHEAD(J,N) OR IBK
02970 LHEAD(J,N) = LHEAD(J,N) OR IBK
02980 ITAG = 1
02990 10 CONTINUE
03000 RETURN
03010 END
03020 SUBROUTINE ETERM(NTERM,MSWIT)
03030C THIS SUBROUTINE ELIMINATES THE TERMINATOR
03040 IAND = 077000000000000000000
03050 IOR = .NOT. IAND
03060 IBK = 055000000000000000000
03070 IBLNK = 10H
03080 NNEW = NTERM AND IAND
03090 IF (NNEW .EQ. 047000000000000000000) GO TO 20
03100 DO 10 K=1,10
03110 NTERM = ISHIFT(NTERM,6)
03120 NNEW = NTERM AND IAND
03130 IF (NNEW .EQ. 047000000000000000000) GO TO 10
03140 NTERM = NTERM AND IOR
03150 MSWIT = 1
03160 NTERM = NTERM OR IBK
03170 10 CONTINUE
03180 RETURN
03190 20 NTERM = IBLNK
03200 MSWIT = 1
03210 RETURN
** "STORE" -- CREATES DATA FILE ACCORDING TO HEADER FORMAT**

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03220 END
03230 SUBROUTINE PRNT (IAK,KHEAD,MHEAD,NHEAD)
03240 DIMENSION IFORM(26),JFORM(24),JHED(3)
03250 DATA IFORM/5H(1Xt),5H(2Xt),5H(3Xt),5H(4Xt),5H(5Xt),5H(6Xt),
+ 5H(7Xt),5H(8Xt),5H(9Xt),6H(10Xt),6H(11Xt),6H(12Xt),6H(13Xt),
+ 6H(14Xt),6H(15Xt),6H(16Xt),6H(17Xt),6H(18Xt),6H(19Xt),
03270+ 6H(20Xt),6H(21Xt),6H(22Xt),6H(23Xt),6H(24Xt),6H(25Xt)/
03290 DATA JFORM /5H(A1t),5H(A2t),5H(A3t),5H(A4t),5H(A5t),5H(A6t),
+ 5H(A7t),5H(A8t),5H(A9t),6H(A10t),6H(A11t),9H(A10t),10H(A10t),
+ 9H(A10t),A1t),9H(A10t),A2t),
03300+ 9H(A10t,A3t),9H(A10t,A4t),9H(A10t,A5t),9H(A10t,A6t),9H(A10t,A7t),
03320+ 9H(A10t,A8t),9H(A10t,A9t),7H(2A10t),10H(2A10t),10H(2A10t,A2t),
03330+ 10H(2A10t,A3t),10H(2A10t,A4t)/
03340C THIS SUBROUTINE ALLOWS PROGRAM TO PRINT HEADING AND READ
03350C Answer all on the same line
03360 KFIVE = 055000000000000000000
03370 MASK = 077000000000000000000
03380 DO 10 I=0,9
03390 IF (IAK .EQ. I) GO TO 20
03410 STOP
03420 20 K = I+1
03430 NN = IFORM(K)
03440 PRINT NN
03450 JHED(1) = KHEAD
03460 JHED(2) = MHEAD
03470 JHED(3) = NHEAD
03480 KCOUNT = 0
03490 KBLNK = 0
03500 DO 45 M=1,3
03510 DO 40 I=0,54,6
03530 HKK = ISHIFT(JHED(M),I)
03540 IF (HKK *NE.* KFIVE) GO TO 30
03550 KBLNK = KBLNK + 1
03560 IF (KBLNK *EQ. 3) GO TO 50
03570 GO TO 00035
03580 30 KBLNK = 0
03590 35 KCOUNT = KCOUNT + 1
03600 40 CONTINUE
03610 45 CONTINUE
03620 PRINT*, *HEADING TOO LONG --- ABORT*
03630 RETURN
03640 50 KCOUNT = KCOUNT - 2
03650 NN = JFORM(KCOUNT)
03660 IF (KCOUNT + GT. 20) GO TO 60
03670 IF (KCOUNT + GT. 10) GO TO 55
03680 PRINT NN, KHEAD
03690 GO TO 00065
03700 55 PRINT NN, KHEAD, MHEAD
03710 GO TO 00065
03720 60 PRINT NN, KHEAD, MHEAD, NHEAD
03730 65 NFORM = 22-(KCOUNT+K)
** "STORE" -- CREATES DATA FILE ACCORDING TO HEADER FORMAT

07/30/71. 09.57.12.

03740  NN = IFORM(NFORM)
03750  PRINT NN
03760  RETURN
03770  END
03780 SUBROUTINE DATE
03790  COMMON N, IAND, IOR, IBK, ITAG, ID(8, 4), LHEAD(3, 160)
03800  READ 10, IDATE
03810  10 FORMAT (A10)
03820  IF (K1 - 36B) 30,30,40
03830  30 K2 = ISHIFT(IDATE, -48) .AND. 77B
03840  IF (K2 .EQ. 55B) GO TO 40
03850  IDY = ISHIFT(IDATE, -48) .OR. 33333333333333330000B
03860  IMON = (ISHIFT(IDATE, 12) .AND. 7777770000000000000000B) .OR.
03870  00000055555555555555B
03880  GO TO 00050
03890  40 IF (IMON .EQ. 3HJAN) MON = 1
03900  IF (IMON .EQ. 3HJUL) MON = 7
03910  IF (IMON .EQ. 3HJUN) MON = 6
03920  IF (IMON .EQ. 3HSEPT) MON = 9
03930  RETURN
03940  END

--- THE END ---
** "RETRIVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
06/05/71, 12:34:08.

00100 PROGRAM RETRVL(INPUT, OUTPUT, TAPE13, TAPE15)
00110 DIMENSION IOUTBL(6)
00120 DIMENSION IQ(18, 7), JCONSV(200), JWHTSV(200)
00130 COMMON IINDEX, INDEX, ID(8, 4), IDATAN(420), IDATAO0(300), ISHFTL(10), ISHFTR(10), KALL(7), IA(18, 7), IQU(6, 10),
00140 + INEG(10), IPRIME(10), IHNDEX(10, 10), IANOSZ(10), IHLA(10),
00150 + IDATAR(10, 2, 10), IDTSIZ(10, 10), IELEM(10, 10), XDATAR(2, 10),
00160 + ICHARJWD, KNIIRETIOUT, IHNDEX(10, 10), IANOSZ(10), ILHEAD(10),
00170 + IOUTMX, ICOMP, IANSW(10), IMAXQ, IWITH0(120), LCQ(120), Dat(6),
00180 + IHD(6, 2, 10), INDOPO(10), IOUTMX, ICOMP, INMAX, IMAXA, ICHAR, ICH,
00190 + IWD, IVDSIZ, JCHAR, JW, KNO, KRET, IQU, ISHFT1, KA, KB, KC, KE, PF,
00200 + KG, KH, KL, KK, KM, KO, KQ, KR, KS, KT, KV, KW, KX, KY, KZ,
00210 + KCOLONKHYPHN, KLPKRP, KSTAB, KTAB, KDOLL, KDRO, KDGRA, KAPOST, KBACKS,
00220 + KEQUAL, NTAPE, KOLON, ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10),
00230 + ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10),
00240 + ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10),
00250 + ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10),
00260 + ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10),
00270 + ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10),
00280 + ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10), ICROSS(10, 10),
00290 COMMON /MODESW/ RETMODE
00300 DATA RETMODE / 6HREMOTE /
00310 DIMENSION ITITLE (8)
00320 DIMENSION IARRAY(2)
00330 DATA IARRAY/0000004.0000020/
00340 DATA ITITLE/2HN0, 4HMEAN, 2HSD, 2HSE, 3HMAX, 3HMIN, 10HMEAN - 2SD,
00350 + 10HMEAN - 2SD/
00360 DATA IOUTBL/4HLIST, 4HCOPY, 5HCOUNT, 6HTAB-SD, 8HTABULATE,
00370 + 8HCROSSTAB/
00380 CALL CLOCK(IX)
00390 CALL DATER(IS)
00400 PRINT 33, IS, IX
00410 33 FORMAT(*PROGRAM: RETRIEVE*, 4X, *DATE:*, A9, 4X, *TIME:*, A9, ///)
00420 100 CALL DROP1 (13)
00430 REWIND 13
00440 PRINT* *ENTER NAME OF DATA FILE:*,
00450 19 READ, NAME
00460 18 FORMAT (A7)
00470 KTIME = 1
00480 CALL PFURC3HRET, 13, NAME, O, ISTA)
00490 IF (ISTA .EQ. 5) GO TO 61
00500 IF (RETMODE .EQ. 5) GO TO 9951
00510 IF (RETMODE .EQ. 6) GO TO 9949
00520 DO 9949 I=1, 8
00530 DO 9949 J=1, 7
00540 IQ(I,J) = 10H
00550 IQ(3, 1) = 10H(ALL OR SP
00560 IQ(4, 1) = 10H(ALL OR SP
00570 IQ(5, 1) = 10H(ALL OR SP
00580 IQ(3, 2) = 10H(ALL OR SP
00590 IQ(4, 2) = 10H(ALL OR SP
00600 IQ(3, 3) = 10H(ALL OR SP
00610 IQ(4, 4) = 10H OR RANGE

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** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM  
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00620 IQ(5,4) = 10HOF DATES) 
00630 IQ(4,5) = IQ(4,7) = 10HECIFY) 
00640 IQ(3,6) = 10H(LIST, COPY) 
00650 IQ(4,6) = 10H(COUNT, ANA) 
00660 IQ(5,6) = 10HLYZE, TABUL 
00670 IQ(6,6) = 10HATE, CROSS- 
00680 IQ(7,6) = 10HTAB) 
00690 IQ(1,5) = 10HCONDITIONS 
00700 IQ(1,6) = 10HACTION 
00710 IQ(1,7) = 10HWHAT 
00720 GO TO 9952 
00730 9951 READ 105, ((IQ(I,J), I=1,8), J=1,7) 
00740 105 FORMAT (7A10, A2) 
00750 9952 CONTINUE 
00760 NTAPE = 13 
00770 KLUNK = 0 
00780 LIST = IOUTBL(1) 
00790 ICOPY = IOUTBL(2) 
00800 ICOUNT = IOUTBL(3) 
00810 IANALY = IOUTBL(4) 
00820 ITAB = IOUTBL(5) 
00830 ICROSS = IOUTBL(6) 
00840 CALL INIT 
00850 CALL REWIND NTAPE 
00860 CALL REDREC 
00870 DO 120 K=1,4 
00880 DO 120 J=1,2 
00890 120 IQ(J,K) = IHEAD(J,K) 
00900 GO TO 129 
00910 125 IF ((IO.EQ.2).OR.(IO.EQ.4).OR.(IO.EQ.5)) GO TO 112 
00920 GO TO 129 
00930 112 PRINT, *DID YOU COPY OR TAB ANY INFO YOU WANT TO SAVE:* , 
00940 READ 960, KEEP 
00950 960 FORMAT (A1) 
00960 IF (KEEP.EQ.1HY) GO TO 380 
00970 129 REWIND 15 
00980 REWIND NTAPE 
00990 IF (NTAPE = 14) 127, 126, 127 
01000 126 NTAPE = 13 
01010 REWIND NTAPE 
01020 127 CONTINUE 
01030 IF (KLUNK .EQ. 0) GO TO 128 
01040 IF (KTIME .EQ. 0) GO TO 128 
01050 CALL SECOND(TTTT) 
01060 TPRINT = TTTT - TTO 
01070 PRINT 9912, TPRINT 
01080 9912 FORMAT (5H*****,* THIS RETRIEVAL TOOK*F6.3,* SECONDS*) 
01090 128 CONTINUE 
01100 ICOMP=0 
01110 IABORT=0 
01120 DO 140 I=1,10 
01130 140 XMAX(I) = -9999999
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
08/05/71. 12.34.08.

01140   XMINE(I) = 999999
01150   IANSW(I) = 0
01160   IANOSZ(I) = 0
01170   INEG(I) = 1
01180   X(I) = 0
01190   X2(I) = 0
01200   XCT(I) = 0
01210   NODECS(I) = 0
01220   DO 140 J=1,10
01230   ICRSUM(I,J) = 0
01240   IDTSIZ(I,J) = 0
01250   IELEM(I,J) = 0
01260   DO 135 K=1,IMAXQ
01270   IQUK(K,J) = IBLNKS
01280   DO 135 L=1,2
01290   XDATAR(L,J) = IBLNKS
01310  135   IHDK(L,J) = IBLNKS
01320  140   ICONN(I) = 0
01330  DO 145 I=1,145
01340  145   ID1(I,J) = IBLNKS
01350  145   ID2(I,J) = IBLNKS
01360   ICOMPE = 0
01370   ILAST = 0
01380   DO 150 I=1,20
01390  150   ISAVE(I) = IBLNKS
01400   IF (KLUNK = EQ. 1) GO TO 9900
01410   CALL SECOND(TTO)
01420  9900   CALL SECOND(TTTT)
01430  9911   FORMAT (5H*****,* CP TIME IS*F6.3,4H ***)
01440   TTO = TTTT
01450  151   KLUNK = 1
01460   DO 265 I=1,7
01470  152   KNO = I
01480   IF (IQ(1,I) = IBLNKS) 155,260,155
01490   KODE = 0
01500  155   IF (KODE = NE. 1) PRINT,/,/
01510   KODE = 1
01520   PRINT 160,(IQ(J,I),J=1,2)
01530  160   FORMAT (A10,A9t)
01540   CALL TYPEN
01550   GO TO (370,165,245,166,125,100), IRET
01560  166   GO TO (265,265,265,265,265,201,265,211), I
01570  165   GO TO (265,265,265,170,203,230,213), I
01580  170   CALL DATEIN
01590   GO TO (175,175,175,265), IRET
01600  175   PRINT 180
01610  180   FORMAT (16H BAD DATE )
01620   GO TO 255
01630  201   DO 202 J=1,200
01640  202   IDATAN(J) = JCONSV(J)
01650   GO TO 205

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** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM  
08/05/71. 12.34.08.*

01660 203. DO 204 J=1,200  
01670 204 JCONSV(J) = IDATAN(J)  
01680 205 IF (KALL(5).EQ.1) GO TO 265  
01690  KNO=1  
01700  NOQ = 10  
01710  ICOMP = 10  
01720 210 CALL WHAT  
01730  IBEGA=ICOMP+1  
01740  GO TO (220,265), IRET  
01750 211 DO 212 J=1,200  
01760 212 IDATAN(J) = JWHTSV(J)  
01770  GO TO 215  
01780 213 DO 214 J=1,200  
01790 214 JWHTSV(J) = IDATAN(J)  
01800 215 IF (KALL(7).EQ.1) GO TO 265  
01810  KNO=ICOMP+1  
01820  NOQ=10  
01830  GO TO 210  
01840 220 PRINT 222  
01841 222 FORMAT(4H****,* DELIMITORS ENTERED INCORRECTLY***)  
01850  GO TO 255  
01860 230 IOUT=IA(2,6)  
01870  DO 235 K=I,6  
01880  IO = K  
01890  IF (IOUT-IOUTBL(K)) 235.265,235  
01900 235 CONTINUE  
01910 PRINT 221  
01911 221 FORMAT(4H****,* ACTION TYPE INCORRECT. MUST BE: LIST,**  
01912+ * COPY, COUNT, TAB-SD,**/* TABULATE, OR CROSSTAB,**/>)  
01920  GO TO 255  
01930 245 PRINT 250, I  
01940 250 FORMAT(4H****,* NO TERMINATING CHARACTER IN QUESTION*  
01941+ **,16,** RE-ENTER,**)  
01950 255 GO TO 152  
01960 260 KALL(KNO)=1  
01970 265 CONTINUE  
01980  IF (IABORT) 125,270,125  
01990 270 IFREC=0  
02000  IFIND=0  
02010  IF (IOUT=4) 290,275,275  
02020 275 CONTINUE  
02030  ISTART = ICOMP + 1  
02040  PRINT 285, (IQU(I,J),J=ISTART,LAST)  
02050  WRITE (15,285) (IQU(I,J),J=ISTART,LAST)  
02060 285 FORMAT (/21X,5(1X,A10))  
02070  IF (ICROSS = IOUT) 290,286,290  
02080 286 PRINT 287, ((IDATARK1,J,K=1,8),J=ISTART,LAST)  
02090 287 FORMAT (17X,5(3X,F5.1))  
02100 288 FORMAT (17X,5(F5.1,H-,F5.1))  
02110 289 CALL REDREC  
02120 290 CALL REDREC  
02130  GO TO (320,295,930,424,920),IRET  

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** "RECREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**
08/05/71, 12:34:08.

```
02140 295  CALL CKID
02150   GO TO (290,300,320),IRET
02160  300  IFREC=1+IFREC
02170   CALL BOOL
02180  305  GO TO (290,306,900,910,920,424,600),IRET
02190  306   IFIND = IFIND + 1
02200   IF (IOUT.EQ.IOUT(2)) CALL WRITREC
02210   GO TO 290
02220  320  IF (IFREC) 360,360,325
02230  325  IF (IFIND) 350,350,327
02240  327  IF (IOUT = IANALY) 328,500,328
02250  328  IF (IOUT = ICROSS) 330,450,330
02260  330  PRINT 335, IFIND
02270  335  FORMAT (9HCOUNT IS *16)
02280  337   GO TO 125
02290   IF (IDATAN(1).EQ.8HRESTART*) GO TO 250
02300  350  PRINT 355
02310  355  FORMAT (//* NONE OF THE SPECIFIED RECORDS CONTAIN THE INFO*)
02320   GO TO 125
02330  360  PRINT 365
02340  365  PRINT (//32H SPECIFIED RECORD IS NOT IN FILE)
02350   GO TO 125
02360  370  PRINT 375
02370  375  FORMAT (15H END OF PROGRAM)
02380   GO TO 435
02390  380   PRINT, *WHAT NAME DO YOU WANT TO CALL IT?*,
02400  383   READ 18,JSAVE
02410   CALL PFUR(3HSAV, 15, JSAVE, 0, ISTA)  
02420   IF (ISTA .EQ. 4) GO TO 381
02430   PRINT 382, JSAVE
02440   GO TO 370
02450  381   PRINT 386, JSAVE
02460   PRINT, *RE-ENTER ANOTHER NAME:*,
02465   GO TO 383
02480  382   FORMAT(A7,** HAS BEEN SAVED**)
02490  386   FORMAT(A7,** ALREADY A PERMAMPT FILE**)
02500  435   STOP
02510  450   IFIND = 0
02520   DO 460 INDEX = 1,ICOMP
02530     IBEGA = ICOMP + 1
02540   IF (IDTSIZ(1,INDEX) - 1000) 456,451,451
02550  451   CONTINUE
02560   PRINT 455, IQU(1,INDEX),XDATAR(I,INDEX),I=1,2)
02570+  (ICRSM(IINDEX,J),J=IBEGA,LAST)
02580  455   FORMAT (A4,F5.1,H-,F5.1,5(4X,I7))
02590   DO 453 J=IBEGA,LAST
02600  453   IFIND = IFIND + ICRSM(IINDEX,J)
02610   GO TO 460
02620  456   JWD = 1
02630   JCHAR = 0
02640   IDATAO(1) = IBLNKS
02650  451   ISTRSW = 3
```
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
08/05/71. 12.34.08.

02660 DO 457 I=1,10
02670 ICHAR = IDATAR(I,1,INDEX) .AND. 77B
02680 CALL STARCH
02690 457 CONTINUE
02700 458 FORMAT (1X,A4,1X,A10,1X,S(4X,I7))
02710 PRINT 458, (IQU(1,INDEX),IDATAO(I),
02720 + ICRSUM(INDEX,J),J=IBEGA,LAST)
02730 DO 459 J=IBEGA,LAST
02740 459 IFIND = IFIND + ICRSUM(INDEX,J)
02750 460 CONTINUE
02760 IDATAO(1) = IBLNKS
02770 GO TO 330
02780 500 IOUT=LIST
02790 CALL FORMA
02800 CALL FORMA
02810 DO 550 I=1,8
02820 IDATAO(1) = ITITLE(I)
02830 JWD = 2
02840 JCHAR = 6
02850 DO 540 J=IBEGALAST
02860 KNO = J
02870 IF (XCT(KNO)-2) 502,502,501
02880 501 IANSW(KNO) = 1
02890 502 IANSW(KNO) = 0
02900 IF (XCT(KNO)) 529,529,505
02910 505 IF (IANOSZ(KNO)) 520,520,510
02920 510 IF (IDTSIZ(1,KNO) - 1000) 530,520,520
02930 520 GO TO (521,522,523,524,525,526,527,528), I
02940 521 CONTINUE
02950 XSAVE(KNO) = XCT(KNO)
02960 GO TO 529
02970 522 CONTINUE
02980 XMEAN(KNO) = X(KNO)/XCT(KNO)
02990 GO TO 529
03000 523 CONTINUE
03010 XSAVE(KNO) = XMEAN(KNO)
03020 524 CONTINUE
03030 XSD(KNO) = SQRT(X2(KNO)/XCT(KNO)-XMEAN(KNO)*XMEAN(KNO))
03040 XSAVE(KNO) = XSD(KNO)
03050 GO TO 529
03060 524 CONTINUE
03070 XSAVE(KNO) = XSD(KNO)/(SQRT(XCT(KNO)))
03080 GO TO 529
03090 525 XSAVE(KNO) = XMAX(KNO)
03100 GO TO 529
03110 526 XSAVE(KNO) = XMIN(KNO)
03120 GO TO 529
03130 527 XSAVE(KNO) = XMEAN(KNO) + 2 * XSD(KNO)
03140 GO TO 529
03150 528 XSAVE(KNO) = XMEAN(KNO) - 2 * XSD(KNO)
03160 529 CALL PFLFIX
03170 GO TO 540

38
** "RETRIEVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**

08/05/71 12.34.08.

```
03180 530 ICHAR = IBLNK
03190  DO 535 M = 1,13
03200 535 CALL STRCH
03210 540 CONTINUE
03220 550 CALL FORMA
03230  GO TO 125
03240 600 PRINT 601
03250 601 FORMAT(4H****,** FATAL ERROR - ATTEMPTED TO WRITE ON NEW*
03251  * COPY FILE**) )
03260  GO TO 435
03270 900 PRINT 901
03280 901 FORMAT(4H****,** FATAL ERROR - EOF ON WRITE**) )
03290  GO TO 435
03300 910 PRINT 911
03310 911 FORMAT(4H****,** FATAL ERROR - DEVICE ERROR**) )
03320  GO TO 435
03330 920 PRINT 921
03340 921 FORMAT(4H****,** FATAL ERROR - END OF TAPE ON WRITE**) )
03350  GO TO 435
03360 930 PRINT 931
03370 931 FORMAT(4H****,** FATAL ERROR - EOF ON READ**) )
03380  GO TO 435
03390 424 PRINT 426
03400 426 FORMAT(4H****,** FATAL ERROR - ICK ERROR**) )
03410  GO TO 435
03420 61 PRINT,** *
03430  PRINT 62,NAME
03440  PRINT,*RE-ENTER CORRECT DATA FILE NAME:*,
03450  GO TO 19
03460 62 FORMAT(A7,* NOT IN PERMANENT STORAGE**) )
03470  END
03480 SUBROUTINE REDREC
03490 COMMON I0INDEX, IINDEX, ID(8,4), IDATAN(420),
03500 IDATA(300), ISHORT(10), ISHTTR(10), KALL(7), IC18(7), IQU(6,10),
03510 INEC(10), IPRIME(10), IINDEX(10,10), IANOSZ(10), IHEAD(10),
03520 IDATAR(10,2,10), IDTSIZ(10,10), IELEM(10,10), KDATA(2,10),
03530 ICONN(10), XSAVE(10), IMAXQ, IFWAA(120), LCQ(120), IDAT(6),
03540 IHD(6,2,10), INDIVQ(10), IOUTMX, ICOMP, IMAX, IMAXA, ICHAR, ICH,
03550 IW, IWSIZ, ICHAR, JND, KNO, IRET, IOUT, ISHFL, KA, KB, KD, KE, KF,
03560 KG, KH, KL, KJ, HK, KL, K, KM, KN, KQ, KP, KR, KS, KT, KU, KV, KX, KY, KZ,
03570 KCOLON, KYPHN, KLP, KRP, KSTAR, KTAB, KDOLL, KDELTA, KAPOST, KBACKS,
03580 KRET, IBLNKS, IBLNK, KDEC, KCOMMA, KCENT, LOWER, ITERM, INO, NOQ,
03590 IMAXC, IMAXQ, IISTRSW, ISTART, NOQUES, LIST, LAST, IGETSW, ISAVE(20),
03600 KEQUAL, NTAPE, KOLON, ICRSUM(10,10), NUMANS(10), IANALY, ICOPY,
03610 ICOUNT, ICROSS, ITAB, IANSW(10), IX(10), X2(10), XCT(10), IBEGA,
03620 NO, XMEAN(10), XSD(10), XMAX(10), XMIN(10), NODECS(10), ID1(12,6),
03630 KZERO, KNINE, IMONTH(22), IHEAD(3,160),
03640  I00(10), KMASK(10), JMASK(10)
03650 DIMENSION IARRAY(2)
03660 DATA IARRAY/0000004, 0000020/
03670 1 DO 105 I=1, IOUTMX
03680 105 IDATA(1)=IBLNKS
```
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
06/05/71. 12:34:08.

03690 ISTAT = 0.
03700 IC = 0.
03710 DO 106 I=1,4
03720 106 ID(8,I) = IBLNKS.
03730 READ (NTAPE,180) IQNDEX, IANDEX.
03740 IF (EOF,NTAPE) 140,107.
03750 107 DO 108 I=1,4.
03760 108 READ (NTAPE,170) (ID(J,I),J=1,7).
03770 DO 110 I=1,10.
03780 110 READ (NTAPE,170) (IHEAD(J,I),J=1,3).
03790 IF (IQRNDEX.LE.65) GO TO 112.
03800 READ (NTAPE,160) (LCQ(I),I=1,65).
03810 READ (NTAPE,160) (LCQ(I),I=66,1QRNDEX).
03820 GO TO 114.
03830 112 READ (NTAPE,160) (LCQ(I),I=1,1QRNDEX).
03840 114 MPT = 22.
03850 MZT = 1.
03860 115 MWT = MZT + 21.
03870 IF (IQNDEX-MPT) 117,117,116.
03880 116 READ (NTAPE,190) (IFWAA(I),I=MZT,MWT).
03890 MPT = MPT + 22.
03900 MZT = MWT + 1.
03910 GO TO 115.
03920 117 READ (NTAPE,190) (IFWAA(I),I=MZT,1QRNDEX).
03930 J = 1.
03940 IZAN = (IQNDEX/6) + 1.
03950 IPAN = (IZAN-1)*6.
03960 IF (IPAN.EQ. IQNDEX) IZAN=IZAN-1.
03970 DO 120 M=1,IZAN.
03980 K = J+5.
03990 READ (NTAPE,170) (IDATAN(I),I=J,K).
04000 120 J=J+6.
04010 ID(3,4) = ID(3,4).AND. 77B.
04020 125 IRET = 2.
04030 IF (IQNDEX-1) 130,130,135.
04040 130 IRET = 1.
04050 RETURN.
04060 135 I = IQNDEX+1.
04070 IFWAA(I) = IANDEX+1.
04080 LCQ(I) = 1.
04090 NOQUES = IQNDEX.
04100 JWD = 0.
04110 RETURN.
04120 140 IQNDEX = 1.
04130 IANDEX = 1.
04140 GO TO 130.
04150 160 FORMAT (1X,6511).
04160 170 FORMAT (1X,7A10).
04170 180 FORMAT (1X,215).
04180 190 FORMAT (1X,2213).
04190 END.
04200 SUBROUTINE BOOL.
** "RETRIVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**

08/05/71. 12.34,08.

04210 DIMENSION IARRAY(2)
04220 DIMENSION ITRUE(10)
04230 COMMON IQNDEX,IDEX,Id(8,4), IDATAN(420),
04240+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04250+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04260+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04270+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04280+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04290+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04300+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04310+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04320+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04330+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04340+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04350+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04360+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04370+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04380+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04390+ IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),IDT(10,10),
04400 DATA IARRAY/0000004,0000020/
04410 04420 1
04430 04440 1
04450 04460 1
04470 04480 1
04490 04500 1
04510 04520 1
04530 04540 1
04550 04560 1
04570 04580 1
04590 04600 1
04610 04620 1
04630 04640 1
04650 04660 1
04670 04680 1
04690 04700 1
04710 04720 1

**Column 41**
** "RETFREE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
08/05/71. 12.34.08.

04730 GO TO 180
04740 175 INDIVQ(KNO) = -1
04750 180 CONTINUE
04760  DO 210 I=1,ICOMP
04770     IGROUP=ICOMP-I+1
04780     ISUM=ICONN(IGROUP)
04790     DO 195 IGN0=1,ICOMP
04800     J=IELEM(IGN0,IGROUP)
04810     IF (J-1) 195,190,185
04820   185 J=ITRUE(J)
04830    GO TO 195
04840   190 J=INDIVQ(IGN0)
04850   195 ISUM=ISUM+J
04860 IF (ISUM) 200,205,205
04870 200 ITRUE(IGROUP)=-1
04880  GO TO 210
04890 205 ITRUE(IGROUP)=1
04900 210 CONTINUE
04910 IF (ITRUE(1)) 215,105,105
04920 215 IRET=1
04930 RETURN
04940 220 CONTINUE
04950  DO 240 I=IBEGA,LAST
04960     KNO=I
04970 INDIVQ (KNO) = 0
04980 IANSW(KNO) = 0
04990 NUMANS(KNO) = 0
05000 ISTART=1
05010 CALL FINDQ
05020 GO TO (240,230), IRET
05030 230 IF (IOUT .LT. LIST) 235,240,235
05040 235 CALL MACHDT
05050 IF (IRET) 240,239,239
05060 239 INDIVQ (KNO) = 1
05070 240 CONTINUE
05080 241 CONTINUE
05090 246 IF (IOUT .EQ. ICR0SS) 244,325,244
05100 244 IF (I0 . EQ. 4) 255,245,245
05110 245 CONTINUE
05120 ISTRSW=1
05130  JWD=1
05140  JCHAR=0
05150  IGNDEX=4
05160  KNO=4
05170 IA(1,4)=IBLNKS
05180 IA(2,4)=IBLNKS
05190 CALL FORMT
05200 K=ICOMP+1
05210  ISTRSW = 3
05220  JWD = 1
05230  JCHAR = 0
05240  DO 1290 M = K,LAST
** "RETRIVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
08/05/71. 12.34.06.

05250  KNO = M
05260  IF (IDTSIZ(1,KNO) - 1000) 1250,1270,1250
05270  1250  J = NUMANS(KNO)
05280  DO 242  JH = 1,NQUES
05290  IF (IQUC(J,NKNO),EQ.IHEAD(1,JH)) GO TO 243
05300  242  CONTINUE
05310  GO TO 1270
05320  243  JDAT = IFWAA(JH)
05330  KPROS = ISHIFT(IDATAN(JDAT),-54).AND.77B
05340  IF (KPROS.EQ.63B) GO TO 247
05350  GO TO 1270
05360  247  IDATAN(JDAT) = IDATAN(JDAT).AND.7777777777777777B
05370  DO 1255  I = 1,4
05380  DOH = IBLNK
05390  1255  CALL STRCH
05400  1270  CALL PFLFIX
05410  1290  CONTINUE
05420  DOE 249  K = 1,7
05430  249  IDATAR(I,J,KNO) = ISHIFT(IDATAN(JDAT),(6*K)).AND.77B
05440  DO 1268  I = 1,7
05450  ICHAR = IDATAR(I,J,KNO)
05460  1268  CALL STRCH
05470  GO TO 1290
05480  1270  CALL PFLFIX
05490  1290  CONTINUE
05500  PRINT 250, ID(2,1),IA(1,4),(IDATA(I),I=1,6)
05510  WRITE (15,250) ID(2,1),IA(1,4),(IDATA(I),I=1,6)
05520  250  FORMAT (A8,A8,5A10,A5)
05530  DO 252  I = 1,28
05540  252  IDATA(I) = IBLNKS
05550  GO TO 310
05560  255  IF (IOUT-ICOPY) 260,125,260
05570  260  CALL HEADIN
05580  DO 300  K=IBEGALAST
05590  KNO=K
05600  265  J=IPRIME(KNO)
05610  IF (J) 300,300,270
05620  270  DO 295  I=1,J
05630  IQNDEX=IHNDEX(I,KNO)
05640  IF (IQNDEX) 275,295,275
05650  275  IF (IQNDEX-ILHEAD(I)) 280,295,280
05660  280  IF (J-I) 290,285,290
05670  285  LOWER=1
05680  290  ILHEAD(I)=IQNDEX
05690  CALL FORMT
05700  IF (ISAME .EQ. 1) GO TO 305
05710  LOWER=0
05720  295  CONTINUE
05730  296  ISTART=IQNDEX+1
05740  CALL FINDQ
05750  GO TO (300,265), IRET
05760  300  CONTINUE

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** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**
06/05/71, 12:34:08.

05770 305 CALL FORMA
05780 308 PRINT 315
05790 315 FORMAT (10H**********)
05800 310 IRET=2
05810 RETURN
05820 325 DO 350 I = 1,ICOMP
05830 IF (INDIVQ(I)) 350,350.,330
05840 330 DO 340 J = IBEGA,LAST
05850 IF (INDIVQ(J)) 340,340,335
05860 335 ICRSUM(I,J) = ICRSUM(I,J) + 1
05870 340 CONTINUE
05880 350 CONTINUE
05890 GO TO 310
05900 900 IRET = 3
05910 RETURN
05920 920 IRET = 5
05930 RETURN
05940 END
05950 SUBROUTINE CKID
05960 COMMON IQNDEXI,INDEX,1D(8,4), IDATAN(420),
05970+ IDATAO(300),ISHFLT(10),ISHFTR(10),KALL(7),IA(16,7),IGU(6,10),
05980+ INEG(10),I1PRIME(10),IHNDEX(10,10),I1ANOSZ(10),I1HEAD(10),
05990+ IDATAR(10,2,10),IDTSIZ(10,10),IELEM(10,10),XDATAR(2,10),
06000+ I1CONN(10),XSAVE(10),IMAXQ,IFWAA(120),LCQ(120),I1DAT(6),
06010+ IH6(6,2,10),INDIVQ(10),IOUTMX,ICOMP,INMAX,IMAXA,ICHAR,ICH,
06020+ IWD,IVDTSIZ,ICHAR,JWJ,KNO,IRET,IOUT,ISHFL1,KA,KB,KC,KE,KF,
06030+ KG,KIJ,KJ,KK,KL,KM,KN,KO,KP,KQ,KS,KU,KV,KW,KX,KY,KZ,
06040+ KCOLON,KDELTA,KNONE,IKDON,IKDON2,IKDON3,IKDON4,IKDON5,IKDON6,
06050+ KRET,ISAVESZ,ISAVES1,ISAVES2,ISAVES3,ISAVES4,ISAVES5,ISAVES6,
06060+ IMAXAC,IMAXCC,ISTRSW,ISTART,NOQUES,LIST,LAST,IGETSW,ISAVE(20),
06070+ KEQUAL,N1APE,KOLON,ICRSUM(10,10),NUMANS(10),I1ANALY,ICOPY,
06080+ ICOUNT,ICROSS,ITAB,I1ANSW(10),10,X2(10),X2(10),XCT(10),IBEGA,
06090+ NO,XMEAN(10),XSD(10),XMAX(10),XMIN(10),NODECS(10),ID1(12,6),
06100+ KZERO,KNINE,IMONTH(22),
06110+ IHEAD(3,160),
06120+ 100(10),KMASK(10),JMASK(10)
06130 DATA IFORM/6HFORMAT/
06140 I=1
06150 IF (KALL(I)) 15,15,10
06160 10 IF (ID(2,1) - IFORM) 100,145,100
06170 15 L=1
06180 KTRK = 0
06190 DO 20 J=2,IMAXA
06200 KCT=1
06210 L=L+1
06220 KLAST(L) = ID(J,I)
06230 DO 50 KLK = 0,54,6
06240 LOOK = ISHIFT(IA(J,I),KLK) o.AND.7700000000000000B
06250 IF (LOOK o.EQ.55000000000000000000B) KTRK = KTRK + 1
06260 IF (KTRK - 2) 60,70,70
06270 60 KCT = KCT + 1
06280 50 CONTINUE
** "Retreve" -- Retrieval Programs for MIMS System
08/05/71. 12:34:08.

06290  20  CONTINUE
06300  70  LMN = KCT-1
06310  KLAST(L) = ID(J,I)
06320     DO 90 J = 2, L
06330   IF (IA(J,I) - KLAST(J)) 145, 90, 145
06340  90  CONTINUE
06350  100  I = I + 1
06360  105  II = I
06370  110  IF (KCALL(I)) 15, 15, 100
06380  115  CONTINUE
06390  KCALL(4) = 120, 120, 140
06400  120  DO 125 I = 1, 3
06410     J = I + 1
06420    IF (IID(I,J) - IDAT(I)) 145, 125, 130
06430  125  CONTINUE
06440  130  DO 135 I = 2, 4
06450     J = I + 2
06460    IF (IID(I,J) - IDAT(J)) 140, 135, 150
06470  135  CONTINUE
06480  140  IRET = 2
06490  145  IRET = 1
06500  150  CONTINUE
06510  155  N = II - 1
06520  160  DO 165 J = 1, N
06530     IF (KCALL(J)) 160, 160, 145
06540  165  CONTINUE
06550  170  RETURN
06560  175  END

06620  SUBROUTINE DATEIN
06630 COMMON IQINDEX, IINDEX, ID(8,4), IDATAN(420),
06640+ IDATAO(300), ISHTFL(10), ISHTFR(10), KALL(7), IAJ(18,7), IOK(6,10),
06650+ INEG(10), IPRIKE(10), IHDINDEX(10,10), IANOSZ(10), IHEAD(10),
06660+ IDATARK(10,2,10), IOMSIZ(10,10), IELEM(10,10), XDATARK(2,10),
06670+ ICHNL(10), XSAVE(10), IMAXG, IFWAA(120), LCQ(120), IDAT(6),
06680+ IHDA(6,2,10), INDIV(10), IOUTMX, ICOM, INMAX, IMAXA, ICHAR, ICH,
06690+ IWD, IWDSIZ, JCHAR, JWD, KNO, IRET, IOUT, IHDFL, KA, KB, KC, KD, KE, KF,
06700+ KG, KH, KL, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ,
06710+ KCOLON, KYPHN, KL, KR, KSTAB, KTRH, KDOL, KDELTA, KPOST, KBACKS,
06720+ KRET, IBLNKS, IBLNK, KDEC, KCOMMA, KCENT, LOWER, ITERM, ION, NOO,
06730+ IMAXAC, IMAXQC, ISTRWS, ISTART, NOQUES, LIST, LAST, IGETSW, ISAVE(20),
06740+ KQUAL, KTAP, KOLON, ICNSUM(10,10), NUMAXS(10), IANALY, COPY,
06750+ ICOUNT, ICRSS, ITAB, IANSW(10), X(10), X2(10), XCT(10), IBEGA,
06760+ X0, XMEAN(10), XSD(10), XMAX(10), XMIX(10), NODECS(10), ID1(12,6),
06770+ KZERO, KNINE, IMONTH(22), IHEAD(3,160),
06780+ 100(10), KMASK(10), JMASK(10)
06790 DATA IFILLO/03333333333333330000/
06800  N = 1
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
08/05/71. 12.34.08. **

06810 I=0
06820 MM=1
06830 IDAY1 = KZERO
06840 IDAY2 = KZERO
06850 GO TO 145
06860 110 I=I+1
06870 IF (IA(I,4)=ITERM) 135,115,135
06880 115 IDAT(4)=IDAT(1)
06890 IDAT(5)=IDAT(2)
06900 IF (IFLAG) 125,120,125
06910 120 IDAT(6)= (KZERO+3)*ISHFL1+(KZERO+1)+IFILLO
06920 GO TO 130
06930 125 IDAT(6)=IDAT(3)
06940 130 IRET=4
06950 RETURN
06960 135 IF (IA(I,4)=KHYPHN) 137,140,137
06970 137 IF (IA(I,4)=KT) 190,138,190
06980 138 I=I+1
06990 140 MM=2
07000 N=4
07010 IDAY1 = KZERO + 3
07020 IDAY2 = KZERO + 1
07030 145 IFLAG=0
07040 150 I=I+1
07050 ICHAR=IA(I,4)
07060 IF (CHAR - KNINE) 155, 155, 175
07070 155 IF (CHAR - KZERO) 175, 160, 160
07080 160 IFLAG=IFLAG+1
07090 GO TO (165,170), IFLAG
07100 165 IDAY1 = KZERO
07110 170 IDAY1=IDAY2
07120 GO TO 150
07130 170 IDAY1=IDAY2
07140 IDAY2=CHAR
07150 I=I+1
07160 ICHAR=IA(I,4)
07170 175 K=ICHAR
07180 I=I+1
07190 L=IA(I,4)
07200 I=I+1
07210 IDATE1=ISHFL1*ISHFL1*K+ISHFL1*L+IA(I,4)
07220 DO 180 M=1,22
07230 180 CONTINUE
07240 IF (IDATE1-IMONTH(M)) 180,185,180
07250 180 I=I+1
07260 IRET=2
07270 RETURN
07280 185 I=I+1
07290 K=IA(I,4)
07300 I=I+1
07310 IDAT(N) = IABS(ISHFL1*K)+IA(I,4)+IFILLO
07320 N=N+1
** "RETRIVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**
08/05/71. 12.34.08.

07330  IDAT(N)=MO
07340  N=N+1
07350  IDAT(N) = IABS(IDAY1*ISHFL1) + IDAY2 + IFILL0
07360  GO TO (110,130), MM
07370  190  IRET=3
07380  RETURN
07390  END

07400  SUBROUTINE FINDQ
07410  COMMON IQNDEX,IANDEXID(8,4), IDATAN(420),
07420  IDATAO(300),ISHFLT(10),ISHFTR(10),KALL(7),IA(18,7),IQU(6,10),
07430  INEG(10),IPRIME(10),IHNDEX(10,10),ITABLE(10),IVAL(10),ISHFLH(6),
07440  IDSIZE(10,10),IHELD(10,10),IDATAR(2,10),
07450  ICONN(10),ISAVE(10),IMAQAQ(10),ISHFL(10),IMAXQ,NQ,
07460  INEQAC,IMAXQ,ICROSS,ITABLE,IVAL,IBLNKS,KDEC,ICOUNT,
07470  KDESCRIPTION,NUMANS(10),IHEAD(35),KHEAD(10),IHD(6,10),
07480  KDIFF,IPSAM,IPRIME,ITABLE,IVAL,IBLNKS,KDEC,ICOUNT,
07490  KDESCRIPTION,NUMANS(10),IHEAD(35),KHEAD(10),IHD(6,10),
07500  IQNDEX,IANDEXID(8,4), IDATAN(420),
07510  IDATAO(300),ISHFLT(10),ISHFTR(10),KALL(7),IA(18,7),IQU(6,10),
07520  INEG(10),IPRIME(10),IHNDEX(10,10),ITABLE(10),IVAL(10),ISHFLH(6),
07530  IDSIZE(10,10),IHELD(10,10),IDATAR(2,10),
07540  ICONN(10),ISAVE(10),IMAQAQ(10),ISHFL(10),IMAXQ,NQ,
07550  INEQAC,IMAXQ,ICROSS,ITABLE,IVAL,IBLNKS,KDEC,ICOUNT,
07560  KDESCRIPTION,NUMANS(10),IHEAD(35),KHEAD(10),IHD(6,10),
07570  IQNDEX,IANDEXID(8,4), IDATAN(420),
07580  IDATAO(300),ISHFLT(10),ISHFTR(10),KALL(7),IA(18,7),IQU(6,10),
07590  INEG(10),IPRIME(10),IHNDEX(10,10),ITABLE(10),IVAL(10),ISHFLH(6),
07600  IDSIZE(10,10),IHELD(10,10),IDATAR(2,10),
07610  ICONN(10),ISAVE(10),IMAQAQ(10),ISHFL(10),IMAXQ,NQ,
07620  INEQAC,IMAXQ,ICROSS,ITABLE,IVAL,IBLNKS,KDEC,ICOUNT,
07630  KDESCRIPTION,NUMANS(10),IHEAD(35),KHEAD(10),IHD(6,10),
07640  IQNDEX,IANDEXID(8,4), IDATAN(420),
07650  IDATAO(300),ISHFLT(10),ISHFTR(10),KALL(7),IA(18,7),IQU(6,10),
07660  INEG(10),IPRIME(10),IHNDEX(10,10),ITABLE(10),IVAL(10),ISHFLH(6),
07670  IDSIZE(10,10),IHELD(10,10),IDATAR(2,10),
07680  ICONN(10),ISAVE(10),IMAQAQ(10),ISHFL(10),IMAXQ,NQ,
07690  INEQAC,IMAXQ,ICROSS,ITABLE,IVAL,IBLNKS,KDEC,ICOUNT,
07700  KDESCRIPTION,NUMANS(10),IHEAD(35),KHEAD(10),IHD(6,10),
07710  IQNDEX,IANDEXID(8,4), IDATAN(420),
07720  DO 120 J=5,10
07730  K=LCQ(J)
07740  IF (K=LCQUES) 130,140,140
07750  130  IHNDEX(K,KNO)=J
07760  KK=K+1
07770  DO 135 KKK=KK,10
07780  135  IHNDEX(KKK,KNO)=0
07790  140  CONTINUE
07800  LSTART=1
07810  I=LCQUES-1
07820  DO 165 L = 1,2
07830  LL = 3-L
07840  IF (IHDL(1,LL,KNO)-IBLNKS) 145,165,145
** "RETRIEVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
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07850  145  DO 160 M=LSTART,I
07860    N=IHNDEX(M,KNO)
07870  150    IF (N) 150,160,150
07880  150    DO 155 J=1,IMAXQ
07890  155    IF (IHD(J) .LT. KNO) - IHEAD(J,N)) 160,155,160
07900  155    CONTINUE
07910  160    LSTART=M
07920  160    GO TO 165
07930  160    CONTINUE
07940  160    ISTART=IQNDEX+1
07950  160    GO TO 105
07960  165    CONTINUE
07970  165    IHNDEX(LCQUES,KNO)=IQNDEX
07980  165    IRET=2
07990  165    RETURN
08000  END

08010  COMMON IQNDEX,IINDEX,ICH(8,4), IDATAN(420),
08020    IADATA(300),ISHFTL(10),ISHFTR(10),KALL(7),IA(18,7),IQU(6,10),
08030    INEG(10),IPRIME(10),IHNDEX(10,10),IANOSZ(10),ILHEAD(10),
08040    IDATAR(10,2,10),IDTSIZ(10,10),IELEMA(10,10),XDATAR(2,10),
08050    IDATAO(300),ISHFTR(10),IMAXQ,IFWAA(120),LCQ(120),IDAT(6),
08060    IHD(6,2,10),INDIV(10),IOUTM,ICOMP,INMAX,IMAXA,ICHAR,ICH,
08070    IWD,ISWSIZ,ICHAR,JWD,KNO,IRET,IOUT,ISHFTR,KA,KB,KC,KD,KF,
08080    KG,KH,KI,KJ,KK,DL,KL,KM,KP,KQ,KR,KS,KT,KU,KV,KW,KX,KEY,KZ,
08090    KFCOL,KHYPHN,KCOL,KBOLR,KDELTA,KAP,KBK,KK,KL,KM,KN,KP,KQ,KR,
08100    KG,KHKI,KJ,KK,KL,KM,KN,KP,KQ,KR,KT,KU,KV,KW,KX,KEY,KZ,
08110    KRET,IBLNKS,IBLNK,KDEC,KCOMMA,KCENT,LOWER,TERM,IGN0,NOQ,
08120    IMAXAC,IMAXQC,ISTRW,ISTART,NOQUES,LIST,LAST,IGETSW,ISAVE(20),
08130    KEQUAL,NTAPE,KOLON,ICRSUM(10,10),NUMANS(10),IANALY,ICOPY,
08140    ICOUNT,ICROSS,ITAB,IANSW(10,10),X(10),X2(10),XCT(10),IBEGA,
08150    INO,XTMAX(10),XMAX(10),XMIN(10),NODECS(10),IDI(12,6),
08160    KZERO,KNINE,MONTH(C22),IHEAD(3,160),
08170    I00(10),KMASK(10),JMASK(10)
08180    IF (.NOT.JWD) 145,130,105
08190  105    IF (.NOT.IOUT-LIST) 110,120,110
08200  110    PRINT 115
08210  115    FORMAT (22H INVALID OUTPUT DEVICE)
08220  115    GO TO 135
08230  120    CALL PRINT
08240  130    GO TO 135
08250  130    JWD=IOUTM
08260  135    DO 140 I=1,JWD
08270  140    IADATA(I)=IBLNKS
08280  145    JWD=1
08290    JCHAR=0
08300    RETURN
08310    END

08320  COMMON IQNDEX,IINDEX,ICH(8,4), IDATAN(420),
08330    IADATA(300),ISHFTL(10),ISHFTR(10),KALL(7),IA(18,7),IQU(6,10),
08340    INEG(10),IPRIME(10),IHNDEX(10,10),IANOSZ(10),ILHEAD(10),
08350    IDATAR(10,2,10),IDTSIZ(10,10),IELEMA(10,10),XDATAR(2,10),
08360    IDATAO(300),ISHFTR(10),IMAXQ,IFWAA(120),LCQ(120),IDAT(6),
08370    IHD(6,2,10),INDIV(10),IOUTM,ICOMP,INMAX,IMAXA,ICHAR,ICH,
08380    IWD,ISWSIZ,ICHAR,JWD,KNO,IRET,IOUT,ISHFTR,KA,KB,KC,KD,KF,
08390    KG,KH,KI,KJ,KK,DL,KL,KM,KP,KQ,KR,KS,KT,KU,KV,KW,KX,KEY,KZ,
08400    KFCOL,KHYPHN,KCOL,KBOLR,KDELTA,KAP,KBK,KK,KL,KM,KN,KP,KQ,KR,
08410    KG,KHKI,KJ,KK,KL,KM,KN,KP,KQ,KR,KT,KU,KV,KW,KX,KEY,KZ,
08420    KRET,IBLNKS,IBLNK,KDEC,KCOMMA,KCENT,LOWER,TERM,IGN0,NOQ,
08430    IMAXAC,IMAXQC,ISTRW,ISTART,NOQUES,LIST,LAST,IGETSW,ISAVE(20),
08440    KEQUAL,NTAPE,KOLON,ICRSUM(10,10),NUMANS(10),IANALY,ICOPY,
08450    ICOUNT,ICROSS,ITAB,IANSW(10,10),X(10),X2(10),XCT(10),IBEGA,
08460    INO,XTMAX(10),XMAX(10),XMIN(10),NODECS(10),IDI(12,6),
08470    KZERO,KNINE,MONTH(C22),IHEAD(3,160),
08480    I00(10),KMASK(10),JMASK(10)

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** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
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08370+ ICONN(10), XSAVE(10), IMAXQ, IFWAA(120), LCQ(120), IDAT(6),
08380+ IH(6, 210), INDIVQ(10), IOUTMX, ICOMP, IMAXQ, IMAXA, ICHAR, ICH,
08390+ IWD, IWD10, ICH, JWD, KNO, IRET, IOUT, ISHFL, KA, KB, KC, KD, KE, KF,
08400+ KG, KH, KI, JK, JL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ,
08410+ KCOLON, KLQ, KPR, KSTAR, KTAQ, KDOLL, KDELTA, KAPPA, KBET2, KBET3,
08420+ KRET, IBLNKS, IBLNK, KDEC, KCOMMA, KCENT, LCORIG, IQNDEX, IQNSEQ,
08430+ IMAXAC, IMAXQC, ISTRS, ISTRW, ISTART, NOQUES, LIST, LAST, IGETSW, ISAVE(20),
08440+ KEQUAL, NTAPE, KOLON, ICRSUM(10, 10), NUMANS(10), IANALY, ICOPY,
08450+ ICOUNT, ICROSS, ITAB, IANSW(10, 10), I0, X(10), X2(10), XCT(10), IBEGA,
08460+ NO, XMEAN(10), XS(10), XMAX(10), XMID(10), NODECS(10), IDI(12, 6),
08470+ KZERO, KUNNO, IMONTH(22), IHEAD(3, 160),
08480+ I00(10), KMASK(10), JMASK(10)
08490+ IF (IOUT-LIST) 110, 105, 110
08500+ 105 ISTRW=3
08510+ 110 IGETSW=1
08520+ IWD=2
08530+ ILIMIT = IMAXAC
08540+ IPROSE=1
08550+ LCORIG=LCQ(IQNDEX)
08560+ IF (IQNDEX=4) 185, 275, 115
08570+ J=LCQ(IQNDEX)
08580+ CALL FORMA
08590+ ICHAR=IBLNK
08600+ IF (J) 130, 130, 120
08610+ 120 DO 125 I=1, J
08620+ 125 CALL STRCH
08630+ 130 IGETSW=2
08640+ IWD=1
08650+ ICH=0
08660+ IBLKT=0
08670+ DO 160 I=1, 24
08680+ CALL GETCH
08690+ IF (ICHAR=IBLNK) 140, 135, 140
08700+ 135 IBLKT=1
08710+ GO TO 160
08720+ 140 IF (IBLKT) 155, 155, 145
08730+ 145 M=ICHAR
08740+ ICHAR=IBLNK
08750+ DO 150 J=1, IBLKT
08760+ 150 CALL STRCH
08770+ 155 ICHAR=M
08780+ CALL STRCH
08790+ 155 CALL STRCH
08800+ 160 CONTINUE
08810+ IGETSW=3
08820+ IWD=IFWAA(IQNDEX)
08830+ IF (IWD) 270, 270, 165
08840+ 165 I=I+1
08850+ 170 ILWA=IFWAA(I)
08860+ IF (ILWA) 175, 175, 180
08870+ 175 I=I+1
08880+ GO TO 170
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
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08890 180 ILIMIT=(ILWA-IWD)*IWDSIZ
08900  IPROSE=0
08910 185 ICH=0
08920  ICODE=0
08930  IDATE = 0
08940  IMIDDT = 0
08950  IBLKCT=0
08960  DO 265 J=1,ILIMIT
08970  CALL GETCH
08980  IF (ICHAR-KTAB) 195,190,195
08990 190 JWD=3
09000  JCHAR = 4
09010  IBLKCT=0
09020  GO TO 265
09030 195 IF (ICHAR-KRET) 205,200,205
09040 200  CALL FORMA
09050  JWD=1
09060  JCHAR=0
09070  GO TO 265
09080 205 IF (ICHAR-IBLNK) 214,210,214
09090 210  IBLKCT=IBLKCT+1
09100  GO TO 265
09110 214 IF (IPROSE)215,215,245
09120 215 IF (IDATE) 216,216,219
09130 216 IF (IMIDDT) 217,217,227
09140 217 IF (ICHAR - KEQUAL) 218,226,218
09150 218 IDATE = 1
09160 219 IF (ICHAR - KOLON) 230,220,230
09170 226 IMIDDT = 1
09180  GO TO 265
09190 227 IF (IMIDDT = 7) 228,228,229
09200 228 CALL STRCH
09210  IMIDDT = IMIDDT + 1
09220  GO TO 265
09230 229 IDATE = 1
09240  IF (IBLKCT) 219,219,221
09250 221 M = /ICHAR
09260  ICHAR = IBLNK
09270  DO/222 I = 1,IBLKCT
09280 222 CALL STRCH
09290  ICHAR = M
09300 999 IBLKCT = 0.
09310  GO TO 219
09320 220 IPROSE=1
09330  IF (ICODE) 265,265,225
09340 225 ICHAR=KRP
09350  CALL STRCH
09360  GO TO 265
09370 230 IF (IPROSE) 235,235,245
09380 235 IF (ICODE) 240,240,245
09390 240 M=CHAR
09400  ICODE=1
** "RETRIVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**
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```
09410  ICHAR=KLP
09420  CALL STRCH
09430  ICHAR=M
09440  245  IF (IBLKCT) 260,260,250
09450  250  M=ICHAR
09460  ICHAR=IBLNK
09470  DO 255 I=1,IBLKCT
09480  255  CALL STRCH
09490  IBLKCT=0
09500  ICHAR=M
09510  260  CALL STRCH
09520  265  CONTINUE
09530  270  IF (LOWER) 285,285,290
09540  275  IGETSW=1
09550  IWD=4
09560  ICH=IWD3IZ-2
09570  CALL GETCH
09580  ISUM = ICHAR - KZERO
09590  IF (ISUM) 276,276,277
09600  276  ICHAR = IBLNK
09610  277  CALL STRCH
09620  CALL GETCH
09630  ISUM = ISUM + ICHAR - KZERO
09640  IF (ISUM) 278,278,279
09650  278  ICHAR = IBLNK
09660  279  CALL STRCH
09670  IWD=3
09680  ICH = IWD3IZ - 1
09690  CALL GETCH
09700  ID(3,4) = IMONTH(ICHAR)
09710  IWD=3
09720  ICH = IWD3IZ-3
09730  DO 280 I=1,3
09740  CALL GETCH
09750  280  CALL STRCH
09760  IWD=2
09770  ICH = IWD3IZ-2
09780  CALL GETCH
09790  CALL STRCH
09800  CALL GETCH
09810  CALL STRCH
09820  285  RETURN
09830  290  IQNDEX=IQNDEX+1
09840  J=LCQ(IQNDEX)
09850  IF (LCORIG-J) 115,115,285
09860  END
09870  SUBROUTINE GETCH
09880  COMMON IQNDEX,IANDEX,ID(8,4), IDAN(420),
09890  IDAT(300),ISHFTR(10),ISHFR(10),KALL(7),IA(18,7),IQU(6,10),
09900  INEG(10),IPRIM(10),IBNEX(10,10),IANOSZ(10),ILHEAD(10),
09910  IDATAR(10,2,10),IWSI4(10,10),IELEM(10,10),XDATAR(2,10),
09920  ICONN(10),XSAVE(10),IMAX2,IFWAA(120),LCQ(120),IDAT(6),

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** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**

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09930+ IHD(6,2,10),INDIVQ(10),IOUTMX,ICOMP,INMAX,IMAXA,ICHAR,ICH,
09940+ IWD,IWDSIZ,JCHAR,JWD,KNO,IRET,IOUT,ISHFL1,KA,KB,KC,KD,KE,KF,
09950+ KG,KH,KI,KJ,KM,KK,KL,KP,KQ,KS,KT,KU,KV,KW,KX,KY,KZ,
09960+ KCOLON,KHYPHN,KLP,KRP,KSTAR,KTAB,KDOLLR,KDELTA,KAPPOST,KBACKS,
09970+ KRET,IBLNSK,IBLNK,KDEC,KCOMMA,KCENT,LOWER,ITEM,IGNO,NOQ,
09980+ IMAXAC,IMAXQC,ISTRSW,ISTART,NOQUES,LIST,LAST,IGETSW,ISAVE(20),
09990+ KEQUAL,NTAPE,KOLON,ICRSUM(10,10),NUMANS(10),IANALY,ICOPY,
10000+ ICOUNT,ICROSS,ITAB,IANSW(10,10),X(10),X2(10),XCT(10),IBEGA,
10010+ NO,XMEAN(10),XSD(10),XMAX(10),XMIN(10),NODECS(10),ID1(12,6),
10020+ KZERO,KNONE,IMONTH(2),IHEAD('3,160),
10030+ IOO(10),KMASK(10),JMASK(10)

10040 DIMENSION SLOT(10)
10050 TYPE INTEGER CHOICE,SLOT
10060 DATA LASTCH / 10HXXXXXXXX9 /
10070 DATA IBG / 0000077 /
10080 ICH = ICH + 1
10090 IF (ICH LE IWDSIZ) GO TO 5
10100 ICH = 1
10110 IWD = IWD + 1
10120 5 CONTINUE
10130 GO TO (10,20,30) IGETSW
10140 10 CHOICE = ID(IWD,IGNDEX)
10150 GO TO 40
10160 20 CHOICE = IHEAD(IWD,IGNDEX)
10170 GO TO 40
10180 30 CHOICE = IDATAN(IWD)
10190 40 CONTINUE
10200 IF (CHOICE EQ LASTCH) GO TO 50
10210 LM = 0
10220 DO 45 I=1,10
10230 LM = LM + 6
10240 SLOT(I) = ISHIFT(CHOICE,LM)
10250 45 SLOT(I) = SLOT(I) .AND. IBG
10260 50 ICHAR = SLOT(ICH)
10270 LASTCH = CHOICE
10280 RETURN
10290 END

10300 COMMON IGNDEX,IINDEX,ICHD(6,4), IDATAN(420),
10310 DATA IGNDEX,ICHD(6,4), IDATAN(420),
10320+ IDATA3(300),ISHFL1(10),ISHFLR(10),KALL(7),IA(18,7),1OU(6,10),
10330+ INEG10),IPRMEC10),IHNDEX(10,10),IANOSZ(10),IHEAD(10),
10340+ IDATAR(10,2,10),IDTSIZ(10,10),IELEM(10,10),XDATAR(2,10),
10350+ IDATN(10),XSAVE(10),IMAXQ,IFWAAN(120),LCO(120),IDAT(6),
10360+ IHDC6,2,10),INDIVQ(10),IOUTMX,ICOMP,INMAX,IMAXA,ICHAR,ICH,
10370+ IWD,IWDSIZ,JCHAR,JWD,KNO,IRET,IOUT,ISHFL1,KA,KB,KC,KD,KE,KF,
10380+ KG,KH,KI,KJ,KM,KK,KL,KP,KQ,KS,KT,KU,KV,KW,KX,KY,KZ,
10390+ KCOLON,KHYPHN,KLP,KRP,KSTAR,KTAB,KDOLLR,KDELTA,KAPPOST,KBACKS,
10400+ KRET,IBLNSK,IBLNK,KDEC,KCOMMA,KCENT,LOWER,ITEM,IGNO,NOQ,
10410+ IMAXAC,IMAXQC,ISTRSW,ISTART,NOQUES,LIST,LAST,IGETSW,ISAVE(20),
10420+ KEQUAL,NTAPE,KOLON,ICRSUM(10,10),NUMANS(10),IANALY,ICOPY,
10430+ ICOUNT,ICROSS,ITAB,IANSW(10,10),X(10),X2(10),XCT(10),IBEGA,
10440+ NO,XMEAN(10),XSD(10),XMAX(10),XMIN(10),NODECS(10),ID1(12,6),
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM  
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```
10450+ KZERO,KNINE,IMONTH(22), IHEAD(3,160), IDATAN(420), 
10460+ I00(10),KMASK(10),JMASK(10) 
10470 105 CALL FORMA 
10480 CALL FORMA 
10490 DO 120 I = 1,4 
10500 IQNDEX = I 
10510 CALL FORMT 
10520 ICHAR=IBLNK 
10530 CALL STRCH 
10540 CALL STRCH 
10550 J = 2*I 
10560 IF (J-JWD) 110,110,120 
10570 110 CALL FORMA 
10580 120 CONTINUE 
10590 CALL FORMA 
10600 DO 130 I=1,10 
10610 130 ILHEAD(I) = 0 
10620 RETURN 
10630 END 
10640 SUBROUTINE INIT 
10650 COMMON IQNDEX,IINDEX,ID(8,4), 
10660+ IDATAN(300),ISHFTL(10),ISHFTR(10),KALL(7),IA(18,7),IOUT(6,10), 
10670+ INES(10),IPRIME(10),IHNDX(10,10),IANOSZ(10),ILHEAD(10), 
10680+ IDATAR(10,2,10),IDsiz(10,10),IELEM(10,10),XDATAR(2,10), 
10690+ ICOMM(10),XSAVE(10),IMAXQ,IFWAA(120),LCQ(120),IDAT(6), 
10700+ IHDC(6,2,10),INDIVQ(10),IOUTMX,ICOMP,INMAX,IMAQUA,ICHAR,ICH, 
10710+ IWD,WDSSIZ,ICHAR,JWD,KNO,IRET,OUT,ISHFLI,KA,KB,KC,KD,KE,KF, 
10720+ KG,KH,KI,KJ,KG,KK,KN,KO,KP,KQ,KR,KS,KT,KU,KV,KW,KX,KY,KZ, 
10730+ KCOLON,KHYPHN,KLP,KRP,KSTAR,KTAB,KDELOR,KAPOST,KBACKS, 
10740+ KRET,IBLNKS,IBLNK,KDEC,KCOMMA,KCENT,LOWER,ITEM,IGNO,NOQ, 
10750+ IMAXAC,IMAXQC,ISTRISW,ISTARNIQUES,LIST,LAST,IGETSW,ISAVE(20), 
10760+ KEQUAL,NTAPE,KOLON,ICRSUM(10,10),NUMANS(10),IANALY,ICOPY, 
10770+ ICOUNT,ICROSS,ITAB,IANSW(10,10),X(10),X2(10),XCT(10),IBEGA, 
10780+ NO,XMAXN(10),XSD(X,10),XMAX(10),XMIN(10),NODECS(10),ID1(12,6), 
10790+ KZERO,KNINE,IMONTH(22), 
10800+ IHEA(3,160), 
10810 DIMENSION IMON(22) 
10820 DATA IMON/0120116,0060502,0150122,0012022,0150131,0122516, 
10830+ 0122514,0012507,0230520,0170324,0161726,0040503,0251613/ 
10840+ IWDSIZ = 10 
10850+ IMAXA = 8 
10860+ IMAXQC = 24 
10870+ IMAXQ = 3 
10880+ IMAXAC = IMAXA * IWDSIZ 
10890+ IOUTMX = 300 
10900+ KNINE = 36 
10910+ KZERO = 27 
10920+ ISHFTL(1) = 1 
10930+ ISHFTL(2) = 2**6 
10940+ ISHFTL(3) = 2**12 
10950+ ISHFTL(4) = 2**18 
10960+ ISHFTL(5) = 2**24 
```
** "RETRIEVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**

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**"RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
08/05/71. 12:34:08.**

11490  KT = 20
11500  KU = 21
11510  KV = 22
11520  KW = 23
11530  KX = 24
11540  KY = 25
11550  KZ = 26
11560  KRET = 53
11570  KHYPHN = 38
11580  KLP = 41
11590  KRP = 42
11600  KSTAR = 39
11610  KTAB = 50
11620  KEQUAL = 44
11630  KDOLLR = 43
11640  KDELTA = 123
11650  KAPOST = 58
11660  KBACKS = 128
11670  KOLON = 51
11680  KCOLON = 51
11690  KCOMMA = 46
11700  KDEC = 47
11710  CONTINUE
11720  ISHFL1 = 2**6
11730  ISHFL2 = ISHFL1**2
11740  DO 100 I=1,22
11750  100 IMONTH(I) = IMON(I)
11760  ITERM = KSTAR
11770  RETURN
11780  END
11790  SUBROUTINE STRCH
11800  COMMON IQNDEX, IINDEX, ID(6,4), IDATAN(420),
11810+ IDATA0(300), ISHFL1(10), ISHFLTR(10), KALL(7), IA(18,7), IOU(6,10),
11820+ INEG(10), IPRIME(10), IHNDEX(10,10), IANOSZ(10), IHLHEAD(10),
11830+ IDATAR(10,2,10), IDTSIZ(10,10), IELEM(10,10), XDATAR(2,10),
11840+ ICONN(10), XSAVE(10), IMAXQ, IFWAA(120), LCQ(120), IDAT(6),
11850+ IH(6,2,10), INDIVQ(10), IOUTMX, ICOMP, IMAXQ, IMAXQ, ICHAR, ICH,
11860+ JD, JWD, JSD, JCHAR, JWD, KNO, IRET, IOUT, IISHTL, KAR, KB, KC, KD, KE, KF,
11870+ KG, KH, KJ, KK, KL, KM, KN, KO, KP, KR, KS, KT, KV, KW, KX, KY, KZ,
11880+ KCOLON, KHYPHN, KLP, KRP, KSTAR, KTAB, KDOLLR, KDELTA, KAPOST, KBACKS,
11890+ KRET, IBLNK, IBLNK, KDEC, KCOMMA, KCENT, LLOWER, ITERM, IGN0, NOQ,
11900+ IMAXQ, IMAXQC, ISTRSW, ISTART, NOQUES, LIST, LAST, IGETSW, ISAVE(20),
11910+ KEQUAL, NTAP, KOLON, ICROM(10,10), NUMANS(10), IANALY, ICOPY,
11920+ ICOUNT, ICROSS, IHTAB, IANSW(10), IO, IX(10), X2(10), XCT(10), IBEGA,
11930+ NO, XMEAN(10), XSD(10), XMAX(10), XMIN(10), NODEC5(10), IDI(12,6),
11940+ KZERO, KNINE, IMONTH(22), IHEAD(3,160),
11950+ IO(10), KMASK(10), JMASK(10)
11960  DIMENSION FMT(10)
11970  DATA FMT/7H(R1,R9),10H(A1,R1,R8),10H(A2,R1,R7),10H(A3,R1,R6),
11980+ 10H(A4,R1,R5),10H(A5,R1,R4),10H(A6,R1,R3),10H(A7,R1,R2),
11990+ 10H(A8,R1,R1)/
12000  TYPE INTEGER CHOICE
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
 08/05/71. 12.34.08.

12010 100 JCHAR = JCHAR + 1
12020 107 IF (JCHAR - IWDSIZ)115,115,110
12030 110 JCHAR = 1
12040 JWD = JWD + 1
12050 115 L = 54 - 6*(JCHAR - 1)
12060 KCHAR = ISHFTCICHARL)
12070 GO TO (108,208,308) ISTRSW
12080 108 IA(JWD,KNO)=(IA(JWD,KNO).AND.100(JCHAR)) .OR. KCHAR
12090 GO TO 400
12100 208 IQUC(JWD,KNO)=(IQUC(JWD,KNO).AND.100(JCHAR)) .OR. KCHAR
12110 GO TO 400
12120 308 IF (JWD - IOUTMX)120,120,910
12130 120 IDATAO(JWD) = (IDATAO(JWD).AND.100(JCHAR)) .OR. KCHAR
12140 400 RETURN
12150 910 PRINT 911
12160 911 FORMAT (3OH OUTPUT BUFFER EXCEEDED
12170 CALL FORMA
12180 JWD = 0
12190 GO TO 110
12200 END
12210 SUBROUTINE TYPEN
12220 COMMON IQNDEX,IANDEX,ID(8,4), IDATAN(420),
12230+ IDATAO(300),ISHFTL(10),ISHFTR(10),KALL(7),IA(18,7),IQUC(6,10),
12240+ INEG(10),IPRIME(10),IHNDEX(10,10),IANOSZ(10),ILHEAD(10),
12250+ IDATAR(10,2,10),IDTSIZ(10,10),IELEM(10,10),XDATAR(2,10),
12260+ ICONN(10),XSAVE(10),IMAXQ,IFVAAC(120),LCQ(120),IDAT(6),
12270+ IHDK(6,2,10),INDIVQ(10),IOUTMK,ICOMP,INMAX,IMAXA,XCHAR,XCH,
12280+ JWD,IWSIZ,JCHAR,JWD,KNO,IRET,IOUT,ISHFLL,IA,KB,KC,KD,KE,KF,
12290+ KG,HI,KJ,KX,KL,SN,KN,NO,KP,KQ,KR,KS,KT,KU,KV,KW,KX,KY,KZ,
12300+ KCOLON,KHYPHN,KLP,KRP,KSTAR,KDOLL,KDENT,KAPOST,KBACKS,
12310+ KRET,IPLBNS,IBLNK,KDEC,KCOMMA,KCENT,LINDER,TERM,IGNO,NOQ,
12320+ IMAXA,IMAXQC,ISTRSW,ISTART,NOQUEST,LIST,LAST,IGETSW,ISAVE(20),
12330+ KEQUAL,NTAPE,KOLON,ICRSUM(10,10),NUMANS(10),IANALY,ICOPY,
12340+ ICOUNT,ICROSS,ITAB,ISAVN(10),IO,X(10),X2(10),XCT(10),IBEGA,
12350+ NO,XMEAN(10),XSD(10),IMAX(10),XMIN(10),NODECS(10),ID1(12,6),
12360+ KZERO,KRINT,INMONTH(22), IHEDC(3,160),
12370+ 100(10),KMASK(10),JMASK(10)
12380 COMMON /MODESW/ RETMODE
12390 DATA IEND1/10HEND OF REG/,IEND2/5HUEST*/
12400 DATA NONE/4NONE/
12410 DATA JALL/3HALL/
12420 INONE=None=(IBLNK*ISHFTL(IWSIZ-4))+(ITEM*ISHFTL(IWSIZ-4))
12430 IALL=JALL=(IBLNK*ISHFTL(IWSIZ-3))+(ITEM*ISHFTL(IWSIZ-3))
12440 ICT = 1
12450 ISTRSW=1
12460 IGETSW=3
12470 IHYP=0
12480 DO 50 I=1,20
12490 50 IDATAN(I) = IBLNKS
12500 105 READ 110, (IDATAN(I),I=1,6)
12510 JJ = 7
12520 JP = 60

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**"RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**
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12530 110 FORMAT (6A10)
12540 111 ICH=0
12550 112 IWD=1
12560 113 IF (RETMODE EQ. 6HREMOTE) GO TO 9950
12570 PRINT 115, (IDATAN(I),I=1,8)
12580 115 FORMAT (7A10,A2)
12590 116 CONTINUE
12600 IF (IHYS) 120,120,185
12610 120 CALL GETCH,
12620 IF (ICHAR-ITERM) 125,235,125
12630 125
12640 DO J=I,IMAXA
12650 130 IA(JKNO)=IBLNKS
12660 KALL(KNO)=1
12670 IF (IDATAN(1) = INONE) 135, 225, 135
12680 135 IF (IDATAN(1)-IALL) 140,230,140
12690 140 KALL(KNO)=0
12700 IF (IDATAN(1)*EQ.8HRESTART*) GO TO 250
12710 IF (IDATAN(1)*EQ.9HNEW FILE*) GO TO 260
12720 IF (IDATAN(1)-IEND1) 150,145,150
12730 145 IF (IDATAN(2)-IEND2) 150,240,150
12740 150 IF (KNO-4) 155,200,170
12750 155 JWD=2
12760 JCHAR=0
12770 DO 165 K=1,IMAXAC
12780 CALL GETCH
12790 IF (ICHAR - ITERM) 160,166,160
12800 160 CALL STRCH
12810 165 CONTINUE
12820 166 IF (KNO - 1) 167,167,169
12830 167 DO 168 I = 1,IMAXA
12840 168 ID1(I,ICT)=IA(I,1)
12850 ICT = ICT + 1
12860 IF (ICHAR - ITERM) 196, 169, 196
12870 169 IRET = 2
12880 RETURN
12890 170 IF (KNO-6) 175,155,184
12900 175 DO 180 I=1,20
12910 180 ISAVE(I)=IDATAN(I)
12920 185 IHYP = 49
12930 185 DO 195 K=1,JP
12940 CALL GETCH
12950 185 IHYP=IHYP+1
12960 IDATAN(IHYP) = ICHAR
12970 IF (ICHAR-ITERM) 190,220,190
12980 190 IF (IHYP-338) 195,215,215
12990 195 CONTINUE
13000 K = JJ+7
13010 196 READ 197, (IDATAN(I),I=JJ,K)
13020 197 FORMAT (8A10)
13030 JJ = JJ+8
13040 JP = 80
** "RETRIVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**

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13050 DO 198 K=1,20
13060 198 ISAVECK(K) = IDATAN(K)
13070 GO TO 185
13080 200 NDEX=1
13090 DO 210 K=1,IMAXAC
13100 CALL GETCH
13110 IF (ICHAR=IBLNK) 205,210,205
13120 205 ICHAR=ICHA(NDEX,4)
13130 NDEX=NDEX+1
13140 IF (ICHAR=ITERM) 210,220,210
13150 210 CONTINUE
13160 215 IRET=3
13170 RETURN
13180 220 IRET=2
13190 RETURN
13200 225 ISAVE(1)=NONE
13210 GO TO 235
13220 230 IA(2,KNO)=JALL
13230 235 IRET=4
13240 RETURN
13250 240 .IRET=1
13260 RETURN
13270 250 .IRET=5
13280 RETURN
13290 260 IRET = 6
13300 RETURN
13310 END
13320 SUBROUTINE MACHDT
13330 COMMON IQNDEX, IANDEX, ID(8,4), IDATAN(420),
13340 IDATAA(300), ISHTFL(10), ISHTFR(10), K2ALL(7), IA(18,7), IG2U(6,10),
13350 INEG(10), IPRIIME(10), IHNDEX(10,10), IANOSZ(10), ILHEAD(10),
13360 IDATAR(10,10), IDTSIZ(10,10), IELEM(10,10), XDATAR(2,10),
13370 ICONN(10), XSAVE(10), IMAXQ, IFWAA(120), LCQ(120), IDAT(6),
13380 HDEC(6,2,10), INDIVQ(10), IOUTMX, ICOMP, IMAXQ, IMAXA, ICHAR, ICH,
13390 IWD, IWDSIZ, JCHAR, JWD, KNO, .IRET, .IOUT, ISHFLT, KA, KB, KD, KE, KF,
13400 KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KT, KU, KV, KW, KX, KY, KZ,
13410 KCOLON, KHYPHN, KLP, KRP, KSTAR, KTAB, KDOLL, KDELTA, KAPOST, KBACKS,
13420 KRET, IBLNKS, IBLNK, KDEC, KCOMMA, KCENT, LOWER, ITERM, IGN0, NOG,
13430 IMAXAC, IMAXGC, ISTRSW, ISTART, NOQUES, LIST, LAST, IGETSW, ISAVE(20),
13440 KEQUAL, NTAPE, KOLON, ICRSUM(10,10), NUMANS(10), IANALY, ICOPY,
13450 ICOUNT, ICROSS, ITAB, IANSW(10), X0, X1, X2(10), XCT(10), IBE, IBE,
13460 NO, XMEAN(10), XSD(10), XMAX(10), XMIN(10), NODEC5(10), ID1(12,6),
13470 XZERO, KNINE, IMONTH(22), IHEAD(3,160),
13480 LCLIM=LCQ(IQNDEX),
13490 LFWAA=IFWAA(IQNDEX),
13500 1480 LFWAA=IFWAA(IQNDEX),
13510 XTOT = 0
13520 IANS = 0
13530 IGETSW=3
13540 INDEX=1QNDEX+1
13550 120 IANSZ=IANOSZ(KNO)
13560 IWD=IFWAA(IQNDEX)
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**  
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13570  KWD = IWD
13580  ICH=0
13590  IF (IWD) 196, 196, 110
13600 110  ILWA=IFWA(INDEX)-1
13610  IF (ILWA) 115,115,124
13620 115  INDEX=INDEX+1
13630  GO TO 110
13640 124  IF (IANSZ1) 210,210,125
13650 125  DO 195 IANO=1,IANSZ1
13660  NUMANS(KNO) = IANO
13670  IWD = KWD
13680  ICH = 0
13690 129  ISIZ = IDTSIZ(IANO,KNO)
13700  IF (ISIZ) .210,210,130
13710 130  IF (ISIZ - 1000) 135,210,135
13720 135  CALL GETCH
13730  IF (IWD-ILWA) 140,140,195
13740 140  IF (ICHAR= KOLON) 135,145,135
13750 145  I=1
13760 150  CALL GETCH
13770  IF (IWD-ILWA) 155,155,195
13780 155  IF (ICHAR-IDATAR(I,IANO,KNO)) 160,190,160
13790 160  IF (ICHAR=IBLNK) 165,150,165
13800 165  IF (ICHAR=KHYPHN) 170,150,170
13810 170  IF (ICHAR=KRET) 175,150,175
13820 175  IF (ICHAR=KTAB) 180,150,180
13830 180  XTOT=0
13840  IF (ICHAR-IDATAR(I,IANO,KNO)) 145,185,145
13850 185  I=1
13860 190  I=I+1
13870  IF (I - ISIZ) 150,150,300
13880 195  CONTINUE
13890 196  IF (LFWA) 310, 197, 310
13900 197  NUMANS(KNO) = 0
13910 200  J = IQNDEX + 1
13920  I = LCQ(J)
13930  IF (LCLIM-I) 205,315,315
13940 205  IQNDEX = J
13950  GO TO 105
13960 210  IEXP=0
13970  XTOT=0
13980  ICOLON=0
13990 215  CALL GETCH
14000  IF (IWD-ILWA) 2215, 2215, 196
14010 2215  IF (ICHAR = KEQUAL) 218,216,218
14020 216  DO 217 I = 1,7
14030 217  CALL GETCH
14040  GO TO 215
14050 218  IF (ICHAR = KRP) 219,275,219
14060 219  IF (ICHAR=KDOLLRL) 220,215,220
14070 220  IF (ICHAR=KCOMMA) 225,215,225
14080 225  IF (ICHAR=IBLNK) 230,215,230
** "RETRIEVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**

08/05/71. I2.34.08.

```
14090 230 IF (ICHAR-KTAB) 235,215,235
14100 235 IF (ICHAR-KRET) 240,215,240
14110 240 IF (ICHAR-KOLON) 245,400,245
14120 400 IF (IANS) 410,410,280
14130 410 ICOLON = 1
14140 GO TO 215
14150 245 IF (ICHAR-KDEC) 250,255,250
14160 250 IF (ICOLON - 1) 251,460,251
14170 460 IF (ICHAR-KLP) 275,470,275
14180 470 ICOLON = 2
14190 GO TO 215
14200 251 XCHAR = ICHAR-KZERO
14210 IF (IEXP) 265,265,260
14220 255 IEXP=1
14230 GO TO 215
14240 260 XTOUTXTXTXCHAR/10.**IEXP
14250 IEXP=IEXP+1
14260 GO TO 270
14270 265 XTOUTXTOT*10.+XCHAR
14280 270 IANS=1
14290 GO TO 215
14300 275 IF (IANS) 310,310,280
14310 280 IF (IANSZI) 305,305,285
14320 285 IF (XDATAR(INO)-XTOT) 290,300,295
14330 290 IF (XDATAR(KNO)-XTOT) 295,300,300
14340 295 CONTINUE
14350 GO TO 196
14360 300 CONTINUE
14370 305 IRET=1
14380 XTOUTXCT(KNO) = XCT(KNO) + 1
14390 X(KNO) = X(KNO) + XTOT
14400 X2(KNO) = X2(KNO) + XTOUTXTOT
14410 IF (XTOT - XMAX(KNO)) 307,307,306
14420 306 XMAX(KNO) = XTOT
14430 307 IF (XTOT - XMIN(KNO)) 308,320,320
14440 308 XMIN(KNO) = XTOT
14450 GO TO 320
14460 310 XTOT = 0.
14470 315 IRET=-1
14480 320 XSAVE(KNO)=XTOT
14490 IANSW(KNO) = IANS
14500 I = IEXP - 1
14510 325 IF (NODECS(KNO) - I) 330,340,340
14520 330 NODECS(KNO) = IEXP - 1
14530 340 RETURN
14540 340 END
14550 SUBROUTINE WHAT
14560 ICHAIN(10)
14570 COMMON IQNDEX,IANDEX,ICD(8,4), IDATAN(420),
14580 IDATAO(300),ISHFTL(10),ISHFTR(10), KALL(7),IA(15,7),IOU(6,10),
14590 INEG(10),IPRIME(10),IHINDEX(10,10),IANOSZ(10),ILHEAD(10),
14600 IDATAR(10,2,10),IDTSIZ(10,10),IELEM(10,10),XDATAR(2,10),
```
** "RETRIVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
08/05/71. 12.34.08.

14610 + ICONN(10), XSAVE(10), IMAXQ, IFWAA(120), LCQ(120), IDAT(6),
14620 + IHDK(6,2,10), INDIV(10), IOUTMX, ICOMP, INMAX, IMAXA, ICHAR, ICH,
14630 + IWD, IWDSIZ, JCHAR, JWD, KNO, IRET, IOUT, ISHFL, KA, KB, KC, KD, KE, KF,
14640 + KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ,
14650 + KCOLON, KYHYPN, KLP, KRP, KSTART, KTAB, KDOLLAR, KDELTA, KAPOST, KBACKS,
14660 + KRET, IBLNKS, IBLNK, KDEC, KCOMMA, KCENT, KDEC, KCOLON, KCOLON10, KCOLON20,
14670 + IMAXAC, IMAXQC, ISTRSW, ISTART, NOQUES, LIST, LAST, IGES, ISAVE(20),
14680 + KEQUAL, NTAP, KOLON, ICRSUM(10,10), NUMANS(10), IANALY, ICOPY,
14690 + ICOUNT, ICROSS, ITAB, IANSW(10,10), I10, I20, I30, I40, I50, I60, I70, I80,
14700 + INO, XMEAN(10), XSD(10), XMAX(10), XMIN(10), NODECS(10), IDI(12,6),
14710 + KZERO, KNINE, IMONTH(22), IHEAD(3,160),
14720 + I100(10), KMASK(10), JMASK(10)
14730 105 ICH = 49
14740 150 IQNO=KNO
14750 150 IGROUP=1
14760 150 IF (KNO=ICOMP) 110, 110, 125
14770 110 ILEVEL=0
14780 110 INEXTA=1
14790 115 CONTINUE
14800 150 IELEM(IQNO, IGROUP)=INEXTA
14810 150 ILEVEL=ILEVEL+1
14820 150 ICHAIN(ILEVEL)=INEXTA
14830 150 IGROUP=ICHAIN(ILEVEL)
14840 150 IF (INEXTA-NOQ) 120, 120, 300
14850 120 INEXTA=INEXTA+1
14860 125 IBLKSW=0
14870 130 JWD=1
14880 135 JCHAR=0
14890 135 CALL GETWH
14900 150 GO TO (320, 265, 115, 140, 145, 145, 145, 200, 225, 190, 175, 200), IRET
14910 140 ILEVEL=ILEVEL-1
14920 140 IGROUP=ICHAIN(ILEVEL)
14930 140 IBLKSW=1
14940 150 GO TO 130
14950 145 IF (IBLKSW) 200, 200, 150
14960 150 CALL GWHAT
14970 150 GO TO (320, 265, 115, 140, 160, 155, 200), IRET
14980 155 I=1
14990 155 GO TO 165
15000 160 I=-1
15010 165 IQNO=IQNO+1
15020 160 IF (KNO=ICOMP) 170, 170, 125
15030 170 ICONN(IGROUP)=ICONN(IGROUP)+1
15040 150 GO TO 125
15050 175 IF (IHD(1,2, KNO)-IBLNKS) 310, 180, 310
15060 180 DO 185 III=1, 6
15070 185 IHD(III, 2, IQNO) = IHD(III, 1, IQNO)
15080 185 IQU(III, IQNO)=IQU(III, IQNO)
15090 185 IQU(III, IQNO)=IBLNKS
15100 185 CONTINUE
15110 150 GO TO 125
15120 190 IF (JCHAR) 135, 135, 195

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** "RETRIEVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM

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15130 195  IBLKSW=1
15140  GO TO 205
15150 200  IBLKSW=0
15160 205  ISTRSW=2
15170 210  IF (IGNO-ICOMP) 210,210,215
15180 215  IELEM(IGNO,IGROUP)=1
15190 215  KNO=IGNO
15200  CALL STRCH
15210  GO TO 135
15220 220  INEG(IGNO)=-1
15230 225  CALL GETWH
15240 230  IF (ICHAR-IBLNK) 230,225,230
15250 235  IF (ICHAR-KZERO) 240, 235, 235
15260 240  IF (ICHAR-KNINE) 245, 245, 240
15270 245  CALL WHCODE
15280 250  GO TO (320,265,115,140,160,155,250), IRET
15290 255  PRINT 255
15300 255  FORMAT (40H ILLEGAL CHAR FOLLOWING CODED DATA
15310 255  GO TO 330
15320 260  CALL WHPROS
15330 265  GO TO (320,265,115,140,160,155,220), IRET
15340 265  IF (IGROUP-1) 270,280,270
15350 270  PRINT 275
15360 275  FORMAT (26H PARENTHESIS COUNTED WRONG)
15370 275  GO TO 330
15380 280  IF (IGNO-ICOMP) 285,285,290
15390 285  ICOMP=IGNO
15400 290  GO TO 295
15410 290  LAST=IGNO
15420 295  IRET=2
15430 295  RETURN
15440 300  PRINT 305
15450 305  FORMAT (29H TOO MANY SETS OF PARENTHESIS)
15460 305  GO TO 330
15470 310  PRINT 315
15480 315  FORMAT (19H TOO MANY MODIFIERS)
15490 315  GO TO 330
15500 320  PRINT 325
15510 325  FORMAT (30H DATA CANNOT EXCEED 288 CHARS )
15520 325  IRET=1
15530 330  RETURN
15540 330  END
15550  SUBROUTINE CKWHAT
15560  COMMON IDATEN(IKINDEX,IXANDEX,IXIDAT(8,4)),
15570  IDATAN(420),
15580+ IDATAO(300),ISHFTL(10),ISHFR(10),KALL(7),IA(16,7),IQU(6,10),
15590+ INEG(10),IPRIME(10),IHNDEX(10,10),IANGSZ(10),ILHEAD(10),
15600+ IDATAR(10,2),IDTSIZ(10,10),IELEM(10,10),XDATAR(2,10),
15610+ ICONN(10),XSAVE(10),IMAXQ,IFWAA(120),LCQ(120),IDAT(6),
15620+ IH(6,2,10),INDIVG(10),IOUTMX,ICOMP,INMAX,IMAXA,ICHAR,ICH,
15630+ IW, IWD, IWSIZ, JCHAR, WD, KNO, IRET, IOUT, ISHFTL, KA, KB, KC, KD, KE, KP,
15640+ KG, KH, KJ, KK, KL, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ,
** "RETRIEVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM  
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```
15650+ KCOLON,KHYPHN,KLP,KRP,KSTAR,KTAB,KDOLLR,KDELTA,KAPOST,KEACKS,
15660+ KREL,IELNK5,IELNK,KDEC,KCOMMA,KCENT,LOWER,TERM,IQNO,NOQ,
15670+ IMAXAC,IMAXOC,ISTRSW,ISTART,NOQUES,LIST,LAST,IGETSW,ISAVE(20),
15680+ KEQUAL,NTAPE,KOLON,ICRSUM(10,10),NUMANS(10),IANALY,ICOPY,
15690+ ICOUNT,ICROSS,ITAB,IANSW(10),X(10),X2(10),XCT(10),IBEGA,
15700+ NO:XMEAN(10),XSD(10),XMAX(10),XMIN(10),NODECS(10),ID1(12,6),
15710+ KZERO,KNINE,IMONTH(22),IHEAD(3,160),
15720+ IO0(10),KMASK(10),JMASK(10)
15730       ICUR=ICH
15740       ICHAR=ICH
15750       GO TO (150,150,150,150,150,150,150,140,140,140,140), IRET
15760       105       CALL GETWH
15770       IF (ICHAR-KN) 140,110,140
15780       110       CALL GETWH
15790       IF (ICHAR-KD) 140,115,140
15800       115       CALL GETWH
15810       IRET=5
15820       GO TO 130
15830       120       CALL GETWH
15840       IF (ICHAR-KR) 140,125,140
15850       125       CALL GETWH
15860       IRET=6
15870       130       IF (ICHAR-IBLNK) 135,150,135
15880       135       IF (ICHAR-KLP) 140,145,140
15890       140       ICHAR=ICH
15900       ICHAR=ICH
15910       IRET=7
15920       RETURN
15930       145       ICHAR=ICH
15940       RETURN
15950       END
15960       SUBROUTINE GETWH
15970       DIMENSION IWH(10)
15980       COMMON IQNDEX,IANDEX,IA(D(8,4)), IDATAN(420),
15990+ IDATA(300),ISHFTL(10),ISHFTR(10),KALL(7),IA(18,7),IQU(6,10),
16000+ INEG(10),IPRIME(10),IHNDXXE(10,10),IANOSZ(10),IHEAD(10),
16010+ IDATAR(10,8,10),IDTSIZ(10,10),IELEM(10,10),XDATAR(2,10),
16020+ ICONN(10),XSAVE(10),MAXX,FWAA(120),LCQ(120),IDAT(6),
16030+ IHQ(6,2,10),INDIVQ(10),IOUTMX,ICOMP,INMAX,IMAXA,ICHR,ICH,
16040+ IW,IFDSIZ,ICHCHAR,JW,JNO,IRETIOUT,ISHFLL,IA,KB,KC,KD,KE,KF,
16050+ KG,KH,CI,JU,KK,KL,CM,KM,KN,KO,KP,KR,KS,KU,KW,KX,KY,KZ,
16060+ KCOLON,KHYPHN,KLP,KRP,KSTAR,KTAB,KDOLLR,KDELTA,KAPOST,KEACKS,
16070+ KREL,IELN5,IELN5,KDEC,KCOMMA,KCENT,LOWER,TERM,TERM,TERM,TERM,TERM,TERM,
16080+ IMAXAC,IMAXOC,ISTRSW,ISTART,NOQUES,LIST,LAST,IGETSW,ISAVE(20),
16090+ KEQUAL,NTAPE,KOLON,ICRSUM(10,10),NUMANS(10),IANALY,ICOPY,
16100+ ICOUNT,ICROSS,ITAB,IANSW(10),X(10),X2(10),XCT(10),IBEGA,
16110+ NO:XMEAN(10),XSD(10),XMAX(10),XMIN(10),NODECS(10),ID1(12,6),
16120+ KZERO,KNINE,IMONTH(22),IHEAD(3,160),
16130+ IO0(10),KMASK(10),JMASK(10)
16140+ 105       ICH=ICH+1
16150       ICHAR = IDATAN(ICH)
16160       IF (ICH-338) 115,115,110
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**"RETRIVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**

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16170 110 IRET=1
16180 RETURN
16190 115 IF (ICH-50)125,120,125
16200 120 IWH(2)=ITEM
16210 IWH(3)=KLP
16220 IWH(4)=KRP
16230 IWH(5)=KA
16240 IWH(6)=KO
16250 IWH(7)=KN
16260 IWH(8)=KCOLON
16270 IWH(9)=IBM
16280 IWH(10)=KCOMMA
16290 125 DO 130 1=2,10
16300 IRET=1
16310 IF (ICHAR-IWH(I)) 130,140,130
16320 130 CONTINUE
16330 IF (ICHAR - KRET) 135,105,135
16340 135 IRET=11
16350 140 RETURN
16360 END
16370 SUBROUTINE WHPROS
16380 COMMON IQNDEX,IINDEX,IA(6,4), IDATAN(420),
16390+ IDATAN(300),ISHFTL(10),ISHFTR(10),KALL(7),IA(18,7),IQU(6,10),
16400+ INEG(10),IPRIME(10),IHINDEX(10,10),IANOSZ(10),ILHEAD(10),
16410+ IDATAR(10,2,10),IDTSIZ(10,10),IELEM(10,10),XDATA(2,10),
16420+ ICONF(10),XSAVE(10),IMAXQ,IFWAA(120),LCG<120),IDAT(6),
16430+ IHDC(6,2,10),INDIVQ(10),IOUTMX,ICOMP,INMAX,IMAXA,ICHAR,ICH,
16440+ IWDSIZ,JCHAR,JUD,KNO,IRET,IOUT,ISHFTL,KA,KB,KC,KE,KF,
16450+ KG,KH,KJ,KL,KN,KK,KT,KU,KV,KW,KX,KY,KZ,
16460+ KCOLON,KHYPHN,KLP,KRP,KSTAR,KTAB,KDOLLR,KDELT,KPOST,KBACKS,
16470+ KRET,IBLKSW,IBLNX,KDEC,KKOMMA,KCENT,LOWER,TERM,IGNO,
16480+ IMAXAC,IMAXQC,IISTRW,ISTART,NOQUES,LIST,LAST,IGET5W,ISAVE(20),
16490+ KEQUAL,NTAPE,KOLON,ICRSUM(10,10),NUMANS(10),IANYAL,YICOPY,
16500+ ICOUNT,IRCORS,ITAB,IANOS(10),IO,X(10),X2(10),XCT(10),IBEGA,
16510+ NO,XMAXQ(10),XSD(10),XMNOX(10),XMIN(10),NODECS(10),ID1(12,6),
16520+ KZERO,KNINE,KMONT(22),IHEAD(3,160),
16530+ 100(10),KMASK(10),JMASK(10)
16540+ IANO=1
16550 105 IBLKSW=0
16560 IDCH=1
16570 IANOSZ(INGO)=IANO
16580 110 GO TO (170,170,170,170,170,115,115,125,150,180,175,150),IRET
16590 115 IF (IBLKSW) 150,150,120
16600 120 CALL CKWHAT
16610 GO TO (170,170,170,170,170,170,170,150), IRET
16620 125 ICURR=ICH
16630 IF (IDCH-1) 150,130,150
16640 130 CALL GETW
16650 IF (ICHAR-KO) 145,135,145
16660 135 CALL GETW
16670 IF (ICHAR-KT) 145,140,145
16680 140 CALL GETW
** "RETRIEVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM**
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IRET=7

IF (ICHAR-I-BLNK) 145,170,145
ICH=ICH-1
ICHAR=KN
CONTINUE
IDTSIZ(IANO,IQNO)=IDCH
IBLKSW=0
IDATAR(IDCH,IANO,IQNO)=ICHAR
ICH=ICH+1
CALL GETWH
GO TO 110
RETURN

CALL GETWH
IANO=IANO+1
GO TO 105

IF (ICHAR-1) 165,165,185
IBLKSW=1
IDCH=IDCH+1
CALL GETWH
GO TO 160
END

SUBROUTINE WHCODE

COMMON IQNDEX,IANDEX,ID(8,4),IDATAN(420),
IDATAO(300),ISHFTL(10),ISHFTR(10),KALL(7),IA(18,7),IGU(6,10),
INEG(10),IPRIME(10),IHNDEX(10,10),IANSZ(10),ILHEAD(10),
IDATAR(10,10),IELEM(10,10),XDATAR(2,10),
IDTSIZ(IANO,IQNO)=1000
XDATA=0
XDATAS=0
IEXP=0
IQUCHAR=ICHAR
IF (IQUCHAR-ZERO) 125,120,120
IF (IQUCHAR=KINE) 180,180,125
IF (IQUCHAR-KHYPH) 130,145,130
IF (IQUCHAR-KT) 155,135,155
CALL GETWH
IF (ICHAR-KO) 175,140,175
ILOWHI=2
IF (ICHAR=K) 175,140,175
CALL GETWH
GO TO 105
**"RETHEVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
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17210 145 IF (XDATAS) 140,150,140
17220 150 XDATAS=-1
17230 GO TO 200
17240 155 IF (IQUCH-KDOLLR) 160,200,160
17250 160 IF (IQUCH-KCENT) 165,200,165
17260 165 IF (IQUCH-KTAB) 170,200,170
17270 170 IF (ICHAR-KDEC) 172,225,172
17280 172 IF (IQUCH-IBLNK) 185,200,185
17290 175 ICHAR=KT
17300 180 ICHAR = ICHAR - KZERO
17310 185 GO TO 185
17320 190 XCHAR = ICHAR - KZERO
17330 195 IF (IEXP) 185,185,230
17340 185 XDATA=XDATA+10.**IEXP
17350 200 IF (XDATAS) 200,195,200
17360 195 XDATAS=1
17370 200 CALL GETWH
17380 205 GO TO (210,210,185,210,205,205,185,185,200,200,110), IRET
17390 205 CALL CKWHAT
17400 210 GO TO (210,210,210,210,210,185), IRET
17410 210 GO TO (215,220), ILOWHI
17420 215 XDATAR(1, IQNO)=XDATA*XDATAS
17430 220 XDATAR(2, IQNO)=XDATA*XDATAS
17440 225 IANOSZ(IQNO)=1
17450 RETURN
17460 225 IEXP=1
17470 230 GO TO 200
17480 230 XDATA=XDATA+XCHAR/10.**IEXP
17490 230 IEXP=IEXP+1
17500 230 GO TO 190
17510 END
17520 SUBROUTINE PFLFIX
17530 COMMON IQNDEX, IANDEX, ID(8,4), IDATAN(420),
17540+ IDATAO(300), ISHFTL(10), ISHFTR(10), KALL(7), IA(18,7), IQU(6,10),
17550+ INEG(10), IPRIME(10), INHEAD(10), IANOSZ(10), IHEAD(3,10),
17560+ IDATAR(10,2,10), IITSIZ(10,10), IELEM(10,10), XDATAR(2,10),
17570+ ICONN(10), XSAVE(10), INMAX, IFWAA(120), LCQ(120), IDAT(6),
17580+ IHD(6,10), INDIVQ(10), OUTMX, ICOMP, INMAX, IMAXA, ICHAR, ICH,
17590+ IHD, IWD, IWSIZ, JCHAR, JDN, KNO, IRET, IOUT, ISHFL, KA, KB, KC, KD, KE, KF,
17600+ KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KS, KT, KU, KV, KW, KY, KZ,
17610+ KCOLON, KHPHYN, KLK, KRP, KSTAR, KTAB, KDOLLR, KDELTA, KAPPOST, KBACKS,
17620+ KRET, KBLNS, KIDNS, KDENS, KCOMMA, KCENT, LOWER, ITERM, IQNO, NOQ,
17630+ IMAXAC, IMAXQC, ISTRSW, ISTART, NOQUES, LIST, LIST, IGETSW, ISAVE(20),
17640+ KEQUAL, NTAP, KOLON, ICRSUM(10,10), NUMANS(10), IHANALY, ICOPY,
17650+ ICOUNT, ICRSS, ITAB, IANSW(10), IOX(10), X2(10), XCT(10), IBEGA,
17660+ NO, XMEAN(10), XSD(10), XMAX(10), XMN(10), NODECS(10), ID1(12,6),
17670+ KZERO, KNINE, IMONTH(28), IHEAD(3,160),
17680+ IOO(10), KMASK(10), JMASK(10)
17690 NOPLAC = 9
17700 NODEC = NODECS(KNO)
17710 IF (NODEC) 1,1,2
17720 1 NOINT = NOPLAC
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
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17730  GO TO 3
17740    2 NOINT = NOPLAC - NODEC - 1
17750    3 CONTINUE
17760    ISTRSW = 3
17770    ICHAR = IBLNK
17780    CALL STRCH
17790    CALL STRCH
17800    IF (IANOSZ(KNO)) 420, 420, 410
17810    410 IF (INDIVQ(KNO)) 280, 280, 10
17820    420 IF (IANSW(KNO)) 280, 280, 10
17830    10 IF (XSAVE(KNO)) 15, 310, 20
17840    15 ICHAR = KHYPHN
17850    CALL STRCH
17860    XSAVE(KNO) = -XSAVE(KNO)
17870    NOINT = NOINT - 1
17880    20 NUNUM = XSAVE(KNO)
17890    XNUDEC = XSAVE(KNO) - XNUM
17900    XNUM = NUNUM
17910    IANS = 0
17920    IF (NUNUM-.10**NOINT)30.250,250
17930    30 DO 80 J=1,NOINT
17940      K = NOINT - J
17950      ICHAR = NUNUM/10**K
17960      NUNUM = NUNUM - ICHAR*10**K
17970      IANS = IANS + ICHAR
17980      ICHAR = ICHAR + KZERO
17990      IF (IANS)40,40,50
18000    40 ICHAR = IBLNK
18010    CALL STRCH
18020    GO TO 80
18030    50 CALL STRCH
18040    80 CONTINUE
18050    IF (NODEC) 340, 340, 90
18060    90 ICHAR = KDEC
18070    CALL STRCH
18080    XNUDEC = XNUDEC*.5/10.**NODEC
18090    100 DO 110 K=1,NODEC
18100      XNO = XNUDEC*10.**K
18110      ICHAR = XNO
18120      CHAR = ICHAR
18130      ICHAR = ICHAR + KZERO
18140    CALL STRCH
18150    XNUDEC = XNUDEC - CHAR/10.**K
18160    110 CONTINUE
18170    GO TO 340
18180    250 ICHAR = KX
18190    GO TO 290
18200    280 ICHAR = IBLNK
18210    290 DO 300 K = 1, NOPLAC
18220    CALL STRCH
18230    300 CONTINUE
18240    GO TO 340
** "RETRIEVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
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18250  310 ICHAR=IBLNK
18260  M=NOINT-1
18270  DO 320 K=1,M
18280  CALL STRCH
18290  320 CONTINUE
18300  ICHAR=KZERO
18310  CALL STRCH
18320  IF (NODEC) 321, 340, 321
18330  321 ICHAR=KDEC
18340  CALL STRCH
18350  ICHAR=KZERO
18360  DO 330 K=1,NODEC
18370  CALL STRCH
18380  330 CONTINUE
18390  340 CONTINUE
18400  RETURN
18410  END
18420  SUBROUTINE PRINT
18430  COMMON IQNDEX,IINDEX,ID(8,4), IDATAN(420),
18440+ IDATAO(300),ISHFTL(10),ISHFTR(10),KALL(7),IQA(16,7),IQC(6,10),
18450+ INEG(10),IPRIME(10),IINDEX(10,10),IANSZ(10),IHEAD(10),
18460+ IDATAR(10,10),IINDEX(10,10),IELEM(10,10),XDATAR(2,10),
18470+ IRECI(10),XSAVE(10),IMAXQ,IFWAA(120),LCQ(120),IDAT(6),
18480+ IH(6,2,10),INDIVQ(10),IOUTMX,ICOMP,INMAX,IMAXA,ICHAR,ICH,
18490+ IWD,IDSVIZ,JCHAR,JWD,KNO,IRETI,OUT,ISHFL1,KA,KB,KC,KE,KF,
18500+ KG,KH,KL,KM,KN,KP,KQ,KR,KS,KT,KU,KV,KW,KX,KY,KZ,
18510+ KCOLON,KEQHYP,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,
18520+ KRET,IBLNK,IBLNK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,
18530+ KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,
18540+ KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,
18550+ KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,
18560+ KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,
18570+ KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,
18580+ KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,KEQK,
18590+ NWD=JWD
18600  IF (JWD - 7) 10,10,20
18610  10 IF ((JWD *EQ. 1) +AND+ (IDATAO(I) *EQ. IBLNKS)) GO TO 15
18620  PRINT 50, (IDATAO(I),I=1,JWD)
18630  RETURN
18640  15 PRINT, **
18650  RETURN
18660  20 PRINT 50, (IDATAO(I),I=1,JWD)
18670  JWD = JWD - 7
18680  K = 8
18690  30 J = K + 4
18700  PRINT 60, (IDATAO(I),I=K,J)
18710  K = J+1
18720  JWD = JWD-5
18730  IF (JWD) 40,40,30
18740  40 JWD=NWD
18750  RETURN
18760  50 FORMAT (8A10)
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
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18770 60 FORMAT (22X,5A10)
18780 END
18790 SUBROUTINE WRITREC
18800 COMMON IQNDEX, IANDEX, ID(8,4), IDATAN(420),
18810+ IDATANO(300), ISHFTL(10), ISHFTR(10), KALL(7), IA(18,7), IQU(6,10),
18820+ INEG(10), IPRIME(10), IINDEX(10,10), IANOSZ(10), ILHEAD(10),
18830+ IDAT(10,2,10), IDTSL(10,10), IELEM(10,10), XDATAR(2,10),
18840+ IDAT(10,2,10), IMAXQ, IFWAA(120), LCQ(120), IDAT(6),
18850+ IHD(6,2,10), INDIVQ(10), IOUTMX, ICOMP, IMAXA, ICHAR, ICH,
18860+ IWD, IWDMS, JCHAR, JWD, KNO, LRET, LOUT, LSHL, LFL, LK, LC, LD, LK, LF,
18870+ KG, KH, KL, KK, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KW, KX, KY, KZ,
18880+ KCOL, KCON, KDP, KFL, KFP, KF, KFL, KF, KF, KF,
18890+ KRET, IBLNK, JBLNK, KDEC, KCOMMA, KCENT, KLOWER, KTERM, KNO, NOQ,
18900+ IMAXAC, IMAXQC, ISTRU, ISTART, NQUES, LIST, NLAST, IGETSW, ISAVE(20),
18910+ KEGUAL, NTAPE, KOLON, ICSPM(10,10), NUMANS(10), IANALY, ICOPY,
18920+ ICOUNT, ICROSS, ITAB, IAWS(10,10), IAWS(10,10), ICT(10), IEGEA,
18930+ NO, XMEN(10), XSD(10), IMAXQ(10), NDECS(10), ID1(12,6),
18940+ KZERO, KNINE, IMONT; 22), IHEAD(3,160),
18950+ 100(10), KMASK(10), JMASK(10)
18960 WRITE (15,100) IQNDEX, IANDEX
18970 DO 10 J = 1,4
18980 10 WRITE (15,110) (IDI,J),I=1,7
18990 DO 20 M = 1, IQNDEX
19000 20 WRITE (15,110) (LHEAD(L,M),L=1,3)
19010 IF (IQNDEX .LE. 65) GO TO 30
19020 WRITE (15,120) (IDATAN(I'),I=J,K)
19030 IF (IQNDEX .NE. MPT) 70,70,60
19040 WRITE (15,130) (IFWAA(K),K=M,N)
19050 K = 1
19060 50 N = M + 21
19070 IF (IQNDEX .EQ. MPT) 70,70,60
19080 WRITE (15,120) (LCQ(K),K=1,65)
19090 60 WRITE (15,130) (IFWAA(K),K=M,N)
19100 M = N + 1
19110 70 WRITE (15,120) (LCQ(K),K=66,IQNDEX)
19120 MPT = MPT + 22
19130 GO TO 50
19140 GO TO 50
19150 WRITE (15,130) (IFWAA(K),K=M,IQNDEX)
19160 J = 1
19170 IZAN = (IANDEX/6) + 1
19180 IPAN = (IZAN-1) * 6
19190 IF (IPAN .EQ. IANDEX) IZAN = IZAN - 1
19200 DO 80 M = 1, IZAN
19210 K = J + 5
19220 WRITE (15,110) (IDATAN(I),I=J,K)
19230 80 J = J + 6
19240 RETURN
19250 100 FORMAT (1X,2I5)
19260 110 FORMAT (1X,7A10)
19270 120 FORMAT (1X,6511)
19280 130 FORMAT (1X,2213)
** "RETREVE" -- RETRIEVAL PROGRAMS FOR MIMS SYSTEM
08/05/71. 12.34*08.*

19290 END

-- THE END --
** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS
08/05/71. 11.31.33.

00100C THIS PROGRAM WAS RE-DESIGNED AND DEVELOPED BY PAUL SIMMONS,
00110C UNITED COMPUTING SYSTEMS, INC., AND RONALD SCHWARZ, GODDARD
00120C SPACE FLIGHT CENTER, JULY, 1971.
00130C
00140 PROGRAM UPDATE (INPUT, OUTPUT, TAPE4, TAPE5)
00150 COMMON IQ(3,7), ISEVN(10), KHEAD(3), MHEAD(3), KDATA(500), MDATA(500),
00160+ ITYPE(500), IA(7,5), ID(7,4), LHEAD(3,160), LCQ(160), IPNT(160),
00170+ JANS(1000), JALL, IBLNK, JCHANGE, JDELETE, JADD, JACTION, KAND, KOLON,
00180+ JCHNGHD, KBLNK, NRTAPE, NTAPE, LANS, JSHT, JCHAR, ICHAR, NaNs, NRET,
00190+ IPUT, KHCT, KDCT, MHCT, NDCT, MCOUNT, KK, KJ, IINDEX, IANDEX, MTCH, JJ,
00200+ KTERM, IDATE(18), JMASK(10), KNEW(20)
00210 COMMON IEND, MACH
00220 DIMENSION KDAT(22)
00230 CALL CLOCK(IX)
00240 CALL DATER(IS)
00250 PRINT 8886, IS, IX
00260 8886 FORMAT (*PROGRAM: UPDATE*, 4X, *DATE:*, A9, 4X, *TIME:*, A9, ///)
00270 PRINT, *DO YOU WANT TO MAKE MORE THAN ONE CHANGE*,
00280 READ 2, ICYCLE
00290 2 FORMAT (A1)
00300 CALL INIT
00310 3378 PRINT, *ENTER THE NAME OF THE FILE TO BE UPDATE*,
00320 3379 READ 3, MDAT
00330 3 FORMAT (A7)
00340 CALL PFUR(3HRET, NRTAPE, MDAT, O, ISTJ)
00350 IF (ISTJ .EQ. 5) GO TO 9214
00360 NEW = 0
00370 JSKIP = 0
00380 C SET UP QUESTIONS TO BE ASKED
00390 CALL READREC
00400 REWIND NRTAPE
00410 DO 5 J = 1, 4
00420 DO 5 I = 2, 3
00430 K = I - 1
00440 5 IQ(I, J) = LHEAD(K, J)
00450 6 MTCHH = 0
00460 DO 7 I = 1, 3
00470 KHEAD(I) = IBLNK
00480 7 MHEAD(I) = IBLNK
00490 DO 8 I = 1, 500
00500 KDATA(I) = IBLNK
00510 8 MDATA(I) = IBLNK
00520 DO 9 I = 1, 20
00530 9 KNEW(I) = IBLNK
00540 11 DO 12 I = 1, 5
00550 12 IA(K, I) = IBLNK
00560 12 IA(K, I) = IBLNK
00570 PRINT, /
00580 DO 20 I = 1, 3
00590 PRINT 10, (IQ(J, I), J = 2, 3)
00600 10 FORMAT (2A10, 7X)
00610 KTERM = 1

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**"UPDATE" -- ALTERS DATA RECORDS AND POINTERS**
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00620 CALL TYPEN
00630C PUT ANSWER IN IA ARRAY
00640 IF (ITYPE(1) .EQ. 4HDONE) ICYCLE = 1H
00650 IF (ITYPE(1) .EQ. 4HDONE) GO TO 90
00660 IF (ITYPE(1) .EQ. 7HRESTART) GO TO 11
00670 IF (ITYPE(1) .EQ. 8HNEW FILE) NEW = 1
00680 IF (NEW .EQ. 1) ICYCLE = 1H
00690 IF (NEW .EQ. 1) GO TO 90
00700 IF (NANS .EQ. 0) GO TO 20
00710 DO 15 J=1,NANS
00720 K = J+1
00730 15 IA(K,1) = ITYPE(J)
00740 20 CONTINUE

00750C INPUT AND CONVERT DATE
00760 16 PRINT 10, (IQ(J,4),J=2,3)
00770 READ 22, (KDAT(I),I=1,22)
00780 22 FORMAT (22R21)
00790 IF (KDAT(1) .EQ. 22B *AND* KDAT(2) .EQ. 05B) GO TO 11
00800 IF (KDAT(1) .EQ. 47B) GO TO 30
00810 NDEX = 1
00820 DO 24 I=1,22
00830 ICHAR = KDAT(I)
00840 IF (ICHAR = 45)23,24,23
00850 23 IDATE(NDEX) = ICHAR
00860 NDEX = NDEX + 1
00870 24 CONTINUE
00880 IF (KDAT(1) .EQ. 01B *AND* KDAT(2) .EQ. 14B) GO TO 25
00890 NPUT = 1
00900 CALL DATEIN
00910 GO TO (26,26,26,30) IRET
00920 26 PRINT*, *BAD DATE*
00930 GO TO 16
00940 25 IA(2,4) = JALL
00950C ACTION
00960 30 PRINT 10, (IQ(J,5),J=2,3)
00970 KTERM = 1
00980 CALL TYPEN
00990 IF (NANS .EQ. 0) GO TO 35
01000 IF (NANS .NE. 1) GO TO 70
01010 IF (ITYPE(1) .EQ. 7HRESTART) GO TO 11
01020 IF (ITYPE(1) .EQ. JCHANGE) JACTION = JCHANGE
01030 IF (ITYPE(1) .EQ. JDELETE) JACTION = JDELETE
01040 IF (ITYPE(1) .EQ. JADD) JACTION = JADD
01050 IF (JACTION .NE. JADD) GO TO 35
01060 PRINT 10, (IQ(J,7),J=2,3)
01070 GO TO 36
01080C WHAT
01090 35 PRINT 10, (IQ(J,6),J=2,3)
01100 36 KTERM = 0
01110 CALL TYPEN
01120 IF (ITYPE(1) .EQ. 7HRESTART) GO TO 11
01130 IF (ITYPE(1) .NE. 4HALL*) GO TO 40

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** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS**

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01140 KDATA(1) = JALL
01150 IF (JACTION .EQ. JDELETE) GO TO 40
01160 PRINT, *CANNOT CHANGE OR ADD ALL*
01170 GO TO 35
01180 40 IPUT = 1
01190 CALL BUILD
01200 GO TO (55,299,35) IRET
01210 55 IF (JACTION .NE. JADD) GO TO 56
01220 PRINT 10, (IQ(J,6),J=2,3)
01230 GO TO 61
01240 56 IF (JACTION .EQ. JDELETE) GO TO 90
01250 C CHANGE 'TO' SOMETHING
01260 PRINT 10, (IQ(J,7),J=2,3)
01270 61 KTERM = 0
01280 CALL TYPEN
01290 IF (JACTION .EQ. JCHNGHD) GO TO 35
01300 70 JACTION = JCHNGHD
01310 75 IF (JACTION .EQ. JCHNGHD) GO TO 90
01400 DO 80 I=1,3
01410 80 MDATA(I) = MHEAD(I)
01420 MDCT = MHCT
01430 CALL READREC AND LOOK FOR MATCH
01440 IF (JSKIP .EQ. 1) GO TO 92
01450 CALL READREC
01460 IF (JEND .EQ. 2) GO TO 95
01470 IF (IRET .EQ. 1) GO TO 105
01480 92 JSKIP = 0
01490 95 IF (MATCHXS .EQ. 1) PRINT 76
01500 PRINT(/4H****,* NO MATCH FOR ID INFORMATION***)
01520 IF (MATCHH .EQ. -1) PRINT 77
01530 PRINT(/4H****#* NO MATCH FOUND FOR HEADER INFORMATION***)
01540 ENDFILE NWTAPE
01550 REWIND NRTAPE
01560 REWIND NWTAPE
01570 CALL PFUR(3HREP,NRTAPE,MDAT,O,ISTA)
01580 47 IF (ISTA .NE. 0) GO TO 49
01590 CALL PFUR(3HREP,NRTAPE,MDAT,O,ISTB)
01600 IEND = 0
01610 MATCHX = 0
01620 MATCHXS = 0
01630 MATCHH = 0
01640 IF (ICYCLE .EQ. 1HY) GO TO 6
01650 IF (NEW .EQ. 1) GO TO 3378

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01660 STOP
01670 49 GO TO 47
01680 STOP
01690 105 MATCHX = 0
01700 CALL IDMATCH
01710 IF (IRET .EQ. 2) MATCHX = 1
01720 IF (MATCHX .EQ. 2) GO TO 841
01730 MATCHX = MATCHX
01740 IF (IRET .EQ. 1) MATCHX = 2
01750 841 CONTINUE
01760 GO TO (115, 110) IRET
01770C ID DOESN'T MATCH...WRITE RECORD AND GO ON
01780 110 IF (ICYCLE .EQ. IHY .AND. MTCHH .EQ. 1) GO TO 112
01790 CALL WRITREC
01800 GO TO 90
01810 112 JSKIP=1
01820 GO TO 6
01830C ID MATCHES...WHAT NOW?
01840 115 IF (JACTION .NE. JDELETE) GO TO 125
01850 IF (KHEAD(1) .NE. JALL) GO TO 1150
01860 PRINT \1167, (ID(2,I),I=1,3)
01870 IF (ICYCLE .EQ. IHY) GO TO 6
01880 GO TO 90
01890C FIND THE HEADING TO BE ELIMINATED AND BLANK IT OUT
01900 1150 MATCHH = 0
01910 CALL MATCH
01920 IF (IRET .EQ. 2) MATCHH = 1
01930 GO TO (116, 110) IRET
01940 116 LHEAD(1,MTCH) = LHEAD(2,MTCH)=LHEAD(3,MTCH)=IBLNK
01950 LCQ(MTCH) = IBLNK
01960C SHIFT THE ANSWER ARRAY
01970 PRINT \167, (ID(2,I),I=1,3)
01980 1167 FORMAT (*MATCH ON *3(A10,1X))
01990 MATCHH=1
02000 117 J = MTCH+1
02010 K = IPNT(MTCH)
02020 IF (J .GT. IQNDEX) GO TO 1172
02030 1171 M = IPNT(J)
02040 IF (M .NE. 0) GO TO 118
02050 J = J+1
02060 GO TO 1171
02070 1172 IQNDEX = IQNDEX - 1
02080 IANDEX = IPNT(MTCH) - 1
02090 K = IANDEX + 1
02100 M = K + 5
02110 DO 1174 I=K,M
02120 1174 JANS(I) = IBLNK
02130 GO TO 110
02140 118 MAX = 1000 - (IPNT(J)-IPNT(K))
02150 IPT = IPNT(J) - IPNT(MTCH)
02160 DO 119 I=K,MAX
02170 JANS(I) = JANS(M)

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02180 119 M = M+1
02190C SHIFT IPNT, LCQ, LHEAD ARRAYS
02200 DO 123 K=M+1,159
02210 J = K+1
02220 IPNT(K) = IPNT(J)
02230 IF (IPNT(K) .NE. 0) IPNT(K)+IPNT(K)-IPT
02240 LCQ(K) = LCQ(J)
02250 DO 121 M=1,3
02260 121 LHEAD(M,K) = LHEAD(M,J)
02270 123 CONTINUE
02280 IQNDEX = IQNDEX - 1
02290 IANDEX = IANDEX - IPT
02300 GO TO 110
02310 124 PRINT, *SORRY, YOU CAN'T DELETE THAT*
02320 STOP
02330 125 IF (IACTION .NE. JADD) GO TO 160
02340C ADD DATA TO AN ALREADY EXISTING ANSWER
02350 MATCHH = 0
02360  CALL MATCH
02370 IF (IRET .EQ. 2) MATCHH = 1
02380 GO TO (127,110) IRET
02390 127 K = MTCH + 1
02400 IF (MTCH .LE. 4) GO TO 159
02410 PRINT 1167, (ID(2,I),I=1,3)
02420 MTCHH = 1
02430 IF (K .GT. IQNDEX) GO TO 131
02440 128 IF (IPNT(K) .NE. O) GO TO 129
02450 K = K+1
02460 GO TO 128
02470 131 DO 132 I=1,500
02480 IF (JANS(I) .EQ. IBLNK) GO TO 133
02490 132 CONTINUE
02500 133 KK = I-1
02510 GO TO 134
02520 129 JDIFF = IPNT(K) - IPNT(MTCH)
02530 KK = IPNT(K) -1
02540C COUNT CHARACTERS IN ALREADY EXISTING ANSWER
02550 134 CALL COUNT
02560 KBOTH = MDCT + KJ
02570 KSTRCH = KBOTH/10 + 1
02580 LSTRCH = (KSTRCH - 1)*10
02590 IF (LSTRCH .EQ. KBOTH) KSTRCH = KSTRCH - 1
02600 LSHFT = KSTRCH - 1
02610 IF (K .GT. IQNDEX) GO TO 153
02620 IF (LSHFT)299,155,135
02630C FIND BLANK IN ANSWER ARRAY
02640 135 DO 140 I=1,500
02650 IF (JANS(I) .EQ. IBLNK) GO TO 145
02660 140 CONTINUE
02670 145 K = (I-1) + LSHFT
02680 I = K - LSHFT
02690 150 JANS(K) = JANS(I)
** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS 08/05/71. 11.31*33.

02700 I = I-1
02710 K = K-1
02720 IF (I .GT. IPNT(MTCH)) GO TO 150
02730 JANS(I+1) = IBLNK
02740C ANSWERS HAVE BEEN SHIFTED UP...NOW ENTER DATA TO BE ADDED
02750 155 CONTINUE
02760C ADJUST IPNT ARRAY
02770 K = MTCH+1
02780 DO 152 I=K,160
02790 IF (IPNT(I) .EQ. 0) GO TO 152
02800 IPNT(I) = IPNT(I) + LSHFT
02810 152 CONTINUE
02820C
02830 153 IANDEX = IANDEX + LSHFT
02840 IPUT = 5
02850 MCOUNT = 0
02860 NW = 1
02870 NC = 0
02880 IF (KJ .LT. 10) GO TO 156
02890 KK = KK+1
02900 KJ = 0
02910 156 KSHFT = (NC*6)-54
02920 ICHAR = ISHIFT(MDATA(NW),KSHFT) .AND. KAND
02930 CALL STRCH
02940 KJ = KJ+1
02950 NC = NC+1
02960 MCOUNT = MCOUNT+1
02970 IF (MCOUNT .GT. MDCT) GO TO 110
02980 IF (KJ .GT. 9) GO TO 158
02990 157 IF (NC .LE. 9) GO TO 156
03000 NC = 0
03010 NW = NW+1
03020 GO TO 156
03030 158 KJ = 0
03040 KK = KK+1
03050 JANS(KK) = IBLNK
03060 GO TO 157
03070 159 PRINT, *YOU CAN ONLY CHANGE DATA IN THE FIRST 4 HEADINGS*
03080 STOP
03090 160 IF (JACTION .NE. JCHANGE) GO TO 220
03100C CHANGE DATA
03110 MATCHX = 0
03120 MATCHH = 0
03130 CALL MATCH
03140 IF (IRET .EQ. 2) MATCHH = 1
03150 GO TO (165,110),IRET
03160 165 K = MTCH + 1
03170 PRINT 1167, (ID(2,I),I=1,3)
03180 MTCHH=1
03190 IF (K .GT. IANDEX) GO TO 167
03200 IF (K .LE. 4) GO TO 218
03210 IF (K .EQ. 5) GO TO 240

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** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS**

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03220 166 JDIFF = IPNT(K) - IPNT(MTCH)
03230 IF (JDIFF .GT. 0) GO TO 167
03240 K = K + 1
03250 GO TO 166
03260 167 KSTRCH = MDCT/10 + 1
03270 LSTRCH = (KSTRCH - 1)*10
03280 IF (LSTRCH .EQ. MDCT) KSTRCH = KSTRCH - 1
03290 IF (K .GT. IQNDEX) GO TO 210
03300 IF (JDIFF .LE. 5) GO TO 216
03310 IF (JDIFF .GT. KSTRCH) 170,210,195
03320C MUST SHIFT DATA UP TO ACCOMODATE BIGGER DATA FIELD
03330 170 DO 175 I=1,1000
03340 IF (JANSCI .EQ. IBLNK) GO TO 180
03350 175 CONTINUE
03360 180 L = ((KSTRCH - JDIFF) - 1) + I
03370 M = I - 1
03380 185 JANSL(I) = JANS(M)
03390 L = L - 1
03400 M = M - 1
03410 IF (M .GT. IPNT(MTCH)) GO TO 185
03420C DATA HAS BEEN SHIFTED UP...NOW MAKE CHANGE
03430C CHANGE POINTERS
03440 N = KSTRCH - JDIFF
03450 M = MTCH + 1
03460 DO 192 I=M,160
03470 IF (IPNT(I) .NE. 0) IPNT(I) = IPNT(I) + N
03480 192 CONTINUE
03490 IANDEX = IANDEX + N
03500 187 N = IPNT(MTCH)
03510 DO 190 I=1,KSTRCH
03520 JANS(N) = MDATA(I)
03530 190 N = N + 1
03540 GO TO 110
03550C SHIFT DATA DOWN
03560 195 M = IPNT(MTCH)
03570 N = M + (JDIFF-KSTRCH)
03580 DO 200 I=N,1000
03590 JANS(M) = JANS(I)
03600 200 M = M+1
03610 DO 205 I=M,160
03620 IF (IPNT(I) .EQ. 0) GO TO 205
03630 IPNT(I) = IPNT(I) - (JDIFF - KSTRCH)
03640 205 CONTINUE
03650 IANDEX = IANDEX - (JDIFF - KSTRCH)
03660 GO TO 187
03670C NO SHIFTING REQUIRED
03680 210 M = IPNT(MTCH)
03690 DO 215 I=1,KSTRCH
03700 JANS(M) = MDATA(I)
03710 215 M = M+1
03720 DO 216 I=1,1000
03730C IF (JANSL .EQ. IBLNK) GO TO 217

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03740 216 CONTINUE
03750 217 IANDEX = I - 1
03760 GO TO 110
03770 218 DO 219 I=1,6
03780 J = I+1
03790 IF (IQUIT *EQ. 3) GO TO 219
03800 MDATA(I) = ISHIFT(MDATA(I),12)
03810 MDATA(I) = MDATA(I) *AND. ISEVN(8)
03820 LTCHAR = MDATA(J) *AND. ISEVN(2)
03830 LTCHAR = ISHIFT(LTCHAR,-48) *AND. 7777B
03840 MDATA(I) = MDATA(I) *OR. LTCHAR
03850 219 IDCJ,MTCH) = MDATA(I)
03860 IQUT = 3
03870 GO TO 110
03880 220 IF (JACTION .NE. JCHNGHD) GO TO 299
03890 CALL MATCH
03900 GO TO (225,110) IRET
03910 225 DO 230 I=1,3
03920 230 LHEADCIMTCH) = MHEAD(I)
03930 PRINT 1167, (IDI(2,I),I=1,3)
03940 MCHH=1
03950 GO TO 110
03960 299 PRINT, *PROGRAMMING ERROR*
03970 STOP
03980 240 IF (ISTP *EQ. 1) GO TO 260
03990 IS = 1
04000 DO 250 I=1,2
04010 DO 245 J=1,10
04020 KSHFT = (J*6)-60
04030 IDATE(IS) = ISHIFT(MDATA(I),KSHFT) *AND. KAND
04040 IF (IDATE(IS).NE. 55B*AND. IDATE(IS).NE. 63B*AND. IDATE(IS).NE.
04050+ 62B) IS = IS+1
04060 245 CONTINUE
04070 250 CONTINUE
04080 255 PRINT, *YOU GAVE ME A SCREWY DATE*
04090 STOP
04100 260 IPUT = 3
04110 265 IDA,MTCH) = MDATA(I)
04120 GO TO 110
04130 END

SUBROUTINE IDMATCH
04140 COMMON IQ(3,7),ISEVN(10),KHEAD(3),MHEAD(3),MDATA(500),MDATA(500),
04150+ ITYPE(500),IA(7,5),ID(7,4),LHEAD(3,160),LCQ(160),IPNT(160),
** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS**
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04260+ JANS(1000), JALL, IBLNK, JCHANGE, JDELETE, JADD, JACTION, KAND, KOLON,
04270+ JCHNGHD, KBLNK, NRTAPE, NWTAPE, LANS, JSHFT, JCHAR, ICHAR, NANS, IRET,
04280+ IPUT, KHCT, KDCT, MHCT, MDCT, MCOUNT, KK, KJ, IINDEX, IINDEX, MTCH, JJ,
04290+ KTERM, IDATE(18), JMASK(10), KNEW(20)
04300 COMMON IEND, MACH
04310 DO 10 J=1,3
04320 IF (IA(2,J) *EQ* JALL) GO TO 10
04330 DO 5 I=2,4
04340 IF (IA(I,J) *NE. ID(I,J)) GO TO 50
04350 5 CONTINUE
04360 10 CONTINUE

C NOW CHECK DATE RANGE
04370 IF (IA(2,4) *EQ. JALL) GO TO 45
04380 IF (ID(2,4) = IA(2,4))50,20,30
04390 20 IF (ID(3,4) = IA(3,4))50,25,30
04400 25 IF (ID(4,4) = IA(4,4))50,30,30
04410 30 IF (ID(2,4) = IA(2,5))45,35,50
04420 35 IF (ID(3,4) = IA(3,5))45,40,50
04430 40 IF (ID(4,4) = IA(4,5))45,45,50
04440 45 IRET = 1
04450 RETURN
04460 IRET = 2
04470 RETURN
04480 END

04490 SUBROUTINE TYPEN
04500 COMMON IQ(3·7),ISEVN(10),KHEAD(3),MHEAD(3),KDATA(500),MDATA(500),
04510 INTYPE(500),IA(7,5),ID(7,4),LHEAD(3,160),LCQ(160),IPNT(160),
04520+ JANS(1000), JALL, IBLNK, JCHANGE, JDELETE, JADD, JACTION, KAND, KOLON,
04530+ JCHNGHD, KBLNK, NRTAPE, NWTAPE, LANS, JSHFT, JCHAR, ICHAR, NANS, IRET,
04540+ IPUT, KHCT, KDCT, MHCT, MDCT, MCOUNT, KK, KJ, IINDEX, IINDEX, MTCH, JJ,
04550+ KTERM, JDATE(18), JMASK(10), KNEW(20)
04560 COMMON IEND, MACH
04570 NANS = 0
04580 K = 1
04590 M=K+4
04610 READ 10, (INTYPE(N), N=K,M)
04620 10 FORMAT (6A10)
04630 DO 15 I=K,M
04640 IF (INTYPE(I) *EQ. IBLNK) GO TO 35
04650 NANS = NANS + 1
04660 15 CONTINUE
04670 CALL ETERM(INTYPE(M), JSWIT, KTERM)
04680 IF (JSWIT *EQ. 1) GO TO 30
04690 K = M+1
04700 PRINT 25
04710 25 FORMAT (27X*)
04720 G0 TO 5
04730 30 IF (INTYPE(M) *EQ. IBLNK) NANS=NANS-1
04740 RETURN
04750 35 M=I-1
04760 G0 TO 20
04770 END
** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS**
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```
04780 SUBROUTINE STRCH
04790 COMMON IQ(3,7),ISELECT(10),KHEA(3),MHEAD(3),KDATA(500),MDATA(500),
04800 TYPE(500),IA(7,5),ID(7,4),LHEAD(3,160),LCQ(160),IPNT(160),
04810 JANS(1000),JALL, IBLNK, JCHANGE, JDELETE, JADD, JACTION, KAND, KOLON,
04820 JCHNGHD,KBLNK,NRTAPE,NWTAPE,LANS,JSHFT,JCHAR,ICCHAR,NANS,IRET,
04830 IPUT,KHCT,KDCT,MDCT,MCOUNT,KK,KJ,IGNINDEX,IINDEX,MCH,JJ,
04840 KTERM, IDATE(18),JMASK(100),KNEW(20)
04850 COMMON IEND, MACH
04860 JSHFT = 54 - (KJ*6)
04870 ISUBS = (JSHFT/6) + 1
04880 GO TO (5,10,15,20,25,30) IPUT
04890 5 KHEAD(KK) = (KHEAD(KK).AND.JMASK(ISUBS)) OR .ISHIFT(ICHAR,JSHFT)
04900 RETURN
04910 10 KDATA(KK) = (KDATA(KK).AND.JMASK(ISUBS)) OR .ISHIFT(ICHAR,JSHFT)
04920 RETURN
04930 15 MHEAD(KK) = (MHEAD(KK).AND.JMASK(ISUBS)) OR .ISHIFT(ICHAR,JSHFT)
04940 RETURN
04950 20 MDATA(KK) = (MDATA(KK).AND.JMASK(ISUBS)) OR .ISHIFT(ICHAR,JSHFT)
04960 RETURN
04970 25 JANS(KK) = (JANS(KK).AND.JMASK(ISUBS)) OR .ISHIFT(ICHAR,JSHFT)
04980 RETURN
04990 30 KNEW(KK) = (KNEW(KK).AND.JMASK(ISUBS)) OR .ISHIFT(ICHAR,JSHFT)
05000 RETURN
05010 END
05020 SUBROUTINE COUNT
05030 COMMON IQ(3,7),ISELECT(10),KHEA(3),MHEAD(3),KDATA(500),MDATA(500),
05040 TYPE(500),IA(7,5),ID(7,4),LHEAD(3,160),LCQ(160),IPNT(160),
05050 JANS(1000),JALL, IBLNK, JCHANGE, JDELETE, JADD, JACTION, KAND, KOLON,
05060 JCHNGHD,KBLNK,NRTAPE,NWTAPE,LANS,JSHFT,JCHAR,ICCHAR,NANS,IRET,
05070 IPUT,KHCT,KDCT,MDCT,MCOUNT,KK,KJ,IGNINDEX,IINDEX,MCH,JJ,
05080 KTERM, IDATE(18),JMASK(100),KNEW(20)
05090 COMMON IEND, MACH
05100 KJ = 10
05110 JSHFT = 6
05120 DO 5 I=1,10
05130 2 JSHFT = JSHFT - 6
05140 ICHAR = .ISHIFT(JANS(KK),JSHFT) .AND. KAND
05150 IF (ICCHAR .NE. 55B) RETURN
05160 5 KJ = KJ - 1
05170 GO TO 2
05180 END
05190 SUBROUTINE READREC
05200 COMMON IQ(3,7),ISELECT(10),KHEA(3),MHEAD(3),KDATA(500),MDATA(500),
05210 TYPE(500),IA(7,5),ID(7,4),LHEAD(3,160),LCQ(160),IPNT(160),
05220 JANS(1000),JALL, IBLNK, JCHANGE, JDELETE, JADD, JACTION, KAND, KOLON,
05230 JCHNGHD,KBLNK,NRTAPE,NWTAPE,LANS,JSHFT,JCHAR,ICCHAR,NANS,IRET,
05240 IPUT,KHCT,KDCT,MDCT,MCOUNT,KK,KJ,IGNINDEX,IINDEX,MCH,JJ,
05250 KTERM, IDATE(18),JMASK(100),KNEW(20)
05260 COMMON IEND, MACH
05270 READ (NRTAPE,100) IGNINDEX,IINDEX
05280 IF (EOF,NRTAPE)140,5
05290 5 DO 10 J=1,4
```

80
**"UPDATE" -- ALTERS DATA RECORDS AND POINTERS**
08/05/71. 11.31.33*

05300 10 READ (NRTAPE,110) (ID(I,J),I=1,7)
05310 ID(3,4) = ID(3,4) .AND. 77B
05320 DO 20 M=1,IQNDEX
05330 20 READ (NRTAPE,110) (LHEAD(L,M),L=1,3)
05340 IF (IQNDEX .LE. 65) GO TO 30
05350 READ (NRTAPE,120) (LCQ(K),K=1,65)
05360 READ (NRTAPE,120) (LCQ(K),K=66,IQNDEX)
05370 GO TO 40
05380 30 READ (NRTAPE,120) (LCQ(K),K=1,IQNDEX)
05390 40 MPT = 22
05400 M = 1
05410 50 N = M+21
05420 IF (IQNDEX .LE. MPT)70,70,60
05430 60 READ (NRTAPE,130) (IPNT(K),K=M,N)
05440 M = N+1
05450 MPT = MPT+22
05460 GO TO 50
05470 70 READ (NRTAPE,130) (IPNT(K),K=M,IQNDEX)
05480C COMPUTE HOW MANY LINES IT TAKES TO READ DATA
05490 J = 1
05500 IZAN = (IANDEX/6) + 1
05510 IPAN = (IZAN - 1)*6
05520 IF (IPAN .EQ. IANDEX) IZAN = IZAN - 1
05530 DO 90 M=1,IZAN
05540 K = J+5
05550 READ (NRTAPE,110) (JANS(I),I=J,K)
05560 90 J = J+6
05570 IRET = 1
05580 RETURN
05590 100 FORMAT (1X,215)
05600 110 FORMAT (1X,7A10)
05610 120 FORMAT (1X,65I1)
05620 130 FORMAT (1X,22I3)
05630 140 IEND = 2
05640 RETURN
05650 END
05660 SUBROUTINE INIT
05670 COMMON IQ(3,7),ISEVN(10),KHEAD(3),MHEAD(3),KDATA(500),MDATA(500),
05680+ ITYPE(500),IA(7,5),ID(7,4),LHEAD(3,160),LCQ(160),IPNT(160),
05690+ JANS(1000),JALL,IBLNK,JCHANGE,JDELETE,JACTION,KAND,KOLON,
05700+ JCHNGD,KBLNK,NRTAPE,NRTAPE,LANS,JSHFT,JCHAR,JCHAR2,JANS,IRET,
05710+ IPUT,KHCT,KDCT,MHCT,MDCT,MCOUNT,KK,KJ,IQNDEX,IANDEX,MTCH,JJ,
05720+ KTERM,1DATE(18),JMASK(10),KNOW(20)
05730 COMMON IEND, MACH
05740 IQ(2,5) = 6HACTION
05750 IQ(2,6) = 4HWHAT
05760 IQ(2,7) = 2HTO
05770 JALL = 3HALL
05780 IBLNK = 10H
05790 JCHANGE = 6CHANGE
05800 JDELETE = 6DELETE
05810 JADD = 3HADD

81
** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS
08/05/71  11.31.33.

05820  JACTION = IBLNK
05830  KAND = 77B
05840  KOLON = 63B
05850  JCHNGHD = 10HCHANGEHEAD
05860  KBLNK = 55B
05870  ISEVN(1) = 0770000000000000000000000
05880  ISEVN(2) = 0777777777700000000000000
05890  ISEVN(3) = 0777777777700000000000000
05900  ISEVN(4) = 0777777777700000000000000
05910  ISEVN(5) = 0777777777700000000000000
05920  ISEVN(6) = 0777777777700000000000000
05930  ISEVN(7) = 0777777777777777777777777
05940  ISEVN(8) = 0777777777777777777777777
05950  ISEVN(9) = 0777777777777777777777777
05960  ISEVN(10) = 0777777777777777777777777
05970  JMASK(0) = 0777777777777777700000000
05980  JMASK(10) = 0777777777777777700000000
05990  JMASK(20) = 0777777777777777700000000
06000  JMASK(30) = 0777777777777777700000000
06010  JMASK(40) = 0777777777777777700000000
06020  JMASK(50) = 0777777777777777700000000
06030  JMASK(60) = 0777777777777777700000000
06040  JMASK(70) = 0777777777777777700000000
06050  JMASK(80) = 0777777777777777700000000
06060  JMASK(90) = 0777777777777777700000000
06070  NRTAPE = 4
06080  NWTAPE = 5
06090  DO 30 I = 1,1000
06100  30 JANS(I) = IBLNK
06110  DO 35 J=1,7
06120  DO 35 I=1,5
06130  35 IACJ(I) = IBLNK
06140  RETURN
06150  END
06160  SUBROUTINE MATCH
06170  COMMON IQ(3,7),ISEVN(10),KHEAD(3),MHEAD(3),KDATA(500),MDATA(500),
06180+  ITYPE(500),IA(7,5),ID(7,4),LHEAD(3,160),LCQ(160),IPNT(160),
06190+  JANS(1000),JALL,IBLNK,JCHANGE,JDELETE,JADD,JACTION,KAND,KOLON,
06200+  JCHNGHD,KBLNK,NRTAPE,NWTAPE,LANS,JSHFT,JCHAR,ICHAR,NANS,IRET,
06210+  IPUT,KHC7,KDC7,MCOUNT,KK,KJ,IXQDEX,IANDX,MTCH,JJ,
06220+  KTERM,IDATE(18),JMASK(10),KNEW(20)
06230  COMMON IEND, MACH
06240  IPUT=6
06250  J=1
06260C  DO HEADINGS MATCH?
06270  5 DO 10 K=1,3
06280  IF (LHEAD(K,J)-KHEAD(K))90,10,90
06290  10 CONTINUE
06300C  Heading matches...Does data?
06310  IF (JACTION.EQ.JCHNGHD) GO TO 95
06320  IF (KDATA(J))90,EQ,IBLNK) GO TO 95
06330  IF (J-4) 105,120,15
** "UPDATE" --- ALTERS DATA RECORDS AND POINTERS
08/05/71. 11.31-33.

06340 15 LPOINT=IPNT(J)
06350 K=J
06360 20 K=K+1
06370 IF (K*GT*IQNDEX) GO TO 30
06380 IF (IPNT(K)*EQ.0) GO TO 20
06390 LIMIT=IPNT(K)
06400 GO TO 35
06410 30 LIMIT=IANDEX
06420 35 IFIRST=0
06430 JOUNT=0
06440 IGET=IFIRST
06450 40 KK=1
06460 KJ=0
06470 45 IF (IGET.LE.9) GO TO 50
06480 IGET=0
06490 LPOINT=LPOINT+1
06500 IF (LPOINT.GT.LIMIT) GO TO 90
06510 50 JSHIFT=(IGET*6)-54
06520 ICHAR=ISHIFT(JANS(LPOINT),JSHIFT).AND.77B
06530 CALL STRCH
06540 JOUNT=JOUNT+1
06550 IF (JOUNT.EQ.KDCT) GO TO 65
06560 KJ=KJ+1
06570 IF (KJ.LE.9) GO TO 60
06580 KJ=0
06590 KK=KK+1
06600 60 IGET=IGET+1
06610 GO TO 45
06620C SEE IF DATA MATCHES
06630 65 DO 75 M=1,20
06640 IF (KNEW(M)-IBLNK) 70,95,70
06650 70 IF (KDATA(M)-KNEW(M)) 80,75,80
06660 75 CONTINUE
06670 GO TO 95
06680C DOESN'T MATCH...TRY AGAIN
06690 80 IFIRST=IFIRST+1
06700 LPINT(IPNT(J)) * IFIRST/10
06710 JOUNT=0
06720 DO 85 M=1,20
06730 85 KNEW(M)=IBLNK
06740 GO TO 40
06750 90 J=J+1
06760 IF (J*GT*IQNDEX) 5,5,100
06770 95 IRET=1
06780 MTCH=J
06790 RETURN
06800 100 IRET=2
06810 RETURN
06820C SEE IF THE LEADER MATCHES
06830 105 DO 1110 K=1,6
06840 L = K+1
06850 IF (KDATA(K)-ID(L,J)) 115,110,115
** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS

08/05/71: 11.31.33.

06860 110 CONTINUE
06870 111 IRET=1
06880 MTCH = J
06890 RETURN
06900 115 J=J+1
06910 GO TO 5
06920 C SEE IF DATE MATCHES
06930 120 I=1
06940 DO 130 K=1,2
06950 DO 125 L=1,10
06960 KSHFT = (6*L) - 60
06970 IDATE(I) = ISHIFT(KDATA(K),KSHFT).AND.77B
06990 125 CONTINUE
07000 130 CONTINUE
07010 IPUT=2
07020 CALL DATEIN
07030 GO TO (135,135,135,105),IRET
07040 135 PRINT, *YOU GAVE ME A SCREWY DATE*
07050 STOP
07060 END
07070 SUBROUTINE BUILD
07080 COMMON IG(3*7),ISEVN(10),KHEAD(3),MHEAD(3),KDATA(500),MDATA(500),
07090+ IYPE(500),IA(7,5),ID(7,4),LHEAD(3,160),LCQ(160),IPNT(160),
07100+ JANS(1000),JALL,IBLNK,JCHANGE,JDELETE,JADD,JACTION,KAND,KOLON,
07110+ JCHNGHD,KBLNK,NRTAPE,NRTAPE,LANS,JSHFT,JCHAR,CHANGE,NANS,IRET,
07120+ IPUT,KHGT,KDCT,MHCT,MDCT,MOUNT,KK,KJ,INDEX,INDEX,MTCH,JC,
07130+ KTERM,DATE(18),JMASK(10),KNEW(20)
07140 COMMON IENDP, MACH
07150 LCNT=0 $ IRET=1 $ LANS=1 $ IRET=1
07160 JCHAR = 0
07170 KK=1
07180 KJ=0
07190 10 JSHFT=(JCHAR*6)-54
07200 ICHAR=ISHIFT(IYPE(LANS),JSHFT).AND.77B
07210 IF (ICCHAR.EQ.47B) GO TO 25
07220 IF (ICCHAR.EQ.63B) GO TO 35
07230 12 IF (ICCHAR.EQ.51B) ICHAR = 62B
07240 IF (ICCHAR.EQ.52B) ICHAR = 63B
07250 CALL STRCH
07260 LCNT=LCNT+1
07270 15 JCHAR=JCHAR+1
07280 KJ=KJ+1
07290 IF (KJ.GT.9) GO TO 30
07300 20 IF (JCHAR.LE.9) GO TO 10
07310 LANS=LANS+1
07320 JCHAR=0
07330 IF (LANS.LE.(NANS+1)) GO TO 10
07340 22 IRET=3
07350 25 GO TO (26,27,28,29),IPUT
07360 26 KHGT=LCNT
07370 RETURN
** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS
08/05/71 11:31:33.

07380 27 KDCT=LCNT
07390 RETURN
07400 28 MHCT=LCNT
07410 RETURN
07420 29 MDCT=LCNT
07430 IF (JACTION .EQ. JCHNGHD) GO TO 37
07440 IF (JACTION .EQ. JADD) RETURN
07450 IF (MDATA(1) .EQ. IBLNK) RETURN
07460 K = ISHIFT(MDATA(1),-54) *AND* 77B
07470 IF (K .EQ. 62B) RETURN
07480 K = MDCT/10 + 2
07490 ISAVE1=63620000000000000000B
07500 DO 291 L=1,K
07510 ISAVE2= MDATA(L) *AND* 7777B
07520 MDATA(L) = ISHIFT(ISAVE2, -12) *AND* 7777777777777777B
07530 MDATA(L) = MDATA(L) *OR* ISAVE1
07540 291 ISAVE1 = ISHIFT(ISAVE2, 48)
07550 LCNT = LCNT+2
07560 RETURN
07570 30 KJ=0
07580 KK=KK+1
07590 GO TO 20
07600 35 GO TO (36,50,37,37), IPUT
07610 36 KHCT=LCNT
07620 IPUT = IPUT+1
07630 GO TO 38
07640 37 MHCT=LCNT
07650 DO 371 L=1,3
07660 MHEAD(L) = MDATA(L)
07670 371 MDATA(L) = IBLNK
07680 IF (JACTION .EQ. JCHNGHD) RETURN
07690 38 LCNT=0
07700 KK=1
07710 KJ=0
07720 39 JCHAR=JCHAR+1
07730 IF (JCHAR.LE.9) GO TO 40
07740 LANS=LANS+1
07750 JCHAR=0
07760 IF (LANS.GT.(NANS+1)) GO TO 22
07770 40 JSHFT=(JCHAR*6)-54
07780 ICHAR=ISHIFT(ITYPEC, JSHFT) *AND* 77B
07790 IF (ICHAR-55B) 12,39,12
07800 50 PRINT, *PROGRAMMING ERROR, SEE PROGRAMMER*
07810 STOP
07820 85
07830 END
07840 SUBROUTINE WRITREC
07850 COMMON I6C(3,7), ISEVN(10), KHEAD(3), MHEAD(3), MHEAD(500), MDATA(500),
07860 + ITYPEC(500), IA(7,5), ID(7,4), LHEAD(3,160), LCQ(160), IPNT(160),
07870 + JANS(1000), JALL, IBLNK, JCHANGE, JDELETE, JADD, JACTION, KAND, KOLON,
07880 + JCHNGHD, KBLNK, NRATPE, NWTPE, LANS, JSHFT, JCHAR, ICHAR, NANS, IRET,
07890 + IPUT, KHCT, KDCT, MHCT, MDCT, MCOUNT, KK, KJ, IINDEX, IANDEX, MTCH, JJ,
07900 + KTERM, IDATE(18), JMASK(10), KNEW(20)
** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS
08/05/71. 11.31.33.

07900 COMMON INDEX, IAND, MACH
07910 WRITE (NWTAPE,100) INDEX, IINDEX
07920 DO 10 J = 1,4
07930 10 WRITE (NWTAPE,110) (ID(I,J), I=1,7)
07940 DO 20 M = 1,INDEX
07950 20 WRITE (NWTAPE,110) (LHEAD(L,M), L=1,3)
07960 IF (INDEXLE.65) GO TO 30
07970 WRITE (NWTAPE,120) (LCQ(K), K=1,65)
07980 WRITE (NWTAPE,120) (LCQ(K), K = 66,INDEX)
07990 GO TO 40
08000 30 WRITE (NWTAPE,120) (LCQ(K), K = 1,INDEX)
08010 40 INDEX = 22
08020 M = 1
08030 50 N = M + 21
08040 IF (INDEX = MPT) 70,70-60
08050 60 WRITE (NWTAPE,130) (IPNT(K), K = M,N)
08060 M = N + 1
08070 MPT = MPT + 22
08080 GO TO 50
08090 70 WRITE (NWTAPE,130) (IPNT(K), K=M,INDEX)
08100C COMPUTE HOW MANY LINES IT TAKES TO WRITE DATA
08110 J = 1
08120 IZAN = (INDEX/6) + 1
08130 IPAN = (IZAN-1) * 6
08140 IF (IPANEQ INDEX) IZAN = IZAN - 1
08150 DO 80 M = 1,IZAN
08160 K = J + 5
08170 WRITE (NWTAPE,110) (JANS(I), I = J,K)
08180 80 J = J + 6
08190 RETURN
08200 100 FORMAT (1X,2I5)
08210 110 FORMAT (1X,7A10)
08220 120 FORMAT (1X,65I1)
08230 130 FORMAT (1X,22I3)
08240 END

08250 SUBROUTINE ETERM(NTERM, MSWIT, JTERM)
08260 MSWIT = 0
08270 IAND = 07700000000000000000
08280 IOR = .NOT. IAND
08290 JASTK = 04700000000000000000
08300 IBK = 05000000000000000000
08310 IBLNK = 10H
08320 NNEW = NTERM AND IAND
08330 IF (NNEWEQ JASTK) GO TO 20
08340 DO 10 K = 1,10
08350 NTERM = ISHIFT(NTERM,6)
08360 NNEW = NTERM AND IAND
08370 IF (NNEWNE JASTK) GO TO 10
08380 NTERM = NTERM AND IOR
08390 MSWIT = 1
08400 IF (JTERM EQ 0) GO TO 5
08410 NTERM = NTERM OR IBK
** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS
08/05/71· 11.31.33.

08420 GO TO 10
08430 5 NTERM = NTERM·OR·JASTK
08440 10 CONTINUE
08450 RETURN
08460 20 IF (JTERM·EQ·1) NTERM = IBLNK
08470 MSWIT = 1
08480 RETURN
08490 END
08500 SUBROUTINE DATEIN
08510 COMMON IQ(3,7),ISEVN(10),KHEAD(3),MHEAD(3),KDATA(500),MDATA(500),
08520+ ITYPE(500),IA(7,5),ID(7,4),LHEAD(3,160),LCQ(160),IPNT(160),
08530+ JANS(1000),JALL,IBLNK,JCHANGE,JDELETE,JADD,JACTION,KAND,KOLON,
08540+ JCHNGHD,KBLNK,NRTAPE,NRTAPE,LANS,JSHFT,JCHAR,NANS,IRET,
08550+ IPUT,KHCT,KDCT,MCOUNT,KK,KJ,IQINDEX,IINDEX,MTCH,JJ,
08560+ KTERM,IDATE(18),JMASK(10),JNEW(20),
08570 DIMENSION IMONTH(22)
08580 DATA IMONTH/0120116,0060502,0150122,0012022,0150131,0128516,
08590+ 0128214,0018507,0230520,0170324,0161726,0040503,0251613/
08600 KZERO = 27
08610 KNINE = 36
08620 ITERM = 39
08630 IFILLO = 0333333333333333300000.
08640ISHFL1 = 2**6
08650 KHYPHN = 38
08660 I = 0
08670 MM = 1
08680 IDAY1 = KZERO
08690 IDAY2 = KZERO
08700 GO TO 145
08710 110 I = I + 1
08720 IF (IDATE(I)-ITERM) 135,115,135
08730 115 IA(2,5) = IA(2,4)
08740 IA(3,5) = IA(3,4)
08750 IF (IFLAG) 125,120,125
08760 120 IA(4,5) = (KZERO+3)*ISHFL1+(KZERO+1)+IFILLO
08770 GO TO 130
08780 125 IA(4,5) = IA(4,4)
08790 130 IRET = 4
08800 RETURN
08810 135 IF (IDATE(I)-KHYPHN) 190,140,190
08820 140 MM = 2
08830 IDAY1 = KZERO + 3
08840 IDAY2 = KZERO + 1
08850 145 IFLAG = 0
08860 150 I = I+1
08870 ICHAR = IDATE(I)
08880 IF (ICHAR·KNINE) 155,155,175
08890 155 IF (ICHAR·KZERO) 175,160,160
08900 160 IFLAG = IFLAG + 1
08910 GO TO (165,170), IFLAG
08920 165 IDAY1 = KZERO
08930 167 IDAY2 = ICHAR

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** "UPDATE" -- ALTERS DATA RECORDS AND POINTERS
08/05/71, 11:31:33.

08940 Go to 150
08950 170 IDAY1 = IDAY2
08960 IDAY2 = ICHAR
08970 I = I + 1
08980 ICHAR = IDATE(I)
08990 175 K = ICHAR
09000 I = I + 1
09010 L = IDATE(I)
09020 I = I + 1
09030 IDATE1 = I$H$FL1*ISH$FL1*K+ISH$FL1*L+IDATE(I)
09040 DO 180 M = 1,22
09050 MO = M
09060 IF (IDATE1-IMONTH(M)) 180,185,180
09070 180 CONTINUE
09080 IRET = 2
09090 RETURN
09100 185 I = I + 1
09110 K = IDATE(I)
09120 I = I + 1
09130 Go to (187,205,210) IPUT
09140 187 IF (MM .eq. 2) Go to 200
09150 IA (2,4) = IABS(ISH$FL1*K)+IDATE(I)+IFILL0
09160 IA(3,4) = MO
09170 IA(4,4) = IABS(IDAY1*ISH$FL1)+IDAY2+IFILL0
09180 Go to (110,130), MM
09190 200 IA(2,5) = IABS(ISH$FL1*K)+IDATE(I)+IFILL0
09200 IA(3,5) = MO
09210 IA(4,5) = IABS(IDAY1*ISH$FL1)+IDAY2+IFILL0
09220 Go to (110,130), MM
09230 190 IRET = 3
09240 RETURN
09250 205 KDAT(A(1) = IABS(ISH$FL1*K)+IDATE(I)+IFILL0
09260 KDAT(A(2) = MO
09270 KDAT(A(3) = IABS(IDAY1*ISH$FL1)+IDAY2+IFILL0
09280 Go to 130
09290 210 MDATA(1) = IABS(ISH$FL1*K)+IDATE(I)+IFILL0
09300 MDATA(2) = MO
09310 MDATA(3) = IABS(IDAY1*ISH$FL1)+IDAY2+IFILL0
09320 Go to 130
09330 END

-- THE END --
** "SORTER" -- Sorts data records by ID items
07/30/71. 08.58.24.

00100C THIS PROGRAM WAS RE-DESIGNED AND DEVELOPED BY PAUL SIMMONS,
00110C UNITED COMPUTING SYSTEMS, INC., AND RONALD SCHWARZ, GODDARD
00120C SPACE FLIGHT CENTER, JULY, 1971.
00130C
00140C CURRENT 7/29/71
00150C PROGRAM SORT(INPUT, OUTPUT, TAPE4, TAPE5)
00160 COMMON I, J, K, NTAPE, KTAPE, IREAD, IWRITE, JID(7,4), KID(7,4),
00170+ JINDEX, JANDEX, JHEAD(3,160), JCODE(160), MPT, M, N,
00180+ KPNT(160), KPTNT(160), KINDEX, KANDEX, KHEAD(3,160), KCODE(160),
00190+ IPAN, JANDEX, IPAN, JANS(800), KANS(700), IDCNT, INUM
00200 Dimension ID(4)
00210 INUM=-1
00220 IDCNT=0
00230 CALL CLOCK(IX)
00240 CALL DATER(IS)
00250 PRINT 16, IX
00260 16 FORMAT("PROGRAM: SORTER", 4X, "DATE:", A9, 4X, "TIME:", A9, "/")
00270 PRINT, *DO YOU NEED OPERATING INSTRUCTIONS*.
00280
00290 READ 17, LANS
00300 17 FORMAT(A1)
00310 IF (LANS .EQ. 'HN') GO TO 6
00320 PRINT, "THIS PROGRAM SORTS ON THE FIRST FOUR DATA ITEMS IN*,
00330+ "EACH RECORD*. SPECIFY THE ORDER OF*,
00340+ "IMPORTANCE OF THESE ITEMS WITH*, /*A 1, 2, 3, OR*,
00350+ "4 WHEN REQUESTED*.
00360 6 PRINT, "ENTER NAME OF THE DATA FILE TO BE SORTED*,
00370 21 READ 2, NAME
00380 2 FORMAT(A7)
00390 CALL PFUR(3HRETNTAPE, NAME, 0, ISTA)
00400 IF (ISTA .EQ. 5) GO TO 61
00410 PRINT, "WILL THE DATA FILE BE SORTED INTO ASCENDING (A) OR*,
00420+ "DESCENDING (D) SEQUENCE*.
00430 IF (ISEQ .NE. '1A') AND (ISEQ .NE. '1DN') GO TO 63
00440 PRINT, "ENTER SORTING SEQUENCE HERE*
00450 DO 100 I=1, 4
00460 100 DO 100 J=2, 7
00470 12 READ 15, IREAD
00480 15 FORMAT(I1)
00490 NTAPE=4
00500 KTAPE=5
00510 20 ISWIT=0
00520 ICHANGE=0
00530 CALL PFUR(3HRETNTAPE, NAME, 0, ISTA)
00540 IREAD=1
00550 CALL RED
00560 IREAD=2
00570 25 CALL RED
00580 DO TO (30, 40, IRET)
00590 30 DO 100 I=1, 4
00600 40 DO 100 J=2, 7
00610 K=ID(1)
** "SORTER" -- SORTS DATA RECORDS BY ID ITEMS
07/30/71. 08.58.24.

00620C COMPARE FIRST TO NEXT
00630 IF (JID(J,J,K)-KID(J,K))135,100,140
00640 100 CONTINUE
00650 105 IRET=1
00660 GO TO 00115
00670 110 IRET=2
00680 115 ISWIT=ISWIT+1
00690 IF (ISWIT .GT. 2) ISWIT=1
00700 IF (IRET .NE. ISWIT) ICHANGE=1
00710 IWRITE=IRET
00720 CALL WRIT
00730 IREAD=IWRITE
00740 GO TO 00025
00750C ASCENDING SEQUENCE?
00760 135 IF (ISEQ-IHA) 110,105,110
00770 140 IF CISEQ-IHA) 105,110,105
00780C DID INTERCHANGE OCCUR?
00790 40 IF (ICCHANGE .EQ. 0) GO TO 80
00800 45 IWRITE=1
00805 50 IWRITE=2
00810 60 CALL WRIT
00820 CALL PFUR(3HREP,KTAPE,NAME,0,ISTA)
00830 IDCNT=1
00840 GO TO 00020
00850 CONTINUE
00860 PRINT,*SORT COMPLETED**
00900 PRINT 90, INUM
00910 90 FORMAT(*YOU HAVE SORTED *,I4,* DATA RECORDS**)
00920 STOP
00930 61 PRINT 44,NAME
00940 PRINT,*RE-ENTER VALID DATA FILE NAME**
00950 GO TO 00021
00960 44 FORMAT(*DATA FILE *,A7,* NOT IN PERMANENT STORAGE.*)
00970 63 PRINT,*ENTER A OR D*
00980 GO TO 00005
00990 STOP
01000 END

01010 SUBROUTINE RED
01020 COMMON I,J,K,NTAPE,KTAPE,IREAD,IRET,IWRITE,JID(7,4),KID(7,4),
01030+ JQNDEX,JANDEX,JHEAD(3,160),JCODE(160),MPT,M,N,
01040+ JPNT(160),KPNT(160),KQNDEX,KANDEX,KHEAD(3,160),KCODE(160),
01050+ IZAN,IZANDEX,IPAN,JANS(800),KANS(700),IDCNT,INUM
01060 IF (IDCNT .EQ. 1) GO TO 2
01070 2 GO TO (5,120), IREAD
01080 5 READ (NTAPE,175) JQNDEX,JANDEX
01100 IF (EOF,NTAPE) 170,10
01110 10 DO 15 I=1,10
01120 15 READ (NTAPE,180) (JID(J,I),J=1,7)
01130 DO 20 I=1,JQNDEX
** "SORTER" -- SORTS DATA RECORDS BY ID ITEMS
07/30/71. 08.58.24.

01140 20 READ (NTAPE,180) (JHEAD(J,I),J=1,3)
01150 IF (JQNDEX LE. 65) GO TO 25
01160 READ (NTAPE,185) (JCODE(I),I=1,65)
01170 READ (NTAPE,185) (JCODE(I),I=66,JQNDEX)
01180 GO TO 00030
01190 25 READ (NTAPE,185) (JCODE(I),I=1,JQNDEX)
01200 30 MPT=22
01210 M=1
01220 35 N=M+21
01230 GO TO (40,55), IREAD
01240 40 IF (JQNDEX LE. MPT) GO TO 50
01250 GO TO 00035
01260 50 READ (NTAPE,190) (JPNT(I),I=M,N)
01270 55 M=N+1
01280 GO TO 00045
01290 60 READ (NTAPE,190) (KPNT(I),I=M,JQNDEX)
01300 GO TO 00075
01310 70 IF (KQNDEX LE. MPT) GO TO 80
01320 READ (NTAPE,190) (KPNT(I),I=M,N)
01330 GO TO 00045
01340 80 IREAD
01350 IANDEX=JANDEX
01360 85 IANDEX=KANDEX
01370 90 JANDEX=JANDEX
01380 95 J=1
01390 100 IZAN=(IANDEX/6)+1
01400 IPAN=(IZAN-1)*6
01410 IF (IPAN EQ. IANDEX) IZAN=IZAN-1
01420 DO 115 M=1,IZAN
01430 K=J+5
01440 DO 105 M=1,IZAN
01450 GO TO (100,105), IREAD
01460 100 READ (NTAPE,180) (JANS(I),I=J,K)
01470 105 READ (NTAPE,180) (KANS(I),I=J,K)
01480 GO TO 00115
01490 115 J=J+6
01500 IRET=1
01510 RETURN
01520 120 READ (NTAPE,175) KQNDX,KANDEX
01530 IF (EOF,NTAPE)170,125
01540 125 DO 130 I=1,4
01550 130 READ (NTAPE,175) (KID(J,I),J=1,7)
01560 135 DO 135 I=1,KQNDX
01570 140 READ (NTAPE,180) (KHEAD(J,I),J=1,3)
01580 145 IF (KQNDX LE. 65) GO TO 140
01590 150 READ (NTAPE,185) (KCODE(I),I=1,65)
01590 155 READ (NTAPE,185) (KCODE(I),I=66,KQNDEX)
01600 160 GO TO 00030
01610 165 READ (NTAPE,185) (KCODE(I),I=1,KQNDEX)
01620 170 IRET=2
** "SORTER" -- SORTS DATA RECORDS BY ID ITEMS
07/30/71 08:58.24

01660 RETURN
01670 175 FORMAT (1X,2I5)
01680 180 FORMAT (1X,7A10)
01690 185 FORMAT (1X,65I1)
01700 190 FORMAT (1X,22I1)
01710 END
01720 SUBROUTINE WRIT
01730 COMMON I,J,K,NTAPE,KTAPE,IREAD,IRET,IWRITE,JID(7,4),KID(7,4),
01740 JQNDEX,JANDEX,JHEAD(3,160),JCODE(160),MPT,M,N,
01750 JPNT(160),KPTN(160),KQNDEX,KANEKX,KHEAD(3,160),KCODE(160),
01760 IZAN,IANDEX,IPAN,JANS(800),KANS(700),IDCNT,INUM
01770 GO TO (5,120), IWRITE
01780 5 WRITE (KTAPE,175) JQNDEX,JANDEX
01790 DO 15 Im1,4
01800 15 WRITE (KTAPE,180) (JIDCJ,I),J=1-7)
01810 DO 20 I=tlJQNDEX
01820 20 WRITE (KTAPE,180) (JHEADCJ,I),J=1.,3)
01830 IF CJQNDEX*LEe
01840 WRITE (KTAPE,185) CJCODE(I),I=1,65)
01850 WRITE (KTAPE,185) (JCODE(I),I=66.JQNDEX)
01860 GO. TO 00030
01870 25 WRITE (KTAPE,185) CJCODECI),I=1,JQNDEX)
01880 30 MPT=22
01890 M=1
01900 35 N=M+21
01910 GO TO (40,55), IWRITE
01920 40 IF (JQNDEX *LE. MPT) GO TO 50
01930 WRITE (KTAPE,190) (JPNT(I),I=M,N)
01940 45 M=N+1
01950 MPT=MPT+22
01960 GO TO 00035
01970 50 WRITE (KTAPE,190) (JPNT(I),I=M,JQNDEX)
01980 GO TO 00075
01990 55 IF (KQNDEX *LE. MPT) GO TO 60
02000 WRITE (KTAPE,190) (KPTN(I),I=M,N)
02010 GO TO 00045
02020 60 WRITE (KTAPE,190) (KPTN(I),I=M,KQNDEX)
02030 75 GO TO (80,85), IWRITE
02040 80 IANDEX=JANDEX
02050 GO TO 00095
02060 85 IANDEX=KANDEX
02070 95 J=1
02080 100 IZAN=(IANDEX/6)+1
02090 IPAN=(IZAN-1)*6
02100 IF (IPAN <E IANDEX)IZAN=IZAN-1
02110 D0 115 M=1,IZAN
02120 K=J+5
02130 GO TO (100,105), IWRITE
02140 100 WRITE (KTAPE,180) (JANS(I),I=J,K)
02150 GO TO 00115
02160 105 WRITE (KTAPE,180) (KANS(I),I=J,K)
02170 115 J=J+6
** "SORTER" -- SORTS DATA RECORDS BY ID ITEMS
07/30/71. 08.58.24.

02180 RETURN
02190 120 WRITE (KTAPE,175) KQNDNX,KQNDNX
02200 DO 130 I=1,4
02210 130 WRITE (KTAPE,180) (KID(J,I),J=1,7)
02220 DO 135 I=1,KQNDNX
02230 135 WRITE (KTAPE,180) (KHEAD(J,I),J=1,3)
02240 IF (KQNDNX .LE. 65) GO TO 140
02250 WRITE (KTAPE,185) (KCODE(I),I=1,65)
02260 WRITE (KTAPE,185) (KCODE(I),I=66,KQNDNX)
02270 GO TO 00030
02280 140 WRITE (KTAPE,185) (KCODE(I),I=1,KQNDNX)
02290 GO TO 00030
02300 175 FORMAT (1X,2I5)
02310 180 FORMAT (1X,7A10)
02320 185 FORMAT (1X,65I1)
02330 190 FORMAT (1X,22I3)
02340 END

-- THE END --
** "MERGE" -- MERGES TWO DATA FILES TO FORM A THIRD

07/30/71. 09.15.18.

00100C THIS PROGRAM WAS RE-DESIGNED AND DEVELOPED BY PAUL SIMMONS,
00110C UNITED COMPUTING SYSTEMS, INC., AND RONALD SCHWARZ, GODDARD
00120C SPACE FLIGHT CENTER, JULY, 1971.
00130C
00140C PROGRAM MERGE (INPUT, OUTPUT, TAPE1, TAPE2, TAPE3)
00150 COMMON I, J, K, NTAPEx, KTAPE, IREAD, IRET, IWRITE, JID(7, 4), KID(7, 4),
00160+ JINDEX, JANDEX, JHEAD(3, 160), JCODE(160), MPT, M, N,
00170+ JPNTE(160), KPNTE(160), KINDEX, KHEAD(3, 160), KCODE(160),
00180+ IZAN, IANDEX, IPAN, IJANS(600), KANS(600), ICOUNT
00190 DIMENSION ID(4)
00200 ICOUNT = 0
00210 NTAPEx = 1
00220 MTAPE = 2
00230 KTAPE = 3
00240 CALL CLOCK(IX)
00250 CALL DATER(IS)
00260 PRINT 4, IS, IX
00270 PRINT. "ENTER NAME OF THE FIRST FILE TO BE MERGED:",
00280 2 READ, NAME
00290 CALL PFUR(3HRET, NTAPEn, NAME, O, ISTA)
00300 IF (ISTA = 5) GO TO 3
00310 iOK = 1
00320 PRINT.. "ENTER NAME OF THE SECOND FILE TO BE MERGED:",
00330 7 READ, NAME
00340 CALL PFUR(3HRET, MTAPE, NAME, O, ISTA)
00350 IF (ISTA = 5) GO TO 3
00360 PRINT. /
00370 PRINT.. "ARE THESE FILES IN ASCENDING (A) OR DESCENDING (D) SEQUENCEN"
00380 READ 10, ISEQ
00390 PRINT.. "WHAT IS THE ORDER OF THE MERGE KEYS? ANSWER THE FOUR*
00400 PRINT.. "QUESTION MARKS WITH A 1, 2, 3, OR 4."
00410 DO 15 I = 1, 4
00420 15 READ 20, ID(I)
00430 IREAD = 1
00440 CALL RED
00450 35 IREAD = 2
00460 CALL RED
00470 GO TO (45.75), IRET
00480 45 DO 50 I = 1, 4
00490 DO 50 J = 2, 7
00500 K = ID(I)
00510C COMPARE FIRST TO NEXT
00520 IF (JID(J, K) = KID(J, K)) 60, 50, 70
00530 50 CONTINUE
00540 55 IWRITE = 1
00550 CALL WRIT
00560 IREAD = 1
00570 GO TO 40
00580C ASCENDING SEQUENCE?
00590 60 IF (ISEQ = 1HA) 65, 55, 65
00600 65 IWRITE = 2
** "MERGE" -- MERGES TWO DATA FILES TO FORM A THIRD
07/30/71. 09.15.18.

00610 CALL WRIT
00620 GO TO 35
00630 70 IF (ISEQ-1HA)55,65,55
00640C WRITE REMAINDER OF OTHER FILE
00650 75 GO TO (80,90), IREAD
00660 80 IWRITE=2
00670 CALL WRIT
00680 IREAD=2
00690 CALL RED
00700 GO TO (80,95), IRET
00710 90 IWRITE=1
00720 CALL WRIT
00730 IREAD=1
00740 CALL RED
00750 GO TO (90,95), IRET
00760 95 CONTINUE
00770 PRINT 110, ICOUNT
00780 PRINT***UNDER WHAT NAME SHOULD ALL OF THE MERGED RECORDS***,
00790** *NOW BE FOUND*.,
00800 READ 5,NAME
00810 IOP = 3HSAV
00820 GO TO 96
00830 96 CALL PIFUR(IOP,KTAPE,NAME,0,ISTA)
00840 IF (ISTA .EQ. 4) GO TO 44
00850 IF (ISTA .EQ. 0) GO TO 99
00860 44 PRINT,**FILE ALREADY PERMANENT*. ENTER A NEW FILE NAME OR**
00870 PRINT**ENTER "REPLACE" TO REPLACE CURRENT PERMANENT FILE**,
00880 NAMES = NAME
00890 READ 5,NAME
00900 IF (NAME .EQ. 7HREPLACE) IOP = 3HREP
00910 IF (NAME .EQ. 7HREPLACE) NAME = NAMES
00920 GO TO 96
00930 99 IACT = 5HSAVED
00940 IF (IOP .EQ. 3HREP) IACT = 8HREPLACED
00950 PRINT 97,NAME, IACT
00960 STOP
00970 3 PRINT 41,NAME
00980 PRINT**RE-ENTER VALID FILE NAME**,
00990 IF (IOK .NE. 1) GO TO 2
01000 GO TO 7
01010 4 FORMAT(**PROGRAM: MERGE**,4X,**DATE:**A9,4X,**TIME:**A9,///)
01020 5 FORMAT(A7)
01030 10 FORMAT(A1)
01040 20 FORMAT(I1)
01050 97 FORMAT(/,A7,**HAS BEEN **A8,** AS MERGED FILE**.)
01060 41 FORMAT/**DATA FILE **A7,** NOT IN PERMANENT STORAGE**)
01070 110 FORMAT(I4,** DATA RECORDS HAVE BEEN MERGED**)
01080 END
01080 SUBROUTINE RED
01090 COMMON I,J,K,KTAPE,KTAPE,IREAD,IRET,IWRITE,JID(7,4),KID(7,4),
01100+ JINDEX,JINDEX,JHEAD(3,160),JCODE(160),MPT,M,N,
01110+ JPNT(160),KPNT(160),KINDEX,KINDEX,KHEAD(3,160),KCODE(160),
** "MERGE" -- MERGES TWO DATA FILES TO FORM A THIRD**

07/30/71. 09.15.18'

**01130+ IZAN, IANDEX, IPAN, JANUS(600), KANS(600), ICOUNT**

01140 GO TO (5, 120), IREAD

01150 5 READ (IREAD, 175) JQNDEX, JANUS

01160 IF (EOF, IREAD) 170, 10

01170 10 DO 15 I = 1, 4

01180 15 READ (IREAD, 180) (JID(J, I), J = I, 7)

01190 DO 20 I = 1, JQNDEX

01200 20 READ (IREAD, 180) (JHEAD(J, I), J = I, 3)

01210 IF (JQNDEX .LE. 65) GO TO 25

01220 READ (IREAD, 185) (JCODE(I), I = 1, 65)

01230 READ (IREAD, 185) (JCODE(I), I = 66, JQNDEX)

01240 GO TO 30

01250 25 READ (IREAD, 185) (JCODE(I), I = 1, JQNDEX)

01260 30 MPT = 22

01270 N = 1

01280 35 N = M + 21

01290 GO TO (40, 55), IREAD

01300 40 IF (JQNDEX .LE. MPT) GO TO 50

01310 READ (IREAD, 190) (JPNT(I), I = M, N)

01320 45 M = N + 1

01330 MPT = MPT + 22

01340 GO TO 35

01350 50 READ (IREAD, 190) (JPNT(I), I = M, JQNDEX)

01360 GO TO 75

01370 55 IF (KQNDEX .LE. MPT) GO TO 60

01380 READ (IREAD, 190) (KPNT(I), I = M, N)

01390 GO TO 45

01400 60 READ (IREAD, 190) (KPNT(I), I = M, KQNDEX)

01410 GO TO 75

01420 75 GO TO (80, 85), IREAD

01430 80 IANDEX = JANUS

01440 GO TO 95

01450 85 IANDEX = KANDUS

01460 95 J = 1

01470 IZAN = (IANDEX / 6) + 1

01480 IPAN = (IZAN - 1) * 6

01490 IF (IPAN .EQ. IANDEX) IZAN = IZAN - 1

01500 DO 115 M = 1, IZAN

01510 K = J + 5

01520 GO TO (100, 105), IREAD

01530 100 READ (IREAD, 180) (JANS(I), I = J, K)

01540 GO TO 115

01550 105 READ (IREAD, 180) (KANS(I), I = J, K)

01560 115 J = J + 6

01570 IRET = 1

01580 RETURN

01590 120 READ (IREAD, 175) KQNDEX, KANDUS

01600 IF (EOF, IREAD) 170, 185

01610 125 DO 130 I = 1, 4

01620 130 READ (IREAD, 180) (KID(J, I), J = I, 7)

01630 DO 135 I = 1, KQNDEX

01640 135 READ (IREAD, 180) (KHEAD(J, I), J = I, 3)
** "MERGE" -- MERGES TWO DATA FILES TO FORM A THIRD
07/30/71. 09.15.18.**

```
01650 IF (KQNDEX .LE. 65) GO TO 140
01660 READ (IREAD,185) (KCODE(I),I=1,65)
01670 READ (IREAD,185) (KCODE(I),I=66,KQNDEX)
01680 GO TO 30
01690 140 READ (IREAD,185) (KCODE(I),I=1,KQNDEX)
01700 GO TO 30
01710 170 IRET=2
01720 RETURN
01730 175 FORMAT (1X,2I15)
01740 180 FORMAT (1X,7A10)
01750 185 FORMAT (1X,65II)
01760 190 FORMAT (1X,22I3)
01770 END
01780 SUBROUTINE WRIT
01790 COMMON I,J,K,NTAPE,KTAPE,IREAD,IRET,IWRITE,JID(7,4),KID(7,4),
01800 JQNDEX,JANDEX,JHEAD(3,160),JCODE(160),MPT,M,N,
01810 JPNT(160),KPNT(160),KQNDEX,KANDEX,KHEAD(3,160),KCODE(160),
01820 IZAN,IANDEX,IPAN,JANS(600),KANS(600),ICOUNT
01830 ICOUNT = ICOUNT+1
01840 GO TO (5,120), IWRITE
01850 5 WRITE (KTAPE,175) JQNDEX,JANDEX
01860 DO 15 I=1,4
01870 15 WRITE (KTAPE,180) (JID(J,I),J=1,7)
01880 DO 20 I=1,JQNDEX
01890 20 WRITE (KTAPE,180) CJHEAD(J,I),J=1,3)
01900 IF (JQNDEX .LE. 65) GO TO 25
01910 WRITE (KTAPE,185) (JCODE(I),I=1,65)
01920 WRITE (KTAPE,185) CJCODECI),I=66,JQNDEX)
01930 GO TO 30
01940 25 WRITE (KTAPE,185) CJCODE(I),I=1,JQNDEX)
01950 30 MPT=22
01960 M=1
01970 35 N=N+21
01980 GO TO (40,55), IWRITE
01990 40 IF (JQNDEX .LE. MPT) GO TO 50
02000 WRITE (KTAPE,190) (JPNT(I),I=M,N)
02010 45 M=N+1
02020 MPT=MPT+22
02030 GO TO 35
02040 50 WRITE (KTAPE,190) (JPNT(I),I=M,JQNDEX)
02050 GO TO 75
02060 55 IF (KQNDEX .LE. MPT) GO TO 60
02070 WRITE (KTAPE,190) (KPNT(I),I=M,N)
02080 GO TO 45
02090 60 WRITE (KTAPE,190) (KPNT(I),I=M,KQNDEX)
02100 75 GO TO (60,85), IWRITE
02110 60 IANDEX=JANDEX
02120 GO TO 95
02130 85 IANDEX=KANDEX
02140 95 J=1
02150 IZAN=(IANDEX/6)+1
02160 IPAN=(IZAN-1)*6
```
** "MERGE" -- MERGES TWO DATA FILES TO FORM A THIRD  
07/30/71. 09.15.18. 

02170 IF (IPAN +EQ+ IANDEX)IZAN=IZAN-1 
02180 DO 115 M=1,IZAN 
02190 K=J+5 
02200 GO TO (100,105), IWRITE 
02210 100 WRITE (KTAPE,180) (JANS(I),I=J,K) 
02220 GO TO 115 
02230 105 WRITE (KTAPE,180) (KANS(I),I=J,K) 
02240 115 J=J+6 
02250 RETURN 
02260 120 WRITE (KTAPE,175) KQNDEX,KANDEX 
02270 DO 130 I=1,4 
02280 130 WRITE (KTAPE,180) (KID(J,I),J=1,7) 
02290 DO 135 I=1,KQNDEX 
02300 135 WRITE (KTAPE,180) (KHEAD(J,I),J=1,3) 
02310 IF (KQNDEX +LE+ 65) GO TO 140 
02320 WRITE (KTAPE,185) (KCODE(I),I=1,65) 
02330 WRITE (KTAPE,185) (KCODE(I),I=66,KQNDEX) 
02340 GO TO 30 
02350 140 WRITE (KTAPE,185) (KCODE(I),I=1,KQNDEX) 
02360 GO TO 30 
02370 175 FORMAT (1X,2I5) 
02380 180 FORMAT (1X,7A10) 
02390 185 FORMAT (1X,6511) 
02400 190 FORMAT (1X,2213) 
02410 END 

--- THE END ---