by

David V. Sommer
Sharon E. Good

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Computation, Mathematics and Logistics Department
Departmental Report

June 1984
**REPORT DOCUMENTATION PAGE**

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<th>CMRD-84-12</th>
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<td>4. TITLE (and Subtitle)</td>
<td>COMPUTER CENTER CDC LIBRARIES/NSRDC AND NSRDC5 (SUBPROGRAMS)</td>
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<td>9. PERFORMING ORGANIZATION NAME AND ADDRESS</td>
<td>DTNSRDC, USER SERVICES, CODE 1892, BETHESDA, MARYLAND 20084</td>
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<td>10. PROGRAM ELEMENT, PROJECT, TASK AREA &amp; WORK UNIT NUMBERS</td>
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<td>COMPTUTION, MATHEMATICS &amp; LOGISTICS DEP, COMPUTER FACILITIES DIVISION (189)</td>
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<td>19. KEY WORDS (Continue on reverse side if necessary and identify by block number)</td>
<td>CDC CYBER 170, INTERACTIVE PROCESSING, COMPUTER, NOS/BE OPERATING SYSTEM, CONTROL STATEMENT, PROGRAMMING LANGUAGES, GRAPHICS, REMOTE JOB ENTRY</td>
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<td>20. ABSTRACT (Continue on reverse side if necessary and identify by block number)</td>
<td>COMPUTER CENTER CDC LIBRARIES/NSRDC (SUBPROGRAMS), CLIB/N, IS A REFERENCE MANUAL WHICH DESCRIBES MOST OF THE SUBPROGRAMS IN LIBRARIES NSRDC AND NSRDC5 ON THE CDC CYBER 170 COMPUTERS AT DTNSRDC. THESE SCIENTIFIC AND UTILITY ROUTINES ARE USED PRIMARILY WITH FORTRAN PROGRAMS AND MOST ARE WRITTEN IN FORTRAN. CLIB/N LISTS THE ROUTINES BY FUNCTIONAL CATEGORY AND ALPHABETICALLY WITH A DESCRIPTIVE TITLE. ALL AVAILABLE MACHINE-READABLE DOCUMENTS DETAILING THE USE OF THESE ROUTINES ARE INCLUDED.</td>
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**EDITION OF NOV 1 85 IS OBSOLETE**

**SIN 0102-LF-014-8601**

**SECURITY CLASSIFICATION OF THIS PAGE (When Date Entered)**
19 KEY WORDS (CONTINUED)

HARDWARE

SOFTWARE DOCUMENTATION
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* - A LISTING OF THE DOCUMENTS IS NOT INCLUDED IN THIS TABLE OF CONTENTS (SEE PAGE 1-10). AS NEW ROUTINES ARE DEVELOPED, THEY WILL BE INSERTED ALPHABETICALLY INTO THIS DOCUMENT AND MAY BE PRINTED ON THE COMPUTER.
*** INTRODUCTION ***

THE COMPUTER CENTER MAKES AVAILABLE ON THE CDC COMPUTERS, IN ADDITION TO THE NOS/BE OPERATING SYSTEM, A WIDE VARIETY OF BOTH SCIENTIFIC AND UTILITY PROGRAMS, SUBPROGRAMS AND CATALOGUED PROCEDURES. MOST OF THE ROUTINES ARE MAINTAINED IN LIBRARIES ON PERMANENT FILES AND MAY BE INVOKED BY THE APPROPRIATE (LOADER) CONTROL STATEMENTS.

THE CLIB-SERIES OF MANUALS CONSISTS OF THE FOLLOWING, WHICH DESCRIBE THE CONTENTS OF THE VARIOUS CDC CYBER LIBRARIES MAINTAINED BY THE COMPUTER CENTER:

- CLIB - COMPUTER CENTER CDC LIBRARIES
- CLIB/N - COMPUTER CENTER CDC LIBRARIES/NSRDC AND NSRDC5 (SUBPROGRAMS)
- CLIB/P - COMPUTER CENTER CDC LIBRARIES/PROCFL (PROCEDURES)
- CLIB/U - COMPUTER CENTER CDC LIBRARIES/UTILITY (PROGRAMS)
- CLIB/M - COMPUTER CENTER CDC LIBRARIES/MNSRDC (PROGRAMS)

THIS MANUAL, CLIB/N, IS A REFERENCE MANUAL WHICH DESCRIBES MOST OF THE SUBPROGRAMS IN LIBRARY 'NSRDC' AND ALL OF THE ROUTINES IN LIBRARY 'NSRDC5'.

*** HOW TO USE THIS MANUAL ***

THE ROUTINES ARE CLASSIFIED IN ONE OR MORE FUNCTIONAL CATEGORIES (SEE PAGE 1-3 FOR A LIST OF CATEGORIES). THEY ARE LISTED, BEGINNING ON PAGE 1-6, UNDER THE VARIOUS CATEGORIES. THE INDIVIDUAL ROUTINES ARE LISTED, WITH DESCRIPTIVE TITLE, BEGINNING ON PAGE 1-9. CHAPTER 2 CONTAINS ALL AVAILABLE MACHINE-READABLE DOCUMENTS DESCRIBING THE USE OF SUBPROGRAMS IN LIBRARY 'NSRDC'. DOCUMENTATION NOT IN CHAPTER 2 MAY BE OBTAINED FROM USER SERVICES, CARDEROCK, BLDG 17, ROOM 100, (202) 227-1907. CHAPTER 3 CONTAINS ALL MACHINE-READABLE DOCUMENTS DESCRIBING THE USE OF SUBPROGRAMS IN LIBRARY 'NSRDC5'.


*** LIBRARY NSRDC ***

'NSRDC' IS A LIBRARY OF DTNSRDC-WRITTEN OR -SUPPORTED SUBPROGRAMS. THESE ROUTINES ARE USED PRIMARILY WITH FTN4, MNF OR RATFOR PROGRAMS AND MOST ARE CODED IN FTN4.

*** USING LIBRARY NSRDC ***

THE FOLLOWING CONTROL STATEMENTS MAY BE USED TO ACCESS 'NSRDC' DURING THE LOADING OF A PROGRAM:

...  
  FTN4. -OR- COBOL. -OR- ATTACH,LGO,MYLGO,ID=XXXX.  
  ATTACH,NSRDC.  
  LDSET,LIB=NSRDC. -OR- LIBRARY,NSRDC.  
  LGO.  
...  

*** LIBRARY NSRDC5 ***

'NSRDC5' IS A LIBRARY OF DTNSRDC-WRITTEN OR -SUPPORTED SUBPROGRAMS. THESE ROUTINES ARE CODED IN FTN5 AND USE FEATURES UNIQUE TO ANSI STANDARD FORTRAN 77. THEY MAY NOT BE CALLED BY ROUTINES WRITTEN IN FTN4, MNF OR RATFOR, OR ANY OTHER HIGH-LEVEL LANGUAGE (SUCH AS COBOL OR COBOL5) WHICH DOES NOT SUPPORT FORTRAN 77 FEATURES.

*** USING LIBRARY NSRDC5 ***

THE FOLLOWING CONTROL STATEMENTS MAY BE USED TO ACCESS 'NSRDC5' DURING THE LOADING OF A PROGRAM:

...  
  FTN5. -OR- ATTACH,LGO,MYLGO,ID=XXXX.  
  ATTACH,NSRDC5.  
  LDSET,LIB=NSRDC5. -OR- LIBRARY,NSRDC5.  
  LGO.  
...  

NOTE THAT WHEN BOTH NSRDC AND NSRDC5 ARE REQUIRED, NSRDC5 SHOULD BE MADE AVAILABLE TO THE LOADER FIRST: LDSET,LIB=NSRDC5/NSRDC.
*** FUNCTIONAL CATEGORIES ***

THE FOLLOWING FUNCTIONAL CATEGORIES ARE USED AT DTNSRDC. THOSE CATEGORIES PRECEDED BY AN ASTERISK (*) ARE LOCAL DTNSRDC CATEGORIES. THE OTHER ARE FROM THE VIM (CDC USERS GROUP) LIST.

A0 ARITHMETIC ROUTINES
A1 REAL NUMBERS
A2 COMPLEX NUMBERS
A3 DECIMAL
A4 I/O ROUTINES

B0 ELEMENTARY FUNCTIONS
B1 TRIGONOMETRIC
B2 HYPERBOLIC
B3 EXPONENTIAL AND LOGARITHMIC
B4 ROOTS AND POWERS

C0 POLYNOMIALS AND SPECIAL FUNCTIONS
C1 EVALUATION OF POLYNOMIALS
C2 ROOTS OF POLYNOMIALS
C3 EVALUATION OF SPECIAL FUNCTIONS (NON-STATISTICAL)
C4 SIMULTANEOUS NON-LINEAR ALGEBRAIC EQUATIONS
C5 SIMULTANEOUS TRANSCENDENTAL EQUATIONS
* C6 ROOTS OF FUNCTIONS

D0 OPERATIONS ON FUNCTIONS AND SOLUTIONS OF DIFFERENTIAL EQUATIONS
D1 NUMERICAL INTEGRATION
D2 NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS
D3 NUMERICAL SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS
D4 NUMERICAL DIFFERENTIATION

E0 INTERPOLATION AND APPROXIMATIONS
E1 TABLE LOOK-UP AND INTERPOLATION
E2 CURVE FITTING
E3 SMOOTHING
E4 MINIMIZING OR MAXIMIZING A FUNCTION

F0 OPERATIONS ON MATRICES, VECTORS & SIMULTANEOUS LINEAR EQUATIONS
F1 VECTOR AND MATRIX OPERATIONS
F2 EIGENVALUES AND EIGENVECTORS
F3 DETERMINANTS
F4 SIMULTANEOUS LINEAR EQUATIONS

G0 STATISTICAL ANALYSIS AND PROBABILITY
G1 DATA REDUCTION (COMMON STATISTICAL PARAMETERS)
G2 CORRELATION AND REGRESSION ANALYSIS
G3 SEQUENTIAL ANALYSIS
G4 ANALYSIS OF VARIANCE
G5 TIME SERIES
G6 SPECIAL FUNCTIONS (INCLUDES RANDOM NUMBERS AND PDF'S)
* G7 MULTIVARIATE ANALYSIS AND SCALE STATISTICS
* G8 NON-PARAMETRIC METHODS AND STATISTICAL TESTS
* G9 STATISTICAL INFERENCE
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tr>
<td>H0</td>
<td>Operations Research Techniques, Simulation &amp; Management Science</td>
</tr>
<tr>
<td>H1</td>
<td>Linear Programming</td>
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<td>H2</td>
<td>Non-Linear Programming</td>
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<td>H3</td>
<td>Transportation and Network Codes</td>
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<td>H4</td>
<td>Simulation Modeling</td>
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<td>H5</td>
<td>Simulation Models</td>
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<td>I0</td>
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<td>Decimal</td>
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<td>BCD (Hollerith)</td>
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<td>K0</td>
<td>Internal Information Transfer</td>
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<td>Internal-To-Internal (Relocation)</td>
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<td>Executive Routines</td>
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<td>L1</td>
<td>Assembly</td>
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<td>Data Handling</td>
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<td>Sorting</td>
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<td>Conversion and/or Scaling</td>
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<td>N0</td>
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<td>N1</td>
<td>Tracing and Trapping</td>
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<td>N2</td>
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<td>N3</td>
<td>Memory Verification and Searching</td>
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<td>N4</td>
<td>Breakpoint Printing</td>
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Q0 SIMULATION OF COMPUTERS AND DATA PROCESSORS (INTERPRETERS)
Q1 OFF-LINE EQUIPMENT (LISTERS, REPRODUCERS, ETC.)
Q3 COMPUTERS
Q4 PSEUDO-COMPUTERS
Q5 SOFTWARE SIMULATION OF PERIPHERALS
Q9 COMPOSITE

P0 DIAGNOSTICS (HARDWARE MALFUNCTION)

Q0 SERVICE OR HOUSEKEEPING, PROGRAMMING AIDS
Q1 CLEAR/RESET
Q2 CHECKSUM ACCUMULATION AND CORRECTION
Q3 REWIND, TAPE MARK, LOAD CARDS, LOAD TAPE PROGRAMS, ETC.
Q4 INTERNAL HOUSEKEEPING, SAVE, RESTORE, ETC.
Q5 REPORT GENERATOR SUBROUTINES
Q6 PROGRAM DOCUMENTATION: FLOW CHARTS, DOCUMENT, STANDARDIZATION
Q7 PROGRAM LIBRARY UTILITIES

R0 LOGIC AND SYMBOLIC
R1 FORMAL LOGIC
R2 SYMBOL MANIPULATION
R3 LIST AND STRING PROCESSING
R4 TEXT EDITING

S0 INFORMATION RETRIEVAL

T0 APPLICATIONS AND APPLICATION-ORIENTED PROGRAMS
T1 PHYSICS (INCLUDING NUCLEAR)
T2 CHEMISTRY
T3 OTHER PHYSICAL SCIENCES (GEOLOGY, ASTRONOMY, ETC.)
T4 ENGINEERING
T5 BUSINESS DATA PROCESSING
T6 MANUFACTURING (NON-DATA) PROCESSING AND PROCESS CONTROL
T7 MATHEMATICS AND APPLIED MATHEMATICS
T8 SOCIAL AND BEHAVIORAL SCIENCES AND PSYCHOLOGY
T9 BIOLOGICAL SCIENCES
T10 REGIONAL SCIENCES (GEOGRAPHY, URBAN PLANNING)
T11 COMPUTER ASSISTED INSTRUCTION

U0 LINGUISTICS AND LANGUAGES

V0 GENERAL PURPOSE UTILITY SUBROUTINES
V1 RANDOM NUMBER GENERATORS
V2 COMBINATORIAL GENERATORS: PERMUTATIONS, COMBINATIONS & SUBSETS
V3 STANDARD AND SPECIAL PROBLEMS

X0 DATA REDUCTION
X1 RE-FORMATTING, DECOMMUTATION, ERROR DIAGNOSIS
X2 EDITING
X3 CALIBRATION
X4 EVALUATION
X5 ANALYSIS (TIME-SERIES ANALYSIS)
X6 SIMULATION (GENERATE TEST DATA FOR DATA REDUCTION SYSTEM)

Y0 INSTALLATION MODIFICATION
Y1 INSTALLATION MODIFICATION LIBRARY
Y2 NEWPL TAPE OF INSTALLATION MODIFICATIONS

Z0 ALL OTHERS
LIST OF SUBPROGRAMS BY CATEGORY

THE SUBPROGRAMS IN LIBRARIES 'NSRDC' AND 'NSRDC5' ARE LISTED BELOW UNDER THEIR FUNCTIONAL CATEGORIES. ROUTINES FLAGGED WITH AN ASTERISK (*) DO NOT HAVE MACHINE-READABLE DOCUMENTATION. ROUTINES FLAGGED WITH A FIVE (5) ARE IN LIBRARY 'NSRDC5'; ALL OTHERS ARE IN LIBRARY 'NSRDC'. AN ALPHABETICAL LIST OF LIBRARY 'NSRDC', WITH A BRIEF DESCRIPTION OF EACH ROUTINE, BEGINS ON PAGE 1-9; THE ALPHABETICAL LIST OF LIBRARY 'NSRDC5' BEGINS ON PAGE 1-21.

A0 ARITHMETIC ROUTINES
  */ICOMN

A1 REAL NUMBERS
  ISUMIT  NFILL  SUMIT

A2 COMPLEX NUMBERS
  CMPINV  HELP  */PSI

B1 TRIGONOMETRIC
  */COTAN

B4 ROOTS AND POWERS
  DPROOT  PROOT

C1 EVALUATION OF POLYNOMIALS
  */APWR  */HIFAC  */POWR1  */PROD2  */BPOWR  */POLDIV  */POWR2

C2 ROOTS OF POLYNOMIALS
  DPROOT  HELP  */NROOTS  PROOT  */QUART

C3 EVALUATION OF SPECIAL FUNCTIONS (NON-STATISTICAL)
  */A1  BESSK  CELLI  */ERROR  */LOGGAM
  */BEJYO  BESSY  */COMBES  */EXPINT  */PSI
  */BEJY1  BSJ  ELLI  FRESNEL  SNCNDN
  BESSI  */CBSF  */ELLIP  GAMCAR
  BESSJ  */CEI3  */ERF  GAMMA

C6 ROOTS OF FUNCTIONS
  */ROOTER

D1 NUMERICAL INTEGRATION
  */FGI  QUADG  SIMPUN
  */FNOL3  */SIMP  */XFIL

D2 NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS
  */FNOL3  KUTMER
E1 Table Look-up and Interpolation
CRDTAB DISCOT FRMRA FRMRAN

E2 Curve Fitting
FFT GMHAS OPLSA RFFT SPLFIT
FFT5 LSQSUB POLYN RFSN SQFIT

E3 Smoothing
SMOOTH

E4 Minimizing or Maximizing a Function
MINMAX

F1 Vector and Matrix Operations
MATINS MATRIX

F2 Eigenvalues and Eigenvectors
MATRIX VARAH1 VARAH2

F3 Determinants
GAUSS MATINS

F4 Simultaneous Linear Equations
BMAM CMPINV MAM MATINS
CGAUSS GAUSS MAM200 MATRIX

G0 Statistical Analysis and Probability
ACP DOV SOV TOV

G1 Data Reduction (Common Statistical Parameters)
BDS CMR STUTEE

G2 Correlation and Regression Analysis
ASA MRA SR1 SR3 MRA PCA SR2

G4 Analysis of Variance
ANOVA1 ANOVA2 AOV

G5 Time Series
ASA

G6 Special Functions (Includes Random Numbers and PDF's)
IAOC IDAYWEEK RANNUM

G8 Non-Parametric Methods and Statistical Tests
RSO

I0 Input
FASTIN

I2 Octal
OFMTDE OFMTV
13 DECIMAL
   */CRTTAB

14 BCD (HOLLERITH)
   */ICOM  */ICOMN IFMTV

J2 OCTAL
   PRTFL

J4 BCD (HOLLERITH)
   5/BANR 5/BANR6 LINE6 5/PRTYM
   5/BANR */ICOM LINE8 5/TTYMSG
   BANR6 */ICOMN PRTIME

J5 PLOTTING
   */PLOTMY PLOTPR */PLOTXY

K2 INTERNAL-TO-INTERNAL (RELOCATION)
   CMOVEF GETRA MOVEIT RCPS
   GETDABA MFETCH MSET SWAP

L0 EXECUTIVE ROUTINES
   5/TTYMSG

L3 MONITORING
   GETCCCL

M0 DATA HANDLING
   COMPSTR EQU60 MASKIT

M1 SORTING
   ASORT 5/CSORT 5/CSORT2 QSORT1 SSORTI
   ASORTMV 5/CSORTD ISSORT SSORT SSORTL
   5/CSHUFIL QSORT SSORTF SSORT3

M2 CONVERSION AND/OR SCALING
   5/CHIN 5/CVINCH HEX3 JGDATE 5/NEWDAT
   5/CVCHIN DATCNV 5/HMS2S JUAN 5/S2HMS
   5/CVCHOL DATFMT IHMS MONTH UNHEX3
   5/CVHOCH GETHOUR IROMAN NEWDAT WEDAY

M4 CHARACTER MANIPULATION
   ADJL 5/CHIN GETCHR OMRONI SKWEZL
   ADJR CHNGSEQ */GETPRM PARGET SKWEZR
   ASCADD CONTRCT 5/GETSTR PUTCIA TEKTRI
   ASCADM 5/CVCHIN IBUNP PUTCRI TRAILBZ
   ASCBSX 5/CVCHOL IPAKLFT REPLAC 5/TRANS
   ASCGET 5/CVHOCH ISTAPE REPLACM VALDAT
   ASCII 5/CVINCH 5/ITRANS REPLHI VFILL
   ASCII 5/CVINCH D630I LBYT REPLLO VT1OOI
   ASCLEN EXPAND 5/LEFT REPLNE ZBLANK
   ASCPUT EXPRM LEFTADJ 5/RIGHT ZEROFL
   ASHIFT EXTBIT MOVCHAR SBYT ZEROS
   CENTER EXTPRM MOVECM SEMICO
   5/CENTER FBINRD MOVSTR SETREW
   CHFILL GETCHA MXGET SHIFTA
M5 SEARCHING, SEEKING, LOCATING
AMAXE FINDWDRD 5/GETSTR 5/LASTCH MINE
AMINE 5/FRSTCH IDIGIT 5/LASTCHH NFILLT
5/CFIND 5/FRSTCH IFINDCH LASTWRD 5/NUMER
FINDC GETCHA LASTC 5/LSTCH VALIDI
FINDW GETCHR LASTCH MAXE

N0 DEBUGGING
ALTIME 5/CMMPGFS 5/CMMPGPS PRTIME
5/ALTYM 5/CMMPGOS GETCL 5/SM5PRNT

N2 DUMPING
5/CMNDUMP DMPCPA DUMPA 5/DUMPXPK
DMPA 5/DMPCPA DUMPFL RECOYR

O1 OFF-LINE EQUIPMENT (LISTERS, REPRODUCERS, ETC.)
WARNING

QO SERVICE OR HOUSEKEEPING, PROGRAMMING AIDS
AC ELTIME HERE LIBSYM 5/PFRC
5/AC 5/ELTYM IBL MACHINE 5/PM
ALTIME FTRNFL IDID MEMUSED PRTFL
5/ALTYM GETCCL ISEC MFRAME REDUCE
BANR GETDABA JOBCM 5/MFRAME ROUTER
BANR6 GETFIT JOBNAME NUMEXEC 5/ROUTER
BUFSIZE GETLFSN JOBOG NUMVAR SKPST
5/CMMHMERC GETLGO LFPFERR OVLNAME TIMLEFT
5/CMHMERC GODROP LIBBAM PFRC

Q3 FILE MANIPULATION
CLUNLD SKPFIL UNLOAD
PF 5/TTYOPN ZSYSEQ

Q4 INTERNAL HOUSEKEEPING, SAVE, RESTORE, ETC.
PRTIME 5/PRTYM

R1 FORMAL LOGIC
COUPLE

S0 INFORMATION RETRIEVAL
5/IDID 5/JOBOG

T4 ENGINEERING
*/ARDCFT

V1 RANDOM NUMBER GENERATORS
*/RANNUM RNDMIZ */RN1 */RN2

20 ALL OTHERS
DAYONOF MF2CPU 5/MF2CPU
*** DESCRIPTIVE TITLES (NSRDC) ***

SUBPROGRAMS IN LIBRARY 'NSRDC' ARE LISTED ALPHABETICALLY BELOW.

AC             GET ACCOUNT NUMBER FOR THIS JOB
ACP            ADD CROSS PRODUCT VARIABLES - STATISTICS
ADJL           LEFT ADJUST A LINE OF WORDS LEAVING ONE SPACE BETWEEN WORDS
ADJR           RIGHT ADJUST A LINE OF WORDS LEAVING ONE SPACE BETWEEN WORDS
AI             AIRY FUNCTION INTEGRAL
ALTIME         OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE START OF JOB (OR INTERCOM SESSION)
AMAXE          FIND MAXIMUM VALUE OF AN ARRAY (ALSO CONTAINS MAXE)
AMINE          FIND MINIMUM VALUE OF AN ARRAY (ALSO CONTAINS MINE)
ANOVA1         ONE-WAY ANALYSIS OF VARIANCE WITH UNEQUAL N
ANOVA2         TWO-WAY ANALYSIS OF VARIANCE WITH EQUAL N
AOV            ANALYSIS OF VARIANCE FROM EQUAL NUMBER OF EQUAL WEIGHT DESIGNS - TOTALS, DEVIATES, SUMS OF SQUARES, DEGREES OF FREEDOM, MEAN SQUARES
APOWR          EXPONENTIATION OF POWER SERIES - ONE VARIABLE
ARDCFT         PROPERITES OF U.S. STANDARD ATMOSPHERE (1962)
ASA            AUTOCORRELATION AND SPECTRAL ANALYSIS FROM STATIONARY TIME SERIES, GIVES POWER SPECTRUM, LAGGED SUMS AND PRODUCTS
ASCADD         ADD AN ASCII STRING TO ANOTHER ASCII STRING
ASCADM         ADD AN ASCII STRING TO ANOTHER ASCII STRING MULTIPLE TIMES
ASCBSX         REMOVE BS (BACKSPACE) AND CAN (CTRL-X) FROM A STRING
ASCGET         GET AN ASCII CHARACTER FROM AN ASCII STRING
ASCIII         CREATE AN ASCII MESSAGE FROM STRINGS OF ASCII CHARACTERS
ASCIII         INITIALIZE COMMON BLOCK /ASCII/ WITH ASCII CHARACTERS
ASCLEN         FIND LENGTH OF AN ASCII STRING
ASCPUT         ADD AN ASCII CHARACTER TO AN ASCII STRING
ASCTXT         CONVERT DISPLAY CODE STRING TO ASCII STRING
ASHIFT SHIFT EACH WORD OF AN ARRAY
ASORT FTN ALPHANUMERIC SORT
ASORTMV SORT 2-DIMENSIONAL ARRAY USING A FAST ARRAY MOVING SUBROUTINE
BANR PRINT A BANNER (LETTERS ARE 10 LINES HIGH, LINES ARE 110 CHARACTERS LONG)
BANR6 PRINT A BANNER (LETTERS ARE 6 LINES HIGH, LINES ARE 80 CHARACTERS LONG)
BDS BASIC DESCRIPTIVE STATISTICS - MEAN, SECOND, THIRD, FOURTH MOMENTS, VARIANCE, STANDARD DEVIATION, SKEWNESS, KURTOSIS
BEJO ZERO-ORDER BESSEL FUNCTIONS FOR REAL ARGUMENTS
BEJY1 FIRST ORDER BESSEL FUNCTIONS FOR REAL ARGUMENTS
BESSI MODIFIED BESSEL FUNCTION OF THE FIRST KIND
BESSJ BESSEL FUNCTION OF THE FIRST KIND
BESSK MODIFIED BESSEL FUNCTION OF THE SECOND KIND
BESSY BESSEL FUNCTION OF THE SECOND KIND
BMAM SOLVE SYSTEM AX=B FOR BANDED SYMMETRIC MATRICES
BPWR EXPONENTIATION OF POWER SERIES IN TWO VARIABLES
BSJ SPHERICAL BESSEL FUNCTION
BUFSIZE PRINT MESSAGE IN DAYFILE FOR EACH FILE SPECIFIED INDICATING BUFFER SIZE AND WHETHER BUFFER IS CURRENTLY ALLOCATED
CBSF COMPLEX BESSEL FUNCTION FOR LARGE ARGUMENT
CCALL EXIT PROGRAM AND EXECUTE ONE OR MORE CONTROL CARD
CE13 COMPLETE ELLIPTIC INTEGRAL OF THE THIRD KIND
CELLI COMPLETE AND INCOMPLETE ELLIPTIC INTEGRALS OF THE FIRST AND SECOND KIND
CENTER CENTER A CHARACTER STRING WITHIN AN OUTPUT FIELD
CFILL FILL AREA WITH ALTERNATING FIELDS OF SPECIFIED CHARACTER AND BLANKS
CGAUSS COMPLEX SOLUTION OF SIMULTANEOUS EQUATIONS AND DETERMINANT BY ITERATIVE GAUSSIAN ELIMINATION
CHFILL FILL (PORTION OF) AN ARRAY WITH A CHARACTER
CHNGSEQ ALLOW COBOL4 USER TO DEFINE A COLLATING SEQUENCE
CLUNLD   CLOSE AND UNLOAD A FILE
CMPINV   COMPLEX MATRIX INVERSION
CMR      CORRELATION MATRIX WITH OPTIONAL MEAN AND STANDARD DEVIATION
COMBES   BESSEL FUNCTIONS FOR COMPLEX ARGUMENT AND ORDER
COMPSR   COMPARE TWO CHARACTER STRINGS
CONTRCT  SQUEEZE ARRAY OF 1R-FORMAT CHARACTERS TO LEFT (SEE EXPAND)
COTAN    COTANGENT FUNCTION
COUPLE   LOGICALLY CONNECT TWO WORDS
CRDCTB   READ TABLES FOR FRMRAN AND FRMRA2 INTERPOLATION
DATCNV   CONVERT DATE FORMATS (USES INTEGERS)
DATFMT   CONVERT DATE FORMATS (USES CHARACTER STRINGS)
DAYONOF  PACKAGE OF SIX SUBROUTINES TO MANIPULATE THE DAYFILE SETTING SETTINGS
DISCOT   SINGLE OR DOUBLE INTERPOLATION
DMPA     CALLABLE OCTAL AND CHARACTER DUMP OF SPECIFIED PORTION OF USER'S FIELD LENGTH (FL) (BY ACTUAL LOCATION) (NO HEADINGS ARE PROVIDED)
DMPCPA   DUMP JOB CONTROL POINT AREA
DOV      DELETION OF VARIABLES - STATISTICS
DPROOT   FIND ALL ROOTS OF A REAL DOUBLE PRECISION POLYNOMIAL
DUMPA    GIVE OCTAL AND CHARACTER DUMP OF USER-SPECIFIED AREA
DUMPCPA  EXPANDED DUMP OF JOB CONTROL POINT AREA
DUMPFL CALLABLE OCTAL AND CHARACTER DUMP OF SPECIFIED PORTION OF USER'S FIELD LENGTH (FL) (BY ACTUAL LOCATION)

D630I INITIALIZE COMMON BLOCK /D630/ WITH ASCII CONTROL CODES FOR DIABLO 630 TERMINALS

ELLI ELLIPTIC INTEGRAL

ELLIP ELLIPTIC INTEGRAL

ELTIME OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL TO ELTIME

EQU60 LOGICAL COMPARE OF TWO ARRAYS

ERROR ERROR FUNCTION

EXPAND EXPAND CHARACTER STRING INTO ARRAY OF 1R-FORMAT WORDS (SEE CONTRCT)

EXPINT EXPONENTIAL INTEGRAL

EXPRM EXTRACT NEXT PARAMETER FROM EXECUTE CARD

EXTBIT EXTRACT BITS FROM A WORD

EXTPRM EXTRACT NEXT PARAMETER FROM USER-SUPPLIED PARAMETER STRING

FASTIN READ AND UNPACK DATA PREPARED ON THE XDS-910 A/D CONVERSION SYSTEM

FBINRD UNPACK AN INPUT ARRAY (N BITS PER INPUT CHARACTER INTO CDC WORD)

FFT FAST FOURIER TRANSFORM FOR COMPLEX TABULATED FUNCTION

FFT5 FAST FOURIER TRANSFORM

FGI FORTRAN GAUSSIAN INTEGRATION

FINDC FIND PRESENCE OR ABSENCE OF SPECIFIED CHARACTER IN AN ARRAY (USER SPECIFIES RELATIONAL OPERAND)

FINDW FIND PRESENCE OR ABSENCE OF SPECIFIED WORD IN AN ARRAY (USER SPECIFIES RELATIONAL OPERAND)

FINDWRD FIND SPECIFIED WORD IN AN ARRAY

FNOL3 INTEGRATE SYSTEM OF ORDINARY DIFFERENTIAL EQUATIONS

FRESNEL EVALUATE FRESNEL INTEGRALS

FRMRAN LINEAR TABLE INTERPOLATION (ONE OR TWO INDEPENDENT VARIABLES)

FRMRA2 LINEAR TABLE INTERPOLATION (MULTIPLE INDEPENDENT VARIABLES)

FTNRFL GET/SET CORE SIZE
GAMCAR  COMPLEX  GAMMA FUNCTION OF A COMPLEX ARGUMENT HAVING POSITIVE REAL PART

GAMMA  INCOMPLETE OR COMPLETE GAMMA FUNCTION

GAUSS  SIMULTANEOUS EQUATION SOLUTION WITH DETERMINANT BY ITERATIVE GAUSSIAN ELIMINATION

GETCCL  GET CCL FIELDS (REGISTERS AND FLAGS)

GETCHA  EXTRACT CHARACTER FROM SPECIFIED POSITION IN AN ARRAY

GETCHR  EXTRACT CHARACTER FROM SPECIFIED POSITION IN A WORD

GETDABA  GET DYNAMIC AREA BASE ADDRESS AND DETERMINE IF CMM IS ACTIVE

GETFIT  GET SPECIFIED FIT ADDRESS

GETHOUR  FOR A SPECIFIED PERIOD OF TIME (UP TO 2 HR 59 MIN 59 SEC) DETERMINE WHICH HOUR IS OCCUPIED THE LONGEST

GETLFNS  GET ACTUAL LOCAL FILE NAMES (FOR FTN)

GETLGO  EXTRACT FIRST 10 CHARACTERS OF ALL EXECUTE CARD PARAMETERS

GETRA  GET PROGRAM COMMUNICATION REGION (RA+0 THRU RA+77B)

GMHAS  HARMONIC ANALYSIS

GODROP  ISSUE USER-SPECIFIED GO/DROP MESSAGE

HELP  COMPLEX ZEROES OF REAL OR COMPLEX POLYNOMIAL

HERE  GET TERMINAL ID FOR THIS JOB

HEX3  SQUEEZE 3-CHARACTER HEX INTO 12 BITS

HIFAC  HIGHEST COMMON FACTOR OF TWO POLYNOMIALS

IAOC  COUNT ONE-BITS IN SPECIFIED WORD

IBL  CALCULATE BEST BLOCK LENGTH (MIN TIME REQ'D FOR RANDOM ACCESS AND MINIMUM BUFFER SIZE) FOR INDEX SEQUENTIAL FILES

IBUNP  UNPACK 12-BIT BYTES FROM ARRAY

IDAYWEK  FUNCTION TO DETERMINE THE DAY OF THE WEEK FOR ANY DATE FROM 10/15/1582 THRU 02/28/4000

IDID  GET USER INITIALS (AND INTERCOM USER ID) FROM CHARGE CARD OR LOGIN

IDIGIT  CHECK FOR DIGITS IN A FIELD WITHIN A WORD

IFINDCH  FIND FIRST OCCURRENCE OF SPECIFIED CHARACTER IN ARRAY
IFMTV  FAST I-FORMAT DECODE OF VARIABLE LENGTH INPUT

IHMS   CONVERT SECONDS TO 'HH.MM.SS.' (SEE ISEC)

IPAKLFT  SQUEEZE LEFT AND REMOVE ZEROS (OOB) AND BLANKS (55B), RETURN NUMBER OF CHARACTERS

IROMAN  CONVERT ROMAN NUMBERS TO INTEGER

ISEC    CONVERT HH.MM.SS TO SECONDS (SEE IHMS)

ISITCNF TEST FOR CONNECTED FILE

ISSORT  FTN-CALLABLE SHELL SORT FOR INTEGER ARRAYS

ISTAPE  GENERATE TAPE NAME 'TAPENN'

ISUMIT  SUM ELEMENTS OF INTEGER ARRAY

JGDATE  CONVERT ANY GREGORIAN DATE TO A JULIAN DATE AND VICE VERSA
        (MULTI-YEAR)

JOBCM   GET JOB CARD CM

JOBNAME GET NOS/BE JOB NAME FOR THIS JOB

JOBORG  GET JOB ORIGIN (BATCH, INTERCOM, GRAPHICS, MULTI-USER)

JULIAN  CONVERT ANY GREGORIAN DATE TO A JULIAN DATE AND VICE VERSA
        (SINGLE YEAR)

KUTMER  INTEGRATE A SYSTEM OF FIRST-ORDER ORDINARY DIFFERENTIAL
        EQUATIONS USING THE KUTTA-MERSON FOURTH-ORDER, SINGLE-STEP
        METHOD

LASTCH  FIND LAST NON-BLANK CHARACTER IN ARRAY

LASTWRD FIND SUBSCRIPT OF LAST WORD OF ARRAY WHICH CONTAINS A
          NON-BLANK

LBYT    EXTRACT VARIABLE LENGTH BYTE

LEFTADJ SQUEEZE LEFT AND REMOVE BLANKS AND OOB (USER MAY SUPPLY
         TRAILING FILL CHARACTER)

LFPFERR DECODE THE "ERR" CODE FROM FILE MANIPULATION SUBROUTINES PF
         AND LF

LIBBAM  DUMMY SUBROUTINE TO FORCE LDSET,LIB=BAMLIB

LIBSYM  DUMMY SUBROUTINE TO FORCE LDSET,LIB=SYMLIB

LINE6   SET PRINT FILE TO 6 LINES PER INCH

LINE8   SET PRINT FILE TO 8 LINES PER INCH
LOGGAM LOGARITHM OF GAMMA FUNCTION FOR COMPLEX ARGUMENT
LSQSUB GENERAL WEIGHTED LEAST SQUARES FIT
MAM SOLVE SYMMETRIC SYSTEM OF LINEAR EQUATIONS
MAM200 SOLVE 200 SYMMETRIC LINEAR EQUATIONS
MASKIT DYNAMIC MASK GENERATOR
MATINS MATRIX INVERSE WITH SIMULTANEOUS EQUATION SOLUTION AND DETERMINANT
MATRIX MATRIX ALGEBRA - TRANSPOSE, MOVE, SYMMETRIC PRODUCT, EIGENVALUE/EIGENVECTOR, PACK SYMMETRIC, UNPACK SYMMETRIC, INVERSE, SOLUTION OF LINEAR EQUATIONS, MULTIPLY, ADD, SUBTRACT, TRANSPOSE MULTIPLY.
MAXE FIND MAXIMUM VALUE OF AN ARRAY (ALSO CONTAINS AMAXE)
MEMUSED PRINT MESSAGE IN DAYFILE GIVING FIELD LENGTH IN USE AT TIME OF CALL TO THIS ROUTINE
MFETCH FETCH A SINGLE WORD FROM USER'S FL (SEE MSET)
MFRAME OBTAIN THE MACHINE AND MAINFRAME RUNNING THE PROGRAM
MF2CPU RETURN CPU NAME CORRESPONDING TO SUPPLIED MAINFRAME NAME
MINE FIND MINIMUM VALUE OF AN ARRAY (ALSO CONTAINS AMINE)
MINMAX GENERALIZED NONLINEAR ITERATOR
MONTH FROM A DATE (MM/DD/YY) FIND THE MONTH AND RETURN FULL SPELLING AND 3- OR 4-CHARACTER ABBREVIATION
MOVCHAR MOVE ONE CHARACTER FROM ONE STRING TO ANOTHER
MOVECM MOVE WORDS FROM ONE AREA IN CORE TO ANOTHER
MOVEIT MOVE AN ARRAY (MOVLEV REPLACEMENT WHICH CALLS MOVECM)
MOVSTR MOVE A STRING OF CHARACTERS FROM ONE ARRAY TO ANOTHER
MRA MULTIPLE REGRESSION ANALYSIS - LEAST SQUARES ESTIMATE OF LINEAR RELATIONSHIPS
MSET SET A SINGLE WORD IN USER'S FL (SEE MFETCH)
MXGET EXTRACT (RIGHT-JUSTIFIED, ZERO-FILLED) 0-10 6-BIT CHARACTERS FROM 60-BIT WORDS
NEWDAT ADD/SUBTRACT SPECIFIED NUMBER OF DAYS TO/FROM A GIVEN DATE
NFILL FILL ELEMENTS 1 THRU N OF AN ARRAY WITH THE VALUES 1 THRU N, RESPECTIVELY
NFILT TEST AN ARRAY FOR THE PRESENCE OF THE INTEGERS 1 THRU N IN ELEMENTS 1 THRU N, RESPECTIVELY

NROOTS REAL AND COMPLEX ROOTS OF REAL POLYNOMIAL

NUMEXEC GET NUMBER OF EXECUTE CARD PARAMETERS WHICH WERE USED IN THIS EXECUTION OF THE PROGRAM

NUMVAR DETERMINE NUMBER OF ARGUMENTS IN CALL TO SUBPROGRAM

OFMTDE FAST 0-FORMAT DECODE

OFMTIV FAST 0-FORMAT DECODE OF VARIABLE LENGTH INPUT

OMRONI INITIALIZE COMMON BLOCK /OMRON/ WITH ASCII CONTROL CODES FOR OMRON CRT'S

OPLSA ORTHOGONAL POLYNOMIAL LEAST SQUARE APPROXIMATION

OVNAME GET NAME OF FILE CURRENTLY BEING EXECUTED

PARGET GET ALL PARAMETERS OF USER-SUPPLIED PARAMETER STRING

PCA PRINCIPLE COMPONENT ANALYSIS - EIGENVALUES AND EIGENVECTORS OF CORRELATION MATRIX, TRANSFORMS NORMALIZED OBSERVATION INTO ORTHOGONAL COMPONENTS AND CHECKS ACCURACY

PF FORTRAN CALLABLE PERMANENT FILE FUNCTIONS AND AUXILIARY FILE ACTION REQUESTS

PFRC SUPPLY DESCRIPTION OF PERMANENT FILE FUNCTION RETURN CODE

PLOTMY PRINTER PLOT - MULTIPLE CURVES

PLOTPR PRINTER PLOT - MULTIPLE CURVES

PLOTXY PRINTER PLOT - SINGLE CURVE

POLDIV POLYNOMIAL DIVISION

POLYN LEAST SQUARES POLYNOMIAL FIT

POWR1 1 TERM IN EXPONENTIATION OF POWER SERIES - ONE VARIABLE

POWR2 1 TERM IN EXPONENTIATION OF POWER SERIES - TWO VARIABLES

PROD2 1 TERM IN PRODUCT OF POWER SERIES - TWO VARIABLES

PROOT FIND ALL ROOTS OF A REAL POLYNOMIAL

PRTFL PRINT CURRENT FL (OR PUT INTO DAYFILE)

PRTIME GET AND PRINT CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL AND PRINT USER-SUPPLIED MESSAGE

PSI COMPLEX PSI FUNCTION
PUTCHA INSERT CHARACTER INTO SPECIFIED POSITION IN AN ARRAY

PUTCHR INSERT CHARACTER INTO SPECIFIED POSITION IN A WORD

QSORT IN-CORE ASCENDING SORT FOR ARRAYS LARGER THAN 500 WORDS

QSORT1 IN-CORE ASCENDING SORT WITH RE-ORDERING OF ASSOCIATED ARRAY (FOR ARRAYS LARGER THAN 500 WORDS)

QUADG INTEGRAL BY GAUSS-LEGENDRE 10-POINT QUADRATURE

QUART REAL OR COMPLEX ROOTS OF QUARTIC

RANNUM NORMALLY DISTRIBUTED RANDOM NUMBERS

RCPA READ (A PORTION OF) CONTROL POINT AREA

RECOVRD ON RECOVERY, PRINT EXCHANGE JUMP PACKAGE, RA+0 THRU RA+77B

REDUCE REDUCE FL TO MINIMUM -OR- REQUEST ADDITIONAL FL RELATIVE TO START OF BLANK COMMON

REPLAC REPLACE ONE CHARACTER WITH ANOTHER IN AN ARRAY

REPLACM REPLACE SEVERAL CHARACTERS WITH OTHER CHARACTERS

REPLHI REPLACE ALL CHARACTERS GREATER THAN SPECIFIED CHARACTER WITH NEW CHARACTER

REPLLO REPLACE ALL CHARACTERS LESS THAN SPECIFIED CHARACTER WITH NEW CHARACTER

REPLNE REPLACE ALL CHARACTERS (EXCEPT SPECIFIED CHARACTER) WITH A SPECIFIED CHARACTER

RFFT FAST FOURIER TRANSFORM FOR REAL TABULATED DATA

RFSN REVERSE FAST FOURIER TRANSFORM

RNDMIZ EMULATE BASIC LANGUAGE 'RANDOMIZE' STATEMENT (CAN BE USED TO GUARANTEE FIRST CALL TO RANF WILL RESULT IN A DIFFERENT NUMBER WITH EACH EXECUTION OF A PROGRAM)

RN1 UNIFORM RANDOM NUMBER USING TWO CONGRUENTIAL GENERATORS

RN2 UNIFORM RANDOM NUMBER USING ONE CONGRUENTIAL GENERATOR

ROOTER GENERAL ROOT FINDER

ROUTERC SUPPLY DESCRIPTION OF ROUTE RETURN CODE

RSO RANK ORDER STANDARDIZED OBSERVATIONS

SBYT STORE VARIABLE LENGTH BYTE
SEMICO REPLACE DISPLAY CODE OOB WITH 77B (SEMI-COLON)

SETREW CONVERT ALPHABETIC REWIND OPTION INTO RM OPEN AND CLOSE CODES

SHIFTA SHIFT ARRAY A SPECIFIED NUMBER OF BITS (CROSSING OVER WORD BOUNDARIES)

SIMP SIMPSON'S RULE INTEGRATION

SIMPUN SIMPSON'S RULE INTEGRATION - UNEQUAL INTERVALS

SKPFIL REPOSITION A SEQUENTIAL FILE FORWARD OR BACKWARD BY A SPECIFIED NUMBER OF UNITS (FOR EXISTING RECORDS ONLY)

SKPSTAT GET THE STATUS OF THE LAST CALL TO 'SKPFIL'

SKWEZL SQUEEZE LEFT AND REMOVE BLANKS AND OOB

SKWEZR SQUEEZE RIGHT AND REMOVE BLANKS AND OOB

SMOOTH LEAST SQUARES POLYNOMIAL SMOOTHING

SNCNDN JACOBIAN ELLIPTIC FUNCTION

SOV STANDARDIZATION OF VARIABLES - STATISTICS

SPLFIT SPLINE CURVE FIT

SQFIT POLYNOMIAL LEAST SQUARE FIT

SR1 INITIAL STEPWISE REGRESSION ANALYSIS BASED ON BMD02R

SR2 ONE STEP IN STEPWISE REGRESSION ANALYSIS

SR3 COMPUTE RESIDUALS FROM SR2 REGRESSION

SSORT FTN SHELL SORT

SSORTF FTN CALLABLE SHELL SORT FOR TWO-DIMENSIONAL ARRAYS

SSORTI FTN CALLABLE SHELL SORT FOR TWO-DIMENSIONAL ARRAYS

SSORTL FTN LOGICAL SHELL SORT

SSORT3 FTN-CALLABLE SHELL SORT FOR REAL ARRAYS WITH ASSOCIATED REAL ARRAY AND INTEGER ARRAY

STUTEE STUDENT'S T DISTRIBUTION

SUMIT SUM ELEMENTS OF REAL ARRAY

SWAP SWAP TWO ARRAYS
TEKTRI INITIALIZE COMMON BLOCK /TEKTRN/ WITH ASCII CONTROL CODES FOR THE TEKTRONIX GRAPHICS TERMINALS

TIMLEFT DETERMINE CP (AND 10) TIME LEFT SINCE START OF BATCH JOB OR INTERCOM COMMAND

TOV TRANSFORMATION OF VARIABLES BY IDENTITY, LOG BASE 10, SQUARE ROOT, SQUARE

TRAILBZ CHANGE TRAILING BLANKS TO ZEROS (00B)

UNHEX3 SPREAD 2 CHARACTERS INTO 3 HEX DIGITS

UNLOAD UNLOAD A FORTRAN FILE

VALDAT LOGICAL FUNCTION TO VALIDATE A DATE FORMAT

VALIDT VALIDATE AN ARRAY TO SEE THAT EACH ELEMENT IS ONE OF A USER-SPECIFIED LIST

VARAH1 EIGENVALUES AND EIGENVECTORS OF A GENERAL REAL MATRIX

VARAH2 IMPROVED ESTIMATES AND BOUNDS FOR EIGENSYSTEM OF A GENERAL REAL MATRIX

VFILL FILL AN ARRAY WITH USER-SPECIFIED WORD

VT100I INITIALIZE COMMON BLOCK /VT100/ WITH ASCII CONTROL CODES FOR THE DEC VT100 CRT

WARNING FIN-CALLABLE 'WARNING' CONTROL CARD

WEKDAY DETERMINE THE DAY OF THE WEEK FOR ANY GREGORIAN DATE FROM OCTOBER 15, 1582 THRU FEBRUARY 28, 4000

XFIL FILON'S METHOD FOR INTEGRALS WITH SIN AND COS

ZBLANK CHANGE BLANKS TO 00B AND VICE VERSA

ZEROFI ZERO FIELD LENGTH (SECURITY EOJ)

ZEROS REPLACE BLANKS WITH (DISPLAY CODE) ZEROS, MULTIPLE FIELDS

ZSYSEQ FORTRAN CALLABLE SYSTEM CALL
DESCRIPTIVE TITLES (NSRDC5)

SUBPROGRAMS IN LIBRARY 'NSRDC5' ARE LISTED ALPHABETICALLY BELOW.

AC GET ACCOUNT NUMBER FOR THIS JOB
ALTYM OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE START OF JOB (OR INTERCOM SESSION)
BANR PRINT A BANNER (LETTERS ARE 10 LINES HIGH, LINES ARE 131 PRINT POSITIONS LONG)
BANR6 PRINT A BANNER (LETTERS ARE 6 LINES HIGH, LINES ARE 80 PRINT POSITIONS LONG)
CENTER CENTER A CHARACTER STRING
CFIND SCAN CHARACTER ARRAY FOR CHARACTER WORD
CHIN CONVERT I-FORMATTED CHARACTER STRING TO INTEGER
CMMDUMP DUMP COMMON MEMORY MANAGER (CMM) DYNAMIC AREA HEADERS AND
CMMERC SUPPLY DESCRIPTION OF CMM MEMORY ERROR CODE TRAILER WITH OPTIONAL DUMP OF THE CONTENTS OF EACH BLOCK
CMMPGFS PRINT THE LARGEST BLOCK-SIZES AVAILABLE FOR ALL POSSIBLE CONDITIONS
CMMPGOS PRINT THE CONTENTS OF THE ARRAY RETURNED BY SUBROUTINE CMMPGOS
CMMPGSS PRINT THE CONTENTS OF THE ARRAY RETURNED BY SUBROUTINE CMMPGSS
CMMUERC SUPPLY DESCRIPTION OF CMM USER ERROR CODE
CSHUFL SHUFFLE A CHARACTER ARRAY
CSORT SORT A CHARACTER ARRAY
CSORTD SORT A CHARACTER ARRAY (DESCENDING)
CSORTN SORT A CHARACTER ARRAY (HAVING AN ASSOCIATED NON-CHARACTER ARRAY)
CSORT2 SORT A CHARACTER ARRAY (HAVING AN ASSOCIATED CHARACTER ARRAY)
CVCHIN CONVERT I-FORMATTED CHARACTER STRING TO INTEGER
CVCHOL CONVERT CHARACTER STRING TO HOLLERITH STRING
CVHOCH CONVERT HOLLERITH STRING TO CHARACTER STRING
CVINCH CONVERT INTEGER TO CHARACTER STRING
DMPCPA  SHORT DUMP OF JOB CONTROL POINT AREA
DUMPXPK  DUMP EXCHANGE PACKAGE (REGISTERS, POINTERS, ETC.)
ELTYM  OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL
FIRSTCH  FIND FIRST NON-BLANK IN CHARACTER VARIABLE
FRSTCH  FIND FIRST NON-BLANK IN CHARACTER VARIABLE
GETSTR  EXTRACT CHARACTER STRING ACCORDING TO USER-DEFINED CRITERIA
HMS2S  CONVERT HH.MM.SS TO SECONDS
IDID  GET USER INITIALS AND INTERCOM USER ID FROM CHARGE CARD OR LOGIN
ITRANS  TRANSLATE CHARACTERS ACCORDING TO USER-SPECIFIED TRANSLATE TABLES
JOBORG  DETERMINE JOB ORIGIN
LASTCH  DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK
LASTCHH  DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK IN A HOLLERITH WORD OR ARRAY
LEFT  LEFT-JUSTIFY A CHARACTER STRING
LSTCH  DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK
MFRAME  OBTAIN THE MACHINE AND MAINFRAME RUNNING THE PROGRAM
MF2CPU  RETURN CPU NAME CORRESPONDING TO SUPPLIED MAINFRAME NAME
NEWDAT  ADD/SUBTRACT SPECIFIED NUMBER OF DAYS TO/FROM A GIVEN DATE
NUMER  TEST STRING FOR NUMERICS
PFRC  SUPPLY DESCRIPTION OF PERMANENT FILE FUNCTION RETURN CODE
PM  WRITE 'PM' PRINTER MESSAGE
PRTYM  GET AND PRINT CPA, CPB, CI, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL AND PRINT USER-SUPPLIED MESSAGE
RIGHT  RIGHT-JUSTIFY A CHARACTER STRING
ROUTERC  SUPPLY DESCRIPTION OF ROUTE RETURN CODE
*** DESCRIPTIVE TITLES (NSRDC5) ***

SUBPROGRAMS IN LIBRARY 'NSRDC5' ARE LISTED ALPHABETICALLY BELOW.

AC   GET ACCOUNT NUMBER FOR THIS JOB
ALTYM OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE START OF JOB (OR INTERCOM SESSION)
BANR PRINT A BANNER (LETTERS ARE 10 LINES HIGH, LINES ARE 131 PRINT POSITIONS LONG)
BANR6 PRINT A BANNER (LETTERS ARE 6 LINES HIGH, LINES ARE 80 PRINT POSITIONS LONG)
CENTER CENTER A CHARACTER STRING
CFIND SCAN CHARACTER ARRAY FOR CHARACTER WORD
CHIN CONVERT I-FORMATTED CHARACTER STRING TO INTEGER
CMMDUMP DUMP COMMON MEMORY MANAGER (CMM) DYNAMIC AREA HEADERS AND TRAILER WITH OPTIONAL DUMP OF THE CONTENTS OF EACH BLOCK
CMMPGFS PRINT THE LARGEST BLOCK-SIZES AVAILABLE FOR ALL POSSIBLE CONDITIONS
CMMPGOS PRINT THE CONTENTS OF THE ARRAY RETURNED BY SUBROUTINE CMMGOS
CMMPGSS PRINT THE CONTENTS OF THE ARRAY RETURNED BY SUBROUTINE CMMGSS
CMMUERC SUPPLY DESCRIPTION OF CMM USER ERROR CODE
CSHUFL SHUFFLE A CHARACTER ARRAY
CSORT SORT A CHARACTER ARRAY
CSORTD SORT A CHARACTER ARRAY (DESCENDING)
CSORTN SORT A CHARACTER ARRAY (HAVING AN ASSOCIATED NON-CHARACTER ARRAY)
CSORT2 SORT A CHARACTER ARRAY (HAVING AN ASSOCIATED CHARACTER ARRAY)
CVCHIN CONVERT I-FORMATTED CHARACTER STRING TO INTEGER
CVCHOL CONVERT CHARACTER STRING TO HOLLERITH STRING
CVHOCH CONVERT HOLLERITH STRING TO CHARACTER STRING
CVINCH CONVERT INTEGER TO CHARACTER STRING
DMPCPA  SHORT DUMP OF JOB CONTROL POINT AREA
DUMPXPK  DUMP EXCHANGE PACKAGE (REGISTERS, POINTERS, ETC.)
ELTYM    OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL
FIRSTCH  FIND FIRST NON-BLANK IN CHARACTER VARIABLE
FRSTCH   FIND FIRST NON-BLANK IN CHARACTER VARIABLE
GETSTR   EXTRACT CHARACTER STRING ACCORDING TO USER-DEFINED CRITERIA
HMS2S    CONVERT HH.MM.SS TO SECONDS
IDID     GET USER INITIALS AND INTERCOM USER ID FROM CHARGE CARD OR LOGIN
ITRANS   TRANSLATE CHARACTERS ACCORDING TO USER-SPECIFIED TRANSLATE TABLES
JOBORG   DETERMINE JOB ORIGIN
LASTCH   DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK
LASTCHH  DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK IN A HOLLERITH WORD OR ARRAY
LEFT     LEFT-JUSTIFY A CHARACTER STRING
LSTCH    DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK
MFRAME   OBTAIN THE MACHINE AND MAINFRAME RUNNING THE PROGRAM
MF2CPU   RETURN CPU NAME CORRESPONDING TO SUPPLIED MAINFRAME NAME
NEWDAT   ADD/SUBTRACT SPECIFIED NUMBER OF DAYS TO/FROM A GIVEN DATE
NUMER    TEST STRING FOR NUMERICS
PFRC     SUPPLY DESCRIPTION OF PERMANENT FILE FUNCTION RETURN CODE
PM       WRITE 'PM' PRINTER MESSAGE
PRTYM    GET AND PRINT CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL AND PRINT USER-SUPPLIED MESSAGE
RIGHT    RIGHT-JUSTIFY A CHARACTER STRING
ROUERC   SUPPLY DESCRIPTION OF ROUTE RETURN CODE
SETREW  CONVERT REWIND OPTION INTO OPEN AND CLOSE CODES
SM5PRNT  PRINT CONTENTS OF SORT/MERGE 5 STATISTICS ARRAY
S2HMS   CONVERT SECONDS TO 'HH.MM.SS.'
TRANS   TRANSLATE CHARACTERS ACCORDING TO USER-SPECIFIED TRANSLATE TABLES
TTYMSG  DRIVER TO WRITE A LINE TO AN INTERACTIVE TERMINAL
TTYOPN  OPEN INTERACTIVE INPUT AND OUTPUT FILES
THIS CHAPTER CONTAINS THE MACHINE-READABLE DOCUMENTATION FOR MANY SUBPROGRAMS IN LIBRARY 'NSRDC'. NON-MACHINE-READABLE DOCUMENTATION FOR OTHER ROUTINES IN THE LIBRARY IS ON FILE IN USER SERVICES, CODE 1892.1, (202) 227-1907.

ALL DOCUMENT FILES RESIDE ON THE MASS STORAGE SYSTEM (MSS). YOUR MSACCES PASSWORD MUST BE SUBMITTED TO THE SYSTEM BEFORE DOCUMENTS CAN BE OBTAINED. THIS MAY BE DONE WITH A SEPARATE 'MSACCES' COMMAND OR BY USING THE MSACCES PARAMETER IN THE BEGIN STATEMENT.

HOW TO PRINT A DOCUMENT

INDIVIDUAL DOCUMENTS MAY BE PRINTED USING:

```
BEGIN, DOCGET, NSRDC, <SUBPROG>, OUTPUT, MSACCES=<PASSWORD>.
```

WHERE <SUBPROG> IS THE DESIRED DOCUMENT.

SEVERAL DOCUMENTS MAY BE PRINTED AT ONE TIME USING:

```
BEGIN, DOCGET, NSRDC,,OUTPUT,,DOCS, MSACCES=<PASSWORD>.
```

WHERE DOCS IS A FILE CONTAINING THE NAMES OF THE DESIRED DOCUMENTS:

```
<SUBPROG1>, <SUBPROG2>, ..., <SUBPROG1>
<SUBPROG1+1>, ..., <SUBPROGN>
```

ALL DOCUMENTS MAY BE PRINTED USING:

```
BEGIN, DOCGET, NSRDC,, ALL, OUTPUT, MSACCES=<PASSWORD>.
```

IF YOU HAVE ALREADY SUBMITTED YOUR MSACCES PASSWORD IN THE JOB OR INTERACTIVE SESSION, IT MAY BE OMITTED FROM THE 'BEGIN, DOCGET, .....'.

TO PRINT THE DOCUMENT(S) ON THE XEROX 8700, EITHER:

A) ADD 'FID=<FID>' TO THE 'BEGIN, DOCGET, .....'
WHERE <FID> IS THE FILE ID FOR THE BANNER

B) USE
BEGIN, XEROX,, OUTPUT, FID,, DOCPRT.
SUBROUTINE 'AC'
FUNCTION 'AC'

PURPOSE
GET ACCOUNT NUMBER FOR THIS JOB

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'AC' MUST BE DECLARED INTEGER IN THE CALLING ROUTINE.

USAGE
CALL AC (I)
IVARIABLE = AC (I)

DESCRIPTION OF PARAMETERS
AC - WILL CONTAIN ACCOUNT NUMBER
(INTEGER TYPE VARIABLE)
I - WILL ALSO CONTAIN ACCOUNT NUMBER

CM REQUIRED: 36B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS
L71FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

METHOD
THE ACCOUNT NUMBER IS TAKEN FROM CONTROL POINT AREA.

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/04/75

DATE(S) REVISED
02/27/76
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,AC,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-2 AC - 1 OF 1
SUBROUTINE 'ADJL'

PURPOSE
LEFT ADJUST A LINE OF WORDS LEAVING ONE SPACE BETWEEN WORDS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL ADJL (A, NA, NC, NW, NWORDS)

DESCRIPTION OF PARAMETERS
A  - ARRAY CONTAINING WORDS TO BE LEFT-ADJUSTED
    (WILL BE REPLACED BY LEFT-ADJUSTED ARRAY)
NA  - NUMBER OF COMPUTER WORDS IN 'A' (DIMENSION OF 'A')
NC  - OUTPUT NUMBER OF CHARACTERS
NW  - OUTPUT NUMBER OF COMPUTER WORDS
    (SUBSCRIPT OF LAST NON-BLANK WORD IN 'A')
NWORDS  - OUTPUT NUMBER OF WORDS IN LINE

CM REQUIRED: 126B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
GETCHA  - GET CHARACTER FROM ARRAY
PUTCHA  - PUT CHARACTER INTO ARRAY

AUTHOR
DAVID V SOMMER  - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/24/76

DATE(S) REVISED
03/23/83  - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ADJL,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-3  ADJL  -  1 OF 1
SUBROUTINE 'ADJR'

PURPOSE
RIGHT ADJUST A LINE OF WORDS LEAVING ONE SPACE BETWEEN WORDS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL ADJR (A, NA, NC, NW, NWORDS)

DESCRIPTION OF PARAMETERS
A - ARRAY CONTAINING WORDS TO BE RIGHT-ADJUSTED
    (WILL BE REPLACED BY RIGHT-ADJUSTED ARRAY)
NA - NUMBER OF COMPUTER WORDS IN 'A' (DIMENSION OF 'A')
NC - OUTPUT POSITION OF FIRST NON-BLANK CHARACTER
NW - OUTPUT SUBSCRIPT OF FIRST NON-BLANK WORD IN 'A'
NWORDS - OUTPUT NUMBER OF WORDS IN LINE

CM REQUIRED: 137R

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
GETCHA - GET CHARACTER FROM ARRAY
PUTCHA - PUT CHARACTER INTO ARRAY

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/24/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ADJR,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84  2-4  ADJR - 1 OF 1
SUBROUTINE 'ALTIME'

PURPOSE

OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE
START OF JOB (OR INTERCOM SESSION)

FUNCTIONAL CATEGORIES: QO NO

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)

CDC 6000/CYBER 170 (NOS/BE)

REMARKS

NONE

USAGE

CALL ALTIME (TIMES)

DESCRIPTION OF PARAMETER

TIMES - 7-WORD ARRAY TO CONTAIN THE FOLLOWING:

1 - CPA TIME IN SECONDS
2 - CPB TIME IN SECONDS
3 - CP TIME IN SECONDS (CPA+CPB)
4 - PP TIME IN SECONDS
5 - IO TIME IN SECONDS
6 - WALL CLOCK TIME (HH.MM.SS.)
7 - WALL CLOCK TIME IN SECONDS

CM REQUIRED: 61B

SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

ISEC - CONVERT HH.MM.SS TO SECONDS
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS

R65FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/15/75

DATE(S) REVISED

03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT

BEGIN,DOCGET,,NSRDC,,ALTIME,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-5  ALTIME - 1 OF 1
SUBROUTINE 'ASCADD'

PURPOSE
ADD AN ASCII STRING TO ANOTHER ASCII STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SUBROUTINE 'ASCII' INSERTS ANY NUMBER OF ASCII STRINGS. IT DOES THIS BY CALLING 'ASCADD' TO ADD EACH STRING. 'ASCADD' MAY BE CALLED DIRECTLY TO ADD A SINGLE STRING.

SEE ALSO SUBROUTINES ASCADM, ASCBSX, ASCGET, ASCII, ASCIII, ASCLEN, ASCPUT, OMROUI, TEKTRI, VT100I, AND PROCEDURE ASCII0.

USAGE
CALL ASCADD (BUF, NEXT, ADD)

DESCRIPTION OF PARAMETERS
BUF - INTEGER BUFFER ARRAY. EACH WORD HOLDS FIVE ASCII CHARACTERS.

NEXT - CHARACTER POSITION IN THE ARRAY TO START ADDING THE NEW CHARACTERS (1 IS THE LEFT-MOST POSITION IN THE ARRAY). THIS MUST BE AN INTEGER VARIABLE BECAUSE IT WILL BE INCREMENTED BY THE NUMBER OF CHARACTERS ADDED BY THE CALL, THUS POINTING TO THE NEXT CHARACTER POSITION AVAILABLE FOR THE NEXT CALL. ON RETURN, THE CHARACTER AT THIS POSITION IS SET TO 12 BITS OF BINARY ZERO.

ADD - THE ASCII CHARACTER STRING TO BE ADDED. THE STRING STARTS IN CHARACTER POSITION 1 AND CONTINUES UNTIL A 12-BIT BINARY ZERO IS ENCONTERED.

CM REQUIRED: 33B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
ASCGET - GET AN ASCII CHARACTER
ASCPUT - PUT AN ASCII CHARACTER

AUTHOR
DAVID V. SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/13/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ASCADD,OUTPUT,MSACCES=<PASSWORD>.

06/07/84  2-7  ASCADD -  2 OF 2
SUBROUTINE 'ASCADM'

PURPOSE
   ADD AN ASCII STRING TO ANOTHER ASCII STRING MULTIPLE TIMES

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   SEE ALSO SUBROUTINES ASCADD, ASCBSX, ASCGET, ASCII, ASCII,
   ASCLEN, ASCPUT, OMRON1, TEKTRI, VT100I, AND PROCEDURE
   ASCII0.

USAGE
   CALL ASCADM (BUF, NEXT, ADD, NTIMES)

DESCRIPTION OF PARAMETERS
   BUF - INTEGER BUFFER ARRAY. EACH WORD HOLDS FIVE
         ASCII CHARACTERS.

   NEXT - CHARACTER POSITION IN THE ARRAY TO START ADDING
          THE NEW CHARACTERS (1 IS THE LEFT-MOST POSITION
          IN THE ARRAY). THIS MUST BE AN INTEGER VARIABLE
          BECAUSE IT WILL BE INCREMENTED BY THE NUMBER OF
          CHARACTERS ADDED BY THE CALL, THUS POINTING TO
          THE NEXT CHARACTER POSITION AVAILABLE FOR THE
          NEXT CALL. ON RETURN, THE CHARACTER AT THIS
          POSITION IS SET TO 12 BITS OF BINARY ZERO.

   ADD - THE ASCII CHARACTER STRING TO BE ADDED.
          THE STRING STARTS IN CHARACTER POSITION 1 AND
          CONTINUES UNTIL A 12-BIT BINARY ZERO IS
          ENCOUNTERED.

   NTIMES - NUMBER OF TIMES STRING 'ADD' IS TO BE ADDED.

CM REQUIRED: 43B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      NONE
   OTHERS
      ASCADD - ADD AN ASCII STRING

06/07/84
INTEGER FUNCTION 'ASCBSX'

PURPOSE
REMOVE BS (BACKSPACE) AND CAN (CTRL-X) FROM A STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE STRING ENDS WITH A CARRIAGE RETURN (CR) OR BINARY ZERO.
CR, IF PRESENT, IS CHANGED TO BINARY ZERO.

SEE ALSO SUBROUTINES ASCADD, ASCADM, ASCGET, ASCII, ASCII,
ASCLEN, ASCPUT, OMRONI, TEKTRI, VT100I, AND PROCEDURE
ASCII0.

USAGE
INTEGER ASCBSX
...
ASCBSX (S1, S2)

DESCRIPTION OF PARAMETERS
S1  - INPUT ASCII STRING TO BE PROCESSED
S2  - OUTPUT ASCII STRING WITH BS/CAN REMOVED
     (S1 AND S2 MAY BE THE SAME)
ASCBSX - WILL HAVE THE LENGTH OF THE OUTPUT STRING
     (I.E., THE POSITION OF THE NEXT CHARACTER AFTER
     THE STRING)

CM REQUIRED:

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
ASCGET - GET AN ASCII CHARACTER
ASCPUT - PUT AN ASCII CHARACTER

AUTHOR
DAVID V. SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/21/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ASCBSX,OUTPUT,MSACCES=<PASSWORD>.

04/06/84 2-10 ASCBSX - 1 OF 1
INTEGER FUNCTION 'ASCGET'

PURPOSE
GET AN ASCII CHARACTER FROM AN ASCII STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS

SEE ALSO SUBROUTINES ASCADD, ASCADM, ASCBSX, ASCII, ASCIII, ASCLEN, ASCPUT, OMRONI, TEKTRI, VT100I, AND PROCEDURE ASCII0.

USAGE
INTEGER ASCGET

... ASCGET (FIELD, N)

DESCRIPTION OF PARAMETERS

FIELD - ASCII STRING FROM WHICH CHARACTER IS TO BE EXTRACTED.

N - CHARACTER POSITION IN FIELD TO BE EXTRACTED. (1 IS THE LEFT-MOST POSITION IN THE STRING). THIS MUST BE AN INTEGER VARIABLE BECAUSE IT WILL BE INCREMENTED BY ONE, THUS POINTING TO THE NEXT CHARACTER POSITION AVAILABLE FOR THE NEXT CALL.

CM REQUIRED: 30B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND MOD OR SHIFT
OTHERS
NONE

AUTHOR
DAVID V. SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/13/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, NSRDC, ASCII, OUTPUT, MSACCES=<PASSWORD>.

03/21/84 2-11 ASCGET - 1 OF 1
SUBROUTINE 'ASCII'

PURPOSE
CREATE AN ASCII MESSAGE FROM STRINGS OF ASCII CHARACTERS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE IS USED TO CREATE ASCII MESSAGES TO BE DISPLAYED AT AN INTERACTIVE TERMINAL. THIS ALLOWS THE GENERATION OF MESSAGES IN UPPER AND LOWER CASE AND THE TAILORING OF OUTPUT TO CERTAIN "INTELLIGENT" Terminals, SUCH AS DEC VT100, OMRON, ETC.

BEFORE PREPARING A PROGRAM TO USE THIS FEATURE, YOU SHOULD RUN PROCEDURE 'ASCIIO' TO GET THE REQUIRED LABELLED COMMON BLOCK(S):
/ASCII/ <-- ASCII CHARACTERS
/OMRON/ <-- OMRON CONTROL CODES
/TEKTRN/ <-- TEKTRONIX CONTROL CODES
/VT100/ <-- VT100 CONTROL CODES

THESE MUST BE MERGED INTO ANY (SUB)PROGRAM WHICH WILL GENERATE ASCII MESSAGES.

THE PROGRAM SHOULD START BY INITIALIZING THE LABELLED COMMON BLOCKS USED:
CALL ASCII <-- INITIALIZE /ASCII/
CALL OMRONI <-- INITIALIZE /OMRON/
CALL TEKTRI <-- INITIALIZE /TEKTRN/
CALL VT100I <-- INITIALIZE /VT100/

TO CREATE AN ASCII MESSAGE, ALLOCATE AN INTEGER BUFFER ARRAY CLEARING IT TO BINARY ZERO. THEN CALL ASCII ANY NUMBER OF TIMES TO PUT THE ASCII CHARACTERS INTO THE BUFFER. WHEN COMPLETE, WRITE THE BUFFER UNFORMATTED TO A SPECIALLY CONNECTED FILE.

TO CREATE ANOTHER ASCII MESSAGE, CLEAR THE BUFFER ARRAY TO BINARY ZERO, OR USE ANOTHER BUFFER ARRAY (ALSO CLEARED TO BINARY ZERO).

SEE ALSO SUBROUTINES ASCADD, ASCADM, ASCBSX, ASCGET, ASCII, ASCLEN, ASCPUT, OMRONI, TEKTRI, VT100I, AND PROCEDURE ASCIIIO.
USAGE

CALL ASCII (BUF, NEXT, ASCSTR1, ASCSTR2, ...)

DESCRIPTION OF PARAMETERS

BUF - INTEGER BUFFER ARRAY. EACH WORD WILL HOLD FIVE ASCII CHARACTERS.

NEXT - CHARACTER POSITION IN THE ARRAY TO START ADDING THE NEW CHARACTERS (1 IS THE LEFT-MOST POSITION IN THE ARRAY). THIS MUST BE AN INTEGER VARIABLE BECAUSE IT WILL BE INCREMENTED BY THE NUMBER OF CHARACTERS ADDED BY THE CALL, THUS POINTING TO THE NEXT CHARACTER POSITION AVAILABLE FOR THE NEXT CALL. ON RETURN, THE CHARACTER AT THIS POSITION IS SET TO 12 BITS OF BINARY ZERO.

ASCSTR1 - FIRST ASCII CHARACTER STRING TO BE ADDED. THE STRING STARTS IN CHARACTER POSITION 1 AND CONTINUES UNTIL A 12-BIT BINARY ZERO IS ENCOUNTERED.

ASCSTR2 - SECOND ASCII CHARACTER STRING TO BE ADDED.

... - ANY NUMBER OF ADDITIONAL ASCII CHARACTER STRINGS TO BE ADDED. THE ONLY LIMIT IS THE NUMBER OF FORTRAN CONTINUATION STATEMENTS ALLOWED.

CM REQUIRED: 21B

EXAMPLE

CREATE AND TYPE THE ASCII MESSAGE "GOOD MORNING!" ('G' AND 'M' ARE UPPER CASE; THE REST LOWER CASE). START BY CREATING "GOOD " AND "MORNING" INTO SEPARATE AREAS:

```
INTEGER BUF(128)    <-- WILL HOLD 640 ASCII CHARACTERS
INTEGER GOOD(2)    <-- WILL HOLD "GOOD"
INTEGER MORN(2)    <-- WILL HOLD "MORNING"
COMMON /ASCII/ ... <-- FROM ASCIIO (SEE REMARKS)
DATA BUF/ 128 * 0/  <-- CLEAR TO BINARY ZERO
... CALL ASCII      <-- INITIALIZE /ASCII/
... COL = 1         <-- SET POINTER FOR FIRST CALL
CALL ASCII (GOOD, COL, GU, OL, OL, DL, SPACE)
COL = 1
CALL ASCII (MORN, COL, MU, OL, RL, NL, IL, NL, GL)
COL = 1
CALL ASCII (BUF, COL, CRLF, GOOD, MORN, EXCLAM, CRLF)
OPEN (5, FILE='YYYYTTY')
CALL CONNEC (5, 2)  <-- SET FOR 256-CHARACTER ASCII
WRITE (5) BUF       <-- WRITE OUT THE MESSAGE
... CLOSE (5, STATUS='DELETE')  <-- RETURN THE CONNECTED LOCAL FILE
...```

03/21/84 2-13 ASCII - 2 OF 3
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
ASCADD - ADD ASCII STRING

AUTHOR
STANLEY WILLNER - DTNSRDC CODE 1892.1

DATE WRITTEN: 03/09/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, ASCII, OUTPUT, MSACCESS=<PASSWORD>.
SUBROUTINE 'ASCIII'

PURPOSE
INITIALIZE COMMON BLOCK /ASCII/ WITH ASCII CHARACTERS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE MUST BE EXECUTED PRIOR TO GENERATING ASCII
MESSAGES USING SUBROUTINE ASCII.

COMMON BLOCK /ASCII/ IS OBTAINED BY RUNNING PROCEDURE ASCII0
AND INSERTING IT INTO EACH (SUB)PROGRAM WHICH WILL GENERATE
ASCII MESSAGES.

IN ADDITION TO THE 128 ASCII CHARACTERS, THE CHARACTER-PAIR
CARRIAGE RETURN/LINE FEED IS ALSO DEFINED.

USAGE
CALL ASCII

CM REQUIRED: 6B

NAMES OF ASCII CHARACTERS
THE STANDARD ASCII NAMES ARE USED FOR THE NON-PRINTING
CHARACTERS:
   NUL, SOH, STX, ETX, EOT, ENQ, ACK, BEL, BS, HT, LF, VT,
   FF, CR, SO, SI, DLE, DC1, DC2, DC3, DC4, NAK, SYN, ETB,
   CAN, EM, SUB, ESC, FS, GS, RS, US, DEL

THE PRINTING CHARACTERS HAVE THE FOLLOWING NAMES:
   AU, BU, CU, DU, ...., ZU (UPPER CASE LETTERS)
   AL, BL, CL, DL, ...., ZL (LOWER CASE LETTERS)
   ZERO (0)
   ONE (1)
   TWO (2)
   THREE (3)
   FOUR (4)
   FIVE (5)
   SIX (6)
   SEVEN (7)
   EIGHT (8)
   NINE (9)
   SPACE (SPACE OR BLANK) (SYNONYM: BLANK)
   EXCLAM (EXCLAMATION MARK)
   QUEST (QUESTION MARK)
   QUOTE (QUOTATION MARK -- ")
   APOST (APOSTROPHE OR SINGLE QUOTE -- ')
   GRAVE (GRAVE ACCENT OR BACK APOSTROPHE)
   POUND (POUND SIGN) (SYNONYMS: SHARP, NUMBER)
DOLLAR  (DOLLAR SIGN)
PERCENT  (PER CENT SIGN)
AMPERSAND  (AMPERSAND)
LEFT PARENTHESIS  (LPAREN)
RIGHT PARENTHESIS  (RPAREN)
LEFT SQUARE BRACKET  (LBRACK)
RIGHT SQUARE BRACKET  (RBRACK)
LEFT BRACE OF LEFT CURLY BRACKET  (LBRACE)
RIGHT BRACE OF RIGHT CURLY BRACKET  (RBRACE)
PLUS  (PLUS SIGN)
MINUS  (MINUS SIGN)  (SYNONYM: DASH)
LESS THAN  (LESS THAN SIGN)
EQUAL  (EQUAL SIGN)
GREATER THAN  (GTR)
ASTERISK  (ASTERISK)  (SYNONYM: STAR)
COMMA  (COMMA)
PERIOD  (PERIOD)
SLASH  (SLASH)
BACKSLASH  (BSLASH)
COLON  (COLON)
SEMICOLON  (SEMI-
COLON)
AT  (AT SIGN -- @)
CARAT  (CARAT -- ^)
UNDERSCORE OR UNDERLINE  (UNDER)
TILDE  (TILDE)

IN ADDITION, THE FOLLOWING CHARACTER-PAIR IS DEFINED:
CRLF  (CARRIAGE RETURN/LINE FEED)

EXAMPLE
CREATE AND TYPE THE ASCII MESSAGE "GOOD MORNING!"  ("G" AND "M" ARE UPPER CASE; THE REST IN LOWER CASE).  START BY CREATING "GOOD" AND "MORNING" IN SEPARATE AREAS:

INTEGER BUF(128)  <!-- WILL HOLD 640 ASCII CHARACTERS
INTEGER GOOD(2)  <!-- WILL HOLD "GOOD"
INTEGER MORN(2)  <!-- WILL HOLD "MORNING"
COMMON /ASCII/  ...  <!-- FROM MSS (SEE REMARKS)
DATA BUF/ 128 & 0/  <!-- CLEAR TO BINARY ZERO

CALL ASCII  <!-- INITIALIZE /ASCII/

CALL ASCII (GOOD, COL, GU, OL, OL, DL, SPACE)
CALL ASCII (MORN, COL, MU, OL, RL, NL, IL, NL, GL)
CALL ASCII (BUF, COL, CRLF, GOOD, MORN, EXCLAM, CRLF)
OPEN (5, FILE='YYYYTYY')
CALL CONNEC (5, 2)  <!-- SET FOR 256-CHARACTER ASCII
WRITE (5) BUF  <!-- WRITE OUT THE MESSAGE

CLOSE (5, STATUS='DELETE')  <!-- RETURN THE CONNECTED LOCAL FILE

03/20/84  2-16  ASCII  -  2 OF  3
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
  NONE
  OTHERS
  NONE

AUTHOR
  DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/07/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
  UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT DECK
  EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ASCII,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'ASCLEN'

PURPOSE
FIND LENGTH OF AN ASCII STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE STRING ENDS WITH A CARRIAGE RETURN (CR) OR BINARY ZERO.
CR, IF PRESENT, IS CHANGED TO BINARY ZERO.

IF ASCLEN PROCESSES A STRING WHICH HAS BEEN READ (RATHER THAN CREATED), BE SURE THE INPUT STATEMENT LIST INCLUDES ROOM FOR THE CARRIAGE RETURN. IF THIS IS NOT DONE, THE COMPUTED LENGTH MAY BE INCORRECT.

SEE ALSO SUBROUTINES ASCADD, ASCADM, ASCBSX, ASCGET, ASCII, ASCII, ASCPUT, OMROMI, TEKTRI, VT100I, AND PROCEDURE ASC110.

USAGE
INTEGER ASCLEN
...
ASCLEN (BUF)

DESCRIPTION OF PARAMETER
BUF - ASCII STRING WHOSE LENGTH IS TO BE FOUND

CM REQUIRED: 20B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V. SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/20/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS

OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ASCLEN,OUTPUT,MSACCES=<PASSWORD>.

03/22/84  2-18  ASCLEN - 1 OF 1
SUBROUTINE 'ASCPUT'

PURPOSE
ADD AN ASCII CHARACTER TO AN ASCII STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE ALSO SUBROUTINES ASCADD, ASCADM, ASCBSX, ASCGET, ASCII, ASCII, ASCPUT, OMRON1, TEKTRI, VT1001, AND PROCEDURE ASC110.

USAGE
CALL ASCPUT (BUF, NEXT, ASCHAR)

DESCRIPTION OF PARAMETERS
BUF - INTEGER BUFFER ARRAY. EACH WORD HOLDS FIVE ASCII CHARACTERS.

NEXT - CHARACTER POSITION IN THE ARRAY TO ADD THE NEW CHARACTER (1 IS THE LEFT-MOST POSITION IN THE ARRAY). THIS MUST BE AN INTEGER VARIABLE BECAUSE IT WILL BE INCREMENTED BY ONE FOR THE CHARACTER ADDED BY THE CALL, THUS POINTING TO THE NEXT CHARACTER POSITION AVAILABLE FOR THE NEXT CALL.

ASCHAR - THE ASCII CHARACTER TO BE ADDED. (LEFT-JUSTIFIED, ZERO-FILLED)

CM REQUIRED: 35B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND MOD OR SHIFT
OTHERS
NONE

AUTHOR
DAVID V. SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/13/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC, ASCPUT, OUTPUT, MSACCES=<PASSWORD>.

03/21/84 2-19 ASCPUT - 1 OF 1
SUBROUTINE 'ASCTXT'

PURPOSE
CONVERT A DISPLAY CODE STRING TO AN ASCII STRING AND PUT IT INTO AN ASCII BUFFER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE WILL SAVE TIME CREATING ASCII MESSAGES.

SEE ALSO SUBROUTINES ASCADD, ASCADM, ASCBSX, ASCGET, ASCII, ASCII, ASCLEN, ASCPUT, OMRONI, TEKTRI, VT100I, AND PROCEDURE ASCII0.

USAGE
CALL ASCTXT (BUF, COL, DC, TYPE)

DESCRIPTION OF PARAMETERS
BUF - INTEGER BUFFER ARRAY. EACH WORD WILL HOLD FIVE ASCII CHARACTERS.

NEXT - CHARACTER POSITION IN THE ARRAY TO START ADDING THE NEW CHARACTERS (1 IS THE LEFT-MOST POSITION IN THE ARRAY). THIS MUST BE AN INTEGER VARIABLE BECAUSE IT WILL BE INCREMENTED BY THE NUMBER OF CHARACTERS ADDED BY THE CALL, THUS POINTING TO THE NEXT CHARACTER POSITION AVAILABLE FOR THE NEXT CALL. ON RETURN, THE CHARACTER AT THIS POSITION IS SET TO 12 BITS OF BINARY ZERO.

DC - DISPLAY CODE CHARACTER STRING

TYPE - TYPE OF CONVERSION DESIRED
1 - CONVERT TO LOWER CASE
2 - CONVERT TO UPPER CASE
3 - CONVERT FIRST CHARACTER TO UPPER CASE AND THE REST TO LOWER CASE

IN ALL CASES, NON-ALPHABETICS ARE CONVERTED TO THEIR ASCII EQUIVALENT.

CM REQUIRED: 233B

EXAMPLE
CREATE AND TYPE THE ASCII MESSAGE "GOOD MORNING!" ('G' AND 'M' ARE UPPER CASE; THE REST LOWER CASE).

05/22/84 2-20 ASCTXT - 1 OF 2
INTEGER BUF(128)  \* WILL HOLD 640 ASCII CHARACTERS  
COMM /ASCII/  \* FROM ASCIO (SEE REMARKS)  
DATA BUF/ 128 * 0/  \* CLEAR TO BINARY ZERO  

CALL ASCII  \* INITIALIZE /ASCII/  

COL = 1  \* SET POINTER FOR FIRST CALL  
CALL ASCII (BUF, COL, CRLF)  
CALL ASCTXT (BUF, COL, 'GOOD ', 3)  
CALL ASCTXT (BUF, COL, 'MORNING', 3)  
CALL ASCII (BUF, COL, EXCLAM, CRLF)  
OPEN (5, FILE='YYYYTY')  
CALL CONNEC (5, 2)  \* SET FOR 256-CHARACTER ASCII  
WRITE (5) BUF  \* WRITE OUT THE MESSAGE  

CLOSE (5, STATUS='DELETE')  \* RETURN THE CONNECTED LOCAL FILE  

SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
ICHAR LEN  
OTHERS  
ASCII - CREATE ASCII STRING  

AUTHOR  
STANLEY WILLNER - DTNSRDC CODE 1892.1  

DATE WRITTEN: 05/17/84  
DATE(S) REVISED  

LOCATION OF DECKS  
SOURCE DECK  
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS  
OBJECT DECK  
EDITLIB USER LIBRARY: NSRDC  

ANOTHER COPY OF THIS DOCUMENT  
BEGIN,DOCGET,,NSRDC,,ASCTXT,OUTPUT,MSACCES=<PASSWORD>.  

05/22/84  
2-21  
ASCTXT - 2 OF 2
SUBROUTINE 'ASHIFT'

PURPOSE
   SHIFT EACH INDIVIDUAL WORD OF AN ARRAY

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   SEE 'SHIFTA' TO SHIFT AN ENTIRE ARRAY.

USAGE
   CALL ASHIFT (A, NA, NABITS)

DESCRIPTION OF PARAMETERS
   A   - ARRAY, EACH WORD OF WHICH IS TO BE SHIFTED
   NA  - NUMBER OF WORDS IN 'A' TO BE SHIFTED
   NABITS - NUMBER OF BITS TO SHIFT EACH WORD
            POSITIVE -- SHIFT LEFT CIRCULAR
            NEGATIVE -- SHIFT RIGHT WITH SIGN PROPAGATION

CM REQUIRED: 14B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      SHIFT
   OTHERS
      NONE

AUTHOR
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 1973

DATE(S) REVISED
   03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,ASHIFT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-22  ASHIFT - 1 OF 1
SUBROUTINE 'ASORT'

PURPOSE

FTN ALPHANUMERIC SORT

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)

CDC 6000/CYBER 170 (NOS/BE)

REMARKS

NONE

USAGE

CALL ASORT (A, I, L, TEM, PT, COL, KEY, TRANA, KEYM)
CALL ASORT (A, I, L, TEM, PT, COL, KEY, 0, KEYM)
CALL ASORT (A, I, L, TEM, PT, COL, KEY, TRANA)
CALL ASORT (A, I, L, TEM, PT, COL, KEY)
CALL ASORT (A, I, L, TEM, PT, COL)

DESCRIPTION OF PARAMETERS

A - TWO-DIMENSIONAL ARRAY TO BE SORTED
I - NUMBER OF COLUMNS (LINES) TO BE SORTED
L - NUMBER OF ROWS (LENGTH OF LINE) PER COLUMN
TEM - TEMPORARY WORK ARRAY OF DIMENSION 'I'
PT - TEMPORARY WORK ARRAY OF DIMENSION 'I'
COL - TEMPORARY WORK ARRAY OF LENGTH 'L'
KEY - IF PRESENT, IS ARRAY OF LENGTH 'L' LISTING THE SORT KEYS:
  KEY(1)=5 IMPLIES THAT THE PRIMARY SORT KEY IS ROW 5
  KEY(2)=7 " " SECONDARY " " ROW 7
  ...
  KEY(N)=M " " N-TH " " ROW M
  KEY(N)=0 IMPLIES THAT THE SORT ENDS AFTER N-1 SORT KEYS ARE USED
TRANA - IF PRESENT, I 63-WORD ARRAY DEFINING THE COLLATING SEQUENCE.
  IF ABSENT OR 0, DISPLAY CODE VALUES ARE USED.
  IF 0, KEYM CAN BE USED WITHOUT CHANGING THE COLLATING SEQUENCE.
KEYM - IF PRESENT, IS AN ARRAY OF LENGTH 'L' FURTHER DEFINING THE SORT KEYS. (E.G., KEYM(2) IS A MASK DEFINING WHAT BITS OF THE SECONDARY SORT KEY WILL BE USED.)

CM REQUIRED: 446B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
IABS  LOCF  SHIFT
OTHERS
EQU60
SENT
SSORTL

AUTHOR
C FLINK - KPS - NWL

DATE WRITTEN: 03/08/71

DATE(S) REVISED
06/23/72 - C FLINK
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ASORT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-24 ASORT - 2 OF 2
SUBROUTINE 'ASORTMV'

PURPOSE
SORT AN ARRAY TAKING ADVANTAGE OF A FAST ARRAY MOVE

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IN ORDER TO USE 'MOVECM', ALL RELATED DATA TO BE SWAPPED
MUST BE PHYSICALLY LOCATED NEXT TO EACH OTHER, THAT IS, EACH
ROW OF 'A' CONTAINS RELATED DATA.

USAGE
CALL ASORTMV (A, NROW, NCOL, IROW, UPDOWN, TEMP, SWAP)

DESCRIPTION OF PARAMETERS
A - 2-DIMENSIONAL ARRAY TO BE SORTED
NROW - NUMBER OF ROWS IN ARRAY 'A' (FIRST DIMENSION)
NCOL - NUMBER OF COLUMNS IN ARRAY 'A' (SECOND DIMENSION)
IROW - ROW POSITION TO BE SORTED
UPDOWN - SORT ORDER DESIRED
ILA - ASCENDING SORT
ILD - DESCENDING SORT
TEMP - WORK ARRAY OF DIMENSION 'NROW' OR GREATER
SWAP - RETURN CODE
0 - NO SWAPPING WAS NECESSARY
   (ARRAY ALREADY IN ORDER)
1 - AT LEAST 1 SWAP WAS NECESSARY
2 - UPDOWN INVALID, ASCENDING SORT ASSUMED,
    NO SWAPPING WAS NECESSARY
3 - UPDOWN INVALID, ASCENDING SORT ASSUMED,
    AT LEAST 1 SWAP WAS NECESSARY
4 - IROW <= 0
5 - IROW > NROW

CM REQUIRED: 257B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
MOVECM - MOVE AN ARRAY

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/01/75

DATE(S) REVISED
02/21/80 - CHANGE 'MOVLEV' TO 'MOVECM'
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ASORTMV,OUTPUT,MSACCES=<<PASSWORD>>.

02/10/84 2-26 ASORTMV - 2 OF 2
SUBROUTINE 'BANR'

PURPOSE
PRINT A BANNER (LETTERS ARE 10 LINES HIGH, LINES ARE 110 CHARACTERS LONG)

FUNCTIONAL CATEGORIES: J4 Q0

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
UPPER CASE ONLY (A-Z 0-9 + - * ( ) $ = SPACE , . # [ ] : " ! ? < > @ \ ^ ;)

EACH BANNER REQUIRED 14 LINES (4 BLANKS, 10 FOR THE BANNER).
THUS, 3 BANNERS WILL FIT ON A PAGE AT 6 LINES PER INCH;
5 AT 8 LPI.

UP TO 10 CHARACTERS MAY APPEAR IN A BANNER. THE LINES ARE
110 CHARACTERS LONG.

SEE SUBROUTINE 'BANR6'.

USAGE
CALL BANR (BANNER, IFILE, NEWPAG)

DESCRIPTION OF PARAMETERS
BANNER - 1-10 CHARACTERS TO BE PRINTED
(SINGLE WORD OR ARRAY ELEMENT)
IFILE - NUMBER OF FILE ON WHICH BANNER IS TO BE WRITTEN
NEWPAG - ONE OF:
ZERO - BANNER IS WRITTEN ON NEW PAGE
NON-ZERO - BANNER IS WRITTEN ON SAME PAGE

CM REQUIRED: 1532B

OUTPUT UNITS
UNIT # LFN/INT USE
USER SPECIFIES LISTABLE OUTPUT

EXAMPLES
PRINT THE BANNER 'HYSTERICAL' AT THE TOP OF THE NEXT PAGE
ON THE PRINTER FILE:
CALL BANR ("HYSTERICAL", 6LOUTPUT, 0)

PRINT THE BANNER '10/19/77' ON THE SAME PAGE ON FILE 9:
CALL BANR (BH10/19/77, 9, 1)
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
VFILL - FILL ARRAY WITH WORD

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/18/75

DATE(S) REVISED
79/07/16 - RE-WRITTEN FOR B7700
81/01/15 - CDC VERSION UPGRADED TO NOS/BE LEVEL 461
83/03/21 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, ,NSRDC, ,BANR, OUTPUT, MSACCES=<PASSWORD>.

SUBROUTINE 'BANR6'

PURPOSE
   PRINT A BANNER (LETTERS ARE 6 LINES HIGH, LINES ARE 80 CHARACTERS LONG)

FUNCTIONAL CATEGORIES: J4 Q0

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   UPPER CASE ONLY (A-Z 0-9 + - * / ( ) $ = SPACE , . 
[ ] : " _ I & ? < > @ \ ^ ;)
   EACH BANNER REQUIRED 10 LINES (4 BLANKS, 6 FOR THE BANNER).
   THUS, 6 BANNERS WILL FIT ON A PAGE AT 6 LINES PER INCH;
   8 AT 8 LPI.
   UP TO 10 CHARACTERS MAY APPEAR IN A BANNER. THE LINES ARE
   80 CHARACTERS LONG.
   SEE SUBROUTINE 'BANR'.

USAGE
   CALL BANR6 (BANNER, IFILE, NEWPAG)

DESCRIPTION OF PARAMETERS
   BANNER - 1-10 CHARACTERS TO BE PRINTED
          (SINGLE WORD OR ARRAY ELEMENT)
   IFILE - NUMBER OF FILE ON WHICH BANNER IS TO BE WRITTEN
   NEWPAG - ONE OF:
          ZERO - BANNER IS WRITTEN ON NEW PAGE
          NON-ZERO - BANNER IS WRITTEN ON SAME PAGE

CM REQUIRED: 746B

OUTPUT UNITS
   UNIT # LFN/INT USE
   -------- -------- -------------------------------
   USER SPECIFIES LISTABLE OUTPUT

EXAMPLES
   PRINT THE BANNER 'HYSTERICAL' AT THE TOP OF THE NEXT PAGE
   ON THE PRINTER FILE:
       CALL BANR6 ("HYSTERICAL", 6LOUTPUT, 0)

   PRINT THE BANNER '10/19/77' ON THE SAME PAGE ON FILE 9:
       CALL BANR6 (8H10/19/77, 9, 1)
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
MOVLEV   SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/18/77

DATE(S) REVISED
79/07/16 - RE-WRITTEN FOR B7700
83/03/23 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,BANR6,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'BESSI'

PURPOSE
MODIFIED BESSEL FUNCTION OF THE FIRST KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
FOR N=0, I(NU) AND I(NU+1) ARE ALWAYS COMPUTED.

IF K-BESSEL FUNCTION IS ALSO REQUIRED, USE SUBROUTINE BESSK TO OBTAIN I- AND K-BESSEL FUNCTIONS.

USAGE
CALL BESSI (X, FNU, N, VI)

DESCRIPTION OF PARAMETERS
X - THE ARGUMENT (X > 0.0)
FNU - NU, THE FRACTIONAL PART OF THE ORDER (0. < FNU < 1.)
N - HIGHEST ORDER IS (N+FNU)
    ABS(N)+1 TABLE ENTRIES ARE TO BE COMPUTED
VI - ARRAY TO CONTAIN THE COMPUTED TABLE
    (DIMENSION MUST BE AT LEAST: MAX(N+13,X+28), THE
    REST OF THE ARRAY IS WORK AREA)
    VI(1) = (E**(-X)) 10(X), WHERE 10 IS I(O+FNU)
    ETC.

CM REQUIRED: 640B

METHOD
SEE "RECURRENCE TECHNIQUES FOR THE CALCULATION OF BESSEL
FUNCTIONS", M. GOLDSTEIN AND R. THALER, MTAC, VOL. XIII,
NO. 66, APRIL 1959.

FOR X > 10.0, ASYMPTOTIC VALUES ARE COMPUTED USING THE
SO-CALLED PHASE AMPLITUDE METHOD. SEE "BESSEL FUNCTIONS FOR
LARGE ARGUMENTS", M. GOLDSTEIN AND R. THALER, MTAC, VOL XII,
NO. 61, JANUARY 1958.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
    ABS   EXP    IABS   MAX0   SQRT
OTHERS
    GAMMA

02/10/84  2-31  BESSI - 1 OF 2
AUTHORS
FLORENCE F. RAGUSA AND M. GOLDSTEIN
HARVEY ABRAMSON
MARGARET FRANTZ
NEW YORK UNIVERSITY

VIM ROUTINE NYUBESS

DATE WRITTEN: BEFORE 11/65

DATE(S) REVISED
11/65 - HA
09/01/67 - MF
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,BESSI,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-32 BESSI - 2 OF 2
SUBROUTINE 'BESSJ'

PURPOSE
BESSEL FUNCTION OF THE FIRST KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
FOR N=0, J(NU) AND J(NU+1) ARE ALWAYS COMPUTED.

IF Y-BESSEL FUNCTION IS ALSO REQUIRED, USE SUBROUTINE
BESSY TO OBTAIN J- AND Y-BESSEL FUNCTIONS.

USAGE
CALL BESSJ (X, FNU, N, VJ)

DESCRIPTION OF PARAMETERS
X - THE ARGUMENT (X > 0.0)
FNU - NU, THE FRACTIONAL PART OF THE ORDER (0. ≤ FNU ≤ 1.)
N - HIGHEST ORDER IS (N=FNU)
    ABS(N)+1 TABLE ENTRIES ARE TO BE COMPUTED
VI - ARRAY TO CONTAIN THE COMPUTED TABLE
    (DIMENSION MUST BE AT LEAST: MAX(N+13,X+28), THE
     REST OF THE ARRAY IS WORK AREA)
     VJ(1) = JO(X), WHERE JO IS J(0+FNU)
     ETC.

CM REQUIRED: 642B

METHOD
SEE "RECURRENCE TECHNIQUES FOR THE CALCULATION OF BESSEL
FUNCTIONS", M. GOLDBSTEIN AND R. THALER, MTAC, VOL. XIII,
- NO. 66, APRIL 1959.

FOR X > 10.0, ASYMPTOTIC VALUES ARE COMPUTED USING THE
SO-CALLED PHASE AMPLITUDE METHOD. SEE "BESSEL FUNCTIONS FOR
LARGE ARGUMENTS", M. GOLDBSTEIN AND R. THALER, MTAC, VOL XII,
NO. 61, JANUARY 1958.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
    ABS  COS  IABS  MAXO  SIN
    SQRT
    OTHERS
    GAMMA

02/10/84  2-33  BESSJ - 1 OF 2
AUTHORS
FLORENCE F. RAGUSA AND M. GOLDSTEIN
HARVEY ABRAMSON
MARGARET FRANTZ
NEW YORK UNIVERSITY

VIM ROUTINE NYUBESS

DATE WRITTEN: BEFORE 11/65

DATE(S) REVISED
11/65 - HA
09/01/67 - MF
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS

SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, , BESSJ, OUTPUT, MSACCESS=<PASSWORD>.

02/10/84

2-34

BESSJ - 2 OF 2
SUBROUTINE 'BESSK'

PURPOSE
BESSEL FUNCTION OF THE SECOND KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
FOR N=0, I(NU) AND I(NU+1) ARE ALWAYS COMPUTED.

THIS SUBROUTINE ALSO COMPUTED THE I-BESSEL FUNCTION.

USAGE
CALL BESSK (X, FNU, N, VI, VK)

DESCRIPTION OF PARAMETERS
X - THE ARGUMENT (X > 0.0)
FNU - NU, THE FRACTIONAL PART OF THE ORDER (0. < FNU < 1.)
N - HIGHEST ORDER IS (N+FNU)
   ABS(N)+1 TABLE ENTRIES ARE TO BE COMPUTED
VI - ARRAY TO CONTAIN THE COMPUTED TABLE
   (DIMENSION MUST BE AT LEAST: MAX(N+13,X+28), THE
   REST OF THE ARRAY IS WORK AREA)
   VI(1) = (E**(-X)) 10(X), WHERE 10 IS I(0+FNU)
   ETC.
VK - ARRAY TO CONTAIN THE COMPUTED K-TABLE
   (DIMENSION MUST BE AT LEAST: MAX(N+13,X+28), THE
   REST OF THE ARRAY IS WORK AREA)
   VK(1) = (E**(X)) 10(X), WHERE 10 IS I(0+FNU)
   ETC.

CM REQUIRED: 437B

METHOD
SEE "RECURRENCE TECHNIQUES FOR THE CALCULATION OF BESSEL
FUNCTIONS", M. GOLDBLIT AND R. THALER, MTAC, VOL. XIII,
NO. 66, APRIL 1959.

FOR X > 10.0, ASYMPTOTIC VALUES ARE COMPUTED USING THE
SO-CALLED PHASE AMPLITUDE METHOD. SEE "BESSEL FUNCTIONS FOR
LARGE ARGUMENTS", M. GOLDBLIT AND R. THALER, MTAC, VOL XII,
NO. 61, JANUARY 1958.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ALOG EXP IABS MAXO SIN
OTHERS
BESSI GAMMA
AUTHORS
FLORENCE F. RAGUSA AND M. GOLDSTEIN
HARVEY ABRAMSON
MARGARET FRANTZ
NEW YORK UNIVERSITY

VIM ROUTINE NYUBESS

DATE WRITTEN: BEFORE 11/65

DATE(S) REVISED
11/65 - HA
09/01/67 - MF
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, BESSK, OUTPUT, MSACCES=<PASSWORD>.
SUBROUTINE 'BESSY'

PURPOSE
BESSEL FUNCTION OF THE SECOND KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
FOR N=0, Y(NU) AND Y(NU+1) ARE ALWAYS COMPUTED.

THIS SUBROUTINE ALSO COMPUTES THE J-BESSEL FUNCTION.

USAGE
CALL BESSY (X, FNU, N, VJ, VY)

DESCRIPTION OF PARAMETERS
X - THE ARGUMENT (X > 0.0)
FNU - NU, THE FRACTIONAL PART OF THE ORDER (0. < FNU < 1.)
N - HIGHEST ORDER IS (N+FNU)
    ABS(N)+1 TABLE ENTRIES ARE TO BE COMPUTED
VJ - ARRAY TO CONTAIN THE COMPUTED TABLE
    (DIMENSION MUST BE AT LEAST: MAX(N+13,X+28), THE
     REST OF THE ARRAY IS WORK AREA)
    VJ(1) = JO(X), WHERE JO IS J(O+FNU)
    ETC.
VY - ARRAY TO CONTAIN THE COMPUTED Y-TABLE
    (DIMENSION MUST BE AT LEAST: MAX(N+13,X+28), THE
     REST OF THE ARRAY IS WORK AREA)
    VY(1) = YO(X), WHERE YO IS Y(O+FNU)
    ETC.

CM REQUIRED: 416B

METHOD
SEE "RECURRENCE TECHNIQUES FOR THE CALCULATION OF BESSEL
FUNCTIONS", M. GOLDSMITH AND R. THALER, MTAC, VOL. XIII,
NO. 66, APRIL 1959.

FOR X > 10.0, ASYMPTOTIC VALUES ARE COMPUTED USING THE
SO-CALLED PHASE AMPLITUDE METHOD. SEE "BESSEL FUNCTIONS FOR
LARGE ARGUMENTS", M. GOLDSMITH AND R. THALER, MTAC, VOL XII,
NO. 61, JANUARY 1958.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
    ABS  COS  IABS  MAXO  SIN
    SORI
OTHERS
    BESSJ
    GAMMA
AUTHORS
FLORENCE F. RAGUSA AND M. GOLSTEIN
HARVEY ABRAMSON
MARGARET FRANTZ
NEW YORK UNIVERSITY

VIM ROUTINE NYUBESS

DATE WRITTEN: BEFORE 11/65

DATE(S) REVISED
11/65 - HA
09/01/67 - MF
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, BESSY, OUTPUT, MSACCES=<PASSWORD>.
SUBROUTINE 'BSJ'

PURPOSE
SPHERICAL BESSEL FUNCTION

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
EVALUATES THE SPHERICAL BESSEL FUNCTION J_N(X) FOR
N=-1,0,...,I BY MEANS OF A RECURSIVE RELATION AND REASONABLE
STARTING VALUES. STARTING VALUES ARE GENERATED WITHIN THE
SUBROUTINE.

USAGE
CALL BSJ (I, X, BJ)

DESCRIPTION OF PARAMETERS
I - HIGHEST ORDER DESIRED
X - SINGLE PRECISION FLOATING POINT VARIABLE
BJ - ARRAY DIMENSIONED AT LEAST 1+2 FOR SOLUTIONS
(BJ(N+2) = J_N(X))

CM REQUIRED: 404B

METHOD
A. THE VALUES ARE COMPUTED BY USING THE RECURSION FORMULA:

\[ J_{i-1}(X) + \frac{2i+1}{X} J_i(X) \]

IF X>20.5, THE RECURSION IS FORWARD.
IF X<20.5, THE RECURSION IS BACKWARD.
FOR VARIOUS RANGES (X<20.5), AN UPPER LIMIT, NU, IS SET.
BJ(NU+1) IS THEN SET TO ZERO, AND THE RECURSION PROCESS
IS EXECUTED.

B. RANGE: THE FOLLOWING DOMAINS HAVE BEEN CAREFULLY CHECKED:
1<X<25; 1<25. ERROR IS LESS THAN \( \pm 5 \times 10^{-11} \). POSSIBLE
DOMAINS ARE: 0<1<25 AND 0<X<100. (CAUTION: FOR LARGER
DOMAINS, CHECK DIMENSIONING IN THE SUBROUTINE.)
NOTE: IF I>X, J_N(X) IS VERY SMALL.

REFERENCES
HANDBOOK OF MATHEMATICAL FUNCTIONS, AMS 55, NATIONAL BUREAU
OF STANDARDS.

ASSOCIATION OF COMPUTING MACHINERY, "GENERATION OF SPHERICAL
BESSEL FUNCTIONS", F. J. CORBATO AND J. L. URETSKY, JULY
1959, VOL. 6, NO. 3, PP. 366-375.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
COS      SIN
OTHERS    NONE

AUTHORS
R L PEXTON - LAWRENCE RADIATION LABORATORY
D A WILBER - LAWRENCE RADIATION LABORATORY

DATE WRITTEN: 01/06/65 (RLP)

DATE(S) REVISED
11/65 (DAW)
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, BSJ, OUTPUT, MSACCESS=<PASSWORD>.
SUBROUTINE 'BUFSIZE'

PURPOSE
PRINT MESSAGE IN DAYFILE FOR EACH FILE SPECIFIED
INDICATING BUFFER SIZE AND WHETHER BUFFER IS
CURRENTLY ALLOCATED.

FUNCTIONAL CATEGORIES: QO

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS ROUTINE PICKS UP THE BUFFER SIZE (BFS) FROM WORD 4 OF
THE FIT. IT ALSO DETERMINES IF THE BUFFER IS CURRENTLY
ALLOCATED BY CHECKING THE BUFFER FIRST WORD ADDRESS (FWB)
IN WORD 6 OF THE FIT. IT PRINTS A REPORT IN THE DAYFILE
OF THE FORM:

FILE BUFFER SIZES
FILE (LFN) SIZE (OCTAL) ALLOCATED
XXXXXXX XXXXXX Y OR N

USAGE
CALLED FROM COBOL PROGRAM
ENTER BUFSIZE USING FILENAME1, FILENAME2,.....
WHERE FILENAMEx IS NAME OF FILE IN FD STATEMENT

CALLED FROM FTN PROGRAM
CALL BUFSIZE (FIT1, FIT2, ......)
WHERE FITx IS ADDRESS OF A FILE INFORMATION
 TABLE.

CM REQUIRED: 72B WORDS

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
BRUCE D. BLACK - DTNSRDC CODE 1892.1 (CDC)

DATE WRITTEN: 04/07/78

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, , BUFSIZE, OUTPUT, MSACCES=<PASSWORD>.

06/14/84 2-41 BUFSIZE - 1 OF 1
SUBROUTINE 'CELLI'
SUBROUTINE 'ELLI'

PURPOSE
COMPLETE AND INCOMPLETE ELLIPTIC INTEGRALS OF THE FIRST AND
SECOND KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
CELLI IS AN ENTRY POINT IN ELLI.

WHEN ABS(PHI) < PI/2, F AND E ARE ACCURATE TO AT LEAST 10
SIGNIFICANT FIGURES. AS ABS(PHI) GETS LARGE, THE ACCURACY
WILL NOT BE AS GOOD SINCE ELLI USES THE TANGENT SUBROUTINE
WHICH BECOMES LESS ACCURATE AS THE ANGLE ABS(PHI) INCREASES.

USAGE
CALL CELLI (PHI, CAY, F, E)
CALL ELLI (PHI, CAY, F, E)

DESCRIPTION OF PARAMETERS
PHI - UPPER LIMIT OF INTEGRAL
     (NOT USED BY CELLI WHICH ASSUMES PI/2)
CAY - THE PARAMETER IN THE INTEGRAL
F  - OUTPUT THE ELLIPTIC INTEGRAL OF THE FIRST KIND
     (F(PHI,CAY))
E  - OUTPUT THE ELLIPTIC INTEGRAL OF THE SECOND KIND
     (E(PHI,CAY))

CM REQUIRED: 351B

ERROR MESSAGES
IF K > 1, F AND E DO NOT EXIST. A MESSAGE IS PRINTED AND
F AND E ARE SET TO PHI.

IF K=1 AND ABS(PHI) > PI/2, F DOES NOT EXIST. A MESSAGE IS
PRINTED AND F IS SET TO SIGN(PHI)*1.0E+294. E EXISTS AND IS
COMPUTED.

OUTPUT UNITS
UNIT  #  LFN  USE
-------  ----  -----------------------------
OUTPUT    ERROR MESSAGES PRINTED BY LABRT

02/10/84  2-42  CELLI - 1 OF 2
METHOD
WHEN K<1, LANDEN'S TRANSFORMATION IS USED.

WHEN K=1, E IS COMPUTED BY:
    E(\(\phi\),1) = N + \text{ABS}(\sin(\phi) - \sin(N\pi/2))
WHERE N IS THE INTEGRAL PART OF \(\phi\)(2/\pi).

WHEN K=1 AND \(\text{ABS}(\phi) < \pi/2\), F IS COMPUTED BY:
    1+\sin(\phi)
    F(\(\phi\),1) = 0.5 \times \text{LN}(-------------)
                      1-\sin(\phi)

REFERENCE: "HANDBOOK OF MATHEMATICAL FUNCTIONS" BY M.
ABRAMOWITZ AND I. A. STEGUN.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
    ABS    AINT    ALOG    AMIN1    AMOD
    ATAN   FLOAT   INT    MOD     SIGN
    SIN    SQRT   TAN
OTHERS
    LABRT   - PRINT ERROR MESSAGES (57B)

AUTHORS
    KARL J MELENDEZ
    DUANE HARDER
    LOS ALAMOS SCIENTIFIC LABORATORY

    VIM ROUTINE LASL C304A

DATE WRITTEN: 02/05/68

DATE(S) REVISED
    02/69 - DH
    09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
    UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS (#DECK ELLI)
OBJECT
    EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,,CELLI,OUTPUT,MSACCESS=<PASSWORD>.
SUBROUTINE 'CENTER'

PURPOSE
CENTER A CHARACTER STRING WITHIN AN OUTPUT FIELD

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

USAGE
CALL CENTER (IN, LIN, OUT, NOUTC)

DESCRIPTION OF PARAMETERS
IN - INPUT ARRAY CONTAINING CHARACTER STRING TO BE CENTERED
(HALACTER STRING STARTS IN POSITION 1 AND ENDS WITH LAST NON-BLANK CHARACTER)
LIN - NUMBER OF WORDS IN 'IN'
OUT - OUTPUT ARRAY IN WHICH 'IN' IS TO BE CENTERED
NOUTC - NUMBER OF CHARACTERS IN 'OUT' WITHIN WHICH 'IN' IS TO BE CENTERED

REMARKS
USEFUL FOR CENTERING HEADINGS ON A PAGE. FOR INSTANCE, IF 'THIS IS A HEADING' IS TO BE CENTERED FOR A 132-COLUMN WIDE PAGE, THE FOLLOWING CAN BE USED:
INTEGER IN(2), OUT(14)
IN(1) = 10HTHIS IS A
IN(2) = 1OHHEADING
CALL CENTER (IN, 2, OUT, 132)
ON RETURN, 'OUT' WILL CONTAIN 'THIS IS A HEADING' IN POSITIONS 58 THRU 74 (WORD 6, POSITION 8 THRU WORD 8, POSITION 4). POSITIONS 1-56 AND 75-132 WILL CONTAIN BLANKS.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
MOD
OTHERS
GETCHA - GET CHARACTER FROM ARRAY
LASTC - FIND LAST NON-BLANK IN ARRAY
MOVECM - FAST ARRAY MOVE
PUTCHA - INSERT CHARACTER INTO ARRAY
VFILL - FILL ARRAY WITH SPECIFIED WORD

CM REQUIRED: 144B

08/18/83 2-44 CENTER - 1 OF 2
AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/19/75

DATE(S) REVISED
05/04/76
03/16/78
04/03/83 - CHANGE MOVLEV TO MOVECH

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC , CENTER , OUTPUT , MSACCES = <PASSWORD> .
SUBROUTINE 'CGAUSS'

PURPOSE
COMPLEX SOLUTION OF SIMULTANEOUS EQUATIONS AND DETERMINANT
BY ITERATIVE GAUSSIAN ELIMINATION

FUNCTIONAL CATEGORIES: F4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
TO INCREASE BEYOND 10 BY 10, THE DIMENSIONS OF ARRAYS A, AA, B, BB, X, XX AND IN MUST BE CHANGED.

USAGE
COMPLEX AA(10,10), BB(10,10), XX(10,10), DET
CALL CGAUSS (N, M, AA, BB, XX, VAL2, DET, MM, NA, NX)

DESCRIPTION OF PARAMETERS
N - NUMBER OF ROWS OF AA, BB, XX (MAX: 10)
M - NUMBER OF COLUMNS OF RIGHT-HAND SIDES (MAX: 10)
AA - COMPLEX ARRAY OF COEFFICIENTS FOR SIMULTANEOUS EQUATIONS AA*XX=BB (MAX: 10 BY 10)
BB - COMPLEX ARRAY OF RIGHT-HAND-SIDES FOR AA*XX=BB (MAX: 10 BY 10)
XX - COMPLEX ARRAY OF SOLUTIONS OF AA*XX=BB (MAX: 10 BY NX)
VAL2 - OUTPUT THE INFINITY NORM OF THE CORRECTION
DET - OUTPUT THE COMPLEX DETERMINANT OF AA
MM - NUMBER OF ITERATIONS
   (MM=0 RETURNS THE RESULT OF THE FIRST GAUSSIAN ELIMINATION)
NA - DIMENSIONS OF AA AND BB AND FIRST DIMENSION OF XX
NX - SECOND DIMENSION OF XX

CM REQUIRED: 1721B

METHOD
A FIRST SOLUTION FOR XX IS OBTAINED DIRECTLY. BB-AA*XX IS CALCULATED AS DD. THE RESIDUAL EQUATION AA*X=DD IS SOLVED AND THE SOLUTION ADDED TO XX. THIS PROCESS CONTINUES FOR MM CYCLES. IF MM=0, THE RESULT OF THE FIRST GAUSSIAN ELIMINATION IS RETURNED.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
CABS
OTHERS
NONE

AUTHORS
UNIVERSITY OF MARYLAND
SUE VOIGT

DATE WRITTEN: 1971

DATE(S) REVISED
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS (*DECK AMCGAUS)
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, CGAUSS, OUTPUT, MSACCES=<PASSWORD>.
SUBROUTINE 'CHFILL'

PURPOSE
FILL (PORTION OF) AN ARRAY WITH A CHARACTER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL CHFILL (FILLCH, TO, TOPOS, NCHAR)

DESCRIPTION OF PARAMETERS
FILLCH - FILL CHARACTER (IR OR 1H OR "")
TO - INTEGER ARRAY TO BE FILLED
TOPOS - STARTING CHARACTER POSITION IN 'TO'
          (CHARACTER 1 IS LEFT-MOST CHARACTER OF TO(1))
NCHAR - NUMBER OF CHARACTERS TO BE FILLED

CM REQUIRED: 35B

EXAMPLE
TO: ************************************************
AFTER CALL CHFILL (IR/, TO, 23, 7)
TO: **********************************************

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND
SHIFT
OTHERS
PUTCHA - INSERT CHARACTER INTO ARRAY

ARITHMETIC STATEMENT FUNCTIONS
L11FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
R11FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/10/77

DATE(S) REvised
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,N$RDC,,CHFILL,OUTPUT,MSACCES=<PASSWORD>.

06/07/84  2-48  CHFILL - 1 OF 1
SUBROUTINE 'CHNGSEQ'

PURPOSE
ALLOW COBOL4 USER TO DEFINE HIS OWN COLLATING SEQUENCE

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 - (NOS/BE)

REMARKS
USER MUST USE THE U OPTION ON THE COBOL CALL CARD.

BINARY ZERO IS THE 64TH CHARACTER IN THE COLLATING SEQUENCE.

ROUTINE SETS TABLES AFFECTING COLLATING SEQUENCE FOR
COBOL IF TESTS, COBOL SORT, INDEX SEQ FILE SEQUENCE, ETC.

USAGE
CALL CHNGSEQ USING MYTBL.

DESCRIPTION OF PARAMETER
THE USER MUST SET UP A DATA ITEM 63 CHARACTERS IN
LENGTH CONTAINING THE CHARACTERS IN THE ORDER HE
WISHES THE COLLATING SEQUENCE TO BE. ALL 63
CHARACTERS MUST BE PRESENT.

NOTE: TO SET " INTO THE STRING, REDEFINE AND USE
MOVE QUOTE TO ..... 

EXAMPLE:

01 MYTBL PIC X(63) VALUE "@:^[#&'?\^,\+\*-\/=\(\)\[\]{\}<>\ABCD EF"
01 MYTBLA REDEFINES MYTBL.
03 ENTR PIC X OCCURS 63 TIMES.

RECALL THAT A NON-NUMERIC LITERAL MUST CONTINUE THRU
COL 72 OF THE FIRST CARD AND THAT CONTINUATION CARD
MUST HAVE A HYPHEN IN COL 7. (EXAMPLE HERE DOESN'T
GO TO COL. 72).

PROCEDURE DIVISION.
PARI.
   MOVE QUOTE TO ENTR (24).
   CALL CHNGSEQ USING MYTBL.

CM REQUIRED: 27B

METHOD
COLLATING SEQUENCE TABLES IN COBOL OBJECT TIME ROUTINES
ARE CHANGED.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
BRUCE D BLACK DTNRDC 1892.1 (CDC)

DATE WRITTEN: 11/15/77

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, CHNGSEQ, OUTPUT, MSACCES=<PASSWORD>.

08/18/83 2-50 CHNGSEQ - 2 OF 2
SUBROUTINE 'CLUNLD'

PURPOSE
CLOSE AND UNLOAD A FILE

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
CAUTION: FOR ICLT=1 OR 2, BE SURE BUFFERS HAVE BEEN FLUSHED BEFORE UNLOADING A PERMANENT FILE IF YOU EXPECT TO USE IT AGAIN. (I.E., CLOSE THE FILE BEFORE CALLING CLUNLD)

CAUTION: RANDOM PERMANENT FILES MUST BE CLOSED BEFORE CLUNLD IS CALLED TO INSURE THAT THE LATEST INDEX IS WRITTEN.

FORTRAN SEQUENTIAL FILES SHOULD HAVE THEIR BUFFERS FLUSHED BE REWRINDING THEM BEFORE CALLING CLUNLD.

USAGE
CALL CLUNLD (IERR, ICLT, LFN)

DESCRIPTION OF PARAMETERS
IERR - ERROR RETURN CODE (0=NO ERRORS)
ICLT - TYPE OF CONTENTS OF 'LFN'
1 - LFN CONTAINS THE ADDRESS OF A FET.
   A CLOSE-UNLOAD IS PERFORMED ON THIS FET.
2 - LFN CONTAINS AN LFN TO BE UNLOADED.
   A DUMMY FET IS CREATED AND THE FILE UNLOADED.
3 - LFN CONTAINS A FILE NAME OR FORTRAN LOGICAL UNIT NUMBER (I.E., ANY FILE ON THE FORTRAN PROGRAM STATEMENT). THE FIT WILL BE FOUND AND THE FILE UNLOADED.
   NOTE: CLOSEM (A RECORD MANAGER ROUTINE) IS CALLED TO CLOSE THE FILE.
   NOTE: A DUMMY FET IS CREATED TO UNLOAD A FILE THAT RECORD MANAGER DOESN'T KNOW HAS BEEN ATTACHED.
LFN - CONTENTS IS DETERMINED BY 'ICLT'

CM REQUIRED: 22B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
CLUXXX FNDFIT INDCMT IZONK ZIO

AUTHOR
C M CHERNICK - DTNSRDC CODE 1832

DATE WRITTEN: 11/15/71

DATE(S) REVISED
06/01/72 11/20/74 02/21/75 05/75 04/76

LOCATION OF DECKS
SOURCE
CODE 1832
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,,NSRDC,,CLUNLD,OUTPUT,MSACCES=<PASSWORD>.

02/10/84
2-52
CLUNLD - 2 OF 2
SUBROUTINE 'CMPINV'

PURPOSE
COMPLEX MATRIX INVERSION

FUNCTIONAL CATEGORIES: F4 A2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE REAL AND/OR IMAGINARY PARTS OF THE MATRIX 'A' MAY BE SINGULAR.

USAGE
CALL CMPINV (A, N, N1, C, ID, E, N2, INDEX)

DESCRIPTION OF PARAMETERS
A - COMPLEX INPUT MATRIX
   (NOT DESTROYED BY SUBROUTINE)
N - DIMENSION OF A AND C (N X N)
N1 - NUMBER OF ROWS IN A AND C CURRENTLY FULL
C - INVERSE RESULT MATRIX
   (MAY BE THE SAME AS A)
ID - RETURN CODE
   1 - INVERSION SUCCESSFUL
   2 - MATRIX SINGULAR
E - TEMPORARY ARRAY SOLVING N2 X N2 SYSTEM
N2 - NO SMALLER THAN N1+N1
INDEX - TEMPORARY ARRAY USED IN INVERSION (N2,3)

THE CALLING PROGRAM MUST INCLUDE:

COMPLEX A(N,N), C(N,N)
REAL E(N2,N2), INDEX(N2,3)

CM REQUIRED: 134B

METHOD
THE SYSTEM SOLVED IS THE EXPANDED MATRIX

\[
\begin{pmatrix}
!_{-AR} & -A_{1}^{-1} \\
E & \\
!_{-A}^1 & A_{1}
\end{pmatrix}
\]

WHERE CR IS TAKEN AS THE UPPER LEFT CORNER OF THE INVERSE AND CI IS TAKEN AS THE LOWER LEFT CORNER OF THE INVERSE. (LANCZOS, APPLIED ANALYSIS, P 137). THE INVERSE IS COMPUTED BY SUBROUTINE MATINS (ALSO ON NSRDC) WHICH USES GAUSS-JORDAN ELIMINATION. THIS METHOD FINDS AN INVERSE IF IT EXISTS, EVEN IF REAL AND IMAGINARY PARTS OF A ARE BOTH INDIVIDUALLY SINGULAR. IDENTIFICATION OF A SINGULAR COMPLEX MATRIX IS RETURNED TO THE CALLING PROGRAM.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AIMAG  CMPLX  REAL
OTHERS
MATINS - MATRIX INVERSION

AUTHOR
SHARON E GOOD - DTNSRDC CODE 1892.1

DATE WRITTEN: 06/10/71

DATE(S) REVISED
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS (*DECK AMCMAT)
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,CMPINV,OUTPUT,MSACCES=<PASSWORD>.

06/14/84  2-54  CMPINV - 2 OF 2
FUNCTION 'COMPSTR'

PURPOSE
COMPARE TWO CHARACTER STRINGS

FUNCTIONAL CATEGORIES: MO

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
TEST = COMPSTR (A, FROMA, B, FROMB, NCHAR)

DESCRIPTION OF PARAMETERS
A - ARRAY CONTAINING FIRST CHARACTER STRING
FROMA - STARTING CHARACTER POSITION IN A
(position 1 is left-most 6-bit character in A(1))
B - ARRAY CONTAINING SECOND CHARACTER STRING
FROMB - STARTING CHARACTER POSITION IN B
(position 1 is left-most 6-bit character in B(1))
NCHAR - NUMBER OF CHARACTERS TO COMPARE
COMPSTR - WILL RETURN ONE OF:
-1. - STRING IN A IS LESS THAN STRING IN B
0. - STRING IN A IS EQUAL TO STRING IN B
+1. - STRING IN A IS GREATER THAN STRING IN B

CM REQUIRED: 66B

SUBPROGRAMES REQUIRED
PART OF LANGUAGE
NONE

OTHERS
GETCHA - GET CHARACTER FROM ARRAY

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/04/77

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC
SUBROUTINE 'CONTRCT'

PURPOSE
SQUEEZE ARRAY OF 1R-FORMAT CHARACTERS TO LEFT

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE SUBROUTINE 'EXPAND'.

USAGE
CALL CONTRCT (A, B, NCHAR)

DESCRIPTION OF PARAMETERS
A - INPUT ARRAY WHOSE ELEMENTS EACH CONTAIN ONE
CHARACTER IN THE RIGHT-MOST 6 BITS (1R FORMAT)
B - OUTPUT ARRAY WHOSE ELEMENTS WILL EACH CONTAIN 10
CHARACTERS FROM ARRAY A (ANY LEFT-OVER BITS OF THE
LAST WORD USED IN ARRAY B WILL BE CLEARED TO 0B)
NCHAR - NUMBER OF CHARACTERS IN ARRAY A

CM REQUIRED: 44B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
MASK MOD

OTHERS
PUTCHA - INSERT CHARACTER INTO ARRAY

ARITHMETIC STATEMENT FUNCTIONS
NWORD - COMPUTE SUBSCRIPT

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/04/77

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, CONTRCT, OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-56 CONTRCT - 1 OF 1
SUBROUTINE 'COUPLE'

PURPOSE
   LOGICALLY CONNECT (PORTIONS OF) TWO WORDS

FUNCTIONAL CATEGORIES: R1

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   CALL COUPLE (FL, AWORD, AB, BWORD, BB, LC, IOAC)

DESCRIPTION OF PARAMETERS
   FL - NUMBER OF BITS TO PROCESS
   AWORD - FIRST WORD (FROM)
   AB - STARTING BIT POSITION IN AWORD
   BWORD - SECOND WORD (TO)
   BB - STARTING BIT POSITION IN BWORD
   LC - CODE FOR LOGICAL CONNECTIVE DESIRED
       0 - PUT ZEROS INTO BWORD FIELD
       1 - AND THE FIELDS
       2 - AND THE COMPLEMENT OF A TO B
       3 - NUMBER OF ONE IN THE LAST FIELD
       4 - AND THE COMPLEMENT OF B TO A
       5 - SUBSTITUTE FIELD OF A INTO B
       6 - EXCLUSIVE OR
       7 - OR
       8 - AND COMPLEMENTS
       9 - IDENTITY
      10 - SUBSTITUTE COMPLEMENT OF A INTO B
      11 - OR THE COMPLEMENT OF A TO B
      12 - COMPLEMENT OF B
      13 - OR A TO THE COMPLEMENT OF B
      14 - OR THE COMPLEMENTS OF A AND B
      15 - PUT ONES INTO BWORD FIELD
   IOAC - OUTPUT NUMBER OF ONE-BITS FOR LC=3

CM REQUIRED: 223B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
   SHIFT
   OTHERS
      IAOC - COUNT ONE BITS IN A WORD
      MASKIT - MULTIPLE-FIELD MASK GENERATOR
AUTHOR
NWL

DATE WRITTEN:

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, , COUPLE, OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-58 COUPLE - 2 OF 2
SUBROUTINE 'DATCNV'

PURPOSE
CONVERT DATE FORMATS

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
MAY BE USED FOR ANY GREGORIAN DATE FROM OCT 15, 1582 THRU
FEB 28, 4000.

USEFUL IS DETERMINING THE ELAPSED NUMBER OF DAYS BETWEEN TWO
CALENDAR DATES.

MAY BE USED TO FIND THE DATE SO MANY DAYS FROM A GIVEN DATE.

IF THE DATE IS RETAINED IN A DATA BASE IN THE RELATIVE-DAY
FORM, IT CAN BE USED IN MANY COMPUTATIONS AND CONVERTED FOR
PRINTOUT WITHOUT THE NEED TO WORRY ABOUT LEAP YEARS AND
CHANGE OF CENTURY.

USAGE
CALL DATCNV (ITYPE, IYR, IMO, IDYMO, IDYRD, IDYYR, IDYWK)

DESCRIPTION OF PARAMETERS
ITYPE - TYPE OF CONVERSION DESIRED
1 - IN: IYR IMO IDYMO
     OUT: IDYRD IDYYR IDYWK
2 - IN: IYR IDYYR
     OUT: IMO IDYMO IDYRD IDYWK
3 - IN: IDYRD
     OUT: IYR IMO IDYMO IDYYR IDYWK

IYR - YEAR (E.G., 1979)
IMO - MONTH (1 TO 12)
IDYMO - DAY-OF-MONTH (1 TO 31)
IDYRD - RELATIVE DAY
   (RETURNS -1 IF ITYPE IS OUT OF RANGE)
IDYYR - DAY-OF-YEAR (1 TO 366)
IDYWK - DAY-OF-WEEK (0 TO 6, SUN IS 0)

CM REQUIRED: 165B
EXAMPLES
1. CONVERT JULY 11, 1979 TO THE OTHER FORMS:
   
   CALL DATCNV (1, 1979, 7, 11, IDYRD, IDYYR, IDYWK)
   
   RETURNS IDYRD=2444066 IDYYR=192 IDYWK=3 (WEDNESDAY)

2. CONVERT DAY 192 OF 1979 TO THE OTHER FORMS:
   
   CALL DATCNV (2, 1979, IMO, IDYMO, IDYRD, 192, IDYWK)
   
   RETURNS IMO=7 IDYMO=11 IDYRD=2444066 IDYWK=3

3. CONVERT RELATIVE DAY 2444066 TO OTHER FORMS:
   
   CALL DATCNV (3, IYR, IMO, IDYMO, 2444066, IDYYR, IDYWK)
   
   RETURNS IYR=1979 IMO=7 IDYMO=11 IDYYR=192 IDYWK=3

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
   NONE
   OTHERS
       JGDATE - JULIAN-GREGORIAN CONVERTER (MULTI-YEAR)
       JULIAN - JULIAN-GREGORIAN CONVERTER (SINGLE YEAR)
       WEKDAY - FIND DAY-OF-WEEK

AUTHOR
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/11/79

DATE(S) REVISED

LOCATION OF DECKS
   SOURCE
       UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
   OBJECT
       EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,DATCNV,OUTPUT,MSACCESS=<PASSWORD>.

06/14/84  2-60  DATCNV - 2 OF 2
SUBROUTINE 'DATFMT'

PURPOSE
DATE FORMAT CONVERSION

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL DATFMT (FMTOLD, FMTNEW, OLD, NEW)

DESCRIPTION OF PARAMETERS (ALL INTEGERS)
FMTOLD - INPUT FORMAT (OLD) -- ONE OF
  1 - 'MM/DD/YY'
  2 - 'MM/DD/YY'
  3 - 'MMDDYY'
-1 - 'YY/MM/DD'
-2 - 'YY/MM/DD'
-3 - 'YYMMDD'
FMTNEW - OUTPUT FORMAT (NEW)
  (SAME VALUES AS FMTOLD)
OLD - DATE TO BE CONVERTED
NEW - WILL CONTAIN CONVERTED DATE

CM REQUIRED: 146B

EXAMPLE
CHANGE MMDDYY TO YY/MM/DD:
INTEGER FMTOLD, FMTNEW, OLD, NEW
DATA OLD/ "072579"/
CALL DATFMT (3, -1, OLD, NEW)
NEW WILL CONTAIN: "79/07/25 ".

06/14/84 2-61 DATFMT - 1 OF 2
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND OR SHIFT
OTHERS NONE

ARITHMETIC STATEMENT FUNCTIONS (CDC CYBER)
FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)
   R21FMT R22FMT R23FMT R24FMT R25FMT
   R27FMT R28FMT

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: B7700: 08/08/79
   CDC : 02/22/80

DATE(S) REVISED
   03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
   UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
   EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,DATFMT,OUTPUT,MSACCESS=<PASSWORD>.
SUBROUTINE 'DAYONOF'

PURPOSE
PACKAGE OF SIX SUBROUTINES TO MANIPULATE THE DAYFILE SETTINGS

FUNCTIONAL CATEGORIES: ZO

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
WHEN DAYOFF OR DAYSV/DAYSVOF IS USED, ANY MESSAGES ALREADY IN THE DAYFILE BUFFER ARE LOST. TO INSURE THAT THEY PRINT, USE DAYFLSH BEFORE USING DAYOFF OR DAYSV/DAYSVOF.

WHILE DAYON AND DAYOFF ARE PROVIDED, IT IS RECOMMENDED THAT DAYSON/DAYSOF AND DAYRS BE USED INSTEAD. THIS WILL ELIMINATE ANY SIDE EFFECTS.

DAYONOF IS PART OF THE OPERATING SYSTEM, NOT IN LIBRARY NSRDC. THE DOCUMENT IS HERE FOR CONVENIENCE.

USAGE
CALL DAYFLSH FLUSH THE DAYFILE BUFFER
CALL DAYOFF TURN THE DAYFILE BUFFER OFF
CALL DAYON TURN THE DAYFILE ON
CALL DAYRS RESTORE THE DAYFILE SETTING
CALL DAYSV SAVE THE CURRENT DAYFILE SETTING AND TURN THE DAYFILE OFF
(SYNONYM: DAYSVOF)
CALL DAYSVON SAVE THE CURRENT DAYFILE SETTING AND TURN THE DAYFILE ON

CM REQUIRED: 60B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE
AUTHORS
SYSTEMS - DTNSRDC CODE 1892.3
(ORIGINAL CODE FOR DAYSV AND DAYRS)
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: UNKNOWN

DATE(S) REVISED
09/29/82 - GENERALIZE THE SUBROUTINE
- ADD CODE FOR DAYON, DAYOFF, DAYFLSH, DAYSVO

LOCATION OF DECKS
SOURCE
CODE 1892.3
OBJECT
PART OF THE OPERATING SYSTEM (SYSLIB)

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,DAYONOF,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-64
DAYONOF - 2 OF 2
SUBROUTINE 'DISCOT'

PURPOSE
SINGLE OR DOUBLE INTERPOLATION

FUNCTIONAL CATEGORIES: El

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
GIVEN A FUNCTION WITH TWO INDEPENDENT VARIABLES, X AND Z, THIS SUBROUTINE PERFORMS KX- AND KZ-ORDER INTERPOLATION TO CALCULATE THE DEPENDENT VARIABLE. ALL SINGLE-LINE FUNCTIONS ARE READ IN AS 2 SEPARATE ARRAYS AND ALL MULTI-LINE FUNCTIONS ARE READ IN AS 3 SEPARATE ARRAYS.

WHEN TABULATING DISCONTINUOUS FUNCTIONS, THERE MUST ALWAYS BE K-1 POINTS ABOVE AND BELOW THE DISCONTINUITY IN ORDER TO GET PROPER INTERPOLATION.

WHEN TABULATING ARRAYS FOR THIS SUBROUTINE, BOTH INDEPENDENT VARIABLES MUST BE IN ASCENDING ORDER.

IN SOME ENGINEERING PROGRAMS WITH MANY TABLES, IT IS QUITE DESIRABLE TO READ IN ONE ARRAY OF X'S THAT COULD BE USED FOR ALL LINES OF A MULTI-LINE FUNCTION OR DIFFERENT FORMULA. THIS NOT ONLY SAVES MUCH TIME IN PREPARING TABULAR DATA, BUT CAN ALSO SAVE MANY LOCATIONS PREVIOUSLY USED WHEN EVERY Y-COORDINATE HAD TO HAVE A CORRESPONDING X-COORDINATE. SEE EXAMPLES.

ANOTHER FEATURE IS THE POSSIBILITY OF A MULTI-LINE FUNCTION WITH NO EXTRAPOLATION ABOVE THE TOP LINE. SEE EXAMPLES.

USAGE
CALL DISCOT (X, Z, TABX, TABY, TABZ, NC, NY, NZ, Y)

DESCRIPTION OF PARAMETERS
X - X-ARGUMENT
Z - Z-ARGUMENT
(THEY MAY BE SAME AS X ON SINGLE LINES)
TABX - ARRAY OF X'S
TABY - ARRAY OF Y'S
TABZ - ARRAY OF Z'S
NC - CONTROL WORD (+HTU)
  + IMPLIES NX = NY/NZ
  - IMPLIES NX = NY
H=0 - EXTRAPOLATE WHEN Z>ZMAX
  =1 - NO EXTRAPOLATION ABOVE ZMAX
T=1 TO 7 - DEGREE INTERPOLATION IN X DIRECTION
U=1 TO 7 - DEGREE INTERPOLATION IN Z DIRECTION
NY - NUMBER OF POINTS IN Y ARRAY
NZ - NUMBER OF POINTS IN Z ARRAY
Y - OUTPUT DEPENDENT VARIABLE

06/14/84 2-65
CM REQUIRED: 517B

EXAMPLES

1) GIVEN $Y = F(X)$  
   $KX=3$
   
   PROGRAM SAMPL1 (TAPE7, ...)
   DIMENSION TABX(50), TABY(50)
   
   10 READ (7, 1) (TABX(I), TABY(I), I=1,50)
   
   READ (7, 1) X
   1 FORMAT (8E9.5)
   CALL DISCOT (X, X, TABX, TABY, -30, 50, 0, Y)
   ...

2) GIVEN $Y = F(X,Z)$  
   $KX=7$, $KZ=3$  
   $NX .NE. NY$
   
   PROGRAM SAMPL2 (TAPE7, ...)
   DIMENSION TABX(80), TABY(800), TABZ(10)
   
   10 READ (7, 1) TABX
   READ (7, 1) TABY
   READ (7, 1) TABZ
   READ (7, 1) X, Z
   1 FORMAT (8E9.5)
   CALL DISCOT (X, Z, TABX, TABY, TABZ, 73, 800, 10, Y)
   ...

3) GIVEN $Y = F(X,Z)$  
   $KX=7$, $KZ=3$  
   $NX=NY$
   
   PROGRAM SAMPL3 (TAPE7, ...)
   DIMENSION TABX(800), TABY(800), TABZ(10)
   
   10 READ (7, 1) TABX
   READ (7, 1) TABY
   READ (7, 1) TABZ
   READ (7, 1) X, Z
   1 FORMAT (8E9.5)
   CALL DISCOT (X, Z, TABX, TABY, TABZ, -73, 800, 10, Y)
   ...

4) GIVEN $Y=F(X,Z)$  
   $KX=7$, $KZ=3$  
   $NX=NY$
   NO EXTRAPOLATION ABOVE Z-MAX
   
   SAME AS EXAMPLE 3 WITH 6TH PARAMETER OF CALL TO DISCOT
   EQUAL TO -173.

METHOD

LAGRANGE'S INTERPOLATION FORMULA IS USED IN BOTH THE X AND
Z DIRECTION. SEE "METHODS IN NUMERICAL ANALYSIS" BY
NIELSEN.
SUBROUTINE 'DMPA'

PURPOSE
CALLABLE OCTAL AND CHARACTER DUMP OF SPECIFIED PORTION
OF USER'S FIELD LENGTH (FL) (BY ACTUAL LOCATION)
(NO HEADINGS ARE PROVIDED)

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL DMPA (FWA, N, INIT)
CALL DMPA (FWA, N)

DESCRIPTION OF PARAMETERS
FWA - FIRST WORD ADDRESS OF AREA TO DUMP
(E.G., LOCF (ARRAY))
N - NUMBER OR WORDS TO DUMP
INIT - STARTING WORD ADDRESS TO BE PRINTED
(IF OMITTED, 0 IS USED)

CM REQUIRED: 313B

OUTPUT UNIT
UNIT # LFN USE
-------- ------- ------------------------
OUTPUT LISTABLE OUTPUT

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF
OTHERS
EQU60 - LOGICAL ARRAY COMPARE
MFETCH - READ WORK IN FL

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 06/14/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,DMPA,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-68 DMPA - 1 OF 1
SUBROUTINE 'DMPCPA'

PURPOSE
SHORT DUMP OF JOB CONTROL POINT AREA

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
FOR A FULL, ANNOTATED DUMP, CALL DUMPCPA.

USAGE
CALL DMPCPA

CM REQUIRED: 324B

OUTPUT DESCRIPTION
AN OCTAL AND CHARACTER DUMP OF THE 200 (OCTAL) WORDS OF THE
CONTROL POINT AREA.

OUTPUT UNITS

<table>
<thead>
<tr>
<th>UNIT</th>
<th>LFN</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OUTPUT LISTABLE OUTPUT</td>
</tr>
</tbody>
</table>

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
DATE TIME
OTHERS
RCPA - READ CONTROL POINT AREA

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/29/75

DATE(S) REVISED
05/25/83 - ORIGINAL SOURCE LOST - RE-WRITTEN IN FORTRAN 77

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,,NSRDC,,DMPCPA,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-69  DMPCPA - 1 OF 1
SUBROUTINE 'DPROOT'

PURPOSE
FIND ALL ROOTS OF A REAL DOUBLE PRECISION POLYNOMIAL

FUNCTIONAL CATEGORIES: C2 B4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE POLYNOMIAL HAS THE FORM:
\[ A + A_1 x + \ldots + A_{N+1} x^{N+1} = 0 \]

USAGE
CALL DPROOT (N, A, U, V, H, B, C, CONV, NPLUS2)

DESCRIPTION OF PARAMETERS
N   - DEGREE OF THE POLYNOMIAL TO BE SOLVED
A   - DOUBLE PRECISION ARRAY (DIMENSIONED N+2) CONTAINING
     THE COEFFICIENTS IN THE ORDER INDICATED ABOVE
U   - DOUBLE PRECISION ARRAY (DIMENSIONED N+2) WHICH WILL
     CONTAIN THE REAL PARTS OF THE ROOTS
V   - DOUBLE PRECISION ARRAY (DIMENSIONED N+2) WHICH WILL
     CONTAIN THE IMAGINARY PARTS OF THE ROOTS
H, B, C - DOUBLE PRECISION WORK ARRAYS (EACH DIMENSIONED N+2)
CONV - CONVERGENCE CRITERION. INITIALLY SET BY DPROOT TO
       1.0D-35 (FAR BELOW THE ACTUAL STARTING CONVERGENCE
       CRITERION OF 5.0D-20 (CDC 6600). IF THE POLYNOMIAL
       HAS NOT CONVERGED AFTER A PRESCRIBED NUMBER OF
       TRIES, THE CONVERGENCE CRITERION IS RELAXED. IF,
       UPON EXIT FROM DPROOT, CONV IS NOT 1.0D-35, THE
       CONVERGENCE CRITERION HAS BEEN RELAXED TO THE
       NUMBER GIVEN. (CONV IS DOUBLE PRECISION.)
NPLUS2 - MUST BE SET TO N+2

CM REQUIRED: 1031B

METHOD
THE ROUTINE CONVERGES SIMULTANEOUSLY TOWARD A LINEAR FACTOR
AND A QUADRATIC FACTOR BY NEWTON'S AND BAIRSTOW'S METHODS,
RESPECTIVELY. WHEN A ROOT IS FOUND BY ONE METHOD, ITERATION
CONTINUES WITH BOTH METHODS USING THEIR MOST RECENT GUESSES.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
DABS DSIGN SQRT
OTHERS
NONE

02/10/84 2-70 DPROOT - 1 OF 2
SUBROUTINE 'DUMPA'

PURPOSE
GIVE OCTAL AND CHARACTER DUMP OF USER-SPECIFIED AREA

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
LINES CONTAIN 4 WORDS EACH. IF A LINE IS THE SAME AS THE
PREVIOUS LINE, IT IS NOT PRINTED (UNLESS IT IS THE LAST
LINE).

USAGE
CALL DUMPA (AREA, NWORDS, NAME)

DESCRIPTION OF PARAMETERS
AREA - START OF AREA TO BE DUMPED
NWORDS - NUMBER OF WORDS TO DUMP
NAME - 1-10 CHARACTER IDENTIFICATION OF START OF AREA
(E.G., 1OHMYAREA(1))
(WILL BE PRINTED IN HEADING LINE)

CM REQUIRED: 240B

OUTPUT UNITS
UNIT # LFN USE
------- ------ -------------------------------
OUTPUT LISTABLE OUTPUT

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
COMPL
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/06/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, NSRDC, DUMPA, OUTPUT, MSACCESS=<PASSWORD>.

02/10/84 2-72 DUMPA - 1 OF 1
SUBROUTINE 'DUMPFL'

PURPOSE
CALLABLE OCTAL AND CHARACTER DUMP OF SPECIFIED PORTION
OF USER'S FIELD LENGTH (FL) (BY ACTUAL LOCATION)

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
1) WHEN CALLED WITHOUT AN ARGUMENT LIST, THE FTN4 CARD
   FOR THE CALLING PROGRAM MUST HAVE THE 'Z' PARAMETER.
2) DUMP IS AT 8 LINES PER INCH ON PRINTERS WHICH WILL PRINT
   AT THAT DENSITY.

USAGE
CALL DUMPFL
CALL DUMPFL (LWA)
CALL DUMPFL (FWA, LWA)

DESCRIPTION OF PARAMETERS
FWA - FIRST WORD ADDRESS OF AREA TO DUMP
(SET TO ZERO IF ANY OF THE FOLLOWING:
  1) FWA OMITTED
  2) FWA LESS THAN ZERO
  3) FWA GREATER THAN FL
  4) FWA GREATER THAN LWA)

LWA - LAST WORD ADDRESS OF AREA TO DUMP
(SET TO FL IF ONE OF THE FOLLOWING:
  1) LWA OMITTED
  2) LWA LESS THAN OR EQUAL TO ZERO
  3) LWA GREATER THAN FL
  4) FWA GREATER THAN LWA)

CM REQUIRED: 376B

OUTPUT UNITS

<table>
<thead>
<tr>
<th>UNIT #</th>
<th>LFN</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OUTPUT LISTABLE OUTPUT</td>
</tr>
</tbody>
</table>

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF

OTHERS
EQU60 - LOGICAL ARRAY COMPARE
FTNRFL - GET CURRENT FL
MFETCH - READ WORD IN USER'S FL

02/10/84  2-73  DUMPFL - 1 OF 2
AUTHOR
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/12/76

DATE(S) REVISED
   06/14/76
   03/23/83 - REcompile AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPL, UN-CSYS
   OBJECT
      EDITLB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN, DOCGET,, NSRDC,, DUMPFL, OUTPUT, MSACCES=<PASSWORD>.

02/10/84
2-74
DUMPFL - 2 OF 2
SUBROUTINE 'D630I'

PURPOSE
INITIALIZE COMMON BLOCK /D630/ WITH ASCII CONTROL CODES
FOR THE DEC D630 CRT

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE MUST BE EXECUTED PRIOR TO GENERATING ASCII
MESSAGES WITH D630 CONTROL CODES USING SUBROUTINE ASCII.

COMMON BLOCK /D630/ IS OBTAINED BY RUNNING PROCEDURE ASCIIIO
AND INSERTING THE COMMON BLOCK INTO EACH (SUB)PROGRAM WHICH
WILL GENERATE ASCII MESSAGES HAVING D630 CONTROL CODES.

USAGE
CALL D630I

CM REQUIRED: 4B

NAMES OF D630 CONTROL CODES
MARGINS AND FORMATTING
SETTPM - SET TOP PAGE MARGIN (AT CURRENT POSITION)
SETBPM - SET BOTTOM PAGE MARGIN (AT CURRENT POSITION)
CLRTBM - CLEAR TOP AND BOTTOM PAGE MARGINS
SETLM - SET LEFT MARGIN (AT CURRENT POSITION)
SETRM - SET RIGHT MARGIN (AT CURRENT POSITION)
SETHMT - SET HORIZONTAL TAB STOP (AT CURRENT POSITION)
SETVT - SET VERTICAL TAB STOP (AT CURRENT POSITION)
CLRHT - CLEAR HORIZONTAL TAB (AT CURRENT POSITION)
CLRHVT - CLEAR ALL HORIZONTAL AND VERTICAL TAB STOPS
SETLPS - SET LINES PER PAGE TO (N)
SETHMI - SET HORIZONTAL MOTION INDEX TO (N-1)
SETVMI - SET VERTICAL MOTION INDEX TO (N-1)
RSTHMI - RETURN HMI CONTROL TO SPACING SWITCH

CARRIAGE MOVEMENT
HT2N - ABSOLUTE HT TO PRINT COLUMN (N)
EAUBKP - ENABLE AUTO BACKWARD PRINTING
DAUBKP - DISABLE AUTO BACKWARD PRINTING
EAUCR - ENABLE AUTO CARRIAGE RETURN
DAUCR - DISABLE AUTO CARRIAGE RETURN
REVPRRT - REVERSE PRINTING MODE
NRMPRT - NORMAL PRINTING MODE
FWDPRT - FORWARD PRINT MODE ON
BKWPRT - BACKWARD PRINT MODE ON/FORWARD PRINT MODE OFF
(CLEAR WITH CR)
PAPER MOVEMENT
VT2N - ABSOLUTE VT TO LINE (N)
NEGLF - PERFORM NEGATIVE LINE FEED
HALFLF - PERFORM HALF-LINE FEED
NEGHLF - PERFORM NEGATIVE HALF-LINE FEED

PRINTING
GRAFON - GRAPHICS MODE ON (CLEAR WITH CR)
GRAFOF - GRAPHICS MODE OFF
HPAMOV - HYPLT ON - ABSOLUTE MOVE (CLEAR WITH CR)
HPAPLT - HYPLT ON - ABSOLUTE PLOT (CLEAR WITH CR)
HPROMV - HYPLT ON - RELATIVE MOVE (CLEAR WITH CR)
HPRPLT - HYPLT ON - RELATIVE PLOT (CLEAR WITH CR)
CHPLCH - CHANGE PLOT CHARACTER TO (CHARACTER)
SETPRE - SET PLOT PRECISION
COLOR2 - PRINT IN SECONDARY COLOR (RED)
COLOR1 - PRINT IN PRIMARY COLOR (BLACK)
PRTSUP - PRINT SUPPRESSION ON (CLEAR WITH CR)
 Lingw - SELECT LANGUAGE/PRINT WHEEL SIZE

WORD PROCESSING COMMANDS
PROPON - PROPORTIONAL SPACE ON (CLEAR WITH RSTM1)
PROPOF - PROPORTIONAL SPACE OFF
OFFSET - OFFSET SELECTION (N)
UNDROF - AUTO UNDERSCORE ON
UNDROF - AUTO UNDERSCORE OFF
BOLD - BOLD PRINT ON (CLEAR WITH CR)
SHADOW - SHADOW PRINT ON (CLEAR WITH CR)
BOSHOF - COLD/SHADOW PRINT OFF
INCTIM - INCREASE CARRIAGE SETTLING TIME TO 20MS
CLRTIM - CLEAR INCREASED CARRIAGE SETTLING TIME
BK120 - BACKSPACE 1/120"
PGMODE - PROGRAM MODE ON
CANWP - CANCEL ALL WP MODES EXCEPT PROP SPACE AND CARRIAGE SETTLING TIME
CENTR - AUTO CENTER ON (CLEAR WITH CR)
JUSTIFY - AUTO JUSTIFY ON
MARGON - MARGIN CONTROL ON (OVERRIDES MARG CONT KEY)
MARGOF - MARGIN CONTROL MODE CONTROLLED BY MARG CONT KEY

MISCELLANEOUS COMMANDS
RESET - INITIATE REMOTE RESET
PR120 - PRINT PRINT WHEEL CHARACTER HEX 20
PR7F - PRINT PRINT WHEEL CHARACTER HEX 7F
HRISON - ENTER PROGRAM "HERE IS ..." MODE
HRISOF - EXIT PROGRAM "HERE IS ..." MODE

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
NONE
SUBROUTINE 'ELLI'
SUBROUTINE 'CELLI'

PURPOSE
INCOMPLETE AND COMPLETE ELLIPTIC INTEGRALS OF THE FIRST AND
SECOND KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
CELLI IS AN ENTRY POINT IN ELLI.
WHEN ABS(PHI) < PI/2, F AND E ARE ACCURATE TO AT LEAST 10
SIGNIFICANT FIGURES. AS ABS(PHI) GETS LARGE, THE ACCURACY
WILL NOT BE AS GOOD SINCE ELLI USES THE TANGENT SUBROUTINE
WHICH BECOMES LESS ACCURATE AS THE ANGLE ABS(PHI) INCREASES.

USAGE
CALL ELLI (PHI, CAY, F, E)
CALL CELLI (PHI, CAY, F, E)

DESCRIPTION OF PARAMETERS
PHI - UPPER LIMIT OF INTEGRAL
     (NOT USED BY CELLI WHICH ASSUMES PI/2)
CAY - THE PARAMETER IN THE INTEGRAL
F - OUTPUT THE ELLIPTIC INTEGRAL OF THE FIRST KIND
   (F(PHI,CAY))
E - OUTPUT THE ELLIPTIC INTEGRAL OF THE SECOND KIND
   (E(PHI,CAY))

CM REQUIRED: 351B

ERROR MESSAGES
IF K > 1, F AND E DO NOT EXIST. A MESSAGE IS PRINTED AND
F AND E ARE SET TO PHI.

IF K=1 AND ABS(PHI) > PI/2, F DOES NOT EXIST. A MESSAGE IS
PRINTED AND F IS SET TO SIGN(PHI)*1.0E+294. E EXISTS AND IS
COMPUTED.

OUTPUT UNITS
UNIT # LFN USE
----- ------ -----------------------------------------------
OUTPUT ERROR MESSAGES PRINTED BY LABRT

02/10/84  2-78  ELLI - 1 OF 2
METHOD

WHEN K<1, LANDEN'S TRANSFORMATION IS USED.

WHEN K=1, E IS COMPUTED BY:

\[ E(\Phi,1) = N + \text{ABS}(\sin(\Phi) - \sin(N\pi/2)) \]

WHERE N IS THE INTEGER PART OF \( \Phi \cdot (2/\pi) \).

WHEN K=1 AND \( |\Phi| < \pi/2 \), F IS COMPUTED BY:

\[ F(\Phi,1) = 0.5 \cdot \ln \left( \frac{1 + \sin(\Phi)}{1 - \sin(\Phi)} \right) \]

REFERENCE: "HANDBOOK OF MATHEMATICAL FUNCTIONS" BY M. ABRAMOWITZ AND I. A. STEGUN.

SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS AINT ALOG AMIN1 AMOD
ATAN FLOAT INT MOD SIGN
SIN SQRT TAN

OTHERS

LABRT - PRINT ERROR MESSAGES (57B)

AUTHORS

KARL J MELENDEZ
DUANE HARDER
LOS ALAMOS SCIENTIFIC LABORATORY

VIM ROUTINE LASL C304A

DATE WRITTEN: 02/05/68

DATE(S) REVISED
02/69 - DH
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS

SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ELLI,OUTPUT,MSACCE\(<PASSWORD\>).
SUBROUTINE 'EQPORT'

PURPOSE
GET INTERCOM EQUIPMENT AND PORT NUMBERS

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE IS USEFUL ONLY AT DTNSRDC BECAUSE IT RELIES ON A DTNSRDC MODIFICATION TO THE INTERCOM USER TABLE.

USAGE
CALL EQPORT (EQ, PORT)

DESCRIPTION OF PARAMETERS
EQ - INT - WILL CONTAIN THE INTERCOM EQUIPMENT NUMBER (02 FORMAT)
PORT - INT - WILL CONTAIN THE INTERCOM PORT NUMBER (03 FORMAT)

CM REQUIRED: 45B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND MASK
OTHERS
REQBL - READ THE INTERCOM USER TABLE

ARITHMETIC STATEMENT FUNCTIONS
GETBITS - EXTRACT BITS FROM A WORD

AUTHOR
DAVID V. SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/11/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, ,NSRDC, ,EQPORT, OUTPUT, MSACCES=<PASSWORD>.

10/11/84 2-80 EQPORT - 1 OF 1
SUBROUTINE 'ELTIME'

PURPOSE

OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL TO ELTIME

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)

CDC 6000/CYBER 170 (NOS/BE)

REMARKS

NONE

USAGE

CALL ELTIME (TIMES)

DESCRIPTION OF PARAMETER

TIMES - 7-WORD REAL ARRAY TO CONTAIN THE FOLLOWING:
1 - CPA TIME IN SECONDS
2 - CPB TIME IN SECONDS
3 - CP TIME IN SECONDS (CPA+CPB)
4 - PP TIME IN SECONDS
5 - IO TIME IN SECONDS
6 - WALL CLOCK TIME (HH.MM.SS.)
7 - WALL CLOCK TIME IN SECONDS

CM REQUIRED: 111B

SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

IHMS - CONVERT SECONDS TO 'HH.MM.SS.'
ISEC - CONVERT HH.MM.SS TO SECONDS
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS

R65FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/15/75

DATE(S) REVISED

10/31/77 - ADJUST FOR MIDNIGHT
03/02/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT

BEGIN,DOCGET,,NSRDC,,ELTIMEOUTPUT,MSACCESS=<PASSWORD>.

06/14/84 2-81 ELTIME - 1 OF 1
FUNCTION 'EQU60'

PURPOSE

LOGICAL COMPARE (OF 2 ARRAYS)

FUNCTIONAL CATEGORIES: MO

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)

CDC 6000/CYBER 170 (NOS/BE)

REMARKS

NONE

USAGE

TEST = EQU60 (A, B, N)
TEST = EQU60 (A, B)

DESCRIPTION OF PARAMETERS

A, B - COMPARE (ARRAY) A WITH (ARRAY) B
N - NUMBER OF WORDS TO COMPARE
   (IF OMITTED, N=1)

EQU60 - WILL RETURN ONE OF:

-1. IF A .LT. B (DISPLAY CODE)
0. IF A .EQ. B (DISPLAY CODE)
+1. IF A .GT. B (DISPLAY CODE)

CM REQUIRED: 24B

SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

C. FLINK - NWL - KPS

DATE WRITTEN: 12/08/70

DATE(S) REVISED

03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS (*DECK COMPAB)

OBJECT

EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT

BEGIN.DOCGET,,NSRDC,,EQU60,OUTPUT,MSACCESS=<PASSWORD>.

02/14/84 2-82 EQU60 - 1 OF 1
SUBROUTINE 'EXPAND'

PURPOSE
   EXPAND CHARACTER STRING INTO ARRAY OF 1R-FORMAT WORDS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   SEE SUBROUTINE 'CONTRCT'.

USAGE
   CALL EXPAND (A, B, NCHAR)

DESCRIPTION OF PARAMETERS
   A      - INPUT ARRAY CONTAINING THE CHARACTER STRING
   B      - OUTPUT ARRAY WHOSE ELEMENTS WILL EACH CONTAIN ONE
            CHARACTER FROM ARRAY A IN 1R FORMAT
   NCHAR  - NUMBER OF CHARACTERS IN ARRAY A

CM REQUIRED: 268

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      NONE
   OTHERS
      GETCHA - GET CHARACTER FROM ARRAY

AUTHOR
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/04/77

DATE(S) REVISED
   03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,EXPAND,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84  2-83  EXPAND - 1 OF 1
SUBROUTINE 'EXPRM'

PURPOSE
EXTRACT PARAMETER FROM CONTROL CARD

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
ON EACH CALL, THE NEXT PARAMETER IS PASSED FROM RA+70B TO WORD(S) IAD, LEFT JUSTIFIED, ZERO-FILLED. ONCE A TERMINATOR IS ENCOUNTERED OR THE END OF A CARD IS REACHED, ZERO IS RETURNED.

IF CALLED WITH THE SECOND ARGUMENT, RETURNED IN ICC WILL BE A CODE INDICATING THE TYPE OF THE SEPARATOR FOUND FOLLOWING THE PARAMETER RETURNED IN IAD.

USAGE
CALL EXPRM (IAD)
CALL EXPRM (IAD, ICC)

DESCRIPTION OF PARAMETERS
IAD - WILL CONTAIN THE NEXT PARAMETER FROM THE CONTROL CARD. IF TERMINATOR OR END OF CARD, 0 IS RETURNED.
ICC - IF PRESENT, WILL CONTAIN A CODE INDICATING THE TYPE OF SEPARATOR ENCOUNTERED
DEC OCT SEPARATOR
  1  1 ,
  2  2 =
  3  3 /
  4  4 ( 
  5  5 +
  6  6 -
  7  7 BLANK
  8 10B ;
 14 16B OTHER
 15 17B . OR ) (TERMINATOR)

CM REQUIRED: 274R

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF SHIFT
OTHERS
MFETCH - FETCH WORD IN USER'S FL
AUTHOR
C FLINK - KPS - NWL

DATE WRITTEN: 06/73

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, EXPRM, OUTPUT, MSACCES=<PASSWORD>.

02/10/84  2-85  EXPRM - 2 OF 2
SUBROUTINE 'EXTBIT'

PURPOSE
 EXTRACT BITS FROM A WORD

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
 CDC 6000/CYBER 170 (NOS/BE)

REMARKS
 IF NBITS GOES PAST THE END OF THE WORD, EXTBIT WILL FILL
 WITH ZEROS. THERE IS NO CHECK FOR THIS.

USAGE
 CALL EXTBIT (ISTART, NBITS, IN, IOUT, IRC)

DESCRIPTION OF PARAMETERS
 ISTART - FIRST/ONLY BIT TO EXTRACT
 (BITS ARE NUMBERED 59-0)
 NBITS - NUMBER OF BITS TO EXTRACT (1-60)
 IN - INPUT WORD FROM WHICH BITS ARE TO BE EXTRACTED
 OUT - OUTPUT ARRAY OF DIMENSION NBITS
 IRC - RETURN CODE
 0 - NO ERROR
 1 - ISTART OUT OF RANGE (MUST BE 0-59)
 2 - NBITS OUT OF RANGE (MUST BE 1-60)
 3 - BOTH ISTART AND NBITS OUT OF RANGE

CM REQUIRED: 44B

SUBPROGRAMS REQUIRED
 PART OF LANGUAGE
 MAXO  MINO  MASK  SHIFT
 OTHERS
 NONE

AUTHOR
 DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/09/75

DATE(S) REVISED
 03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
 SOURCE
 UPDATE LIBRARY ON MSS: NSRDCPL,UN=SYS
 OBJECT
 EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
 BEGIN,DOCGET,,NSRDC,,EXTBIT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-86  EXTBIT - 1 OF 1
SUBROUTINE 'EXTPRM'

PURPOSE
EXTRACT NEXT PARAMETER FROM USER-SUPPLIED PARAMETER STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE SUBROUTINE IS PRE-INITIALIZED FOR PROCESSING THE FIRST
USER PARAMETER STRING. IF A SECOND STRING IS TO BE
PROCESSED, THE SUBROUTINE MUST BE RE-INITIALIZED USING
EITHER THE THIRD OR FOURTH FORM OF THE CALL.

USAGE
CALL EXTPRM (IAREA, LAREA, IPARM, ISEP)
CALL EXTPRM (IAREA, LAREA, IPARM)
CALL EXTPRM (0, LAREA)
CALL EXTPRM (0)

DESCRIPTION OF PARAMETERS
IAREA - IN - ARRAY CONTAINING PARAMETER STRING
LAREA - IN - NUMBER OF WORDS IN 'IAREA'
OUT - FIRST AND SECOND FORMS OF CALL ONLY:
0 IF END OF 'IAREA' REACHED
THIRD FORM OF CALL:
INITIALIZE FOR THIS MANY WORDS
FOURTH FORM OF CALL (OMITTED):
INITIALIZE FOR 16 WORDS
(BECAUSE 'LAREA' IS BOTH AN INPUT AND OUTPUT
ARGUMENT, IT MUST ALWAYS BE USED AS A
VARIABLE, NEVER AS AN EXPLICIT INTEGER.)
IPARM - OUT - NEXT PARAMETER, LEFT-JUSTIFIED, ZERO-FILLED
ISEP - OUT - IF PRESENT, CODE INDICATING TYPE OF
SEPARATOR FOUND FOLLOWING THE PARAMETER
RETURNED IN 'IPARM' (COMPATIBLE WITH SCOPE
3.3 AND 3.4)
DEC OCT SEPARATOR
1 01 ,
2 02 =
3 03 /
4 04 ( 
5 05 +
6 06 -
7 07 BLANK
8 10 ;
14 16 OTHER
15 17 . OR ) (TERMINATOR)

CM REQUIRED: 425B

02/10/84 2-87 EXTPRM - 1 OF 2
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF MINTO SHIFT
OTHERS
NONE

AUTHORS
C FLINK - KPS NWL
D V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 06/73 - CF

DATE(S) REVISED
04/11/74 - DVS - ORIGINAL SUBROUTINE 'EXPRM' MODIFIED TO
ACCEPT USER-SUPPLIED PARAMETER STRING
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, EXTPRM, OUTPUT, MSACCES=<PASSWORD>.

02/10/84  2-88  EXTPRM - 2 OF 2
SUBROUTINE 'FBINRD'

PURPOSE
UNPACK AN INPUT ARRAY

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL FBINRD (BW, NUMB, IN, OUT)

DESCRIPTION OF PARAMETERS
BW - BITS-PER-WORD TO BE EXTRACTED
NUMB - NUMBER OF BW-BIT OUTPUT WORDS DESIRED
DIMENSION OF IN IS ((NUMB*BW)+59)/60
DIMENSION OF OUT IS NUMB
IN - INPUT ARRAY
OUT - OUTPUT ARRAY

CM REQUIRED: 35B

METHOD
THE BW EXTRACTED BITS ARE RIGHT JUSTIFIED WITH LEADING
ZEROS IN OUT.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
A. CINCOTTA - DTNSRDC CODE 1892.3

DATE WRITTEN: 03/75
DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDTILIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,FBINRD,OUTPUT,MSACCESS=<PASSWORD>.

08/18/83 2-89 FBINRD - 1 OF 1
SUBROUTINE 'FFT'

PURPOSE
FAST FOURIER TRANSFORM FOR COMPLEX TABULATED FUNCTION

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS ROUTINE ALSO COMPUTES THE INVERSE FOURIER TRANSFORM.
WITH SLIGHT MODIFICATIONS OF THE RESULTING TRANSFORM, TWO
REAL TABULATED FUNCTIONS MAY BE TRANSFORMED SIMULTANEOUSLY.

FOR REAL, ONE-DIMENSIONAL DATA, SEE RFFT OR RFSN.

USAGE
CALL FFT (A, M, INV, S, IFSET, IFERR)

DESCRIPTION OF PARAMETERS
A - THE ARRAY CONTAINING A COMPLEX TABULATED FUNCTION OF
UP TO 3 DIMENSIONS TO BE TRANSFORMED. 'A' CONTAINS
CONSECUTIVE COMPLEX PAIRS OF DATA. FOR THE ARRAY
A(I,J,K), THE ELEMENT WITH SUBSCRIPT (I,J,K) IS
STORED WITH THE REAL PART IN SUBSCRIPT 2*((K*N1*N2)+
(J*N1) + 1), AND THE IMAGINARY PART IN THE
FOLLOWING CELL. N1 AND N2 ARE COMPUTED AS 2**M(1)
AND 2**M(2), RESPECTIVELY. NOTE THAT 'I' VARIES
MOST RAPIDLY, K LEAST RAPIDLY.
ON OUTPUT, 'A' CONTAINS THE FOURIER TRANSFORM.
M - A 3-CELL ARRAY WHICH CONTAINS THE MINIMUM INTEGER
WHICH IS ≥ THE LOG-BASE-2 OF THE DIMENSIONS OF 'A'.
INV - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
S - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
IFSET - COMPUTATION FLAG
= 0 -- SET UP TABLES IN INV AND S
= 1 -- SET UP TABLES AND COMPUTE FOURIER TRANSFORM
=-1 -- SET UP TABLES AND COMPUTE INVERSE FOURIER
TRANSFORM
= 2 -- COMPUTE FOURIER TRANSFORM ASSUMING TABLES
EXIST
=-2 -- COMPUTE INVERSE FOURIER TRANSFORM ASSUMING
TABLES EXIST
IFERR - RETURN CODE
= 0 -- NORMAL COMPLETION
<>0 -- ERRORS IN SUBROUTINE ARGUMENTS
NOTE: 3 ≤ M(L) ≤ 20, WHERE L IS THE SUBSCRIPT OF THE
LARGEST ELEMENT IN M. DATA DIMENSIONS MUST BE POWERS
OF 2. IF DATA DIMENSIONS ARE < 2**M(L), THE
REMAINING LOCATIONS MUST BE SET TO ZERO OR ANY
APPROPRIATE CONSTANT.

CM REQUIRED: 1246B

02/10/84 2-90 FFT - 1 OF 2
METHOD

THIS SUBROUTINE IS BASED ON AN ALGORITHM PROPOSED BY COOLEY AND TUKEY AND IS WELL DOCUMENTED IN REFERENCE 1. BASICALLY, THE ALGORITHM DECOMPOSES THE TRANSFORMATION INTO PRODUCT OF SEVERAL ELEMENTARY TRANSFORMATIONS FOLLOWED BY A REORDERING OF SUBSCRIPTS OF THE RESULT.

A METHOD EXISTS FOR TRANSFORMING 2 REAL DATA SETS SIMULTANEOUSLY WITH AN ELEMENTARY TRANSFORMATION ON THE RESULTING ANSWERS TO SEPARATE THE TRANSFORMS. THIS PROCEDURE IS DOCUMENTED IN REFERENCE 2.

TWO OTHER ROUTINES RFFT AND RFSN ACCOMPLISH THE FAST FOURIER TRANSFORM AND INVERSE TRANSFORM, RESPECTIVELY, OF ONE-DIMENSIONAL DATA. THESE ROUTINES USE A MODIFICATION OF THE COOLEY-TUKEY PROCESS AND ARE FASTER THAN PROCESSING A COMPLEX ARRAY WITH A ZERO IMAGINARY COMPONENT.

REFERENCES


SUBPROGRAMS REQUIRED

PART OF LANGUAGE
COS IABS MAX0 SIN SQRT

OTHERS
NONE

AUTHORS
WES RICE
DUANE HARDER
LOS ALAMOS SCIENTIFIC LABORATORY

VIM ROUTINE LASL C329A

DATE WRITTEN: 07/16/68
DATE(S) REVISED
02/69 - DH
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS (*DECK LASC329)
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, FFT, OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-91 FFT - 2 OF 2
SUBROUTINE 'FFT5'

PURPOSE
   FAST FOURIER TRANSFORM

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   CALL FFT5 (F, NPTS, KOMPLX)

DESCRIPTION OF PARAMETERS

   F   - (COMPLEX) ARRAY TO BE TRANSFORMED
         (IF 'F' IS REAL, THE VALUES MUST BE STORED IN
          CONTIGUOUS CORE LOCATIONS)

   NPTS - NUMBER OF WORDS IN 'F' TO BE TRANSFORMED.
          MUST BE POWER OF 2 AND LE 8192.
          TO COMPUTE THE INVERSE TRANSFORM, NPTS MUST
          BE NEGATIVE.

   KOMPLX - ONE OF:
             0 - DATA IN 'F' IS REAL
             1 - DATA IN 'F' IS COMPLEX

CM REQUIRED: 4520B

METHOD
   SEE CMD-25-71

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      COS
      FLOAT
      IABS
   PART OF PROGRAM
      IRVING
   OTHERS
      NONE

02/10/84  2-92  FFT5  -  1 OF  2
AUTHORS
W. H. HAILE
GEORGE GLUCK

DATE WRITTEN: 1971

DATE(S) REVISED
09/30/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS (*DECK AMFFT5)
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, ,NSRDC, ,FFT5, OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-93 FFT5 - 2 OF 2
SUBROUTINE 'FINDC'

PURPOSE
FIND PRESENCE OR ABSENCE OF SPECIFIED CHARACTER IN AN ARRAY
(USER SPECIFIES RELATIONAL OPERAND)

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL FINDC (A, NA, CHAR, NC, NW, REL, FIRSTCH)
CALL FINDC (A, NA, CHAR, NC, NW, REL)

DESCRIPTION OF PARAMETERS
A  - ARRAY TO BE SEARCHED
NA - NUMBER OF WORDS IN 'A' TO BE SEARCHED
CHAR - CHARACTER TO BE SEARCHED FOR ACCORDING TO 'REL'
       (LEFT-ADJ, BLANK- OR ZERO-FILLED -OR-
       RIGHT-ADJ, ZERO-FILLED)
NC - OUTPUT POSITION OF FIRST CHARACTER (RELATIVE TO
       START OF 'A') WHICH SATISFIES THE RELATION
       'REL' -OR-
       0 - CONDITION IS NOT SATISFIED -OR-
       -1 - 'REL' IS INVALID
       -2 - 'FIRSTCH' GT 10^NA
NW - OUTPUT SUBSCRIPT OF WORD CONTAINING POSITION
       'NC' -OR-
       0 - CONDITION IS NOT SATISFIED -OR-
       -1 - 'REL' IS INVALID
       -2 - 'FIRSTCH' GT 10^NA
REL - RELATIONAL OPERAND
"EQ" - FIND FIRST CHARACTER IN 'A' EQUAL TO
       'CHAR'
"NE" - FIND FIRST CHARACTER IN 'A' NOT EQUAL TO
       'CHAR'
"LT" - FIND FIRST CHARACTER IN 'A' LESS THAN
       'CHAR'
"LE" - FIND FIRST CHARACTER IN 'A' LESS THAN OR
       EQUAL TO 'CHAR'
"GT" - FIND FIRST CHARACTER IN 'A' GREATER THAN
       'CHAR'
"GE" - FIND FIRST CHARACTER IN 'A' GREATER THAN
       OR EQUAL TO 'CHAR'
FIRSTCH - FIRST CHARACTER TO BE SEARCHED (OPTIONAL)
           (DEFAULT: 1)
           IF FIRSTCH < 1, DEFAULT IS USED.

CM REQUIRED: 236B

02/10/84  2-94  FINDC - 1 OF 2
SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOC

OTHERS

GETCHA - GET CHARACTER FROM ARRAY

ARITHMETIC STATEMENT FUNCTIONS

L11FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

L21FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

R11FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHORS

DAVID V SOMMER - DTNSRDC CODE 1892.2

PETE ROTH - DTNSRDC CODE 1720.3

DATE WRITTEN: 04/20/76

DATE(S) REVISED

07/22/76 - PR/DVS - ADD PARAMETER 'FIRSTCH'

03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT

BEGIN,DOCGET,,NSRDC,,FINDC,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-95  FINDC - 2 OF 2
SUBROUTINE 'FINDW'

PURPOSE
FIND PRESENCE OR ABSENCE OF SPECIFIED WORD IN AN ARRAY
(USER SPECIFIES RELATIONAL OPERAND)

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL FINDW (A, NA, W, NW, REL)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE SEARCHED
NA - NUMBER OF WORDS IN 'A' TO BE SEARCHED
W - WORD TO BE TESTED FOR ACCORDING TO 'REL'
NW - OUTPUT POSITION (SUBSCRIPT) OF FIRST WORD IN 'A'
   WHICH SATISFIES THE RELATION 'REL' -OR-
   0 - CONDITION IS NOT SATISFIED -OR-
   -1 - 'REL' IS INVALID
REL - RELATIONAL OPERAND
"EQ" - FIND FIRST WORD IN 'A' WHICH IS EQUAL TO 'W'
"NE" - FIND FIRST WORD IN 'A' WHICH IS NOT EQUAL TO 'W'
"LT" - FIND FIRST WORD IN 'A' WHICH IS LESS THAN 'W'
"LE" - FIND FIRST WORD IN 'A' WHICH IS LESS THAN OR
   EQUAL TO 'W'
"GT" - FIND FIRST WORD IN 'A' WHICH IS GREATER THAN 'W'
"GE" - FIND FIRST WORD IN 'A' WHICH IS GREATER THAN
   OR EQUAL TO 'W'

CM REQUIRED: 142B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/20/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, NSRDC, FINDW, OUTPUT, MSACCES=<PASSWORD>.
SUBROUTINE 'FINDWRD'

PURPOSE
FIND SPECIFIED WORD IN AN ARRAY

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL FINDWRD (A, NA, WORD, NWORD)
CALL FINDWR (A, NA, WORD, NWORD)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE SEARCHED
NA - NUMBER OF WORDS IN 'A' TO BE SEARCHED
WORD - WORD TO BE SEARCHED FOR
NWORD - OUTPUT SUBSCRIPT OF FIRST OCCURRENCE OF WORD IN 'A' (IF NO MATCH, ZERO (0) IS RETURNED)

CM REQUIRED: 22B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/08/74

DATE(S) REVISED
05/07/79 - MOVE TO BURROUGHS B7700
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, FINDWRD, OUTPUT, MSACCESS=<PASSWORD>.

06/14/84  2-98  FINDWRD - 1 OF 1
SUBROUTINE 'FRESNEL'

PURPOSE
EVALUATE FRESNEL INTEGRALS

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS

\[ C(x) = \int_0^x \cos\left(\frac{\pi}{2}u^2\right)du \]

\[ S(x) = \int_0^x \sin\left(\frac{\pi}{2}u^2\right)du \]

RELATIVE ERROR < 2.E-10.

USAGE
CALL FRESNEL (X, C, S)

DESCRIPTION OF PARAMETERS
X - REAL INPUT PARAMETER
C - REAL OUTPUT PARAMETER (\(C(x)\))
S - REAL OUTPUT PARAMETER (\(S(x)\))

CM REQUIRED: 252B

METHOD
TRUNCATED CHEBYSHEV SERIES

REFERENCE
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ABS       AINT       COS       FLOAT      SIN
OTHERS
NONE

AUTHOR
R BULIRSCH - UNIVERSITY OF CALIFORNIA AT SAN DIEGO

DATE WRITTEN: 01/68

DATE(S) REVISED
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,FRESNEL,OUTPUT,MSACCE=<PASSWORD>.

02/10/84  2-100  FRESNEL - 2 OF 2
SUBROUTINE 'FTNRFL'

PURPOSE
GET/SET CORE SIZE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL FTNRFL (IFL)

DESCRIPTION OF PARAMETER
IFL - INTEGER FIELD LENGTH DESIRED.
IF THE VALUE OF IFL IS ZERO (0), THE FL IS NOT CHANGED
BUT THE PRESENT FIELD LENGTH IS RETURNED IN IFL.

CM REQUIRED: 20B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
C FLINK - KPS NWL

DATE WRITTEN: 12/18/70

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,FTNRFL,OUTPUT,MSACCESS=<PASSWORD>.
FUNCTION 'GAMCAR'

PURPOSE
    COMPLEX GAMMA FUNCTION OF A COMPLEX ARGUMENT HAVING POSITIVE
    REAL PART

FUNCTIONAL CATEGORIES:  C3

LANGUAGE:  FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
    CDC 6000/CYBER 170 (NOS/BE)

REMARKS
    HAS BEEN CHECKED FOR CX = A + BI,  0<A<20,  0<B<20.
    RELATIVE ERROR IS \leq 2 \times 10^{-10}.

USAGE
    COMPLEX CX, CY, GAMCAR

    ...  

    CY = GAMCAR (CX)

DESCRIPTION OF PARAMETERS
    CX - COMPLEX VARIABLE WITH POSITIVE REAL PART
    CY - COMPLEX SOLUTION

CM REQUIRED:  154B

METHOD
    \text{GAMCAR}(Z+1) = (Z+5.5)^{(Z+1/2)} \times
                       \exp(-Z+5.5) \times
                       \sqrt{2\pi} \times
                       \left[\text{CONSTANT} + \sum_{i=1,6} \left(C_i/Z+1\right)\right]

WHERE \text{CONSTANT} = 1.00000 00001 78
    C(1) = 76.18009 17294 06
    C(2) = -86.50532 03271 12
    C(3) = 24.01409 82222 3
    C(4) = -1.23173 95161 4
    C(5) = 0.00120 85800 3
    C(6) = -0.00000 53638 2

REFERENCES
    C. LANCZOS, NUMERICAL ANALYSIS, SIAM SERIES B, VOL I, PP.

    HANDBOOK OF MATHEMATICAL FUNCTIONS, NATIONAL BUREAU OF
    STANDARDS, APPLIED MATHEMATICS SERIES NO. 55.

SUBPROGRAMS REQUIRED
    PART OF LANGUAGE
        CEXP  CLOG
    OTHERS
        NONE
AUTHORS
R L PEXTON - LAWRENCE RADIATION LABORATORY
D A WILBER - LAWRENCE RADIATION LABORATORY

DATE WRITTEN: 12/16/64 (RLP)

DATE(S) REVISED
08/65 (DAW)
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN.DOCGET, NSRDC, GAMCAR_OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-103 GAMCAR - 2 OF 2
FUNCTION 'GAMMA'

PURPOSE
INCOMPLETE GAMMA FUNCTION

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
COMPUTES GAMMA (A, X) UNDER THE FOLLOWING RESTRICTIONS:
1) X >= 0,
2) WHEN X = 0, A IS NOT A NON-POSITIVE INTEGER.

USAGE
Y = GAMMA (A, X)

DESCRIPTION OF PARAMETERS
A - FLOATING POINT NUMBER
X - >= 0 (X=0 FOR COMPLETE GAMMA FUNCTION)

CM REQUIRED: 520B

OUTPUT UNIT
UNIT # LFN USE
--------- ------- -------------------
OUTPUT ERROR MESSAGES

REFERENCE
C. E. FROBERG, RATIONAL CHEBYCHEV APPROXIMATION OF
ELEMENTARY FUNCTIONS, BIT, VOL. 1, P. 256, 1961.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ABS ALOG SQRT

PART OF PROGRAM
GAMNEG - COMPUTES GAMMA(A,X) WHEN A IS NEGATIVE INTEGER
(DUE TO THE REPRESENTATION OF NUMBERS IN THE
CDC, IF A=-N+-E, WHERE E<1.0E-10, THEN A IS
TAKEN TO BE A NEGATIVE INTEGER)
GCHEB - COMPUTES BY A RATIONAL CHEBYSHEV APPROXIMATION
(GAMMA(A))
GFRAC - COMPUTES THE CONTINUES FUNCTION FOR GAMMA(A,X)
GSERIES - COMPUTES SUM (N=0,INF) ((-X)^*N)/((A+N)!)

OTHERS
NONE
SUBROUTINE 'GAUSS'

PURPOSE
GAUSSIAN ELIMINATION WITH PARTIAL PIVOTING FOR SOLVING
AX=B WHERE B MAY BE A SYSTEM OF M RIGHT-HAND SIDES

FUNCTIONAL CATEGORIES: F4 F3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IF A-INV \(uspended\)SE IS DESIRED; ANX=[B IN] WILL YIELD
THE SOLUTION TO AX=B AS WELL AS THE INVERSE.

IF MM=0, XX CONTAINS RESULT OF FIRST GAUSSIAN ELIMINATION.

USAGE
CALL GAUSS (N, M, AA, BB, XX, VAL2, DET, MM)

DESCRIPTION OF PARAMETERS
N - SIZE OF MATRIX AA
M - NUMBER OF COLUMNS IN BB (<=51)
    (NUMBER OF RIGHT HAND SIDES)
AA - MATRIX (51X51)
BB - RIGHT HAND SIDE(S) (51X51)
XX - SOLUTION VECTORS (51X51)
VAL2 - FINAL MAXIMUM ROW SUM OF RESIDUALS
    (INFINITY-NORM OF RESIDUAL)
DET - DETERMINANT
MM - NUMBER OF ITERATIONS ON RESIDUALS
    INPUT - MAXIMUM NUMBER TO BE PERMITTED
    OUTPUT - NUMBER ACTUALLY DONE

CM REQUIRED: 17741B

REFERENCE:
WILKINSON, J. H., ROUNDING ERRORS IN ALGEBRAIC PROCESSES.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ABS
OTHERS
NONE
SUBROUTINE 'GETCCL'

PURPOSE
   GET CCL FIELDS (REGISTERS AND FLAGS)

FUNCTIONAL CATEGORIES: Q0 NO L3

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   USES LABELLED COMMON BLOCK /ZZZCCL/.

USAGE
   CALL GETCCL (FIELDS)

DESCRIPTION OF PARAMETER
   FIELDS - 8-WORD INTEGER ARRAY WHICH WILL CONTAIN:
      FIELDS(1) - EF (ERROR FLAG)
      FIELDS(2) - EFG (GLOBAL ERROR FLAG)
      FIELDS(3) - R1 (REGISTER)
      FIELDS(4) - R2 (REGISTER)
      FIELDS(5) - R3 (REGISTER)
      FIELDS(6) - RIG (GLOBAL REGISTER)
      FIELDS(7) - DSC (DAYFILE SKIP FLAG)
      FIELDS(8) - PNL (PROCEDURE NESTING LEVEL)

CM REQUIRED: 45B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
   AND SHIFT
   OTHERS
      RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS
   FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
      L32FMT      L35FMT      L38FMT
   FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)
      R11FMT      R110FMT     F25FMT
   OTHERS
      GETBIT - EXTRACT A BIT FROM A WORD
AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/09/81

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,GETCCL,OUTPUT,MSACCESS=<PASSWORD>.

06/07/84 2-109 GETCCL - 2 OF 2
SUBROUTINE 'GETCHA'
FUNCTION 'GETCHA'

PURPOSE
EXTRACT CHARACTER FROM SPECIFIED POSITION IN AN ARRAY

FUNCTIONAL CATEGORIES: M4 M5

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

USAGE
CALL GETCHA (ARRAY, NPOS, ICHAR)
VARIABLE = GETCHA (ARRAY, NPOS, ICHAR)

DESCRIPTION OF PARAMETERS
ARRAY - ARRAY FROM WHICH CHARACTER IS TO BE EXTRACTED
NPOS - POSITION OF CHARACTER TO BE EXTRACTED
  (POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN ARRAY(1))
ICHAR - WILL CONTAIN THE EXTRACTED CHARACTER IN 1R FORMAT
  (RIGHT-ADJ, ZERO-FILLED)
GETCHA - WHEN USED AS A FUNCTION, GETCHA WILL CONTAIN THE
  SAME AS ICHAR AND MUST BE DECLARED INTEGER IN THE
  CALLING PROGRAM

CM REQUIRED: 56B (INCLUDES PUTCHA)

REMARKS
NONE

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
MOD SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DINSRDC CODE 1892.2

DATE WRITTEN: 03/16/76

DATE(S) REVISED
08/01/79 - DOCUMENT MODIFIED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,GETCHA,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84
2-110
GETCHA - 1 OF 1
SUBROUTINE 'GETCHR'
FUNCTION  'GETCHR'

PURPOSE
EXTRACT CHARACTER FROM SPECIFIED POSITION IN A WORD

FUNCTIONAL CATEGORIES:  M4  M5

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170  (NOS/BE)

USAGE
CALL GETCHR (WORD, NPOS, ICHAR)
VARIABLE = GETCHR (WORD, NPOS, ICHAR)

DESCRIPTION OF PARAMETERS
WORD   -  WORD FROM WHICH CHARACTER IS TO BE EXTRACTED
NPOS   -  POSITION OF CHARACTER TO BE EXTRACTED
          (POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN WORD)
ICHAR  -  WILL CONTAIN THE EXTRACTED CHARACTER IN ICHAR FORMAT
          (LEFT-ADJ, BLANK-FILLED)
GETCHR -  WHEN USED AS A FUNCTION, GETCHR WILL CONTAIN THE
          SAME AS ICHAR AND MUST BE DECLARED INTEGER IN THE
          CALLING PROGRAM

CM REQUIRED:  46B (INCLUDES PUTCHR)

REMARKS
NONE

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

AUTHOR
FROM BIMED PACKAGE

DATE WRITTEN:
1975 - DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE(S) REvised
08/01/79 - DOCUMENT MODIFIED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,GETCHR,OUTPUT,MSACCE=<PASSWORD>.

02/10/84  2-111  GETCHR - 1 OF 1
FUNCTION 'GETDABA'

PURPOSE
GET DYNAMIC AREA BASE ADDRESS AND DETERMINE IF CMM IS ACTIVE

FUNCTIONAL CATEGORIES: K2 Q0

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
INTEGER GETDABA
LOGICAL CMM
...
GETDABA (CMM)

DESCRIPTION OF PARAMETERS
CMM - LOG - WILL CONTAIN EITHER
TRUE - CMM IS ACTIVE
FALSE - CMM IS NOT ACTIVE
GETDABA - INT - WILL RETURN THE ADDRESS OF THE FIRST WORD OF
THE DYNAMIC AREA

CM REQUIRED: 25B

METHOD
THE DABA IS IN WORD RA+65B, BITS 17-0. IF POSITIVE, CMM IS
INACTIVE; IF NEGATIVE, CMM IS ACTIVE.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND SHIFT
OTHERS
MFETCH - READ WORD OF MEMORY

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/16/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, GETDABA, OUTPUT, MSACCESS=<PASSWORD>

02/16/83 2-112 GETDABA - 1 OF 1
SUBROUTINE 'GETFIT'

PURPOSE
GET SPECIFIED FIT ADDRESS

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL GETFIT (LFN, ADDR)

DESCRIPTION OF PARAMETERS
LFN - LOCAL FILE NAME
(LEFT-JUSTIFIED, ZERO-FILLED)
(E.G., 5LTape1)
ADDR - WILL CONTAIN THE FIT ADDRESS

CM REQUIRED: 25B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
ANTHONY CINCOTTA - DTNSRDC CODE 1892.3

DATE WRITTEN: 03/20/75

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,GETFIT,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84 2-113 GETFIT - 1 OF 1
SUBROUTINE 'GETHOUR'

PURPOSE
FOR A SPECIFIED PERIOD OF TIME (UP TO 2 HR 59 MIN 59 SEC) DETERMINE WHICH HOUR IS OCCUPIED THE LONGEST

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL GETHOUR (FROM, TO, HOUR)

DESCRIPTION OF PARAMETERS
FROM - STARTING TIME ('HH.MM.SS', 'HH.MM.SS' OR 'HH.MM.SS')
TO - STOPPING TIME (SAME FORMAT AS 'FROM')
HOUR - WILL CONTAIN AN INTEGER HOUR
  0 - TIME PERIOD TOO LONG TO DETERMINE HOUR
  N - MOST/ALL TIME IS IN THE HOUR N-1 TO N
      (E.G., HOUR=8 MEANS MOST/ALL TIME IS IN
      THE HOUR 7-8)

CM REQUIRED: 121B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
  AND SHIFT
OTHERS
  ISEC - CONVERT HH.MM.SS TO SECONDS

ARITHMETIC STATEMENT FUNCTIONS
  I21FMT - FAST I-FORMAT DECODE
  L11FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

METHOD
THE HOURS IN FROM (HF) AND TO (HT) ARE COMPARED.
IF EQUAL, HOUR IS SET TO HT+1.
IF THE DIFFERENCE IS 1, THE AMOUNT OF TIME SPENT IN EACH
HOUR IS COMPARED AND THE HOUR IS SET TO THE LARGER+1.
IF AN EQUAL AMOUNT OF TIME IS SPENT IN EACH HOUR, HOUR IS
SET TO HT+1.
IF THE DIFFERENCE IS 2, HOUR IS SET TO THE MIDDLE HOUR+1.
SUBROUTINE 'GETLFSN'

PURPOSE
GET ACTUAL LOCAL FILE NAMES (FOR FTN)

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
USEFUL ONLY IN FTN PROGRAMS (WHICH ALLOW FILE NAME
REPLACEMENT IN THE 'LGO' CARD).

USAGE
CALL GETLFSN (LFNS, NLFN)
CALL GETLFSN (LFNS)

DESCRIPTION OF PARAMETERS
LFNS - ARRAY DIMENSIONED AT LEAST 1 GREATER THAN NUMBER OF
FILES (INCLUDING EQUATED FILES) ON FTN PROGRAM
STATEMENT
(LFNS(NLFN) WILL BE SET TO 0)
NLFN - IF PRESENT, WILL RETURN NUMBER OF FILE NAMES + 1
(SUBSCRIPT OF FINAL ZERO-WORD IN ARRAY LFNS)

CM REQUIRED: 41B

EXAMPLES
PROGRAM SAMPLE (INPUT,OUTPUT,TAPE1,TAPE5=INPUT,TAPE6=OUTPUT)
DIMENSION LFN(6)
CALL GETLFSN (LFN, NLFN)

EXECUTE CARD: LGO. LGO,,OUT,TAPE2.
AFTER CALL: LFN(1) = 5LINPUT LFN(1) = 5LINPUT
LFN(2) = 6LOUTPUT LFN(2) = 3LOUT
LFN(3) = 5LTAPE1 LFN(3) = 5LTAPE2
LFN(4) = 5LINPUT LFN(4) = 5LINPUT
LFN(5) = 6LOUTPUT LFN(5) = 3LOUT
LFN(6) = 0 LFN(6) = 0
NLFN = 6 NLFN = 6

METHOD
FILE NAMES FROM PROGRAM CARD ARE IN RA+2 ON. EACH HAS A
POINTER TO ITS FIT. THE FIRST WORD OF EACH FIT IS THE
ACTUAL FILE NAME. THE LIST, STARTING IN RA+2, ENDS IN A
WORD OF ZEROS.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND
LOCF
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
L71FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
R38FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/30/74

DATE(S) REVISED
12/29/75
10/20/77 - REWRITE TO REDUCE CM REQUIREMENT AND ELIMINATE
SPECIAL FUNCTION CALL
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,GETLFNS,OUTPUT,MSACCES=<PASSWORD>.

02/10/84
2-117
GETLFNS - 2 OF 2
SUBROUTINE 'GETLGO'

PURPOSE
EXTRACT FIRST 10 CHARACTERS OF ALL EXECUTE CARD PARAMETERS

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS -(OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL GETLGO (LGO, NLGO)

DESCRIPTION OF PARAMETERS
LGO - ARRAY TO CONTAIN EXECUTE CARD PARAMETERS
    LGO(1) CONTAINS EXECUTE NAME
    LGO(2)-LGN(NLGO) CONTAIN FIRST 10 CHARACTERS
    OF EACH PARAMETER (0 MEANS PARAMETER OMITTED)
NLGO - NUMBER OF WORDS OF LGO FILLED

CM REQUIRED: 26B

METHOD
PARAMETERS ARE EXTRACTED FROM RA+70B THRU RA+77B.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
EXPRM - GET NEXT PARAMETER FROM EXECUTE CARD

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 09/01/77

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,GETLGO,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-118 GETLGO - 1 OF 1
SUBROUTINE 'GETRA'

PURPOSE
GET FIRST 100B WORDS OF USER'S FL

FUNCTIONAL CATEGORIES: K2

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL GETRA (RA)

DESCRIPTION OF PARAMETER
RA - 64-WORD ARRAY TO HOLD FIRST 100B WORDS OF FL

CM REQUIRED: 7B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/03/73

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,GETRA,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-119  GETRA - 1 OF 1
SUBROUTINE 'GODROP'

PURPOSE
CREATE GO/DROP MESSAGE AND PROCESS RESPONSE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NOT DESIGNED FOR BATCH JOBS.

IN INTERCOM, WILL GENERATE MESSAGE AT THE TERMINAL, NOT AT THE CENTRAL SITE CONSOLE.

WHEN USED WITH NO ARGUMENT LIST, THE 'Z' PARAMETER MUST BE USED ON THE FTN CARD.

USAGE
CALL GODROP (MESSAGE)
CALL GODROP

DESCRIPTION OF PARAMETER
MESSAGE - IF USED, CONTENTS WILL BE DISPLAYED (SHOULD BE A ZERO-BYTE TERMINATED FIELD)
IF OMITTED, THE MESSAGE IS TAKEN FROM RA+70B THRU RA+77B AND PREFIXED WITH 'GO/DROP- '. THE MESSAGE MAY BE INSERTED BY 'CALL PUTRA (MESSAGE, 70B, 76B)'

CM REQUIRED: 142B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF REMARK
OTHERS
MFETCH - READ A WORD IN USER'S FL
MSET - SET WORD IN USER'S FL

AUTHOR
C FLICK - KPS NWL

DATE WRITTEN: 06/73

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,GODROP,OUTPUT,MSACCES=<PASSWORD>.

02/10/84
SUBROUTINE 'HELP'

PURPOSE
COMPLEX ROOTS OF A REAL OR COMPLEX POLYNOMIAL

FUNCTIONAL CATEGORIES: C2 A2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 - (NOS/BE)

REMARKS
CALCULATES THE ROOTS OF THE COMPLEX POLYNOMIAL
\[ F(Z) = A(N)Z^N + A(N-1)Z^{N-1} + \ldots + A(1)Z + A(0) \]
WHERE A(I) (I=0,1,...,N) ARE PSEUDO-COMPLEX COEFFICIENTS.

SEE ALSO MSL SUBROUTINE 'HELP'.

USAGE
CALL HELP (N, A, ROOT, TAU, ETAI, MI)

DESCRIPTION OF PARAMETERS
N - DEGREE OF POLYNOMIAL
(DEstroyed by HELP)
A - ARRAY OF N+1 COEFFICIENTS (SEE NOTE)
(DEstroyed by HELP)
ROOT - ARRAY TO CONTAIN THE N ROOTS (SEE NOTE)
TAU - THE TOLERANCE TO BE PRESCRIBED FOR \( F(Root(I)) \)
\( \text{abs}(F(Root(I))) \leq TAU \)
IN THE SCALE OF THE SYSTEM OF COORDINATES
CONSIDERED AT THE MOMENT
ETAI - INDICATOR ARRAY
ETAI(I)=+1 -- abs(Fn(ZI)) <= TAU
= 0 -- DID NOT FIND A NEW CIRCLE
=-1 -- INCREMENTING THE ROOT BY NU DID NOT
CHANGE THE ROOT (BECAUSE OF MACHINE
LIMITS)
MI - INDICATOR VECTOR

NOTE: ARRAYS 'A' AND 'ROOT' ARE 2-DIMENSIONAL REAL ARRAYS
A(N+1,2), Root(N,2), WHERE A(I,1), Root(I,1) ARE THE
REAL PARTS AND A(I,2), Root(I,2) ARE THE IMAGINARY
PARTS.

CM REQUIRED: 1400B

METHOD
THE METHOD OF D. H. LEHMER (JOURNAL ACM. 1961, VOL 8,
P. 151) IS USED.
SUBPROGRAMS REQUIRED
  PART OF LANGUAGE
  ABS    SIN    SQRT
  PART OF PROGRAM
  ANSWER
  ANULUS
  COMADD
  COMMUL
  DIVIDE
  FUNC
  OVRLAP
  OTHERS
  NONE

AUTHORS
  ADEL S. ABDELGAWAD
  G. MIEDEL
  DEUTSCHES RECHENZENTRUM

SHARE PROGRAM NUMBER 3400

DATE WRITTEN: 11/64

DATE(S) REVISED
  11/18/65 - GM
  09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
  SOURCE
    UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS (*DECK ZFHELP)
  OBJECT
    EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
  BEGIN,DOCGET,,NSRDC,,HELP,OUTPUT,MSACCES=<PASSWORD>.

SUBROUTINE 'HERE'
FUNCTION 'HERE'

PURPOSE
GET TERMINAL ID FOR THIS JOB

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL HERE (I)
VARIABLE = HERE (I)

DESCRIPTION OF PARAMETERS
I - WILL CONTAIN THE TERMINAL ID, LEFT-JUSTIFIED,
ZERO-FILLED (1LC = CENTRAL SITE)
(WHEN USED AS A FUNCTION, 'HERE' WILL CONTAIN THE SAME AS
'I'. 'VARIABLE' AND 'HERE' MUST BE OF THE SAME TYPE.)

CM REQUIRED: 40B

METHOD
THE TERMINAL ID IS TAKEN FROM CONTROL POINT AREA.
IF THIS FIELD IS ZERO, IT IS A CENTRAL SITE JOB. IN THIS
CASE, 1LC IS RETURNED.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND SHIFT
OTHERS
RCPA - READ CONTROL POINT AREA
UNHEX3 - CONVERT 2-CHAR DISPLAY CODE TO 3-CHAR HEX

ARITHMETIC STATEMENT FUNCTIONS
L25FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/05/75

DATE(S) REVISED
10/01/78 - CHANGE FOR 3-CHARACTER TERMINAL ID
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, HERE, OUTPUT, MSACCES=<PASSWORD>.
FUNCTION 'HEX3'

PURPOSE
SQUEEZE 3-CHARACTER HEX INTO 12 BITS

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'HEX3' IS AN INTEGER FUNCTION.

WRITTEN TO CHANGE USER-SUPPLIED 3-CHARACTER HEX TERMINAL ID TO THE FORM NEEDED BY THE CALLABLE ROUTE.

USAGE
INTEGER HEX
I = HEX3 (HEXVAL)

DESCRIPTION OF PARAMETERS
HEXVAL - INPUT HEX VALUE (E.G., 3LF04)
HEX3 - OUTPUT IN FIRST 2 CHARACTERS (E.G., 2L@D)

CM REQUIRED: 61B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE AND OR SHIFT
OTHERS NONE

ARITHMETIC STATEMENT FUNCTIONS
FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)
R11FMT R12FMT R13FMT

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 09/19/78

DATE(S) REVISED
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,HEX3,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-125  HEX3 - 1 OF 1
FUNCTION 'IAOC'

PURPOSE
   COUNT ONE-BITS IN SPECIFIED WORD

FUNCTIONAL CATEGORIES: G6

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   \( N = IAOC (I) \)

DESCRIPTION OF PARAMETERS
   I - WORD TO BE PROCESSED
   IAOC - NUMBER OF ONE-BITS

CM REQUIRED: 2B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      NONE
   OTHERS
      NONE

AUTHOR
   FROM NWL

DATE WRITTEN:

DATE(S) REVISED:

LOCATION OF DECKS

SOURCE
   UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT
   EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,IAOC,OUTPUT,MSACCES=<PASSWORD>.

08/18/83  2-126  IAOC - 1 OF 1
SUBROUTINE 'IBL'
FUNCTION 'IBL'

PURPOSE
CALCULATE BEST BLOCK LENGTH (MIN TIME REQ'D FOR RANDOM
ACCESS AND MINIMUM BUFFER SIZE) FOR INDEX SEQUENTIAL FILES

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE CALCULATES BEST BLOCK LENGTHS FOR INDEX SEQ
FILES BASED ON EITHER VALUES ESTABLISHED IN A FIT OR A SIX
WORD TABLE. IF INPUT IS A FIT, THIS ROUTINE WILL SET FIT
FIELDS MBL AND IBL TO THE VALUE IT CALCULATES. A SHORT
(5 LINE) REPORT CAN BE PRINTED DEPENDING ON THE VALUE OF
THE SECOND PARAMETER PASSED TO IBL.

SEVERAL ASSUMPTIONS ARE MADE IN DERIVING THE FORMULA THIS
SUBROUTINE USES. AMONG THESE ARE:

1. GENERAL INDEX-SEQ PROCESSING IS ASSUMED.
   IF THE FILE IS PROCESSED RANDOMLY ONLY, FILE ORGANIZA-
   TIONS OTHER THAN INDEX-SEQ PROVIDE BETTER PERFORMANCE.
   IF THE FILE IS ACCESSED HEAVILY SEQUENTIALLY THIS
   CALCULATION MAY NOT PROVIDE THE OPTIMUM SIZE.

2. EQUAL LENGTH DATA AND INDEX BLOCKS ARE ASSUMED TO ALLOW
   SHARING OF BUFFER AREAS.

3. BLOCK SIZE SHOULD BE OF MINIMAL LENGTH WHICH ALLOWS THE
   FILE TO BE FILLED TO CAPACITY INCLUDING PADDING.

4. BUFFER SPACE IS KEPT NEARLY MINIMAL AND RANDOM ACCESS
   TIME IS KEPT NEARLY MINIMAL.

THE ROUTINE IS BASED ON AN ARTICLE PUBLISHED IN CONTROL

THE ROUTINE CANNOT BE USED IF RESULTING BLOCK LENGTH IS
SMALLER THAN MAX REC LENGTH. IT SHOULD NOT BE USED IF
RECORD TRUNCATION RESULTS IN EXCESSIVE PADDING IN THE
DATA BLOCKS.

THE TIMINGS IN THE OUTPUT REPORT ARE BASED ON THE
ASSUMPTION OF:

   ACCESS TIME (POSITION + LATENCY) = 30 MS
   TRANSFER TIME             = 1 MS/PRU
   CP TIME TO PROCESS THE REQUEST = 1 MS

SO TOTAL TIME = 1 + (NO. INDEX LEVELS)^n(30+NPRUS)
USAGE
FORTRAN CALLING SEQUENCES
CALL IBL (FIT, IFLAG)
IBLKSZ = IBL (FIT, IFLAG)

COBOL CALLING SEQUENCE
ENTER IBL USING FIT, IFLAG.

FIT - FILE INFORMATION TABLE -OR-
A SIX-WORD INTEGER ARRAY CONTAINING:
FLM MAX RECORDS IN THE FILE
RL AVERAGE RECORD LENGTH
KL KEY LENGTH
IP INDEX PADDING PERCENT
DP DATA PADDING PERCENT
MRL MAX RECORD LENGTH

IFLAG - PRINTOUT FLAG
"Y" - PRINT 5-LINE REPORT
OTHER - DO NOT PRINT

IBL - WHEN USED AS A FORTRAN FUNCTION, IBL RETURNS
THE COMPUTED BLOCK SIZE

CM REQUIRED: 342B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
IFETCH STOREF
OTHERS
NONE

AUTHOR
ACQUIRED FROM AUTHOR OF CDC PSI ARTICLE
MODIFIED BY BRUCE D. BLACK - DINSRDC CODE 1892.1 (CDC)

DATE WRITTEN: 04/03/78

DATE(S) REVISED
04/03/78 - ADD OPTION TO TURN OFF PRINT OF REPORT
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, IBL, OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-128 IBL - 2 OF 2
SUBROUTINE 'IBUNP'

PURPOSE

UNPACK 12-BIT BYTES FROM ARRAY

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)

CDC 6000/CYBER 170 (NOS/BE)

REMARKS

NONE

USAGE

CALL IBUNP (A1, A2, N)

DESCRIPTION OF PARAMETERS

A1 - INPUT ARRAY FROM WHICH BYTES ARE UNPACKED
A2 - OUTPUT ARRAY INTO WHICH BYTES ARE PLACED, 1 BYTE PER WORD, RIGHT JUSTIFIED, WITH LEADING ZEROS
N - NUMBER OF CDC WORDS TO UNPACK

DIMENSION OF A1 IS N
DIMENSION OF A2 IS 5*N

CM REQUIRED: 12B

SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

FROM NWL

DATE WRITTEN:

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT

BEGIN,DOCGET,,NSRDC,,IBUNP,OUTPUT,MSACCES=<PASSWORD>.

08/18/83 2-129 IBUNP - 1 OF 1
FUNCTION 'IDAYWEK'

PURPOSE
DETERMINE THE DAY OF THE WEEK FOR ANY DATE FROM 10/15/1582
THRU 02/28/4000

FUNCTIONAL CATEGORIES: G6

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
IDAY = IDAYWEK (IDATE, ICENT)
IDAY = IDAYWEK (IDATE)

DESCRIPTION OF PARAMETERS
IDATE - DATE TO BE PROCESSED ('MM/DD/YY' OR 'MM/DD/YY'
OR 'MM/DD/YY')
(IF IDATE = 0, TODAY'S DATE WILL BE USED; IDATE
WILL BE SET TO TODAY'S DATE 'MM/DD/YY')

ICENT - CENTURY (E.G., 1900)
IF OMITTED, 1900 IS ASSUMED.

IDAYWEK - WILL CONTAIN THE DAY OF THE WEEK IN A-FORMAT
(E.G., 'SUNDAY ')

CM REQUIRED: 104B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND DATE LOCF SHIFT
OTHERS
WEKDAY - DETERMINE DAY OF WEEK

ARITHMETIC STATEMENT FUNCTIONS
FAST I-FORMAT DECODE
I21FMT  I24FMT  I27FMT
FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
L11FMT

02/10/84  2-130  IDAYWEK - 1 OF 2
AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/06/77

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,IDAYWEK,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'IDID'
FUNCTION 'IDID'

PURPOSE
GET USER INITIALS (AND INTERCOM USER ID) FROM CHARGE CARD OR LOGIN

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IF USER INITIALS AND USER ID ARE EQUAL, IT IS A BATCH JOB.

USAGE
CALL IDID (ID, IUSERID)
CALL IDID (ID)
IID = IDID (ID, IUSERID)
IID = IDID (ID)

DESCRIPTION OF PARAMETERS
ID - WILL CONTAIN 4-CHARACTER USER INITIALS FROM CHARGE CARD OR START OF LOGIN
IUSERID - WILL CONTAIN 4-CHARACTER USER INITIALS FROM CHARGE CARD OR UP TO 10-CHARACTER USER ID FROM LOGIN
(IF ID = IUSERID, IT IS A BATCH JOB)
WHEN USED AS A FUNCTION, THE CONTENTS OF ID IS ALSO RETURNED AS THE FUNCTION VALUE.

CM REQUIRED: 27B

METHOD
THE ID IS TAKEN FROM THE CONTROL POINT AREA.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF
OTHERS
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS
L41FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/28/77

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,IDIDOUTPUT,MSACCES=<PASSWORD>.

08/18/83  2-133  1DID - 2 OF 2
FUNCTION 'IDIGIT'

PURPOSE
CHECK FOR DIGITS IN A FIELD WITHIN A WORD

FUNCTIONAL CATEGORIES: M5

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE VALUE RETURNED IS ONE OF THE FOLLOWING:
-11 - ERROR - ISTOP < ISTART
-N - ERROR - START NON-DIGIT FOUND IN POSITION N
0 - ALL POSITIONS IN FIELD ARE DIGITS
+N - OOB FOUND IN POSITION N
   ALL PRECEDING CHARACTERS ARE DIGITS

USAGE
IDIGIT (I, ISTART, ISTOP)
IDIGIT (I, ISTART)
IDIGIT (I)

DESCRIPTION OF PARAMETERS
I - WORD TO BE ANALYZED
ISTART - STARTING POSITION OF FIELD TO BE CHECKED
   (1-10, DEFAULT: 1)
ISTOP - STOP POSITION OF FIELD TO BE CHECKED
   (1-10, DEFAULT: 10)
   (TESTING WILL STOP IF OOB ENCOUNTERED)

CM REQUIRED: 50B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
   LOCF MAXO MINO SHIFT
   NONE

02/10/84 2-134 IDIGIT - 1 OF 2
SUBROUTINE 'IFINDCH'
FUNCTION 'IFINDCH'

PURPOSE
FIND FIRST OCCURRENCE OF SPECIFIED CHARACTER IN ARRAY

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL IFINDCH (A, NA, CHAR, NC, NW)
NC = IFINDCH (A, NA, CHAR, NC, NW)
NC = IFINDCH (A, NA, CHAR)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE SEARCHED
NA - NUMBER OF WORDS IN 'A' TO BE SEARCHED
CHAR - CHARACTER TO BE SEARCHED FOR (1R FORMAT)
NC - OUTPUT POSITION OF FIRST OCCURRENCE OF CHAR IN 'A'
     (IF NO MATCH, ZERO (0) IS RETURNED)
NW - OUTPUT SUBSCRIPT OF WORD IN 'A' CONTAINING CHAR
     (IF NO MATCH, NW IS SET TO NA)

CM REQUIRED: 60B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF
OTHERS
GETCHA - GET CHARACTER FROM ARRAY

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/20/76

DATE(S) REVISED
11/02/76 - CHANGE TO FUNCTION AND SUBROUTINE
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,IFINDCH,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84 2-136 IFINDCH - 1 OF 1
FUNCTION 'IFMTV'

PURPOSE
FAST I-FORMAT DECODE OF VARIABLE LENGTH INPUT (UNSIGNED, POSITIVE INTEGER)

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

FUNCTIONAL CATEGORIES: I4

REMARKS
USEFUL IN DECODING INTEGERS PASSED AS ARGUMENTS IN THE EXECUTE STATEMENT FOR A FTN PROGRAM.

USAGE
IFMTV (I)

DESCRIPTION OF PARAMETER
I - SINGLE WORD CONTAINING NUMBER TO BE DECODED;
1-10 DIGITS, LEFT-JUSTIFIED, ZERO-PADDED;
A NON-DIGIT EMBEDDED IN THE FIELD WILL RETURN -1
(EG, 3L987 WILL RETURN THE INTEGER 987;
6L9 7654 WILL RETURN -1 (EMBEDDED BLANK))

CM REQUIRED: 30B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/74

DATE(S) REVISED
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,IFMTV,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-137 IFMTV - 1 OF 1
FUNCTION 'IHMS'

PURPOSE
   CONVERT SECONDS TO ' HH.MM.SS.'

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   IHMS (ISEC)

DESCRIPTION OF PARAMETER
   ISEC - TIME (IN SECONDS) TO BE CONVERTED

CM REQUIRED: 44B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
   OR     SHIFT
   OTHERS
   NONE

AUTHOR
   DAVID V SOMMER - D1NSRDC CODE 1892.2

DATE WRITTEN: 05/08/74

DATE(S) REVISED
   03/23/83 - RECOMPILATE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,IHMS,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-138  IHMS - 1 OF 1
FUNCTION 'IPAKLFT'

PURPOSE
SQUEEZE LEFT AND REMOVE ZEROS (OOB) AND BLANKS (55B). RETURN
NUMBER OF CHARACTERS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IF ANY BLANKS OR ZEROS WERE REMOVED, THE ARRAY IS PADDED
WITH TRAILING ZEROS

USAGE
NCHAR = IPAKLFT (A)
NCHAR = IPAKLFT (A, NA)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE PROCESSED
NA - NUMBER OF WORDS TO BE PROCESSED
(OMITTED = 1)
IPAKLFT - NUMBER OF NON-BLANK (NON-ZERO) CHARACTERS AFTER
PROCESSING

CM REQUIRED: 72B

EXAMPLE
DIMENSION A(3)
DATA A/ "THIS IS A SAMPLE FIELD"/
NCHAR = IPAKLFT (A, 3)
...    
AFTER EXECUTION: 'A' = 18LTHISISASAMPLEFIELD, IPAKLFT = 18

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF
OTHERS
GETCHA - GET A CHARACTER
PUTCHA - PUT A CHARACTER
AUTHOR
  DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/25/77

DATE(S) REVISED
  03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
  UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
  EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,IPAKLFT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-140  IPAKLFT - 2 OF 2
FUNCTION 'IROMAN'

PURPOSE
   CONVERT ROMAN NUMBERS TO INTEGER

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   VALIDITY OF THE ROMAN NUMBER IS NOT CHECKED. INVALID ROMAN
   NUMERALS ARE IGNORED. ROMAN NUMBER ENDS WHEN FIRST
   BLANK OR OOB IS ENCOUNTERED.

USAGE
   IVAR = IROMAN (NUMBER)

DESCRIPTION OF PARAMETERS
   IROMAN - WILL CONTAIN INTEGER EQUIVALENT OF SUPPLIED
   ROMAN NUMBER
   NUMBER - ROMAN NUMBER TO BE CONVERTED

CM REQUIRED: 130B

EXAMPLES
   MCMLXXVI WILL RETURN THE INTEGER 1976
   I " " " " 1
   ETC.

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
   NONE
   OTHERS
       GETCHA - EXTRACT CHARACTER FROM AN ARRAY

AUTHOR
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/02/76

DATE(S) REVISED
   03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
       UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
   OBJECT
       EDITION USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,IROMAN,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84  2-141   IROMAN - 1 OF 1
FUNCTION 'ISEC'

PURPOSE
CONVERT HH.MM.SS TO SECONDS

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
ISEC (ITIME)

DESCRIPTION OF PARAMETER
ITIME - TIME TO BE CONVERTED
(MAY BE 'HH.MM.SS.', 'HH.MM.SS.', OR 'HH.MM.SS')

CM REQUIRED: 40B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND SHIFT
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
FAST I-FORMAT DECODE
I21FMT I24FMT I27FMT
FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
L11FMT

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/01/74

DATE(S) REVISED
03/02/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ISEC,OUTPUT,MSACCESS=<PASSWORD>.

06/14/84 2-142 ISEC - 1 OF 1
FUNCTION 'ISITCNF'

PURPOSE
SEE IF SPECIFIED FILE IS CONNECTED

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE FILE BEING TESTED MUST BE OPENED BEFORE USING
THIS FUNCTION. FOR FORTRAN LFN'S, THIS IS ACCOMPLISHED
BY ANY I/O OPERATION OR CALL CONNEC OR CALL DISCONT.

USAGE
ISITCNF (I)

DESCRIPTION OF PARAMETERS
LFN - FILE TO BE CHECKED (E.G., 5LTAPE1)
ISITCNF - WILL RETURN ONE OF:
+1 - FILE IS CONNECTED
0 - FILE IS NOT CONNECTED
-1 - ERROR - FILE NOT FOUND
-2 - ERROR - LFN = 0

CM REQUIRED: 66B

METHOD
BIT 19 OF WORD 17 (18TH WORD) OF FIT IS EXTRACTED.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND SHIFT
OTHERS
LOFFTN - GET FORTRAN LIST-OF-FILES
MFETCH - GET SPECIFIED WORD IN USER'S FIELD LENGTH

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/02/75

DATE(S) REVISED
12/11/81 - UPGRADE TO LEVEL 508
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET., NSRDC., ISITCNF, OUTPUT, MSACCES=<PASSWORD>.

06/07/84 2-143 ISITCNF - 1 OF 1
SUBROUTINE 'ISSORT'

PURPOSE
   FTN-CALLABLE SHELL SORT FOR INTEGER ARRAYS

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   THIS MAY BE USED WHEN YOU HAVE DEFINED TWO ARRAYS WHICH
   "GO TOGETHER" AND YOU ARE SORTING ONE ARRAY AND WISH TO KEEP
   CORRESPONDING ELEMENTS OF THE OTHER ARRAY WITH IT. THAT IS,
   WHEREVER A(1) ENDS UP AFTER THE SORT, T(1) WILL BE IN THE
   SAME RELATIVE POSITION.

USE SSORT FOR REALS.

USAGE
   CALL ISSORT (A, I, T)
   CALL ISSORT (A, I)

DESCRIPTION OF PARAMETERS
   A - INTEGER ARRAY TO BE SORTED
   I - NUMBER OF ELEMENTS TO BE SORTED
   T - IF PRESENT, AN ASSOCIATED ARRAY RE-ORDERED TO MAINTAIN
       1 TO 1 CORRESPONDENCE WITH THE ELEMENTS OF ARRAY 'A'

CM REQUIRED: 71B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      LOCF     SHIFT
   OTHERS
      NONE

AUTHORS
   C FLINK - KPS NWL
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/07/70 (CF - SSORT)

DATE(S) REVISED
   10/06/81 - DVS - MAKE INTEGER VERSION OF SSORT
   03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN, DOCGET,, NSRDC,, ISSORT, OUTPUT, MSACCS=<PASSWORD>.

02/10/84  2-144  ISSORT - 1 OF 1
FUNCTION 'ISTAPE'

PURPOSE
   GENERATE TAPE NAME 'TAPENN'

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   NAME = ISTAPE (NN)

DESCRIPTION OF PARAMETERS
   NAME - RESULTANT DISPLAY CODE NAME 'TAPENN'
          (LEFT-JUSTIFIED, ZERO-FILLED)
          (5LTAPEN OR 6LTAPENN)
   NN  - FORTRAN LOGICAL UNIT NUMBER

CM REQUIRED: 23B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      NONE
   OTHERS
      NONE

AUTHOR
   NWL

DATE WRITTEN: ?

DATE(S) REVISED
   03/22/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,ISTAPE,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84  2-145  ISTAPE - 1 OF 1
FUNCTION 'ISUMIT'

PURPOSE
   SUM ELEMENTS OF INTEGER ARRAY

FUNCTIONAL CATEGORIES: A1

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   ITOTAL = ISUMIT (IARRAY, N)

DESCRIPTION OF PARAMETERS
   ISUMIT - WILL CONTAIN IARRAY(1)+IARRAY(2)+...+IARRAY(N)
   IARRAY - ARRAY TO BE SUMMED
   N      - NUMBER OF ELEMENTS OF IARRAY TO BE SUMMED

CM REQUIRED: 16B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      NONE
   OTHERS
      NONE

AUTHOR
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/23/76

DATE(S) REVISED
   03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,ISUMIT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84     2-146     ISUMIT - 1 OF 1
FUNCTION 'ITL'

PURPOSE
GET CURRENT INTERCOM TIME LIMIT (ETL)

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IF THE VALUE RETURNED IS ZERO, THE DEFAULT SETTING IS IMPLIED (MFE=60 SECONDS; MFF=20 SECONDS).

USAGE
ITL ()

DESCRIPTION OF PARAMETER
ITL - WILL CONTAIN ONE OF:
THE CURRENT ETL VALUE -OR-
0 (THE DEFAULT VALUE - SEE REMARKS)

CM REQUIRED: 43B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE

AND MASK

OTHERS
RFJ.TBL - READ INTERCOM USER TABLE

ARITHMETIC STATEMENT FUNCTIONS
GETBITS - EXTRACT BITS FROM A WORD

AUTHOR
DAVID V. SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/05/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ITL,OUTPUT,MSACCESS=<PASSWORD>.

10/05/84 2-147 ITL - 1 OF 1
SUBROUTINE 'JGDATE'

PURPOSE
CONVERT ANY GREGORIAN DATE TO A RELATIVE JULIAN DATE OR VICE VERSA (FOR MULTI-YEAR COMPUTATIONS)

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
JG=1 IS VALID FOR ANY GREGORIAN DATE PRODUCING A RELATIVE JULIAN DATE GREATER THAN ZERO.

THIS SUBROUTINE IS USEFUL IN DETERMINING THE ELAPSED NUMBER OF DAYS BETWEEN ANY TWO CALENDAR DATES. IT CAN ALSO BE USED TO FIND THE CALENDAR DATE SO MANY DAYS FROM ANY GIVEN DATE.

THE RELATIVE JULIAN DATE CORRESPONDING TO A GREGORIAN DATE HAS MEANING TO THIS SUBROUTINE ONLY. IT REPRESENTS THE NUMBER OF DAYS SINCE 11/24/-4713 (EXTRAPOLATING THE GREGORIAN CALENDAR).

SEE ALSO SUBROUTINE 'JULIAN' FOR DAY-OF-YEAR DETERMINATION.

USAGE
CALL JGDATE (JG, JD, IGY, IGM, IGD)

DESCRIPTION OF PARAMETERS
JG - DIRECTION OF CONVERSION
1 - GREGORIAN TO RELATIVE JULIAN
2 - RELATIVE JULIAN TO GREGORIAN
JD - RELATIVE JULIAN DATE (OUT IF JG=1, IN IF JG=2)
IGY - GREGORIAN YEAR (EG, 1975) (IN IF JG=1, OUT IF JG=2)
IGM - GREGORIAN MONTH (1-12) (IN IF JG=1, OUT IF JG=2)
IGD - GREGORIAN DAY (1-31) (IN IF JG=1, OUT IF JG=2)

CM REQUIRED: 72B
SUBPROGRAMS REQUIRED
  PART OF LANGUAGE
    NONE
  OTHERS
    NONE

ARITHMETIC STATEMENT FUNCTIONS
  NONE

METHOD

AUTHOR
  ?

DATE WRITTEN: 1968 OR EARLIER

DATE(S) REVISED
  03/01/79 - IMPLEMENT ON B7700
  03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
  SOURCE
    UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
  OBJECT
    EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
  BEGIN,DOCGET,,NSRDC,,JGDATE,OUTPUT,MSACCE=<PASSWORD>.
FUNCTION 'JOBCM'

PURPOSE
GET JOB CARD CM

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
JCM = JOBCM (JBCM)
CALL JOBCM (JBCM)

DESCRIPTION OF PARAMETERS
JOBCM - WILL CONTAIN JOB CARD CM
JBCM - WILL ALSO CONTAIN JOB CARD CM

CM REQUIRED: 25B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
 AND SHIFT
OTHERS
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS
R27FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

METHOD
THE JOB CARD CM IS TAKEN FROM CONTROL POINT AREA.

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/16/81

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, JOBCM, OUTPUT, MSACCES=<PASSWORD>.

02/10/34  2-150  JOBCM - 1 OF 1
SUBROUTINE 'JOBNAME'
FUNCTION 'JOBNAME'

PURPOSE
GET SYSTEM JOB NAME FOR THIS JOB

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL JOBNAME (I)
VARIABLE = JOBNAME (I)

DESCRIPTION OF PARAMETERS
JOBNAME - WILL CONTAIN JOB NAME, LEFT-JUSTIFIED,
ZERO-FILLED (WHEN USED AS FUNCTION)
I - WILL CONTAIN JOB NAME, LEFT-JUSTIFIED,
ZERO-FILLED

CM REQUIRED: 25B

METHOD
THE JOB NAME IS TAKEN FROM THE FIRST 7 CHARACTERS OF
CONTROL POINT AREA + 25B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
RCPA - READ CONTROL POINT AREA

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/04/75

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,JOBNAME,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-151  JOBNAME - 1 OF 1
FUNCTION 'JOBORG'
SUBROUTINE 'JOBORG'

PURPOSE
DETERMINE JOB ORIGIN

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
IVAR = JOBORG (I, IA)
IVAR = JOBORG (I)
CALL JOBORG (I, IA)
CALL JOBORG (I)

DESCRIPTION OF PARAMETERS
I - WILL CONTAIN ONE OF THE FOLLOWING:
   1 - IF CALLING JOB IS A BATCH JOB
   2 - FOR REAL TIME JOB
   3 - FOR GRAPHICS JOB
   4 - FOR MULTI-USER JOB
   5 - FOR INTERCOM

IA - IF SPECIFIED, WILL CONTAIN: 'BATCH', 'REAL TIME',
     'GRAPHICS', 'MULTI-USER', OR 'INTERCOM', ACCORDING
     TO THE VALUE OF 'I'.

IF USED AS A FUNCTION, 'JOBORG' WILL RETURN THE SAME VALUE
AS 'I'.

CM REQUIRED: 35B

METHOD
THE INFORMATION IS TAKEN FROM THE CONTROL POINT AREA.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND
OTHERS
   RCPA - READ CONTROL POINT AREA
SUBROUTINE 'JULIAN'

PURPOSE
CONVERT ANY GREGORIAN DATE TO A JULIAN DAY-OF-YEAR OR VICE
VERSA (FOR SINGLE YEAR COMPUTATIONS ONLY)

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE PARAMETER 'IGY' IS ALWAYS INPUT.

- IF JG=1 AND (GM<1 OR GM>12 OR GD<1 OR GD>31),
  THEN JD IS SET TO ZERO (0).
- IF JG=2 AND (JD<1 OR JD>366), THEN GM IS SET TO ZERO (0).
- IF JG IS NOT 1 OR 2, THEN JD AND GM ARE SET TO ZERO (0).

SEE ALSO SUBROUTINE 'JGDATE' FOR MULTI-YEAR COMPUTATIONS.

USAGE
CALL JULIAN (JG, JD, IGY, IGM, IGD)

DESCRIPTION OF PARAMETERS
JG - DIRECTION OF CONVERSION
  1 - GREGORIAN TO JULIAN
  2 - JULIAN TO GREGORIAN
JD - JULIAN DAY-OF-YEAR (1-366)
IGY - GREGORIAN YEAR (E.G., 1968, ALWAYS INPUT)
IGM - GREGORIAN MONTH (1-12)
IGD - GREGORIAN DAY (1-31)

CM REQUIRED: 1418

REFERENCE
SUBPROGRAMS REQUIRED
PART OF LANGUAGE MOD
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 1968

DATE(S) REVISED
04/26/73 - REWRITTEN IN FORTRAN FOR CDC 6000 - DVS
06/21/76
01/11/78
03/01/79 - IMPLEMENTED ON B7700
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,JULIAN,OUTPUT,MSACCESS=<PASSWORD>.
SUBROUTINE 'KUTMER'

PURPOSE
INTEGRATE A SYSTEM OF FIRST-ORDER ORDINARY DIFFERENTIAL
EQUATIONS USING THE KUTTA-MERSON FOURTH-ORDER, SINGLE-STEP
METHOD

FUNCTIONAL CATEGORIES: D2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS ROUTINE WILL INTEGRATE A SYSTEM OF FIRST-ORDER
DIFFERENTIAL EQUATIONS OF THE FORM
\[ \frac{\text{d}\bar{Y}}{\text{d}T} = \bar{f}(T, \bar{Y}) \]

GIVEN A SET OF INITIAL CONDITIONS \( T, \bar{Y}(T), 0, 0 \)
AN INTERVAL H AND A SUBROUTINE FOR EVALUATING \( \bar{f}(T, \bar{Y}) \)
FOR SPECIFIED VALUES OF T AND Y-BAR.

THE DIMENSIONS OF THE ARRAYS FOR STORING INTERMEDIATE VALUES
OF THE VECTORS \( \bar{f} \) AND Y-BAR ARE PRESENTLY SET TO 10.
THIS CAN BE READILY CHANGED BY CHANGING THE DIMENSION
STATEMENT AT THE BEGINNING OF THE SUBROUTINE.

USAGE
CALL KUTMER (N, T, Y, EPS, H, FIRST, HCX, A)

DESCRIPTION OF PARAMETERS
N - NUMBER OF EQUATIONS (I.E., THE NUMBER OF COMPONENTS
IN Y-BAR
T - THE INDEPENDENT VARIABLE, T
Y - THE ARRAY OF DEPENDENT VARIABLES, Y-BAR
EPS - THE RELATIVE ERROR CRITERION FOR EACH STEP, TO BE
USED FOR THOSE COMPONENTS OF Y-BAR WHICH ARE GREATER
THAN A IN ABSOLUTE VALUE
H - THE INTEGRATION INTERVAL, H
FIRST - WILL HAVE ONE OF THE FOLLOWING SETTINGS:
0 - WHEN KUTMER IS ENTERED FOR THE FIRST TIME, OR IS
RE-ENTERED WITH A CHANGED INTERVAL <H>. WHEN
KUTMER IS SO ENTERED, <FIRST> IS RESET BY KUTMER
TO 1.
1 - WHEN KUTMER IS RE-ENTERED WITH THE SAME INTERVAL
<H>, TO CONTINUE AN INTEGRATION SEQUENCE. UNDER
THESE CIRCUMSTANCES, KUTMER WILL NOT RESET
<FIRST>.

02/10/84  2-156  KUTMER - 1 OF 3
2 - When KUTMER cannot meet the specified error criteria even when the integration step has been reduced to H/128, KUTMER will reset <FIRST> to 2 and print a statement indicating that the error criterion could not be met. Then KUTMER will return control to the calling program.

HCX - Is set up by KUTMER before each return to the calling program. This will contain the minimum step size used during the integration over the interval <H>.

A - An absolute error criterion to be used for any component of Y-BAR whenever it becomes smaller in absolute value than <A>.

On entry, <T> and the array <Y> contain values of the independent and the dependent variables, respectively, at the beginning of the interval of integration. On return, provided the error criterion has been met, i.e., <FIRST> has not been reset to 2, <T> and <Y> contain values of T and Y-BAR at the end values of the integration interval of <H>.

A subroutine for evaluating f-bar(T,Y-BAR) with a call of the form

CALL DAUX (T, Y, F)

must be supplied. Here <T> and the array <Y> refer to T and Y-BAR, respectively, and the array <F> should contain, on return from this subroutine, the vector f-bar (T, Y-BAR).

CM REQUIRED: 352B

OUTPUT UNITS

UNIT # LFN USE

OUTPUT ERROR MESSAGE

METHOD

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ABS
OTHERS
DAUX - USER-SUPPLIED SUBROUTINE TO EVALUATE F-BAR

AUTHOR
E. CUTHILL - DTNSRDC CODE 1805

DATE WRITTEN: 10/29/64 (FORTRAN VERSION)

DATE(S) REVISED
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, , KUTMER, OUTPUT, MSACCES=<PASSWORD>.

02/10/84

2-158

KUTMER - 3 OF 3
FUNCTION 'LASTC'

PURPOSE
DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK (NON-ZERO (OOB))

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE WORD IN 'A' WHICH CONTAINING THE LAST NON-BLANK (NON-ZERO) CHARACTER IS (LASTC(A,N)+9)/10

USAGE
LASTC (A)
LASTC (A, N)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE SCANNED
N - NUMBER OF WORDS IN 'A' TO BE PROCESSED
LASTC - WILL CONTAIN THE NUMBER OF CHARACTERS IN 'A'
EXCLUDING TRAILING BLANKS (ZEROS)

CM REQUIRED: 37B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/06/76

DATE(S) REVISED
07/25/77 - MAKE PARAMETER 'N' OPTIONAL
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, LASTC, OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-159 LASTC - 1 OF 1
FUNCTION 'LASTCH'

PURPOSE
DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE WORD IN 'A' WHICH CONTAINS THE LAST NON-BLANK CHARACTER IS \( (\text{LASTCH}(A,N)+9)/10 \).

USAGE
LASTCH (A, NCHAR)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE SCANNED
NCHAR - NUMBER OF CHARACTERS IN 'A' TO BE PROCESSED
LASTCH - WILL CONTAIN THE NUMBER OF CHARACTERS IN 'A'
EXCLUDING TRAILING BLANKS

CM REQUIRED: 71B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND MOD
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/13/79

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL.UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,LASTCH,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-160 LASTCH - 1 OF 1
FUNCTION 'LASTWRD'

PURPOSE
DETERMINE SUBSCRIPT OF LAST WORD OF ARRAY WHICH CONTAINS A
NON-BLANK

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
LASTWRD (A, N)

DESCRIPTION OF PARAMETERS
LASTWRD - WILL CONTAIN SUBSCRIPT OF LAST WORD OF ARRAY WHICH
CONTAINS A NON-BLANK (AND NON-OOB)
A - ARRAY TO BE SCANNED
N - NUMBER OF WORDS IN 'A' TO BE PROCESSED

CM REQUIRED: 22B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
LASTC - FIND LAST NON-BLANK/NON-OOB CHARACTER IN ARRAY

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/15/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,LASTWRD,OUTPUT,MSACCES=<PASSWORD>.

02/10/84
2-161
LASTWRD
FUNCTION 'LBYT'

PURPOSE
EXTRACT VARIABLE LENGTH BYTE

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
EXTRACTS A BYTE OF ANY LENGTH (1-60 BITS) FROM A 60-BIT WORD. THE EXTRACTED BYTE IS THEN STORED RIGHT-JUSTIFIED INTO ANOTHER 60-BIT WORD.

USAGE
VARIABLE = LBYT (N, LENGTH, FROM)

DESCRIPTION OF PARAMETERS
VARIABLE - LOCATION INTO WHICH THE EXTRACTED BYTE IS STORED RIGHT-JUSTIFIED
N - STARTING BIT POSITION OF THE BYTE TO BE EXTRACTED. BITS ARE NUMBERED 1-60 FROM RIGHT TO LEFT.
LENGTH - LENGTH OF THE BYTE (NUMBER OF BITS)
FROM - WORD FROM WHICH THE BYTE IS TO BE EXTRACTED

CM REQUIRED: 16B

EXAMPLE
STARTING AT THE TWELFTH BIT FROM THE RIGHT OF A WORD, A FOUR-BIT BYTE WILL BE EXTRACTED FROM THE VARIABLE <TAKE> AND STORED IN VARIABLE <ISTORE> IN BIT PLACES 1-4.

TAKE = 1111 2222 3333 4476 5555B
ISTORE = LBYT (12, 4, TAKE)

RESULTS IN
ISTORE = 0000 0000 0000 0000 0016B

NOTE: BIT POSITIONS 12-15 OF <TAKE> ARE 1 1 1 0.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
FROM CDC KRONOS SYSTEM

DATE WRITTEN:

DATE(S) REVISED
03/22/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,LBYT,OUTPUT,MSACCE=<PASSWORD>.

02/10/84
2-163
LBYT - 2 OF 2
SUBROUTINE 'LEFTADJ'

PURPOSE
SQUEEZE LEFT AND REMOVE BLANKS AND OOB (USER MAY SUPPLY
TRAILING FILL CHARACTER)

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE LAST NON-BLANK CHARACTER POSITION AND WORD ARE RETURNED.

USAGE
CALL LEFTADJ (A, NA, LASTC, NW, FILL)
CALL LEFTADJ (A, NA, LASTC, NW)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE LEFT JUSTIFIED
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED
LASTC - WILL RETURN THE LAST CHARACTER POSITION
WHICH IS NON-BLANK/NON-OOB (LEFT-MOST CHARACTER
POSITION IS 1)
(IF ARRAY CONTAINS ONLY BLANKS AND/OR OOB, LASTC IS
SET TO 0)
NW - WILL RETURN SUBSCRIPT OF WORD CONTAINING LAST
NON-BLANK/NON-OOB CHARACTER
(IF LASTC=0, THEN NW IS SET TO 0)
FILL - OPTIONAL FILL CHARACTER FOR EACH CHARACTER
POSITION AFTER LASTC (USE 1R OR 1H FORMAT)
(IF OMITTED, FILL CHARACTER IS OOB)

CM REQUIRED: 100B

EXAMPLE

DIMENSION A(4)
CONTENTS OF A: 12345 67890 ABCDEFGHIJ
CALL LEFTADJ (A, 4, LASTC, NW)
CONTENTS OF A: 1234567890ABCFDEFGHIJ
LASTC IS 20; NW = 2
CALL LEFTADJ (A, 4, LASTC, NW, 1R/)
CONTENTS OF A: 1234567890ABCFDEFGHIJ/----------------/-----------------
LASTC AND NW ARE THE SAME
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF
OTHERS
GETCHA  - EXTRACT ONE CHARACTER FROM AN ARRAY
PUTCHA  - INSERT ONE CHARACTER INTO AN ARRAY

ARITHMETIC STATEMENT FUNCTIONS
R11FMT  - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/02/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, LEFTADJ, OUTPUT, MSACCES=<PASSWORD>.
SUBROUTINE 'LFPFERR'

PURPOSE
DECODE THE "ERR" CODE FROM FILE MANIPULATION SUBROUTINES PF AND LF

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL LFPFERR (ERR, PARMNO, CODE)

DESCRIPTION OF PARAMETERS
ERR - "ERR" RETURNED BY PF OR LF
PARMNO - PARAMETER NUMBER
CODE - ERROR CODE NUMBER

CM REQUIRED: 13B

METHOD
THE PARAMETER NUMBER IS EXTRACTED FROM BITS 35-19 OF ERR;
THE ERROR CODE NUMBER IS EXTRACTED FROM BITS 18-0.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND SHIFT
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
FAST R-FORMAT DECODE (RIGHT-ADJUSTED, ZERO-FILLED)
R35FMT   R38FMT

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/24/83

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,LFPFERR,OUTPUT,MSACCES=<PASSWORD>.

02/10/84
2-166
LFPFERR - 1 OF 1
SUBROUTINE 'LIBBAM'

PURPOSE
DUMMY SUBROUTINE TO FORCE LDSET,LIB-BAMLIB

FUNCTIONAL CATEGORIES: QO

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE IS USED TO FORCE A LOADER TABLE ENTRY FOR 'LDSET,LIB-BAMLIB' TO BE GENERATED SO THAT THE USER DOES NOT HAVE TO SUPPLY A LOADER DIRECTIVE EACH TIME. THIS IS NEEDED ONLY IF ROUTINES ON BAMLIB ARE USED AND NOTHING IN YOUR PROGRAM FORCES THE COMPILER TO GENERATE THIS LOADER TABLE ENTRY. AN EXAMPLE IS SUBROUTINE 'UNLOAD' TO UNLOAD A FILE. IT LOCATES THE FORTRAN FILE IN THE PROGRAM'S LIST OF FILES AND CALLS RECORD MANAGER ROUTINE 'CLOSEM' TO UNLOAD THE FILE. IF THIS IS THE ONLY RECORD MANAGER CALL IN THE PROGRAM, NO REFERENCE TO BAMLIB IS GENERATED BY THE COMPILER OR AN OBJECT-TIME SUBPROGRAM. 'UNLOAD', THEREFORE, HAS A DUMMY 'CALL LIBBAM', WHICH IS NEVER EXECUTED, THOUGH IT COULD BE.

USAGE
. CALL LIBBAM

CM REQUIRED: 2

. SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/14/81

DATE(S) REVISED
03/22/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,LIBBAM,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84 2-167 LIBBAM - 1 OF 1
SUBROUTINE 'LIBSYM'

PURPOSE
DUMIY SUBROUTINE TO FORCE LDSET,LIB=SYMLIB

FUNCTIONAL CATEGORIES: QO

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE IS USED TO FORCE A LOADER TABLE ENTRY FOR
'LDSET,LIB=SYMLIB' TO BE GENERATED SO THAT THE USER DOES NOT
HAVE TO SUPPLY A LOADER DIRECTIVE EACH TIME. THIS IS NEEDED
ONLY IF FORTRAN-CALLABLE CMM ROUTINES ARE USED AND NOTHING
IN YOUR PROGRAM FORCES THE COMPILER TO GENERATE THIS LOADER
TABLE ENTRY.

USAGE
CALL LIBSYM

CM REQUIRED: 2B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/15/83

DATE(S) REVISED
03/22/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,LIBSYM,OUTPUT,MSACCES=<PASSWORD>.

06/14/84 2-168 LIBSYM - 1 OF 1
SUBROUTINE 'LINE6'

PURPOSE
SET PRINT FILE TO 6 LINES PER INCH

FUNCTIONAL CATEGORIES: J4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
YOU SHOULD PRINT YOUR NEXT LINE AT THE TOP OF THE NEXT PAGE.

USAGE
CALL LINE6 (IOUT)

DESCRIPTION OF PARAMETER
IOUT - OUTPUT UNIT NUMBER (1-99) OR NAME (1-7 CHARACTERS,
LEFT-JUSTIFIED, ZERO-FILLED)

CM REQUIRED: 20B

OUTPUT UNIT
UNIT #   LFN                USE
-------- ------ --------------------------------------------------
IOUT     LISTABLE OUTPUT FILE

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 06/11/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,LINE6,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-169  LINE6 - 1 OF 1
SUBROUTINE 'LINE8'

PURPOSE
SET PRINT FILE TO 8 LINES PER INCH

FUNCTIONAL CATEGORIES: J4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
YOU SHOULD PRINT YOUR NEXT LINE AT THE TOP OF THE NEXT PAGE.

USAGE
CALL LINE8 (IOUT)

DESCRIPTION OF PARAMETER
IOUT - OUTPUT UNIT NUMBER (1-99) OR NAME (1-7 CHARACTERS,
LEFT-JUSTIFIED, ZERO-FILLED)

CM REQUIRED: 20B

OUTPUT UNIT
UNIT #   LFN USE
--------  ------- --------------------------------------------------
IOUT      ------- LISTABLE OUTPUT FILE

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 06/11/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,LINE8,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-170  LINE8 - 1 OF 1
SUBROUTINE 'MACHINE'

PURPOSE
RETURN 4-WORD SYSTEM HEADING

FUNCTIONAL CATEGORIES: QO

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
MACHINE IS PART OF THE OPERATING SYSTEM, NOT IN LIBRARY NSRDC. THE DOCUMENT IS HERE FOR CONVENIENCE.

USAGE
CALL MACHINE (ARRAY)

DESCRIPTION OF PARAMETER
ARRAY - 4-ELEMENT ARRAY WHICH WILL CONTAIN THE SYSTEM HEADING
(E.G., 'NSRDC MFB NOS/BE 1.5 K+7 83013 ')

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NJNE
OTHERS
NONE

CM REQUIRED: 25B

AUTHOR
DTNSRDC CODE 1892.3

DATE WRITTEN: 04/75

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
CODE 1892.3
OBJECT
EDITLIB SYSTEM LIBRARY: SYSLIB

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, MACHINE, OUTPUT, MSACCES=<PASSWORD>.

02/14/84 2-171 MACHINE - 1 OF 1
FUNCTION 'MASKIT'

PURPOSE
DYNAMIC MASK GENERATOR

FUNCTIONAL CATEGORIES: MO

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
MASKIT GENERATES AS ITS FUNCTIONAL VALUE A WORD WITH 'N' FIELDS OF BITS SET, EACH FIELD 'FL' BITS LONG, AND STARTING AT BIT ADDRESS 'BIT'.

EXAMPLE: TO GENERATE THE MASK
11100011111111110111100000000000010001000000011711110000011111
7 0 7 7 6 7 0 0 0 4 2 0 0 7 7 0 0 7 7

USE THE FOLLOWING:
MSK = MASKIT (3,59,11,53,3,41,1,29,1,25,6,17,6,5)

USAGE
MSK = MASKIT (FL1, BIT1, FL2, BIT2, ..., FLN, BITN)

DESCRIPTION OF PARAMETERS
FL - NUMBER OF BITS
BIT - STARTING BIT ADDRESS
BIT ADDRESSES ARE THE RELEVANT POWER OF 2. I.E., 59,58,57,... 2,1,0

CM REQUIRED: 16B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
C FLINK - KPS NWL

DATE WRITTEN: 07/70

DATE(S) REVISED
03/22/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MASKIT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84

2-172

MASKIT - 1 OF 1
SUBROUTINE 'MATINS'

PURPOSE
MATRIX INVERSION WITH ACCOMPANYING SOLUTION OF SIMULTANEOUS EQUATIONS AND DETERMINANT

FUNCTIONAL CATEGORIES: F4 F1 F3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
TESTS FOR LOSS OF DIGITS DUE TO SUBTRACTION.

TO SCALE THE DETERMINANT, ROUTINE MUST BE RECOMPILED TO OMIT INTERNAL 'DETERM = 1.'. IN THIS CASE, PARAMETER 'DETERM' IS THE INPUT SCALING FACTOR AS WELL AS THE OUTPUT DETERMINANT.

USAGE
CALL MATINS (A, NR, N1, B, NC, M1, DETERM, ID, INDEX)

DESCRIPTION OF PARAMETERS
A - INPUT MATRIX (NR X NR) (WILL BE REPLACED BY INVERSE OF 'A')
NR - REFERS TO CALLING PROGRAM DIMENSIONS:
  # ROWS IN 'A'; # COLUMNS IN 'A';
  # ROWS IN 'B'; # ROWS IN 'INDEX'
N1 - ORDER OF 'A'
  (ACTUAL SIZE OF 'A' BEING USED)
B - COLUMN VECTORS (WILL BE REPLACED BY CORRESPONDING SOLUTION VECTORS)
NC - REFERS TO CALLING PROGRAM DIMENSIONS:
  # COLUMNS IN 'B'
M1 - NUMBER OF ACTUAL COLUMN VECTORS IN 'B'
  (MAY BE 0)
DETERM - OUTPUT DETERMINANT
ID - OUTPUT CODE
  1 - INVERSE SUCCESSFUL
  2 - MATRIX 'A' SINGULAR
INDEX - WORKING STORAGE ARRAY OF DIMENSION (NR X 3)

NOTE: N1 <= NR; M1 <= NC

CM REQUIRED: 340B

METHOD
PIVOT METHOD - GAUSS-JORDAN
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ABS
OTHERS
NONE

AUTHORS
ANF402 FROM SHARE
SHARON E GOOD - DINSRDC CODE 1892.1
C R NEWMAN - NOL

DATE WRITTEN: 11/71

DATE(S) REVISED
07/26/77 - ADD CRN CODING (SEG)
09/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS (*DECK AMMAT4)
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MATINS,OUTPUT,MSACCES=<PASSWORD>.

06/30/84  2-174  MATINS - 2 OF 2
SUBROUTINE 'MAXE'
FUNCTION 'MAXE'
FUNCTION 'AMAXE'

PURPOSE
FIND MAXIMUM VALUE OF AN ARRAY

FUNCTIONAL CATEGORIES: M5

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
FUNCTION MAXE HAS INTEGER INPUT AND OUTPUT.
FUNCTION AMAXE HAS REAL INPUT AND OUTPUT.

USAGE
CALL MAXE (ARRAY, ISIZE, AMAXV)

MAXV = MAXE (IARRAY, ISIZE)
AMAXV = AMAXE (ARRAY, ISIZE)

DESCRIPTION OF PARAMETERS
ARRAY = REAL ARRAY TO BE PROCESSED
IARRAY = INTEGER ARRAY TO BE PROCESSED
ISIZE = LENGTH OF ARRAY/IARRAY
AMAXV = REAL MAXIMUM RETURNED IN SUBROUTINE

CM REQUIRED: 14B

REMARKS
FUNCTION MAXE HAS INTEGER INPUT AND OUTPUT.
FUNCTION AMAXE HAS REAL INPUT AND OUTPUT.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
C FLINK - KPS NWL

DATE WRITTEN: 11/22/70

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MAXE,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-175 MAXE - 1 OF 1
SUBROUTINE 'MEMUSED'

PURPOSE
PRINT MESSAGE IN DAYFILE GIVING FIELD LENGTH IN USE AT
TIME OF CALL TO THIS ROUTINE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS ROUTINE ISSUES A MEMORY MACRO REQUEST TO DETERMINE
FIELD LENGTH AND PRINTS A MESSAGE IN THE DAYFILE OF
THE FORM:

FIELD LENGTH IN USE (OCTAL) = XXXXX

IT MIGHT BE OF INTEREST TO USERS WITH PROGRAMS WHICH
MANAGE FIELD LENGTH DYNAMICALLY ABOVE THAT SHOWN IN THE
NORMAL LOAD MAP (SUCH AS FILE BUFFER SPACE IN COBOL
PROGRAMS).

USAGE
CALLED FROM COBOL PROGRAM
ENTER MEMUSED.

CALLED FROM FTN PROGRAM
CALL MEMUSED

CM REQUIRED: 30B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
BRUCE D. BLACK - DTNSRDC CODE 1892.1 (CDC)

DATE WRITTEN: 04/07/78

DATE(S) REVISED
03/22/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MEMUSED,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-176  MEMUSED - 1 OF 1
FUNCTION 'MFETCH'

PURPOSE
   FETCH A SINGLE WORD (BY ABSOLUTE ADDRESS) FROM USER'S FL

FUNCTIONAL CATEGORIES: K2

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   'MFETCH' IS AN ENTRY POINT IN 'CMDRCT'.

USAGE
   MFETCH (ADDR)

DESCRIPTION OF PARAMETER
   ADDR - ADDRESS IN USER'S FL TO BE FETCHED

   NO ERROR CHECKING IS DONE.

CM REQUIRED: 11B (INCLUDES 'MSET')

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      NONE
   OTHERS
      NONE

AUTHOR
   ? - NWL

DATE WRITTEN:

DATE(S) REVISED
   03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS (*DECK CMDRCT)
   OBJECT
      EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,MFETCH,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-177  MFETCH - 1 OF 1
SUBROUTINE 'MFRAME'

PURPOSE
OBTAIN THE MACHINE AND MAINFRAME RUNNING THE PROGRAM

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL MFRAME (CPU, MF)

DESCRIPTION OF PARAMETER
CPU - WILL RETURN MACHINE ON WHICH THE PROGRAM IS RUNNING
(CDC FTN4: INTEGER, LEFT-ADJ, BLANK-FILLED)
(CDC FTN5: CHARACTER*6;
(WILL RETURN ONE OF:
"6700", "6600", "6400", "CY74", "CY750", "CY176", 
"CY825")

MF - WILL RETURN MAINFRAME ON WHICH THE PROGRAM IS RUNNING
(CDC FTN4: INTEGER, LEFT-ADJ, BLANK-FILLED)
(CDC FTN5: CHARACTER*3;
(WILL RETURN ONE OF:
"MFA", "MFB", "MFC", "MFD", "MFE", "MFF", 
"MFG", "MFZ")

CM REQUIRED: 143B (FTN4); 320B (FTN5)

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND SHIFT
OTHERS
MACHINE - GET SYSTEM MACHINE INFORMATION

ARITHMETIC STATEMENT FUNCTIONS
R38FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)
FUNCTION 'MF2CPU'

PURPOSE
RETURN CPU NAME CORRESPONDING TO SUPPLIED MAINFRAME NAME

FUNCTIONAL CATEGORIES: 20

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
ICPU = MF2CPU (MF)

DESCRIPTION OF PARAMETERS
MF - INPUT MAINFRAME NAME OR LETTER
     (E.G., "MFF" OR "F")
MF2CPU - WILL RETURN THE CORRESPONDING CPU NAME
     (E.G., "CY176")
     -OR- " ", IF MF IS NOT RECOGNIZED

CM REQUIRED: 111B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/20/82

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MF2CPU,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'MINE'
FUNCTION 'MINE'
FUNCTION 'AMINE'

PURPOSE
FIND MINIMUM VALUE OF AN ARRAY

FUNCTIONAL CATEGORIES: M5

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
FUNCTION MINE HAS INTEGER INPUT AND OUTPUT.
FUNCTION AMINE HAS REAL INPUT AND OUTPUT.

USAGE
CALL MINE (ARRAY, ISIZE, AMINV)

MINV = MINE (IARRAY, ISIZE)
AMINV = AMINE (ARRAY, ISIZE)

DESCRIPTION OF PARAMETERS
ARRAY - REAL ARRAY TO BE PROCESSED
IARRAY - INTEGER ARRAY TO BE PROCESSED
ISIZE - LENGTH OF ARRAY/IARRAY
AMINV - REAL MINIMUM RETURNED IN SUBROUTINE

CM REQUIRED: 14B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
C FLINK - KPS NWL

DATE WRITTEN: 11/22/70

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MINE,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84 2-181 MINE - 1 OF 1
SUBROUTINE 'MONTH'

PURPOSE
FROM A DATE (MM/DD/YY) FIND THE MONTH AND RETURN FULL
SPELLING AND 3- OR 4-CHARACTER ABBREVIATION

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL MONTH (DATE, MONTH, MM)

DESCRIPTION OF PARAMETERS
DATE  - DATE TO BE PROCESSED ('MM/DD/YY', 'MM/DD/YY',
     OR 'MM/DD/YY')
IMONTH - WILL CONTAIN THE MONTH (COMPLETE SPELLING)
MM    - WILL CONTAIN THE MONTH (3- OR 4-CHARACTER
     ABBREVIATION)

CM REQUIRED: 62B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
I21FMT - FAST I-FORMAT DECODE
L11FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/21/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MONTH,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84  2-182  MONTH - 1 OF 1
SUBROUTINE 'MOVCHAR'

PURPOSE
MOVE ONE CHARACTER FROM ONE STRING TO ANOTHER

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS
NONE

USAGE
CALL MOVCHAR (FROM, FROM COL, TO, TO COL)

DESCRIPTION OF PARAMETERS
FROM - ARRAY CONTAINING STRING FROM WHICH THE CHARACTER IS TO BE EXTRACTED
FROM COL - POSITION OF CHARACTER IN FROM (1 IS LEFTMOST POSITION)
TO - ARRAY TO WHICH THE CHARACTER IS TO BE MOVED
TO COL - POSITION OF CHARACTER IN TO (1 IS LEFTMOST POSITION)

CM REQUIRED: 35B

EXAMPLE
BEFORE: FROM THIS IS A CHARACTER STRING.
TO = THIS IS ANOTHER STRING
CALL MOVSTR (FROM, 27, TO, 23)
AFTER : TO THIS IS ANOTHER STRING.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE AND MOD OR SHIFT
OTHERS NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/14/77

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MOVCHAR,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-183 MOVCHAR - 1 OF 1
SUBROUTINE 'MOVECM'

PURPOSE

MOVE WORDS FROM ONE AREA IN CORE TO ANOTHER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)

CDC 6000/CYBER 170 (NOS/BE)

REMARKS

'MOVECM' IS ABOUT 20 PERCENT FASTER THAN THE FTN-SUPPLIED
'MOVELV'. IT MOVES 4 WORDS AT A TIME (INSTEAD OF 2) AND
DOES NOT REQUIRE AT LEAST ONE CM WORD BETWEEN THE SENDING
AND RECEIVING FIELDS.

AT SPEED, 'MOVECM' MOVES ABOUT 2 WORDS PER MICROSECOND.

USAGE

CALL MOVECM (FWA, LWA, NEW FWA)

DESCRIPTION OF PARAMETERS

FWA - FIRST WORD ADDRESS OF SENDING FIELD
LWA - LAST WORD ADDRESS OF SENDING FIELD
NEW FWA - FIRST WORD ADDRESS OF RECEIVING FIELD

(MOVE MEMORY WORDS BEGINNING AT FWA AND ENDING AT LWA
TO A BLOCK STARTING AT NEW FWA.)

CM REQUIRED: 20B

EXAMPLE

MOVE ARRAY 'A' TO ARRAY 'B':

... DIMENSION A(100), B(100) ...
... CALL MOVECM (A(1), A(100), B(1)) ...

METHOD

WORDS ARE MOVED 4 AT A TIME, UNLESS FEWER THAN 4 REMAIN TO
BE MOVED.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
EXTRACTED FROM 'NETED', THE TEXT EDITOR FROM ED FOURT OF LAWRENCE BERKLEY LABS

DATE WRITTEN:

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MOVECM,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-185  MOVECM - 2 OF 2
SUBROUTINE 'MOVEIT'

PURPOSE
MOVLEV REPLACEMENT WHICH CALLS MOVECM

FUNCTIONAL CATEGORIES: K2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
AT NOS/BE LEVEL 461, THE FTN SUBROUTINE 'MOVLEV' USES CMM, WHICH CAN CAUSE PROBLEMS WITH PROGRAMS MOVING INTO PROGRAM-EXTENDED FL. SUBROUTINE 'MOVECM' IS A MUCH FASTER ROUTINE WHICH DOES NOT USE CMM, HOWEVER, IT HAS A DIFFERENT CALLING SEQUENCE. 'MOVEIT' IS A TRANSITIONAL SUBROUTINE. IT HAS THE SAME CALLING SEQUENCE AS 'MOVLEV' BUT CALLS 'MOVECM'. IT TAKES A LITTLE LONGER TO EXECUTE THE MOVE BECAUSE IT INVOLVES TWO (2) CALLS, BUT THE CALLING SEQUENCE MAY BE MORE MEANINGFUL AND EASIER TO USE.

USAGE
CALL MOVEIT (FROM, TO, NWORDS)

DESCRIPTION OF PARAMETERS
FROM - ARRAY TO BE MOVED
TO - RECEIVING ARRAY
NWORDS - NUMBER OF WORDS TO BE MOVED

CM REQUIRED: 20B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
MOVECM - MOVE AN ARRAY 4 WORDS AT A TIME

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/16/79

DATE(S) REVISED
07/15/80 - MOVE TO NSRDC
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MOVEIT,OUTPUT,MSACCES=<PASSWORD>.

06/07/84 2-186 MOVEIT - 1 OF 1
SUBROUTINE 'MOVSTR'

PURPOSE
MOVE A STRING OF CHARACTERS FROM ONE ARRAY TO ANOTHER

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS
NONE

USAGE
CALL MOVSTR (FROM, IFROM, TO, ITO, LEN, IRC)
CALL MOVSTR (FROM, IFROM, TO, ITO, LEN)

DESCRIPTION OF PARAMETERS
FROM - ARRAY FROM WHICH STRING IS TO BE EXTRACTED
IFROM - STARTING POSITION OF STRING TO BE EXTRACTED
          (POSITION 1 IS LEFT-MOST CHARACTER OF FROM(M))
TO - ARRAY TO RECEIVE THE STRING
ITO - STARTING POSITION TO INSERT THE STRING
          (POSITION 1 IS LEFT-MOST CHARACTER ON TO(M))
LEN - NUMBER OF CHARACTERS IN STRING TO BE MOVED
IRC - OPTIONAL ERROR RETURN CODE
       0 - NO ERROR, STRING MOVED
       1 - IFROM LE 0
       2 - ITO LE 0
       3 - LEN LE 0

CM REQUIRED: 61B

EXAMPLE
FROM: ABCDEFGHIJKLMNOPQRSTUVWXYZ TO: ***************
AFTER CALL MOVSTR (FROM, 5, TO, 12, 4, IRC)
FROM: ABCDEFGHIJKLMNOPQRSTUVWXYZ TO: *************EFGH*****
IRC : 0
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND LOCF MOD OR SHIFT
OTHERS NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/04/76

DATE(S) REVISED
04/04/77 - MAKE IRC OPTIONAL
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MOVSTR,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'MSET'

PURPOSE
SET A SINGLE WORD (BY ABSOLUTE ADDRESS) IN USER'S FL

FUNCTIONAL CATEGORIES: K2

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'MSET' IS AN ENTRY POINT IN 'CMDRCT'.

USAGE
CALL MSET (ADDR, NEW)

DESCRIPTION OF PARAMETERS
ADDR - ADDRESS IN USER'S FL TO BE SET
NEW  - WORD TO BE PUT INTO 'ADDR'

NO ERROR CHECKING IS DONE.

CM REQUIRED: 11B (INCLUDES 'MFETCH')

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
? - NWL:

DATE WRITTEN:

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS (*DECK CMDRCT)
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,MSET,OUTPUT,MSACCES=<PASSWORD>.

06/14/84  2-189  MSET - 1 OF 1
FUNCTION 'MXGET'

PURPOSE
EXTRACT (RIGHT-JUSTIFIED, ZERO-FILLED) 0-10 6-BIT CHARACTERS FROM 60-BIT WORDS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
MXGET (WORD, START, NCHAR)

DESCRIPTION OF PARAMETERS
WORD - WORD FROM WHICH CHARACTERS ARE TO BE EXTRACTED
START - STARTING CHARACTER
(LEFT-MOST CHARACTER IS POSITION 1)
NCHAR - NUMBER OF CHARACTERS TO EXTRACT (0-10)
MXGET - WILL CONTAIN ONE OF:
-1 -- START OR NCHAR OR START+NCHAR INVALID
0 -- IF NCHAR IS 0
XXX -- EXTRACTED CHARACTER STRING, R-FORMAT

CM REQUIRED: 26B

EXAMPLES
1) EXTRACT CHARACTERS 3-7 FROM A WORD CONTAINING 'ABCDEFGHIJ':
   DATA WORD/ "ABCDEFGHIJ"/
   ...
   ICHARS = MXGET (WORD, 3, 5)
   ICHARS WILL CONTAIN 'CDEFG' (0000 0000 0003 0405 0607B)

2) EXTRACT 'THIS' FROM 'THISSTRING':
   DATA IWORD/ "THISSTRING"/
   ...
   IF (MXGET(IWORD,1,4) .EQ. 4RTHIS) ...

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND SHIFT
OTHERS
NONE

02/10/84
2-190
MXGET  - 1 OF 2
SUBROUTINE 'NEWDAT'

PURPOSE
ADD/SUBTRACT SPECIFIED NUMBER OF DAYS TO/FROM A GIVEN DATE

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL NEWDAT (FMT, OLD, NEW, OCENT, NCENT, ADD)

DESCRIPTION OF PARAMETERS
FMT - FORMAT OF DATE (INTEGER)
1 - 'MM/DD/YY'
2 - 'MM/DD/YY'
OLD - OLD DATE (MM/DD/YY)
NEW - NEW DATE
OCENT - OLD CENTURY (E.G., INTEGER 1900)
NCENT - NEW CENTURY (E.G., INTEGER 1900)
ADD - NUMBER OF DAYS TO ADD
(NEGATIVE TO SUBTRACT)

CM REQUIRED: 162B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
JGDATE - JULIAN/GREGORIAN DATE CONVERTER (MULTI-YEAR)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 1968

DATE(S) REVISED
02/73 - CONVERT TO SCOPE 3.3
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,NEWDAT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-192 NEWDAT - 1 OF 1
SUBROUTINE 'NFILL'

PURPOSE
FILL ELEMENTS 1 THRU N OF AN ARRAY WITH THE VALUES 1 THRU N, RESPECTIVELY

FUNCTIONAL CATEGORIES: A1

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL NFILL (A, N)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE FILLED
N - NUMBER OF ELEMENTS TO BE FILLED

CM REQUIRED: 6B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 08/09/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,NFILL,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-193 NFILL - 1 OF 1
FUNCTION 'NFILLT'
SUBROUTINE 'NFILLT'

PURPOSE
TEST AN ARRAY FOR THE PRESENCE OF THE INTEGERS 1 THRU N
IN ELEMENTS 1 THRU N, RESPECTIVELY

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
A SUGGESTED USE OF THIS ROUTINE IS IN CONJUNCTION WITH ONE
OF THE SORTING ROUTINES TO DETERMINE IF THE ARRAY BEING
SORTED WAS ALREADY IN ORDER.

USAGE
ISUB = NFILLT (A, N, I)
CALL NFILLT (A, N, I)

DESCRIPTION OF PARAMETERS
A   - ARRAY TO BE SCANNED
N   - NUMBER OF ELEMENTS TO TEST
I   = 0 - A(1) THRU A(N) CONTAIN 1 THRU N
    >0 - A(I) IS FIRST ELEMENT TO FAIL TEST
NFILLT - IF USED AS A FUNCTION, WILL RETURN THE SAME VALUE
         AS 'I'

CM REQUIRED: 25B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 08/19/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,NFILLT,OUTPUT,MSACces=<PASSWORD>.

02/10/84  2-194  NFILLT - 1 OF 1
SUBROUTINE 'NUMEXEC'

PURPOSE
GET NUMBER OF EXECUTE CARD PARAMETERS WHICH WERE USED IN
THIS EXECUTION OF THE PROGRAM

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL NUMEXEC (NEXEC)

DESCRIPTION OF PARAMETER
NEXEC - WILL RETURN THE NUMBER OF EXECUTE CARD PARAMETERS

CM REQUIRED: 16B

METHOD
THE NUMBER OF PARAMETERS IS IN THE RIGHTMOST 18 BITS OF
WORD RA+52 (64B) IN THE USER'S FL.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
MFETCH - GET SPECIFIED WORD OF USER'S FL

ARITHMETIC STATEMENT FUNCTIONS
R38FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/15/75

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, NUMEXEC, OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-195 NUMEXEC - 1 OF 1
SUBROUTINE 'NUMVAR'

PURPOSE
GET THE NUMBER OF ARGUMENTS THAT WERE PASSED TO THE ROUTINE
WHICH CALLED NUMVAR

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
WHEN USED, IT SHOULD PRECEDE OTHER EXECUTABLE STATEMENTS IN
THE SUBPROGRAM TO INSURE THAT THE REGISTERS HAVE NOT BEEN
DESTROYED.

USAGE
CALL NUMVAR (NARGS)

DESCRIPTION OF PARAMETER
NARGS - WILL CONTAIN THE NUMBER OF ARGS IN THE ROUTINE
WHICH CALLED NUMVAR

CM REQUIRED: 5B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
MIKE CHERNICK

DATE WRITTEN: UNKNOWN

DATE(S) REVISED
03/22/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,,NSRDC,,NUMVAR, OUTPUT, MSACCES=<PASSWORD>.

02/10/84
FUNCTION 'OFMTDE'

PURPOSE
   FAST 0-FORMAT DECODE

FUNCTIONAL CATEGORIES: 12

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   VARIABLE = OFMTDE (IWORD, ISTART, NCHAR)

DESCRIPTION OF PARAMETERS
   VARIABLE - WILL CONTAIN THE RESULT RIGHT-JUSTIFIED
                OR -1 IF NON-OCTAL DIGIT FOUND
                OR -2 IF ISTART IS OUT OF RANGE
                OR -3 IF ISTART+NCHAR GREATER THAN 10.
                (IF VARIABLE IS INTEGER, OFMTDE MUST BE DECLARED
                 INTEGER IN THE CALLING PROGRAM)
   IWORD   - WORD FROM WHICH THE FIELD WILL BE EXTRACTED
   ISTART  - FIRST CHARACTER POSITION OF FIELD WITHIN IWORD
             (1-10)
   NCHAR   - NUMBER OF CHARATERS IN FIELD (1-10)
             (ISTART+NCHAR MUST BE LESS THAN 11)

CM REQUIRED: 51B

EXAMPLE
   VARIABLE = OFMTDE (10L1234567654, 6, 3) WILL PRODUCE
             VARIABLE = 0000 0000 0000 0000 0676B
   VARIABLE = OFMTDE (5L123.4, 3, 3) WILL PRODUCE
             VARIABLE = 7777 7777 7777 7777 7776B
   VARIABLE = OFMTDE (IWORD, 0, 5) WILL PRODUCE
             VARIABLE = 7777 7777 7777 7777 7775B
   VARIABLE = OFMTDE (IWORD, 3, 8) WILL PRODUCE
             VARIABLE = 7777 7777 7777 7777 7774B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/24/75

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,OFMTDE,OUTPUT,MSACCE=<PASSWORD>.
FUNCTION 'OFMTV'

PURPOSE
FAST O-FORMAT DECODE OF VARIABLE LENGTH INPUT

FUNCTIONAL CATEGORIES: 12

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
VARIABLE = OFMTV (I)

DESCRIPTION OF PARAMETERS
VARIABLE - WILL CONTAIN THE RESULT RIGHT-JUSTIFIED
OR -1 IF A NON-OCTAL DIGIT FOUND.
IF VARIABLE IS INTEGER, OFMTV MUST BE
DECLARED INTEGER IN THE CALLING PROGRAM.
I - WORD OF OCTAL DIGITS ENDING WITH AN OCTAL
   OOB. (EG. 3L123, 9L123456701)

CM REQUIRED: 27B

EXAMPLE
VARIABLE = OFMTV (5L12345) WILL RETURN
VARIABLE = 0000 0000 0000 0001 2345B
VARIABLE = OFMTV (11+) WILL RETURN
VARIABLE = 7777 7777 7777 7777 7776B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/24/75

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,OFMTV,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84  2-199  OFMTV - 1 OF 1
SUBROUTINE 'OMRONI'

PURPOSE
INITIALIZE COMMON BLOCK /OMRON/ WITH ASCII CONTROL CODES
FOR OMRON CRT'S

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CyBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE MUST BE EXECUTED PRIOR TO GENERATING ASCII
MESSAGES WITH OMRON CONTROL CODES USING SUBROUTINE ASCII.

COMMON BLOCK /OMRON/ IS OBTAINED BY RUNNING PROCEDURE ASCIIIO
AND INSERTING THE COMMON BLOCK INTO EACH (SUB)PROGRAM WHICH
WILL GENERATE ASCII MESSAGES HAVING OMRON CONTROL CODES.

USAGE
CALL OMRONI

CM REQUIRED: 6B

NAMES OF CONTROL CODES
TAB CONTROL
   TABSET - SET TAB
   TABCLR - CLEAR TAB
   TAB - TAB
   TABBACK - BACK TAB
CURSOR CONTROL
   CURSU - CURSOR UP
   CURSD - CURSOR DOWN
   CURSR - CURSOR RIGHT
   CURSL - CURSOR LEFT
   HOME - CURSOR HOME
SCREEN CONTROL
   SCROLD - SCROLL DOWN
   SCROLU - SCROLL UP
   NXTPAG - NEXT PAGE
   PRVPAG - PREVIOUS PAGE
INSERT/DELETE
   INSCH - INSERT CHARACTER
   INSLIN - INSERT LINE
   DELCH - DELETE CHARACTER
   DELINE - DELETE LINE
CLEAR
    CLRIN - CLEAR LINE
    CLRSCR - CLEAR SCREEN
    CLRMEM - CLEAR MEMORY

VIDEO
    VIDNRM - NORMAL VIDEO
    VIDOFF - VIDEO OFF
    VIDREV - REVERSE VIDEO
    VIDDIM - DIM VIDEO
    REVDIM - DIM REVERSE VIDEO
    BLINK - BLINK
    BLNKRV - BLINK REVERSE
    UNDRON - UNDERLINE ON

SUBPROGRAMS REQUIRED
    PART OF LANGUAGE
        NONE
    OTHERS
        NONE

AUTHOR
    DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/07/84

DATE(S) REVISED

LOCATION OF DECKS
    SOURCE DECK
        UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
    OBJECT DECK
        EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
    BEGIN,DOCGET,,NSRDC,,OMRONI,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'OPLSA'

PURPOSE
ORTHOGONAL POLYNOMIAL LEAST SQUARE APPROXIMATION

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE APPROXIMATING POLYNOMIAL IS
C(1)+C(2)*X+C(3)*X**2+...+C(M+1)*X**M

FOR MORE THAN 9TH DEGREE OR MORE THAN 30 DATA POINTS, THE SOURCE PROGRAM MUST BE REDIMENSIONED.

USAGE
CALL OPLSA (N, W, X, F, M, D, A, C)

DESCRIPTION OF PARAMETERS
N - NUMBER OF DATA POINTS (MAX: 30)
W - ARRAY OF N WEIGHTS
X - ARRAY OF N DATA POINTS
F - ARRAY OF N FUNCTION VALUES
M - DESIRED DEGREE OF POLYNOMIAL (MAX: 9)
D - OUTPUT ARRAY OF COEFFICIENTS OF POLYNOMIALS O(J,X)
   (DIMENSION: 10,N)
A - OUTPUT ARRAY OF COEFFICIENTS OF O(J,X)'S OF LEAST SQUARE POLYNOMIALS (DIMENSION: M+1)
C - ARRAY TO CONTAIN COEFFICIENTS OF RESULTING LEAST SQUARE POLYNOMIAL (SEE REMARKS) (DIMENSION: M+1)

CM REQUIRED: 767B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHORS
UNIVERSITY OF MARYLAND
S VOIGT

DATE WRITTEN: 1971

DATE(S) REVISED
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS (*DECK AMOPLSA)

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,,NSRDC,,OPLSA,OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-203 OPLSA - 2 OF 2
SUBROUTINE 'OVNAME'

PURPOSE
GET NAME OF FILE CURRENTLY BEING EXECUTED

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'I' MAY BE USED AS THE FIRST ARGUMENT IN 'CALL OVERLAY'.

USAGE
CALL OVNAME (I)

DESCRIPTION OF PARAMETER
I - WILL CONTAIN THE LOCAL FILE NAME CURRENTLY BEING EXECUTED

CM REQUIRED: 3

METHOD
THE FILE NAME IS EXTRACTED FROM BITS 59-18 OF WORD RA+64B IN THE USER'S FIELD LENGTH

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
? - NWL

DATE WRITTEN: ?

DATE(S) REVISED
03/22/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,OVNAME,OUTPUT,MSACCES=<PASSWORD>.

06/07/84  2-204  OVNAME - 1 OF 1
SUBROUTINE 'PARGET'

PURPOSE
GET ALL PARAMETERS OF USER-SUPPLIED PARAMETER STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL PARGET (IAREA, LAREA, IPARAM, NPARAM, ISEP, RSEP, LSEP)
CALL PARENT (IAREA, LAREA, IPARAM, NPARAM, ISEP, RSEP)
CALL PARENT (IAREA, LAREA, IPARAM, NPARAM, ISEP)
CALL PARENT (IAREA, LAREA, IPARAM, NPARAM)

DESCRIPTION OF PARAMETERS
IAREA - AREA CONTAINING PARAMETER LIST TO BE EXTRACTED
LAREA - NUMBER OF WORDS IN 'IAREA' (16 MAX)
IPARAM - ARRAY TO CONTAIN PARAMETERS
(IF IT IS NOT KNOWN WHETHER THE PARAMETER LIST IN
IAREA CONTAINS A TERMINATOR ('.' OR ')') OR NOT,
THEN IPARAM, ISEP, LSEP AND RSEP SHOULD BE
DIMENSIONED AT LEAST 10 TIMES LAREA. THIS WILL
ALLOW FOR THE WORST POSSIBLE CASE (IAREA ALL
BLANKS).)
NPARAM - WILL BE NUMBER OF PARAMETERS FOUND
ISEP - IF PRESENT, ARRAY TO CONTAIN A CODE IDENTIFYING
THE SEPARATOR FOUND FOLLOWING THE CORRESPONDING
PARAMETER
DEC OCT SEPARATOR
1 1 ,
2 2 =
3 3 /
4 4 (4
5 5 +
6 6 -
7 7 BLANK
8 10B ;
14 16B OTHER
15 17B , OR ) (TERMINATOR)
RSEP - IF PRESENT, ARRAY TO CONTAIN THE SEPARATOR
FOUND (1R FORMAT)
LSEP - IF PRESENT, ARRAY TO CONTAIN THE SEPARATOR
FOUND (1L FORMAT)

CM REQUIRED: 117B
SUBPROGRAMS REQUIRED
  PART OF LANGUAGE
  LOCF
  OTHERS
EXTPRM - EXTRACT THE NEXT PARAMETER

AUTHOR
  DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/11/74

DATE(S) REVISED
  11/18/75 - NAME CHANGED FROM GETPAR TO PARGET TO AVOID
             CONFLICT WITH SYSIO ROUTINE OF SAME NAME
  06/24/76 - PROCESSING OF OPTIONAL PARAMETERS MODIFIED
  03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
  UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
  EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,PARGET,OUTPUT,MSACCE=<PASSWORD>.
SUBROUTINE 'PF'
SUBROUTINE 'PFX'
SUBROUTINE 'PFLOOK'
SUBROUTINE 'PFWAIT'
SUBROUTINE 'LF'

PURPOSE
FORTRAN CALLABLE PERMANENT FILE FUNCTIONS AND AUXILIARY FILE ACTION REQUESTS

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE PERMANENT FILE FUNCTIONS HAVE BEEN DEVELOPED ACCORDING TO A CDC WRITTEN AND VIM APPROVED SPECIFICATION. THE AUXILIARY FILE ACTION REQUESTS HAVE BEEN EXTENDED TO INCLUDE THE 'ROUTE' FUNCTION.

SINCE IT IS NOT KNOWN IF CDC WILL RELEASE THE CODE, THIS VERSION WAS OBTAINED FROM VIM.

EXTENSIONS TO THE APPROVED SPECIFICATION ARE NOTED IN THE DESCRIPTION BELOW.

ONLY THOSE PARAMETERS WHICH HAVE MEANING AT DINSRDC ARE LISTED IN THIS DOCUMENT.

USERS SHOULD EXPERIENCE LITTLE OR NO PROGRAM MODIFICATION IF CDC IMPLEMENTS THIS FACILITY.

NOTES FOR COBOL:
1. THE PARAMETERS FOR THE PF FUNCTIONS SHOULD BE AT THE BEGINNING OF WORKING STORAGE TO ENSURE CORRECT WORD BOUNDARY.
2. PICTURES MUST BE FULL WORDS.
3. THE PFN MUST BE A PICTURE OF FOUR WORDS-----X(40).
4. RCV AND ERRV MUST BE COMP-1 PIC 9(10).
5. REMEMBER TO ENTER COMPASS, NOT FORTRAN-X.
6. WHEN ENTERING PF, REMEMBER TO PUT PF IN QUOTES SINCE IT IS A COBOL RESERVED WORD.
7. BOTH LFN AND PFN MUST BE SPECIFIED.

THIS PACKAGE REPLACES THE FOLLOWING SUBROUTINES IN LIBRARY NSRDC: REQUEST, ROUTE, ZPPPUT, ZPFUNC, ZRTPUT. THESE ROUTINES WILL CONTINUE TO BE AVAILABLE FOR USE BY EXISTING PROGRAMS, BUT MAY NOT BE UPGRADED FOR FUTURE RELEASES OF NOS/BE.

RELATED ROUTINES IN LIBRARIES NSRDC AND/OR NSRDC5:
LPPFERR - SEPARATE LF/PF "ERR" CODES
PFRC  - INTERPRET PF INTEGER RETURN CODE ("RC")
ROUTERC - INTERPRET LF("ROUTE") INTEGER RETURN CODE ("RC")

12/20/83 2-207 PF - 1 OF 15
**Usage**

```plaintext
CALL PF ("FUNCTION", "LFN", "PFN", KEY(1), VAL(1), ..., Key(N), Val(N))
CALL PFX ("FUNCTION", "LFN", "PFN", KEYS, VALS, RETURN)
CALL PFLOOK (LOOK)
CALL PFWAIT (LOOK)
CALL LF ("REQUEST", "LFN", "KEY(1)", "KEY(2)", "VAL(1)", ...
    )
CALL LF ("RETURN", "LFN(1)", "LFN(2)", ..., "LFN(N)"
CALL LF ("RETURNX", "LFN(1)", "LFN(2)", ...
    )
CALL LF ("ROUTE", "LFN", "KEY(1)", "KEY(2)", "VAL(1)", ...
    )
```

**Description of Parameters**

**CALL PF**

**Function** - One of the following:

<table>
<thead>
<tr>
<th>Function</th>
<th>FTN5/4</th>
<th>FTN5</th>
<th>FTN4</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;ATTACH&quot;</td>
<td>OR L&quot;ATTACH&quot;</td>
<td>OR 6LATTACH</td>
<td></td>
</tr>
<tr>
<td>&quot;CATALOG&quot;</td>
<td>OR L&quot;CATALOG&quot;</td>
<td>OR 7LCATALOG</td>
<td></td>
</tr>
<tr>
<td>&quot;EXTEND&quot;</td>
<td>OR L&quot;EXTEND&quot;</td>
<td>OR 6LEXEND</td>
<td></td>
</tr>
<tr>
<td>&quot;RENAME&quot;</td>
<td>OR L&quot;RENAME&quot;</td>
<td>OR 6LRENAME</td>
<td></td>
</tr>
<tr>
<td>&quot;PURGE&quot;</td>
<td>OR L&quot;PURGE&quot;</td>
<td>OR 5LPURGE</td>
<td></td>
</tr>
<tr>
<td>&quot;ALTER&quot;</td>
<td>OR L&quot;ALTER&quot;</td>
<td>OR 5LALTER</td>
<td></td>
</tr>
<tr>
<td>&quot;PERM&quot;</td>
<td>OR L&quot;PERM&quot;</td>
<td>OR 4LPERM</td>
<td></td>
</tr>
</tbody>
</table>

**LFN** - Local file name

(Left-justified display code (first must be alphabetic, first 7 characters used)
--OR--
N (For tape, 1 <= N <= 999))

**PFN** - Permanent file name

(0-40 left-justified display code, first blank or binary zero ends the PFN)
(Extension: If first character of PFN is blank or binary zero, PFN = LFN)
(Extension: If first character of LFN is blank or binary zero, LFN = PFN (first 7 characters))

**KEYI, VALI** - One of the following pairs:

<table>
<thead>
<tr>
<th>Key(I)</th>
<th>Val(I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;ID&quot;</td>
<td>4- to 9-character string</td>
</tr>
<tr>
<td>&quot;RP&quot;</td>
<td>3-digit string</td>
</tr>
<tr>
<td>*RW &quot;CY&quot;</td>
<td>3-digit string</td>
</tr>
<tr>
<td>&quot;TK&quot;</td>
<td>9-character string</td>
</tr>
<tr>
<td>&quot;CN&quot;</td>
<td>9-character string</td>
</tr>
<tr>
<td>&quot;MD&quot;</td>
<td>9-character string</td>
</tr>
<tr>
<td>&quot;EX&quot;</td>
<td>9-character string</td>
</tr>
<tr>
<td>&quot;RD&quot;</td>
<td>9-character string</td>
</tr>
<tr>
<td>&quot;XR&quot;</td>
<td>9-character string</td>
</tr>
</tbody>
</table>

12/20/83 2-208 PF - 2 of 15
"PW" UP TO 5 PASSWORDS
9-CHARACTER STRING
"AC" 10-CHARACTER STRING
(ALL DIGITS OR 5+9 DIGITS)
"MR" "O" OR "1"
"LC" "O" OR "1"
"RW" "O" OR "1"
"RB" "O" OR "1"
"FO" "IS" OR "DA" OR "AK"
"ST" 3-CHARACTER STRING
"SN" 7-CHARACTER STRING
(for user device set)
(synonym: "SETNAME")
"VSN" 6-CHARACTER STRING
(for user device set)
*W "RC" INTEGER VARIABLE FOR RETURN CODE
(extension -- not for COBOL4)
*W "RRC" REAL VARIABLE FOR RETURN CODE
(extension)
"NONE" ANY VALUE (SKIP NEXT WORD IN
PARAMETER LIST - NO OP)
*W "ERR" INTEGER VARIABLE CONTAINING ERROR
CODE FOR PARAMETER ERRORS. USE AS
FIRST KEY(I) WHEN DEBUGGING, THEN
REMOVE AFTER DEBUGGING IS
COMPLETE.
(SEE 'FORMAT OF ERR' BELOW.)
"NR" "O" OR "1" (extension)
"O" - DO NOT RETURN UNTIL ACTION
HAS COMPLETED.
"1" - START ACTION AND DON'T WAIT.
YOU ARE RESPONSIBLE FOR
CHECKING THE COMPLETION BY
USING PFLOOK AND/OR PFWAIT.
"DAY" DAYFILE OUTPUT (extension)
"ON" - PUT 1- TO 5-LINE SUMMARY
INTO DAYFILE
"OFF" - NO DAYFILE MESSAGES
"FLUSH" - DISPLAY CURRENT DAYFILE
MESSAGES NOW
(DEFAULT: "ON")
(CAUTION: IF DAY=OFF, ERROR
MESSAGES ARE ALSO SUPPRESSED)
*RW - VAL(I) IS READ/WRITE. MUST BE A
VARIABLE, NOT A CONSTANT.
*W - VAL(I) IS WRITE ONLY. MUST BE A
VARIABLE, NOT A CONSTANT.
ALL OTHERS ARE READ ONLY.

CALL PFX (LIKE PF, EXCEPT KEYS AND VALUES ARE IN ARRAYS)
FUNCTION - SAME AS FOR 'PF'
LFN - SAME AS FOR 'PF'
PFN - SAME AS FOR 'PF'
KEYS - ARRAY CONTAINING KEYWORDS.
(END WITH "END")
VALS - ARRAY CONTAINING CORRESPONDING VALUES.
RETURN - RETURN CODE
(WILL HAVE SAME AS "RC" PARAMETER)

12/20/83 2-209 PF - 3 OF 15
CALL PFLOOK (CHECK ON PERMANENT FILE STATUS)
LOOK - WILL CONTAIN THE STATUS IN THE FORMAT:

<table>
<thead>
<tr>
<th>BITS</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>0 = PREVIOUS FUNCTION INCOMPLETE</td>
</tr>
<tr>
<td>1</td>
<td>1 = PREVIOUS FUNCTION COMPLETE</td>
</tr>
<tr>
<td>58:9</td>
<td>0 = UNUSED</td>
</tr>
<tr>
<td>8:0</td>
<td>ERROR VALUE (SEE 'NOS/BE-GENERATED RETURN CODES FOR PF/PFX' BELOW)</td>
</tr>
</tbody>
</table>

CALL PFWAIT (WAIT UNTIL PERMANENT FILE FUNCTION IS COMPLETE)
LOOK - SAME AS FOR 'PFLOOK'

NOTE - IF THE ACTION WILL NEVER COMPLETE, THE SYSTEM WILL ABORT THE JOB WITH 'JOB HUMG IN AUTO RECALL'. THE CODE IN THE VICINITY OF THIS SUBROUTINE HAS PROBABLY BEEN Clobbered.

CALL LF ("REQUEST", ...) (REQUEST *PF OR *Q)
LFN - SAME AS FOR 'PF'

KEY(I) - ONE OF:
"*PF" - PERMANENT FILE SPACE
"*Q" - QUEUE SPACE
"SN" - SETNAME OF USER DEVICE SET (THE NEXT PARAMETER IS THE <SETNAME>)
"VSN" - VOLUME SERIAL NUMBER OF USER DEVICE SET (THE NEXT PARAMETER IS THE <VSN>)

VAL(I) - VALUES FOR 'SN' AND "VSN" KEYS

CALL LF ("RETURN", ...) (RETURN FILES)
CALL LF ("RETURNX", ...) (RETURN FILES)
LFN(I) - SAME AS FOR 'PF'

NOTES - 1) RETURN RETURNS ANY FILE IN THE PROGRAM, WHETHER IT HAS BEEN DECLARED OR NOT (LOOKS FOR FIT'S (FILE INFORMATION TABLES)). RETURNX RETURNS ANY FILE, EVEN IF IT IS NOT PART OF THE PROGRAM (DOES NOT LOOK FOR FIT'S).

- 2) THIS SETS THE FIT (IF THERE IS ONE) AS BEING CLOSED. THIS IS TO PREVENT RECORD MANAGER FROM RE-OPENING THE FILE AT END-OF-PROGRAM. BE CAREFUL! IF YOUR FILE HAS NOT BEEN CLOSED PROPERLY, LF(RETURN) WILL NOT FLUSH YOUR BUFFERS AND WILL NOT FIX UP ANY DIRECTORIES OF OTHER FILE LINKAGES. THEREFORE, BE SURE YOUR FILES ARE CLOSED. 'REWIND', 'END FILE', 'CLOSE', 'CALL CLOSEM', 'CALL CLOSMS' ARE SOME WAYS TO CLOSE A FILE (USE ONE FOR THE KIND OF FILE TO BE CLOSED) BEFORE LF(RETURN).
CALL LF ("ROUTE", ... ) (ROUTE A FILE)
LFN - SAME AS FOR 'PF'

KEY(I) - ONE OF:
"ERR" - SAME AS FOR 'PF'
"RC" - SAME AS FOR 'PF'
(SEE 'NOS/BE-GENERATED MESSAGES FOR LF(ROUTE)'
BELOW)
"RRC" - SAME AS FOR 'PF'
"FID" - FILE ID
(1-5 DISPLAY CODE CHARACTERS)
OPTIONALLY PRECEDED BY *)
"TID" - TERMINAL ID
(3 HEXADECIMAL DIGITS, -OR-
"C" FOR CENTRAL SITE)
*S "DEFER" - DON'T ROUTE THE FILE UNTIL END-OF-JOB
(SYNONYMS: "DEF", "DEFERRED")
"DC" - DISPOSITION CODE. ONE OF:
"SC" - SCRATCH (DEFAULT)
"PR" - PRINTER
"PU" - PUNCH
"IN" - INPUT QUEUE
"TO" - COBOLESE SYNONYM FOR "DC"
(SYNONYMS: "EQUIP", "EQUIPMENT")
NOTE: "DC" WORKS ONLY WITH THE ABOVE KEYWORDS;
"TO", ETC., WORK ONLY WITH THE FOLLOWING KEYWORDS:
"PRINTER" - PRINTER
"PRINT" - PRINTER
"OUTPUT" - PRINTER
"PUNCH" - PUNCH
"PUNCHB" - PUNCH
"SCRATCH" - SCRATCH
"INPUT" - INPUT QUEUE
"FC" - FORMS CODE (SEE CCRM, P 2-14)
(SYNONYM: "FORMS")
"REP" - REPEAT COUNT FOR NUMBER OF OUTPUT COPIES
(SYNONYMS: "REPETCOUNT", "REPEATCNT")
"DEPENDENCY" - DEPENDENCY COUNT
"PRI" - PRIORITY FOR REMOTE SITES  
(SYNONYM: "PRIORITY")

"EXT" - EXTERNAL CHARACTERISTICS CODE  
(SEE CCRM, P 2-11)  
(NOTE: "EXT" USED TO AVOID  
CONFLICT WITH "EC"  
PARAMETER OF PF/PFX,  
WHICH IS NOT USED AT  
DTNSRDC.)  
(SYNONYMS: "EXTERNAL",  
"EXTCODE")

"RETURNNAME" - RETURN NAME ASSIGNED BY THE  
SYSTEM

"SC" - SPACING CODE FOR 580 PRINTER  
ON CYBER 176  
(SYNONYM: "SPACECODE")

*S - SINGLE KEYWORD. ALL OTHERS REQUIRE A  
VAL(I) AS THE NEXT PARAMETER.

VAL(I) - REQUIRED FOR THOSE KEYWORDS WHICH HAVE VALUES  
AND MUST FOLLOW THE CORRESPONDING KEY(I)

CM REQUIRED: 2060B
EXAMPLES

1) ATTACH, COPY AND CATALOG A PERMANENT FILE OF CARD IMAGES:

```plaintext
PROGRAM COPY80 (INPUT, OUTPUT)
C
C SAMPLE PROGRAM TO COPY A FILE OF CARD IMAGES
C
CHARACTER REC * 80
C
INTEGER PFNIN(4), PFNOUT(4)
INTEGER RC
C
GET NAME OF FILE TO BE COPIED
C
100 CONTINUE
IDIN = " "
READ (*, 1, END=110) IDIN, PFNIN
C
IF SPECIFIED, ATTACH THE FILE
C
110 CONTINUE
IF (IDIN .NE. " ") THEN
CALL PF ("ATTACH", "INFYL", PFNIN, "ID", IDIN, "RC", RC)
A
C
IF NOT ATTACHED, PRINT ERROR MESSAGE
C
IF (RC .NE. 0) THEN
WRITE (*, 2) 'ATTACH', PFNIN, IDIN, RC
C
FILE ATTACHED, GET PF SPACE AND COPY IT
C
ELSE
CALL LF ("REQUEST", "OUTFYL", "*PF")
OPEN (1, FILE='INFYL')
OPEN (2, FILE='OUTFYL')
NIN = 0
120 CONTINUE
READ (1, 3, END=130) REC
NIN = NIN + 1
WRITE (2, 3) REC
GO TO 120
C
WRITE AN EOF ON OUTPUT FILE
C
130 CONTINUE
END FILE 2
WRITE (*, 4) NIN
C
GET NAME OF NEW FILE (IF NONE, USE OLD PFN/ID)
C
IDOUT = " "
READ (*, 1, END=140) IDOUT, PFNOUT
```

12/20/83  2-213  PF  -  7 OF 15
C CATALOG THE NEW FILE
C
140 CONTINUE
   IF (IDOUT .EQ. "") THEN
      CALL PF ("CATALOG", "OUTFYL", PFNIN,
               "ID", IDIN, "RC", RC)
      IF (RC .NE. 0) WRITE (*, 2) 'CATALOG', PFNIN,
               IDIN, RC
   ELSE
      CALL PF ("CATALOG", "OUTFYL", PFNOUT,
               "ID", IDOUT, "RC", RC)
      IF (RC .NE. 0) WRITE (*, 2) 'CATALOG', PFNOUT,
               IDOUT, RC
   END IF
C ELSE
C ERROR - NO FILE NAME READ
C ELSE
   WRITE (*, 5)
END IF
C RETURN FILES
C (AN ALTERNATE WAY IS:
C REWIND 2
C CALL LF ("RETURN", "INFYL", "OUTFYL")
C
CLOSE (1, STATUS='DELETE')
CLOSE (2, STATUS='DELETE')
C FORMATS
C
1 FORMAT (A4, 4A10)
2 FORMAT ('COULD NOT ', A, ' FILE ', 4A10 /
               ' ID=', A4, ' - RETURN CODE = ', O3, 'B')
3 FORMAT (A)
4 FORMAT ('0', 110, ' RECORDS COPIED')
5 FORMAT ('ERROR - NO FILE NAME READ - COPY NOT DONE')
C
END
2) CREATE AND ROUTE A FILE TO PRINT ON THE XEROX PRINTER:

PROGRAM ROUTST
C
C SAMPLE PROGRAM ILLUSTRATING ROUTE
C
CHARACTER LINE * 133
CHARACTER RCTEXT * 50
C
INTEGER RC
C
GET QUEUE SPACE FOR FILE
C
100 CONTINUE
CALL LF ("REQUEST", "XRX", "*Q")
OPEN (1, FILE='XRX')
REWIND 1
C
CODE TO WRITE TO FILE XRX
C
...
C
CLOSE AND ROUTE
C
REWIND 1
CLOSE (1, STATUS='KEEP')
C
PRINT MESSAGE (ROUTERC IS IN LIBRARY NSRDC5)
C
IF (RC .NE. 0) THEN
   CALL ROUTERC (RC, RCTEXT)
   PRINT 1, RC, RC, RCTEXT
ELSE
   PRINT 2, NAME
END IF
C
FORMATS
C
1 FORMAT ('OROUTE FAILED - RETURN CODE = ', 03, 'B (', A 12, ')') /
B 1X, A)
2 FORMAT ('OFILE ROUTED WITH NAME ', A7)
C
END
3) COPY AND CATALOG A FILE OF CARD IMAGES USING COBOL5:

IDENTIFICATION DIVISION.
PROGRAM-ID. CPYFYL.
ENVIRONMENT DIVISION.
INPUT-OUTPUT SECTION.
FILE-COMTROL.
    SELECT IN-FILE ASSIGN TO "INPUT".
    SELECT OUT-FILE ASSIGN TO "TEST"
    USE "BT=C,RT=Z".
DATA DIVISION.
FILE SECTION.
FD IN-FILE
    LABEL RECORDS ARE OMITTED
    DATA RECORD IS IN-REC.
01 IN-REC PIC X(80).
FD OUT-FILE
    LABEL RECORDS ARE OMITTED
    DATA RECORD IS OUT-REC.
01 OUT-REC PIC X(80).
WORKING-STORAGE SECTION.
01 REQUEST PIC X(10) VALUE "REQUEST ".
01 PF-SPACE PIC X(10) VALUE "PF ".
01 CATALOG PIC X(10) VALUE "CATALOG ".
01 LFN PIC X(10) VALUE "TEST ".
01 PFN PIC X(10) VALUE "TESTPFN ".
01 PFNFIL PIC X(30) VALUE SPACES.
01 ERR PIC X(10) VALUE "ERR ".
01 ERRV COMP-1 PIC 9(10).
01 ID PIC X(10) VALUE "ID ".
01 IDV PIC X(10) VALUE "XXXX ".
01 RC PIC X(10) VALUE "RC ".
01 RCV COMP-1 PIC 9(10).
01 OUT-LINE PIC X(80).
PROCEDURE DIVISION.
START-PG.
    OPEN INPUT IN-FILE.
    ENTER COMPASS "LF" USING REQUEST LFN PF-SPACE.
    OPEN OUTPUT OUT-FILE.
READ-PARAG.
    READ IN-FILE
        AT END GO TO EOJ.
    MOVE IN-REC TO OUT-LINE.
    WRITE OUT-REC FROM OUT-LINE.
    GO TO READ-PARAG.
EOJ.
    CLOSE IN-FILE OUT-FILE.
    ENTER COMPASS "PF" USING CATALOG LFN PFN ERR ERRV
        ID IDV RC RCV.
    IF RCV IS EQUAL TO 0
        DISPLAY "FILE CATALOGUED"
    ELSE
        DISPLAY "FILE NOT CATALOGUED".
    STOP RUN.
ERROR MESSAGES

IF "ERR" IS PROVIDED, PARAMETERS ERRORS ARE RETURNED (SEE FORMAT OF "ERR").

IF "RC" OR "RRC" IS PROVIDED, EXECUTION ERRORS ARE RETURNED (SEE NOS/BE-GENERATED MESSAGES).

OTHER ERROR MESSAGES INCLUDE:
- ENTERED FROM 000121 - INTERNAL PF ABORT
- SOME OTHER ERROR OCCURRED.

NO ERROR RETURN SUPPLIED - INTERNAL PF ABORT
- SOME PARAMETER WAS IN ERROR AND "ERR" WAS NOT USED.

FORMAT OF "ERR"

<table>
<thead>
<tr>
<th>BITS</th>
<th>EXPLANATION</th>
</tr>
</thead>
</table>
| 59:36| 0 - UNUSED
| 35:18| PARAMETER IN ERROR  |
| 17:10| SPECIFIC ERROR       |

SUBROUTINE LFPFERR IN LIBRARY NSRDC MAY BE USED TO EXTRACT THESE TWO VALUES.

SPECIFIC ERRORS

<table>
<thead>
<tr>
<th>ROUTINE</th>
<th>FUNCTION</th>
<th>OCT</th>
<th>DEC</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>INTERDICTED PROCESSING</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- UNEXPECTED BINARY ZERO PARAMETER.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ALL ROUTINES USE THIS COMMON EXIT - LOOK FOR CORE CLOBBER OR MESSED UP PARAMETER LIST OR SHORT LIST.</td>
</tr>
<tr>
<td>LF</td>
<td></td>
<td>0010</td>
<td>8</td>
<td>NO PARAMETERS SUPPLIED AT ALL.</td>
</tr>
<tr>
<td>LF</td>
<td></td>
<td>0020</td>
<td>16</td>
<td>FUNCTION IS BINARY ZERO.</td>
</tr>
<tr>
<td>LF</td>
<td></td>
<td>0030</td>
<td>24</td>
<td>UNDEFINED FUNCTION.</td>
</tr>
<tr>
<td>LF</td>
<td>&quot;ROUTE&quot;</td>
<td>0050</td>
<td>40</td>
<td>NO FILE NAME.</td>
</tr>
<tr>
<td>LF</td>
<td>&quot;ROUTE&quot;</td>
<td>0060</td>
<td>48</td>
<td>FILE NAME BINARY ZERO.</td>
</tr>
<tr>
<td>LF</td>
<td>&quot;ROUTE&quot;</td>
<td>0070</td>
<td>56</td>
<td>UNDEFINED FUNCTION.</td>
</tr>
<tr>
<td>LF</td>
<td>&quot;REQUEST&quot;</td>
<td>0100</td>
<td>64</td>
<td>NO FILE NAME.</td>
</tr>
<tr>
<td>LF</td>
<td>&quot;REQUEST&quot;</td>
<td>0110</td>
<td>72</td>
<td>UNDEFINED PARAMETER.</td>
</tr>
<tr>
<td>LF</td>
<td>&quot;REQUEST&quot;</td>
<td>0120</td>
<td>80</td>
<td>1ST CHAR LFN NO-ALFA.</td>
</tr>
<tr>
<td>PFX</td>
<td></td>
<td>0200</td>
<td>128</td>
<td>BINARY ZERO ADDRESS IN 4TH PARAMETER.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NOTE THAT IN THIS CASE THE PARAM NUMBER IS GARBAGE.</td>
</tr>
<tr>
<td>PFX</td>
<td></td>
<td>0210</td>
<td>136</td>
<td>BINARY ZERO ADDRESS IN 5TH PARAMETER.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NOTE THAT IN THIS CASE THE PARAM NUMBER IS GARBAGE.</td>
</tr>
</tbody>
</table>
PF/PFX 0300 192 UNDEFINED PARAMETER.
PF/PFX 0310 200 ILLEGAL LFN.
PF/PFX 0320 208 BINARY ZERO OR NON-ALFA IN LFN.
PF/PFX 0330 816 NO OR ILLEGAL PFN.
PF 0340 224 UNDEFINED PARAMETER.
PFX 0350 232 BINARY ZERO 1ST PARAM.
PFX 0360 240 BINARY ZERO PARAMETER.
PFX 0370 248 UNDEFINED PARAMETER.
PFX/PFX 0400 256 NEITHER LFN NOR PFN.
PFX/PFX 0500 320 ALFA IN REAL TIME SWITCH.
PFX/PFX 0510 328 NON-ALFA, NON-NUMERIC IN REAL TIME SWITCH.
LF 0600 384 BINARY ZERO/BLANKS IN DISPOSITION CODE.
LF 0610 392 ILLEGAL DISPOSITION CODE.
LF 0700 448 FID BINARY ZERO/BLANKS.
LF 1000 512 TID BINARY ZERO/BLANKS.
LF 1100 576 BINARY ZERO OR BLANKS IN DISPOSITION CODE EQUIP.
LF 1110 584 ILLEGAL PARAMETER.
LF 1200 640 BINARY ZERO OR BLANKS IN FORMS CODE.
1300 704 ALFA OR BINARY ZERO IN DIGIT STRING.
1310 712 SPECIAL CHARACTER IN DIGIT STRING.
PF/LF 1320 720 STRING TOO LONG.
PF/LF 1330 728 TOO MANY PARAMETERS.
PF/LF 1340 736 MORE THAN 5 PASSWORDS.
PF/LF 1350 744 FAILED ABSOLUTE CHAR TEST.
PF/LF 1360 752 EXCEEDED BINARY MAXIMUM.
1400 816 XX IN TAPEXX > 99.
5000 2560 USER HAS CLOBBERED CORE.
6001 3073 INVALID TID.
### NOS/BE-GENERATED MESSAGES FOR PF/PFX *

<table>
<thead>
<tr>
<th>DEC</th>
<th>OCT</th>
<th>COMND</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>000</td>
<td>ALL</td>
<td>FUNCTION SUCCESSFUL</td>
</tr>
<tr>
<td>1</td>
<td>001</td>
<td>PFN/ID ERROR</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>002</td>
<td>A,P</td>
<td>LFN ALREADY IN USE</td>
</tr>
<tr>
<td>3</td>
<td>003</td>
<td>CEPR</td>
<td>UNKNOWN LFN</td>
</tr>
<tr>
<td>4</td>
<td>004</td>
<td>C</td>
<td>TOO MANY CYCLES (5 MAX)</td>
</tr>
<tr>
<td>5</td>
<td>005</td>
<td>C,E</td>
<td>PF CATALOG FULL</td>
</tr>
<tr>
<td>6</td>
<td>006</td>
<td></td>
<td>NO LFN OR PFN</td>
</tr>
<tr>
<td>8</td>
<td>010</td>
<td>C,E</td>
<td>LATEST INDEX NOT WRITTEN</td>
</tr>
<tr>
<td>9</td>
<td>011</td>
<td>C</td>
<td>FILE NOT ON A PF DEVICE</td>
</tr>
<tr>
<td>10</td>
<td>012</td>
<td>A</td>
<td>FILE NOT CATALOGED, SN=&lt;SETNAME&gt;</td>
</tr>
<tr>
<td>11</td>
<td>013</td>
<td>A</td>
<td>ARCHIVE RETRIEVAL ABORTED</td>
</tr>
<tr>
<td>12</td>
<td>014</td>
<td>C,R</td>
<td>BAD LPF COMMUNICATION</td>
</tr>
<tr>
<td>13</td>
<td>015</td>
<td>C</td>
<td>CY LIMIT REACHED (999 MAX)</td>
</tr>
<tr>
<td>14</td>
<td>016</td>
<td>C</td>
<td>PF DIRECTORY FULL</td>
</tr>
<tr>
<td>15</td>
<td>017</td>
<td>CEPR</td>
<td>FUNCTION ATTEMPTED ON A NON-PERMANENT FILE</td>
</tr>
<tr>
<td>16</td>
<td>020</td>
<td></td>
<td>FCN ATTEMPTED ON NON-LOCAL FILE</td>
</tr>
<tr>
<td>17</td>
<td>021</td>
<td>A</td>
<td>IMPROPER ARCHIVE RETRIEVAL CALL</td>
</tr>
<tr>
<td>18</td>
<td>022</td>
<td>C</td>
<td>FILE NEVER ASSIGN TO A DEVICE</td>
</tr>
<tr>
<td>19</td>
<td>023</td>
<td>A</td>
<td>CYCLE INCOMPLETE OR DUMPED</td>
</tr>
<tr>
<td>20</td>
<td>024</td>
<td>A</td>
<td>FILE ALREADY ATTACHED</td>
</tr>
<tr>
<td>21</td>
<td>025</td>
<td>A</td>
<td>FILE ARCHIVED</td>
</tr>
<tr>
<td>22</td>
<td>026</td>
<td></td>
<td>ILLEGAL CHARACTER IN FDB PARAM</td>
</tr>
<tr>
<td>23</td>
<td>027</td>
<td></td>
<td>ILLEGAL LFN</td>
</tr>
<tr>
<td>24</td>
<td>030</td>
<td>A</td>
<td>FILE DUMPED</td>
</tr>
<tr>
<td>25</td>
<td>031</td>
<td></td>
<td>ILLEGAL FUNCTION CODE</td>
</tr>
<tr>
<td>26</td>
<td>032</td>
<td>P</td>
<td>PURGE ATTEMPT IGNORED; USE RB PARAMETER</td>
</tr>
<tr>
<td>27</td>
<td>033</td>
<td></td>
<td>ALTER NEEDS EXCLUSIVE ACCESS</td>
</tr>
<tr>
<td>28</td>
<td>034</td>
<td></td>
<td>FDB IS TOO LARGE</td>
</tr>
<tr>
<td>29</td>
<td>035</td>
<td>C</td>
<td>FILE ALREADY IN SYSTEM</td>
</tr>
<tr>
<td>30</td>
<td>036</td>
<td>A</td>
<td>NO APF SPACE</td>
</tr>
<tr>
<td>31</td>
<td>037</td>
<td></td>
<td>PERMISSION CONFLICTS</td>
</tr>
<tr>
<td>32</td>
<td>040</td>
<td>ILLEGAL SETNAME SPECIFIED</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>041</td>
<td></td>
<td>DEVICE NOT MOUNTED AT CTL POINT</td>
</tr>
<tr>
<td>34</td>
<td>042</td>
<td>RBT CHAIN TOO LARGE FOR PFC</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>043</td>
<td>A,P</td>
<td>FILE RESIDES ON UNAVAILABLE DEVICE</td>
</tr>
<tr>
<td>36</td>
<td>044</td>
<td>A,P</td>
<td>FILE NOT AVAILABLE</td>
</tr>
<tr>
<td>56</td>
<td>070</td>
<td></td>
<td>PFM STOPPED BY SYSTEM</td>
</tr>
<tr>
<td>**57</td>
<td>071</td>
<td></td>
<td>INCORRECT PERMISSION</td>
</tr>
<tr>
<td>**58</td>
<td>072</td>
<td></td>
<td>FILE DEFINITION BLOCK ADDRESS INVALID (NOT RETURNED TO FDB)</td>
</tr>
<tr>
<td>**59</td>
<td>073</td>
<td></td>
<td>I/O ERROR ON PFD/PFC READ/WRITE</td>
</tr>
</tbody>
</table>

* - THE TEXT CAN BE OBTAINED IN A PROGRAM BY USING SUBROUTINE PFRC IN LIBRARY NSRDC5 OR NSRDC.

** - ALWAYS CAUSES ABNORMAL JOB TERMINATION

12/20/83  2-219  PF  - 13 OF 15
### NOS/BE-GENERATED MESSAGES FOR LF(ROUTE) *

<table>
<thead>
<tr>
<th>DEC</th>
<th>OCT</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>001</td>
<td>INVALID LFN - DSP</td>
</tr>
<tr>
<td>011</td>
<td>002</td>
<td>CANNOT ROUTE NON-ALLOCATABLE EQUIPMENT</td>
</tr>
<tr>
<td>012</td>
<td>003</td>
<td>CANNOT ROUTE PERMANENT FILE</td>
</tr>
<tr>
<td>013</td>
<td>004</td>
<td>NO PERMISSION TO ROUTE THIS FILE</td>
</tr>
<tr>
<td>014</td>
<td>005</td>
<td>ROUTE TO INPUT NOT IMMEDIATE - IGNORED</td>
</tr>
<tr>
<td>015</td>
<td>006</td>
<td>IMMEDIATE ROUTING - NO FILE - IGNORED</td>
</tr>
<tr>
<td>016</td>
<td>007</td>
<td>INVALID DISPOSITION CODE - ROUTING IGNORED</td>
</tr>
<tr>
<td>017</td>
<td>008</td>
<td>INVALID FID - ROUTING IGNORED</td>
</tr>
<tr>
<td>018</td>
<td>009</td>
<td>DSP ABORTED BY SYSTEM</td>
</tr>
<tr>
<td>019</td>
<td>010</td>
<td>DSP PARAMETER OUTSIDE FL</td>
</tr>
<tr>
<td>020</td>
<td>011</td>
<td>PRIORITY SPECIFICATION IGNORED</td>
</tr>
<tr>
<td>021</td>
<td>012</td>
<td>E1200 SPECIFIED - INTERCOM USED (DSP)</td>
</tr>
<tr>
<td>022</td>
<td>013</td>
<td>E1200 SPECIFIED - INTERCOM USED (DSP)</td>
</tr>
<tr>
<td>023</td>
<td>014</td>
<td>CANNOT ROUTE INPUT FILE</td>
</tr>
<tr>
<td>024</td>
<td>015</td>
<td>DSP COMPLETE BIT ALREADY SET</td>
</tr>
<tr>
<td>025</td>
<td>016</td>
<td>FILE ON DISMOUNTABLE DEVICE - ROUTING IGNORED</td>
</tr>
<tr>
<td>026</td>
<td>017</td>
<td>TID NOT ALPHANUMERIC - ROUTING IGNORED</td>
</tr>
<tr>
<td>027</td>
<td>018</td>
<td>FORMS CODE NOT ALPHANUMERIC - ROUTING IGNORED</td>
</tr>
<tr>
<td>028</td>
<td>019</td>
<td>INVALID LINK TYPE - ROUTING IGNORED (DSP)</td>
</tr>
<tr>
<td>029</td>
<td>020</td>
<td>FILE NOT ON QUEUE DEVICE - ROUTING IGNORED</td>
</tr>
<tr>
<td>030</td>
<td>021</td>
<td>PRE-DAYFILE LFN AND NO DC=IN - ROUTE IGNORED</td>
</tr>
<tr>
<td>031</td>
<td>022</td>
<td>PRE-DAYFILE FILE NOT FOUND - ROUTE IGNORED</td>
</tr>
</tbody>
</table>

* - THE TEXT CAN BE OBTAINED IN A PROGRAM BY USING SUBROUTINE ROUTERC IN LIBRARY NSRDC5 OR NSRDC.
SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED
PART OF LANGUAGE
  NONE
OTHERS
  NONE

AUTHORS
  J. REM
  DTNSRDC CODE 1892.3

DATE WRITTEN: 12/21/78

DATE(S) REVISED
  02/15/83 - MAKE AC 10 CHARACTERS
             - MAKE TID 3 CHARACTERS
             - ADD DEF AS SYNONYM FOR DEFER
             - ADD PARAMETER "DAY" TO CONTROL DAYFILE MESSAGES
             - INSTALL IN SYSTEM LIBRARY SYSLIB
  05/12/83 - MAKE TAPE NUMBER 3 DIGITS
             - ALLOW TO RUN IN A CAPSULE

LOCATION OF DECKS
SOURCE
  CODE 1892.3
OBJECT
  PART OF OPERATING SYSTEM (MODULE NAME PRMFIL)

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,PF,OUTPUT,MSACCES=<PASSWORD>.

12/20/83
SUBROUTINE 'PFRC'

PURPOSE
SUPPLY DESCRIPTION OF PERMANENT FILE FUNCTION RETURN CODE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE DESCRIPTIONS ARE THOSE FOUND IN THE "NOS/BE VERSION 1 REFERENCE MANUAL" (60493800 H) ON PAGE 83.

USAGE
CALL PFRC (IRC, A)

DESCRIPTION OF PARAMETERS
IRC - RETURN CODE FROM THE PERMANENT FILE FUNCTION
A - 5-WORD ARRAY WHICH WILL CONTAIN THE DESCRIPTION OF THE SUPPLIED 'IRC'
(IF 'IRC' IS INVALID, 'UNKNOWN RETURN CODE' IS RETURNED)

CM REQUIRED: 1075B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
MOVEIT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/18/76

DATE(S) REVISED
02/14/77 - UPDATE FOR NOS/BE 1.0
07/15/80 - UPDATE FOR NOS/BE 1.4 (LEVEL 508)
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,PFRC,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'PLOTPR'

PURPOSE

PRODUCE PRINTER PLOTS WHICH MAY HAVE:

FUNCTIONAL CATEGORIES: J5

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)

CDC 6000/CYBER 170 (NOS/BE)

REMARKS

A CALL TO 'INITPLO' WILL SET THE DEFAULT VALUES.

THE MINIMUM SIZE OF A GRID IS 101 X 101 POINTS (THIS IS 1-1/2 COMPUTER PAGES). IF MORE THAN 101 VALUES FOR THE INDEPENDENT VARIABLE ARE GIVEN, THE REQUIRED INTEGRAL NUMBER OF 100-POINT GRIDS ARE AUTOMATICALLY JOINED TOGETHER.


1) ANY NUMBER OF PLOTS PER RUN
2) ANY NUMBER OF VALUES FOR THE INDEPENDENT VARIABLE
3) UP TO 9 DEPENDENT VARIABLES PER PLOT.

USAGE

COMMON /PLO/ NRUN, NPLLOT, ITIP(6), ITY(6), ITX(6), NUMPAG, MAXSCA, SCA(10), FROM(10)

... CALL INITPLO
C SET ANY SPECIAL VALUES IN COMMON /PLO/ AFTER 'CALL INITPLO'
... C WRITE ANY DATA FOR THE PLOT
DO 5 I=1,NOPTS
5 WRITE (NFILE) VARIND(I), VARDEP1(I), ..., VARDEPN(I)
... CALL PLOTPR (NFILE, NUMVAR, IVAR)

DESCRIPTION OF PARAMETERS

NFILE - FORTRAN LOGICAL UNIT NUMBER OF FILE CONTAINING THE DATA VALUES, INDEPENDENT FOLLOWED BY DEPENDENT

NUMVAR - NUMBER OF VARIABLES (UP TO 10) (TOTAL: INDEPENDENT + DEPENDENT)

IVAR - 10-WORD ARRAY WITH ALPHANUMERIC NAMES FOR THE VARIABLES WHICH WILL APPEAR ON THE PLOT

ADDITIONAL INFORMATION IS PROVIDED THRU LABELLED COMMON BLOCK /PLO/

NRUN - NUMBER OF THIS RUN (DEFAULT: 1)
NPLLOT - NUMBER OF PLOT (DEFAULT: 1)
ITP - PAGE TITLE  (DEFAULT: BLANK)
ITY - Y TITLE  (DEFAULT: BLANK)
ITX - X TITLE  (DEFAULT: BLANK)
     (TITLE ARRAYS ARE 6 WORDS EACH OF UP TO 6
     CHARACTERS PER WORD - 6A6 FORMAT)
NUMPAG - NUMBER OF DOUBLE PAGES TO SPREAD THE PLOT
     OVER (NO MORE THAN 100 POINTS PER PAGE)
     (DEFAULT: 1)
MAXSCA - SCALING OPTION
     1 - OPTIMUM SCALING IS CALCULATED FOR EACH
     VARIABLE (DEFAULT)
     2 - PLOT ALL DEPENDENT VARIABLES ON THE
     SAME SCALE
     (IF THE PROGRAMMER SCALES ANY OF THE
     DEPENDENT VARIABLES, THIS OPTION IS DEFAULTED)
SCA AND FROM-
     ARRAYS CONTAINING THE INCREMENTS AND THE
STARTING VALUES FOR EACH VARIABLE.
     IF ONE OF THESE ARRAYS IS USED FOR A VARIABLE,
     BOTH MUST BE USED.
     IF THERE ARE MORE THAN 101 VALUES FOR THE
     INDEPENDENT VARIABLE, THOSE VALUES MUST HAVE A
     CONSTANT INCREMENT AND THE SCALING IS ALWAYS
     BASED ON THAT INCREMENT.
     (DEFAULT: OPTIMUM SCALE AND STARTING VALUE
     ARE CALCULATED FOR EACH VARIABLE)

REMEMBER TO PUT 'TAPE_NFILE' INTO PROGRAM STATEMENT OF THE
MAIN PROGRAM.

CM REQUIRED: 1514B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ABS  ALOG10  AMAX1  AMIN1  AND
COMPL  EOF  OR  REWIND  SHIFT
OTHERS
DRAWGD
INITGD
INITPLO

AUTHOR
ADAPTED FROM MIMIC BY ANN BANDURSKI - DTNSRDC CODE 1833

DATE WRITTEN: 05/22/72

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS (*DECK AMLOTDP)
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,PLOTPR,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-224  PLOTPR - 2 OF 2
SUBROUTINE 'POLYN'

PURPOSE
LEAST SQUARES POLYNOMIAL FIT

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
FIT AN N-TH DEGREE POLYNOMIAL TO SETS OF POINTS \((X(1), Y(1), Z(1), \ldots)\), WHERE \(X\) IS THE INDEPENDENT VARIABLE IN EACH CASE, \((i=1,2,\ldots,N)\).

\[ P_N(X) = A(0) + A(1)*X + A(2)*X^2 + \ldots + A(N)*X^N \]

USAGE
CALL POLYN (ND, NP, NC, X, Y, NAPT, WORKA, V, SUM)

DESCRIPTION OF PARAMETERS
ND - DEGREE OF POLYNOMIAL \((N)\)
NP - NUMBER OF POINTS IN SET OF OBSERVATIONS \((X(1), Y(1), Z(1), \ldots)\)
NC - NUMBER OF CURVES TO BE FITTED (E.G., \(Y, Z, \ldots\))
X - ARRAY CONTAINING THE INDEPENDENT VARIABLE
Y - ARRAY CONTAINING THE DEPENDENT VARIABLE(S)
    MUST BE DIMENSIONED AT LEAST NP TIMES NC.
    \((Y(1), Y(2), \ldots \) MUST BE CONTIGUOUS IN MEMORY.
    \(Z(1)\) NEED NOT FOLLOW \(Y(N)\) IMMEDIATELY.
NAPT - NUMBER OF LOCATIONS BETWEEN SETS OF DATA
    \((Y, Z, \ldots \) (NUMBER OF WORDS BETWEEN \(Y(1)\) AND \(Z(1)\).) ALL SETS \(Y, Z, \ldots \) MUST BE EQUALLY SPACED.
WORKA - WORK ARRAY USED IN MATRIX SOLUTION OF THE \((ND+1)\)
    SETS OF LINEAR EQUATIONS. MUST BE DIMENSIONED AT LEAST \((ND+1)^{\times2}\).
V - OUTPUT ARRAY USED IN MATRIX SOLUTION FOR VECTOR.
    MUST BE DIMENSIONED AT LEAST \((ND+1)\) TIMES NC.
    \(V(1), \ldots, V(ND+1)\) WILL CONTAIN COEFFICIENTS \(A(0), \ldots, A(N)\) OF THE FIRST CURVE.
SUM - WORK ARRAY FOR SUMS OF POWERS OF \(X\).
    MUST BE DIMENSIONED AT LEAST \((2^{\times ND+1})\).

CM REQUIRED: 321B

METHOD
LEAST SQUARES - MINIMIZING SUM OF SQUARES OF DEVIATIONS FROM AVERAGE.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
PART OF PROGRAM
ENXEN
OTHERS
NONE

AUTHOR
J. N. BROOKS (SHARE ROUTINE NUMBER 848)

DATE WRITTEN: 01/29/60

DATE(S) REVISED
09/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS (*DECK ARPLN1)
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,POLYN,OUTPUT,MSACCESS=<PASSWORD>.
SUBROUTINE 'PROOT'

PURPOSE
FIND ALL ROOTS OF A REAL POLYNOMIAL

FUNCTIONAL CATEGORIES: C2 B4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE POLYNOMIAL HAS THE FORM:
\[ A + a_1 x + \ldots + a_n x^n + 1 = 0 \]

USAGE
CALL PROOT (N, A, U, V, H, B, C, CONV, NPLUS2)

DESCRIPTION OF PARAMETERS
N - DEGREE OF THE POLYNOMIAL TO BE SOLVED
A - ARRAY (DIMENSIONED N+2) CONTAINING THE COEFFICIENTS
    IN THE ORDER INDICATED ABOVE
U - ARRAY (DIMENSIONED N+2) WHICH WILL CONTAIN THE
    REAL PARTS OF THE ROOTS
V - ARRAY (DIMENSIONED N+2) WHICH WILL CONTAIN THE
    IMAGINARY PARTS OF THE ROOTS
H, B, C - WORK ARRAYS (EACH DIMENSIONED N+2)
CONV - CONVERGENCE CRITERION. INITIALLY SET BY PROOT TO
    1.0E-35 (FAR BELOW THE ACTUAL STARTING CONVERGENCE
    CRITERION OF 5.0E-20 (CDC). IF THE POLYNOMIAL HAS
    NOT CONVERGED AFTER A PRESCRIBED NUMBER OF TRIES,
    THE CONVERGENCE CRITERION IS RELAXED. IF, UPON EXIT
    FROM PROOT, CONV IS NOT 1.0E-35, THE CONVERGENCE
    CRITERION HAS BEEN RELAXED TO THE NUMBER GIVEN.
NPLUS2 - MUST BE SET TO N+2

CM REQUIRED: 421B

METHOD
THE ROUTINE CONVERGES SIMULTANEOUSLY TOWARD A LINEAR FACTOR
AND A QUADRATIC FACTOR BY NEWTON'S AND BAIRSTOW'S METHODS,
RESPECTIVELY. WHEN A ROOT IS FOUND BY ONE METHOD, ITERATION
CONTINUES WITH BOTH METHODS USING THEIR MOST RECENT GUESSES.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ABS SIGN SQRT
OTHERS
NONE

02/10/84 2-227 PROOT - 1 OF 2
SUBROUTINE 'PRTFL'

PURPOSE
PRINT CURRENT FL (OR PUT INTO DAYFILE)

FUNCTIONAL CATEGORIES: QO J2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL PRTFL (IOUT)

DESCRIPTION OF PARAMETER
IOUT - FORTRAN LOGICAL UNIT NUMBER
(0=PUT INTO DAYFILE; N=WRITE ON TAPEN)

CM REQUIRED: 50B

OUTPUT UNITS

<table>
<thead>
<tr>
<th>UNIT</th>
<th>LFN</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>----</td>
<td>----</td>
<td>------------</td>
</tr>
<tr>
<td>USER SPECIFIES...</td>
<td>LISTABLE OUTPUT</td>
<td></td>
</tr>
</tbody>
</table>

SUBPROGRAMS REQUIRED

PART OF LANGUAGE

REMARK

OTHERS

FTNRFL - GET CURRENT FL

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/16/75

DATE(S) REVISED
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS

SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,PRTFL,OUTPUT,MSACCES=<PASSWORD>.

02/10/84   2-229   PRTFL - 1 OF 1
SUBROUTINE 'PRTIME'

PURPOSE
GET AND PRINT CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES
SINCE LAST CALL AND PRINT USER-SUPPLIED MESSAGE

FUNCTIONAL CATEGORIES: Q4 J4 NO

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL PRTIME (IOUNIT, TIMES, MSG)
CALL PRTIME (IOUNIT, TIMES, 0)

DESCRIPTION OF PARAMETERS
IOUNIT - OUTPUT UNIT FOR PRINTED LINE
(EITHER FORTRAN LOGICAL UNIT NUMBER (1-99) OR
1- TO 7-CHARACTER LOCAL FILE NAME, LEFT-ADJ,
ZERO-FILLED (E.G., 6LOUTPUT))

TIMES - 7-WORD ARRAY TO CONTAIN THE FOLLOWING:
1 - ELAPSED CPA TIME IN SECONDS
2 - ELAPSED CPB TIME IN SECONDS (0.0)
3 - ELAPSED CP TIME IN SECONDS (CPA+CPB=CP)
4 - ELAPSED PP TIME IN SECONDS
5 - ELAPSED IO TIME IN SECONDS
6 - ELAPSED WALL CLOCK TIME (HH.MM.SS.)
7 - ELAPSED WALL CLOCK TIME IN SECONDS

MSG - 5-WORD MESSAGE TO BE PRINTED
(IF SUPPLIED AS HOLLERITH CONSTANT, MAY BE FEWER
THAN 5 WORDS. SEE EXAMPLE BELOW)
(IF MSG(1) IS 0 (OR 1LO OR 1HO), HEADINGS, BUT NOT
TIMES, WILL BE PRINTED.)

CM REQUIRED: 102B

OUTPUT UNITS
UNIT # LFN USE
--------- ------- ----------------------------------------
USER SPECIFIES... LISTABLE OUTPUT
EXAMPLE
  PROGRAM TEST (OUTPUT=128, .......
  REAL TIMES(7)
  C GET INITIAL TIMES AND PRINT HEADING
  CALL PRTIME (6LOUTPUT, TIMES, 0)
  ......
  C GET ELAPSED TIMES AND PRINT WITH MESSAGE
  CALL PRTIME (6LOUTPUT, TIMES, "TEST NUMBER 1")
  ...
  C NEW HEADINGS ARE NOT NEEDED, SO CALL ELTIME DIRECTLY
  CALL ELTIME (TIMES)
  ......
  C GET ELAPSED TIMES AND PRINT WITH MESSAGE
  CALL PRTIME (6LOUTPUT, TIMES, "TEST NUMBER 2")
  ...
END

SUBPROGRAMS REQUIRED
  PART OF LANGUAGE
    NONE
  OTHERS
    ELTIME - GET ELAPSED TIME SINCE LAST CALL
    FINDCHR - FIND FIRST OCCURRENCE OF CHARACTER IN ARRAY

AUTHOR
  DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/20/76

DATE(S) REVISED
  03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
  SOURCE
    UPDATE LIBRARY ON MSS:  NSRDCPL,UN-CSYS
  OBJECT
    EDITION USER LIBRARY:  NSRDC

ANOTHER COPY OF THIS DOCUMENT
  BEGIN,DOCGET,,NSRDC,,PRTIME,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84  2-231  PRTIME - 2 OF 2
SUBROUTINE 'PUTCHA'
FUNCTION 'PUTCHA'

PURPOSE
INSERT CHARACTER INTO SPECIFIED POSITION IN AN ARRAY

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'PUTCHA' IS AN ENTRY POINT IN 'GETCHA'.

USAGE
CALL PUTCHA (A, N, CH)
VARIABLE = PUTCHA (A, N, CH)

DESCRIPTION OF PARAMETERS
A - ARRAY INTO WHICH CHARACTER IS TO BE INSERTED
N - POSITION AT WHICH CHARACTER IS TO BE INSERTED
   (POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN A(1))
CH - CHARACTER TO BE INSERTED (IN 1R FORMAT)
   (WHEN USED AS A FUNCTION, PUTCHA WILL CONTAIN THE WORD
    IN 'A' WHICH WAS CHANGED)

CM REQUIRED: 56B (INCLUDES GETCHA)

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
   SHIFT
OTHERS
   NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/16/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
   UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS (*DECK GETCHA)
OBJECT
   EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,PUTCHA,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-232  PUTCHA - 1 OF 1
SUBROUTINE 'PUTCHR'
FUNCTION 'PUTCHR'

PURPOSE
INSERT CHARACTER INTO SPECIFIED POSITION IN A WORD

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'PUTCHR' IS AN ENTRY POINT IN 'GETCHR'.

USAGE
CALL PUTCHR (A, N, CH)
VARIABLE = PUTCHR (A, N, CH)

DESCRIPTION OF PARAMETERS
A - WORD INTO WHICH CHARACTER IS TO BE INSERTED
N - POSITION AT WHICH CHARACTER IS TO BE INSERTED
(POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN A)
CH - CHARACTER TO BE INSERTED (IN 1H FORMAT)
(WHEN USED AS A FUNCTION, PUTCHR WILL CONTAIN THE SAME
AS 'A')

CM REQUIRED: 46B (INCLUDES GETCHR)

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

AUTHOR
FROM BIMED PACKAGE

DATE WRITTEN:

DATE(S) REVISED
1975 - DAVID V SOMMER - DTNSRDC CODE 1892.2
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS ("DECK GETCHR")
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,PUTCHR,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-233 PUTCHR - 1 OF 1
SUBROUTINE 'QSORT'

PURPOSE
IN-CORE ASCENDING SORT FOR REAL ARRAYS LARGER THAN 500 WORDS

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'QSORT' IS THE MOST EFFICIENT SORT AVAILABLE (AS OF DATE BELOW) FOR THE SORTING IN CORE OF ARRAYS LARGER THAN 500 WORDS.

THIS ROUTINE IS A TRANSLATION OF ALGORITHM 402, COMM. ACM, NOV, 1970.


ON THE CDC:
WRITE A DUMMY SUBROUTINE TO SET KL AND THE DIMENSION OF K GREATER.

THIS SUBROUTINE MIGHT HAVE THE FORM:

    SUBROUTINE DUMMY
    COMMON /QSORT/ KL, K(<NEW>)
    KL = <NEW>
    RETURN
    END

A CALL TO THIS SUBROUTINE MUST OCCUR BEFORE ANY CALL TO QSORT; THE BEST PLACE BEING ONE OF THE FIRST STATEMENTS IN THE MAIN PROGRAM.

USAGE
CALL QSORT (A, I)

DESCRIPTION OF PARAMETERS
A - REAL ARRAY TO BE SORTED INTO ASCENDING ORDER
I - NUMBER OF WORDS IN 'A' TO BE SORTED

CM REQUIRED: 207B (+ 57B COMMON)

ERROR MESSAGE
ABORT IN QSORT WITH MN=<MN>
SEE REMARKS.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
   DISPLA (CDC)
OTHERS
   ZABORT - NON-EXISTENT ROUTINE TO FORCE ABORT

AUTHORS
   C FLINK - KPS NWL
   DTNSRDC CODE 1892

DATE WRITTEN: 11/25/70 - CF

DATE(S) REVISED
   01/30/81 - DVS - ADD DAYFILE ERROR MESSAGE
   - CHANGE ABORT PROCESS
   02/17/81 - DVS - CONVERT TO B7700
   03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN, DOCGET,, NSRDC,, QSORT, OUTPUT, MSACCES=<PASSWORD>.
SUBROUTINE 'QSORT1'

PURPOSE
   IN-CORE ASCENDING SORT WITH RE-ORDERING OF ASSOCIATED ARRAY
   (FOR REAL ARRAYS LARGER THAN 500 WORDS)

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   'QSORT1' IS THE MOST EFFICIENT SORT AVAILABLE (AS OF DATE
   BELOW) FOR THE SORTING IN CORE OF ARRAYS LARGER THAN 500
   WORDS.

   THIS ROUTINE IS A TRANSLATION OF ALGORITHM 402, COMM. ACM
   NOV, 1970.

   IF THE ARRAY 'T' IS NOT NEEDED, USE 'QSORT'.

   IF THE JOB ABORTS WITH THE MESSAGE "ABORT IN QSORT1 WITH
   MN=<MN>", CHECK IF MN EXCEEDS KL (CURRENTLY KL=46).
   IF SO, THE VALUE OF KL AND THE DIMENSION OF ARRAY K MUST BE
   SET HIGHER (TRY DOUBLING IT).
   ON THE CDC:
      WRITE A DUMMY SUBROUTINE TO SET KL AND THE DIMENSION OF K
      GREATER.

   THIS SUBROUTINE MIGHT HAVE THE FORM:

   SUBROUTINE DUMMY
      COMMON /QSORT/ KL, K(<NEW>)
      KL = <NEW>
      RETURN
   END

   A CALL TO THIS SUBROUTINE MUST OCCUR BEFORE ANY CALL TO
   QSORT1; THE BEST PLACE BEING ONE OF THE FIRST STATEMENTS
   IN THE MAIN PROGRAM.

USAGE
   CALL QSORT1 (A, I, T)

DESCRIPTION OF PARAMETERS
   A - REAL ARRAY TO BE SORTED INTO ASCENDING ORDER
   I - NUMBER OF WORDS IN 'A' TO BE SORTED
   T - ASSOCIATED ARRAY TO BE REORDERED

CM REQUIRED: 271B (+ 57B COMMON)
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
DISPLA (CDC)
OTHERS
ZABORT - NON-EXISTENT ROUTINE TO FORCE ABORT

AUTHORS
C FLINK - KPS NWL
DTNSRDC CODE 1892

DATE WRITTEN: 11/30/70

DATE(S) REVISED
01/30/81 - DVS - ADD DAYFILE ERROR MESSAGE
- CHANGE ABORT PROCESS
02/17/81 - DVS - CONVERT TO B7700
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, QSORT1, OUTPUT, MSACCES=<PASSWORD>.

02/10/84
SUBROUTINE 'QUADG'

PURPOSE
INTEGRAL BY GAUSS-LEGENDRE 10-POINT QUADRATURE

FUNCTIONAL CATEGORIES: DI

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
APPROXIMATES
\[ \int_{X_L}^{X_U} f(x) \, dx = \frac{X_U - X_L}{2} \sum_{i=0}^{4} \left( \frac{W_i}{2} \right) \left( f\left( \frac{A + Z_i/2}{B} \right) + f\left( \frac{A - Z_i/2}{B} \right) \right) \]
WHERE \( W_i \) ARE WEIGHT FACTORS
\( Z_i \) ARE ROOTS OF LEGENDRE POLYNOMIAL
INTEGRAL IS FROM \( X_L \) TO \( X_U \).

USAGE
CALL QUADG (XL, XU, FNC, Y)

DESCRIPTION OF PARAMETERS
XL - LOWER LIMIT OF INTEGRATION
XU - UPPER LIMIT OF INTEGRATION
FNC - THE EXTERNAL FUNCTION FOR EVALUATING THE INTEGRAND
\( f(x) \).
(USER MUST SUPPLY THE FUNCTION 'FNC' WITH ONE ARGUMENT
FOR EVALUATING \( f(x) \), THE INTEGRAND. FNC MUST BE
DECLARED EXTERNAL IN THE ROUTINE CALLING QUADG.)
Y - THE RESULTING INTEGRAL VALUE

CM REQUIRED: 153B

METHOD
LET \( A = \frac{1}{2}(X_U + X_L) \)
\( B = X_U - X_L, \)
THEN, SINCE THE \( Z_i \)'S ARE SYMMETRIC ABOUT ZERO,
\( Y = B \sum_{i=0}^{4} \left( \frac{W_i}{2} \right) \left( f\left( \frac{A + Z_i/2}{B} \right) + f\left( \frac{A - Z_i/2}{B} \right) \right) \)

REFERENCE
"APPLIED NUMERICAL METHODS" BY B. CARNAHAN, H. LUTHER
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
SUSAN VOIGT - DTNSRDC CODE 1892

DATE WRITTEN: 09/71

DATE(S) REVISED
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS (*DECK AMQUADG)

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,QUADG,OUTPUT,MSACCES=<PASSWORD>.

02/10/84

2-239

QUADG - 2 OF 2
SUBROUTINE 'RCPA'

PURPOSE
READ (A PORTION OF) CONTROL POINT AREA

FUNCTIONAL CATEGORIES: K2

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL RCPA (ISTART, NWORDS, AREA)

DESCRIPTION OF PARAMETERS
ISTART - STARTING WORD IN CONTROL POINT AREA
NWORDS - NUMBER OF WORDS TO READ
AREA - ARRAY TO HOLD THE SPECIFIED WORDS
(AREA(2) THRU AREA(NWORDS+1))

CM REQUIRED: 43B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
MIKE GOLDEN - DTNSRDC CODE 1844
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/75

DATE(S) REVISED
12/03/75
03/22/83 - CHANGE 60-BIT ADDRESSES TO 18 BITS TO MAKE IT
USABLE IN A CAPSULE
- ADD COMMENT FOR LOAD MAP LIST

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,RCPA,OUTPUT,MSACCES=<PASSWORD>.

03/22/83  2-240  RCPA  -  1 OF  1
SUBROUTINE 'RECOVRD'

PURPOSE
ON RECOVERY, PRINT EXCHANGE JUMP PACKAGE, RA+0 THRU RA+77B
AND ENDRUN INDICATOR

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE

EXTERNAL RECOVRD

CALL RECOVR (RECOVRD, 77B, 0)

--OR--

EXTERNAL ANY

CALL RECOVR (ANY, 77B, 0)

SUBROUTINE ANY (EXCHJP, ENDRUN, RAO)

DIMENSION EXCHJP(17)

CALL RECOVRD (EXCHJP, ENDRUN, RAO)

DESCRIPTION OF PARAMETERS

EXCHJP - 17-WORD ARRAY TO HOLD EXCHANGE JUMP PACKAGE
ENDRUN - ENDRUN INDICATOR (WILL HAVE MEANING ONLY IF SECOND
FORM OF USAGE IS USED AND IF ENDRUN IS SET BEFORE
THE CALL TO RECOVRD)

RAO - RA+O POINTER (NOT USED BY THIS SUBROUTINE)

CM REQUIRED: 606B

OUTPUT UNITS

USE

----------------------------------------
OUTPUT LISTABLE OUTPUT

SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS
GETRA - GET RA+0 THRU RA+77B

02/10/84
SUBROUTINE 'REDUCE'

PURPOSE
REDUCE FL TO MINIMUM OR REQUEST ADDITIONAL FL RELATIVE TO
START OF BLANK COMMON

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NOT RECOMMENDED. USE COMMON MEMORY MANAGER CALLS.

REQUIRES FTN4,STATIC OR FTN5,STATIC.

USAGE
CALL REDUCE - REDUCE TO FIRST WORD OF BLANK COMMON
CALL REDUCE (I) - ADJUST TO 'I' WORDS AFTER START OF BLANK
COMMON

DESCRIPTION OF PARAMETER
I - IF PRESENT, NUMBER OF WORDS PAST START OF BLANK COMMON

CM REQUIRED: 36B (PLUS 1 IN BLANK COMMON)

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF  SHIFT
OTHERS
MFETCH - GET SPECIFIED WORD IN USER'S FL
MSET - SET SPECIFIED WORD IN USER'S FL

AUTHOR
?-NWL

DATE WRITTEN: ?

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITS LIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,REDUCE,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-243 REDUCE - 1 OF 1
SUBROUTINE 'REPLAC'

PURPOSE
REPLACE ONE CHARACTER BY ANOTHER IN AN ARRAY

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
ALL PARAMETERS ARE TYPE 'INTEGER'

USAGE
CALL REPLAC (A, NA, OLD, NEW)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE PROCESSED
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED
OLD - OLD CHARACTER (IR FORMAT)
NEW - NEW CHARACTER (IR FORMAT)

CM REQUIRED: 24B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 1973

DATE(S) REVISED
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN.DOCGET,,NSRDC,,REPLAC,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-244 REPLAC - 1 OF 1
SUBROUTINE 'REPLACM'

PURPOSE
REPLACE OLD CHARACTERS WITH NEW CHARACTERS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
ALL PARAMETERS ARE TYPE 'INTEGER'

USAGE
CALL REPLACM (A, NA, OLD, NEW, NCH)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE PROCESSED
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED
OLD - ARRAY OF OLD CHARACTERS (1R FORMAT)
NEW - ARRAY OF CORRESPONDING NEW CHARACTERS (1R FORMAT)
NCH - NUMBER OF CHANGE PAIRS (DIMENSION OF 'OLD' AND 'NEW')

CM REQUIRED: 44B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/21/75

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, .NSRDC, REPLACM, OUTPUT, MSACCES=<PASSWORD>.

02/10/84  2-245  REPLACM - 1 OF 1
SUBROUTINE 'REPLHI'

PURPOSE
REPLACE ALL CHARACTERS GREATER THAN SPECIFIED CHARACTER WITH
NEW CHARACTER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
ALL PARAMETERS ARE TYPE 'INTEGER'

USAGE
CALL REPLHI (A, NA, OLD, NEW)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE PROCESSED
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED
OLD - OLD CHARACTER (IR FORMAT)
NEW - NEW CHARACTER (IR FORMAT)

CM REQUIRED: 25B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/26/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE '.LIBRARY ON MSS:  NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,,REPLHI,OUTPUT,MSACCS=<PASSWORD>.

02/10/84  2-246  REPLHI - 1 OF 1
SUBROUTINE 'REPLLO'

PURPOSE
REPLACE ALL CHARACTERS LESS THAN SPECIFIED CHARACTER WITH
NEW CHARACTER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
ALL PARAMETERS ARE TYPE 'INTEGER'

USAGE
CALL REPLLO (A, NA, OLD, NEW)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE PROCESSED
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED
OLD - OLD CHARACTER (1R FORMAT)
NEW - NEW CHARACTER (1R FORMAT)

CM REQUIRED: 25B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/26/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,REPLLO,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-247 REPLLO - 1 OF 1
SUBROUTINE 'REPLNE'

PURPOSE
REPLACE ALL CHARACTERS (EXCEPT SPECIFIED CHARACTER) WITH A SPECIFIED CHARACTER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
ALL PARAMETERS ARE TYPE 'INTEGER'

USAGE
CALL REPLNE (A, NA, OLD, NEW)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE PROCESSED
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED
OLD - OLD CHARACTER (IR FORMAT)
NEW - NEW CHARACTER (IR FORMAT)

CM REQUIRED: 24B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSTDC CODE 1892.2

DATE(S) REVISED
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,REPLNE,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-248 REPLNE - 1 OF 1
SUBROUTINE 'REQTBL'

PURPOSE
   READ THE INTERCOM USER TABLE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: CDC CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   THIS DOCUMENT DESCRIBES ONLY ONE FUNCTION OF THE SUBROUTINE.

USAGE
   CALL REQTBL (CMDORD, BUFFER, DUMMY1, LBUFR, NWORDS, DUMMY2, ERR)

DESCRIPTION OF PARAMETERS
   CMDORD - COMMAND ORDINAL (MUST BE 1)
   BUFFER - ARRAY TO RECEIVE THE TABLE
      (NORMALLY 16 WORDS)
   DUMMY1 - NOT USED (SHOULD BE 0)
   LBUFR - LENGTH OF BUFFER ARRAY
   NWORDS - NUMBER OF WORDS OF TABLE DESIRED
      (UP TO LBUFR WORDS WILL BE TRANSFERRED)
   DUMMY2 - NOT USED (MAY BE OMITTED IF ERROR CODE NOT NEEDED)
   ERR - ERROR RETURN CODE (OPTIONAL)
      0 - NO ERROR

CM REQUIRED: 33B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      NONE
   OTHERS
      TBL - PP PROGRAM TO PROCESS THE REQUEST

AUTHOR
   VERNON GREENHILL - DTNSRDC CODE 1892.3 (CDC)

DATE WRITTEN: 10/05/84

DATE(S) REVISED

LOCATION OF DECKS
   SOURCE DECK
      UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
   OBJECT DECK
      EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,REQTBL,OUTPUT,MSACCESS=<PASSWORD>.

10/05/84  2-249  REQTBL - 1 OF 1
SUBROUTINE 'REQUEST'

PURPOSE
CALLABLE REQUEST FUNCTION

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NO LONGER SUPPORTED SINCE SUBROUTINE 'REQUEST' HAS BEEN REPLACED BY SYSTEM SUBROUTINE 'LF' (SEE SUBROUTINE 'PF' DOCUMENT).

ASSIGNMENT OF EQUIPMENT MAY BE REQUESTED FROM A RUNNING CENTRAL PROCESSOR PROGRAM BY THE REQUEST SUBROUTINE, WHICH HAS THE EFFECT OF A REQUEST CARD.

USAGE
CALL REQUEST (IRC, LFN, ICODE, SN)
CALL REQUEST (IRC, LFN, ICODE)
CALL REQUEST (IRC, LFN)

DESCRIPTION OF PARAMETERS
IRC - OUTPUT: RIGHT-JUSTIFIED NOS/BE-GENERATED ERROR RETURN CODE
IRC=0 - REQUEST WAS SUCCESSFUL

LFN - CONTENTS DETERMINED BY ICODE
IF ICODE IS NON-ZERO, LFN IS A 1-7 CHARACTER LOCAL FILE NAME, LEFT-JUSTIFIED, ZERO- OR BLANK-FILLED (E.G., 5LTAPE7).
IF ICODE IS ZERO (OR MISSING), LFN IS AN ARRAY CONSTRUCTED AS DESCRIBED IN NOS/BE REFERENCE MANUAL, PAGE 12-23 ON.

ICODE - DETERMINES CONTENTS OF LFN AND EFFECT OF REQUEST
ICODE 0 OR MISSING - LFN IS AN ARRAY CONTAINING PARAMETERS FOR REQUEST MACRO
ICODE = ""Q", "2\*Q" OR "2L\*Q" - LFN IS 1-7 CHARACTER LOCAL FILE NAME AND REQUEST HAS EFFECT OF REQUEST,LFN,\*Q.
ICODE ANYTHING ELSE - LFN IS 1-7 CHARACTER LOCAL FILE NAME AND REQUEST HAS THE EFFECT OF REQUEST,LFN,\*PF.

SN - OPTIONAL SN (\*PF ONLY)
WHEN USED, IS 1-7 CHARACTER USER DEVICE SET NAME (HAS EFFECT OF REQUEST,LFN,\*PF,SN=SETNAME.)

CM REQUIRED: 121B
EXAMPLES
REQUEST, TAPE1, *PF. BECOMES
CALL REQUEST (IRC, 5LTAPE1, 1)

REQUEST, TAPE2, *Q. BECOMES
CALL REQUEST (IRC, 5LTAPE2, "*Q")

REQUEST, TAPE3, *PF, SN=MYSET1. BECOMES
CALL REQUEST (IRC, "TAPE3", "*PF", "MYSET1")

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF SHIFT
OTHERS
IZONK NUMVAR ZPFMAC

AUTHORS
JAMES BLACK, MIKE CHERNICK - DTNSRDC CODE 1832
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/26/71

DATE(S) REVISED
01/10/75 - V3.5 - MC
01/27/77 - DVS - ADD *Q
03/24/77 - DVS - ADD SN
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, REQUEST, OUTPUT, MSACCESS=<PASSWORD>.
SUBROUTINE 'RFFT'

PURPOSE
FAST FOURIER TRANSFORM OF A REAL TABULATED FUNCTION

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL RFFT (A, M, INV, S, IFERR)

DESCRIPTION OF PARAMETERS
A - THE ARRAY CONTAINING A REAL TABULATED ONE-
DIMENSIONAL FUNCTION. 'A' MUST BE DIMENSIONED AS
A POWER OF 2 AND REQUIRES 4 ADDITIONAL LOCATIONS
BEYOND THE LENGTH OF THE DATA. TOTAL DIMENSION FOR
'A' IS 2***(M+1)+4.
ON OUTPUT 'A' CONTAINS THE FOURIER TRANSFORM. A(1)
AND A(2) CONTAIN, RESPECTIVELY, THE REAL AND
IMAGINARY ZERO-CYCLE COMPONENTS; A(3) AND A(4)
CONTAIN THE FUNDAMENTAL FREQUENCY COMPONENTS, ETC.

M - ONE LESS THAN THE SMALLEST INTEGER BASE 2 LOGARITHM
THAT HAS AN ANTILOG WHICH WILL CONTAIN ALL THE
ELEMENTS TO BE TRANSFORMED. FOR EXAMPLE, IF THE
ARRAY TO BE TRANSFORMED CONTAINS 28 POINTS, M MUST
BE SET TO 4.

INV - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
S - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
IFERR - ERROR RETURN CODE
= 0 -- NORMAL COMPLETION
<>0 -- ERRORS IN SUBROUTINE ARGUMENTS

NOTE: 3 ≤ M ≤ 20. THIS IS BASED ON AN ARRAY WHICH HAS A
LENGTH THAT CAN BE EXPRESSED AS A POWER OF 2. IF THE
DATA OCCUPIES LESS SPACE THAN 2***(M+1), THE REMAINING
LOCATIONS MUST BE SET TO ZERO OR ANOTHER APPROPRIATE
CONSTANT.

CM REQUIRED: 250B
METHOD

THIS OPERATION MAKES USE OF THE SEPARABLE PROPERTIES OF THE
FOURIER COEFFICIENTS OF THE REAL AND IMAGINARY COMPONENTS OF
THE COMPLEX VECTOR. THIS IS ALMOST A SPECIAL CASE OF THE
DUAL USE OF THE COOLEY-TUKEY ALGORITHM DESCRIBED IN
REFERENCE 2. REFERENCES TO THIS METHOD CAN BE FOUND IN
REFERENCE 3 ALSO.

IN BRIEF, A SCALED VERSION OF THE FIRST PORTION OF THE REAL
ARRAY IS PLACED IN THE REAL COMPONENT OF THE VECTOR, WHILE A
SCALED VERSION OF THE SECOND PORTION OF THE ARRAY IS PLACED
IN THE COMPLEX COMPONENT. THE ALGORITHM IS PERFORMED IN
NORMAL FASHION ON THE COMPLEX ARRAY. THE COEFFICIENTS FOR
THE REAL ARRAY ARE OBTAINED BY PROPERLY COMBINING AND
REORDERING THE FOURIER COEFFICIENTS FROM THE COMPLEX
PROCESSING.

REFERENCES

1. COOLEY, J. W. AND TUKEY, J. W. "AN ALGORITHM FOR THE
MACHINE CALCULATION OF COMPLEX FOURIER SERIES," MATH.
COMPUT. 19, 90 (APRIL 1965), 297-301.
2. GODFREY, M. D., BINGHAM, C., AND TUKEY, J. W., "MODERN
TECHNIQUES OF POWER SPECTRUM ESTIMATION," IEEE TRANS. ON
3. SINGLETON, RICHARD C., "ON COMPUTING THE FAST FOURIER
TRANSFORM," COMM. OF THE ACM, VOL 10, NO 10, OCTOBER
1967.
4. SYSTEM/360 SCIENTIFIC SUBROUTINE PACKAGE, IBM TECHNICAL
PUBLICATIONS DEPT., 1967.

SUBPROGRAMS REQUIRED

PART OF LANGUAGE
COS FLOAT SIN
OTHERS
FFT - FAST FOURIER TRANSFORM OF A COMPLEX TAB FCN

AUTHORS
WES RICE
DUANE HARDER
LOS ALAMOS SCIENTIFIC LABORATORY

VIM ROUTINE LASL C330A

DATE WRITTEN: 07/24/68

DATE(S) REVISED
02/69 - DH
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCKM, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,NSRDC,RFFT,OUTPUT,MSACCESS=<PASSWORD>.

06/07/84 2-253 RFFT - 2 OF 2
SUBROUTINE 'RFSN'

PURPOSE
INVERSE FAST FOURIER TRANSFORM

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL RFSN (A, M, INV, S, IFERR)

DESCRIPTION OF PARAMETERS
A - THE ARRAY CONTAINING THE REAL AND IMAGINARY FOURIER COEFFICIENT. A(1) AND A(2) CONTAIN, RESPECTIVELY, THE REAL AND IMAGINARY COMPONENTS. ETC. \(2^{2(M+1)+1}\) AND \(2^{2(M+1)+2}\) ARE THE FINAL FREQUENCY SUBSCRIPTS WHICH ARE USED IN THE SYNTHESIS. 'A' MUST BE DIMENSIONED AT LEAST \(2^{2(M+1)+4}\). ON OUTPUT 'A' CONTAINS THE INVERSE FOURIER TRANSFORM.

M - ONE LESS THAN THE SMALLEST INTEGER BASE 2 LOGARITHM THAT HAS AN ANTILOG WHICH WILL CONTAIN ALL THE ELEMENTS TO BE TRANSFORMED. FOR EXAMPLE, IF THE ARRAY TO BE TRANSFORMED CONTAINS 28 POINTS, M IS SET TO 4. THIS RESULT WOULD REQUIRE 17 PAIRS OF COEFFICIENTS.

INV - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'

S - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'

IFERR - ERROR RETURN CODE
= 0 -- NORMAL COMPLETION
<>0 -- ERRORS IN SUBROUTINE ARGUMENTS

NOTE: \(3 \leq M \leq 20\). ALL COEFFICIENTS MUST BE DEFINED; THEREFORE ALL \(2^{2(M+1)}\) REAL AND IMAGINARY COEFFICIENTS MUST BE SET TO APPROPRIATE VALUES.

CM REQUIRED: 254B
METHOD


REFERENCES


SUBPROGRAMS REQUIRED

PART OF LANGUAGE
COS SIN

OTHERS
FFT - FAST FOURIER TRANSFORM OF A COMPLEX TAB FCN

AUTHORS

WES RICE
DUANE HARDER
LOS ALAMOS SCIENTIFIC LABORATORY

VIM ROUTINE LASL C331A

DATE WRITTEN: 08/07/68

DATE(S) REVISED
02/69 - DH
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS

SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,RFSN,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84 2-255 RFSN - 2 OF 2
FUNCTION 'RNDMIZ'

PURPOSE
EMULATE BASIC LANGUAGE 'RANDOMIZE' STATEMENT (CAN BE USED TO
GUARANTEE FIRST CALL TO RANF WILL RESULT IN A DIFFERENT
NUMBER WITH EACH EXECUTION OF A PROGRAM)

FUNCTIONAL CATEGORIES: V1

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
R = RNDMIZ (N)

DESCRIPTION OF PARAMETERS
N - DUMMY ARGUMENT - IGNORED
RNDMIZ - WILL RETURN A RANDOM NUMBER SIMILAR TO THAT
OBTAINED BY RANF

CM REQUIRED: 23B

METHOD
THE RANF SEED IS CHANGED USING THE CURRENT CP TIME
(FRACTIONAL PART ONLY)

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
INT RANF SECOND
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/08/77

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL.UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN.DOCGET..NSRDC..RNDMIZ.OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-256 RNDMIZ - 1 OF 1
SUBROUTINE 'ROUTE'

PURPOSE
CALLABLE ROUTE COMMAND

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NO LONGER SUPPORTED SINCE SUBROUTINE 'ROUTE' HAS BEEN
REPLACED BY SYSTEM SUBROUTINE 'LF' (SEE SUBROUTINE 'PF'
DOCUMENT).

THE FILE TO BE ROUTED MUST BE ON A QUEUE DEVICE.

THE CALLING PROGRAM MUST CLOSE THE FILE BEFORE 'ROUTE' IS
CALLED. AN FTN SEQUENTIAL FILE (WRITE, PRINT, PUNCH) MAY BE
"CLOSED" BY ISSUING A 'REWIND N' BEFORE THE CALL TO 'ROUTE'.
IF THE FILE IS NOT CLOSED, THE FINAL BUFFER MAY NOT BE
ROUTED.

USAGE
CALL ROUTE (IRC, IPRMS, NW)

DESCRIPTION OF PARAMETERS
IRC - ERROR RETURN CODE

<table>
<thead>
<tr>
<th>DEC</th>
<th>OCT</th>
<th>MEANING</th>
<th>NOS/BE-GENERATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>000</td>
<td>FUNCTION SUCCESSFUL</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>001</td>
<td>INVALID LFN - DSP</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>002</td>
<td>CANNOT ROUTE NON-ALLOCATABLE EQUIPMENT</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>003</td>
<td>CANNOT ROUTE PERMANENT FILE</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>004</td>
<td>NO PERMISSION TO ROUTE THIS FILE</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>005</td>
<td>ROUTE TO INPUT NOT IMMEDIATE - IGNORED</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>006</td>
<td>IMMEDIATE ROUTING - NO FILE - IGNORED</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>007</td>
<td>INVALID DISPOSITION CODE - ROUTING IGNORED</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>010</td>
<td>INVALID FID - ROUTING IGNORED</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>011</td>
<td>DSP ABORTED BY SYSTEM</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>012</td>
<td>DSP PARAMETER OUTSIDE FL</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>013</td>
<td>PRIORITY SPECIFICATION IGNORED</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>014</td>
<td>RMT ROUTING, NO ID - CENTRAL SITE ASSUMED</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>015</td>
<td>E1200 SPECIFIED - INTERCOM USED (DSP)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>016</td>
<td>CANNOT ROUTE INPUT FILE</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>017</td>
<td>DSP COMPLETE BIT ALREADY SET</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>020</td>
<td>FILE ON DISMOUNTABLE DEVICE - ROUTING IGNORED</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>021</td>
<td>TID NOT ALPHANUMERIC - ROUTING IGNORED</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>022</td>
<td>FORMS CODE NOT ALPHANUMERIC - ROUTING IGNORED</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>023</td>
<td>INVALID LINK TYPE - ROUTING IGNORED (DSP)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>024</td>
<td>FILE NOT ON QUEUE DEVICE - ROUTING IGNORED</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>025</td>
<td>PRE-DAYFILE LFN AND NO DC=IN - ROUTE IGNORED</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>026</td>
<td>PRE-DAYFILE FILE NOT FOUND - ROUTE IGNORED</td>
<td></td>
</tr>
</tbody>
</table>

06/07/84

2-257

ROUTE - 1 OF 4
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1962-A
IPRMS - PARAMETERS FOR ROUTE
(UNUSED FIELDS MUST BE SET TO ZERO)

<table>
<thead>
<tr>
<th>IPRMS</th>
<th>CONTENTS</th>
<th>FORMAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LFN</td>
<td>1-7 CHAR, LEFT**</td>
</tr>
<tr>
<td>2</td>
<td>DC</td>
<td>0 FOR DEFAULT -OR- 2-CHAR DISPOSITION CODE, LEFT**</td>
</tr>
<tr>
<td>3</td>
<td>TID</td>
<td>0 -OR- 1LC - ROUTE TO CENTRAL SITE -OR- 2-CHAR TERMINAL ID, LEFT** -OR- 4HERE - ROUTE TO THIS TERMINAL</td>
</tr>
<tr>
<td>4</td>
<td>FID</td>
<td>1-7 CHAR FILE ID -OR- 1L* -OR- 1-5 CHAR FILE ID, PRECEDED BY * (ALL LEFT** )</td>
</tr>
<tr>
<td>5</td>
<td>DEF</td>
<td>0 -OR- 3LDEF - TO DEFER ROUTING UNTIL END-OF-JOB</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>NON-ZERO TO RETURN THE JOB NAME IN THIS WORD</td>
</tr>
<tr>
<td>7</td>
<td>FC</td>
<td>0 -OR- 2-CHAR FORMS CODE, LEFT**</td>
</tr>
<tr>
<td>8</td>
<td>EC</td>
<td>0 - USE DEFAULT FOR PRINT: 2LB4, 2LB6, 2LA6, 2LA9 FOR PUNCH: 2LSB, 5L80COL, 3L026, 3L029, 5LASCII</td>
</tr>
<tr>
<td>9</td>
<td>IC</td>
<td>0 OR 3LDIS - DISPLAY CODE 5LASCII - ASCII 3LBIN - BINARY</td>
</tr>
<tr>
<td>10</td>
<td>STID</td>
<td>3-CHAR STATION (SITE) ID, LEFT**</td>
</tr>
<tr>
<td>11</td>
<td>PRI</td>
<td>PRIORITY FOR INTERACTIVELY ROUTED OUTPUT FILE BEING ROUTED TO THE ROUTING TERMINAL - 1-4 DIGIT OCTAL VALUE (0000B-7777B) FOR ALL OTHER FILES - 0</td>
</tr>
<tr>
<td>12</td>
<td>REP</td>
<td>REPEAT COUNT (0-31 (37B))</td>
</tr>
<tr>
<td>13</td>
<td>NCD</td>
<td>0 -OR- 1 - NO COMPLEMENTARY DAYFILE (VALID ONLY IF IPRMS(5)=3LDEF)</td>
</tr>
<tr>
<td>14</td>
<td>SC</td>
<td>SPACING CODE FOR 580 PRINTER (0-77B; 0 IS DEFAULT ARRAY) (NOT AVAILABLE YET AT DTNSRDC)</td>
</tr>
</tbody>
</table>

** LEFT=LEFT-JUSTIFIED, BLANK OR ZERO PADDED

NW - NUMBER OF LAST ELEMENT IN IPRMS (IF OMITTED, NW=13)

CM REQUIRED: 401B
EXAMPLES

1) ASSUME THE PROGRAM HAS WRITTEN FILE 'TAPE7' TO BE PRINTED AT CENTRAL SITE:

... INTEGER IPRMS(14) ...
IPRMS(1) = 5LTape7
IPRMS(2) = 2LPR
IPRMS(3) = 1LC
IPRMS(4) = 1L*
... REWIND 7
CALL ROUTE (IRC, IPRMS, 4) ...

THIS WILL SIMULATE: ROUTE, TAPE7, DC-PR, TID=C, FID=*

2) A PROGRAM WISHES TO PUNCH FILE 'PUNCH' AT REMOTE TERMINAL '011' AT END OF JOB:

... INTEGER IPRMS(14) ...
IPRMS(1) = 5LPUNCH
IPRMS(2) = 2LPU
IPRMS(3) = 3L011
IPRMS(4) = 1L*
IPRMS(5) = 3LDEF
IPRMS(6) = 1
... CALL ROUTE (IRC, IPRMS, 6)
IF (IRC .EQ. 0) PRINT 1, IPRMS(6)
1 FORMAT (' TAPE7 WILL BE PRINTED WITH JOB NAME " A7) ...

THIS WILL SIMULATE: ROUTE, PUNCH, DC-PU, TID=011, FID=*, DEF.

3) A PROGRAM CREATES A 'JOB' ON FILE 'TAPE99' TO BE SUBMITTED TO THE SAME INPUT QUEUE AS THE CREATING JOB:

... INTEGER IPRMS(14) ...
IPRMS(1) = 6LTape99
IPRMS(2) = 2LIN
IPRMS(3) = 4LHERE ...
WRITE (99, 1)
99 FORMAT ('JOBCARD / CHARGE CARD / ....")
REWIND 99
CALL ROUTE (IRC, IPRMS, 3)

THIS WILL SIMULATE: ROUTE, TAPE99, DC-IN, TID.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND LOCF MAXO MINO OR
SHIFT
OTHERS
BZFILL - CHANGE BLANKS TO 00B
HERE - GET TERMINAL ID FOR THIS JOB
HEX3 - CONVERT 3-DIGIT HEX TO 2-CHAR
MOVECH - MOVE AN ARRAY
TRAILBZ - CHANGE TRAILING BLANKS TO 00B
ZSYSEQ - CALL THE SYSTEM

ARITHMETIC STATEMENT FUNCTIONS:
FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
   L11FMT L21FMT L31FMT L52FMT L71FMT
FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)
   R18FMT R21FMT

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/08/75

DATE(S) REVISED
01/24/77 - ADD REP PARAMETER, CHANGE PRI DESCRIPTION
11/30/77 - ADD NCD PARAMETER
10/01/78 - CHANGE TO 3-CHARACTER TID
02/24/81 - UPGRADE FOR LEVEL 508
04/04/83 - ADD 14-TH PARAMETER SC FOR FUTURE USE
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
   UPDATE LIBRARY ON MSS: NSRDCPL, UN-CSYS
OBJECT
   EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, , ROUTE, OUTPUT, MSACCES=<PASSWORD>.
SUBROUTINE 'ROUTERC'

PURPOSE
SUPPLY DESCRIPTION OF ROUTE RETURN CODE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE DESCRIPTIONS ARE THOSE FOUND IN THE "NOS/BE VERSION 1 REFERENCE MANUAL" (60493800H) ON PAGE 7-82.

USAGE
CALL ROUTERC (IRC, A)

DESCRIPTION OF PARAMETERS
IRC - RETURN CODE FROM SUBROUTINE 'ROUTE'
A - 5-WORD ARRAY WHICH WILL CONTAIN THE DESCRIPTION OF THE SUPPLIED 'IRC'
(IF 'IRC' IS INVALID, 'UNKNOWN RETURN CODE' IS RETURNED)

CM REQUIRED: 625B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
MOVEIT - MOVE AN ARRAY

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/15/77

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ROUTERC,OUTPUT,MSACCE..<PASSWORD>.

02/10/84 2-261 ROUTERC - 1 OF 1
SUBROUTINE 'SBYT'
FUNCTION 'SBYT'

PURPOSE
STORE VARIABLE LENGTH BYTE

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS <OPERATING SYSTEMS>
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
STORES A 1 TO 60-BIT BYTE FROM ONE WORD INTO ANY POSITION IN
A SECOND WORD WITHOUT DISTURBING THE REMAINING PART OF THAT
WORD.

USAGE
CALL SBYT (N, LENGTH, INTO, FROM)
-OR-
VARIABLE = SBYT (N, LENGTH, INTO, FROM)

DESCRIPTION OF PARAMETERS
N - BEGINNING BIT POSITION IN WORD <INTO> WHERE THE
    BYTE WILL BE PLACED. BITS ARE NUMBERED FROM 1 TO
    60 FROM RIGHT TO LEFT.
LENGTH - LENGTH OF THE BYTE IN BITS. THIS LENGTH STARTS
    WITH THE RIGHTMOST BIT OF <FROM>.
INTO - WORD INTO WHICH THE BYTE WILL BE PLACED.
FROM - WORD FROM WHICH THE BYTE WILL BE TAKEN FROM THE
    LOW ORDER BITS.

NOTE: IN THE SECOND FORM, <VARIABLE> AND <INTO> WILL
    CONTAIN THE SAME VALUE. THUS, THEY MAY HAVE THE
    SAME VARIABLE NAME.

NOTE: BITS 1 THRU <LENGTH> OF WORD <FROM> ARE PLACED INTO
    BITS <N> THRU (N+LENGTH-1) OF <INTO>.

CM REQUIRED: 20B

EXAMPLE
I = 7777 1111 2222 5555 4444B
J = 3333 2222 1111 5555 4436B
AA = SBYT (37, 6, I, J)

RESULTS IN
AA = 7777 1136 2222 5555 4444B
I = 7777 1136 2222 5555 4444B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR: FROM CDC KRONOS SYSTEM

DATE WRITTEN:

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,SBYT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84
SUBROUTINE 'SEMICO'

PURPOSE
REPLACE DISPLAY CODE 00B WITH 77B (SEMI-COLON)
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL SEMICO (IA, I)

DESCRIPTION OF PARAMETERS
IA - (ARRAY) TO BE PROCESSED
I - NUMBER OF WORDS IN 'IA' TO BE PROCESSED

CM REQUIRED: 21B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

AUTHOR
? - NWL

DATE WRITTEN: ?

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, SEMICO, OUTPUT, MSACCES=<PASSWORD>.

02/10/84  2-264  SEMICO - 1 OF 1
SUBROUTINE 'SETREW'

PURPOSE
CONVERT REWIND OPTION INTO RM OPEN AND CLOSE CODES

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL SETREW (REW, OPEN, CLOSE, NOE)
CALL SETREW (REW, OPEN, CLOSE)

DESCRIPTION OF PARAMETERS
REW  - INPUT REWIND OPTION. ONE OF:
     A  - OPEN=NOREWIND; CLOSE=REWIND
     B  - OPEN=REWIND ; CLOSE=NOREWIND
     E  - OPEN=POSITION BEFORE END-OF-INFORMATION;
           CLOSE=NOREWIND
     EN - OPEN=POSITION BEFORE EOI; CLOSE=NOREWIND
     ER - OPEN=POSITION BEFORE EOI; CLOSE=REWIND
     EU - OPEN=POSITION BEFORE EOI; CLOSE=UNLOAD
     R  - OPEN=REWIND ; CLOSE=REWIND
     U  - OPEN=REWIND ; CLOSE=REWIND AND UNLOAD
     OTHER  - OPEN=NOREWIND; CLOSE=NOREWIND
     (ANY WORDS BEGINNING WITH THESE LETTERS WILL
      PRODUCE THE SAME RESULTS. ONLY THE FIRST 1
      OR 2 LETTERS ARE RETURNED IN L-FORMAT)
OPEN  - WILL CONTAIN OPEN REWIND OPTION (1LE, 1LN, 1LR)
CLOSE - WILL CONTAIN CLOSE REWIND OPTION (1LN, 1LR, 1LU)
NOE  - OMITTED OR 0  - ALLOW ALL VALUES OFREW
      OTHER  - DO NOT ALLOW 'E' VALUES OFREW

CM REQUIRED: 113B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/29/75

DATE(S) REVISED
01/29/76
01/11/76 - ADD 'NOE' PARAMETER
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, , SETREW, OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-266 SETREW - 2 OF 2
SUBROUTINE 'SHIFTA'

PURPOSE
SHIFT WHOLE ARRAY SPECIFIED NUMBER OF BITS (CROSSING OVER
WORD BOUNDARIES)

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE 'ASHIFT' FOR SHIFTING INDIVIDUAL WORDS OF AN ARRAY.

USAGE
CALL SHIFTA (A, B, N, NBITS)

DESCRIPTION OF PARAMETERS
A  - INPUT ARRAY OF DIMENSION 'N'
B  - OUTPUT ARRAY OF DIMENSION 'N+1'
(MAY NOT BE SAME AS 'A')
N  - NUMBER OF WORDS TO BE PROCESSED
NBITS - NUMBER OF BITS TO SHIFT
  <0  - SHIFT TO LEFT
       (LEFTMOST BITS LOST, TRAILING BITS SET TO 0,
        B(N+1) NOT DEFINED)
  =0 - JUST MOVE (B(N+1) IS SET TO 0)
  >0  - SHIFT TO RIGHT
       (LEADING AND TRAILING BITS SET TO 0)

CM REQUIRED: 57B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTKSRDC CODE 1892.2

DATE WRITTEN: 04/26/74

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC, UN=CSYS
OBJECT
EDTILIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, NSRDC, SHIFTA, OUTPUT, MSACCES=<PASSWORD>.

02/10/84  2-267  SHIFTA - 1 OF 1
FUNCTION 'SIMPUN'

PURPOSE
SIMPSON'S RULE INTEGRATION - EQUAL OR UNEQUAL INTERVALS

FUNCTIONAL CATEGORIES: D1

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
VALUE = SIMPUN (X, Y, N)

DESCRIPTION OF PARAMETERS
X - ARRAY OF MONOTONE X-VALUES
Y - ARRAY OR CORRESPONDING Y-VALUES
N - NUMBER OF VALUES

CM REQUIRED: 100B

ERROR MESSAGE
L=XXXXX, X=X.XXXXXXX E+YY, X NOT MONOTONE STOP
SELF-EXPLANATORY

METHOD
THE INTEGRAL FROM X1 TO XN OF YDX IS EVALUATED BY FITTING
PARABOLAS TO SUCCESSIVE INTERVALS AND INTEGRATING OVER
THE INTERVALS.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHORS
WERNER FRANK
SHARON E GOOD - DTNSRDC CODE 1892.1

DATE WRITTEN:

DATE(S) REVISED
06/29/68 - SEG
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM,UN=CSYS (*DECK AMSIUF)
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,SIMPUN,OUTPUT,MSACCESS=<PASSWORD>.

06/07/84 2-268 SIMPUN - 1 OF 1
SUBROUTINE 'SKPFIL'

PURPOSE
REPOSITION A SEQUENTIAL FILE FORWARD OR BACKWARD BY A
SPECIFIED NUMBER OF UNITS (FOR EXISTING RECORDS ONLY)

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

USAGE
CALL SKPFIL (LUN, COUNT)
CALL SKPFIL (LUN, COUNT, TYPE)
CALL SKPFIL (LUN, COUNT, TYPE, RT)
CALL SKPFIL (LUN, COUNT, TYPE, RT, BT)
CALL SKPFIL (LUN, COUNT, TYPE, RT, BT, SB)

DESCRIPTION OF PARAMETERS
LUN - FORTRAN LOGICAL UNIT NUMBER OF FILE
COUNT - NUMBER OF UNITS TO REPOSITION
         <0 - BACKWARD SKIP
         0 - NO SKIP
         >0 - FORWARD SKIP
TYPE - TYPE OF RECORDS TO SKIP
       (1 CHARACTER, LEFT-ADJUSTED)
       B - PARTITIONS
       F - LEVEL 17, EOFS (DEFAULT)
       L - LOGICAL RECORDS
       P - SCOPE LOGICAL RECORDS OF LEVEL 0
       (FOR RT=W, BT=I, A PARTITION BOUNDARY IS
       IMPLEMENTED THRU A RECORD LEVEL ZERO PRU.)
       S - SECTIONS
RT - RECORD TYPE (1 CHARACTER, LEFT-ADJUSTED)
D - CHARACTER COUNT
F - FIXED LENGTH
R - RECORD MARK
S - SCOPE LOGICAL RECORD (DEFAULT)
T - TRAILER
U - USER-DEFINED LENGTH
W - CONTROL WORD
Z - ZERO
BT - BLOCK TYPE (1 CHARACTER, LEFT-ADJUSTED)
C - CHARACTER COUNT (DEFAULT)
E - EXACT RECORDS
I - INTERNAL
K - RECORD COUNT
       (MBL MUST BE PRE-DEFINED)
SB - CIRCULAR BUFFER SUPPRESSION
=0 - USE CIRCULAR BUFFER (DEFAULT)
<>0 - USE WORKING STORAGE AREA

NOTE: FORTRAN UNFORMATTED - BT=I, RT=W
      FORTRAN FORMATTED - BT=C, RT=Z
      BUFFER IN/OUT - BT=C, RT=S

02/10/84 2-269 SKPFIL - 1 OF 3
CM REQUIRED: 412B

EXAMPLES
1 - SKIP 5 FILES ON 'TAPE10', A STRANGER TAPE:
   CALL SKPFIL (10, 5)

2 - SKIP A PARTITION ON A FORTRAN UNFORMATTED TAPE:
   CALL SKPFIL (10, 1, 1LP, 1LW, IL1) RECOMMENDED FORM
   CALL SKPFIL (10, 1, 1LB, 1LW, IL1) MORE CP TIME

REMARKS
1 - SEQUENTIAL FILES ONLY
2 - FOR RT=U: FORWARD SKIP IS NOT ALLOWED
3 - FOR TYPE=B/L/S, BACKWARD SKIP IS NOT SUPPORTED FOR:
   A - RT=D/T
   B - RT=U AND BT<>K
   C - BLOCKED FILES OF ONE RECORD PER BLOCK
   D - BT=E

4 - FOR BT=C AND RT=F: IF A BACKWARD SKIP IS ATTEMPTED WHEN
   A FILE IS POSITIONED AT A TERMINATOR, IT IS NOT POSSIBLE
   TO DETERMINE THE EXACT RECORD BOUNDARY.
5 - FOR RT=F: IF A BACKWARD SKIP IS ATTEMPTED AND THE LENGTH
   OF EACH RECORD IS NOT A MULTIPLE OF 10, POSITIONING MAY
   BE UNPREDICTABLE (NOT A RECORD BOUNDARY).

'SKPFIL' TERMINATES IF:
1 - THE FILE TO BE SKIPPED HAS NOT BEEN DEFINED
2 - THE RECORD MANAGER PROCESSORS NEEDED FOR SKIPPING
   HAVE NOT BEEN LOADED

SKPFIL IS PART OF THE OPERATING SYSTEM, NOT IN LIBRARY
NSRDC. THE DOCUMENT IS HERE FOR CONVENIENCE.

METHOD
1 - IF COUNT=0, CONTROL IS RETURNED TO THE USER
2 - THE PARAMETERS ARE SCRUTINIZED AND DEFAULT PARAMETERS
   ARE USED AS REQUIRED
3 - CHECK TO BE SURE THAT THE RECORD MANAGER PROCESSORS
   NEEDED FOR SKIPPING HAVE BEEN LOADED
4 - THE RECORD TYPE AND FILE ORGANIZATION ARE SET IN THE FIT
5 - IF THE FILE TO BE REPOSITIONED HAS NOT BEEN OPENED, OPEN
   THE FILE
6 - THE COUNT AND TYPE PARAMETERS ARE PLACED IN A RECORD
   MANAGER SKIPDU MACRO AND THIS MACRO IS EXECUTED, THEREBY
   REPOSITIONING THE FILE
7 - IF A BOUNDARY CONDITION IS DETECTED BEFORE THE SKIP
   COUNT IS EXHAUSTED, CONTROL IS RETURNED TO THE USER
   (SEE SUBROUTINE 'SKPSTAT'). THE FILE IS POSITIONED
   IMMEDIATELY AFTER THE TERMINATOR ON A FORWARD SKIP AND
   BEFORE THE DELIMITER ON A BACKWARD SKIP.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
GETFIT=

02/10/84  2-270 SKPFIL - 2 OF 3
SUBROUTINE 'SKPSTAT'

PURPOSE
GET THE STATUS OF THE LAST CALL TO 'SKPFIL'

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

USAGE
CALL SKPSTAT (STATUS)

DESCRIPTION OF PARAMETER
STATUS - STATUS OF THE LAST CALL TO 'SKPFIL'
000B - MID-RECORD
001B - END-OF-LABEL-GROUP OR BEGINNING-OF-INFORMATION (EOL/BOI)
002B - BEGINNING-OF-FILE/VOLUME (BOF/BOV)
004B - END-OF-VOLUME (EOV)
010B - END-OF-SECTION (EOS)
020B - END-OF-RECORD (EOR)
040B - END-OF-PARTITION (EOP)
100B - END-OF-INFORMATION (EOI)

CM REQUIRED: OB (THIS IS AN ENTRY POINT IN 'SKPFIL', WHICH REQUIRES 412B)

REMARKS
SKPSTAT IS PART OF THE OPERATING SYSTEM, NOT IN LIBRARY NSRDC. THE DOCUMENT IS HERE FOR CONVENIENCE.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
ANTHONY CINCOTTA - DTNSRDC CODE 1892.3

DATE WRITTEN: 03/25/75

DATE(S) REVISED
08/75 01/76

LOCATION OF DECKS
SOURCE
CODE 1892.3
OBJECT
EDITLIB SYSTEM LIBRARY: SYSLIB (NO ATTACH OR SPECIAL LDSET,LIB= REQUIRED)

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,SKPSTAT,OUTPUT,MSACCES=<PASSWORD>.

02/14/84  2-272    SKPSTAT - 1 OF 1
SUBROUTINE 'SKWEZL'

PURPOSE
SQUEEZE LEFT AND REMOVE BLANKS AND OOB

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE SKWEZR.

USAGE
CALL SKWEZL (A, NA, NC, NW)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE SQUEEZED
    (WILL BE REPLACED BY SQUEEZED ARRAY)
NA - NUMBER OF WORDS TO BE SQUEEZED
NC - OUTPUT NUMBER OF CHARACTERS IN SQUEEZED ARRAY
NW - OUTPUT NUMBER OF WORDS IN SQUEEZED ARRAY

CM REQUIRED: 73B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
GETCHA - EXTRACT CHARACTER FROM ARRAY
PUTCHA - PUT CHARACTER INTO ARRAY

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/19/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,SKWEZL,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'SKWEZR'

PURPOSE
SQUEEZE RIGHT AND REMOVE BLANKS AND OOB

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE SKWEZL.

USAGE
CALL SKWEZR (A, NA, NC, NW)

DESCRIPTION OF PARAMETERS
A    - ARRAY TO BE SQUEEZED
      (WILL BE REPLACED BY SQUEEZED ARRAY)
NA   - NUMBER OF WORDS TO BE SQUEEZED
NC   - OUTPUT POSITION OF FIRST NON-ZERO CHARACTERS IN
      SQUEEZED ARRAY (POSITION 1 IS LEFTMOST CHARACTER IN
      A(1))
NW   - OUTPUT SUBSCRIPT OF FIRST NON-ZERO WORD

CM REQUIRED: 75B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
GETCHA - EXTRACT CHARACTER FROM ARRAY
PUTCHA - PUT CHARACTER INTO ARRAY

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/19/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, ,NSRDC, ,SKWEZR, OUTPUT, MSACCESS=<PASSWORD>.

02/10/84 2-274 SKWEZR - 1 OF 1
SUBROUTINE 'SNCNDN'

PURPOSE
EVALUATE THE THREE JACOBIAN ELLIPTIC FUNCTIONS

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IF CM=0 AND ABS(X) > (2K/PI) * 6.87E10, WHERE K IS THE QUARTER
PERIOD OF SN, THE ERROR MESSAGE
SNCNDN ARGUMENT X TOO LARGE. X=
IS PRINTED ON FILE 'OUTPUT'.

USAGE
CALL SNCNDN (X, CM, SN, CN, DN)

DESCRIPTION OF PARAMETERS
X - INPUT PARAMETER
CM - INPUT PARAMETER
SN - OUTPUT PARAMETER - WILL CONTAIN THE VALUE OF SN(X,K)
CN - OUTPUT PARAMETER - WILL CONTAIN THE VALUE OF CN(X,K)
DN - OUTPUT PARAMETER - WILL CONTAIN THE VALUE OF DN(X,K)

CM REQUIRED: 254B

OUTPUT UNITS
UNIT # LFN USE
-------- ------ ----------------------
OUTPUT ERROR MESSAGE (SEE REMARKS)

METHOD
GAUSS TRANSFORMATION

REFERENCE
BULIRSCH, R, "NUMERICAL CALCULATIONS OF ELLIPTIC INTEGRALS
AND ELLIPTIC FUNCTIONS", NUMERISCHE MATHEMATIK, 7, 1965,
PP. 78-90
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ABS    EXP    SIGN    SIN    SQRT
OTHERS
NONE

AUTHOR
R BULIRSCH

DATE WRITTEN: 01/68

DATE(S) REVISED
09/20/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPM, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, , SNCNDN, OUTPUT, MSACCES=<PASSWORD>.

02/10/84  2-276  SNCNDN - 2 OF 2
SUBROUTINE 'SSORT'

PURPOSE
FTN-CALLABLE SHELL SORT FOR REAL ARRAYS

LANGUAGE: FORTRAN IV EXTENDED

FUNCTIONAL CATEGORIES: M1

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS MAY BE USED WHEN YOU HAVE DEFINED TWO ARRAYS WHICH
"GO TOGETHER" AND YOU ARE SORTING ONE ARRAY AND WISH TO KEEP
CORRESPONDING ELEMENTS OF THE OTHER ARRAY WITH IT. THAT IS,
WHEREVER A(1) ENDS UP AFTER THE SORT, T(1) WILL BE IN THE
SAME RELATIVE POSITION.

USE ISSORT FOR INTEGERS.

USAGE
CALL SSORT (A, I, T)
CALL SSORT (A, I)

DESCRIPTION OF PARAMETERS
A - REAL ARRAY TO BE SORTED
I - NUMBER OF ELEMENTS TO BE SORTED
T - IF PRESENT, AN ASSOCIATED ARRAY RE-ORDERED TO MAINTAIN
   1 TO 1 CORRESPONDENCE WITH THE ELEMENTS OF ARRAY 'A'

CM REQUIRED: 70B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF SHIFT
OTHERS
NONE

AUTHOR
C FLINK - KPS NWL

DATE WRITTEN: 12/07/70

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, SSORT, OUTPUT, MSACCES=<PASSWORD>.

02/10/84 2-277 SSORT - 1 OF 1
SUBROUTINE 'SSORTF'

PURPOSE
FTN-CALLABLE SHELL SORT FOR TWO-DIMENSIONAL REAL ARRAYS

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS ROUTINE IS INEFFICIENT IF M .GT. 10.

USAGE
CALL SSORTF (A, TEMP, M, N, I)
CALL SSORTF (A, TEMP, M, N)

DESCRIPTION OF PARAMETERS
A - REAL ARRAY TO BE SORTED
TEMP - TEMPORARY ARRAY OF DIMENSION M USED IN THE SORT
M - NUMBER OF WORDS PER ITEM
N - NUMBER OF ITEMS PER ARRAY
(DIMENSION OF A IS A(M,N))
I - IF PRESENT, NUMBER FROM 1 TO M SPECIFYING ON WHICH
WORD OF AN ITEM TO SORT.
IF OMITTED, I=1.

CM REQUIRED: 200B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF SHIFT
OTHERS
MOVECM - MOVE AN ARRAY

AUTHOR
C FLINK - KPS NWL

DATE WRITTEN: 01/10/71

DATE(S) REVISED
11/23/76 - DVS - DTNSRDC - CHANGE SUBROUTINE SENT TO MOVLEV
02/21/80 - DVS - DTNSRDC - CHANGE MOVLEV TO MOVECM
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,SSORTF,OUTPUT,MSACCE=<PASSWORD>.
SUBROUTINE 'SSORTI'

PURPOSE
FTN-CALLABLE SHELL SORT FOR TWO-DIMENSIONAL INTEGER ARRAYS

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS ROUTINE IS INEFFICIENT IF M .GT. 10.

USAGE
CALL SSORTI (A, TEMP, M, N, I)
CALL SSORTI (A, TEMP, M, N)

DESCRIPTION OF PARAMETERS
A - INTEGER ARRAY TO BE SORTED
TEMP - TEMPORARY ARRAY OF DIMENSION M USED IN THE SORT
M - NUMBER OF WORDS PER ITEM
N - NUMBER OF ITEMS PER ARRAY
   (DIMENSION OF A IS A(M,N))
I - IF PRESENT, NUMBER FROM 1 TO M SPECIFYING ON WHICH
   WORD OF AN ITEM THE ARRAY IS TO BE SORTED.
   IF ABSENT, THE ARRAY WILL BE SORTED ON THE FIRST
   WORD (I=1).

CM REQUIRED: 200B

SUBPROGRMS REQUIRED
PART OF LANGUAGE
LOCF SHIFT
OTHERS
MOVECM - MOVE AN ARRAY

AUTHOR
C FLINK - KPS NWL
ALBAN P GASS - NWL
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/10/71

DATE(S) REVISED
03/10/74 - APG - CHANGE FROM REAL TO INTEGER
06/09/76 - DVS - CHANGE SUBROUTINE SENT TO MOVLEV
02/21/80 - DVS - CHANGE SUBROUTINE MOVLEV TO MOVECM
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,SSORTI,OUTPUT,MSACCES=<PASSWORD>.
02/10/84 2-279 SSORTI - 1 OF 1
SUBROUTINE 'SSORTL'

PURPOSE
FTN-CALLABLE LOGICAL SHELL SORT FOR CHARACTER ARRAYS

FUNCTIONAL CATEGORIES: MI

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS MAY BE USED WHEN YOU HAVE DEFINED TWO ARRAYS WHICH
"GO TOGETHER" AND YOU ARE SORTING ONE ARRAY AND WISH TO KEEP
CORRESPONDING ELEMENTS OF THE OTHER ARRAY WITH IT. THAT IS,
WHEREVER A(I) ENDS UP AFTER THE SORT, T(I) WILL BE IN THE
SAME RELATIVE POSITION.

USAGE
CALL SSORTL (A, I, M, T)
CALL SSORTL (A, I, M)

DESCRIPTION OF PARAMETERS
A - CHARACTER ARRAY TO BE SORTED
I - NUMBER OF ELEMENTS IN ARRAY 'A' TO BE SORTED
M - MASK WORD WITH THE RELEVANT BITS SET
T - IF PRESENT, ASSOCIATED ARRAY, RE-ORDERED SUCH THAT
   A(K) STILL RELATES TO T(K)

CM REQUIRED: 133B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF
SHIFT
OTHERS
EQU60

AUTHOR
C FLINK - KPS NWL

DATE WRITTEN: 12/03/70

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,SSORTL,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84 2-280 SSORTL - 1 OF 1
SUBROUTINE 'SSORT3'

PURPOSE
FTN-CALLABLE SHELL SORT FOR REAL ARRAYS WITH ASSOCIATED REAL
ARRAY AND INTEGER ARRAY

LANGUAGE: FORTRAN IV EXTENDED

FUNCTIONAL CATEGORIES: M1

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE SUBROUTINE 'SSORT'.

USAGE
CALL SSORT3 (ARRAY, NWORDS, REALA, INTA)
CALL SSORT3 (ARRAY, NWORDS)

DESCRIPTION OF PARAMETERS
ARRAY  - REAL ARRAY TO BE SORTED
NWORDS  - NUMBER OF ELEMENTS TO BE SORTED
REALA  - IF PRESENT, AN ASSOCIATED REAL ARRAY RE-ORDERED TO
MAINTAIN 1-TO-1 CORRESPONDENCE WITH THE ELEMENTS
OF ARRAY 'ARRAY'
INTA  - AN ASSOCIATED INTEGER ARRAY RE-ORDERED TO MAINTAIN
1-TO-1 CORRESPONDENCE WITH THE ELEMENTS OF ARRAY
'ARRAY'. IF 'REALA' IS PRESENT, 'INTA' MUST ALSO
BE PRESENT. IF 'REALA' IS OMITTED, 'INTA' MUST
ALSO BE OMITTED.

CM REQUIRED: 111B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF  SHIFT
OTHERS  NONE

AUTHORS
C FLINK  - KPS NWL
D V SOMMER  - DTNSRDC (ADD INTEGER ARRAY)

DATE WRITTEN: 12/07/70

DATE(S) REVISED
02/02/82  - ADD INTEGER ARRAY
03/23/83  - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,SSORT3,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-281  SSORT3  -  1 OF  1
FUNCTION 'SUMIT'

PURPOSE
SUM ELEMENTS OF REAL ARRAY

FUNCTIONAL CATEGORIES: A1

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
ITOTAL = SUMIT (ARRAY, N)

DESCRIPTION OF PARAMETERS
SUMIT - WILL CONTAIN ARRAY(1)+ARRAY(2)+...+ARRAY(N)
ARRAY - ARRAY TO BE SUMMED
N - NUMBER OF ELEMENTS OF ARRAY TO BE SUMMED

CM REQUIRED: 16B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/23/76

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,SUMIT,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84 2-282 SUMIT - 1 OF 1
SUBROUTINE 'SWAP'

PURPOSE
SWAP TWO ARRAYS

FUNCTIONAL CATEGORIES: K2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL SWAP (A, B, NWORDS)

DESCRIPTION OF PARAMETERS
A, B - ARRAYS TO BE SWAPPED
NWORDS - NUMBER OF WORDS TO BE SWAPPED

CM REQUIRED: 16B

EXAMPLE
PROGRAM TEST (OUTPUT=128)
INTEGER A(10), B(10)
DATA A/ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10/
DATA B/ 10, 9, 8, 7, 6, 5, 4, 3, 2, 1/
... CALL SWAP (A, B, 10)
C ARRAY A NOW CONTAINS 10, 9, 8, 7, 6, 5, 4, 3, 2, 1
C ARRAY B NOW CONTAINS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
...

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/12/80

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, SWAP, OUTPUT, MSACCES=<PASSWORD>.

06/14/84 2-283 SWAP - 1 OF 1
SUBROUTINE 'TEKTRI'

PURPOSE
INITIALIZE COMMON BLOCK /TEKTRN/ WITH ASCII CONTROL CODES
FOR THE TEKTRONIX GRAPHICS TERMINALS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE MUST BE EXECUTED PRIOR TO GENERATING ASCII
MESSAGES WITH TEKTRONIX CONTROL CODES USING SUBROUTINE
ASCII.

COMMON BLOCK /TEKTRN/ IS OBTAINED BY RUNNING PROCEDURE ASCII10
AND INSERTING THE COMMON BLOCK INTO EACH (SUB)PROGRAM WHICH
WILL GENERATE ASCII MESSAGES HAVING TEKTRONIX CONTROL CODES.

USAGE
CALL TEKTRI

CM REQUIRED: 6B

NAMES OF TEKTRONIX CONTROL CODES

CHARACTER SETTING
SELASC - SELECT ASCII CHARACTERS
SELAPL - SELECT APL CHARACTERS
C74   - SELECT 74 CHARACTERS PER LINE, 35 LINES
C81   - SELECT 81 CHARACTERS PER LINE, 38 LINES
C121  - SELECT 121 CHARACTERS PER LINE, 58 LINES
C133  - SELECT 133 CHARACTERS PER LINE, 64 LINES

MODE SETTING
SETLFAF - SET ALPHA MODE (NORMAL)
SETGIN - SET GIN MODE
SETLGRA - SET GRAPH MODE
SETLCE - SET LCE
BYPASS - SET BYPASS
INCPLOM - SET INCREMENTAL PLOT
MISCELLANEOUS
CLRSCR - HOME, CLEAR SCREEN
HRDCOPY - MAKE HARD COPY
REVLF - REVERSE LINE FEED
BEAM AND VECTOR SELECTORS
NZNVA - NORMAL Z AXIS AND NORMAL VECTORS OR ALPHA
NZDLIN - NORMAL Z AXIS AND DOTTED LINE VECTORS
NZDDV - NORMAL Z AXIS AND DOT-DASHED VECTORS
NZSDV - NORMAL Z AXIS AND SHORT-DASHED VECTORS
NZLDV - NORMAL Z AXIS AND LONG-DASHED VECTORS
NORMZ - NORMAL Z AXIS
DZNVA - DEFOCUSED Z AXIS AND NORMAL VECTORS OR ALPHA
DZDLIN - DEFOCUSED Z AXIS AND DOTTED LINE VECTORS
DZDDV - DEFOCUSED Z AXIS AND DOT-DASHED VECTORS
DZSDV - DEFOCUSED Z AXIS AND SHORT-DASHED VECTORS
DZLDV - DEFOCUSED Z AXIS AND LONG-DASHED VECTORS
DEFOCZ - DEFOCUSED Z AXIS
WTNVA - WRITE-THRU MODE AND NORMAL VECTORS OR ALPHA
WTDLIN - WRITE-THRU MODE AND DOTTED LINE VECTORS
WTDDV - WRITE-THRU MODE AND DOT-DASHED VECTORS
WTSDV - WRITE-THRU MODE AND SHORT-DASHED VECTORS
WTLDV - WRITE-THRU MODE AND LONG-DASHED VECTORS
WRITRU - WRITE-THRU MODE

INCREMENTAL PLOT MODE CHARACTERS
BEAMOF - BEAM OFF (PEN UP)
BEAMON - BEAM ON (PEN DOWN)
NORTH - MOVE NORTH
NOREST - MOVE NORTHEAST
EAST - MOVE EAST
SQUEST - MOVE SOUTHEAST
SOUTH - MOVE SOUTH
SOUWST - MOVE SOUTHWEST
WEST - MOVE WEST
NORWST - MOVE NORTHWEST

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/07/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,TEKTRI,OUTPUT,MSACCES=<PASSWORD>.

03/19/84 2-285 TEKTRI - 2 OF 2
SUBROUTINE 'TIMLEFT'

PURPOSE
DETERMINE CP (AND IO) TIME LEFT SINCE START OF BATCH JOB
OR INTERCOM COMMAND

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL TIMLEFT (CP, XIO)
CALL TIMLEFT (CP)

DESCRIPTION OF PARAMETERS
CP - WILL CONTAIN CP TIME REMAINING
XIO - IF PRESENT, WILL CONTAIN IO TIME REMAINING
(IF NEGATIVE, THE SYSTEM IS NOT TESTING IO TIME.
THE TOTAL IO TIME USED IS ABS(XIO).)

CM REQUIRED: 65B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND FLOAT SHIFT
OTHERS
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS
R65FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/27/77

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, TIMLEFT, OUTPUT, MSACCESS=<PASSWORD>.

02/10/84 2-286 TIMLEFT - 1 OF 1
SUBROUTINE 'TRAILBZ'

PURPOSE
CHANGE TRAILING BLANKS TO ZEROS (OOB)

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
OOB IS TREATED AS A BLANK.

THIS SUBROUTINE IS USEFUL WHEN GENERATING MESSAGES FOR PRINTING IN THE DAYFILE USING 'CALL REMARK'. AFTER A MESSAGE IS GENERATED WITH AN ENCODE, A CALL TO 'TRAILBZ' WILL REMOVE ANY TRAILING BLANKS. THIS WILL RESULT IN THE SHORTEST POSSIBLE MESSAGE. THIS IS PARTICULARLY DESIRABLE FOR PROGRAMS WHICH ARE RUN FROM TELTYPE, SINCE TRAILING BLANKS ARE NOT SUPPRESSED FOR DAYFILE MESSAGES.

USAGE
CALL TRAILBZ (A, N)
CALL TRAILBZ (A, N, NW)
CALL TRAILBZ (A, N, NW, NC)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE PROCESSED
N - NUMBER OF WORDS OF 'A' TO BE PROCESSED
NW - NUMBER OF LAST NON-BLANK WORD OF 'A'
  (0 LE NW LE N)
  (NW=0 MEANS ALL OF 'A' IS BLANK)
NC - POSITION OF LAST NON-BLANK CHARACTER OF A(NW)
  (0 LE NC LE 10)
  (NC=0 MEANS ALL OF 'A' IS BLANK)

CM REQUIRED: 72B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOC/MASK/SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/08/75

DATE(S) REVISED
12/20/82 - RECOMPILE AT 552 TO REDUCE MEMORY REQUIREMENT

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, , TRAILBZ, OUTPUT, MSACCES=<PASSWORD>.

08/18/83  2-288  TRAILBZ - 2 OF 2
FUNCTION 'UNHEX3'

PURPOSE
SPREAD 2 CHARACTERS INTO 3 HEX DIGITS

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV EXTENDED

 COMPUTERS (OPERATING SYSTEMS)
 CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'UNHEX3' IS AN INTEGER FUNCTION.

WRITTEN TO CHANGE 2-CHARACTER INTERNAL TERMINAL ID INTO
3-CHARACTER (HEX) TERMINAL ID

USAGE
UNHEX3 (INTTID)

DESCRIPTION OF PARAMETERS
INTTID - INPUT INTERNAL TID (E.G., 2L@D)
UNHEX3 - OUTPUT IN FIRST 3 CHARACTERS (E.G., 3LF04)

CM REQUIRED: 43B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND OR SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 09/19/78

DATE(S) REVISED
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN-CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC, , UNHEX3, OUTPUT, MSACCES<<PASSWORD>>.

02/10/84 2-289 UNHEX3 - 1 OF 1
SUBROUTINE 'UNLOAD'

PURPOSE
UNLOAD A FORTRAN FILE

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE FILE TO BE UNLOADED MUST BE LISTED IN THE FORTRAN IV
PROGRAM STATEMENT.

FORTRAN SEQUENTIAL FILES SHOULD HAVE THEIR BUFFERS FLUSHED
BY ISSUING A REWIND BEFORE CALLING THIS ROUTINE.

LEVEL 508 ON: PROGRAMS WHICH REWIND A FILE AND CALL UNLOAD
BUT WHICH NEVER READ OR WRITE ON THE FILE MUST BE MODIFIED
TO READ (OR WRITE) AT LEAST ONE RECORD BEFORE CALLING
UNLOAD. THIS IS BECAUSE THE SYSTEM NO LONGER ALLOWS A
CLOSE TO BE ISSUED TO AN UNOPENED (OR NON-EXISTENT) FILE.
A FORTRAN REWIND STATEMENT ONLY SETS A FLAG FOR THE NEXT
READ/WRITE TO THE FILE. IT DOES NOT CAUSE AN IMMEDIATE
REWIND.

DO NOT USE WITH FORTRAN 77; USE THE 'CLOSE' STATEMENT

USAGE
CALL UNLOAD (IOUNIT)

DESCRIPTION OF PARAMETER
IOUNIT - FORTRAN LOGICAL UNIT NUMBER
-OR-
1- TO 7-CHARACTER LOCAL FILE NAME

CM REQUIRED: 70B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND CLOSEM LOCF OR
OTHERS
FITADDR - GET FORTRAN FIT ADDRESS
ISTAPE - FORM 'TAPEN' FROM N
LASTC - FIND LAST NON-BLANK CHARACTER
LIBBAM - LDSET,LIB=BAMLIB
TRAILBZ - CHANGE TRAILING BLANKS TO OOB

ARITHMETIC STATEMENT FUNCTIONS
LETTER - TEST FOR LETTER
OCFLAG - GET OPEN/CLOSE FLAG FROM FIT
OPEN - TEST FOR FILE OPEN
R11FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)
AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/07/75

DATE(S) REVISED
07/07/81 - TOTAL REWRITE FOR LEVEL 508
07/14/81 - ADD DUMMY CALL TO SET LDSET,LIB=BAMLIB
07/17/81 - FIX PROBLEM WITH OCCASIONAL REDEFINITION OF
SUBROUTINE ARGUMENT
02/15/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,UNLOAD,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-291 UNLOAD - 2 OF 2
FUNCTION 'VALDAT'

PURPOSE
LOGICAL FUNCTION TO VALIDATE A DATE FORMAT

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'VALDAT' MUST BE DECLARED LOGICAL IN THE CALLING PROGRAM.

UPON RETURN, IF THE FORMAT WAS VALID, THE DATE IS RETURNED AS 'MM/DD/YY'.

USAGE
VALDAT (DATE)

DESCRIPTION OF PARAMETERS.
DATE - DATE TO BE ANALYZED
(IF FORMAT OK, RETURNED AS 'MM/DD/YY')

VALDAT - WILL CONTAIN
.TRUE. - DATE FORMAT WAS OK
.FALSE. - DATE FORMAT WAS NOT OK

CM REQUIRED: 162B

METHOD
DATE FORMAT IS VALIDATED BY THE FOLLOWING CHECKS:
EXACTLY 2 SLASHES
SLASHES SEPARATED BY 1 OR 2 CHARACTERS
SLASHES NOT IN POSITIONS 1, 9 OR 10
MONTH CONTAINS 1 OR 2 DIGITS (LEADING BLANKS OK)
DAY CONTAINS 1 OR 2 DIGITS (LEADING BLANKS OK)
YEAR CONTAINS 2 DIGITS
VALDAT RETURNS IF ANY CHECK FAILS.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND OR SHIFT
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/26/77

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,VALDAT,OUTPUT,MSACCES=<PASSWORD>.

08/18/83             2-293               VALDAT - 2 OF 2
SUBROUTINE 'VALIDT'

PURPOSE
VALIDATE ARRAY 'A' TO SEE THAT EACH ELEMENT IS ONE OF THOSE OF ARRAY 'V'

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL VALIDT (A, NA, V, NV, VALID)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE VALIDATED
NA - NUMBER OF ELEMENTS OF 'A' TO BE TESTED
V - ARRAY OF VALID ELEMENTS
NV - NUMBER OF ELEMENTS IN 'V'
VALID - LOGICAL OUTPUT CODE
TRUE - ALL ELEMENTS OF 'A' ARE VALID
FALSE - AT LEAST 1 ELEMENT OF 'A' IS INVALID

CM REQUIRED: 25B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/72

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,VALIDT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-294 VALIDT - 1 OF 1
SUBROUTINE 'VFILL'

PURPOSE
FILL AN ARRAY WITH USER-SPECIFIED WORD

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL VFILL (WORD, A, NA)

DESCRIPTION OF PARAMETERS
WORD - WORD TO BE PUT INTO ARRAY 'A'
A - ARRAY TO RECEIVE 'WORD'
NA - NUMBER OF WORDS IN 'A' TO BE SET TO 'WORD'

CM REQUIRED: 15B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
C FLINK - KPS NWL

DATE WRITTEN: 02/10/71

DATE(S) REVISED
??/??/74 - DAVID V SOMMER - DTNSRDC CODE 1892.2
(NAME CHANGED FROM 'MOVE' TO 'VFILL')
05/01/79 - MOVE TO BURROUGHS B7700
(CHANGE TO FORTRAN - DVS)
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,VFILL,OUTPUT,MSACCES=<PASSWORD>.

06/14/84 2-295 VFILL - 1 OF 1
SUBROUTINE 'VT100I'

PURPOSE
INITIALIZE COMMON BLOCK /VT100/ WITH ASCII CONTROL CODES
FOR THE DEC VT100 CRT

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE MUST BE EXECUTED PRIOR TO GENERATING ASCII
MESSAGES WITH VT100 CONTROL CODES USING SUBROUTINE ASCII.

COMMON BLOCK /VT100/ IS OBTAINED BY RUNNING PROCEDURE ASCIIO
AND INSERTING THE COMMON BLOCK INTO EACH (SUB)PROGRAM WHICH
WILL GENERATE ASCII MESSAGES HAVING VT100 CONTROL CODES.

USAGE
CALL VT1001

CM REQUIRED: 6B

NAMES OF VT100 CONTROL CODES

CHARACTER VIDEO ATTRIBUTES
SGR0 - PRIMARY (NORMAL)
SGR1 - BOLD
SGR4 - UNDERScore
SGR5 - BLINK
SGR7 - REVERSE

CHARACTER SETS
SCSUU0 - UK
SCSAS0 - ASCII
SCSSGO - SPECIAL GRAPHICS
SCSAC0 - ALT ROM
SCSAGO - ALT ROM SPECIAL GRAPHICS
SCSUUKI - UK
SCSASI - ASCII
SCSSG1 - SPECIAL GRAPHICS
SCSAC1 - ALT ROM
SCSAG1 - ALT ROM SPECIAL GRAPHICS

CHARACTER SIZE
PCDHLU - DOUBLE HIGH UPPER HALF
PCDHLL - DOUBLE HIGH BOTTOM HALF
PCSWL - SINGLE WIDTH SINGLE HEIGHT
PCDWL - DOUBLE WIDTH SINGLE HEIGHT
CURSOR MOVEMENTS

CUU - CURSOR UP
(YOU MAY SET THE NUMBER OF ROWS TO MOVE UP
01-24 IN POSITIONS 3-4 - USE SUBROUTINE
ASCPUT)

CUD - CURSOR DOWN
(YOU MAY SET THE NUMBER OF ROWS TO MOVE DOWN
01-24 IN POSITIONS 3-4 - USE SUBROUTINE
ASCPUT)

CUF - CURSOR RIGHT (FORWARD)
(YOU MAY SET THE NUMBER OF ROWS TO MOVE RIGHT
001-132 IN POSITIONS 3-5 - USE SUBROUTINE
ASCPUT)

CUB - CURSOR LEFT (BACK)
(YOU MAY SET THE NUMBER OF ROWS TO MOVE LEFT
001-132 IN POSITIONS 3-5 - USE SUBROUTINE
ASCPUT)

HOME - CURSOR TO HOME POSITION

CUP - POSITION CURSOR RELATIVELY AT I,J
(YOU MUST SET I,J - I IS 01-24 AND IS IN
POSITIONS 3-4; J IS 001-132 AND IS IN
POSITIONS 6-8 - USE SUBROUTINE ASCPUT)

HVP - POSITION CURSOR ABSOLUTELY AT I,J
(YOU MUST SET I,J - I IS 01-24 AND IS IN
POSITIONS 3-4 . J IS 001-132 AND IS IN
POSITIONS 6-8 - USE SUBROUTINE ASCPUT)

IND - INDEX (DOWN ONE LINE, SAME COLUMN)

RI - REVERSE INDEX (UP ONE LINE, SAME COLUMN)

NEL - NEW LINE

PCSC - SAVE CURSOR AND ATTRIBUTES (PRIVATE CODE)

PCRC - RESTORE CURSOR AND ATTRIBUTES (PRIVATE CODE)

A NOTE ON SETTING THE CURSOR MOTION COUNTS (CUU,
CUD, CUF, CUB, CUP, HVP): THESE ARE PRE-DEFINED
WITH VALUES OF 01 OR 001 CURSOR POSITION. TO
CHANGE, FOR EXAMPLE, CUD TO 12 ROWS DOWN, USE
CALL ASCII (NCOL, BUF, CUD)
CALL ASCPUT (NCOL-3, BUF, TWO)
CALL ASCPUT (NCOL-2, BUF, ONE)

TO CHANGE CUP TO 05,123, USE
CALL ASCII (NCOL, BUF, CUP)
CALL ASCPUT (NCOL-7, BUF, ZERO)
CALL ASCPUT (NCOL-6, BUF, FIVE)
CALL ASCPUT (NCOL-4, BUF, ONE)
CALL ASCPUT (NCOL-3, BUF, TWO)
CALL ASCPUT (NCOL-2, BUF, THREE)

ERASE

EL0 - CURSOR TO END-OF-LINE

EL1 - BEGINNING-OF-LINE TO CURSOR

EL2 - ENTIRE LINE

ED0 - CURSOR TO END-OF-SCREEN

ED1 - BEGINNING-OF-SCREEN TO CURSOR

ED2 - ENTIRE SCREEN
LED'S
PCLLO - EXTINGUISH ALL
PCLL1 - L1 ON
PCLL2 - L2 ON
PCLL3 - L3 ON
PCLL4 - L4 ON

MEDIA COPY
MC0 - COPY CONTENTS OF DISPLAY TO AUX. OUTPUT DEVICE
MC4 - START COPYING DATA STREAM TO AUX. OUTPUT DEVICE
MC5 - STOP COPYING DATA STREAM TO AUX. OUTPUT DEVICE

MODES
PCARMS - SET AUTO-REPEAT
PCARMR - RESET AUTO-REPEAT
PCCOLS - SET 132 CHARACTER PER LINE DISPLAY
PCCOLR - SET 80 CHARACTER PER LINE DISPLAY
PCCKMS - FOUR CURSOR FUNCTION KEYS SEND APPLICATION FUNCTIONS
PCCKMR - FOUR CURSOR FUNCTION KEYS SEND ANSI CURSOR CONTROL COMMANDS
PCCNLS - INTERLACE ON (480 LINES PER FRAME)
(HIGH RESOLUTION GRAPHICS)
PCCNL - INTERLACE OFF (240 LINES PER FRAME)
(NORMAL DATA DISPLAY)
PCKPAM - KEY PAD APPLICATION MODE
PCKPNM - KEY PAD NUMERIC MODE
LNMS - LF CAUSES CURSOR TO MOVE TO FIRST POSITION OF NEXT LINE AND CR SEND CR/LF
LNMR - LF CAUSES VERTICAL MOVEMENT AND CR SENDS ONLY CARRIAGE RETURN CONTROL CODE
PCOMS - ORIGIN MODE (CURSOR POSITION NUMBERS ARE RELATIVE TO TOP MARGIN)
PCOMR - ORIGIN MODE (CURSOR POSITION NUMBERS ARE RELATIVE TO TOP LINE OF SCREEN)
PCCSNS - SCREEN MODE (NORMAL - LIGHT CHAR ON DARK BKGD)
PCCSNR - SCREEN MODE (REVERSE - LIGHT CHAR ON DARK BKGD)
PCCSLS - SET SMOOTH SCROLLING
PCSCLR - SET JUMP SCROLLING
------- - SET ANSI MODE (MUST BE DONE WITH ATS CONTROL SEQUENCE)
PCANM - SET ATS (ALTERNATE TERMINAL SUPPORT) MODE
PCAWMS - SET AUTO WRAPAROUND
PCAWMR - RESET AUTO WRAPAROUND

REPORTS
DSR5 - STATUS REPORT REQUEST
DSR6 - CURSOR POSITION REPORT REQUEST
PCRTPO - REQUEST TERMINAL PARAMETERS (SUBSEQUENT REPORTS MAY BE UNSOLICITED)
PCRTP1 - REQUEST TERMINAL PARAMETERS (SUBSEQUENT REPORTS ONLY IN RESPONSE TO HOST REQUEST)
DA - REQUEST DEVICE ATTRIBUTES
RESET TO INITIAL STATE
RIS - RESET TO INITIAL STATE
SCROLLING REGION
PCSTBM - SET TOP AND BOTTOM MARGINS
TABS
HTS - SET TAB
TBC0 - CLEAR TAB
TBC3 - CLEAR ALL TABS
TESTS
PCALN - FILL SCREEN WITH 'E'

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
STANLEY WILLNER - DTNSRDC CODE 1892.1

DATE WRITTEN: 03/07/84

DATE(S) REVISED
05/17/84 - CORRECT AND EXPAND CURSOR MOTION FIELDS

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDCPL,UN-CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,VT100I,OUTPUT,MSACCESS=<PASSWORD>.

05/17/84 2-299 VT100I - 4 OF 4
SUBROUTINE 'WARNING'

PURPOSE
  FTN-CALL APPLY 'WARNING' CONTROL CARD

FUNCTIONAL CATEGORIES: 01

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
  CDC 6000/CYBER 170 (NOS/BE)

REMARKS
  NONE

USAGE
  CALL WARNING (BANNER, OUTFILE)

DESCRIPTION OF PARAMETERS
  BANNER - BANNER REQUEST. ONE OF:
    "FOUO" - FOR OFFICIAL USE ONLY
    "OFFICIAL" - FOR OFFICIAL USE ONLY
    "PRIVACY" - PERSONAL DATA PRIVACY ACT OF 1974
    "CONFIDENTIAL" - CONFIDENTIAL
    "SECRET" - SECRET
  NOTE: ONLY THE FIRST 7 CHARACTERS ARE TESTED.

  OUTFILE - FORTRAN LOGICAL UNIT NUMBER OF THE OUTPUT FILE

CM REQUIRED: 1735B

OUTPUT DESCRIPTION
  ONE BANNER PAGE WITH THE REQUESTED BANNER.

OUTPUT UNITS

<table>
<thead>
<tr>
<th>UNIT #</th>
<th>LFN</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>USER SPECIFIES</td>
<td>LISTABLE OUTPUT</td>
<td></td>
</tr>
</tbody>
</table>

02/10/84 2-300 WARNING - 1 OF 2
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND
OTHERS
NONE

ARITHMETIC STATEMENT FUNCTIONS
L71FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 09/19/79

DATE(S) REVISED
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,WARNING,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84 2-301 WARNING - 2 OF 2
SUBROUTINE 'WEKDAY'

PURPOSE
DETERMINE THE DAY OF THE WEEK FOR ANY GREGORIAN DATE FROM
OCTOBER 15, 1582 THRU FEBRUARY 28, 4000

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
DATES FROM JANUARY 1, 1582 THRU OCTOBER 14, 1582 AND
AFTER FEBRUARY 28, 4000 THRU DECEMBER 31, 4000 ARE NOT
VALIDATED.

USAGE
CALL WEKDAY (IERR, IDAY, IGY, IGM, IGD)

DESCRIPTION OF PARAMETERS
IERR - RETURN CODE
0 - NO ERROR
1 - AT LEAST ONE OF IGY, IGM, IGD OUT OF RANGE
IDAY - WILL CONTAIN DAY-OF-WEEK
0 (SUNDAY) THRU 6 (SATURDAY)
IGY - GREGORIAN YEAR (EG, 1975)
IGM - GREGORIAN MONTH (1-12)
IGD - GREGORIAN DAY (1-31)

CM REQUIRED: 73B

METHOD
SEE IBM PROGRAM DESCRIPTION 360D 03.1.004
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
MOD
OTHERS
NONE

AUTHOR
RICHARD CONNER - IBM

DATE WRITTEN: 10/15/66

DATE(S) REVISED
04/26/73 - REWRITTEN IN FORTRAN FOR CDC 6000 - DVS
04/25/79 - IMPLEMENTED ON BURROUGHS B7700 - DVS
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UD=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,WEKDAY,OUTPUT,MSACCES=<PASSWORD>.

06/14/84  2-303  WEKDAY - 2 OF 2
SUBROUTINE 'ZBLANK'

PURPOSE
   CHANGE BLANKS TO OOB AND VICE VERSA

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   CALL ZBLANK (A, NA)

DESCRIPTION OF PARAMETERS
   A - START OF AREA TO BE PROCESSED
   NA - NUMBER OF WORDS TO BE PROCESSED

CM REQUIRED: 25B

SUBPROGRMS REQUIRED
   PART OF LANGUAGE
      AND
   OTHERS
      NONE

AUTHOR
   J. P. - KPS - NWL

DATE WRITTEN: 1973

DATE(S) REVISED
   03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDCPl,UN=CSYS
   OBJECT
      EDItLib USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC,,ZBLANK,OUTPUT,MSACCEs=<PASSWORD>.

02/10/84  2-304  ZBLANK - 1 OF 1
SUBROUTINE 'ZEROFL'

PURPOSE
ZERO FIELD LENGTH (SECURITY EOJ)

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'ZEROFL' ZEROS THE JOB'S FIELD LENGTH ABOVE 77B AND ENDS THE JOB WITHOUT DAYFILE MESSAGES.

THE INTENDED USE IS AS THE TERMINATION ROUTINE, CALLED BY REPRIEVE, WHENEVER A UTILITY PROGRAM HAS WITHIN ITS FIELD LENGTH DATA THAT SHOULD NOT APPEAR IN A USER'S DUMP.

USAGE
CALL ZEROFL

CM REQUIRED: 21B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
C FLINK - KP NWL

DATE WRITTEN: 08/73

DATE(S) REVISED
03/22/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ZEROFL,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-305 ZEROFL - 1 OF 1
SUBROUTINE 'ZEROS'
SUBROUTINE 'ZEROES'

PURPOSE
REPLACE BLANKS WITH (DISPLAY CODE) ZEROS, MULTIPLE FIELDS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'ZEROS' WILL REPLACE BLANKS WITH ZEROS UP TO THE 1ST NON-BLANK CHARACTER IN A GIVEN FIELD.
IF THE 1ST NON-BLANK CHARACTER IS MINUS (-), THEN THAT CHARACTER POSITION IS REPLACES WITH A ZERO AND THE 1ST CHARACTER IN THE FIELD IS REPLACED WITH A MINUS (-).

USAGE
CALL ZEROS (A, S1, L1, S2, L2, ..., SN, LN)
CALL ZEROES (A, S, L1, S2, L2, ..., SN, LN)

DESCRIPTION OF PARAMETERS
A - ARRAY TO BE PROCESSED
S - STARTING BYTE OF A FIELD
   (BYTE COUNT BEGINS WITH 1 FOR THE LEFTMOST BYTE IN 'A')
L - NUMBER OF BYTES IN THIS FIELD TO PROCESS
   (UP TO 31 PAIRS OF SI,LI)

CM REQUIRED: 55B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
T HERRING - KPS NWL

DATE WRITTEN: 12/09/70

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ZEROS,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-306 ZEROS - 1 OF 1
SUBROUTINE 'ZPFPUT'

PURPOSE
PUT USER-SPECIFIED PARAMETERS INTO ARRAY FOR LATER CALL TO ZPFUNC

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NO LONGER SUPPORTED SINCE SUBROUTINE 'ZPFUNC' HAS BEEN REPLACED BY SYSTEM SUBROUTINE 'PF'.

USAGE
CALL ZPFPUT (IPRMS, NW)
CALL ZPFPUT (IPRMS, NW, LFN, PFN, ID, TK, RD, EX, MD, CN, MR, AC, CY, RP, XR, LC, RW, SN, VSN, FO, ST, UV, RB)

FOR EXAMPLE:
CALL ZPFPUT (IPRMS, 0)
CALL ZPFPUT (IPRMS, 1, LFN)
CALL ZPFPUT (IPRMS, 5, LFN, PFN)
CALL ZPFPUT (IPRMS, 6, LFN, PFN, ID)

... CALL ZPFPUT (IPRMS, 13, LFN, PFN, ID, TK, RD, EX, MD, CN, MR, AC) ...

... CALL ZPFPUT (IPRMS, 24, LFN, PFN, ID, TK, RD, EX, MD, CN, MR, AC, CY, RP, XR, LC, RW, SN, VSN, FO, ST, UV, RB)

DESCRIPTION OF PARAMETERS
IPRMS - ARRAY (MAXIMUM REQUIRED DIMENSION 24) TO BE DEFINED
NW - 0 - SET ALL 24 WORDS TO ZERO
1 THRU 24 - DEFINE NW PARAMETERS FROM THE FOLLOWING
LFN - LOCAL FILE NAME (1-7 CHARACTERS)
PFN - 4-WORD PERMANENT FILE NAME
ID - 1-9 CHARACTERS
TK - TURNKEY PASSWORD (1-9 CHARACTERS)
RD - READ PASSWORD (1-9 CHARACTERS)
EX - EXTEND PASSWORD (1-9 CHARACTERS)
MD - MODIFY PASSWORD (1-9 CHARACTERS)
CN - CONTROL PASSWORD (1-9 CHARACTERS)
MR - MULTIPLE-READ (0 OR NOT)
AC - ACCOUNT NUMBER (10 CHARACTERS, LAST IS NUMERIC)
CY - CYCLE (INTEGER -999 TO -1, 1 TO 999)
RP - RETENTION PERIOD (0-999)
XR - READ-ONLY PASSWORD (1-9 CHARACTERS)
LC - LOWEST CYCLE (0 OR NOT)
RW - MULTI-READ, SINGLE WRITE (0 OR NOT)
SN - SETNAME (1-7 CHARACTERS)
VSN - VOLUME SERIAL NUMBER (1-6 CHARACTERS, LEFT-JUSTIFIED). RESERVED FOR FUTURE.
FO - FILE ORGANIZATION (2-CHARACTERS)
ST - STATION ID (MULTI-FRAME)
  RESERVED FOR FUTURE.
UV - UNIVERSAL PASSWORD (1-9 CHARACTERS)
RB - PURGE RB CONFLICTS (0 OR NOT)

NOTE: ALL VARIABLES ARE TYPE INTEGER. CHARACTER DATA IS LEFT-JUSTIFIED AND MAY BE ZERO- OR BLANK-PADDED.
TO CLEAR (OR OMIT) A SPECIFIC PARAMETER, USE 0.

CM REQUIRED: 137B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
  MINO
OTHERS
  NONE

AUTHOR
  DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/13/76

DATE(S) REVISED
  01/20/76
  09/23/80 - UPGRADE TO LEVEL 508 (UV AND RB ADDED)
  03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
  UPDATE LIBRARY ON MSS: NSRDCPL, UN=CSYS
OBJECT
  EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC,, ZPFPUT, OUTPUT, MSACCES=<PASSWORD>.

02/10/84

2-308

ZPFPUT - 2 OF 2
SUBROUTINE 'ZPFUNC'

PURPOSE
   CALLABLE PERMANENT FILE FUNCTIONS

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NO LONGER SUPPORTED SINCE SUBROUTINE 'ZPFUNC' HAS BEEN
   REPLACED BY SYSTEM SUBROUTINE 'PF'.

USAGE
   CALL ZPFUNC (IRC, IPRMS, NW)

DESCRIPTION OF PARAMETERS
   IRC - INPUT: PERMANENT FILE FUNCTION DESIRED
      1 - ATTACH (10B)
      2 - CATALOG (20B)
      3 - EXTEND (30B)
      4 - PURGE (40B)
      5 - RENAME (50B)
      6 - PERM (60B)
      24 - ALTER
   IF THE VALUE IN PARENTHESES IS USED, THE 2-
   OR 3-LINE SYSTEM MESSAGE WILL APPEAR IN THE
   DAYFILE.

OUTPUT: ERROR RETURN CODE
   (EITHER ZPFUNC- OR NOS/BE-GENERATED)

ZPFUNC-GENERATED

   IRC  MEANING
   ----  ------
   -1 IRC HAD ILLEGAL INPUT VALUE
   -2 LAST CHARACTER OF AC IS NOT DISPLAY CODE

NOS/BE-GENERATED: SEE NEXT PAGE
<table>
<thead>
<tr>
<th>DEC</th>
<th>OCT</th>
<th>COMND</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>000</td>
<td>ALL</td>
<td>FUNCTION SUCCESSFUL</td>
</tr>
<tr>
<td>1</td>
<td>001</td>
<td>PFN/ID ERROR</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>002</td>
<td>A,P</td>
<td>LFN ALREADY IN USE</td>
</tr>
<tr>
<td>3</td>
<td>003</td>
<td>CEPR</td>
<td>UNKNOWN LFN</td>
</tr>
<tr>
<td>4</td>
<td>004</td>
<td>C</td>
<td>TOO MANY CYCLES (5 MAX)</td>
</tr>
<tr>
<td>5</td>
<td>005</td>
<td>C,E</td>
<td>PF CATALOG FULL</td>
</tr>
<tr>
<td>6</td>
<td>006</td>
<td></td>
<td>NO LFN OR PFN</td>
</tr>
<tr>
<td>8</td>
<td>010</td>
<td>C,E</td>
<td>LATEST INDEX NOT WRITTEN</td>
</tr>
<tr>
<td>9</td>
<td>011</td>
<td>C</td>
<td>FILE NOT ON A PF DEVICE</td>
</tr>
<tr>
<td>10</td>
<td>012</td>
<td>A</td>
<td>FILE NOT CATALOGED, SN=&lt;SETNAME&gt;</td>
</tr>
<tr>
<td>11</td>
<td>013</td>
<td>A</td>
<td>ARCHIVE RETRIEVAL ABORTED</td>
</tr>
<tr>
<td>12</td>
<td>014</td>
<td>C,R</td>
<td>BAD LPF COMMUNICATION</td>
</tr>
<tr>
<td>13</td>
<td>015</td>
<td>C</td>
<td>CY LIMIT REACHED (999 MAX)</td>
</tr>
<tr>
<td>14</td>
<td>016</td>
<td>C</td>
<td>PF DIRECTORY FULL</td>
</tr>
<tr>
<td>15</td>
<td>017</td>
<td>CEPR</td>
<td>FUNCTION ATTEMPTED ON A NON-PERMANENT FILE</td>
</tr>
<tr>
<td>16</td>
<td>020</td>
<td></td>
<td>FCN ATTEMPTED ON NON-LOCAL FILE</td>
</tr>
<tr>
<td>17</td>
<td>021</td>
<td>A</td>
<td>IMPROPER ARCHIVE RETRIEVAL CALL</td>
</tr>
<tr>
<td>18</td>
<td>022</td>
<td>C</td>
<td>FILE NEVER ASSIGN TO A DEVICE</td>
</tr>
<tr>
<td>19</td>
<td>023</td>
<td>A</td>
<td>CYCLE INCOMPLETE OR DUMPED</td>
</tr>
<tr>
<td>20</td>
<td>024</td>
<td>A</td>
<td>FILE ALREADY ATTACHED</td>
</tr>
<tr>
<td>21</td>
<td>025</td>
<td>A</td>
<td>FILE ARCHIVED</td>
</tr>
<tr>
<td>22</td>
<td>026</td>
<td></td>
<td>ILLEGAL CHARACTER IN FDB PARAM</td>
</tr>
<tr>
<td>23</td>
<td>027</td>
<td></td>
<td>ILLEGAL LFN</td>
</tr>
<tr>
<td>24</td>
<td>030</td>
<td>A</td>
<td>FILE DUMPED</td>
</tr>
<tr>
<td>25</td>
<td>031</td>
<td></td>
<td>ILLEGAL FUNCTION CODE</td>
</tr>
<tr>
<td>26</td>
<td>032</td>
<td>P</td>
<td>PURGE ATTEMPT IGNORED; USE RB PARAMETER</td>
</tr>
<tr>
<td>27</td>
<td>033</td>
<td></td>
<td>ALTER NEEDS EXCLUSIVE ACCESS</td>
</tr>
<tr>
<td>28</td>
<td>034</td>
<td></td>
<td>FDB IS TOO LARGE</td>
</tr>
<tr>
<td>29</td>
<td>035</td>
<td>C</td>
<td>FILE ALREADY IN SYSTEM</td>
</tr>
<tr>
<td>30</td>
<td>036</td>
<td>A</td>
<td>NO APF SPACE</td>
</tr>
<tr>
<td>31</td>
<td>037</td>
<td></td>
<td>PERMISSION CONFLICTS</td>
</tr>
<tr>
<td>32</td>
<td>040</td>
<td></td>
<td>ILLEGAL SETNAME SPECIFIED</td>
</tr>
<tr>
<td>33</td>
<td>041</td>
<td></td>
<td>DEVICE NOT MOUNTED AT CTL POINT</td>
</tr>
<tr>
<td>34</td>
<td>042</td>
<td></td>
<td>RBT CHAIN TOO LARGE FOR PFC</td>
</tr>
<tr>
<td>35</td>
<td>043</td>
<td>A,P</td>
<td>FILE RESIDES ON UNAVAILABLE DEVICE</td>
</tr>
<tr>
<td>36</td>
<td>044</td>
<td>A,P</td>
<td>FILE NOT AVAILABLE</td>
</tr>
<tr>
<td>56</td>
<td>070</td>
<td></td>
<td>PFM STOPPED BY SYSTEM</td>
</tr>
<tr>
<td>57</td>
<td>071</td>
<td></td>
<td>INCORRECT PERMISSION</td>
</tr>
<tr>
<td>58</td>
<td>072</td>
<td></td>
<td>FILE DEFINITION BLOCK ADDRESS INVALID (NOT RETURNED TO FDB)</td>
</tr>
<tr>
<td>59</td>
<td>073</td>
<td></td>
<td>I/O ERROR ON PFD/PFC READ/WRITE</td>
</tr>
</tbody>
</table>

* - ALWAYS CAUSES ABNORMAL JOB TERMINATION
IPRMS - PARAMETERS FOR PF FUNCTION
(UNUSED FIELDS MUST BE SET TO ZERO)

<table>
<thead>
<tr>
<th>IPRMS</th>
<th>CONTENTS</th>
<th>FUNCTIONS</th>
<th>FORMAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LFN</td>
<td>ALL</td>
<td>1-7 CHAR, LEFT* (IF 0, 1ST 7 CHAR OF PFN ARE USED (A,C,P))</td>
</tr>
<tr>
<td>2-5</td>
<td>PFN</td>
<td>A,C,P,R</td>
<td>1-40 CHAR, LEFT</td>
</tr>
<tr>
<td>6</td>
<td>ID</td>
<td>A,C,P,R</td>
<td>1-9 CHAR, LEFT</td>
</tr>
<tr>
<td>7</td>
<td>TK</td>
<td><strong>,</strong>*</td>
<td>1-9 CHAR, LEFT</td>
</tr>
<tr>
<td>8</td>
<td>RD</td>
<td><strong>,</strong>*</td>
<td>1-9 CHAR, LEFT</td>
</tr>
<tr>
<td>9</td>
<td>EX</td>
<td><strong>,</strong>*</td>
<td>1-9 CHAR, LEFT</td>
</tr>
<tr>
<td>10</td>
<td>MD</td>
<td><strong>,</strong>*</td>
<td>1-9 CHAR, LEFT</td>
</tr>
<tr>
<td>11</td>
<td>CN</td>
<td><strong>,</strong>*</td>
<td>1-9 CHAR, LEFT</td>
</tr>
<tr>
<td>12</td>
<td>MR</td>
<td>A,C</td>
<td>0 OR NOT</td>
</tr>
<tr>
<td>13</td>
<td>AC</td>
<td>C,R****</td>
<td>10 CHAR (LAST 3 NUMERIC)</td>
</tr>
<tr>
<td>14</td>
<td>CY</td>
<td>A,C,P,R</td>
<td>INTEGER (1-999) NEGATIVE TO RETURN VALUE</td>
</tr>
<tr>
<td>15</td>
<td>RP</td>
<td>C,R</td>
<td>INTEGER (0-999)</td>
</tr>
<tr>
<td>16</td>
<td>XR</td>
<td>C,R ***</td>
<td>1-9 CHAR, LEFT</td>
</tr>
<tr>
<td>17</td>
<td>LC</td>
<td>A,P</td>
<td>0 OR NOT</td>
</tr>
<tr>
<td>18</td>
<td>RW</td>
<td>A,C</td>
<td>0 OR NOT</td>
</tr>
<tr>
<td>19</td>
<td>SN</td>
<td>A,P</td>
<td>1-7 CHAR, LEFT</td>
</tr>
<tr>
<td>20</td>
<td>VSN</td>
<td></td>
<td>VOLUME SERIAL NUMBER (RESERVED FOR FUTURE)</td>
</tr>
<tr>
<td>21</td>
<td>FO</td>
<td>C</td>
<td>2-CHAR, LEFT (DA, IS, AK)</td>
</tr>
<tr>
<td>22</td>
<td>ST</td>
<td></td>
<td>STATION ID (MULTI-FRAME) (RESERVED FOR FUTURE)</td>
</tr>
<tr>
<td>23</td>
<td>UV</td>
<td>A,P</td>
<td>1-9 CHAR, LEFT</td>
</tr>
<tr>
<td>24</td>
<td>RB</td>
<td>P</td>
<td>0 OR NOT</td>
</tr>
</tbody>
</table>

A=ATTACH; C=CATALOG; P=PURGE; R=RENAME
* LEFT=LEFT-JUSTIFIED, BLANK OR ZERO PADDED
** FOR A,P, INTERPRETED AS SUBMITTED PASSWORD
*** FOR C, USED AS BOTH DEFINITION AND SUBMITTED PW
**** FOR R, WHEN SET TO 1, THE PASSWORD IS CLEARED
****** FOR C, WHEN OMITTED, AC IS TAKEN FROM CHARGE CARD OR LOGIN

NW - NUMBER OF LAST FILLED ELEMENT IN IPRMS (OPTIONAL)
EXAMPLE

PROGRAM TEST (INPUT, OUTPUT, TAPE5=INPUT, TAPE6=OUTPUT)
INTEGER IPRMS(24)
DATA LFN / 6LMYFILE/
DATA ID / 4LXXXX/
DATA IPFN1, IPFN2 / 10HPERMANENTF, 3LILE/
DATA IAC / 10H9876543210/ << SEE NOTE BELOW
DATA IPW / 8LPASSWORD/

... DO 10 I=1,13
10 IPRMS(I) = 0
IPRMS( 1) = LFN
IPRMS( 2) = IPFN1
IPRMS( 3) = IPFN2
IPRMS( 6) = ID
IPRMS( 7) = IPW
IPRMS(13) = IAC << SEE NOTE BELOW
IRC = 2
CALL ZPFUNC (IRC, IPRMS, 13)
IF (IRC .NE. 0) WRITE (6, 20) IRC, IRC
20 FORMAT ('OERROR - IRC=', 03, 'B = ', 17)

... STOP
END

THIS PROGRAM IS EQUIVALENT IN EFFECT TO THE FOLLOWING CONTROL CARDS:

CATALOG(MYFILE,PERMANENTFILE,ID=XXXX,AC=9876543210,
PW=PASSWORD)

FOR A NEW CYCLE OF AN EXISTING FILE; OR

CATALOG(MYFILE,PERMANENTFILE,ID=XXXX,AC=9876543210,
TK=PASSWORD)

FOR THE CREATION OF A NEW FILE.

NOTE: IF THESE TWO LINES ARE OMITTED (THAT IS, AC IS ZERO), AC WILL BE TAKEN FROM THE BATCH CHARGE CARD OR THE INTERCOM LOGIN.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND SHIFT
OTHERS
IZPFBTZ
IZRT9ZR
NUMVAR
ZPFMAC
ZPFPFW

CM REQUIRED: 407B

AUTHOR
C M CHERNICK - DTNSRDC CODE 1832

DATE WRITTEN: 01/75

DATE(S) REVISED
05/75 01/02/76
09/23/80 - DVS - UPGRADE TO LEVEL 508 (ADD UV AND RB)
03/21/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ZPFUNC,OUTPUT,MSACCES=<PASSWORD>.

02/10/84 2-313 ZPFUNC - 5 OF 5
SUBROUTINE 'ZRTPUT'

PURPOSE
PUT USER-SPECIFIED PARAMETERS INTO ARRAY FOR LATER CALL TO ROUTE

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NO LONGER SUPPORTED SINCE SUBROUTINE 'ROUTE' HAS BEEN REPLACED BY SYSTEM SUBROUTINE 'LF' (SEE SUBROUTINE 'PF' DOCUMENT).

USAGE
CALL ZRTPUT (IPRMS, NW)
CALL ZRTPUT (IPRMS, NW, LFN, DC, TID, FID, DEF, RETJOB, FC, EC, IC, STID, PRI, REP, NCD, SC)

FOR EXAMPLE:
CALL ZRTPUT (IPRMS, 0)
CALL ZRTPUT (IPRMS, 1, LFN)
CALL ZRTPUT (IPRMS, 2, LFN, DC)

... CALL ZRTPUT (IPRMS, 14, LFN, DC, TID, FID, DEF, RETJOB, FC, EC, IC, STID, PRI, REP, NCD, SC)

DESCRIPTION OF PARAMETERS
IPRMS - ARRAY (MAXIMUM REQUIRED DIMENSION 14) TO BE DEFINED
NW - 0 - SET ALL 14 WORDS TO ZERO
     1 THRU 12 - DEFINE NW PARAMETERS FROM THE FOLLOWING
LFN - LOCAL FILE NAME (1-7 CHARACTERS)
DC - DISPOSITION CODE (2 CHARACTERS)
TID - TERMINAL IDENTIFICATION
     1LC - CENTRAL SITE
     2-CHARACTER TERMINAL ID
     4LHERE - ROUTE TO THIS TERMINAL
FID - FILE IDENTIFICATION
     1L* - OR -
     1-5 CHARACTER FILE ID, PRECEDED BY *
DEF - 3LDEF - DEFER ROUTE UNTIL END OF JOB
RETJOB - NON-ZERO TO RETURN JOB NAME IN THIS WORD
FC - FORMS CODE (2 CHARACTERS)
EC - EXTERNAL CHARACTERISTICS
     FOR PRINT:
     2LB4, 2LB6, 2LA6, 2LA9
     FOR PUNCH:
     2LSB, 5L80COL, 3L026, 3L029, 5LASCII
IC - INTERNAL CHARACTERISTICS
     0 OR 3LDIS - DISPLAY CODE
     5LASCII - ASCII
     3LBIN - BINARY
STID - 3-CHARACTER STATION ID
PRI - PRIORITY (TO ROUTING TERMINAL ONLY)
     (0000B-7777B)
     ALL OTHERS USE 0
REP - REPEAT COUNT (0-31 (37B))
NCD - 0 -OR-
     1 - NO COMPLEMENTARY DAYFILE
     (VALID ONLY IF IPRMS(5)=3LDEF)
SC - SPACING CODE FOR 580 PRINTER (0-77B)

NOTE: ALL VARIABLES ARE TYPE INTEGER. CHARACTER DATA IS
LEFT-JUSTIFIED AND ZERO-PADDED.
TO CLEAR (OR OMIT) A SPECIFIC PARAMETER, USE 0.

CM REQUIRED: 75B

SUBPROGRAMS REQUIRED
    PART OF LANGUAGE
    MINO
    OTHERS
    NONE

AUTHOR
    DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/19/76

DATE(S) REVISED
    01/24/77 - ADD REP PARAMETER
    11/30/77 - ADD NCD PARAMETER
    04/07/83 - ADD SC PARAMETER

LOCATION OF DECKS
    SOURCE
        UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
    OBJECT
        EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
    BEGIN,DOCGET,,NSRDC,,ZRTPUT,OUTPUT,MSACCES=<PASSWORD>.

02/10/84  2-315  ZRTPUT - 2 OF 2
SUBROUTINE 'ZSYSEQ'

PURPOSE
FORTRAN CALLABLE SYSTEM CALL

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL ZSYSEQ (I)

DESCRIPTION OF PARAMETER
I - THE CONTENTS OF I ARE PUT INTO X6 BEFORE THE SYSTEM IS CALLED

EXAMPLE
CALL SYSTEM ROUTINE DSP WITH PARAMETERS CONTAINED IN 'A':

CALL ZSYSEQ (4LDSP .OR. LOCF(A))

NOTE: THE P AFTER DSP IS THE RECALL BIT. IF NO RECALL REQUIRED, THEN:

CALL ZSYSEQ (3LDSP .OR. LOCF(A))

CM REQUIRED: 4B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS

AUTHOR
C M CHERNICK - DTNSRDC CODE 1832

DATE WRITTEN: 04/07/75

DATE(S) REVISED
03/23/83 - RECOMPILE AT NOS/BE LEVEL 552

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDCPL,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC,,ZSYSEQ,OUTPUT,MSACCESS=<PASSWORD>.

02/10/84  2-316  ZSYSEQ - 1 OF 1
THIS CHAPTER CONTAINS THE MACHINE-READABLE DOCUMENTATION FOR THE
SUBPROGRAMS IN LIBRARY 'NSRDC5'.

ALL DOCUMENT FILES RESIDE ON THE MASS STORAGE SYSTEM (MSS). YOUR
MSACCES PASSWORD MUST BE SUBMITTED TO THE SYSTEM BEFORE DOCUMENTS CAN
BE OBTAINED. THIS MAY BE DONE WITH A SEPARATE 'MSACCES' COMMAND OR BY
USING THE MSACCES PARAMETER IN THE BEGIN STATEMENT.

*** HOW TO PRINT A DOCUMENT ***

INDIVIDUAL DOCUMENTS MAY BE PRINTED USING:

BEGIN,DOCGET,,NSRDC5,,<SUBPROG>,OUTPUT,MSACCES=<PASSWORD>.

WHERE <SUBPROG> IS THE DESIRED DOCUMENT.

SEVERAL DOCUMENTS MAY BE PRINTED AT ONE TIME USING:

BEGIN,DOCGET,,NSRDC5,,OUTPUT,,,DOCS,MSACCES=<PASSWORD>.

WHERE DOCS IS A FILE CONTAINING THE NAMES OF THE DESIRED DOCUMENTS:

<SUBPROG1>,<SUBPROG2>,...,<SUBPROG1>
<SUBPROG1+1>,...,<SUBPROG1N>

ALL DOCUMENTS MAY BE PRINTED USING:

BEGIN,DOCGET,,NSRDC5,,ALL,OUTPUT,MSACCES=<PASSWORD>.

TO PRINT THE DOCUMENT(S) ON THE XEROX 8700, EITHER:

A) ADD 'FID=<FID>' TO THE 'BEGIN,DOCGET,...'
   WHERE <FID> IS THE FILE ID FOR THE BANNER

B) USE
   BEGIN,XEROX,,OUTPUT,FID,,DOCPRT.
FUNCTION 'AC'

PURPOSE
GET ACCOUNT NUMBER FOR THIS JOB

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
'AC' MUST BE DECLARED CHARACTER*10 IN THE CALLING ROUTINE.
THE FTN4 VERSION HAS A SLIGHTLY DIFFERENT CALLING SEQUENCE.

USAGE

AC()

DESCRIPTION OF PARAMETER
AC - CH*10 - WILL CONTAIN ACCOUNT NUMBER

CM REQUIRED: 52B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND OR SHIFT
OTHERS
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS
L71FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

METHOD
THE ACCOUNT NUMBER IS TAKEN FROM CONTROL POINT AREA.

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/04/75

DATE(S) REVISED
02/27/76
12/10/81 - CONVERT TO FORTRAN 77 EXTENDED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5,P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5.

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, AC, OUTPUT, MSACCESS=<PASSWORD>.
SUBROUTINE 'ALTYM'

PURPOSE
OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE
START OF JOB (OR INTERCOM SESSION)

FUNCTIONAL CATEGORIES: QO NO

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL ALTYM (TIMES, CLOK)

DESCRIPTION OF PARAMETER
TIMES - REAL - 6-WORD ARRAY TO CONTAIN THE FOLLOWING:
1 - CPA TIME IN SECONDS
2 - CPB TIME IN SECONDS
3 - CP TIME IN SECONDS (CPA+CPB)
4 - PP TIME IN SECONDS
5 - IO TIME IN SECONDS
6 - WALL CLOCK TIME IN SECONDS

CLOK - CH*10 - WALL CLOCK (HH.MM.SS.)

CM REQUIRED: 102B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
HSM2S - CONVERT HH.MM.SS TO SECONDS
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS
R65FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/15/75 (ALTIME)

DATE(S) REVISED
07/05/83 - CONVERT TO FORTRAN 77
- CHANGE NAME FROM ALTIME TO ALTYM

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN-CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,ALTYM,OUTPUT,MSACCES=<PASSWORD>.

07/06/83 3-3 ALTYM - 1 OF 1
SUBROUTINE 'BANR'

PURPOSE
PRINT A BANNER (LETTERS ARE 10 LINES HIGH, LINES ARE 131 PRINT POSITIONS LONG)

FUNCTIONAL CATEGORIES: J4

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
UPPER CASE ONLY (A-Z 0-9 + - / ) $ = SPACE , . # [ ] : , ! & I ? < > @ \ ^ ; )

EACH BANNER REQUIRES 14 LINES (4 BLANKS, 10 FOR THE BANNER). THUS, 3 BANNERS WILL FIT ON A PAGE AT 6 LINES PER INCH; 5 AT 8 LPI.

UP TO 10 CHARACTERS MAY APPEAR IN A BANNER. THE LINES ARE 131 PRINT POSITIONS LONG.

SEE SUBROUTINE 'BANR6'.

USAGE
CALL BANR (BANNER, IFILE, NEWPAG)

DESCRIPTION OF PARAMETERS
BANNER - 1-10 CHARACTERS TO BE PRINTED (UP TO CHARACTER*10)
IFILE - NUMBER OF FILE ON WHICH BANNER IS TO BE WRITTEN
NEWPAG - ONE OF:
ZERO - BANNER IS WRITTEN ON NEW PAGE
NON-ZERO - BANNER IS WRITTEN ON SAME PAGE

CM REQUIRED: 1604B

OUTPUT UNITS
UNIT # LFN/INT USE
USER SPECIFIES LISTABLE OUTPUT

EXAMPLES
PRINT THE BANNER 'HYSTERICAL' AT THE TOP OF THE NEXT PAGE ON THE PRINTER FILE:
CALL BANR ('HYSTERICAL', L"OUTPUT", 0)

PRINT THE BANNER '10/19/77' ON THE SAME PAGE ON FILE 9:
CALL BANR ('10/19/77', 9, 1)
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LEN MIN
OTHERS
LASTCH - FIND LAST NON-BLANK

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/18/75

DATE(S) REVISED
79/07/16 - RE-WRITTEN FOR B7700 (FORTRAN 66)
81/01/15 - CDC VERSION UPGRADED TO NOS/BE LEVEL 461
82/02/18 - CDC FORTRAN 77 VERSION WRITTEN
83/09/21 - SPEED UP BY USING INDEX FUNCTION

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, BANR, OUTPUT, MSACCESS=<PASSWORD>.
SUBROUTINE 'BANR6'

PURPOSE
PRINT A BANNER (LETTERS ARE 6 LINES HIGH, LINES ARE 80
PRINT POSITIONS LONG)

FUNCTIONAL CATEGORIES: J4

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
UPPER CASE ONLY (A-Z 0-9 + - * / ) $ = SPACE . #
[ ] : " ! & ' ? < > @ \ ^ ;

EACH BANNER REQUIRES 10 LINES (4 BLANKS, 6 FOR THE BANNER).
THUS, 6 BANNERS WILL FIT ON A PAGE AT 6 LINES PER INCH;
8 AT 8 LPI.

UP TO 10 CHARACTERS MAY APPEAR IN A BANNER. THE LINES ARE
80 PRINT POSITIONS LONG.

SEE SUBROUTINE 'BANR'.

USAGE
CALL BANR6 (BANNER, IFILE, NEWPAG)

DESCRIPTION OF PARAMETERS
BANNER - 1-10 CHARACTERS TO BE PRINTED
(UP TO CHARACTER*10)
IFILE - NUMBER OF FILE ON WHICH BANNER IS TO BE WRITTEN
NEWPAG - ONE OF:
ZERO - BANNER IS WRITTEN ON NEW PAGE
NON-ZERO - BANNER IS WRITTEN ON SAME PAGE

CM REQUIRED: 663B

OUTPUT UNITS
UNIT # LFN/INT USE
--------- -------- -----------------------------
USER SPECIFIES LISTABLE OUTPUT

EXAMPLES
PRINT THE BANNER 'HYSTERICAL' AT THE TOP OF THE NEXT PAGE
ON THE PRINTER FILE:
CALL BANR6 ('HYSTERICAL', L"OUTPUT", 0)

PRINT THE BANNER '10/19/77' ON THE SAME PAGE ON FILE 9:
CALL BANR6 ('10/19/77', 9, 1)
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LEN
OTHERS
LASTCH = FIND LAST NON-BLANK

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/18/77

DATE(S) REVISED
79/07/16 - RE-WRITTEN FOR B7700 (FORTRAN 66)
81/01/15 - CDC VERSION UPGRADED TO NOS/BE LEVEL 461
82/02/19 - CDC FORTRAN 77 VERSION WRITTEN
83/09/21 - SPEED UP BY USING INDEX FUNCTION

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,BANR6,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'CENTER'

PURPOSE
CENTER A CHARACTER STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE ALSO LEFT, RIGHT.

USAGE
CALL CENTER (CH, WORK)

DESCRIPTION OF PARAMETERS
CH - CHARACTER STRING TO BE CENTERED IN PLACE
WORK - CHARACTER VARIABLE THE SAME LENGTH AS 'CH'

CM REQUIRED: 114B

EXAMPLES
CHARACTER*20 A, WORK
DATA A/ 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'/
CALL CENTER (A, WORK)
'A' NOW CONTAINS 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LEN

OTHERS
FIRSTCH - FIND FIRST NON-BLANK CHARACTER
LASTCH - FIND LAST NON-BLANK CHARACTER

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/15/82

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, CENTER, OUTPUT, MSACCES=<PASSWORD>
.

08/18/83  3-8  CENTER - 1 OF 1
FUNCTION 'CFIND'

PURPOSE
SCAN CHARACTER ARRAY FOR CHARACTER WORD

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
NELT = CFIND (CARRAY, CMAX, CWORLD)

DESCRIPTION OF PARAMETERS
CARRAY - CHAR - ARRAY TO BE SCANNED
CMAX - INT - NUMBER OF WORDS IN CARRAY TO BE SCANNED
CWORLD - CHAR - WORD TO BE SCANNED FOR
CFIND - INT - WILL CONTAIN THE SUBSCRIPT OF THE ELEMENT
OF CARRAY WHICH MATCHES CWORLD
(IF NO MATCH, CFIND = 0)

CM REQUIRED: 40B

EXAMPLE

... 
CHARACTER*1 LETTERS(26)
DATA LETTERS/ 'A', 'B', ..., 'Z'/
G = CFIND (LETTERS, 26, 'G')
BAD = CFIND (LETTERS, 26, '')
PRINT *, 'G IS IN LETTERS', G, '"
PRINT *, '" IS IN LETTERS('', BAD, ')'
...

WILL PRINT:

G IS IN LETTERS(7)
" IS IN LETTERS(0)
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/14/81

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,CFIND,OUTPUT,MSACCES=<PASSWORD>.

FUNCTION 'CHIN'

PURPOSE
   CONVERT I-FORMATTED CHARACTER STRING TO INTEGER

FUNCTIONAL CATEGORIES:  M2  M4

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   SEE CVCHIN FOR SUBROUTINE VERSION.

USAGE
   CHIN (STRING)

DESCRIPTION OF PARAMETERS
   STRING    - INPUT CHARACTER STRING
   CHIN      - OUTPUT INTEGER

CM REQUIRED:  146B

DAYFILE ERROR MESSAGE
   *** CHIN - CHARACTER <N> (<CH>) INVALID
      A CHARACTER OTHER THAN A DIGIT, BLANK, PLUS, OR MINUS
      WAS ENCOUNTERED IN THE CHARACTER STRING, OR, A PLUS OR
      MINUS WAS ENCOUNTERED OUT OF PLACE. THE PROGRAM IS
      ABORTED.

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      INDEX   LEN
   OTHERS
      ABORT  - TERMINATE THE PROGRAM ABNORMALLY

AUTHORS
   N L FICKEN   - DTNSRDC CODE 1806
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/16/81 (NLF)

DATE(S) REVISED
   03/30/83 - DVS - CHANGE NAME FROM CNVCHIN TO CVCHIN
   07/06/83 - DVS - COMPLETE RE-WRITE TO MAKE MACHINE-INDEPENDENT
                   - CONVERT FROM SUBROUTINE TO FUNCTION
                   - CHANGE NAME FROM CVCHIN TO CHIN
                   - MOVE ERROR MESSAGE FROM PRINTER TO DAYFILE

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC5,,CHIN,OUTPUT,MSACES=<PASSWORD>.
   07/18/83 3-11  CHIN   - 1 OF 1
SUBROUTINE 'CMMDUMP'

PURPOSE
DUMP COMMON MEMORY MANAGER (CMM) DYNAMIC AREA HEADERS AND TRAILER WITH OPTIONAL DUMP OF THE CONTENTS OF EACH BLOCK

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THIS SUBROUTINE PRINTS ON THE STANDARD OUTPUT FILE. IF THE FILE HAS NOT BEEN OPENED WHEN CMMDUMP IS CALLED, THE CONTENTS OF THE DYNAMIC AREA MAY CHANGE DURING DUMPING.

USAGE
CALL CMMDUMP (FULL)

DESCRIPTION OF PARAMETER
FULL - LOG - IN - TRUE - DUMP EACH BLOCK IN OCTAL AND CHARACTER
FALSE - DUMP ONLY THE HEADERS AND TRAIL

CM REQUIRED: 365B (+20B LBLD COMMON + 225B SUPPORTING DUMP)

OUTPUT DESCRIPTION
FOR FULL=.FALSE.:
EACH HEADER AND TRAILER WORD(S) IS LISTED IN OCTAL WITH ITS ADDRESS. POINTERS IN THE WORD ARE SHOWN SEPARATELY, AS ARE THE GROUP-ID (IF ANY) AND THE FWA/LWA SHRINK/GROW CHARACTERISTICS. FOR EACH BLOCK, THE NUMBER OF WORDS AND THE ADDRESS RANGE IS LISTED.

FOR FULL=.TRUE.:
SAME AS ABOVE. IN ADDITION, THE CONTENTS OF EACH BLOCK IS ALSO DUMPED IN OCTAL AND CHARACTER. MULTIPLE DUPLICATE LINES ARE REPLACED BY A SINGLE LINE WITH 'SAME'.

OUTPUT UNITS
<table>
<thead>
<tr>
<th>UNIT #</th>
<th>LFN</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OUTPUT</td>
</tr>
</tbody>
</table>

08/18/83 3-12 CMMDUMP - 1 OF 2
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND CMNGOS SHIFT
PART OF PROGRAM
CMMDMPA - DUMP CONTENTS OF A BLOCK
OTHERS
LIBSYM - DUMMY ROUTINE TO FORCE LDSET,LIB=SMLIB.
MFETCH - READ A MEMORY WORD

ARITHMETIC STATEMENT FUNCTIONS
Bkd - EXTRACT BACKWARD POINTER
flg - EXTRACT FLAG
fs - TEST FOR FWA SHRINK
fwd - EXTRACT FORWARD POINTER
grid - EXTRACT GROUP-ID
hd2 - TEST FOR 2-WORD HEADER
lg - TEST FOR LWA GROW
ls - TEST FOR LWA SHRINK

AUTHOR
DAVID V SOMMER - DTONSRDC CODE 1892.2

DATE WRITTEN: 03/01/83

DATE(S) REVISED
04/14/83 - PRINT FIXED BLOCK AND FREE SPACE LENGTHS IN OCTAL
DECIMAL

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,CMMDUMP,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'CMMMERC'

PURPOSE
SUPPLY DESCRIPTION OF CMM MEMORY ERROR CODE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE DESCRIPTIONS ARE THOSE FOUND IN THE "COMMON MEMORY
MANAGER VERSION 1 REFERENCE MANUAL", 60499200 E, FIGURE B-1.

SEE ALSO 'CMMUERC'.

USAGE
CHARACTER MSG * 40
CALL CMMMERC (ME, MSG)

DESCRIPTION OF PARAMETERS
ME - THE MEMORY ERROR CODE
     (THIS IS WORD 1 OF THE ARRAY FOR OWN-CODE
      PROCESSING)
MSG - WILL CONTAIN TEXT DESCRIBING THE ERROR
     (IF NO ERROR, 'NO MEMORY ERROR' IS RETURNED)

CM REQUIRED: 145B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
    NONE
OTHERS
    NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/23/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC5, , CMMMERC, OUTPUT, MSACCES=<PASSWORD>.

06/18/84
3-14
CMMMERC - 1 OF 1
SUBROUTINE 'CMMOVEF'

PURPOSE
GET A LARGER AREA FROM CMM, MOVE OLD AREA TO NEW AREA,
RELEASE OLD AREA AND RESET POINTERS

FUNCTIONAL CATEGORIES: K2

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SINCE CYBER RECORD MANAGER (CRM - THE I/O SYSTEM) ALSO USES
CMM, IT IS NOT SAFE TO GET BLOCKS WHICH CAN GROW AT LWA.
THIS SUBROUTINE PROVIDES AN EASY WAY TO LENGTHEN AN AREA
WITHOUT THE RESTRICTIONS OF A GROW-AT-LWA BLOCK. THERE IS A
COST, HOWEVER. THERE WILL ALWAYS BE SOME DEAD SPACE IN THE
DYNAMIC AREA (WHICH CAN BE USED BY CMM FOR OTHER BLOCKS) AND
EACH TIME THE AREA IS "INCREASED", THE SUBROUTINE HAS TO
MOVE THE OLD AREA TO THE NEW AREA.

USAGE
CALL CMMOVEF (BASARY, FWA, PTR, NWORDS, INCR)

DESCRIPTION OF PARAMETERS
BASARY - DUMMY ARRAY BEING USED FOR THE DYNAMIC AREA
           (THIS MUST BE THE FIRST WORD OF THE ACTUAL ARRAY,
           NOT THE FIRST WORD OF THE DYNAMIC REFERENCE)
FWA - WILL CONTAIN THE FIRST WORD ADDRESS OF THE DYNAMIC
       AREA (DO NOT CHANGE THIS!)
PTR - WILL POINT TO THE WORD BEFORE THE DYNAMIC AREA
       (DO NOT CHANGE THIS!)
NWORDS - LENGTH OF CURRENT DYNAMIC AREA
INCR - NUMBER OF WORDS TO ADD TO THE DYNAMIC AREA

CM REQUIRED: 53B

EXAMPLE
USE SUBROUTINE CMMOVEF TO GET A 100-WORD ARRAY (10 WORDS AT
A TIME) AND FILL THE N-TH ELEMENT OF THE ARRAY WITH N:
INTEGER P(1)

   ...    
   FWA = 0
   INCR = 10
   MAX  = 0
   PTR  = 0
   DO 110 N=1,100
       IF (N .GT. MAX) THEN
           CALL CMMOVEF (P, FWA, PTR, N-1, INCR)
           MAX = MAX + INCR
       END IF
       P(PTR+N) = N
   110 CONTINUE

08/18/83 3-15 CMMOVEF - 1 OF 2
METHOD
A NEW AREA OF LENGTH NWORDS+INCR IS OBTAINED USING CMMALF
AND A NEW POINTER CALCULATED. IF THIS IS NOT THE FIRST CALL
(THAT IS, IF FWA IS GREATER THAN 0), MOVE THE OLD AREA TO
THE NEW AREA. FINALLY, SET FWA AND PTR TO POINT TO THE NEW
AREA.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LOCF
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/22/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, CMMOVEF, OUTPUT, MSACCES=<PASSWORD>.

08/18/83
3-16
CMMOVEF - 2 OF 2
SUBROUTINE 'CMMPGFS'

PURPOSE
PRINT THE LARGEST BLOCK-SIZES AVAILABLE FOR ALL POSSIBLE CONDITIONS

FUNCTIONAL CATEGORIES: NO

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL CMMPGFS

CM REQUIRED: 117B

OUTPUT DESCRIPTION
THE FOLLOWING EIGHT LINES ARE PRINTED AFTER A BLANK LINE:

<table>
<thead>
<tr>
<th>INCREASE</th>
<th>EXTEND</th>
<th>LARGEST BLOCK-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL TO MAXLF</td>
<td>BELOW HHA</td>
<td>AVAILABLE</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>&lt;OCTAL&gt; &lt;INTEGER&gt;</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>&lt;OCTAL&gt; &lt;INTEGER&gt;</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>&lt;OCTAL&gt; &lt;INTEGER&gt;</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>&lt;OCTAL&gt; &lt;INTEGER&gt;</td>
</tr>
</tbody>
</table>

OUTPUT UNITS
UNIT # LFN USE
--------- ------ --------------------------------------------------
OUTPUT LISTABLE OUTPUT

SUBPROGRAMS REQUIRED
PART OF LANGUAGE CMMGFS
OTHERS NONE

08/18/83 3-17 CMMPGFS - 1 OF 2
SUBROUTINE 'CMMPGOS'

PURPOSE
PRINT THE CONTENTS OF THE ARRAY RETURNED BY SUBROUTINE CMMPGOS

FUNCTIONAL CATEGORIES: NO

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
YOU MUST CALL CMMPGOS BEFORE CALLING THIS SUBROUTINE.

USAGE
CALL CMMPGOS (GOS)

DESCRIPTION OF PARAMETER
GOS  - THE 16-WORD ARRAY RETURNED BY AN EARLIER CALL TO SUBROUTINE CMMPGOS

CM REQUIRED: 17B

OUTPUT DESCRIPTION
THE FOLLOWING TEN LINES ARE PRINTED AFTER A BLANK LINE:

<table>
<thead>
<tr>
<th>Description</th>
<th>Octal</th>
<th>Integer</th>
</tr>
</thead>
<tbody>
<tr>
<td>DABA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAXF1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% OF MEMORY USED</td>
<td></td>
<td></td>
</tr>
<tr>
<td># CONTIG FREE WORDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td># FXD-POS BLOCKS</td>
<td></td>
<td></td>
</tr>
<tr>
<td># ALLOC FXD-POS WORDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td># FREE AREAS</td>
<td></td>
<td></td>
</tr>
<tr>
<td># FREE WORDS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OUTPUT UNITS

<table>
<thead>
<tr>
<th>UNIT</th>
<th>LFN</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OUTPUT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LISTABLE OUTPUT</td>
</tr>
</tbody>
</table>

EXAMPLE
INTEGER GOS(0:15)
...
CALL CMMPGOS (GOS)
CALL CMMPGOS (GOS)
...

SUBPROGRAMS REQUIRED
 PART OF LANGUAGE
  NONE
 OTHERS
  NONE
AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/02/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS:  NSRDC5P, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY:  NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, ,NSRDC5, ,CMMPGOS, OUTPUT, MSACCES=<PASSWORD>.
SUBROUTINE 'CMMPGSS'

PURPOSE
PRINT THE CONTENTS OF THE ARRAY RETURNED BY SUBROUTINE CMMGSS

FUNCTIONAL CATEGORIES: NO

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
YOU MUST CALL CMMGSS BEFORE CALLING THIS SUBROUTINE.

USAGE
CALL CMMPGSS (GSS)

DESCRIPTION OF PARAMETER
GSS - THE 6-WORD ARRAY RETURNED BY AN EARLIER CALL TO SUBROUTINE CMMGSS

CM REQUIRED: 62B

OUTPUT DESCRIPTION
THE FOLLOWING FOUR LINES ARE PRINTED AFTER A BLANK LINE:

MAX # ALLOC WORDS = <OCTAL> <INTEGER>
MAX FL ATTAINED = <OCTAL> <INTEGER>
# FL INCREASES = <OCTAL> <INTEGER>
# FL DECREASES = <OCTAL> <INTEGER>

OUTPUT UNITS
UNIT # LFN USE
---------------
OUTPUT LISTABLE OUTPUT

EXAMPLE
INTEGER GSS(0:5)
...
CALL CMMGSS (GSS)
CALL CMMPGSS (GSS)
...

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE
SUBROUTINE 'CMMUERC'

PURPOSE
SUPPLY DESCRIPTION OF CMM USER ERROR CODE

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE DESCRIPTIONS ARE THOSE FOUND IN THE "COMMON MEMORY
MANAGER VERSION 1 REFERENCE MANUAL", 60499200 E, TABLE B-1.

SEE ALSO 'CMMMERC'.

USAGE
CHARACTER MSG * 40
CALL CMMUERC (UE, MSG)

DESCRIPTION OF PARAMETERS
UE - THE USER ERROR CODE
(THE WORD 2 OF THE ARRAY FOR OWN-CODE
PROCESSING)
MSG - WILL CONTAIN TEXT DESCRIBING THE ERROR
(IF NO ERROR, 'NO ERROR' IS RETURNED)

CM REQUIRED: 502B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/23/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5, CMMUERC, OUTPUT, MSACCESS=<PASSWORD>.

08/18/83 3-23 CMMUERC - 1 OF 1
SUBROUTINE 'CSHUFL'

PURPOSE
SHUFFLE A CHARACTER ARRAY

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL CSHUFL (ORIG, NELTS, REORDR, SUBARY, WORK)

DESCRIPTION OF PARAMETERS
ORIG - CHAR - ORIGINAL ARRAY TO BE SHUFFLED
NELTS - INT - NUMBER OF ELEMENTS TO BE SHUFFLED
REORDR - CHAR - SHUFFLED ARRAY
SUBARY - INT - ARRAY TO CONTAIN THE REORDERED SUBSCRIPTS
(THE ORIGINAL POSITION OF REORDR(I) IS ORIG(SUBARY(I)))
WORK - CHAR*1 - WORK ARRAY

CM REQUIRED: 144B

METHOD
THE RANDOM NUMBER GENERATOR IS STARTED USING THE TIME SINCE
THE BEGINNING OF THE JOB, SO EACH EXECUTION SHOULD PRODUCE A
DIFFERENT RE-ORDERING.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
RANF RANSET SECOND
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/16/81

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET.,NSRDC5.,CSHUFL,OUTPUT,MSACCES=<PASSWORD>, 08/18/83 3-24 CSHUFL - 1 OF 1
SUBROUTINE 'CSORT'

PURPOSE
SORT A CHARACTER ARRAY

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE CSORTD, CSORTN, CSORT2.

USAGE
CALL CSORT (CARRAY, NELTS, CTEMP)

DESCRIPTION OF PARAMETERS
CARRAY - CHAR - ARRAY TO BE SORTED
NELTS - INT - NUMBER OF ELEMENTS TO BE SORTED
CTEMP - CHAR - VARIABLE OF THE SAME LENGTH AS 'CARRAY'
USED FOR SWAPPING

CM REQUIRED: 110B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/17/81

DATE(S) REVISED
02/09/82 - RESTRUCTURE

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC5, , CSORT, OUTPUT, MSACCESS=<PASSWORD>.

08/18/83 3-25 CSORT - 1 OF 1
SUBROUTINE 'CSORTD'

PURPOSE
    SORT A CHARACTER ARRAY (DESCENDING)

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
    CDC 6000/CYBER 170 (NOS/BE)

REMARKS
    SEE CSORT, CSORTN, CSORT2.

USAGE
    CALL CSORTD (CARRAY, NELTS, CTEMP)

DESCRIPTION OF PARAMETERS
    CARRAY - CHAR - ARRAY TO BE SORTED
    NELTS - INT - NUMBER OF ELEMENTS TO BE SORTED
    CTEMP - CHAR - VARIABLE OF THE SAME LENGTH AS 'CARRAY'
        USED FOR SWAPPING

CM REQUIRED: 110B

SUBPROGRAMS REQUIRED
    PART OF LANGUAGE
        NONE
    OTHERS
        NONE

AUTHOR
    DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/09/82

DATE(S) REVISED

LOCATION OF DECKS
    SOURCE
        UPDATE LIBRARY ON MSS: NSRDC5P,UN-CSYS
    OBJECT
        EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
    BEGIN,DOCGET,,NSRDC5,,CSORTD,OUTPUT,MSACCES=<PASSWORD>.
SUBROUTINE 'CSORTN'

PURPOSE
SORT A CHARACTER ARRAY (HAVING AN ASSOCIATED NON-CHARACTER
ARRAY)

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE CSORT, CSORTD, CSORT2.

USAGE
CALL CSORTN (CARRAY, NELTS, CTEMP, ASSOC)

DESCRIPTION OF PARAMETERS
CARRAY - CHAR - ARRAY TO BE SORTED
NELTS - INT - NUMBER OF ELEMENTS TO BE SORTED
CTEMP - CHAR - VARIABLE OF THE SAME LENGTH AS 'CARRAY'
USED FOR SWAPPING
ASSOC - ASSOCIATED NON-CHARACTER ARRAY WHICH WILL BE RE-ORDERED TO MAINTAIN A 1-TO-1 CORRESPONDENCE WITH THE ELEMENTS OF 'CARRAY'

CM REQUIRED: 117B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/17/81

DATE(S) REVISED
02/09/82 - RESTRUCTURE

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,CSORTN,OUTPUT,MSACCES=<PASSWORD>.

08/18/83 3-27 CSORTN - 1 OF 1
SUBROUTINE 'CSORT2'

PURPOSE
SORT A CHARACTER ARRAY (HAVING AN ASSOCIATED CHARACTER ARRAY)

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE CSORT, CSORTD, CSORTN.

USAGE
CALL CSORT2 (CARRAY, NELTS, CTEMP, CASSOC, CTEMPA)

DESCRIPTION OF PARAMETERS
CARRAY - CHAR - ARRAY TO BE SORTED
NELTS - INT - NUMBER OF ELEMENTS TO BE SORTED
CTEMP - CHAR - VARIABLE OF THE SAME LENGTH AS 'CARRAY'
USED FOR SWAPPING
CASSOC - CHAR - ASSOCIATED ARRAY WHICH WILL BE RE-ORDERED
TO MAINTAIN A 1-TO-1 CORRESPONDENCE WITH
THE ELEMENTS OF 'CARRAY'
CTEMPA - CHAR - VARIABLE OF THE SAME LENGTH AS 'CASSOC'
USED FOR SWAPPING

CM REQUIRED: 151B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/17/81

DATE(S) REVISED
02/09/82 - RESTRUCTURE

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,CSORT2,OUTPUT,MSACCES=<PASSWORD>.

08/18/83  3-28  CSORT2 - 1 OF 1
SUBROUTINE 'CVCHIN'

PURPOSE
CONVERT I-FORMATTED CHARACTER STRING TO INTEGER

FUNCTIONAL CATEGORIES: M2 M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL CVCHIN (CHAR, INT)

DESCRIPTION OF PARAMETERS
CHAR - INPUT CHARACTER STRING
INT  - OUTPUT INTEGER

CM REQUIRED: 130B

OUTPUT UNITS
UNIT  # LFN USE
-------- ------ ------------------------
OUTPUT  ERROR MESSAGE

ERROR MESSAGES
*** CVCHIN - INVALID CHARACTER IN STRING = <CHAR>
A CHARACTER OTHER THAN A DIGIT, BLANK, PLUS, OR MINUS
WAS ENCOUNTERED IN THE CHARACTER STRING. THE PROGRAM
IS ABORTED.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
ICHAR LEN
OTHERS
ABORT - TERMINATE THE PROGRAM ABNORMALLY

AUTHOR
N L FICKEN - DTNSRDC CODE 1806

DATE WRITTEN: 03/16/81

DATE(S) REVISED
03/30/83 - NAME CHANGED FROM CNVCHIN TO CVCHIN

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,CVCHIN,OUTPUT,MSACCES=<PASSWORD>.

08/18/83 3-29 CVCHIN - 1 OF 1
SUBROUTINE 'CVCHOL'

PURPOSE
   CONVERT CHARACTER STRING TO HOLLERITH STRING

FUNCTIONAL CATEGORIES: M2 M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   CALL CVCHOL (CHAR, HOL, LENGTH)

DESCRIPTION OF PARAMETERS
   CHAR   - INPUT CHARACTER STRING
   HOL    - OUTPUT HOLLERITH STRING
   LENGTH - LENGTH OF STRING

CM REQUIRED: 71B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      ICHAR LEN OR SHIFT
   OTHERS
      NONE

AUTHOR
   N L FICKEN - DTNSRDC CODE 1806

DATE WRITTEN: 03/16/81

DATE(S) REVISED
   03/30/83 - NAME CHANGED FROM CNVCHOL TO CVCHOL

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC5,,CVCHOL,,OUTPUT,MSACCES=<PASSWORD>.

08/18/83  3-30  CVCHOL - 1 OF 1
SUBROUTINE 'CVHOCH'

PURPOSE
    CONVERT HOLLERITH STRING TO CHARACTER STRING

FUNCTIONAL CATEGORIES: M2 M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
    CDC 6000/CYBER 170 (NOS/BE)

REMARKS
    NONE

USAGE
    CALL CVHOCH (CHAR, HOL, LENGTH)

DESCRIPTION OF PARAMETERS
    CHAR - OUTPUT CHARACTER STRING
    HOL - INPUT HOLLERITH STRING
    LENGTH - LENGTH OF STRING

CM REQUIRED: 123B

SUBPROGRAMS REQUIRED
    PART OF LANGUAGE
    AND ICHAR LEN SHIFT
    OTHERS
    NONE

AUTHOR
    N L FICKEN - DTNSRDC CODE 1806

DATE WRITTEN: 03/16/81

DATE(S) REVISED
    03/30/83 - NAME CHANGED FROM CNVHOCH TO CVHOCH

LOCATION OF DECKS
    SOURCE
        UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
    OBJECT
        EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
    BEGIN,DOCGET,,NSRDC5,,CVHOCH,OUTPUT,MSACCES=<PASSWORD>.

08/18/83  3-31  CVHOCH - 1 OF 1
SUBROUTINE 'CVINCH'

PURPOSE
CONVERT INTEGER TO CHARACTER STRING

FUNCTIONAL CATEGORIES: M2 M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IF LEN(CHAR) < LENGTH, THE OUTPUT STRING WILL HAVE ONLY
LEN(CHAR) CHARACTERS.

AN ASTERISK WILL BE INSERTED INTO THE LEFTMOST CHARACTER
POSITION IF THE OUTPUT STRING IS TOO SMALL TO HOLD THE
ENTIRE NUMBER.

USAGE
CALL CVINCH (CHAR, INT, LENGTH)

DESCRIPTION OF PARAMETERS
CHAR - OUTPUT CHARACTER STRING OR SUBSTRING
INT - INPUT INTEGER VALUE
LENGTH - LENGTH OF OUTPUT SUBSTRING IN CHAR

CM REQUIRED: 164B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
CHAR IABS LEN
OTHERS NONE

AUTHOR
N L FICKEN - DTNSRDC CODE 1806

DATE WRITTEN: 03/16/81

DATE(S) REVISED
03/30/83 - NAME CHANGED FROM CNVINCH TO CVINCH

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, CVINCH, OUTPUT, MSACCES=<PASSWORD>.

08/18/83 3-32 CVINCH - 1 OF 1
SUBROUTINE 'DMPCPA'

PURPOSE
SHORT DUMP OF JOB CONTROL POINT AREA

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
FOR A FULL, ANNOTATED DUMP, CALL DUMPCPA.

USAGE
CALL DUMPCPA

CM REQUIRED: 372B

OUTPUT DESCRIPTION
AN OCTAL AND CHARACTER DUMP OF THE 200 (OCTAL) WORDS OF THE
CONTROL POINT AREA.

OUTPUT UNITS
UNIT #   LFN   USE
--------   ----- -------------------------------
OUTPUT   LISTABLE OUTPUT

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
DATE     TIME
OTHERS
RCPA     - READ CONTROL POINT AREA

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/29/75

DATE(S) REVISED
05/25/83 - ORIGINAL SOURCE LOST - RE-WRITTEN IN FORTRAN 77

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC5, , DMPCPA, OUTPUT, MSACCESS=<PASSWORD>.

06/09/83  3-33  DMPCPA - 1 OF 1
SUBROUTINE 'DUMPXPK'

PURPOSE
DUMP EXCHANGE PACKAGE (REGISTERS, POINTERS, ETC.)

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN 77 EXTENDED

REMARKS
PRINTOUT IS AT 8 LINES PER INCH AND IS RESTORED TO 6 LINES PER INCH BEFORE RETURN.

USAGE
CALL DUMPXPK

CM REQUIRED: 711B

OUTPUT UNITS

UNIT  #   LFN                        USE
-------- ----                        -----------
          OUTPUT LISTABLE OUTPUT

SUBPROGRAMS REQUIRED

PART OF LANGUAGE
AND   MASK   SHIFT
OTHERS
MFETCH - READ WORD OF MEMORY
MFRAME - GET EXECUTING MAINFRAME
RCPA   - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS
FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)
   L32FMT  L35FMT  L38FMT
FAST L-FORMAT DECODE (SHIFTED -42)
   S32FMT  S35FMT  S38FMT
FAST L-FORMAT DECODE (SHIFTED 42, -42)
   X38FMT
FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)
   R21FMT  R23FMT  R25FMT  R27FMT  R29FMT
   R32FMT  R35FMT
OTHERS
   CY176   - TEST FOR CYBER 176
   INRANGE - TEST FOR ADDRESS WITHIN FL
SUBROUTINE 'ELTYM'

PURPOSE
OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL ELTYM (TIMES, CLOK)

DESCRIPTION OF PARAMETER
TIMES - 6-WORD REAL ARRAY TO CONTAIN THE FOLLOWING:
1 - CPA TIME IN SECONDS
2 - CPB TIME IN SECONDS
3 - CP TIME IN SECONDS (CPA+CPB)
4 - PP TIME IN SECONDS
5 - IO TIME IN SECONDS
6 - WALL CLOCK TIME IN SECONDS
CLOK - CH'10 - WALL CLOCK (HH.MM.SS.)

CM REQUIRED: 137B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
HMS2S - CONVERT HH.MM.SS TO SECONDS
RCPA - READ CONTROL POINT AREA
S2HMS - CONVERT SECONDS TO ' HH.MM.SS.'

ARITHMETIC STATEMENT FUNCTIONS
R65FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/15/75 (ELTIME)

DATE(S) REVISED
10/31/77 - ADJUST FOR MIDNIGHT
03/18/83 - CONVERT TO FORTRAN 77
- CHANGE NAME FROM ELTIME TO ELTYM

04/13/83 3-36 ELTYM - 1 OF 2
LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,ELTYM,OUTPUT,MSACCESS=<PASSWORD>.

04/13/83 3-37
FUNCTION 'FIRSTCH'

PURPOSE
   FIND FIRST NON-BLANK IN CHARACTER VARIABLE

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   FIRSTCH (A, NCHAR)

DESCRIPTION OF PARAMETERS
   A      - CHARACTER STRING TO BE SCANNED
   NCHAR  - NUMBER OF CHARACTERS IN 'A' TO BE PROCESSED
            (ACTUAL NUMBER PROCESSED IS THE LESSER OF 'NCHAR'
             AND THE LENGTH OF 'A')
   FIRSTCH - WILL CONTAIN THE POSITION OF THE FIRST NON-BLANK
            (IF ALL BLANKS, 0 (ZERO) IS RETURNED)

CM REQUIRED: 47B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
   AND
   MOD
   OTHERS
   NONE

AUTHOR
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/23/82

DATE(S) REVISED

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
      OBJECT
      EDITION USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,,NSRDC5,,FIRSTCH,OUTPUT,MSACCES=<PASSWORD>

06/14/84  3-38  FIRSTCH - 1 OF 1
FUNCTION 'FRSTCH'

PURPOSE
    FIND FIRST NON-BLANK IN CHARACTER VARIABLE

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
    CDC 6000/CYBER 170 (NOS/BE)

REMARKS
    NONE

USAGE
    FRSTCH (A)

DESCRIPTION OF PARAMETERS
    A       - CHARACTER STRING TO BE SCANNED
    FRSTCH - WILL CONTAIN THE POSITION OF THE FIRST NON-BLANK
              (IF ALL BLANKS, 0 (ZERO) IS RETURNED)

CM REQUIRED: 43B

SUBPROGRAMS REQUIRED
    PART OF LANGUAGE
    AND MOD
    OTHERS
        NONE

AUTHOR
    DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/19/84

DATE(S) REVISED

LOCATION OF DECKS

SOURCE
    UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS

OBJECT
    EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
    BEGIN,DOCGET,,NSRDC5,,FRSTCH,OUTPUT,MSACCES=<PASSWORD>.

06/14/84  3-39  FRSTCH - 1 OF 1
FUNCTION 'GETSTR'

PURPOSE
EXTRACT CHARACTER STRING ACCORDING TO USER-DEFINED CRITERIA

FUNCTIONAL CATEGORIES: M5 M4

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE LENGTH OF THE EXTRACTED STRING IS THE SMALLEST OF:
1) THE NUMBER OF CHARACTERS WHICH MEET THE CRITERIA
2) THE IMPLIED LENGTH OF THE INPUT STRING
3) THE IMPLIED LENGTH OF THE OUTPUT STRING

IF NECESSARY, THE EXTRACTED STRING IS PADDED ON THE RIGHT
WITH BLANKS.

USAGE
INTEGER GETSTR
...
N = GETSTR (IN, OUT, CODE, MATCH)

DESCRIPTION OF PARAMETERS
IN - CH** - IN - THE INPUT STRING
OUT - CH** - OUT - THE OUTPUT STRING
(FOR CODE=6/-6, USE ' ')
CODE - INT - IN - EXTRACTION CRITERIA. ONE OF:
1 - ALPHANUMERIC (LETTERS AND NUMBERS ONLY)
-1 - ALPHANUMERIC AND BLANK
2 - ALPHABETIC ONLY
-2 - ALPHABETIC AND BLANK
3 - NUMERIC ONLY
-3 - NUMERIC AND BLANK
4 - NUMERIC AND MINUS ('-')
-4 - NUMERIC AND MINUS AND BLANK
5 - WHILE IN <MATCH>
-5 - WHILE NOT IN <MATCH>
6 - SKIP WHILE IN <MATCH>
-6 - SKIP WHILE NOT IN <MATCH>
MATCH - CH** - IN - STRING OF ACCEPTABLE CHARACTERS
( FOR CODE=5/6)
STRING OF UNACCEPTABLE CHARACTERS
( FOR CODE=-5/-6)
(Note: THIS PARAMETER IS USED ONLY
CODE=5/-5/6/-6 AND MAY BE
OMITTED ON CDC. HOWEVER, TO

08/18/83 3-40 GETSTR - 1 OF 3
COMPLY WITH THE ANSI FORTRAN 77 STANDARD, IT SHOULD BE SPECIFIED FOR THE OTHER VALUES OF CODE. " " WILL MEET THE REQUIREMENT.)

GETSTR - INT - OUT - WILL CONTAIN THE LENGTH OF THE EXTRACTED OR SKIPPED STRING OR:
0 - NO STRING
-1 - CODE WAS INVALID

CM REQUIRED: 761B

EXAMPLES
1) EXTRACT 3 STRINGS FROM A "RECORD". THE FIRST STRING IS ALPHANUMERIC (7 CHARACTERS MAX), THE SECOND IS NUMERIC AND '-' (3 CHARACTERS MAX), THE THIRD IS EVERYTHING LEFT UP TO THE NEXT COMMA, BLANK, PERIOD OR RIGHT PARENTHESIS.

CHARACTER RECORD*80, FIRST*7, SECOND*20, THIRD*80

NEXT = 1
N1 = GETSTR (RECORD(NEXT:), FIRST, 1, ' ')
NEXT = NEXT + N1
N2 = GETSTR (RECORD(NEXT:), SECOND(1:3), 4, ' ')
NEXT = NEXT + N2
N3 = GETSTR (RECORD(NEXT:), THIRD, -5, ', .')

2) AS EXAMPLE 1, EXCEPT SKIP LEADING BLANKS FOR EACH FIELD.

CHARACTER RECORD*80, FIRST*7, SECOND*20, THIRD*80

NEXT = 1
NEXT = NEXT + GETSTR (RECORD(NEXT:), ' ', 6, ' ')
N1 = GETSTR (RECORD(NEXT:), FIRST, 1, ' ')
NEXT = NEXT + N1
NEXT = NEXT + GETSTR (RECORD(NEXT:), ' ', 6, ' ')
N2 = GETSTR (RECORD(NEXT:), SECOND(1:3), 4, ' ')
NEXT = NEXT + N2
NEXT = NEXT + GETSTR (RECORD(NEXT:), ' ', 6, ' ')
N3 = GETSTR (RECORD(NEXT:), , THIRD, -5, ', .')

3) EXTRACT 5 COMMA-SEPARATED PARAMETERS. NOTE THAT THE LAST PARAMETERS ENDS WITH A BLANK INSTEAD OF A COMMA.

CHARACTER*80 RECORD, STR1, STR2, STR3, STR4, STR5

NEXT = 1
N1 = GETSTR (RECORD(NEXT:), STR1, -5, ', ')  
NEXT = NEXT + N1 + 1
N2 = GETSTR (RECORD(NEXT:), STR2, -5, ', ')

N5 = GETSTR (RECORD(NEXT:), STR5, -5, ', ')
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LEN MIN
OTHERS NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/12/82

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, GETSTR, OUTPUT, MSACCES=<PASSWORD>.

08/18/83 3-42 GETSTR - 3 OF 3
FUNCTION 'HMS2S'

PURPOSE
   CONVERT HH.MM.SS TO SECONDS

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
   CDC 6000/CYBER 170 (NOS/BE)

REMARKS
   NONE

USAGE
   HMS2S (HMS)

DESCRIPTION OF PARAMETERS
   HMS - CH** - TIME TO BE CONVERTED
         (MAY BE 'HH.MM.SS.', 'HH.MM.SS',
          OR 'HH.MM.SS')

CM REQUIRED: 100B

SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
       NONE
   OTHERS
       NONE

AUTHOR
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/01/74 (ISEC)

DATE(S) REVISED
   03/18/83 - CONVERT TO FORTRAN 77
              - CHANGE NAME FROM ISEC TO HMS2S

LOCATION OF DECKS
   SOURCE
       UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
   OBJECT
       EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
   BEGIN,DOCGET,,NSRDC5,,HMS2S,OUTPUT,MSACCESS=<PASSWORD>.

04/13/83  3-43  HMS2S - 1 OF 1
SUBROUTINE 'IDID'

PURPOSE
GET USER INITIALS AND INTERCOM USER ID FROM CHARGE CARD OR LOGIN

FUNCTIONAL CATEGORIES: 50

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS):
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IF USER INITIALS AND USER ID ARE EQUAL, IT IS A BATCH JOB.

THE FTN4 VERSION HAS A SLIGHTLY DIFFERENT CALLING SEQUENCE.

USAGE
CALL IDID (ID, USERID)

DESCRIPTION OF PARAMETERS
ID  - CH*4  - WILL CONTAIN 4-CHARACTER USER INITIALS
FROM CHARGE CARD OR START OF LOGIN
USERID  - CH*10  - WILL CONTAIN 4-CHARACTER USER INITIALS
FROM CHARGE CARD OR UP TO 10-CHARACTER USER ID FROM LOGIN
(IF ID = USERID, IT IS A BATCH JOB)

CM REQUIRED: 60B

METHOD
THE ID IS TAKEN FROM THE CONTROL POINT AREA.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
RCPA  - READ CONTROL POINT AREA

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/28/77

DATE(S) REVISED
12/10/81 - CONVERT TO FORTRAN 77 EXTENDED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN-CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,IDID,OUTPUT,MSACCES=<PASSWORD>.

08/18/83  3-44  IDID - 1 OF 1
FUNCTION 'ITRANS'

PURPOSE
TRANSLATE CHARACTERS ACCORDING TO USER-SPECIFIED TRANSLATE TABLES

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IF THE 'FROM' AND 'TO' TABLES DO NOT HAVE THE SAME LENGTH,
NO TRANSLATION OCCURS.

SEE 'TRANS' FOR THE SUBROUTINE VERSION.

USAGE
ITRANS (STRING, FROM, TO)

DESCRIPTION OF PARAMETERS
STRING - CH** - STRING WHOSE CHARACTERS ARE TO BE TRANSLATED
FROM - CH** - STRING OF CHARACTERS TO BE TRANSLATED
TO - CH** - STRING OF TRANSLATION CHARACTERS
ITRANS - INT - WILL CONTAIN ONE OF:
+N - THE NUMBER OF CHARACTERS TRANSLATED
0 - NO TRANSLATIONS
-1 - THE FROM AND TO TABLES HAVE DIFFERENT
LENGTHS - NO TRANSLATION OCCURRED

CM REQUIRED: 105B

EXAMPLES
IN ALL THE EXAMPLES, 'STRING' HAS BEEN DEFINED AS A
CHARACTER VARIABLE OF SOME LENGTH.

1) TRANSLATE ALL ' ' IN A STRING TO '-':
NTR = ITRANS (STRING, ' ', '-')
NTR WILL CONTAIN THE NUMBER OF CHARACTERS WHICH WERE
TRANSLATED

2) ADD 1 TO ALL DIGITS IN A STRING (9 BECOMES 0):
NTR = ITRANS (STRING, '0123456789', '1234567890')

3) CHANGE THE CHARACTERS ABCDE TO EDCBA, RESPECTIVELY:
NTR = ITRANS (STRING, 'ABCDE', 'EDCBA')

4) ILLUSTRATE AN INVALID CALL:
NTR = ITRANS (STRING, '1234', '123456')
ON RETURN, N WILL BE -1, BECAUSE THE TWO TRANSLATE
STRINGS ARE OF DIFFERENT LENGTHS.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LEN
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/25/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, ITRANS, OUTPUT, MSACCES=<PASSWORD>.
FUNCTION 'JOBORG'

PURPOSE
DETERMINE JOB ORIGIN

FUNCTIONAL CATEGORIES: SO

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE CALLING SEQUENCE DIFFERS FROM THE FORTRAN IV VERSION.

USAGE
JOBORG (ORG)

DESCRIPTION OF PARAMETERS
JOBORG - WILL CONTAIN ONE OF THE FOLLOWING:
   1 - IF CALLING JOB IS A BATCH JOB
   2 - FOR REAL TIME JOB
   3 - FOR GRAPHICS JOB
   4 - FOR MULTI-USER JOB
   5 - FOR INTERCOM

ORG - WILL CONTAIN: 'BATCH', 'REAL TIME', 'GRAPHICS',
      'MULTI-USER', OR 'INTERCOM', ACCORDING TO THE VALUE
      OF 'JOBORG'.

CM REQUIRED: 54B

METHOD
THE INFORMATION IS TAKEN FROM THE CONTROL POINT AREA.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND
OTHERS
RCPA - READ CONTROL POINT AREA

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/07/77

DATE(S) REVISED
09/30/82 - CONVERT TO FORTRAN 77

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, ,NSRDC5, ,JOBORG, OUTPUT, MSACCES=<PASSWORD>

08/18/83  3-47  JOBORG - 1 OF 1
FUNCTION 'LASTCH'

PURPOSE
DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
LASTCH (A, NCHAR)

DESCRIPTION OF PARAMETERS
A - CHARACTER STRING TO BE SCANNED
NCHAR - NUMBER OF CHARACTERS IN 'A' TO BE PROCESSED
(ACTUAL NUMBER PROCESSED IS THE LESSER OF 'NCHAR' AND THE LENGTH OF 'A')
LASTCH - WILL CONTAIN THE NUMBER OF CHARACTERS IN 'A' EXCLUDING TRAILING BLANKS

CM REQUIRED: 47B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND MOD
OTHERS NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/13/79

DATE(S) REVISED
07/15/81 - CONVERT TO FTN5

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,LASTCH,OUTPUT,MSACCES=<PASSWORD>.

06/14/84 3-48 LASTCH - 1 OF 1
FUNCTION 'LASTCHH'

PURPOSE
DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK IN A
HOLLERITH WORD OR ARRAY

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE WORD IN 'A' WHICH CONTAINS THE LAST NON-BLANK CHARACTER
IS (LASTCHH(A,N)+9)/10.

THIS IS IDENTICAL TO FUNCTION 'LASTCH' FOR FTN4. THE FTN5
VERSION OF 'LASTCH' IS FOR CHARACTER DATA; 'LASTCHH' IS FOR
HOLLERITH DATA.

USAGE
LASTCHH (A, NCHAR)

DESCRIPTION OF PARAMETERS
A   - ARRAY TO BE SCANNED
NCHAR - NUMBER OF CHARACTERS IN 'A' TO BE PROCESSED
LASTCHH - WILL CONTAIN THE NUMBER OF CHARACTERS IN 'A'
            EXCLUDING TRAILING BLANKS

CM REQUIRED: 113B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND       MOD
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/13/79

DATE(S) REVISED
06/21/82 - NAME CHANGED TO LASTCHH TO ALLOW CO-EXISTENCE
          WITH LASTCH (FOR CHARACTER DATA)
          - CONVERTED TO FORTRAN 77

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,LASTCHH,OUTPUT,MSACCES=<PASSWORD>.

02/14/84 3-49 LASTCHH - 1 OF 1
SUBROUTINE 'LEFT'

PURPOSE
LEFT-JUSTIFY A CHARACTER STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE ALSO CENTER, RIGHT.

USAGE
CALL LEFT (CH, WORK)

DESCRIPTION OF PARAMETERS
CH             - CHARACTER STRING TO BE LEFT-JUSTIFIED IN PLACE
WORK           - CHARACTER VARIABLE THE SAME LENGTH AS 'CH'

CM REQUIRED: 63B

EXAMPLES
CHARACTER*20 A, WORK
DATA A/ 'ABCDEFHGIJ' /
...
CALL LEFT (A, WORK)
'A' NOW CONTAINS 'ABCDEFHGIJ'

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LEN
OTHERS
FIRSTCH - FIND FIRST NON-BLANK CHARACTER

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/15/82

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, LEFT, OUTPUT, MSACCES=<PASSWORD>.

08/18/83  3-50  LEFT - 1 OF 1
SUBROUTINE 'LGDATM'

PURPOSE
GET LOGIN DATE AND TIME

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL LGDATM (LOGDAT, LOGTIM)

DESCRIPTION OF PARAMETERS
LOGDAT - CH*5 - WILL CONTAIN THE LOGIN DATE (YYJJJ)
LOGTIM - CH*4 - WILL CONTAIN THE LOGIN TIME (HHMM)

CM REQUIRED: 102

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND
MASK
OTHERS
CVHOCH - CONVERT HOLLERITH TO CHARACTER
REQTBL - READ INTERCOM USER TABLE

ARITHMETIC STATEMENT FUNCTIONS
GETBITS - EXTRACT BITS FROM A WORD

AUTHOR
DAVID V. SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/05/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, LGDATM, OUTPUT, MSACCES=<PASSWORD>.

10/05/84 3-51 LGDATM - 1 OF 1
FUNCTION 'LSTCH'

PURPOSE
DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
LSTCH (A)

DESCRIPTION OF PARAMETERS
A - CHARACTER STRING TO BE SCANNED
LSTCH - WILL CONTAIN THE NUMBER OF CHARACTERS IN 'A'
EXCLUDING TRAILING BLANKS

CM REQUIRED: 45B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND MOD
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/19/84

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, NSRDC5, LSTCH, OUTPUT, MSACCESS=<PASSWORD>.
SUBROUTINE 'MFRAME'

PURPOSE
OBTAIN THE MACHINE AND MAINFRAME RUNNING THE PROGRAM

FUNCTIONAL CATEGORIES:  QO

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL MFRAME (CPU, MF)

DESCRIPTION OF PARAMETER
CPU - WILL RETURN MACHINE ON WHICH THE PROGRAM IS RUNNING
(CDC FTN4: INTEGER, LEFT-ADJ, BLANK-FILLED;
CDC FTN5: CHARACTER*6)
(WILL RETURN ONE OF:
'6700', '6600', '6400', 'CY74', 'CY750', 'CY176',
'CY825')

MF - WILL RETURN MAINFRAME ON WHICH THE PROGRAM IS RUNNING
(CDC FTN4: INTEGER, LEFT-ADJ, BLANK-FILLED;
CDC FTN5: CHARACTER*3)
(WILL RETURN ONE OF:
'MFA', 'MFB', 'MFC', 'MFD', 'MFE', 'MFF',
'MFG', 'MFZ')

CM REQUIRED: 320B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
AND SHIFT
OTHERS
MACHINE - GET SYSTEM MACHINE INFORMATION

ARITHMETIC STATEMENT FUNCTIONS
R38FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)
AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/15/79

DATE(S) REVISED
08/15/80 - ADD "CY74" FOR CYBER 74
05/05/81 - CONVERT TO FTN5 ON CDC
07/01/82 - UPGRADE TO LEVEL 552
- ADD SUPPORT FOR MFE, MFF, MFG
08/18/83 - CHANGE TEST OF CPU FOR MFG

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,MFRAME,OUTPUT,MSACCESS=<PASSWORD>.

06/14/84
3-54
MFRAME - 2 OF 2
FUNCTION 'MF2CPU'

PURPOSE
RETURN CPU NAME CORRESPONDING TO SUPPLIED MAINFRAME NAME

FUNCTIONAL CATEGORIES: ZO

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CHARACTER*6 CPU, MF2CPU
CHARACTER*3 MF
CPU = MF2CPU (MF)

DESCRIPTION OF PARAMETERS
MF    - CH*3    - INPUT MAINFRAME NAME 'R LETTER
       (E.G., 'MFF' OR 'F')
MF2CPU - CH*6    - WILL RETURN THE CORRESPONDING CPU NAME
       (E.G., 'CY176')
-OR-    "", IF MF IS NOT RECOGNIZED

CM REQUIRED: 321B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/20/82

DATE(S) REVISED
04/20/82 - CONVERT TO FORTRAN 77

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, MF2CPU, OUTPUT, MSACCESS=<PASSWORD>.

02/14/84  3-55  MF2CPU - 1 OF 1
SUBROUTINE 'NEWDAT'

PURPOSE
ADD/SUBTRACT SPECIFIED NUMBER OF DAYS TO/FROM A GIVEN DATE

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL NEWDAT (FMT, OLD, NEW, OCENT, NCENT, ADD)

DESCRIPTION OF PARAMETERS
FMT - FORMAT OF DATES (INTEGER)
  1 - 'MM/DD/YY'
  2 - 'MM/DD/YY'
  3 - 'MMDYY'
-1 - 'YY/MM/DD'
-2 - 'YY/MM/DD'
-3 - 'YYMDD'

OLD - OLD DATE (CHARACTER * 10)
NEW - NEW DATE (CHARACTER * 10)
OCENT - OLD CENTURY (E.G., INTEGER 1900)
NCENT - NEW CENTURY (E.G., INTEGER 1900)
ADD - INTEGER NUMBER OF DAYS TO ADD
       (NEGATIVE TO SUBTRACT)

CM REQUIRED: 372B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
JGDATE - JULIAN/GREGORIAN DATE CONVERTER (MULTI-YEAR)

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 1968

DATE(S) REVISED
02/07/73 - CONVERT TO SCOPE 3.3
07/09/79 - CONVERT TO BURROUGHS B7700
05/06/81 - CONVERT TO CDC FORTRAN 77

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARIES: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC5, , NEWDAT, OUTPUT, MSACCES=<PASSWORD>.

06/14/84 3-56
NEWDAT - 1 OF 1
FUNCTION 'NUMER'

PURPOSE
TEST STRING FOR NUMERICS

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
NUMER (STRING)

DESCRIPTION OF PARAMETERS
STRING - CHARACTER STRING TO BE TESTED
NUMER - WILL CONTAIN ONE OF:
0 - THE STRING CONTAINS ONLY DIGITS
+N - THE POSITION OF THE FIRST NON-DIGIT

CM REQUIRED: 51B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
INDEX LEN
OTHERS NONE

ARITHMETIC STATEMENT FUNCTIONS
DIGIT - TEST CHARACTER FOR DIGIT

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/13/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P, UN-CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC5, , NUMER, OUTPUT, MSACCES=<PASSWORD>.

07/27/83  3-57  NUMER - 1 OF 1
SUBROUTINE 'PFRC'

PURPOSE
SUPPLY DESCRIPTION OF PERMANENT FILE FUNCTION RETURN CODE

FUNCTIONAL CATEGORIES: QO

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE DESCRIPTIONS ARE THOSE FOUND IN THE "NOS/BE VERSION 1 REFERENCE MANUAL" (60493800 L) ON PAGE 7-84.

USAGE
CALL PFRC (RC, MSG)

DESCRIPTION OF PARAMETERS
RC       - INT       - RETURN CODE FROM THE PERMANENT FILE FUNCTION
MSG      - CHAR(50)  - WILL CONTAIN THE DESCRIPTION OF THE SUPPLIED 'IRC'
           (IF 'RC' IS INVALID, 'UNKNOWN RETURN CODE' IS RETURNED)

CM REQUIRED: 1027B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE

OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/18/76

DATE(S) REVISED
02/14/77 - UPDATE FOR NOS/BE 1.0
07/15/80 - UPDATE FOR NOS/BE 1.4 (LEVEL 508)
02/02/82 - CONVERT TO FORTRAN 77

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5,P,UN=CSYS

OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,PFRC,OUTPUT,MSACCES=<PASSWORD>.

08/18/83 3-58 PFRC - 1 OF 1
SUBROUTINE 'PM'

PURPOSE
WRITE 'PM' PRINTER MESSAGE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL PM (OUTFYL, FC)

DESCRIPTION OF PARAMETERS
OUTFYL - INT - OUTPUT FILE UNIT NUMBER -OR-
-1 FOR SYSTEM OUTPUT FILE
FC - CHAR - 2-CHARACTER FORMS CODE -OR-
1- TO 30-CHARACTER MESSAGE DESCRIBING
PRINTER CHANGES REQUIRED -OR-
* ' FOR THE MESSAGE 'RESTORE PRINTER'

CM REQUIRED: 206B

OUTPUT DESCRIPTION
ONE OF THE FOLLOWING LINES IS WRITTEN TO THE SPECIFIED FILE:

'IT'
'PM 1-PART NARROW UNLINED PAPER'

'<FC>'
'PM MOUNT SPECIAL FORMS <FC>'

'<UP-TO-30-CHARACTER MESSAGE>'
'PM<UP-TO-30-CHARACTER MESSAGE>'

' PM RESTORE PRINTER'

OUTPUT UNITS
UNIT # LFN USE
--------- -------- --------------------------------------
USER SPECIFIED LISTABLE OUTPUT (WILL CONTAIN PM LINE)
EXAMPLE
USE ONE-PART NARROW PAPER WRITING TO SYSTEM OUTPUT FILE:
...
EXTERNAL EOJ
...
CALL PM (-1, 'IT')
CALL RECOVR (EOJ, 0"77", 0)
...
CALL PM (-1, ' ')
END
SUBROUTINE EOJ
...
CALL PM (-1, ' ')
...
RETURN
END
THE FIRST CALL TO PM WRITES THE MESSAGE 'PM 1-PART NARROW UNLINED PAPER'. THE 'EXTERNAL EOJ' AND 'CALL EOJ ...' ARE NEEDED IN CASE THE PROGRAM SHOULD TERMINATE ABNORMALLY. IT MUST BE SURE THAT THE 'PM RESTORE PRINTER' MESSAGE IS WRITTEN, IF NOT BY THE SECOND CALL ABOVE, THEN BY THE REPRIEVE ROUTINE 'EOJ'. NOTICE THAT THE SECOND CALL IN THIS EXAMPLE IS THE LAST EXECUTABLE STATEMENT IN THE PROGRAM. THIS IS TO PREVENT A SECOND 'RESTORE PRINTER' MESSAGE IN CASE THE PROGRAM TERMINATES ABNORMALLY AFTER THE FIRST ONE WAS WRITTEN.

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LEN
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/15/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,PM,OUTPUT,MSACCES=<PASSWORD>.

07/15/83 3-60 PM - 2 OF 2
SUBROUTINE 'PRTYM'

PURPOSE
GET AND PRINT CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL AND PRINT USER-SUPPLIED MESSAGE

FUNCTIONAL CATEGORIES: Q4 J4

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL PRTYM (OUTFYL, TIMES, CLOK, MSG)
CALL PRTYM (OUTFYL, TIMES, CLOK, 'O')

DESCRIPTION OF PARAMETERS
OUTFYL - INT - OUTPUT UNIT FOR PRINTED LINE
(FORTRAN LOGICAL UNIT NUMBER (1-999))
(FOR STANDARD OUTPUT FILE (I.E., PRINT OR WRITE (*), USE -1)
TIMES - REAL - 6-WORD ARRAY TO CONTAIN THE FOLLOWING:
1 - ELAPSED CPA TIME IN SECONDS
2 - ELAPSED CPB TIME IN SECONDS
3 - ELAPSED CP TIME IN SECONDS (CPA+CPB)
4 - ELAPSED PP TIME IN SECONDS
5 - ELAPSED IO TIME IN SECONDS
6 - ELAPSED WALL CLOCK TIME IN SECONDS
CLOK - CH*10 - ELAPSED WALL CLOCK TIME (HH.MM.SS.)
MSG - CH** - MESSAGE TO BE PRINTED
(IF MSG IS 'O', HEADINGS, BUT NOT TIMES, WILL BE PRINTED.)

CM REQUIRED: 146B

OUTPUT UNITS
UNIT # LFN USE
-------- ------- ---------------------------
USER SPECIFIES... LISTABLE OUTPUT
EXAMPLE

PROGRAM TEST (OUTPUT=128, ...)
CHARACTER CLOK*10
REAL TIMES(6)
C GET INITIAL TIMES AND PRINT HEADING
CALL PRTYM (-1, TIMES, CLOK, '0')
......
C GET ELAPSED TIMES AND PRINT WITH MESSAGE
CALL PRTYM (-1, TIMES, CLOK, 'TEST NUMBER 1')
......
C NEW HEADINGS ARE NOT NEEDED, SO CALL ELTYM DIRECTLY
CALL ELTYM (TIMES, CLOK)
......
C GET ELAPSED TIMES AND PRINT WITH MESSAGE
CALL PRTYM (-1, TIMES, CLOK, 'TEST NUMBER 2')
......
END

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
ELTYM - GET ELAPSED TIME SINCE LAST CALL

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/20/76 (PRTIME)

DATE(S) REVISED
03/18/83 - CONVERT TO FORTRAN 77
- CHANGE NAME FROM PRTIME TO PRTYM

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, PRTYM, OUTPUT, MSACCES=<PASSWORD>.

08/18/83 3-62 PRTYM - 2 OF 2
SUBROUTINE 'RIGHT'

PURPOSE
RIGHT-JUSTIFY A CHARACTER STRING

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
SEE ALSO CENTER, LEFT.

USAGE
CALL RIGHT (CH, WORK)

DESCRIPTION OF PARAMETERS
CH   - CHARACTER STRING TO BE RIGHT-JUSTIFIED IN PLACE
WORK - CHARACTER VARIABLE THE SAME LENGTH AS 'CH'

CM REQUIRED: 104B

EXAMPLES
CHARACTER*20 A, WORK
DATA A/ ' ABCDEFGHIJ ' /
... CALL RIGHT (A, WORK)
'A' NOW CONTAINS ' ABCDEFGHIJ'

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LEN
OTHERS
LASTCH - FIND LAST NON-BLANK CHARACTER

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/15/82

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,RIGHT,OUTPUT,MSACCE=<PASSWORD>.

08/18/83  3-63  RIGHT - 1 OF 1
SUBROUTINE 'ROUTERC'

PURPOSE
SUPPLY DESCRIPTION OF ROUTE RETURN CODE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN 77 EXTENDED

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE DESCRIPTIONS ARE THOSE FOUND IN THE "NOS/BE VERSION 1
REFERENCE MANUAL" (60493800 M) ON PAGE 7-81.

USAGE
CALL ROUTERC (IRC, TEXT)

DESCRIPTION OF PARAMETERS
IRC - INT - RETURN CODE FROM SUBROUTINE 'LF ("ROUTE",'
TEXT - CH'50 - WILL CONTAIN THE DESCRIPTION OF THE
SUPPLIED 'IRC'
(IF 'IRC' IS INVALID, 'UNKNOWN RETURN CODE'
IS RETURNED)

CM REQUIRED: 605B

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/15/77

DATE(S) REVISED
05/17/83 - CONVERT TO FORTRAN 77

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,ROUTERC,OUTPUT,MSACCES=<PASSWORD>.

05/17/83 3-64 ROUTERC - 1 OF 1
SUBROUTINE 'SETREW'

PURPOSE
CONVERT REWIND OPTION INTO OPEN AND CLOSE CODES

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL SETREW (REW, OPEN, CLOSE, NOE)

DESCRIPTION OF PARAMETERS
REW - CH*2 - INPUT REWIND OPTION. ONE OF:
A - OPEN=NOREWIND; CLOSE=REWIND
B - OPEN=REWIND; CLOSE=NOREWIND
E - OPEN=POSITION BEFORE EOI;
    CLOSE=NOREWIND
EN - OPEN=POSITION BEFORE EOI;
    CLOSE=NOREWIND
ER - OPEN=POSITION BEFORE EOI;
    CLOSE=REWIND
EU - OPEN=POSITION BEFORE EOI;
    CLOSE=UNLOAD
R - OPEN=REWIND; CLOSE=REWIND
U - OPEN=REWIND; CLOSE=REWIND AND UNLOAD
OTHER - OPEN=NOREWIND; CLOSE=NOREWIND
(ANY WORDS BEGINNING WITH THESE LETTERS WILL
PRODUCE THE SAME RESULTS.)

OPEN - CH*1 - WILL CONTAIN OPEN REWIND OPTION
('E', 'N', 'R')

CLOSE - CH*1 - WILL CONTAIN CLOSE REWIND OPTION
 ('N', 'R', 'U')

NOE - INT - 0 - ALLOW ALL VALUES OF Rew
OTHER - DO NOT ALLOW 'E' VALUES OF Rew

CM REQUIRED: 321B
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/29/75

DATE(S) REVISED
01/29/76
01/11/76 - ADD 'NOE' PARAMETER
09/28/82 - CONVERT TO FORTRAN 77

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, , NSRDC5, , SETREW, OUTPUT, MSACCESS=<PASSWORD>.
SUBROUTINE 'SM5PRNT'

PURPOSE
PRINT CONTENTS OF SORT/MERGE 5 STATISTICS ARRAY

FUNCTIONAL CATEGORIES: NO

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL SM5PRNT (OUTYL, SM5ARAY)

DESCRIPTION OF PARAMETERS
OUTYL - OUTPUT UNIT NUMBER (1-999) -OR-
-1 TO INDICATE STANDARD OUTPUT FILE
SM5ARAY - ARRAY USED IN CALL TO SM5SORT OR SM5MERG

CM REQUIRED: 154B

OUTPUT DESCRIPTION
THE FOLLOWING IS PRINTED ON THE SPECIFIED FILE AFTER A BLANK LINE:

NNNNNNNNNN RECORDS READ
NNNNNNNNNN RECORDS DELETED BY OWN1
NNNNNNNNNN RECORDS INSERTED BY OWN1
NNNNNNNNNN RECORDS INSERTED BY OWN2
NNNNNNNNNN RECORDS SORTED
NNNNNNNNNN RECORDS DELETED BY PWN3
NNNNNNNNNN RECORDS INSERTED BY OWN3
NNNNNNNNNN RECORDS INSERTED BY OWN4
NNNNNNNNNN <RESERVED>
NNNNNNNNNN RECORDS DELETED BY OWN5
NNNNNNNNNN RECORDS COMBINED FOR SUMMING
NNNNNNNNNN RECORDS WRITTEN
MINIMUM RECORD LENGTH NNNNNNNNNN CHARACTERS
AVERAGE RECORD LENGTH NNNNNNNNNN CHARACTERS
MAXIMUM RECORD LENGTH NNNNNNNNNN CHARACTERS

OUTPUT UNITS

<table>
<thead>
<tr>
<th>UNIT #</th>
<th>LFN</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;USER SPECIFIED&gt;</td>
<td>SORT SUMMARY</td>
<td></td>
</tr>
</tbody>
</table>

10/14/83  3-67  SM5PRNT - 1 OF 2
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, SM5PRNT, OUTPUT, MSACCES=<PASSWORD>.

10/14/83  3-68  SM5PRNT - 2 OF 2
FUNCTION 'S2HMS'

PURPOSE
CONVERT SECONDS TO 'HH.MM.SS.'

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
S2HMS (SEC)

DESCRIPTION OF PARAMETERS
SEC - INT - TIME (IN SECONDS) TO BE CONVERTED
S2HMS - CHAR - WILL CONTAIN 'HH.MM.SS'

SUBPROGRAMS REQUIRED
PART OF LANGUAGE
NONE
OTHERS
NONE

CM REQUIRED: 46B

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/08/74 (IHMS)

DATE(S) REVISED
03/18/83 - CONVERT TO FORTRAN 77
- CHANGE NAME FROM IHMS TO S2HMS

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET,, NSRDC5,, S2HMS, OUTPUT, MSACCES=<PASSWORD>.

04/13/83
3-69
S2HMS - 1 OF 1
FUNCTION 'TRANS'

PURPOSE
TRANSLATE CHARACTERS ACCORDING TO USER-SPECIFIED TRANSLATE TABLES

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
IF THE 'FROM' AND 'TO' TABLES DO NOT HAVE THE SAME LENGTH, NO TRANSLATION OCCURS.

SEE 'ITRANS' FOR THE FUNCTION VERSION WHICH WILL RETURN THE NUMBER OF CHARACTERS TRANSLATED.

USAGE
CALL TRANS (STRING, FROM, TO)

DESCRIPTION OF PARAMETERS
STRING - CH** - STRING WHOSE CHARACTERS ARE TO BE TRANSLATED
FROM - CH** - STRING OF CHARACTERS TO BE TRANSLATED
TO - CH** - STRING OF TRANSLATION CHARACTERS

CM REQUIRED: 77B

EXAMPLES
IN ALL THE EXAMPLES, 'STRING' HAS BEEN DEFINED AS A CHARACTER VARIABLE OF SOME LENGTH.

1) TRANSLATE ALL ' ' IN A STRING TO ' - ':
   CALL TRANS (STRING, ' ', ' - ')

2) ADD 1 TO ALL DIGITS IN A STRING (9 BECOMES 0):
   CALL TRANS (STRING, '0123456789', '1234567890')

3) CHANGE THE CHARACTERS ABCDE TO EDCBA, RESPECTIVELY:
   CALL TRANS (STRING, 'ABCDE', 'EDCBA')

4) ILLUSTRATE AN INVALID CALL:
   CALL TRANS (STRING, '1234', '123456')
   NO TRANSLATION OCCURS BECAUSE THE TWO TRANSLATE TABLES HAVE DIFFERENT LENGTHS.
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
LEN
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/25/83

DATE(S) REVISED

LOCATION OF DECKS
SOURCE DECK
UPDATE LIBRARY ON MSS: NSRDC5P, UN=CSYS
OBJECT DECK
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN, DOCGET, ,NSRDC5, ,TRANS, OUTPUT, MSACCES=<PASSWORD>.
SUBROUTINE 'TTYMSG'

PURPOSE
DRIVER TO WRITE A LINE TO AN INTERACTIVE TERMINAL

FUNCTIONAL CATEGORIES: LO J4

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
THE SUBROUTINE INCLUDES AN OPTIONAL ENTRY TO OPEN THE TTY
FILE SPECIFYING A UNIT NUMBER OTHER THAN THE DEFAULT OF 77.
IT ALSO INCLUDES AN ENTRY TO CLOSE AND RETURN THE FILE.

USAGE
CALL TTYOPEN (UNIT)
CALL TTYMSG (MSG)
CALL TTYCLOS

DESCRIPTION OF PARAMETERS
UNIT  - FORTRAN UNIT NUMBER TO BE USED FOR THE TTY FILE
       (IF THE CALL TTYOPEN IS OMITTED, UNIT 77 IS USED)
MSG   - CHARACTER MESSAGE TO BE WRITTEN

CM REQUIRED: 103B

OUTPUT UNITS

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<tr>
<td>77</td>
<td>YYTTY</td>
<td>CONNECTED TTY FILE</td>
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<td>(OPENED BY TTYOPEN, WHICH MAY CHANGE THE</td>
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<td>UNIT NUMBER, OR BY THE FIRST CALL TO</td>
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<td>TTYMSG - CLOSED AND RETURNED BY TTYCLOS)</td>
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</table>

EXAMPLE
CHARACTER*30 NAME

... CALL TTYOPEN (66) ...

CALL TTYMSG ('ENTER YOUR NAME-')
READ (66, '(A)') NAME

... CALL TTYCLOS
SUBPROGRAMS REQUIRED
PART OF LANGUAGE
CONN
OTHERS
NONE

AUTHOR
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/22/82

DATE(S) REVISED

LOCATION OF DECKS
SOURCE
UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
OBJECT
EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
BEGIN,DOCGET,,NSRDC5,,TTYMSG,OUTPUT,MSACCESS=<PASSWORD>.

08/18/83 3-73 TTYMSG - 2 OF 2
SUBROUTINE 'TTYOPN'
SUBROUTINE 'TTYCLO'

PURPOSE
OPEN INTERACTIVE INPUT AND OUTPUT FILES

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN 77

COMPUTERS (OPERATING SYSTEMS)
CDC 6000/CYBER 170 (NOS/BE)

REMARKS
NONE

USAGE
CALL TTYOPN (IN, OUT) << OPEN AND CONNECT FILES IN AND OUT
CALL TTYCLO << CLOSE AND RETURN FILES

DESCRIPTION OF PARAMETERS
IN - INPUT UNIT NUMBER
OUT - OUTPUT UNIT NUMBER

CM REQUIRED: 66B

INPUT/OUTPUT UNITS
UNIT # LFN USE
--------- ------ ----------------------------------------
USER CONSOL CONNECTED OUTPUT FILE
SPECIFIES
USER KEYBRD CONNECTED INPUT FILE
SPECIFIES

EXAMPLE
CALL TTYOPN (1, 2)
...
CALL TTYCLO

SUBPROGRAMS REQUIRED
PART OF LANGUAGE CONNECT
OTHERS NONE
AUTHOR
    DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 06/21/83

DATE(S) REVISED

LOCATION OF DECKS
    SOURCE DECK
        UPDATE LIBRARY ON MSS: NSRDC5P,UN=CSYS
    OBJECT DECK
        EDITLIB USER LIBRARY: NSRDC5

ANOTHER COPY OF THIS DOCUMENT
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