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NEUTRON PHYSICS DIVISION

THE MAINTAIN CODE FOR USE IN MAINTAINING
AND REVISING CARD IMAGE FILES ON TAPE

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ABSTRACT

The conversational Remote Batch Entry, (CRBE) System is useful for on-line creating, editing, and storing text data on disk via the ORNL IBM 360/75. The on-line storage space is limited, however, and it is therefore necessary to copy data onto tape for off-line longer-term storage. The MAINTAIN code was written for this purpose. The code is stored on the AZZZZZ disk for shared use. Jobs using MAINTAIN may be submitted from CRBE, the PDP-10, or by other means. Normally the code uses input data to revise or add to data from one tape and writes a new tape which incorporates the desired changes. Data blocks in card image format are identified by a "file name" or entry name which simply consists of a sequence of normally up to 8 characters starting in column 1 on any record. It normally precedes a group of records which can be called a "file." The end of a file is the record \$SEND in the first five columns.

I: TEXT FILE MAINTENANCE

Input data commands, similar to those of CRBE, control the operations of the program. Each command consists of \$\$ plus three more characters in columns 1-5. Additional characters may be added if desired. These commands and their uses are:

COMMAND

RESULT

(1) \$NEW Input data following command are written on logical tape 2. Input data are terminated by \$SEND end-of-data signal which is entered on the tape as an end-of-file record. The first 8 characters of the next data line after the command is the file name.

Examples:

\$NEW	
FILENAME	} data written on tape
FIRST CARD	
.	
.	
LAST CARD	
\$SEND	
\$NEW	} data written on tape
FILE 2	
=DATAFILE	
\$SEND	

(2) \$ADD Input data following command are written on tape 2. The first 8 characters of the next data line after the command is the file name. The first time this command is given, logical tape 1 will be copied to tape 2, if not already copied, before the data are added. The added data ends with \$\$END.

Examples:

```
  $$ADD
  LATEST      JUN. 26, 1973
  =ABCXX.F4
  $$END
  $$ADD
  FILE 3
  =DEFXX.DAT
  $$END
```

data written on tape

data written on tape

(3) \$\$PRINT Data on tape 2 are copied to the line printer via unit 51. If the next input line is ALL, the entire tape is listed. Otherwise the next input line is taken to be an 8-character file name and tape 2 will be searched for that name. The file, if found, will be copied to the line printer until \$\$END is encountered on tape 2.

Line numbers are assigned each record in the printout starting at 1000 and incrementing by 1000 for each file.

Print commands should be given for files in the order that they are located on tape 2 for maximum efficiency. They should be given only at the conclusion of writing all data on tape 2.

Examples:

```
  $$PRINT
  FILE 1
  $$PRINT
  FILE 2
  $$PRINT
  ALL
```

- (4) \$\$FETCH The result is the same for \$\$PRINT, including 'ALL', except a SYSOUT=R control card routes the output to the CRBE terminal via unit 52 and the XXXXXX or YYYYYY disk. Routing files to the PDP-10 is also easily accomplished. Both the file name record and the \$\$END are included. After executing CRBE BRING and LIST commands, the line numbers are consistent with those on a MAINTAIN printout. If the data have lower case characters, one must make the file a TEXT file to alter lower case letters by CRBE commands. The CRBE command to do this is

FETCH *, TEXT.

- (5) \$\$BRING The result is the same as for \$\$FETCH except that the file name and \$\$END records are omitted. One can run FORTRAN jobs with files retrieved from tape in a following job step by routing the output to a scratch file (unit 52).
- (6) \$\$REPLACE File name must follow command. Tape 1 is copied to tape 2 until the entry is found. Input data following command are copied to tape 2 until \$\$END is encountered replacing the named file on tape 1. Remainder of tape 1 should be copied to tape 2 following the sequence of writing commands.* This action is initiated by a non-writing command such as \$\$PRINT.

The new input file name record is copied to tape 2. Thus new comments may be added, such as the date, beyond column 8. Note that the file must have the same file name as that on tape 1. If it is desired to replace with a file by another name, \$\$PURGE and \$\$NEW commands should be given.

*The writing commands to which this applies are: \$\$REPLACE, \$\$PURGE, \$\$INSERT, and \$\$NEW. These commands (except \$\$NEW) must be given before the \$\$ADD command.

Examples:

```

  $$REPLACE
  FILENAME
  DATA1
  DATA2
  $$END
  $$REPLACE
  FILE 2   CHANGED   JUN. 26, 1973
  =ABCXX.NEW
  $$END

```

data written on tape

data written on tape

- (7) \$\$PURGE File name must follow command. Result is the same as for \$\$REPLACE except a new file is not copied to tape 2. If the file name cannot be found, tape 2 will be a copy of tape 1 since copying takes place up to the end of the tape.

Examples:

```

  $$PURGE
  BADATA
  $$REPLACE
  OLD FILE
  =ABCXX.F4
  $$END
  $$PURGE
  ABC
  $$END

```

data written on tape

- (8) \$\$INSERT File name*must follow command. Result is similar to that of the \$\$REPLACE command except data following specified file name are inserted immediately after file name record on tape 2. If another command follows \$\$INSERT, i.e., no data are inserted, tape 1 is simply copied to and including the file name record. This procedure can be used to move the tape to a unique record. It is equivalent to a command to copy the tape until it gets to the named record. Additional insertions can then be made. The \$\$END record

*Any record on tape 1 can be considered a "file name".

is not inserted. Such an insertion can be made, however, if the \$\$OPT command is used (see below).

Examples:

```
$$INSERT
A976BYX    No data are inserted since command follows
$$INSERT
<>
<HEADER> RECORD 50    Data written on tape
$$END
```

- (9) \$\$DIRECTORY Tape 2 is rewound and a list of file names (first record and records following \$\$END) will be printed on the line printer in the order they appear on tape 2.
- (10) \$\$PUBLISH Tape 2 will be rewound and the contents of the tape will be printed with an index to all the files. A scratch file (unit 13) is required.
- (11) \$\$LIST This alters all following \$\$PRINT commands so that there is a skip to a new page at the beginning of each file on the printout.
- (12) \$\$CØLUMN Normally the first 8 columns of the file name record are assumed to be the file name. The number of characters examined can be changed to any number between 2 and 80. The command can be given any number of times and between any other commands. The number of characters to be examined is given in the first two columns of the record following the command.

Examples:

```
$$CØL
80
$$REPLACE
```


SUBROUTINE GEORGE

=ABCXX.GEO

\$\$END

\$\$CØL

08

- (13) \$\$EØF An end-of-file mark will be written on tape 2 at the current position.
- (14) \$\$CHANGE When job control records containing / in columns 1 and 2 are to be entered as input, they should first be changed to). Otherwise the remaining input will be flushed since / is regarded as an end-of-file by the operating system. Files on tape having) in columns 1 and 2 will have the) converted to / by the \$\$FETCH, \$\$BRING commands if the \$\$CHANGE command has been given.

The \$\$REPLACE \$\$PURGE and \$\$INSERT commands which write on tape 2 must be given in a certain sequence since they copy and alter data from tape 1, and this cannot be repeated. These commands should be grouped and given as indicated below.

New tape 2

Copy tape 1 → tape 2

\$\$NEW

\$\$LIST

\$\$PRINT

\$\$DIR

\$\$NEW

\$\$REPLACE, \$\$PURGE, \$\$INSERT, or \$\$NEW

These commands must be given in the order that the referenced file name appears on tape 1. The \$\$NEW command will insert an entire file.

\$\$ADD or \$\$NEW

\$\$PRINT or \$\$FETCH

- (15) \$\$COPY File name must follow command. Tape 1 is searched for the file name. When it is found, the file is copied to tape 2. Copied files need not be given in the same order as they

appear on tape 1 but it is more efficient to do so. This command and \$\$REPLACE \$\$PURGE and \$\$INSERT commands must not be given in the same run. The entire tape can be copied by giving the file name ALL as for \$\$PRINT.

- (16) \$\$CADSEP The function is similar to \$\$COPY except file names and \$\$END signals are deleted and \$\$ABSTRACT end-of-entry signals are converted to the ADSEP signal <>.* A final \$\$ADD command can be used to add the ADSEP end-of-file mark <999999>.
- (17) \$\$CHECK The function is to check the first N characters of the first record of tape 1, to be sure that the first data record is correct before being copied to tape 2. The value of N is 8 unless reset by \$\$COL. The data record following the command is checked against the first record of tape 1. This should be the first command, if given, to avoid writing on tape 2 if the data is bad on tape 1, e.g., the wrong tape is mounted. Tape 1 is rewound afterwards.
- (18) \$\$PUNCH The function is the same as for \$\$BRING except the output unit is 7.

II: OPTIONAL END-OF-FILE USAGE

In applications where a card-image tape has not been processed by MAINTAIN, or when FORTRAN or job control files are processed, the \$\$END convention is not convenient. It is possible to use the MAINTAIN code with any specified "end-of-file" records. To implement this option, the following command is given:

- (19) \$\$OPTION This command turns on a switch, requiring that the end record be specified as in the following examples. On input, \$\$ (only) is the normal end to the new data to

*A. A. Brooks, "ADSEP Text Input," ORNL-CF-71-9-3 (September 1971).

be written. The \$\$ record is not written on tapes. With this option, a \$\$END record is overlooked in input and assumed to be ordinary data. If any other record starting with \$\$ is encountered, (other than \$\$END and \$\$ (only)), it is assumed to be a command and the end of the preceding data, and a \$\$END will be inserted.

With this option, the following commands must be followed by the file name record and by the end record: \$\$PRINT, \$\$FETCH, \$\$BRING, \$\$REPLACE, \$\$PURGE, \$\$COPY, \$\$LIST, \$\$DIRECTORY, \$\$PUBLISH, \$\$CADSEP. The \$\$PURGE command will delete one record if no end record is given, that is, if the file name record is followed by another command.

The end record for the \$\$LIST command does not have to be the same as for the others. For example, many FORTRAN sub-routines can be printed by one \$\$PRINT command, each file starting on a new page.

Examples:

```

  $$OPT
  $$ADD
  FILE NAME      }
  =ABCXX.F4      } data written on tape
  CEND           }
  $$
  $$CØL
  10
  $$REPLACE
  FILE 1         } THIS IS THE NEW FILE NAME (data written on tape)
  $$END         } (end record removed)
  =DEFXX.F4     } data written on tape
  CEND          } THIS IS THE NEW END-OF-FILE
  $$
  $$INSERT
  LAST CARD
  $$END         (data written on tape)
```

```
$$  
$$PURGE  
FILEX          (file name)  
ENDCARD       (end record)  
$$PURGE  
BAD CARD      (one record is removed)  
$$PRINT  
FILE Y        (file name)  
$$END  
$$PRINT  
FILE Z        (file name)  
END CARD      (end record)
```

(20) \$\$NØØPT The option switch is turned off; the end card will be assumed to be the one last read in for all subsequent commands.

III: ERROR PROCEDURES

1. If a command is not recognized, a message is printed and the job is terminated.

2. If a command is encountered in the input while entering data (\$\$ADD, \$\$NEW, \$\$REPLACE, \$\$INSERT), a \$\$END record will be written on tape 2 and a message will be printed. If a \$\$ (only) record is encountered on input, no \$\$END record is inserted. This procedure is operative at all times but most useful with \$\$ØPT.

3. If the file name cannot be found during a \$\$REPLACE or \$\$PURGE, tape 1 will be copied to the end, and no additional \$\$REPLACE, \$\$PURGE, \$\$INSERT commands will be accepted. Thus a nonsense file name can be used to copy the rest of the tape.

4. If the end record cannot be found on tape 1 during a \$\$REPLACE, \$\$PURGE command, the command is not executed, tape 1 is repositioned, and an attempt is made to execute the next command. If the end record for a \$\$COPY command is not found, the rest of the tape is copied.

5. If a sequence of \$\$REPLACE, \$\$PURGE, \$\$INSERT commands are interrupted by other commands, the remainder of tape 1 will be copied, and no further \$\$REPLACE, \$\$PURGE, \$\$INSERT commands will be accepted. If these commands are the last ones given, no additional copying of tape 1 will be accomplished.

IV: ADDITIONAL COMMENTS

The program may be used by submitting an FLIST file similar to the examples. The program is on the AZZZZZ disk for shared use; see examples for JCL data. The region size can be 80K, the time should be less than 1/2 minute of 360/91 time.

Do's and Don'ts

1. Always convert CRBE FLIST files to OTHER and change / in JCL data to another character such as).
2. Remove FT01 line and following one in job control lines if only tape 2 is to be mounted. Otherwise, the computer operator gets confused and may cancel your job.
3. Never give \$\$ADD commands prior to \$\$PURGE or \$\$REPLACE sequences. \$\$NEW is permitted before, during, or after such sequences.
4. Always \$\$PRINT or \$\$FETCH at end of command sequence.
5. Except in the optional usage, always end \$\$NEW, \$\$ADD, and \$\$REPLACE data sequence with \$\$END. \$\$END is permitted in the other cases but not required.

```
100 //DKTXX123 JOB (13368,,,15,1000,,1),'TRUBEY  BLOG 6025',
200 //  MSGLEVEL=1,CLASS=G,TYPRUN=HOLD
300 // EXEC LINKNGO,REGION.GO=100K
400 //LINK.MAINTAIN DD DISP=SHR,DCB=(RECFM=FBS,LRECL=80,BLKSIZE=3200),
500 // VOL=SER=AZZZZZ,UNIT=2314,
600 // DSN=AA.G4.P36944.C13368.TRUBEY.DKTXX.MAINTAIN
700 //LINK.SYSIN DD *
800  !INCLUDE MAINTAIN
900 /*
1300 //GO.FT51F001 DD SYSOUT=A
1400 //FT52F001 DD SYSOUT=R,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),
1401 //  SPACE=(3200,(10,10)),UNIT=CRBEPKS
1500 //GO.FT01F001 DD UNIT=TAPE9,DISP=OLD,VOL=SER=01,
1600 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(,NL)
1700 //GO.FT02F001 DD UNIT=TAPE9,DISP=OLD,VOL=SER=02,
1800 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(,NL)
1900 //GO.FT50F001 DD *
1901 $$NEW TAPE
1902 CCC1
1903 =MBNXX.CCC1
1904 $$END
2000 $$PRINT
2500 ALL
2600 /*
      %
```

```
100 //DKTXX123 JOB (13368,,,15,1000,,1), 'TRUBEY BLDG 6025',
200 // MSGLEVEL=1,CLASS=G,TYPRI=HOLD
300 // EXEC LINKGO,REGION.GO=100K
400 //LINK.MAINTAIN DD DISP=SHR,DCB=(RECFM=FBS,LRECL=80,BLKSIZE=3200),
500 // VOL=SER=AZZZZ,UNIT=2314,
600 // DSN=AA.G4.P36944.C13368.TRUBEY.DKTXX.MAINTAIN
700 //LINK.SYSIN DD *
800 INCLUDE MAINTAIN
900 /*
1300 //GO.FT51F001 DD SYSOUT=A
1400 //FT52F001 DD SYSOUT=R,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),
1401 // SPACE=(3200,(10,10)),UNIT=CRBEPKS
1500 //GO.FT01F001 DD UNIT=TAPE9,DISP=OLD,VOL=SER=01,
1600 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(,NL)
1700 //GO.FT02F001 DD UNIT=TAPE9,DISP=OLD,VOL=SER=02,
1800 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(,NL)
1900 //GO.FT50F001 DD *
1901 $$REPLACE
1902 ANNRAPR
1903 *MBNXX,ANNRAPR
1904 $$END
2000 $$PRINT
2100 ANNRAPR
2200 $$FETCH
2300 ANNRAPR
2400 $$END
2500 /*
2600 //
```

3

```
100 //DKTXX123 JOB (13368,,,15,1000,,1),'TRUBEY BLDG 6025',
200 // MSGLEVEL=1,CLASS=G,TYPRUN=HOLD
300 // EXEC LINKNGO,REGION.GO=100K
400 //LINK.MAINTAIN DD DISP=SHR,DCB=(RECFM=FBS,LRECL=80,BLKSIZE=3200),
500 // VOL=SER=AZZZZZ,UNIT=2314,
600 // DSN=AA.G4.P30944.C13368.TRUBEY.DKTXX.MAINTAIN
700 //LINK.SYSIN DD *
800 INCLUDE MAINTAIN
900 /*
1300 //GO.FT51F001 DD SYSOUT=A
1400 //FT52F001 DD SYSOUT=R,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),
1401 // SPACE=(3200,(10,10)),UNIT=CRBEPKS
1500 //GO.FT01F001 DD UNIT=TAPE9,DISP=OLD,VOL=SER=01,
1600 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(,NL)
1700 //GO.FT02F001 DD UNIT=TAPE9,DISP=OLD,VOL=SER=02,
1800 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(,NL)
1900 //GO.FT50F001 DD *
1901 $$REPLACE
1902 TEST1
1903 FEB 10,1972
1904 $$END
2000 $$REPLACE
2500 TAPEREEL
2600 REEL X-4032
2601 $$END
2602 $$PURGE
2603 XXXXXX
2604 $$ADD
2605 TEST3
2606 =DKTXX.TEST3
2607 $$END
2608 $$FETCH
2609 TEST2
2610 $$PRINT
2611 ALL
2612 /*
```

3


```
//DKTME001 JOB (13368,,15,1000,,1,,60),'SAVE6522,16 DKT 6025',
// CLASS=E,TYPRUN=HOLD
/*ROUTE PRINT LOCAL
/*ROUTE PUNCH REMOTE3
// EXEC LINKNGO,REGION.GO=80K,TIME.GO=1
//LINK.MAINTAIN DD DISP=SHR,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),
// VOL=SER=AZZZZZ,UNIT=2414,
// DSN=AA.G4.P36944.C13368.TRIBBY.DKTX.MAINTAINI
//LINK.SYSIN DD *
  INCLUDE MAINTAIN
/*
//GO.PT51P001 DD SYSOUT=A
//PT07P001 DD SYSOUT=B,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)
//PT52P001 DD SYSOUT=B,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),
// SPACE=(3200,(10,10))
//GO.PT01P001 DD UNIT=TAPE9,DISP=OLD,VOL=SER=01,
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(,NL)
//GO.PT02P001 DD UNIT=TAPE9,DISP=OLD,VOL=SER=02,
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(,NL)
//GO.PT13P001 DD UNIT=SYSDA,
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=3520),
// SPACE=(3520,(100),RLSE)
//GO.PT50P001 DD *
  $$CHECK
  TAPEREEL
  $$COL
  30
  $$OPT
  $$REPLACE
  C      SUBROUTINE ABC(D,E,F)
        END
  =ABC.P4
  $$
  $$PURGE
        SUBROUTINE GHI(J,K)
        END
  $$NEW
  =GHI.P4
  $$
  $$NOOPT
  $$REPLACE
  C      SUBROUTINE LMN(O)
  =LMN.P4
  $$
  $$OPT
  $$DIR
  $$END
  $$NOOPT
  $$PUBLISH
/*
```

JOB NUMBER		360/ G 60K		JOB CARD		<input type="checkbox"/> 91	<input checked="" type="checkbox"/> 75	<input type="checkbox"/> EITHER	
PHONE		TAPES REQUIRED							
NAME TRUBBY		LOG NO	REEL NUMBER	SPECIAL HANDLING	SAVE	SAVED REEL NUMBER	FILE PROTECT		7 OR 9 TRACK
BUILDING 6025	ROOM						BEFORE	AFTER	
	PLANT						Y N	Y N	
CHARGE 13368	MAXIMUM EXECUTION TIME	1	X2136		X		X	X	9
	<input checked="" type="checkbox"/> 360 75 <input type="checkbox"/> 360 91	1	X4032		X			X X	9
DUMP ON OPERATOR CANCELLATION <input type="checkbox"/> YES <input type="checkbox"/> NO									
CANCELLATION BY OPERATOR		REMARKS:							
<input type="checkbox"/> EXCEEDED TIME <input type="checkbox"/> OTHER									
CONSOLE ERROR MESSAGE(S)		DISKS IDENT. AZZZZZ							

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