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DPSTM-500

THE JOSHUA SYSTEM

Vol. 9.3 OPERATING SYSTEM

Approved by

J. R. Hilley, Research Manager
Computer Applications Division

NOTICE

This document contains descriptions of the JOSHUA Operating System and Applications Modules. The document is prepared as a set of loose-leaf notebooks which will be periodically updated. All of the material is preliminary and should not be referenced.

JUNE 1974

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Purpose: To initiate the activating or deactivating of a terminal, the allocation or deallocation of a terminal unit, the activating or deactivating of a function, or the issuing of a message.

Attribute: Nonreusable

JOS Main Program Name: JTVARY

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
CCB	D	CCBMCB - Monitor Control Block CCBUSER - User data set name

External References: DAR, CLOSE, LINK, GALLOC, OPEN, SAEC, SPAR, GETMAIN, FREEMAN

Objective: The module has the following objectives:

- (1) To activate or deactivate a terminal.
- (2) To allocate or deallocate a terminal unit.
- (3) To activate or deactivate functions.
- (4) To issue general messages.

Program Logic: The address of the communication control block (CCB) is received via the argument list. A check is made on the third double word of argument 1 (WCBARG1) to see if a control request is indicated (indicated by there not being a third name). If it is a special request, the terminal is checked to see if it is a control terminal. If the terminal is not a control terminal, an appropriate code is set up, and a return is issued (this is called an invalid procedure). If the terminal was a control terminal (MCFCNTRL flag on), a check is made to see if it is a function request. If a function request is indicated and it is valid (proper authorization necessary or invalid procedure is followed), the function offline flag (FCLFCTOF) is either set on or off depending on the request and a return is issued. If no function existed for the one indicated, the invalid procedure is followed.

If the request has been concerned with a message for all terminals, the message area for all terminal (RCBMSG) would be obtained via GETMAIN (if not already available) and the message moved in or the message area would have been freed up via FREEMAIN depending on the request. A return is issued after performing the desired action.

If an external terminal request is desired, the terminal is located and the request is analyzed. If the terminal is to be varied on-line or off-line, the proper flags are set and a return is issued. If a message is to be put to a terminal, the terminal message area (WCBMSG) is obtained via a GETMAIN (if not already available), the message moved in, and a return is issued. If the terminal message is to be removed, the area is freed via FREEMAIN and a return is issued.

If a unit is to be allocated, a LINK is issued to GALLOC

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with the proper arguments and the return code is checked. If the return code is nonzero, the invalid procedure is followed; otherwise, the data control block for the unit (GALDCBG) is OPENED, the graphic attention routines are set up via SAEC and SPAR macros, and a return is issued.

If the deallocation of a unit is indicated, the graphic attention routine is deleted via the DAR macro, the data control block (DCB) is CLOSED, a LINK is issued to GALLOC for deallocation, and a return is issued. If there are any errors obtained in any of the above operations, the invalid procedure is followed.

If the request had not been special, the terminal would not have had to be a control one.

Terminating Conditions: Upon obtaining some error upon allocating or deallocating or fullfilling some other request, an appropriate code is set up, and a return is issued.

Referenced by: JTMON

Language: Assembler

Author: R. L. Boyce, Jr.

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Title Module: JTVIEWQ

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Purpose: To initiate the display of the job hold queue.

Attribute: Nonreusable

JOS Main Program Name: JTVIEWQ

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
CCB	D	CCBMCB - Monitor Control Block

External References: GETMAIN, FREEMAIN, OPEN, READ, WAIT, CLOSE

Data Sets: Job hold queue data set; communication data set.

Objective: To initiate the display of the job hole queue by transferring the hold queue to the communication data set.

Program Logic: The address of the CCB is received via the argument list. The hold queue data set is OPENED. The control record is READ and a check is made to see if there are any records in the queue. If there are none, the next subfunction is set to a blank (to skip it), a CLOSE is issued on the data set and a return is issued; otherwise, the areas are set up for reading. The records are read and put into the display buffer until it is filled up or until the end of the job is reached at which time a link is made to WPAGE. WPAGE will put them into the communication data set. This is done until the end of the records is reached. A CLOSE is then issued on the data set and a return is issued.

Termination Condition: If a READ error is encountered, the module willabend.

Referenced By: JTMON

Language: Assembler

Author: W. H. Brotherton, Jr.

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Title Module: JTVQACCT

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Purpose: To allow display of accounting information.

Attribute: Nonreusable

JOS Main Program Name: JTVQACCT

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
CCB	D	CCBMCB - Monitor Control Block

External References: GETMAIN, FREEMAIN, READ, WAIT, ABEND

Data Sets: Accounting data set.
Communication data set.

Objective: The objective is to display the accounting data where the data consists of the following:

- 1) the data accumulated by a user during a terminal session.
- 2) the data stored on encountering a protection violation.

Program Logic: The address of the CCB is received via the argument list. The accounting control record (QCBACB) is read and the proper areas are set up. After reading the record, the function control table flag is examined to see if violations are desired or if accounting records are.

The appropriate flag (ACTVLTN) in the record will tell which type record has been read. After this is determined and a desired records is read, the data is edited. After two records are encountered and edited, the edited information is written to the communication data set via BALR to WPAGE. When all records have been read, examined, etc., a return is issued.

Terminating Conditions: An appropriate code is issued when an I/O error is encountered.

Referenced By: JTMON

Language: Assembler

Author: W. H. Brotherton, Jr.

Restrictions: The module is restricted to system and operation personnel usage.

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Module: JTWSTATS

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Purpose: To handle the logging out of BNAM statistics.

Attribute: Nonreusable

JOS Main Program Name: JTWSTATS

Arguments:

Parameter

Type

Description

CCB

D

CCBMCB - Monitor Control Block

\$CBMONF - Monitor Mode Flag

External References: GETMAIN, FREEMAIN, ENQ, SVC 252, READ, WAIT, WRITE, DEQ, TIME

Data Sets: Accounting data set

Program Logic: The address of the CCB is received via the argument list. The BNAM statistics table is located and then the type of record to be written is determined. If the monitor mode flag (\$CBMONF) indicates computational, the EM record is built and written to the accounting data set via the WRITE macro. After this write, the BNAM statistics are reset to zero. If it was not the computational mode, the EOJ (End of Job) record is build and written to the accounting data set provided there is a sufficient amount of data to warrant it. If an I/O error is encountered, a return code is set up; otherwise, a normal return is issued. An enq is provided for the accounting data set to protect from concurrent usage.

The records built will consist of a particular code (determines type record), badge number, date, member name, and BNAM statistics. The badge number is obtained via SVC 252 and the date via the TIME macro. On moving the statistics into the record, halfword overflow is indicated by making data negative.

Terminating Conditions: Module terminates on an I/O error.

Enq Name: JOSYSTEM JOSQUEUE

Referenced By: JTMON

Language: Assembler

Author: W. H. Brotherton, Jr.

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Title

Module: JTXBCHEK

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Purpose: To check for proper authorization in presenting hold queue jobs to HASP.

Attribute: Nonreusable

JOS Main Program Name: JTXBCHEK

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
CCB	D	CCBMCB - Monitor Control Block CCBBADGE - User Badge Number

External References: GETMAIN, FREEMAIN

Program Logic: The address of the CCB is received via the argument list. The user badge number (CCBBADGE) is checked for on the authorized badge list. If the user's badge number is found, a return is issued; otherwise, the next subfunctren is set up to be skipped before issuing the return.

Referenced by: JTMOM

Language: Assembler

Author: W. H. Brotherton, Jr.

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Module: JTXBCHEK

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Purpose: To place in the communication data set an edited list of all fully-qualified names in a BNAM-catalogued tree or subtree.

Attribute: Nonreusable

JOS Main Program: LIST

<u>Arguments:</u>	<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
	A1	Real*8	CCB
	A2	Real*8	WCBARG1. Specifies the subtree to be listed.
	A8	Integer*4	WXTNTGR. Defines the number of qualifiers in A2.
	A4	Logical*1	Area pointed to by MCBUFFG. Used as a buffer by WPAGE.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
\$TERR	\$TERR
LCDINT	\$CDINT, HCDINT
LINK	BNAM, WPAGE
MOVEIT	MOVEIT

Data Sets: Communication Data Set (CDS)

Program Logic:

- Initialize edit controls.
- Call BNAM (functional request 12) to retrieve each fully qualified name in the subtree designated by A2. A separate call to BNAM is required for each name. A2 may be null in which case the first data set located from the search sequence will be listed. Failure to locate a subtree results in termination via \$TERR.
- The subordinate portion of the name is edited in A4. This includes:
 1. specifying data classification level if other than zero;
 2. providing the relative record number of the data record;
 3. replacing deleted qualifiers with the literal 'DELETED.';
 4. replacing a qualifier with blanks unless it introduces a new subtree or is part of the first record being listed on any page.
- Write out each page as it is completed and any partial page when the list is complete.

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Terminating Conditions: BNAM error - via a call to \$TERR.

Comments: Data are entered into A4 on the basis of a ten line, six hundred forty character page.

Language: FORTRAN IV

Author: R. C. Haywood - J. C. Jensen

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Title Module: LISTB

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Purpose: Given an incomplete record name, to list the son node and all the brother nodes of that son.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
A1	Real*8	CCB.
A2	Real*8	WCBARG1 - contains the record name.
A4	Real*8	Area pointed to by MCBUFFG and used as WPAGE buffer.
A8	Integer*4	WXTNTGR - specifies the number of qualifiers in A2.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
\$TERR	\$TERR
LINK	BNAM, WPAGE
MOVEIT	MOVEIT

Data Sets: Communication data set (CDS)

Program Logic:

- Functional symbol '\$?\$\$' is added as a final qualifier to A2. This marks the level from which the nodes are to be listed.
- A series of functional request 11's is made to BNAM retrieving on each call a number of brothers up to the number sufficient to complete a formatted CDS record which is written thru a call to WPAGE.
- When a BNAM error is encountered, execution is terminated thru a call to \$TERR.

Language: FORTRAN IV

Author: R. C. Haywood

Purpose: To fit a specified mathematical function to a set of data points by the least squares method.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
A1	Real*8	CCB.
A2	Real*8	WCBARG1 - enters with the name of the input record; returns the name of the output record.
A8	Real*8	WXTNTGR - the number of qualifier in A2.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
\$TERR	\$TERR
IPUT	IPUT, JPUT
JSREAD	JSREAD
LINK	BNAM, JTREE
LSTSQR*	LSTSQR
MINVS*	MINVS

Program Logic:

- The name of the input record is ascertained to be of form LSTSQR.INPUT.?.? with or without an explicit data set reference. Failure to meet this criteria results in a call to \$TERR.
- The input data is read. If the limits of the modules arrays would be exceeded, \$TERR is called.
- The data is passed to subroutine LSTSQR to obtain a fit; from this a ratio of calculated to observed data is determined as a goodness-of-fit indication.
- The results are written to a record LSTSQR.OUTPUT.?.? where the variable qualifiers are the same as specified for the input record. A BNAM close follows the write.
- The name of the output record is loaded into A2 and A8 set to reflect the number of qualifiers.

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Terminating Conditions:

- Invalid form for the input record.
- Nonexistence of specified input record.
- Program data areas exceeded by input record requirements.
- Error in writing the output record.

Language:

FORTRAN IV

Author:

R. C. Haywood - F. D. Knight

JOSHUA DPSTM-500	Title Module: LSTSQR Subroutine: LSTSQR	Vol. IX	Page E.1.456
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Purpose: To fit a specified mathematical function to a set of data points by the least squares criterion and to calculate statistics for a goodness of fit determination.

Usage: CALL LSTSQR(L,M,X,Y,W,A,B,MPL,STAT,MX,&SN)

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
L	Integer*4	Number of data points.
M	Integer*4	Number of terms in function excluding constant term.
X	Real*8	LXM matrix of the functions of the independent variables.
Y	Real*8	L-dimensioned vector of the dependent variable.
W	Real*8	L-dimensioned vector of the weighting factors to be used (W = 0 or 1 if equal weighting desired).
A	Real*8	A = 0 to specify no constant term A = 1 to specify a constant term (On returning from this routine, A will contain the fitted constant if applicable.)
B	Real*8	M-dimensioned vector of the independent fitted parameters.
MPL	Integer*4	MPL=0 -Functions of independent variables are set up by calling program. MPL=1 -Polynomial fit is to be set up by the LSTSQR routine in which case only X(L,1) must be specified for the array X.
STAT	Real*8	STAT(1) - Square of multiple correlation coefficient. STAT(2) - Variance of estimate. STAT(3) - F ratio for variances.
MX	Integer*4	Value to which the first subscript of X has been dimensioned (>L).

Subprogram Used:

MINVS

Objective:

To fit a mathematical function to a set of data points by the least squares criterion. The routine has the capability of fitting any function in which the relationship is linear in the parameters to be calculated. Several options are available for use with this routine. The function can be fitted with or without a constant intercept (i.e., the intercept can be determined from the data or set to 0); specified data points can be weighted in the fitting calculation; and for polynomial fits, the routine generates the higher powered terms (X^2 , X^3 etc.). The program obtains the fitting parameters by the least squares criterion given below in matrix form.

$$B = (X^T W X)^{-1} X^T W Y ; \quad A = \bar{Y} - B \bar{X}$$

where:

- X - matrix of independent variables shifted by respective means
- Y - vector of dependent variable shifted by its mean
- W - diagonal matrix of weighting factors (stored and used as vector)
- B - vector of fitted parameters
- A - optional constant term
- $\bar{Y}$ - mean of the dependent variable
- $\bar{X}$ - vector of means for the independent variables.

It calculates the square of the multiple correlation coefficient, the variance of estimate, and the F ratio for variance.

Program Logic:

The degrees of freedom are determined and a switch set based on whether a constant is or is not requested. The work areas are zero initialized and the weighting vector is set to 1 if initialized to zero by the user. The higher power terms are generated from the

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Subroutine: LSTSQR

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values of $X(L,1)$ if a polynomial fit has been requested. The quantities $x^{TW}x$, $x^{TW}y$, $\bar{y}$, and $\bar{x}$ are generated and the $x^{TW}x$ matrix inverted via a call to MINVS. The fitting parameters (B) are calculated from the relation shown previously. If requested, the constant term A is then calculated. The goodness of fit parameters: the square of the multiple correlation coefficient, the variance of estimate, and the F ratio for variances are calculated by standard statistical methods.

Remarks:

The maximum number of data points is determined by the calling program. The maximum number of terms in the function is currently set at 4, but can be easily increased.

Language:

FORTRAN IV

Author:

F. D. Knight

JOSHUA DPSTM-500	Title Module: LSTSQR Subroutine: MINVS	Vol. IX	Page E.1.460
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Purpose: To find the inverse and determinant of an NXN matrix A and the solution vector, X, for the matrix problem $AX=B$.

Usage: CALL MINVS(A,N,NN,D,B,K)

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
A	Real*8	Matrix to be inverted.
N	Integer*4	Size of matrix to be inverted.
NN	Integer*4	Value to which the first subscript of array A has been dimensioned ($\geq N$).
D	Real*8	Determinant of A (returned as output).
B	Real*8	Only used if solution to $AX=B$ requested. On input, B contains the right-hand side vector. On output, B contains the solution vector X.
NB	Integer*4	NB = 0 - find inverse of A NB = 1 - find inverse of A and solve $AX=B$ for X.

Objective: To determine the inverse of an NXN matrix A which is a subset of a KXL matrix where $N < K = NN$ and $N < L$. This routine is a modification of the IBM/360 SSP routine MINV and allows for the inversion of matrices stored in normal row-column form $A(I,J)$. The inversion procedure is standard Gauss-Jordan with both row and column searching for next pivot. The inverse is generated in place, hence destroying the original A matrix. The routine also calculates the solution vector X to $AX=B$ if requested. This result is stored in the vector B, thus destroying its original contents.

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Program Logic:

The program utilizes the standard Gauss-Jordan inversion procedure whereby an implied identity matrix is transformed into the desired inverse through a series of row operations. Superimposed upon this are row and/or column interchanges for placing the maximum value of the reduced matrix as the pivot element. At the conclusion of the Gauss-Jordan procedure, reverse row/column interchanges are made to give the desired inverse. The determinant is calculated at each matrix reduction as $\prod_i P_i$ where P_i is the pivot of the i^{th} reduced matrix. If the solution vector X to $AX=B$ is requested, appropriate Gauss-Jordan row operations are performed on the vector B as the inversion proceeds.

Language:

FORTRAN IV

Author:

F. D. Knight

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Title Module: MATHERRX

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Purpose: To provide traceback routine for mathematical errors.

Attribute: Nonreusable

JOS Main Program Name: MATHERRX

External Reference: SVC 13, OPEN, WRITE, CHECK

Data Sets: FT06FO01 (Printer)

Program Logic: The program is entered via the LOAD macro instruction from the \$LINK routine. The function that the math error occurred in is retrieved from the save area along with the subroutine in which it occurred. The return address for the particular math function is also retrieved. This information is then put in message 1 which is written to the printer (FT06FO01) by issuing a WRITE macro instruction. An abend code of 29 is then set up before 'abending' via the OS 360 SVC 13.

MESSAGE 1: 'ABEND OCCURRED IN FUNCTION FFFFFFFF
CALLED FROM SUBROUTINE SSSSSS
AT ISN NNNNNNNN'

where:

FFFFFFF = function name

SSSSSS = subroutine name

NNNNNNNN = internal statement
number (return address)

Referenced By: \$LINK

Language: Assembler

Author: R. L. Boyce, Jr.

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'WRITE ROUTINE':

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Purpose:

In the MT function, to direct function execution to the proper module for disposition of the template page type.

Attribute:

Nonreusable

JOS Main Program:

MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	
A1	Real*	CCB.
A4	Logical*1	Area pointed to by MCBBUFFG - buffer area containing page-type display and user-specified indicators.
A13	Integer*2	WXTWORK3 - A13(162) is set to the page count of the next CDS record to be read.
A15	Integer*4	MCBCFCT.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
MOVEIT	MOVEIT
RHAR	CHAR

Program Logic:

- If a numeric character is found in either the first or eight hundred eighty-first position of A4, it is used to define the number of the next CDS page to be read. A page one specification is always reset to page two.
- Positions 707, 787, and 867 of A4 are checked for indicated dispositions of delete, insert, or process, respectively. Multiple indications or no indication results in the display being returned for proper specification.
- Any required change to A13(162) and A15 as a result of the specified disposition is made.

Language:

FORTRAN IV

Author:

R. C. Haywood

Purpose: In the MT function to read from the CDS and place in the display buffer the specified template page type so that modifications may be made.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	
A1	Real*8	CCB.
A4	Real*8	Area pointed to by MCBUFFG - used as the CDS buffer and the terminal buffer.
A13	Integer*2	WXTWORK3 - A13(1) -A13(124) contains the template I/O list; A13(134) counts the number of template nests (or page types) already processed; A13(139) -A13(151) are pointers to the start of template loops in the I/O list in A13(1) to A13(124); A13(152) -A13(156) specify the number of loops in each nest A13(161) is a flag signalling initial execution when zero; A13(162) is the number of the CDS record to be read.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
LINK	\$LINK, RPAGE
MOVEIT	MOVEIT
XNSTID	XNSTID

External References: JTRSTPGE - referenced via call to \$LINK.

Data Sets: Communication Data Set (CDS) - via call to RPAGE.

Program Logic:

- A call to \$LINK is made to execute JTRSTPGE thus repositioning to the start of the CDS.
- To retrieve the specified page (two on initial execution), the CDS is read sequentially until the desired page is read into A4 or the end of the CDS is reached. In the latter case, the area of A4 which would normally contain the page type display is initialized to question marks.

JOSHUA DPSTM-500	Title	Module: MTPAGE	Vol.	Page
			IX	E.1.470
			Rev. ₁	Date 6/73

- XNSTID is called to place the page type's associated nest from the I/O list on the last line of the buffer.
- Instructions for indicating the options of delete, insert, or process in bytes 707, 787, and 867, respectively, are loaded into the buffer.

Language:

FORTRAN IV

Author:

R. C. Haywood

JOSHUA DPSTM-500	Title Module: MTPAGE	Vol. IX	Page E.1.472
		Rev. 1	Date 6/73

(Blank)

JOSHUA

DPSTM-500

Title Module: NTERPRET

Vol.

IX

Page

E.1.473

Rev.

1

Date

6/73

Purpose: To create unformatted data records from formatted input.

Attribute: Nonreusable

JOS Main Program: MAIN

<u>Arguments:</u>	<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
	A1	Real*8	CCB.
	A2	Real*8	WCBARG1 - returns the name of the data record written except when conditions indicate a lownam is in progress.
	A3	Real*8	WCBARG2 - specifies the name of the data record to be written.
	A4	Logical*1	Area addressed by MCBBUFFG - used as CDS buffer by RPAGE.
	A8	Integer*4	WXTNTGR - returns the number of qualifiers placed in A2.
	A10	Integer*4	WXTWORK1 - assumed to have been used as the COMTEM array in an earlier BNAM reference. The relative values of A10(4) and A10(7) are used to determine if a lownam is in progress. When no lownam is indicated, A10(3) is set to zero.

Subprograms:

Control Section

\$TERR
BCDFIX
BCDFLT
INVER*
LINK
MOVEIT
OVFLO*
PEELPG*
TRNSLT

Entry Point

\$TERR
BCDFIX
BCDFLT
INVER
BNAM, JTREE, RPAGE
MOVEIT
OVFLO
PEELPG
TRNSLT

Data Set: JOSHUA data file
Communication Data Set (CDS)

JOSHUA DPSTM-500	Title	Module: NTERPRET	Vol.	Page
			IX	E.1.474
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			1	6/73

Program Logic:

- The number of qualifiers in A3 is determined by locating the delimiting qualifier, hexadecimal 55's.
- The template for the record type being created or modified is located by means of a read (functional request 2) request to BNAM. The template is sought first in the output data set and then according to the default search sequence. The qualifiers defined in A3 are prefixed by the qualifier 'TEMPLATE'. If the initial qualifier in A3 was of the form of a job or user data set, that qualifier is eliminated for the search. The node corresponding to BNAM's COMTEM(8) must be set to hexadecimal 4's.
- The template record is read and used to strip the data from formatted pages (in subroutine PEELPG) which are retrieved from the communication data set to create the output data record. Processing continues until the template is satisfied. When an end-of-file situation exists on the CDS, A4 is loaded with blanks.
- When the last physical record of data has been written (output is performed by subroutine OVFL0) a final call is made to OVFL0 to assure the proper record length is cataloged.
- When a lownam is not in process, the name of the record written is placed in A2, A8 set to indicate the number of qualifiers, and A10(3) set to zero.

Terminating Conditions:

The following errors result in calls to \$TERR:

- Failure to locate a template.
- Invalid data in the template record.
- Failure in BNAM write of the data record.

Language:

FORTRAN IV

Author:

R. C. Haywood - J. E. Suich

Supplement A:

Supplement A (contd):

JOSHUA

DPSTM-500

Title

Module: NTERPRET
Subroutine: INVER

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E.1.478

Rev.

1

Date

6/73

Purpose:

To convert an EBCDIC display of data to the prescribed internal format.

Usage:

CALL INVER(FMT, VAR, OUT, DATA)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
FMT	Logical*1	Two-byte template format code.
VAR	Logical*1	Two-byte template variable description.
OUT	Logical*1	Receives the converted data.
DATA	Logical*1	EBCDIC display.

Subprograms:

BCDFIX
BCDFLT
MOVEIT
TRNSLT

Program Logic:

- The conversion is based on the format code FMT; the length of the converted data is defined by the second byte of VAR.
- Hexadecimal - Converted data is justified right in OUT; when necessary DATA is truncated from the left. Valid EBCDIC characters appearing in DATA are all numerics and the alphabetic characters A through F; invalid characters are considered as EBCDIC zeros. One hundred eighty-three is subtracted from alphabetic representations, two hundred forty is subtracted from numeric representations. Grouping by sets of twos from the right, the high-order remainder is multiplied by sixteen and added to the low-order remainder to complete the conversion.
- Alphameric - No conversion is made. Truncation of DATA takes place on the right; OUT is justified left and, when necessary, filled out with blanks.
- Fixed-point - Any uncleared format descriptors are set to blanks. The data to be converted, the first group of nonblank characters in DATA, is passed to BCDFIX for conversion and the result moved to OUT.
- Floating-point - DATA is scanned for the first occurrence of the character E; all other occurrences of E and all occurrences of F are replaced by blanks. BCDFLT is called to convert the data and the result placed in OUT.

Language:

FORTRAN IV

Author:

R. C. Haywood

JOSHUA DPSTM-500	Title Module: NTERPRET Subroutine: OVFL0	Vol. IX	Page E.1.484
		Rev. 1	Date 6/73

Purpose: To write out new or modified named data records.

Usage: CALL OVFL0(CCB, SRCH, NAMES, MAXIN, INPUT, INSIZ)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
CCB	Real*8	Communication Control Block.
SRCH	Real*8	Qualifiers for the named data record to be written.
NAMES	Integer*4	Number of qualifiers in SRCH.
MAXIN	Integer*4	The number of bytes to be cataloged for the output record.
INPUT	Logical*1	Data to be written.
INSIZ	Integer*4	Physical record length of the data file.

Subprograms:

\$TERR
BNAM
JTREE

Data Sets:

JOSHUA data file

Program Logic:

The subroutine is entered under two distinct conditions:

MAXIN = 0 - When this condition exists, a BNAM write is issued using the record length maintained locally by the subroutine, the local variables reinitialized, and a BNAM close issued.

MAXIN $\neq$ 0 - When the initial or opening call is indicated, a BNAM write is issued using a length of zero in order to obtain the length of an existing record if there be one. Then, and for all succeeding calls until MAXIN = 0, the new length is checked against the old length. When the new length is greater, a BNAM write is issued using the new length. The data is written to the appropriate physical record relative to the base record number returned by BNAM. When a BNAM call indicates a change in the base number, any previously written physical records are relocated.

Language:

FORTRAN IV

Author:

R. C. Haywood

JOSHUA

DPSTM-500

Title

Module: NTERPRET
Subroutine: PEELPG

Vol.

IX

Page

E.1.487

Rev.

1

Date

6/73

Purpose:

To locate the start position of the next variable on a page-type and convert the data to the designated internal format.

Usage:

CALL PEELPG(TM, TMPTR, PAG, PAGPTR, DATA, TYPE, PAGESIZ)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
TM	Logical*1	Page-type template segment.
TMPTR	Integer*2	Index for TM.
PAG	Logical*1	Formatted page.
PAGPTR	Integer*2	Index to PAG.
DATA	Logical*1	Receives the converted data.
TYPE	Logical*1	A two-byte field defining the type (first byte) and length (second byte) of the converted data.
PAGESIZ	Integer*2	Defines the limit of PAG.

Subprogram:

INVER

Program Logic:

TM is examined until a data field location in PAG is determined or PAG is exhausted. The first data field encountered is converted; the next data field or index field or the end of the page results in a return to the calling routine.

Language:

FORTRAN IV

Author:

J. E. Suich

JOSHUA

DPSTM-500

Title

Module: PRECOP

Vol.

IX

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E.1.489

Rev. 1

Date
6/73

Purpose:

In the batch, to serve as an interface between a module requesting the copying of JOSHUA records and the system module COPY.

Attribute:

Nonreusable

Entry:

PRECOP

Arguments:

General purpose register one should point to the following list of addresses.

1. Either the true CCB or the user's local CCB (\$JCB).
2. A fullword containing the number of qualifiers in the input namestring.
3. A set of contiguous doublewords each containing a qualifier for the input namestring.
4. A fullword containing the number of qualifiers in the output namestring.
5. A set of contiguous doublewords each containing a qualifier for the output namestring.

Program Logic:

- The parameter address list to COPY is constructed.
- The designated number of doublewords of input and output record name qualifiers are transferred to WCBARG1 and WCBARG2, respectively. No more than fifteen qualifiers will be placed in either array; if more are specified, a four is placed in register 15 and execution terminated. The doublewords in WCBARG1 and WCBARG2 following the last qualifier in each is filled with hexadecimal 55's.
- The number of qualifiers in the input namestring is placed in WXTNTGR.
- IBCOM initialization is performed.
- A link to LIST is effected.
- Execution is terminated without clearing register 15.

Language:

O/S 360 Assembler

Author:

R. C. Haywood

Remarks:

The following members are copied from JOS.COPYLIB:

SAVER
MCB
MCB\$CB
MCBWCB
WCBWXT

JOSHUA

DPSTM-500

Title

Module: PROC

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E.1.491

Rev.

1

Date

6/73

Purpose:

In the EP function, to control the sequence of operations as define in a procedure record.

Attribute:

Nonreusable

JOS Main Program:

MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
CCB	Real*8	CCB.
NAME1	Real*8	WCBARGS1 - The data for the first name line of the function frame is returned.
NAME2	Real*8	WCBARGS2 - The data for the second name line of the function frame is returned.
PROCNM	Real*8	WXTpname - defines the variable qualifiers for the procedure record SYSTEM.PROC.?.?.
FUNCTN	Real*8	WCBFNM - the function to be executed, as defined by the procedure record, is returned.
FLAG	Integer*4	WXTpFLAG - a zero return indicates procedure has been completed; a two indicates it is incomplete.
PSTPNO	Integer*4	WXTpSTEP - Initially zero, it is set to indicate the latest procedure step.

Subprograms:

Control Section

Entry Points

\$TERR
IPUT
JSREAD
LINK
MOVEIT
SHIFTB
SHIFTN
XLOC
ZCOMP

\$TERR
IPUT, JPUT
JSREAD
BNAM, JTREE
MOVEIT
SHIFTB
SHIFTN
XLOC
ZCOMP

Data Sets:

JOSHUA date file specified for procedure record
JOSHUA standard data file 'SAVEDATA' for the record
SAVEDATA.\$BADGE

JOSHUA DPSTM-500	Title Module: PROC	Vol. IX	Page E.1.492
		Rev. 1	Date 6/73

Program Logic:

- The procedure record is read. If any control values are out of range, \$TERR is called.
- '\$JOB' is established as a variable name in addition to any defined by the procedure record.
- On the first step, the actual job name is placed as an additional value to be used for each of the nine possible iterations of a loop.
- On all but the first step, a set of saved control values is read.
- If the data indicates all steps have been executed, FLAG is set to zero, the values for the function frame initialized, and execution terminated.
- If the step to be executed is the first step of a loop, a record defined in some procedure step is read to acquire the repeat factor which will be compared to the iteration count before commencing with any iteration of the loop. The repeat factor may not exceed nine.
- When in a loop and the previous step was a two name function and this step is not a repeat of step one, any variable values from NAME1 are used to update the list of established variable values.
- Values to replace the variable qualifiers in the current name, which is initially set up as NAME2, are obtained from the specified record. At the same time, NAME1 is being established with fixed qualifiers the same as NAME2, but with the variable values coming from the list of already established values. The blanks are packed out of NAME1 and NAME2 and the vectors padded with periods. When the function to be executed is a one-name function NAME1 is replaced by NAME2 and NAME2 filled with periods.
- FUNCTN is set as defined and an indicator set to indicate for next time whether the function is a one- or two-name function. If the FUNCTN is SK execution continues immediately with the next step.
- The set of control variables necessary for the succeeding execution is written.
- FLAG is set to two and execution terminated.

Terminating Conditions:

1. BNAM errors.
2. Any conditions which would cause an overflow of an array.

Language:

FORTRAN IV

Author:

J. C. Jensen

JOSHUA DPSTM-500	Title Module: PROC	Vol. IX	Page E.1.494
		Rev. 1	Date 6/73

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JOSHUA

DPSTM-500

Title

Module: RENAME

Vol.

IX

Page

E.1.495

Rev.

1

Date

6/73

Purpose: To change a qualifier in a namestring.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
CCB	Real*8	CCB.
S	Real*8	WCBARG1 - the fully or partially qualified name the last qualifier of which is to be replaced.
SX	Real*8	WCBARG2 - the new qualifier.
NSEND	Real*8	WXTNTGR - the number of qualifiers in S.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
\$TERR	\$TERR
LINK	BNAM

Program Logic:

- The namestring S is examined for the presence of the qualifier '<D>' any of which are replaced by the 'deleted' indicator, hexadecimal 55's.
- The qualifier in SX is added to the end of S.
- A rename (functional request 10) is issued to BNAM using the modified S.
- A close (functional request 4) is issued to BNAM.

Terminating Conditions:

Absence of at least one qualifier each in either S or SX or the occurrence of a BNAM error results in a call to \$TERR.

Language:

FORTTRAN IV

Author:

J. C. Jensen

JOSHUA DPSTM-500	Title Module: RMEND	Vol. IX	Page E.1.497
		Rev. 1	Date 6/73

Purpose: To write the record REACTOR.?.?GEOMETRY.HEX.MESH.? with data as specified by the facemap.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	
A1	Real*8	CCB.
A2	Integer*2	Starting a WCBARG1, the contiguous area defined by WCBARG1 and WCBARG2. It is used for the communication of data as described in module RMSTART.
A4	Logical*1	The area addressed by MCBUFFG - the display buffer.
A13	Integer*2	A13 is equated with the start of WXTWORK3. The actual area used is the contiguous block starting twenty-eight bytes before WXTWORK3 in WXTWORK2 and including all of WXTWORK3 and WXTWORK4. It is used to communicate the coded assembly symbols.
A15	Integer*4	MCBCFCT

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
\$TERR	\$TERR
FMPACK	FMPACK
FMUNPK	FMUNPK
IPUT	IPUT, JPUT
LCDINT	\$CDINT
LINK	BNAM, JTREE
MOVEIT	MOVEIT
XLOC	XLOC
XYHEX	XYHEX

Program Logic: The list of assembly symbols is scanned to determine all assembly symbols listed. Each symbol listed is given an index corresponding to its position in the menu. All symbols not listed in the menu are given an index of zero.

From the reactor type, the number of patches and the radius of the tank are determined.

JOSHUA DPSTM-500	Title Module: RMEND	Vol. IX	Page E.1.498
		Rev. 1	Date 6/73

A sweep is made, patch by patch, over all hexes in the reactor. The X-Y coordinates of the hex are obtained and checks are made to determine if the hex is inside the reactor boundary. Hexes inside the reactor are given the appropriate packed assembly symbol. Hexes outside the reactor are given either the symbol of the moderator or the symbol of the reflector, depending on whether or not they are inside or outside the reactor tank.

If, during the sweep, a hex is found with the symbol "?" or with a symbol not in the menu, the CRT buffer is set up for another display to correct the error. The window portion is set to display the patch containing the error, other options (END and Symmetry) are reset to their initial value, thirty-two subtracted from A15, and a return issued.

If no errors are found the geometry record is written. A call to BNAM locates a position in the user data set for the record. The reactor type, the symmetry option, and the number of points are transferred to the buffer. Then a sweep is made, in GAUGE patch/hex order, over all the hexes in the reactor. For each point the X and Y coordinates are determined. If the point does not fall within the sectors specified by the symmetry option, it is ignored. Otherwise, the assembly symbol is unpacked to its 2-byte form and 'MO' and 'RE' are supplied for moderator and reflector types. Then the X-coordinate, Y-coordinate, and assembly type are transferred to the buffer. The number of entries in the assembly symbol list and the menu itself are then transferred to the buffer. Whenever the buffer is full, the buffering routine writes it on the disk through JTREE. A final call to IPUT assures transfer of any partially filled buffer. A BNAM close is issued to update the tree pages.

Language:

FORTRAN IV

Author:

J. E. Suich

JOSHUA DPSTM-500	Title Module: RMEND	Vol. IX	Page E.1.500
		Rev. 1	Date 6/73

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JOSHUA

DPSTM-500

Title

Module: RMSTART

Vol.

IX

Page

E.1.501

Rev. 1

Date
6/73

Purpose: In the RM function, to initialize the data arrays.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
A1	Real*8	CCB.
A2	Real*8	WCBARG1 - contains on input the name of the input geometry record.
A3	Real*8	WCBARG2 - may contain the name of the output geometry record.
		A2 is also considered as the total contiguous area defined by WCBARG1 and WCBARG2 and is used for communication between subfunctions of the following data:
	<u>Byte</u>	<u>Data</u>
	1-8	First variable qualifier of the output record name.
	9-16	Second variable qualifier of the output record name.
	17-18	Reactor type.
	19-20	X-coordinate of origin.
	21-22	Y-coordinate of origin.
	23-24	Window type.
	25-26	Symmetry type.
	27-28	Character to be replaced.
	29-30	Substitute character.
	31-32	Number of defined assembly symbols.
	33-272	Area for up to forty assembly symbols divided into six halfword nodes each composed of a two-byte assembly symbol and a four-byte description.
	273-280	Not used
	281-288	Third variable qualifier of the output record name.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
\$TERR	\$TERR
FMINIT	FMINIT
FMPACK	FMPACK
RMREAD*	RMREAD
HEXXY	HEXXY
LINK	BNAM, JTREE
MOVEIT	MOVEIT
XYHEX	XYHEX

Program Logic:

- The input record is assured of being of the form REACTOR.?.?.GEOMETRY.HEX.MESH.? with or without a preceding data set designation.
- When an output record is specified, it is checked for proper form; when it is not, the name of the input record is assumed for output also. The variable qualifiers of the output record name are saved in the designated locations in A2.
- The default specifications for the display are established in A2 and A13; A4 is blanked.
- A BNAM read is issued to attempt to locate the input record. When successful, RMREAD is called to replace the default specifications in accordance with the data in the input record. When the record does not exist and a specific data set was designated as the source of the record, \$TERR is called.

Terminating Conditions:

- Invalid record name.
- Failure to locate a record in an explicitly designated data set.

Language:

FORTRAN IV

Author:

R. C. Haywood - J. E. Suich

JOSHUA DPSTM-500	Title Module: RMSTART Subroutine: RMREAD	Vol. IX	Page E.1.504
		Rev. 1	Date 6/77

Purpose: To read the geometry record and establish the facemap (X,Y) coordinates.

Usage: CALL RMEAD(JDS, JREC, TYPE, MAP, MENU, NMEN)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
JDS	Integer*4	The reference number (FT number) of the data set on which the specified geometry record resides.
JREC	Integer*4	The relative record number on the data set at which the specified geometry record begins.
TYPE	Integer*2	Returns the reactor type.
MAP	Logical*1	Array of twenty-eight rows and thirty-one columns to be loaded with coded assembly symbols.
MENU	Integer*2	Array to be loaded with up to forty six-byte nodes each consisting of a two-byte assembly symbol and a four-byte mnemonic.
NMEN	Integer*2	The number of defined nodes in MENU.

Subprograms:

FMPACK
JTREE
MOVEIT

Program Logic:

- The geometry record is read.
- The reactor type is checked and, if valid, loaded into TYPE.
- The symmetry option is checked.
- The assembly symbols are coded and loaded into the positions in MAP specified by their associated X and Y coordinate values. Depending on the symmetry type of the record, the coded assembly symbols are also stored in appropriate rotations of the original coordinates.
- The list of assembly symbols and mnemonics is loaded into MENU

Language: FORTRAN IV

Author: J. E. Suich

JOSHUA DPSTM-500	Title Module: RMSTART Subroutine: RMREAD	Vol.	Page
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JOSHUA

DPSTM-500

Title

Module: SETJOB

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Rev.

1

Date

6/73

Purpose:

To set a requested jobname, if properly formed, into the CCB thus establishing the active job, and, if the job data set already exists, to assure the proper catalog is in core.

Attribute:

Nonreusable

JOS Main Program:

SETJOB

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
CCB	Real*8	Communication Control Block.
S	Real*8	WCBARG1 - The first doubleword specifies the requested job name.
TBUF	Real*8	Area pointed to by MCBBUFG - results of a successful execution returned here.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
\$TERR	\$TERR
LINK	BNAM, WPAGE
MOVEIT	MOVEIT

Data Sets:

Communication data set (CDS) - thru WPAGE.

Program Logic:

- The jobname is checked for valid form (i.e. AXXXXNNN where A is an alphabetic character, X an alphabetic or numeric character, and N a numeric character) and \$TERR called to terminate the function if the test is failed.
- The jobname is placed in CCB.
- Functional request seven is made to BNAM using A2.
- A message reflecting the status of the job data set is placed in TBUF. In the batch, WPAGE is called to write TBUF to the CDS.

Terminating Conditions:

Invalid job name.

Language:

FORTRAN IV

Author:

R. C. Haywood

JOSHUA

DPSTM-500

Title

Module: SETJOB

Vol. IX

Page E.1.508

Rev. 1

Date 6/73

JOSHUA

DPSTM-500

Title Module: SUPSCRTH

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Rev. 1	Date 6/73

Purpose: To scratch all scratch data sets not in use.

Attribute: Nonreusable

JOS Main Program Name: SUPSCRTH

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
CCB	D	Communication Control Block

External References: OPEN, READ, CHECK, CLOSE, ENQ, DEQ, LINK, SCRATCH

Data Sets: Catalog Data Set

Program Logic: The address of the CCB is received via the argument list. The JOSHUA data set name catalog is opened via the OPEN macro. Each record is read by issuing a READ macro and each name (98 names per record) in each record is checked to see if it is a scratch data set name (indicated by ** as first two characters of name). On encountering a scratch data set name an ENQ is issued to see if it is in use. If the ENQ is successful, the name is deq'd on and a LINK to SCRATCH is issued to scratch the particular name. If the ENQ was unsuccessful, the next name is checked. After going through all records a CLOSE is issued on the data set and a return is issued.

EQN Name: JOSYSTEM (Scratch data set name)

Referenced By: JTSNOPEN

Language: Assembler

Author: W. H. Brotherton, Jr.

JOSHUA DPSTM-500	Title Module: SUPSCRTH	Vol. IX	Page E.1.512
		Rev. 1	Date 6/73

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JOSHUA

DPSTM-500

Title Module: SYSMMSG

Vol. IX	Page E.1.513
Rev. 1	Date 6/73

Purpose: To format the record 'SYSTEM'.'USER'.'MESSAGE' in the terminal buffer.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
CCB	Real*8	CCB.
TBUF	Real*8	Area addressed by MCBBUFFG - the terminal buffer.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
LINK	BNAM, JTREE
MOVEIT	MOVEIT

Data Sets:

JOSHUA standard data set 'SYSTEM'

Program Logic:

- A read (functional request 2) is issued to BNAM to retrieve the record 'SYSTEM'.'USER'.'MESSAGE' from the data set 'SYSTEM'.
- When the record is located, two physical records are read using JTREE and the first six hundred forty bytes loaded into lines two thru eleven of A4.

Language: FORTRAN IV

Author: J. C. Jensen

JOSHUA

DPSTM-500

Title

Module: TDISPLAY

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E.1.515

Rev.

1

Date

6/73

Purpose: To create a display of a template record.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
A1	Real*8	CCB.
A2	Real*8	WCBARG1 - specifies the template record for which a display is desired.
A3	Real*8	WCBARG2 - specifies an output record name. When no qualifiers are present on input, the qualifiers in the input record, following the qualifier 'TEMPLATE' are loaded into this area.
A4	Real*8	Area pointed to by MCBUFFG. Used as CDS buffer as well as the terminal buffer.
A5	Integer*2	WCBFNM - specifies current function.
A7	Integer*4	WXTDSRF6 - provides the factor for determining a starting record on FT77FO01.
A8	Integer*4	WXTNTGR - number of qualifiers in A2.
A13	Integer*2	WXTWORK3. A13(136) returns the calculated starting record number for FT77FO01. When in the 'MT' function, the following initializations are made: A13(134) = 0 A13(125) = 64 A13(126) = 10

Subprograms:

Control Section

\$TERR
CRPAGE*
CTYPE*
FLDPIX*
LCDINT
LINK
MOVEIT
RHAR
SHIFTB
XLIST
ZCOMP

Entry Points

\$TERR
CRPAGE
CTYPE
FLDPIX
\$CDINT
BNAM, JTREE, WPAGE
MOVEIT
CHAR, RHAR
SHIFTB
XLIST
ZCOMP

JOSHUA DPSTM-500	Title Module: TDISPLAY	Vol. IX	Page E.1.516
		Rev. 1	Date 6/73

Data Sets:

JOSHUA Data File
 Communication Data Set (CDS)
 FT77F001

Program Logic:

- The contents of A2 are copied to a local area where the qualifier 'TEMPLATE' is prefixed to the value before issuing a BNAM read (functional request 2).
- If A3 does not specify an output record name, the name of the record read, less the qualifiers thru the first occurrence of 'TEMPLATE', are loaded into A3.
- Each nest is associated with a page type. For each page type, the total portion of the template associated with the page type is read into core and the format data passed to CRPAGE for creation of a displayable image. Each page is written to FT77F001.
- Except when in a CD function, the list page is recreated first by passing the I/O list from the template to XLIST to be analyzed and then, as each page type is developed, the variable typings for each page type are passed to CTYPE where those mnemonics whose typings do not match FORTRAN default typing are singled out and loaded into A4 along with their explicit type information. When complete, the list page is written to the CDS.
- The records on FT77F001 are copied to the CDS.
- In the MT function, in addition to certain initializations, the list display is left in the buffer with cursor placement at the bottom of the page.

Terminating Conditions:

- Failure to locate the template record results in termination through \$TERR.
- Various checks are made of known template limits in order to recognize invalid template records. Failure to meet these tests results in termination through \$TERR.
- Insufficient space to contain all that portion of a template pertaining to any nest - through \$TERR.

Comments:

In the case of a CD function, the standard practice of establishing the root qualifier of A2 as a data set override when the initial BNAM call fails is suspended. In such a case, termination will result though a call to \$TERR.

Language:

FORTRAN IV

Author:

R. C. Haywood - J. E. Suich

JOSHUA DPSTM-500	Title Module: TDISPLAY Subroutine: CRPAGE	Vol. IX	Page E.1.518
		Rev. 1	Date 6/73

Purpose: To recreate a template page type for display.

Usage: CALL CRPAGE(IN, INPTR, OUT, OUTPTR, OUTSIZ)

Arguments:

<u>Parameter</u>	<u>Usage</u>	<u>Description</u>
IN	Logical*1	Array containing coded page format.
INPTR	Integer*2	Index for IN, already set upon entry and incremented as IN is examined.
OUT	Logical*1	Array returning page image.
OUTPTR	Integer*2	Index for OUT, already set upon entry and incremented as OUT is loaded.
OUTSIZ	Integer*4	Maximum size of OUT (in bytes).

Subprograms Used: FLDPIX

Program Logic:

IN is examined on a byte-by-byte basis.

If the value of the byte being examined is greater than 63 and less than 250 it is moved to the output area and examination continued with the next byte.

If the value is less than 64 and greater than 0 the value of the next byte is propagated in the output area a number of times equal to two plus the value in the first byte.

If the value in the first byte is greater than 249 it represents a variable data field and FLDPIX is called to interpret it and recreate its field. Coding for a variable data field requires two bytes.

If the value of the byte is 0, a repeat indicator has been encountered. A double colon is placed in the output area and a RETURN statement executed.

If at any point the number of bytes of output generated exceeds OUTSIZ execution terminates and control returns to the calling routine.

Language: FORTRAN IV

Author: J. E. Suich

2

JOSHUA DPSTM-500	Title Module: TDISPLAY Subroutine: CTYPE	Vol. IX	Page E.1.520
		Rev. 1	Date 6/73

Purpose: To list variable typings as defined in a template record.

Usage: CALL CTYPE(START,END,LIST,BUFFER,BUFPOS,NTMPLT)

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
START	Integer*2	Byte location in LIST of the start of the variable's mnemonic.
END	Integer*2	Byte location in LIST of the end of the variable's mnemonic.
LIST	Logical*1	Contains mnemonic of variable whose typing is being investigated.
BUFFER	Logical*1	Returns variable type, length and mnemonic if other than FORTRAN predefined specification.
BUFPOS	Integer*2	Index to BUFFER.
NTMPLT	Integer*2	Specifies variable type and length in template form (e.g. Real*4= X'D904').

Subprograms Used: \$CDINT

Program Logic: The variable's predefine specification type is compared to the template typing. If they do not match NTMPLT is decoded by placing the high-order byte in BUFFER followed by an '*', the EBCDIC conversion of the low-order byte of NTMPLT, and the variable's mnemonic from LIST.

Language: FORTRAN IV

Author: R. C. Haywood

JOSHUA DPSTM-500	Title Module: TDISPLAY Subroutine: FLDPIX	Vol. IX	Page E.1.522
		Rev. 1	Date 6/73

Purpose: To recreate a template variable field format for display.

Usage: CALL FLDPIX(FMT,OUT)

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
FMT	Logical*1	Two byte field containing a coded variable type field.
OUT	Logical*1	Array returns the decoded and recreated variable data field.

Objective: To decide a template variable type field and recreate it in an output field.

Program Logic: The variable type is in the first byte of FMT and contains a fixed point value from 250 through 255 to represent an index field and FORTRAN format types Z,A,I,E, and F, respectively. The second byte of FMT describes the field. In Z, A, and I types it represents the field width. In other types, the field width is represented by the low-order four bits only; the binary value of the high-order four bits represents the index level or the number of decimal positions.

The actual number of bytes used in OUT is one greater than width due to the prefixing of a colon. Thus a format code X'FF37' is recreated as ':FFF.FFF'.

Language: FORTRAN IV

Author: J. E. Suich

JOSHUA DPSTM-500	Title Module: TDISPLAY Subroutine: FLDPIX	Vol. IX	Page E.1.524
		Rev. 1	Date 6/73

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JOSHUA

DPSTM-500

Title

Module: TEMPEXIT

Vol.

IX

Page

E.1.525

Rev.

1

Date

6/73

Purpose:

In the CT and MT functions, to assemble and write out a template record.

Attribute:

Nonreusable

JOS Main Program:

MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
A1	Real*8	CCB.
A3	Real*8	WCBARG2 - the name of the template record being created.
A13	Integer*2	WXTWORK3 - referenced as follows: A13(1)-A13(124) - template I/O list. A13(127) - number of halfwords of coded page types. A13(129) - number of nests (and therefore page types). A13(130) - number of loops. A13(135) - number of records on FT77F001 containing a coded page types, starting with the base record plus one. A13(136) - the base record on FT77F001. A13(139)-A13(152) - for each loop in the I/O list, a node here defines the byte at which that loop begins, including a pseudo-loop-start marking the end of the list. Thus A13 (A13(139)+A13(130)) defines the number of bytes in the list.

Subprograms:

Control Section

\$TERR
LINK

Entry Point

\$TERR
BNAM, JTREE

Data Sets:

1. JOSHUA data file
2. FT77F001

JOSHUA DPSTM-500	Title Module: TEMPEXIT	Vol. IX	Page E.1.526
		Rev. 1	Date 6/73

Program Logic:

- A write (functional request 3) is issued to BNAM with the name of the template record and its calculated length in order to assure space and establish a starting record. Before the name, as defined in A3, can be submitted, it must have the first qualifier removed if that qualifier is the name of the 'write' data set, and it must be prefixed by the qualifier 'TEMPLATE'. A BNAM error results in a call to \$TERR.
- The template record is assembled from the portions contained in A13 and on FT77FO01 and written to the JOSHUA data file.
- A close (functional request 4) is issued to BNAM.

Language:

FORTRAN IV

Author:

R. C. Haywood - J. E. Suich

JOSHUA DPSTM-500	Title Module: TEMPEXIT	Vol. IX	Page E.I. 528
		Rev. 1	Date 6/73

(Blank)

Purpose:

In the CT function, to perform required initializations and provide a display for entry of the I/O list.

Attribute:

Nonreusable

JOS Main Program:

MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	
A1	Real*8	CCB.
A2	Real*8	WCBARG1 - defines the record type for which a template is to be created.
A3	Real*8	WCBARG2 - the contents of A2 are copied here.
A4	Integer*4	Area addressed by MCBBUGFG - the terminal buffer.
A7	Integer*4	WXTDSRF6 - used in the algorithm for establishing a base record in FT77FO01.
A8	Integer*4	WXTNTGR - the number of qualifiers in A2.
A13	Integer*2	WXTWORK3 - portions of this area are initialized.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
\$TERR	\$TERR
LINK	BNAM
MOVEIT	MOVEIT
SHIFTB	SHIFTB

Program Logic:

- A write (functional request 3) is issued to BNAM using the contents of A2, prefixed by the qualifier 'TEMPLATE' and with a record length of zero, in order to assure that the record name is valid. \$TERR is called if an error is encountered.
- The contents of A2 are transferred to A3 and the end of the name in A3 marked with the system namestring delimiter.
- A4 is formatted to facilitate entry of the list and variable typing data. The area for entry of information by the user is defined with question marks and instructions are loaded into the remaining area. SHIFTB loads the record name into the start of A4.
- Portions of A13 are initialized. This includes:

JOSHUA DPSTM-500	Title	Module: TEMPINIT	Vol.	Page
			IX	E.I.530
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A13(125) - 64
A13(126) - 10
A13(134) - 0
A13(136) - A7*10

Language:

FORTRAN IV

Author:

R. C. Haywood - J. E. Suich

JOSHUA DPSTM-500	Title Module: TEMPINIT	Vol. IX	Page E.1.532
		Rev. 1	Date 6/73

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JOSHUA

DPSTM-500

Title Module: TEMPLIST

Vol. IX Page E.1.533

Rev. 1 Date 6/73

Purpose: To analyze a template I/O list into sets of nested DO-loops, determining the number of nests, the number of loops in each nest, the number and type of the variables in each loop, and the limits to each loop.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
A1	Real*8	CCB.
A4	Real*8	Area pointed to by MCBBUFFG. Contains the I/O list and any explicit variable typings.
A10	Integer*2	WXTWORK1 and WXTWORK2 used as follows: A10(1)-A10(72) divided into sets of six halfwords each to contain the following information for each loop: 1. number of variables; 2. loop lower limit; 3. loop upper limit; 4-6. for later use. A10(73)-A10(92) - the type and length specification for each variable in the list.
A13	Integer*2	WXTWORK3 used as follows: A13(1)-A13(124) - saves the I/O list. A13(125) - considering A4 to be series of 80-byte lines the number of characters to be considered in each line. A13(129) - the number of nests. A13(130) - the number of loops. A13(131) - the number of variables. A13(134) - set to zero.
A		A13(136) - base record number on FT77F001. A13(139)-A13(151) - loop start positions. A13(152)-A13(156) - number of loops in each nest. A13(161) - set to zero.
A15	Integer*4	MCBCFCT.

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			IX	E.1.534
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			1	6/73

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
MOVEIT	MOVEIT
STRIP*	STRIP
XLIMIT*	XLIMIT
XLIST	XLIST
ZCOMP	ZCOMP

Program Logic:

- The I/O list with blanks and question marks packed out, is passed to XLIST to be analyzed into nests, loops, and variables.
- The I/O list as returned from XLIST is loaded into A13.
- The loop limits are analyzed by XLIMIT.
- Typing instructions are packed and passed along with the list to XLIST where all variables in the list are typed. Standard FORTRAN default typing is assigned any variable for which no explicit typing is given.
- Required initializations for subsequent subfunctions is performed.
- If a syntax error is encountered, a diagnostic message is set in the last 80 positions of A4 and the display returned for correction.

Language:

FORTRAN IV

Author:

R. C. Haywood - J. E. Suich

JOSHUA DPSTM-500	Title Module: TEMPLIST Subroutine: STRIP	Vol. IX	Page E.1.536
		Rev. 1	Date 6/73

Purpose: To pack a data string by eliminating blanks and question marks.

Usage: CALL STRIP(CD, NCMAX, MAXCAR)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
CD	Logical*1	The data string from which the blanks and question marks are to be packed out.
NCMAX	Integer*4	The number of characters in each line to be considered when handling CD as a series of 80 byte lines.
MAXCAR	Integer*4	The overall length of CD on input; the length of the packed string on return.

Program Logic:

- Each character in the string is examined and any character not a blank or a question mark is shifted so as to complete a contiguous string of characters none of which is a blank or a question mark. The length of that string is loaded into MAXCAR.

Language: FORTRAN IV

Author: R. C. Haywood

Purpose:

To define for a template the limits of loops in the I/O list.

Usage:

CALL XLIMIT(LIMIT, EOL, NLOC, NLOX, MAXCAR, NESTS, NVMAX, NERR, LOOPS, FLAG, CD)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
LIMIT	Integer*2	Six contiguous nodes per loop. The second and third node in each set return the lower and upper limits, respectively, of the associated loop as defined for a template.
EOL	Integer*2	The location in CD of the end of each loop.
NLOC	Integer*2	The starting location in CD of each variable.
NLOX	Integer*2	The ending location in CD of each variable.
MAXCAR	Integer*2	The length of the I/O list.
NESTS	Integer*2	The number of nests.
NVMAX	Integer*2	The number of variables.
NERR	Integer*2	Location in the list of a syntax error.
LOOPS	Integer*2	The number of loops in each nest.
FLAG	Integer*2	Indicates an error when FLAG = 1.
CD	Logical*1	The I/O list.

Program Logic:

- Loops to which there is not explicit indexing (do not end on an equal sign) have their limits set to one.
- In loops with explicit indexing, the lower limit is recognized as being bounded by an equal sign and a comma; the upper limit by a comma and a right parenthesis.
- Explicit limits are examined to determine if they are constant, a previously defined variable, or an index in an outer loop of the same nest. Being any of these, LIMIT is loaded with the appropriate code.
- Invalid syntax results in FLAG and NERR being set as indicated above.

Language:

FORTTRAN IV

Author:

J. E. Suich

JOSHUA DPSTM-500	Title Module: TEMPLIST Subroutine: XTYPE	Vol. IX	Page E.1.540
		Rev. 1	Date 6/73

Purpose: To define the type and length of template variables.

Usage: CALL XTYPE(NLOC, NLOX, TYPE, LIST, MAXCAR, NVMAX, NERR,
FLAG, CD)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
NLOC	Integer*2	The starting location in LIST of each variable.
NLOX	Integer*2	The ending location in LIST of each variable.
TYPE	Integer*2	Returns the type and length code for each variable.
LIST	Logical*1	I/O list.
MAXCAR	Integer*2	Length of LIST.
NVMAX	Integer*2	Number of variables in the list.
NERR	Integer*2	Location of an error.
FLAG	Integer*2	Indicates an error when FLAG = 1
CD	Logical*1	Explicit variable typings.

Subprograms:

ZCOMP

Program Logic:

- Each variable is typed according to the standard FORTRAN IV predefined length and type specifications.
- CD is examined and any explicit typing overrides the predefined value already established in TYPE for the variables indicated. Valid types are:
 - I*2 and I*4 for integer values;
 - R*4 and R*8 for real values;
 - C*N, where $0 < N < 64$ for variable length strings.
- Invalid syntax or explicit typing of a variable not in the list results in an error condition.

Language: FORTRAN IV

Author: R. C. Haywood - J. E. Suich

JOSHUA

DPSTM-500

Title

Module: TEMPLIST
Subroutine: XTYPE

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JOSHUA

DPSTM-500

Title

Module: TEMPNEST

Vol.

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Page

E.I.543

Rev.

1

Date

6/73

Purpose:

To provide format instructions and display area guides for preparation of a template page type.

Attribute:

Nonreusable

JOS Main Program:

MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
A1	Real*8	CCB.
A4	Real*8	Area addressed by MCBUFFG - the terminal buffer.
A13	Integer*2	WXTWORK2 - portions referenced by this module: A13(1)-A13(124) - template I/O list. A13(134) - number of the nest for which a page type is to be created. A13(139)-A13(151) - array of loop start positions in the I/O list. A13(152)-A13(156) - array of loop counts for each nest.
A15	Integer*4	MCBCFCT.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
XNSTID	XNSTID

Program Logic:

- A4 is considered in terms of twelve eighty character lines. The first sixty-four positions of lines two thru eleven are loaded with question marks. The remaining sixteen positions of these lines are loaded with formatting instructions. Line twelve is loaded with that portion of the template I/O list relating to the page type to be defined.
- A15 is incremented by sixteen in order to skip a position in the function list.

Language:

FORTTRAN IV

Author:

J. E. Suich

JOSHUA

DPSTM-500

Title

Module: TEMPPAGE

Vol.

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1

Date

6/73

Purpose:

To scan a template page-type display, convert it to a template format, and assemble a page-type segment.

Attribute:

Nonresuable

Main Program:

MAIN

Arguments:

Mnemonic

Type

Description

A1

Real *8

CCB

A4

Logical *1

Area pointed to by MCBBUFFG - the display buffer.

A5

Integer *2

WCBFNM

A10

Integer *2

WXTWORK1 and WXTWORK2 referenced as follows:

A10(1)-A10(72) sets of six nodes for each loop containing?

1. number of variables,
2. lower loop limit;
3. upper loop limit;
4. format start location;
5. page start location;
6. page type (always one).

A10(73)-A10(92) - variable type and length specifications.

A13

Integer *2

WXTWORK3 - referenced as follows:

A13(125) - Considering A4 to be a series of 80-byte lines, the number of bytes to be scanned in each line.

A13(126) - Number of contiguous lines to be scanned.

A13(127) - Total length of coded page-types - in halfwords.

A13(129) - Total number of nests.

A13(130) - Total number of loops.

A13(131) - Total number of variables.

A13(132) - Cumulative number of bytes of coded format.

A13(134) - Nest counter

A13(135) - Counters of records written to FT77R001 starting at A13(136) + 1.

A13(136) - Starting relative record on FT77F001.

A13(152)-A13(156) - The number of loops in each of the two possible nests.

A15

Integer *4

MCBCFCT.

JOSHUA DPSTM-500	Title Module: TEMPPAGE	Vol. IX	Page E.1.546
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Subprograms Used:

<u>Control Section</u>	<u>Entry Point</u>
LINK	JTREE
MOVEIT	MOVEIT
SKIP*	SKIP
XPAGE*	XPAGE
XPTRS*	XPTRS
XTMPLT*	XTMPLT

Data Sets: FT77F001

Program Logic:

- o XPAGE is called to code the display
- o XPTRS is called to set the page and format loop start positions.
- o XTMPLT is called to assemble the format and controls into a page-type segment.
- o The page-type segment is written to FT77001.
- o When finishing the last page-type the total number of halfwords in all the page-type segments is calculated to be passed to the succeeding subfunction.
- o A15 is adjusted for proper continuation.
- o When an error is indicated by XPAGE, XPTRS, or XTMPLT, a diagnostic is placed in the buffer and continuation set for the preceding display.

Language: FORTRAN IV

Author: R. C. Haywood - J. E. Suich

JOSHUA DPSTM-500	Title Module: TEMPPAGE Subroutine: SKIP	Vol. IX	Page E.1.548
		Rev. 1	Date 6/73

Purpose: To record in a two-byte field the number of successive occurrences of a one-byte variable.

Usage: Call SKIP(FMT,I,N,B)

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
FMT	Logical*1	Returns a one- or two-byte coded form of input.
I	Integer*2	Incremented by number of bytes used to code input.
N	Integer*2	The number of occurrences of B.
B	Logical*1	Variable whose occurrences are to be recorded.

Program Logic: If the value of N is 0-2, the value in B is placed in N number of bytes of FMT.

If N is greater than two the value in B is moved to the second byte of FMT and the value N-2 placed in the first byte.

I is incremented by the number of bytes utilized.

Language: Fortran IV

Author: J. E. Suich

Restrictions: To allow proper decoding the value of N should be in the range of 0-65 inclusive.

JOSHUA DPSTM-500	Title Module: TEMPPAGE Subroutine: XPAGE	Vol. IX	Page E.1.550
		Rev. 1	Date 6/73

Purpose: To scan a template page-type display and convert it to a template format.

Usage: Call XPAGE(NCMAX, NLMAX, NSTAR, NERR, FMTL, CD, NDFS)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
NCMAX	Integer *2	Only the first NCMAX positions of each set of eighty positions of CD are of interest.
NLMAX	Integer *2	Number of eighty-byte fields (or lines) in CD.
NSTAR	Integer *2	Index to FMTL.
NERR	Integer *2	Returns the position in CD of any illegal syntax; otherwise set to zero.
FMTL	Logical *1	Returns the template format
CD	Logical *1	Page-type display.
NDFS	Integer *2	Returns the number of variable data fields.

Subprograms: SKIP

Program Logic:

- o Test data is coded and stored in FMTL. All byte configurations are considered text except for colons and any characters following a colon which constitute a data field definition.
- o A colon may indicate a page roll-off, a format repeat, an index data field, or a variable data field.
- 1. A colon at some NCMAX indicates a roll-off request; the colon is stored as text.
- 2. A double colon represents a format repeat with the repeat starting at the beginning of the previous line. A double colon ending a line is adjusted to the start of the next line. Scanning of the page terminates when a format repeat indication is encountered.
- 3. A colon followed by a numeric character 1-7 indicates an index data field. The width of the field is limited to fifteen positions (excluding the colon). Field definitions may not span lines; any continuation is interpreted as text.
- 4. A colon followed by a series of one of the characters in the set A, E, F, I, or Z indicates a variable data field.

E and F type fields must contain a decimal point; the decimal point may not be the initial character. They are also limited to a width of fifteen positions, including the decimal point but excluding the colon. An E field must have at least four positions following the decimal. Field definitions may not span lines; continuation are interpreted as text.

Any other use of a colon is illegal.

Error Conditions:

1. Page starts with a repeat indicator.
2. Illegal use of colon.
3. Floating-point field does not have a decimal point.
4. Width of an index or floating-point field exceeds fifteen positions.
5. Fewer than four decimal positions specified for an E field.

Language:

FORTRAN IV

Author:

R. C. Haywood - J. E. Suich

Remarks:

See Template Interpretation and Structure for explanation of actual template coding.

JOSHUA

DPSTM-500

Title

Module: TEMPPAGE

Subroutine: XPTRS

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Purpose:

For a template page-type, to determine the loop starting locations both in the format and on the page and to set the loop page type.

Usage:

Call XPTRS (LIMIT, NSTAR, LOOPS, FLAG, FMTL, PGESIZ)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
LIMIT	Integer *2	For each loop, a set of six nodes defined as follows: <ol style="list-style-type: none">1. Number of variables in the loop.2. Loop lower limit.3. Loop upper limit.4. Loop format start location.5. Loop page start location.6. Page-type (always one).
NSTAR	Integer *2	Pointer to end of FMTL.
LOOPS	Integer *2	Indicates the number of loops on the page.
FLAG	Integer *2	Returns a completion code: zero for successful completion. One when an error is encountered.
FMTL	Logical *1	Coded page format.
PGESIZ	Integer *2	Size of page-in bytes.

Program Logic:

- o The page type for all loops is one.
- o A loop start is considered to have been encountered when an index or variable data field is encountered after having passed over sufficient variable data fields to accommodate the preceding loops. The format and page start for the first loop is set to one.
- o When a roll-off is indicated the format start is set for the next position and the page start to one. All succeeding page starts are based on the resetting unless a another roll-off is encountered.

Terminating Conditions:

Page or format limits exceeded.

Language:

FORTRAIN IV

Author:

R. C. Haywood - J. E. Suich

JOSHUA

DPSTM-500

Title

Module: TEMPPAGE

Subroutine: XTAMPLT

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1

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6/73

Purpose:

To consolidate the data for a template nest segment.

Usage:

Call XTAMPLT (LIMIT, LOOPS, NSTAR, TSIZE, NTMPLT, FMTL, TYPE, FLAG)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
LIMIT	Integer *2	For each loop, a set of six nodes defined as follows: <ol style="list-style-type: none">1. Number of variables.2. Lower limit.3. Upper limit.4. Format start position.5. Page start position.6. Page type.
LOOPS	Integer *2	Number of loops.
NSTAR	Integer *2	Pointer to the end of FMTL.
TSIZE	Integer *2	Maximum number of halfword allowed for a nest segment.
NTMPLT	Integer *2	Area into which the segment is consolidated.
FMTL	Logical *1	Coded format.
TYPE	Integer *2	For each variable in the nest, a mode supplies the length and type.
FLAG	Integer *2	Completion code - one of an error is encountered, zero.

Program Logic:

The data is consolidated to form a segment as described in Template Interpretation and Structure.

Error Condition:

Space required exceeds space allowed.

Language:

FORTRAN IV

Author:

R. C. Haywood - J. E. Suich

JOSHUA

DPSTM-500

Title

Module: VERIFY

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6/73

Purpose: To determine whether a given user may have access to a data set.

Attribute: Nonreusable

JOS Main Program: MAIN

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
\$MCB	Real*8	CCB.
DSN	Real*8	WCBARG1 - specifies the JOSHUA data set for which access is to be verified.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
\$TERR	\$TERR
MOVEIT	MOVEIT
TRNSLT	TRNSLT

Program Logic:

- The access record is sought. The search is restricted to the subject data set and standard or, for standard data sets, to standard only. When no record is located, access is allowed any user.
- The access record is read and checked to see if it contains the USER number. When it is, a functional request 7 is made to BNAM to assure the correct copy of the JDSCB is in core. Otherwise, \$TERR is called to indicate unsuccessful completion.

Terminating Conditions: ◦ USER number not included in an existing access record.

Language: FORTRAN IV

Author: R. C. Haywood - J. C. Jensen

JOSHUA

DPSTM-500

Title

Module: ZONK1

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Rev. 1

Date
6/73

Purpose: To provide a display of job accounting information based upon the current days completed jobs.

Attribute: Nonreusable

JOS Main Program Name: ZONK1

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
Job name	D	1 to 8 byte character string defining search argument
Badge Number	F	4 alpha numeric digits defining search argument.

External References: EXCP, WPAGE, WAIT

Data Sets: SYS1. ACCTNG1

Objective: The program builds displayable screen images VIA module WPAGE of job accounting information based on one of two arguments

- (a) Full or partial job name
- (b) User Badge number

Program Logic: The address of search argument and a screen buffer is received VIA Register 1. The code searches the nucleus for the Data Control Block and Data Extent Block that define the SYS1. ACCTNG1 data set and builds an Input Output Control Block to allow retrieval of accounting records. The current data is established and a cylinder search using a full track read in initiated. Once the current data is located the search continues until a record containing 8:00 A.M. is located. The code then searches on either job name or user badge number for matching records. On a match, accounting information including job statistics are formatted for display to the requesting user. The search continues until either an end of file or 4:00 P.M. is encountered.

Referenced by: JTMON

Language: Assembler

Author: Leo F. Zimmerman

JOSHUA

DPSTM-500

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1

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1. Introduction

This section will describe the subroutines and functions which compose the JOSHUA Operating System. The subroutine description is followed by a flow chart. If a particular subroutine cannot be found in this section, its description may be found within the module that used it (exclusively uses it) in the Module Section.

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DPSTM-500

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Subroutine: \$\$DP

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1

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PURPOSE : PREPARE AN EDIT PAGE FOR DISPLAY.

USAGE : CALL \$\$DP(\$A,\$S,TX,PAGENO)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
\$A	ANY	A 960 BYTE AREA USED BY THE JOSHUA MONITOR FOR TERMINAL DISPLAYS. DIMENSIONED \$A(80,12).
\$S	I*4	DIMENSIONED AS \$S(8,2) WHERE THE FIRST EIGHT WORDS WILL BE FILL IN WITH THE BEGINNING FILE POSITIONS OF EACH LINE IN THE DISPLAY AND THE LAST EIGHT WORDS WILL BE FILLED WITH THE ENDING FILE POSITIONS OF EACH LINE IN THE DISPLAY.
TX	VARIOUS	80 BYTE AREA HOLDING EDITOR CONTROL FIELDS DESCRIBED BY THE 'TX' DSECT.
PAGENO	I*4	THE NUMBER OF THE PAGE TO BE DISPLAYED.

PROGRAM LOGIC :

- A IF THERE ARE NO ACTIVE PAGES THEN FORCE THE EDITOR'S CONTROL PAGE ROUTINE TO BE RUN NEXT.
- B SAVE PAGENO IN 'LSTRD' (SEE 'TX' DSECT).
- C IF 'LSTRD' IS OUT OF RANGE OF THE ACTIVE PAGES THEN FORCE IT TO THE NEAREST ACTIVE PAGE NUMBR.
- D READ DATA FROM THE USER'S WORK SPACE.
- E SAVE FILE POSITIONS IN \$S.
- F SETUP \$A FOR DISPLAY LEAVING COLUMNS 1-72 ON THE FIRST LINE AND COLUMNS 5-80 ON THE LAST LINE UNMODIFIED.

SUBROUTINES USED : JTREE \$STL

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

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JOSHUA

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Title Subroutine: \$\$FI

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PURPOSE : FILL IN INCOMPLETE INTEGER FILE POSTION RANGES.

USAGE : CALL \$\$FI(I1,I2)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
------------------	-------------	--------------------

I1	I*2	DIMENSIONED AS I1(4) WHERE, FOR A STARTING FILE POSITION, THE FOLLOWING APPLIES: I1(1) PAGE NUMBER; I1(2) ORIGINAL LINE NUMBER; I1(3) INCREMENTAL LINE NUMBER; I1(4) COLUMN NUMBER.
----	-----	---

I2	I*2	DIMENSIONED AS I2(4) WHERE, FOR AN ENDING FILE POSITION, THE FOLLOWING APPLIES: I2(1) PAGE NUMBER; I2(2) ORIGINAL LINE NUMBER; I2(3) INCREMENTAL LINE NUMBER; I2(4) COLUMN NUMBER.
----	-----	--

PROGRAM LOGIC : A COMPLETE DEFAULTS

```
IF I1(2) EQ 0 THEN SET I1(2) EQ 1
IF I1(4) EQ 0 THEN SET I1(4) EQ 1
IF I2(4) EQ 0 THEN SET I2(4) EQ 80
```

B COMPLETE I2

CONDITION

	YES	YES	YES	NO
IF I2(1) EQ 0	YES	YES	YES	NO
IF I2(2) EQ 0	YES	YES	NO	YES
IF I2(3) EQ 0	YES	NO	-	-

DECISION TABLE

ACTION

SET I2(1) EQ I1(1)	YES	YES	YES	NO
SET I2(2) EQ I1(2)	YES	YES	NO	NO
SET I2(2) EQ 1	NO	NO	NO	YES
SET I2(3) EQ I1(3)	YES	NO	NO	NO

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

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Title Subroutine: \$\$IP

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PURPOSE : CONVERT INTEGER FILE POSITIONS TO PACKED FILE POSITIONS.

USAGE : CALL \$\$IP(I1,PK)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
------------------	-------------	--------------------

I1	I*2	DIMENSIONED AS I1(4) WHERE, FOR A FILE POSITION, THE FOLLOWING APPLIES: I1(1) PAGE NUMBER; I1(2) ORIGINAL LINE NUMBER; I1(3) INCREMENTAL LINE NUMBER; I1(4) COLUMN NUMBER.
----	-----	---

PK	L*1	DIMENSIONED AS PK(4) WHERE, FOR A FILE POSITION, THE FOLLOWING APPLIES: PK(1) PAGE NUMBER; PK(2) ORIGINAL LINE NUMBER; PK(3) INCREMENTAL LINE NUMBER; PK(4) COLUMN NUMBER.
----	-----	---

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

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PURPOSE : CONVERT INTEGER FILE POSITIONS TO UNPACKED FILE POSITIONS.

USAGE : CALL \$\$IU(I1,UK)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
------------------	-------------	--------------------

I1	I*2	DIMENSIONED AS I1(4) WHERE, FOR A FILE POSITION, THE FOLLOWING APPLIES: I1(1) PAGE NUMBER; I1(2) ORIGINAL LINE NUMBER; I1(3) INCREMENTAL LINE NUMBER; I1(4) COLUMN NUMBER.
----	-----	---

UK	L*1	DIMENSIONED AS UK(15) WHERE, FOR A FILE POSITION, A LEFT ADJUSTED HOLLERITH FIELD WILL BE CONSTRUCTED. THE FIELD PPP.LLL+III.CCC HAS THE FOLLOWING DEFINITIONS: PPP PAGE NUMBER; •LLL ORIGINAL LINE NUMBER; +III OPTIONAL - CREATED ONLY WHEN I1(3) NE ZERO; •CCC OPTIONAL - CREATED ONLY WHEN I1(4) GT ONE.
----	-----	---

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

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Title Subroutine: \$\$PI

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PURPOSE : CONVERT PACKED FILE POSITIONS TO INTEGER FILE POSITIONS.

USAGE : CALL \$\$PI(PK,I1)

ARGUMENTS :

PARAMETER

TYPE

DESCRIPTION

PK

L*1

DIMENSIONED AS PK(4) WHERE, FOR A
FILE POSITION, THE FOLLOWING APPLIES:

PK(1) PAGE NUMBER;

PK(2) ORIGINAL LINE NUMBER;

PK(3) INCREMENTAL LINE NUMBER;

PK(4) COLUMN NUMBER.

I1

I*2

DIMENSIONED AS I1(4) WHERE, FOR A
FILE POSITION, THE FOLLOWING APPLIES:

I1(1) PAGE NUMBER;

I1(2) ORIGINAL LINE NUMBER;

I1(3) INCREMENTAL LINE NUMBER;

I1(4) COLUMN NUMBER.

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

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Title

Function: \$\$\$SC

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PURPOSE : ANALYZE THE EDITOR COMMAND RETURNED ON A TERMINAL DISPLAY.

USAGE : N=\$\$\$SC(IN,OUT)

ARGUMENTS :

PARAMETER	TYPE	DESCRIPTION
N	I*4	CODE VALUE OF THE EDITOR COMMAND.
IN	L*1	CONTAINS THE EDITOR INSTRUCTION BEING ANALYZED. 'IN' IS OF VARIABLE LENGTH BASED ON THE INSTRUCTION.
OUT	R*8	THE OUTPUT AREA IS USED IN VARIOUS WAYS DEPENDING ON THE INPUTTED EDITOR INSTRUCTION.

EQUIVALENCES WITH OUT(1) USED:

PARAMETER	TYPE	DESCRIPTION
FP(4,1)	I*2	WILL CONTAIN FILE POSITIONS WHEN APPROPRIATE.

COMMANDS ANALYZED : THE FOLLOWING EDITOR COMMAND SYNTAX IS HANDLED:

ADD INSTRUCTION	\$\$\$SC = 1
A	FP(1-4,1) CONTAIN 0
	FP(1-4,2) CONTAIN 0
A FP1	FP(1-4,1) CONTAIN 'FP1'
	FP(1-4,2) CONTAIN 'FP1'
A FP1*FP2	FP(1-4,1) CONTAIN 'FP1'
	FP(1-4,2) CONTAIN 'FP2'
COPY INSTRUCTION	\$\$\$SC = 2
C FP1 FP3	FP(1-4,1) CONTAIN 'FP1'
	FP(1-4,2) CONTAIN 'FP1'
	FP(1-4,3) CONTAIN 'FP3'
	FP(1-4,4) CONTAIN 'FP3'
C FP1 FP3*FP4	FP(1-4,1) CONTAIN 'FP1'
	FP(1-4,2) CONTAIN 'FP1'
	FP(1-4,3) CONTAIN 'FP3'
	FP(1-4,4) CONTAIN 'FP4'
C FP1*FP2 FP3	FP(1-4,1) CONTAIN 'FP1'
	FP(1-4,2) CONTAIN 'FP2'
	FP(1-4,3) CONTAIN 'FP3'
	FP(1-4,4) CONTAIN 'FP3'
C FP1*FP2 FP3*FP4	FP(1-4,1) CONTAIN 'FP1'
	FP(1-4,2) CONTAIN 'FP2'
	FP(1-4,3) CONTAIN 'FP3'
	FP(1-4,4) CONTAIN 'FP4'

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DELETE INSTRUCTION
D FP1

D FP1*FP2

D MEMBER <D>

\$\$SC = 3

FP(1-4,1) CONTAIN 'FP1'

FP(1-4,2) CONTAIN 'FP1'

FP(1-4,1) CONTAIN 'FP1'

FP(1-4,2) CONTAIN 'FP2'

SEE WRITE INSTRUCTION.

GET INSTRUCTION

G

G MEMBER

\$\$SC = 5

FP(1-4,1) CONTAIN 0

OUT(2) CONTAINS 'BLANKS'

OUT(2) CONTAINS 'MEMBER'

LOOK INSTRUCTION

L

L FP1

\$\$SC = 6

FP(1-4,1) CONTAIN 0

FP(1-4,1) CONTAIN 'FP1'

MOVE INSTRUCTION

M FP1 FP3

M FP1 FP3*FP4

M FP1*FP2 FP3

M FP1*FP2 FP3*FP4

\$\$SC = 7

FP(1-4,1) CONTAIN 'FP1'

FP(1-4,2) CONTAIN 'FP1'

FP(1-4,3) CONTAIN 'FP3'

FP(1-4,4) CONTAIN 'FP3'

FP(1-4,1) CONTAIN 'FP1'

FP(1-4,2) CONTAIN 'FP1'

FP(1-4,3) CONTAIN 'FP3'

FP(1-4,4) CONTAIN 'FP4'

FP(1-4,1) CONTAIN 'FP1'

FP(1-4,2) CONTAIN 'FP2'

FP(1-4,3) CONTAIN 'FP3'

FP(1-4,4) CONTAIN 'FP3'

FP(1-4,1) CONTAIN 'FP1'

FP(1-4,2) CONTAIN 'FP2'

FP(1-4,3) CONTAIN 'FP3'

FP(1-4,4) CONTAIN 'FP4'

OVERLAY INSTRUCTION

O ?FIELD1??FIELD2?

\$\$SC = 10

'OUT' AREA IS NOT USED

QUERY INSTRUCTION

Q ?FIELD?

\$\$SC = 15

'OUT' AREA IS NOT USED

REPLACE INSTRUCTION

R

\$\$SC = 13

'OUT' AREA IS NOT USED

STOP INSTRUCTION

S

\$\$SC = 4

'OUT' AREA IS NOT USED

UPDATE INSTRUCTION

U

U FP1

\$\$SC = 11

FP(1-4,1) CONTAIN 0

FP(1-4,1) CONTAIN 'FP1'

WRITE INSTRUCTION

\$\$SC = 9

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D MEMBER <D>	EP(2-4,1) CONTAIN 0 IN ALL CASES
W <R>	EP(1,1) CONTAINS 'D'
W <R> **?	OUT(2) CONTAINS 'MEMBER'
W (RN)	EP(1,1) CONTAINS 'RS'
W (RN) **?	OUT(2) CONTAINS 'BLANKS'
W MEMBER <A>	EP(1,1) CONTAINS 'RS'
W MEMBER <A> **?	OUT(2) CONTAINS 'BLANKS'
W MEMBER <AN>	EP(1,1) CONTAINS 'RN'
W MEMBER <AN> **?	OUT(2) CONTAINS 'BLANKS'
W MEMBER <R>	EP(1,1) CONTAINS 'RN'
W MEMBER <R> **?	OUT(2) CONTAINS 'MEMBER'
W MEMBER <RN>	EP(1,1) CONTAINS 'AS'
W MEMBER <RN> **?	OUT(2) CONTAINS 'MEMBER'
EXECUTE INSTRUCTION	EP(1,1) CONTAINS 'AS'
X	OUT(2) CONTAINS 'MEMBER'
X S	EP(1,1) CONTAINS 'AN'
COMPRESS WORKSPACE	OUT(2) CONTAINS 'MEMBER'
Y	EP(1,1) CONTAINS 'AN'
Y R	OUT(2) CONTAINS 'MEMBER'
Y N	EP(1,1) CONTAINS 'AN'
DATASET UTILITIES	OUT(2) CONTAINS 'MEMBER'
Z	EP(1,1) CONTAINS 'RN'
Z G	OUT(2) CONTAINS 'MEMBER'
Z GS	EP(1,1) CONTAINS 'RN'
Z GZ	OUT(2) CONTAINS 'MEMBER'
Z GZS	EP(1,1) CONTAINS 'RN'
Z S	OUT(2) CONTAINS 'MEMBER'
Z Z	EP(1,1) CONTAINS 'RN'
Z ZS	OUT(2) CONTAINS 'MEMBER'

\$\$\$C = 12

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

\$\$\$C = 8

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

\$\$\$C = 14

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

'OUT' AREA IS NOT USED

SUBROUTINES USED : \$\$\$T \$\$\$U

LANGUAGE : ASSEMBLER

AUTHOR : P S WOOD

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Subroutine: \$\$TL

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1

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PURPOSE : CONVERT UP TO EIGHT PACKED FILE POSITIONS TO A HOLLERITH STRING.

USAGE : CALL \$\$TL(L1,\$S)

ARGUMENTS :

PARAMETER

TYPE

DESCRIPTION

L1

L*1

DIMENSIONED AS L1(64) WHERE UP TO EIGHT UNPACKED FILE POSITIONS, PRECEDED BY A LEADING ", WILL BE CREATED. IF THE PAGE CHANGES THEN A " WILL PRECEED THAT UNPACKED FILE POSITION ALSO. EACH OF THE UNPACKED FILE POSITIONS WILL BE SEPARATED FROM THE NEXT BY TWO BLANKS. IN GENERAL PPP.LLL+III.CCC IS THE FORM WHERE:

PPP PAGE NUMBER;

.LLL ORIGINAL LINE NUMBER;

+III INCREMENTAL LINE NUMBER;

.CCC COLUMN NUMBER.

INCREMENTAL LINE NUMBERS OF ZERO AND COLUMN NUMBERS EQUAL TO ONE WILL NOT BE USED FOR THE HOLLERITH GENERATION.

\$S

I*4

DIMENSIONED AS \$S(8) WHERE UP TO EIGHT PACKED FILE POSITIONS ARE CONTAINED. THE END OF THIS VECTOR IS SIGNALLED BY A ZERO FILE POSITION.

SUBROUTINES USED : \$\$IU \$\$PI

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

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JOSHUA

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1

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PURPOSE : CONVERT UNPACKED FILE POSITIONS TO INTEGER FILE POSITIONS.

USAGE : CALL \$\$UI(UK,I1)

ARGUMENTS :

PARAMETER

TYPE

DESCRIPTION

UK

L*1

DIMENSIONED AS UK(15) WHERE, FOR A
FILE POSITION, A LEFT ADJUSTED HOLLERITH
FIELD WILL IS PRESENTED. THE FIELD
PPP.LLL+III.CCC IS CONSIDERED TERMINATED WHEN
THE FIRST BLANK IS FOUND AND
HAS THE FOLLOWING DEFINITIONS:
PPP PAGE NUMBER;
.LLL ORIGINAL LINE NUMBER;
+III INCREMENTAL LINE NUMBER;
.CCC COLUMN NUMBER.

IF NO DIGITS APPEAR BETWEEN THE PERIODS AND
PLUS USED AS FIELD DEFINERS THEN THE CORRES-
INTEGER FIELD WILL BE RETURNED AS ZERO.

I1

I*2

DIMENSIONED AS I1(4) WHERE, FOR A
FILE POSITION, THE FOLLOWING APPLIES:

I1(1) PAGE NUMBER;
I1(2) ORIGINAL LINE NUMBER;
I1(3) INCREMENTAL LINE NUMBER;
I1(4) COLUMN NUMBER.

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

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JOSHUA DPSTM-500	Title Subroutine: \$AER	Vol. IX	Page E.2.23
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PURPOSE : CONTAINS ALL THE MESSAGES USED WHEN EITHER THE ALLOCATION OR THE DEALLOCATION OF AN OS CATALOGED DATASET FAILS.

USAGE : CALL \$AER(\$A,\$S,*)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
\$A	ANY	A 960 BYTE AREA USED BY THE JOSHUA SYSTEM FOR DISPLAYING PURPOSES.
\$S	I*2	DIMENSIONED AS \$S(2,32) WHERE \$S(2,30) CONTAINS ONE OF THE FOLLOWING ERROR CODES: 1 LE \$S(2,30) LE 31 ALLOCATION TERMINATING ERROR; 32 LE \$S(2,30) LE 38 ALLOCATING NONTERMINATING ERROR; 48 EQ \$S(2,30) DEALLOCATION TERMINATING ERROR.

* RETURN 1 IS TAKEN WHEN TERMINATING THE TEXT EDITOR.

SUBROUTINES USED : \$MVC HCDINT

LANGUAGE : FORTRAN

AUTHOR : R S WOOD

JOSHUA
DPSTM-500

Title Subroutine: \$AER

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Page E.2.24

Rev. 1

Date 6/73

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JOSHUA

DPSTM-500

Title

Subroutine: \$BDG

Vol.

IX

Page

E.2.25

Rev.

1

Date

6/73

PURPOSE : RETURN THE HOLLERITH USER'S BADGE NUMBER.

USAGE : BADGE=\$BDG(CCB)

ARGUMENTS :

PARAMETER

TYPE

DESCRIPTION

BADGE

R*8

RETURNING FIELD CONTAINING THE USER'S
BADGE NUMBER AS A HOLLERITH.

CCB

VARIOUS JOSHUA CCB CONTROL BLOCK.

PROGRAM LOGIC : USE THE CCB TO RETURN THE \$CCBADGE FIELD.

JOSHUA CONTROL BLOCKS USED : CCB

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

JOSHUA

DPSTM-500

Title Subroutine: \$BDG

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Rev.
1

Date
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JOSHUA

DPSTM-500

Title Subroutine: \$BERR

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Rev. 1	Date 6/73

Purpose: To write BNAM error and statistical messages to SYSOUT data set.

Usage: Call \$BERR (CCB, N, S)

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Usage</u>
CCB	Real*8	CCB communication array of 16 double words.
N	Integer*4	Eight occurrences - error number is in sixth occurrence; number of names in S is in fourth occurrence; position in S of an invalid name would occur in eighth occurrence.
S	Real*8	Namestring - eighteen double words.

Subprogram Used: \$FLG16

Data Sets: SYSOUT Data Set (FT06F001).

Program Logic: A branch is calculated on the basis of the error message number, the proper error message written to the SYSOUT data set and a STOP 17 executed. Statistical information is also written to the SYSOUT data set. A branch is issued to \$FLG16 to set error code.

Language: FORTRAN IV

Author: J. C. Jensen

JOSHUA

DPSTM-500

Title

Function: \$BOX

Vol.

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E.2.29

Rev.

1

Date

6/73

PURPOSE : RETURNS THE USER'S BOX NUMBER AS A HOLLERITH.

USAGE : BOX=\$BOX(BADGE)

ARGUMENTS :

PARAMETER

TYPE

DESCRIPTION

BOX

I*4

RETURNING FIELD CONTAINING THE USER'S
COMPUTER ROOM BOX NUMBER AS A HOLLERITH.

BADGE

ANY

CONTAINS THE USER'S HOLLERITH BADGE NUMBER.

SUBROUTINES USED : RINSCH

LANGUAGE : FORTRAN

AUTHOR : R S WOOD

JOSHUA

DPSTM-500

Title Function: \$BOX

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E.2.30

Rev.
1

Date
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JOSHUA

DPSTM-500

Title

Function: \$CC\$

Vol.

IX

Page

E.2.31

Rev.

1

Date

6/73

PURPOSE : RETURN THE HOLLERITH USER'S COST CODE.

USAGE : COSTCD=\$CC\$(CCB)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
COSTCD	R*8	RETURNING FIELD CONTAINING THE USER'S COST CODE AS A HOLLERITH.
CCB	VARIOUS	JOSHUA CCB CONTROL BLOCK.

PROGRAM LOGIC : USE THE CCB TO RETURN THE \$CBCC FIELD.

JOSHUA CONTROL BLOCKS USED : CCB

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

JOSHUA DPSTM-500	Title Function: \$CC\$	Vol. IX	Page E.2.32
		Rev. 1	Date 6.73

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JOSHUA

DPSTM-500

Title

Function: \$CF\$

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Rev.

1

Date

6/73

PURPOSE : RETURN THE USER'S WORKSPACE CATEGORY VALUE.

USAGE : CFCAT=\$CF\$(CCB)

ARGUMENTS :

PARAMETER

TYPE

DESCRIPTION

CFCAT

I*4

RETURNING FIELD CONTAINING THE WORKSPACE
CATEGORY VALUE.

CCB

VARIOUS JOSHUA CCB CONTROL BLOCK.

PROGRAM LOGIC : USE THE CCB TO RETURN THE \$CBCF FIELD.

JOSHUA CONTROL BLOCKS USED : CCB

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

JOSHUA DPSTM-500	Title Function: \$CF\$	Vol. IX	Page E.2.34
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JOSHUA

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Title Subroutine: \$CFO

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1

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6/73

PURPOSE : SET THE USER'S WORKSPACE CATEGORY VALUE.

USAGE : CALL \$CFO(CCB,CFCAT)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
CFCAT	I*4	CURRENT VALUE OF THE USER'S WORKSPACE CATEGORY.
CCB	VARIOUS	JOSHUA CCB CONTROL BLOCK.

PROGRAM LOGIC : SET THE \$CBCE FIELD IN THE CCB TO CFCAT.

JOSHUA CONTROL BLOCKS USED : CCB

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : P S WOOD

JOSHUA DPSTM-500	Title Subroutine: \$CFO	Vol. IX	Page E.2.36
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JOSHUA

DPSTM-500

Title

Subroutine: \$CLC

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Rev.

1

Date

6/73

PURPOSE : COMPARE LOGICALLY TWO FIELDS OF ARBITRARY LENGTH.

USAGE : CALL \$CLC(F1,F2,LENGTH,CODE)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
F1	ANY	FIRST FIELD USED IN LOGICAL COMPARISON.
F2	ANY	SECOND FIELD USED IN LOGICAL COMPARISON.
LENGTH	I*4	LENGTH OF THE LOGICAL COMPARISON.
CODE	I*4	THE FOLLOWING CODES ARE RETURNED: CODE = 1 IF 'F1' LT 'F2'; CODE = 2 IF 'F1' EQ 'F2'; CODE = 3 IF 'F1' GT 'F2'.

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

JOSHUA DPSTM-500	Title Subroutine: \$CLC	Vol. IX	Page E.2.38
		Rev. 1	Date 6/73

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JOSHUA

DPSTM-500

Title

Subroutine: \$CLI

Entry: \$RLI

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1

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6/73

PURPOSE : COMPARE LOGICALLY A SINGLE BYTE WITH A BYTE STRING.
FOR \$CLI RETURN 1 IF AN EQUAL COMPARISON WAS MADE.
FOR \$RLI RETURN 1 IF AN EQUAL COMPARISON WAS NOT MADE.

USAGE : CALL \$CLI(BYTE,STRING,LENGTH,*)
CALL \$CLI(BYTE,STRING,LENGTH,*,INDEX)
CALL \$RLI(BYTE,STRING,LENGTH,*)
CALL \$RLI(BYTE,STRING,LENGTH,*,INDEX)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
BYTE	L*1	SINGLE BYTE FOR WHICH A SEARCH IS BEING MADE.
STRING	L*1	DIMENSIONED STRING(LENGTH). THE STRING OF BYTES IN WHICH A SEARCH FOR AN EQUAL COMPARISON WITH 'BYTE' IS BEING CONDUCTED.
LENGTH	I*4	LENGTH OF THE STRING USED IN COMPARISON.
INDEX	I*4	OPTIONAL ARGUMENT. ON RETURN IT WILL CONTAIN THE INDEX WITHIN 'STRING' OF WHERE AN EQUAL COMPARISON WAS FOUND. UNDETERMINED IF NO EQUAL COMPARISON WAS FOUND.

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

JOSHUA DPSTM-500	Title Subroutine: \$CLI Entry: \$RLI	Vol. IX	Page E.2.40
		Rev. 1	Date 6/73

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Purpose: To read the directory of a partitioned data set.

Usage: To open the data set:

CALL \$DIRO (USERBASE, DCBADR, ERRNO)

To retrieve the next directory entry:

CALL \$DIRR (LOC, LNTH, ERRNO)

To close the data set:

CALL \$DIRC

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
USERBASE	Logical*1	A directory entry will be retrieved by specifying its location as being at some displacement from the start of this pseudo-array.
DCBADR	Integer*4	The address of a ninety-six byte area located on a fullword boundary which will be overlaid during \$DIRO, except for the DDNAME field, by a local DCB and which is then used as the DCB for the data set in question.
LOC	Integer*4	The displacement, relative one, in USERBASE of the location in the buffer of the current directory entry.
LNTH	Integer*4	The length in bytes of the current directory entry.
ERRNO	Integer*4	An optional error number field.

Error numbers for \$DIRO are:

<u>Number</u>	<u>Definition</u>
0	Successful open.
1	Not used.
2	No DD statement.
3	Data set not located.
4	Data set not a PDS.

JOSHUA DPSTM-500	Title Subroutine: \$DIR	Vol. IX	Page E.2.42
		Rev. 1	Date 6/73

Error numbers for \$DIRR are:

<u>Number</u>	<u>Definition</u>
0	Next directory entry successfully located.
1	End of directory or an invalid directory entry.

The error number is also multiplied by four and loaded into register fifteen as a return code.

External References: The following system macro instructions are used:

CHECK
CLOSE
DCB
DCBD
LOCATE
OBTAIN
OPEN
READ (BSAM)
READJFCB
REGDEF

Program Logic:

- \$DIRO
 - The location of USERBASE is stored locally.
 - The external DCB is established by overlaying the area with a local DCB except for the DCBDDNAM field of the external area which is left unchanged. All DCB references will now relate to the external area.
 - The data set organization is checked by
 1. Issuing a READJFCB to obtain the DSNAME prior to
 2. Issuing a LOCATE to check the device class and obtain the volume number and
 3. Issuing an OBTAIN to assure that the data set is a partitioned data set.

JOSHUA DPSTM-500	Title Subroutine: \$DIR	Vol. IX	Page E.2.43
		Rev. 1	Date 6/73

- The DCBDSORG field is set accordingly.
- An OPEN is issued.
- \$DIRR
 - If no entries remain in the current block, the next block is read and the number of bytes defined as being used checked for reasonability.
 - The member name in the next directory entry is checked for the highest collating value in the system (i.e. all bits on) as this signifies that all entries have been passed.
 - The location of the next valid directory entry is determined as a displacement from USERBASE and returned in LOC. The length of the entry is returned in LNTH and also used in a calculation to determine for next time the number of bytes of data remaining in the block.
- \$DIRC
 - A close is issued.
 - DCB addressability is reestablished as being the local DCB.
 - All other initializations necessary to allow reuse of the subroutine are performed.

Language:

OS/360 Assembler

Author:

R. C. Haywood

JOSHUA

DPSTM-500

Title Function: \$EXC

Vol.
IX

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E.2.45

Rev.
1

Date
6/73

PURPOSE : EXCHANGE THE CONTENTS OF TWO FIELDS OF ARBITRARY LENGTH.

USAGE : N=\$EXC(F1,LOC1,F2,LOC2,LENGTH)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
N	I*4	LENGTH OF THE TWO FIELDS BEING EXCHANGED.
F1	ANY	FIRST FIELD USED IN THE EXCHANGE.
LOC1	I*4	BEGINNING BYTE POSITION IN THE FIRST FIELD.
F2	ANY	SECOND FIELD USED IN THE EXCHANGE.
LOC2	I*4	BEGINNING BYTE POSITION IN THE SECOND FIELD.
LENGTH	I*4	LENGTH OF THE TWO FIELDS BEING EXCHANGED.

COMMENTS : BINARY ZEROS WILL BE PRODUCED FOR ANY SEGMENT OF THE TWO FIELDS THAT OVERLAP.

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

JOSHUA

DPSTM-500

Title Function: \$EXC

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1

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JOSHUA

DPSTM-500

Title Subroutine: \$FLG16

Vol.
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E.2.47

Rev.
1

Date
6/73

Purpose: To set error flag in communication area.

Usage: CALL \$FLG16 (CCB), where CCB = Communication Control Block

Program Logic: The address of the CCB is received via the argument list. The error code condition (fullword one) is set for both the JCB and CCB areas. A return is issued.

Language: Assembler

Author: R. L. Boyce, Jr.

JOSHUA

DPSTM-500

Title

Subroutine: \$FLG16

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1

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JOSHUA

DPSTM-500

Title

Common: \$JCOMA

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Rev.

1

Date

6/73

Purpose:

To establish certain initializations of the named common area \$JCOMA.

External References: Named common area \$JCOMA structured as follows:

\$JCB - Sixteen doublewords
\$NAMES - Eighteen doublewords
\$BNAMI - Sixteen words

Description:

The total area is defined as zero except:

\$BNAMI(9) = 16
\$BNAMI(10) = 1
\$BNAMI(11) = 16
\$BNAMI(12) = 2
\$BNAMI(13) = 2

Language:

FORTRAN IV

Author:

R. C. Haywood

JOSHUA
DPSTM-500

Title Common: \$JCOMA

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Date 6/73

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PURPOSE : MOVE A BYTE STRING OF ARBITRARY LENGTH.

USAGE : N=\$MVC(F1,F2,LENGTH)
N=\$MVC(F1,LOC1,F2,LOC2,LENGTH)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
N	I*4	LENGTH OF THE BYTE STRING BEING MOVED.
F1	ANY	FIELD TO WHICH THE BYTE STRING IS MOVED.
LOC1	I*4	OPTIONAL ARGUMENT BUT IF USED THEN 'LOC2' MUST ALSO BE USED. BEGINNING BYTE LOCATION IN 'F1' TO WHICH THE STRING IS MOVED.
F2	ANY	FIELD FROM WHICH THE BYTE STRING IS MOVED. THIS FIELD IS NOT MODIFIED.
LOC2	I*4	OPTIONAL ARGUMENT BUT IF USED THEN 'LOC1' MUST ALSO BE USED. BEGINNING BYTE LOCATION IN 'F2' FROM WHICH THE STRING IS MOVED.
LENGTH	I*4	LENGTH OF THE BYTE STRING BEING MOVED.

COMMENTS : IF 'LOC1' AND 'LOC2' ARE NOT USED THEN THE BYTE LOCATIONS IN BOTH FIELDS ARE ASSUMED TO BE THE FIRST.

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

JOSHUA
DPSTM-500

Title Subroutine: \$MVC

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Rev.
1

Date
6/73

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PURPOSE : PACK THE BLANKS OUT OF A FORTRAN SOURCE STATEMENT.

USAGE : CALL \$PKF(IN,LEN1,OUT,LEN2)
 CALL \$PKF(IN,LEN1,OUT,LEN2,EQ)
 CALL \$PKF(IN,LEN1,OUT,LEN2,EQ,LP,RP)
 CALL \$PKF(IN,LEN1,OUT,LEN2,EQ,LP,RP,LQ,RQ)
 CALL \$PKF(IN,LEN1,OUT,LEN2,EQ,LP,RP,LQ,RQ,LS,RS)

ARGUMENTS :

PARAMETER

TYPE

DESCRIPTION

IN	L*1	FIELD CONTAINING THE INPUTTED FORTRAN SOURCE STATEMENT.
LEN1	I*4	LENGHT OF INPUTTED FORTRAN SOURCE STATEMENT.
OUT	L*1	FIELD CONTAINING THE OUTPUTTED FORTRAN SOURCE STATEMENT.
LEN2	I*4	LENGHT OF OUTPUTTED FORTRAN SOURCE STATEMENT.
EQ	I*4	OPTIONAL ARGUMENT. CONTAINS THE INDEX IN 'OUT' OF THE LAST '=' FOUND.
LP	I*4	OPTIONAL ARGUMENT. CONTAINS THE INDEX IN 'OUT' OF THE FIRST LEFT PARENTHESES FOUND.
RP	I*4	OPTIONAL ARGUMENT. CONTAINS THE INDEX IN 'OUT' OF THE MATCHING RIGHT PARENTHESIS, SEE 'LP' ABOVE.
LQ	I*4	OPTIONAL ARGUMENT. CONTAINS THE INDEX IN 'OUT' OF THE FIRST QUOTE MARK FOUND.
RQ	I*4	OPTIONAL ARGUMENT. CONTAINS THE INDEX IN 'OUT' OF THE SECOND QUOTE MARK.
LS	I*4	OPTIONAL ARGUMENT. CONTAINS THE INDEX IN 'OUT' OF THE FIRST SLASH MARK FOUND.
RS	I*4	OPTIONAL ARGUMENT. CONTAINS THE INDEX IN 'OUT' OF THE MATCHING SLASH MARK, SEE 'LS'.

COMMENTS : ALL OPTIONAL ARGUMENTS DEFAULT TO ZERO. IF USED, THEY MUST BE USED IN THE ORDER IN WHICH THEY ARE DESCRIBED.

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : P S WOOD W H BROTHERTON

JOSHUA DPSTM-500	Title Subroutine: \$PKF	Vol. IX	Page E.2.54
		Rev. 1	Date 6/73

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JOSHUA

DPSTM-500

Title

Subroutine: \$RDR

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Rev.

1

Date

6/73

Purpose:

To read a sequential data set or a member of a partitioned data set.

Usage:

To open the data set:

CALL \$RDRO (USERBASE, DCBADR, [MEMBER])

To retrieve the next logical record:

CALL \$RDRR (LOC, LNTH)

To close the data set:

CALL \$RDRC

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
USERBASE	Logical*1	A relative record will be retrieved by specifying its location in the buffer as a displacement within the pseudo-array USERBASE.
DCBADR	Integer*4	The address of a ninety-six byte area originating on a fullword boundary which will be overlaid during \$RDRO, except for the DDNAME field, by a local DCB and which is then used as the DCB for the data set in question.
MEMBER	Logical*1	An eight-byte field specifying the member to be selected from a partitioned data set.
LOC	Integer*4	The displacement, relative one, in USERBASE of the location in the buffer of the start of the current logical record.
LNTH	Integer*4	The length in bytes of the current logical record.

Return Codes:

The following values are found in register fifteen following execution of the subroutine.

<u>Entry</u>	<u>Code</u>	<u>Explanation</u>
\$RDRO	0	Successful completion.
	4	No DD statement.
	8	Data set not located.
	12	Illegal data set organization.
	16	Discrepancy exists in the member specification vis-a-vis the data set organization or the DD statement.
	20	Specified member does not exist in the data set.
	24	Blocksize exceeds size of area provided for buffer.
\$RDRR	0	Successful read.
	4	End of data set or member.
\$RDRC	0	Always set to zero.

External References: The following system macro instructions are used:

CHECK
 CLOSE
 DCB
 DCBD
 FIND
 LOCATE
 OBTAIN
 OPEN
 READ (BPAM, BSAM)
 READJFCB
 REGDEF

JOSHUA DPSTM-500	Title Subroutine: \$RDR	Vol. IX	Page E.2.57
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Program Logic:

◦ \$RDRO

- The location of USERBASE is stored locally.
- The external DCB is established by overlaying the area with a local DCB except for the DCBDDNAM field of the external area which is left unchanged. All DCB references following this operation are set to relate to the external area.
- The data set organization is determined by:
 1. Issuing a READJFCB to obtain the DSNAME preparatory to
 2. Issuing a LOCATE to check the device class and obtain the volume number and, if necessary,
 3. Issuing an OBTAIN when the device type is direct-access.

The only valid organizations are sequential and partitioned; sequential is assumed when the device type is not direct-access.

- If the argument MEMBER is not present or is blank the data set must be sequential or the member must have been specified in the DD statement. If MEMBER is present and non-blank the data set must be partitioned and the JFCBELNM field must be either blank or the same as MEMBER.
- The DCBDSORG field is set as was indicated as a result of the OBTAIN except when, for a PDS, the member name was specified in the DD statement in which case it is set as physical sequential.
- An OPEN is issued and the DCBBLKSI checked.
- For data sets opened as partitioned organization, a FIND is issued to position for the first read at the first block of the specified member.

◦ \$RDRR

- If no logical records remain in the current block, the next block is read and the size of the block and the number of logical records it contains are determined
- The next logical record is located. Its position is saved to be used on the next call and is then calculated as a displacement in USERBASE. This displacement and the length of the logical record are returned in LOC and LNTH, respectively.

JOSHUA DPSTM-500	Title Subroutine: \$RDR	Vol. IX	Page E.2.58
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- When EODAD is indicated the operations described in \$RDRC are performed except that a return code of four is issued.

- \$RDRC

- A CLOSE is issued.

- DCB addressing is reset to the local DCB.

- All other initializations necessary to allow reuse of the subroutine are performed.

Language: OS/360 Assembler

Author: R. C. Haywood

JOSHUA DPSTM-500	Title Subroutine: \$RDR	Vol. IX	Page E. 2. 60
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JOSHUA

DPSTM-500

Title

Function: \$SF\$

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Rev.

1

Date

6/73

PURPOSE : RETURN THE USER'S SIGNON CATEGORY VALUE.

USAGE : SFCAT=\$SF\$(CCB)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
SFCAT	I*4	RETURNING FIELD CONTAINING THE SIGNON CATEGORY VALUE.
CCB	VARIOUS	JOSHUA CCB CONTROL BLOCK.

PROGRAM LOGIC : USE THE CCB TO RETURN THE \$CBSE FIELD.

JOSHUA CONTROL BLOCKS USED : CCB

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

JOSHUA DPSTM-500	Title Function: \$SF\$	Vol. IX	Page E.2.62
		Rev. 1	Date 6/73

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JOSHUA DPSTM-500	Title Subroutine: \$TERR	Vol. IX	Page E.2.63
		Rev. 1	Date 6/73

Purpose: To handle module abends.

Usage: CALL \$TERR (CCB,PGNM) or
 CALL \$TERR (CCB,FWAR,NM1) where

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
CCB	D	Communication Control Block
PGNM	H	Program abend number
FWAR	F	Twenty Full-word Array (optional)
NM1	D	Name 1 Arguments (optional)

External References: LOAD, JIBCOM, SVC 13

Program Logic: The addresses of the CCB and the program number are received on a two argument call or the addresses of the CCB, twenty full-word array, and name one argument area are received on a three argument call. If it is a two argument call, the program number and error number are set up in the CCB, and the abending subfunction is checked to see if IBCOM is used. If IBCOM is used, a LOAD is issued on JIBCOM and a link is made to the 'STOP' routine for IBCOM; otherwise, only an abend service is issued (SVC 13). If the call was with three arguments, the name one string is moved to the full-word array and the BNAM program number is set up before checking for IBCOM usage (as indicated in a two argument call).

Referenced by: Calling routines.

Language: Assembler

Author: W. H. Brotherton, Jr., R. L. Boyce, Jr.

JOSHUA DPSTM-500	Title	Function: \$UNT	Vol.	Page
			IX	E.2.65
			Rev. 1	Date 6/73

PURPOSE : RETURN THE HOLLERITH UNIT NUMBER.

USAGE : I=\$UNT(CCB)

ARGUMENTS :

<u>PARAMETER</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
------------------	-------------	--------------------

CCB	VARIOUS	JOSHUA CCB CONTROL BLOCK.
-----	---------	---------------------------

PROGRAM LOGIC : USING THE CCB -> MCB -> WCB LINKAGE THE WCGUNITB FIELD IS RETURNED AS AN INTERGER VALUE.

JOSHUA CONTROL BLOCKS USED : CCB MCB WCB

SUBROUTINES USED : NONE

LANGUAGE : ASSEMBLER

AUTHOR : R S WOOD

JOSHUA DPSTM-500	Title Function: \$UNT	Vol. IX	Page E.2.66
		Rev. 1	Date 6/73

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JOSHUA DPSTM-500	Title Subroutine: \$WTR	Vol. IX	Page E. 2. 67
		Rev. 1	Date 6/73

Purpose: To write a sequential data set.

To add, replace, or delete a member in a partitioned data set.

Usage: To open the data set:

Call \$WTRO (DCBADR [,MEMBER [,DIRACT]])

To write a logical record:

CALL \$WTRW (DATA, DATALENGTH)

To close the data set:

CALL \$WTRC

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
DCBADR	Integer*4	The address of a ninety-six byte area, a DCB, located on a fullword boundary which will be overlaid during \$WTRO, except for the DDNAME field, by a local DCB and which is then used as the DCB for the data set in question.
MEMBER	Logical*1	An eight-byte field specifying the member of a partitioned data set.
DIRACT	Logical *1	Specified the desired directory action of adding ('A'), deleting ('D') or replacing ('R') a member in a PDS. When this argument is not given, add is assumed.
DATA	Logical*1	The data to be written.
DATALENGTH	Integer*4	The length of DATA in bytes.

Return Codes: The following values are returned in general purpose register fifteen:

<u>Entry</u>	<u>Code</u>	<u>Explanation</u>
\$WTRO	00	Successful completion.
	04	RDJFCB failed - No DD statement.
	08	LOCATE failed - control volume not mounted.

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<u>Entry</u>	<u>Code</u>	<u>Explanation</u>
	OC	Illegal organization - only physical sequential and partitioned organizations are supported.
	10	A discrepancy exists in the member specification vis-a-vis the data set organization or the DD statement; or the specified directory action is invalid.
	14	OPEN failed.
	18	Blocksize exceeds buffer size.
	1C	Blocksize for data set was not previously established.
	20	Directory update (a deletion) was successful.
	24	Not used.
	28	Member to be deleted could not be found.
	2C	Not used.
	30	A permanent I/O error was detected when attempting to update the directory.
\$WTRW	00	Successful execution.
	04	Data set not open.
	08	Data length specified exceeds maximum logical record size - no transfer made.
	OC	DASD primary allocation exhausted - no secondary allocation requested.
\$WTRC	00	Successful operation.
	04	Attempt to add a member - directory already contained specified member.
	08	Attempt to replace a member - specified member could not be found; member added.
	OC	No directory space.
	10	A permanent I/O error was detected when attempting to update the directory.
	14	Data set was not open.

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External References: The following system macro instructions are used:

CHECK
CLOSE
DCB
DCBD
LOCATE
OBTAIN
RDJFCB
REGDEF
WRITE (BPAM, BSAM)

The following SVC is issued:

21 (STOW)

Program Logic:

◦ \$WTRO

- The external DCB is established by overlaying the area with a local DCB, except for the DCBDDNAM field of the external area which is left unchanged. Following this operation, all DCB references are applicable to the external area.
- The data set organization is determined by:
 1. Issuing a READJFCB to obtain the DSNAME preparatory to;
 2. Issuing a LOCATE to check the device class and obtain the volume number, and if necessary;
 3. Issuing an OBTAIN when the data set is located on a direct-access device.

The only valid organizations are physical sequential and partitioned; sequential is assumed when the data set is not on a direct-access device.

- If the argument MEMBER is not provided or is blank, the data set organization must be physical sequential or the member name must have been specified in the DD statement. If MEMBER is given, and non-blank, the data set must be partitioned and the JFCBELNM field must be blank or the same as member.

- The DCBDSORG field is set as indicated by the OBTAIN.
- When the data set organization is partitioned, DIRACT is checked. If it is not present it is assumed that an addition to the directory is to be made. When an action is specified, it must be an 'A', 'R', or 'D' indicating, respectively, add, replace, or delete.
- A type 'J' OPEN is issued and a test made to assure it was successful.
- If a directory action of delete was specified for a partitioned data set, execution is concluded by issuing a STOW followed by a CLOSE.
- The DCBRECFM and DCBBLKSI fields are checked. Both the record format (fixed or undefined only) and the blocksize must have been previously defined. The maximum length of any logical record to be accepted is established as either the blocksize (for undefined) or as indicated by the DCBLRECL field (for fixed format). The number of logical records per block is established. The blocksize may not exceed the space allocated for the buffer.

◦ \$WTRW

- The open or closed status of the data set is ascertained.
- The length of the logical record is checked to insure it does not exceed the maximum established size.
- If space for another record exists in the buffer, DATA is transferred into it; when space does not exist, a write is issued before transferring the data. If the record format is U a write is issued following each transfer of data to the buffer.
- When the data set is located on a DASD and no secondary allocation was specified, a check is made before writing a block to see if the space has been exhausted.

◦ \$WTRC

- If the data set is not opened, a return code is set; no further action is taken.
- If a data remains in the buffer, the DCBBLKSI field is set to indicate how much data and a WRITE issued.
- If the data set is of partitioned organization and a WRITE was issued, a STOW is executed with the appropriate directory action (add or replace) indicated.
- Initializations necessary to allow reuse of the subroutine are made.
- A CLOSE is issued.

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Purpose: To convert a zoned or edited number to a fixed point value.

Attribute: Reusable

Usage: The general Fortran form is

I = BCDFIX (X,L, [K])

where, I is the resulting fullword fixed-point number;

X is the zoned or edited value string;

L is a fullword specifying the length of X in bytes;

K is a fullword composite of one or more of the following values:

0 - ignore all blanks.

1 - return an error indication (by returning K < 0.

2 - treat blanks as zeros.

4 - treat embedded or trailing blanks as an error.

Program Logic:

- Initialize to an error condition.
- Check for optional argument K; if present, assure proper value or return.
- Return if L is not greater than zero.
- The string X must meet the following criteria -
 - a. It may be signed, but redundant signs are treated as an error.
 - b. Blanks are treated as specified. Blanks between a leading sign and the number are not considered as embedded; blanks between a trailing sign and the number are considered embedded.
 - c. In each byte, bits 4-7 must compose a value in the range 0-9.
 - d. In each byte, except when blank, bits 0-3 must be on except for the last byte in a zoned number for which two other possible configurations are valid, representing the sign.

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- Conversion takes place by originally setting register zero to zero and then for each byte to be converted, multiplying the register by ten and then adding in the value of the byte after masking the zoned bits.
- If processing of X is completed with no numeric data encountered, the error flag is left on and control returned to the calling routine.
- When processing of X is successfully completed, the error flag is turned off and the sign of the result established.
- In returning control to the calling routine when an error indication has been requested and an error encountered, an undefined negative value is placed in K; otherwise K is not changed.

Language: OS/360 Assembler

Author: R. C. Haywood

JOSHUA DPSTM-500	Title Subroutine: BCDFIX	Vol. IX	Page E.2.76
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JOSHUA

DPSTM-500

Title Subroutine: BCDFLT

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Purpose: To convert to a double precision value and EBCDIC string of the form

[[[N][. [N]]][(D|E) [+|-]N]]

where N represents one or more numeric characters.

Usage: From Fortran -

as a subroutine

CALL BCDFLT (A, L, X, & N)

as a double-precision function

X = BCDFLT (A, L)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
A	Not restricted	The EBCDIC representation.
L	Fullword	The length of A.
X	Doubleword	Receives the converted value.

General purpose register one should point to the list of addresses of the variables used as arguments.

Program Logic:

A translate and test table is constructed. A is scanned using a TRT instruction. Between each continuation of the scan, the various function bytes are altered appropriately. Each group of numerics is converted to fixed-point. The two values representing the whole and fractional portion of the number are converted separately to floating-point, the fractional floating-point value successively divided by ten until the proper value is obtained and then added to the whole number floating-point value after first normalizing the whole number. The sum is then adjusted by the appropriate power of ten as indicated by the value representing the exponent portion of the original representation. The result is left in floating point register zero as well as stored at X if X is defined as an argument.

Language: O/S 360 Assembler

Author: R. C. Haywood

JOSHUA

DPSTM-500

Title Subroutine: DEFINE

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1

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Purpose: To describe the characteristics of the data sets used during a JOSHUA direct-access operation.

Usage: CALL DEFINE

Data Sets: Direct-Access Data Sets for JOSHUA Data Record Storage

Program Logic: The program is entered via its entry name.
FORTRAN DEFINE FILE statements are then issued on the direct-access data sets for JOSHUA data record storage. Thirty-two thousand seven hundred sixty-seven 400-byte records are established for each data set. A return is then issued.

Language: FORTRAN IV

Author: J. C. Jensen

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JOSHUA

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Title Subroutine: FLEXIT

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Purpose: To terminate the function.

Usage: CALL FLEXIT (CCB or \$JCB)
where,
CCB = Communication Control Block (terminal region)
\$JCB = Common MCB - (batch region)

Program Logic: The address of the CCB or \$JCB is received via the argument list. The next sub-function name area is located and set to a blank. A return is then issued.

Referenced by: Calling routines.

Language: Assembler

Author: R. L. Boyce, Jr.

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JOSHUA

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Title

Subroutine: FMINIT

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1

Date

6/73

Purpose: To initialize the MAP array to its default values.

Usage: CALL FMINIT(MAP,RTYPE)

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
MAP	Logical*1 (28,31)	One character mnemonic of assembly types at each position of a 28 x 31 (X,Y) grid.
RTYPE	Integer*2	Literal denoting reactor type: 'C' or not 'C'.

Subprograms: HEXXY

XYHEX

FMPACK

Program Logic: The reactor boundary on the (X,Y) grid is contained in an array $Y_0 = RX(X_0)$. Within this boundary, the mnemonic for '?' is stored unless the X,Y position is either a control assembly, 'C', or a sparjet, 'S', or a gasport, ' '.

Language: Fortran IV

Author: J. E. Suich

JOSHUA

DPSTM-500

Title

Subroutine: FMPACK

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Purpose: To code two-byte reactor assembly symbols into a one-byte representation.

Usage: CALL PACK(K,L)

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
K	Logical*1	Output code value.
L	Logical*1	Two-byte input symbol.

Program Logic: Associate with each symbol L (of the form ai, where a may be A-H,J-N,P-Y and i may be 0-9 or blank) a coded value n*11+j where n and j are the sequence numbers of a and i over their defined possible strings. The two special symbols, blank-blank and ?blank, are coded as 255 and 254, respectively. Exceptions are treated as follows: The input characters are set to "AI", and the output value is set to 254 for "?b".

Language: Fortran IV

Author: J. E. Suich

Restrictions: Exception logic is dependent upon use of EBCDIC for the input symbols.

JOSHUA

DPSTM-500

Title Subroutine: FMUNPK

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Purpose: To decode the one-byte representation of reactor assembly symbols into two EBCDIC characters.

Usage: CALL PACK(K,L)

Arguments:

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
K	Logical*1	Input code.
L	Logical*1	Output characters.

Program Logic: Perform a table look-up to translate the input code into 256 output, two-byte symbols. The table is constructed of the symbols A-H,J-N,P-Y and the symbols 0-9, blank. The first output symbol is the $[K/11]$ -th entry in the first table, and the second is the $(K \bmod 11)$ -th entry in the second table. In addition, the two special codes, 254 and 255, respectively are translated as ?-blank and blank-blank.

Language: Fortran IV

Author: J. E. Suich

Restrictions: Tables established by a data statement as EBCDIC.

JOSHUA DPSTM-500	Title Subroutine: HEXXY	Vol. IX	Page E.2.89
		Rev. 1	Date 6/73

Purpose: To convert from the SRP X,Y coordinate representation of a hexagonal reactor lattice to the patch/point or GAUGE indexing representation.

Usage: CALL HEXXY(IX,IY,IP,IPT,IBC,IR, IQ, IXP, IYP)
where:

IX - X coordinate of the point
IY - Y coordinate of the point
IP - patch number
IPT - point number in patch
IBC - boundary flag (=1 if a 5 point or corner patch, =0 otherwise)
IR - ring number
IQ - sector number
IXP - X coordinate of patch center
IYP - Y coordinate of patch center

IX and IY are transmitted to the subroutine; all the other variables are calculated by HEXXY. All arguments are integer*4 variables.

The X-Y coordinate system is that used at SRP except that the origin has been translated to the center of the reactor.

The GAUGE indexing scheme used is that in the original code with three points per hex and a full six sectors in the geometry. The interior points of a patch are numbered 1 to 13 as in GAUGE; the boundary points are given negative indexes which will run from -1 to -5 or -8 depending on the patch. (Superpatch or one point per hex index numbers can also be obtained from HEXXY. Set IX = Y coordinate, IY = 1/3 (X coordinate) and HEXXY will return with the appropriate index numbers in the superpatch structure.

Program Logic: First the sector number is determined. This is done using the set of lines which bisect each sector. These lines are perpendicular to the lines connecting the centers of the 'corner' patches. The projection of the point on each of these lines is calculated. From the sign of these three projections, the sector in which the point lies may be found. See Figure 1.

A decision table, shown below, is used to generate the sector number from the six different combinations of signs. A value, stored in the array QTST, is assigned to each line. If Q is given an initial value of 2 and the appropriate QTST is added to Q for each negative sign found, the resulting Q will determine the sector.

Line	QTST Value	Sector					
		1	2	3	4	5	6
1	1	+	+	-	-	-	+
2	3	+	+	+	-	-	-
3	-1	-	+	+	+	-	-
Resulting Q		1	2	3	6	5	4

For $Q \leq 3$, the sector number is Q; for $Q > 3$, the sector number is $10 - Q$ and the sector (either 1, 2, or 3) which is opposite to this is $7 - Q$.

Once the sector has been determined, we can decide where the point is in its patch using the value of the projection of the point on the line bisecting the sector. Figure 2 shows the projections for three patches which are in the same ring. You can see that similarly placed points in each patch have the same projection. Furthermore, the projections occur in evenly spaced increments. This pattern repeats in each successive ring. Taking the distance modulo 21 identifies each point irrespective of ring. A table lookup, using the array XYPTS, converts the point index in terms of distances into the GAUGE point number.

Given the point number, the coordinates of the patch center can be determined as a translation from the X-Y coordinates of the point. The CORR array is used to effect this translation. To save space in the CORR array, use is made of the fact that the displacements for points in sectors 4 - 6 are the negative of those in the corresponding sectors 1 - 3.

The projection of the patch center along the line bisecting the sector is calculated. This distance, divided by 21, gives the ring number. The third index needed to locate the particular patch, namely the index of the patch in each row or ring of the sector, is calculated from the displacement of the patch.

Figure 1

The solid lines are the lines connecting the centers of the 'corner' patches. The dashed lines are the lines through the middle of each sector and are perpendicular to the solid lines.

We calculate the projection of the point onto each of the dashed lines. Positive and negative projections are defined as shown in the figure. Consider line 1. All points in sectors 1, 2, and 6 will project onto the positive side of the line while points in sectors 3, 4, and 5 will have negative projections. Each sector can then be uniquely defined by the sign of its projections on the three lines. For each sector the particular sign combination is shown on the figure.

Figure 2. Projections for Three Patches in Same Ring.

Detailed flowchart for
exceptional points:

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Title Subroutine: HEXXY

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JOSHUA DPSTM-500	Title Subroutine: IBMDATE	Vol. IX	Page E.2.97
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Purpose: To return, as a fixed point value, in both the argument provided and in register 0 (allowing use as a FORTRAN integer function) the day in the form YYDDD, where:

YY is the last two digits of the year;

DDD is the day of the year.

Usage: The general FORTRAN form for usage is:

[CALL] IBMDATE (L)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
L	Integer*4	Returns the date.

Program Logic: The date is retrieved in packed decimal form from the OS Communication Vector Table (CVT), converted to fixed point, and returned in register zero and in L.

Language: OS/360 Assembler

Author: R. C. Haywood

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JOSHUA

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Title

Function: IBMJUL

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1

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Purpose:

To convert a date of the form YYDDD to a Julian date reckoned from March 1 of the preceding centurial year.

Usage:

As a FORTRAN function

IBMJUL (IBMDAT)

The result is returned in register zero (OS/360 FORTRAN).

Arguments:

Mnemonic

Type

Description

IBMDAT

Integer*4

A date of the form YYDDD where:

YY is the last two digits of the year.

DDD is the day of the year.

Program Logic:

- The year is multiplied by 1461 (the number of days in a four year period in the order 365-365-365-366), and then divided by four. The integer result plus the day of the year minus either 59 (normal years) or 60 (leap years) produces the Julian date.

Restrictions:

In the current implementation, the centurial year is not a leap year.

Language:

OS/360 Assembler

Author:

R. S. Wood - R. C. Haywood

Purpose: To simulate IBCOM sequential write conventions.

Usage: CALL IPUT (BUFFER, NDS, NREC)

CALL JPUT (VADD, LNTH)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
BUFFER	Logical*1	An area provided by the caller which is used as the buffer area. It must be a minimum of 400 contiguous bytes.
LNTH	Integer*4	Length in bytes of VADD.
NDS	Integer*4	The output data set reference (FT) number.
NREC	Integer*4	The starting relative record number of the output data set.
VADD	Logical*1	The data to be transferred to BUFFER and written.

Subprograms:

<u>Control Section</u>	<u>Entry Point</u>
LINK	JTREE
MOVEIT	MOVEIT
XLOC	XLOC

Objective: To perform output operations while conforming to the IBCOM convention of leaving slack bytes at the end of a record block rather than divide a logical data unit between two blocks.

Program Logic:

- Normal usage is a series of calls to JPUT bounded by an initial and final call to IPUT.
- Entry point IPUT establishes the data set and relative record references numbers, the addressability of the buffer, and sets the buffer location counter to zero. When the location counter is not zero on entry, data remaining in the buffer is written.
- Entry point JPUT effects the transfer of the data to the buffer. If the transfer of the data would overflow the buffer, the data existing in the buffer is written, the record counter incremented and the location counter reset before transfer.

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Title

Subroutine: IPUT

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Remarks:

A RETURN 1 (setting a condition code of 4) is taken
if LNTH > 400.

Language:

Fortran IV

Author:

R. C. Haywood

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Title Subroutine: IPUT

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Title Subroutine: JOSDEQ

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Purpose: To deq on the argument name.

Usage: CALL (NAME2), where
NAME2 = Enq-Deq Name 2 (8 bytes long)

External References: DEQ

Program Logic: The address of the enq-deq name two is received via the argument list. A DEQ is issued on the name two passed. A return is issued.

ENQ Name: JOSYSTEM (Name 2 passed = NAME2)

Referenced by: Calling routines.

Language: Assembler

Author: W. H. Brotherton, Jr.

JOSHUA

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Title Subroutine: JOSENQ

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Purpose: To enq on the name passed.

Usage: CALL (NAME2,&N), where

NAME2 = Enq-deq name 2.

&N = Statement number N passed to on unsuccessful enq.

External References: ENQ, STIMER

Program Logic: The address of enq-deq name 2 is recieved via the argument list. An ENQ is issued on the name and a test is made to see if it was successful. If the enq was successful, a return is issued; otherwise, a STIMER is issued and upon end of STIMER the conditional return is set up.

ENQ Name: JOSYSTEM (NAME2)

Referenced by: Calling routines.

Language: Assembler

Author: W. H. Brotherton, Jr.

Purpose: To simulate IBCOM sequential read conventions.

Usage: CALL JSREAD (FIELD, ELNTH, ELNO [,DSREF, DSREC, FLAG],*)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
FIELD	Not restricted	Area into which data from the buffer is to be transferred.
ELNTH	Integer*4	Length of a logical element of FIELD.
ELNO	Integer*4	Number of elements to be loaded.
DSREF	Integer*4	The data set reference (FT) number.
DSREC	Integer*4	The starting relative record number.
FLAG	Integer*4	FLAG = 0 - Starts the transfer at the beginning of record specified by DSREF and DSREC. FLAG = 1 - Continues the transfer at point where preceding call left off. Note: When the option FLAG = 1 would be used, the last three arguments may be omitted to obtain the same result.

Subprograms: JTREE

Objective: To extract data from a record while conforming to the IBCOM convention of skipping the slack bytes at the end of a record block which were produced as a result of the refusal to divide a logical unit between blocks.

Program Logic:

- The element length ELNTH is ascertained not to exceed the buffer size.
- When the six argument form has been used, FLAG is checked. If it is zero, the new DSREF and DSREC are established as local variables and the initial record read.
- As many elements of length ELNTH, up to the number requested, ELNO, as remain in the buffer are transferred to FIELD. If the request is not satisfied, DSREC is incremented locally, JTREE called to read the next record, and the transfer resumed. A counter is maintained locally of the number of bytes remaining in a buffer.

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Terminating Conditions:

Register fifteen is set to four (analogous to a RETURN 1) if:

1. the specified data set is not on-line;
2. the value specified by ELNTH exceeds the maximum buffer size allowed.

Restriction: The buffer area is fixed at four hundred bytes.

Language: OS/360 Assembler

Author: R. C. Haywood

JOSHUA

DPSTM-500

Title Subroutine: JSREAD

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1

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Purpose: To perform the direct access input/output

Usage: CALL JTREE (OPTION, DSREF, RECNO, BUFFER, &N)
where

<u>Parameter</u>	<u>Type</u>	<u>Description</u>
OPTION	I*4	0 - write record 1 - read record 2 - close all files 5 - open as input and read 8 - open only return code of '4' if unsuccessfully
DSREF	I*4	Data set reference number
RECNO	I*4	Relative record number in direct access file.
BUFFER		Storage for one record
&N		Returning to statement N on open error.

Internal Tables: Model DCB for direct access data sets.
Table of DCB addresses.
Program Control Block.

External References: GETMAIN, OPEN, CLOSE, READ, WRITE, CHECK, FREEMAIN, ABEND, WTO.

Data Sets: JOS catalog data sets.

Program Logic: The addresses of OPTION, DSREF, RECNO, AND BUFFER are received via the argument list. Exclusive control of this routine is obtained by issuing an ENQ macro-instruction. If the routine is already in use a STIMER macro is issued in order to wait a specified time before again issuing the ENQ. This cycle is continued until the usage of the routine is obtained. The OPTION argument is tested for a close request. If a close file is indicated, the DCB pointers and counters are reset and the data sets are closed (CLOSE macro instruction issued). The DCB area is freed up by issuing the FREEMAIN macro instruction and then a return is issued.

If the close was not indicated, the record is adjusted for BDAM usage; dynamic area to build a model DCB is obtained by issuing the GETMAIN macro; and the data set is OPENED in the updated mode unless OPTION argument indicated input only. The OPTION argument is then checked to see if a OPEN is the only thing desired; if so, and if the open was successful, a return is issued. An error return option is used if the OPEN was unsuccessful. Otherwise, the OPTION argument is then checked for a write request. If there is a write request, the direct access record (RECNO) is written into the BUFFER area by issuing a WRITE macro instruction and then a return is issued; otherwise, a read request is tested for. If there is a read request, the record is read into the buffer by issuing a READ macro and then a return is issued. If there is neither a read nor a write request, an error flag is set (last byte of OPTION is set to HEX 'FF') and a return is issued. Exclusive control of this routine is released by issuing a DEQ macro instruction immediately before returning to the calling program. (JTREE appropriates storage for a specified number of DCB's). If one DCB is needed after the specified number is taken, the existing DCB's are closed and their storage is cleared leaving space for construction of the same number of new DCB's.

Terminating Conditions:

If there is neither a read, write, nor a close request, an error flag is set and a return is issued.

If there is an I/O error, an abend is set up with a dump and a code of 24.

Referenced By: Calling routines.

Language: Assembler

Author: R. L. Boyce, Jr.

"CLOSE ROUTINE":

JOSHUA DPSTM-500	Title Function: JULDAT	Vol. IX	Page E.2.119
		Rev. 1	Date 6/73

Purpose: To convert to a calendar date a Julian date reckoned from March 1 of the preceding centurial year.

Usage: As a FORTRAN function

JULDAT (JULSEQ)

The date is returned as a fixed point value in register zero in the form MMDDYY.

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
JULSEQ	Integer*4	A Julian date.

Program Logic: ◦ The primary factors utilized in the conversion are:

- the sequence 365 - 365 - 365 - 366 of days in the consecutive four-year periods starting March 1, 1900;
- the sequence 31 - 30 - 31 - 30 - 31 in the two successive five month periods starting with March;
- the eleventh month in a twelve month cycle (i.e. January) also has 31 days.

Language: OS/360 Assembler

Author: R. S. Wood - R. C. Haywood

Purpose: To convert a fixed point number to an edited zoned format.

Attribute: Nonreusable.

Entry: LCDINT for a one byte fixed point value.
 HCDINT for a half word fixed point value.
 \$CDINT for a full word fixed point value.

Usage: The general form in Fortran is
 as a subroutine CALL xCDINT (J,K,Y)
 or
 as a double-precision function xCDINT (J , K , Y)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
J	Varies with entry point	The fixed point value for which an EBCDIC representation is desired.
K	Integer*4	K specifies the width of the field. When positive, leading zeroes are desired; when negative, leading zeroes are to be replaced by blanks. When K is not specified, the width of the field is what is required for the sign (if negative) and the significant digits.
Y	Logical*1	The output field whose length is defined by K, but will not exceed eight, if the field will not accomodate the result, Y is filled with asterisks.

Program Logic: The fixed point value is converted to decimal and edited. Any minus sign is moved to the leading position of the result field followed by the indicated numerics, including any leading blanks if indicated. The result is loaded into floating point register zero and, when specified, the user's output field.

Should the output field width be inadequately wide, the field is filled with EBCDIC asterisks. The width of the output field will not exceed eight positions. When the width of the field is less than one, Y is left unaltered and floating point register zero returns EBCDIC blanks.

Language: OS/360 Assembler

Author: R. S. Wood

JOSHUA

DPSTM-500

Title Subroutine: LEFTIT

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Purpose: To left adjust a double word.

Usage: CALL LEFTIT (DW)

where

DW = pointer to double word.

Program Logic: The double word (DW) address is received via the argument list. The double word name field is tested for all blanks. If it is all blanks, a return is issued; otherwise, the first character is checked for a blank. If the character is a blank, all characters are shifted to the left and a blank character is put on end. This procedure is repeated until the first character is no longer a blank and then a return is issued.

Referenced By: Calling routines.

Language: Assembler

Author: W. H. Brotherton, Jr.

JOSHUA

DPSTM-500

Title

Function: MDYJUL

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Rev.

1

Date

6/73

Purpose:

To convert a date of the form MMDDYY to a Julian date with a base date of March 1 of the preceding centurial year.

Usage:

As a FORTRAN function

MDYJUL (MDY)

The Julian date is returned as a fixed point value in register zero (for OS/360 FORTRAN).

Arguments:

Mnemonic

Type

Description

MDY

Integer*4

A calendar date of the form MMDDYY.

Program Logic:

- Conversion utilizes the following elements:

The number of days in each year of the consecutive four-year periods within the effective range produces the sequence 365 - 365 - 365 - 366;

The number of days in each month of the two consecutive five-month periods beginning with March produces the sequence 31 - 30 - 31 - 30 - 31;

The eleventh month of a twelve-month period (i.e. January) also has 31 days.

Language:

OS/360 Assembler

Author:

R. W. Wood - R. C. Haywood

Purpose: To set a contiguous string of bytes starting from a specified location in one field equal to a contiguous string of bytes starting at a specified location in another field.

Attribute: Reusable

Entry: MOVEIT

Usage: The general form in Fortran is

CALL MOVEIT (TO, I, FROM, J, L)

where: TO is the receiving field;

I is the relative byte within TO at which the operation will start;

FROM is the original field;

J is the relative byte within FROM at which the operation will start;

L is the number of contiguous bytes in both TO and FROM, beginning at relative bytes I and J, respectively, involved in the operation.

Program Logic:

- If L is less than one, subroutine execution is terminated.
- The starting points in fields TO and FROM are determined.
- The specified number of bytes from FROM is moved to TO first in as many blocks of 256 bytes as are contained in the number specified and then the remainder.
- The necessary registers are reset and control returned to the calling routine.

Language: OS/360 Assembler

Author: R. L. Boyce - R. S. Wood

JOSHUA
DPSTM-500

Title Subroutine: MOVEIT

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Rev. 1	Date 6/73

(Blank)

Purpose: To search a byte string for the first occurrence of a specified value.

Attribute: Reusable

Entry: CHAR

RHAR

Usage: The general form in Fortran is

CALL {CHAR|RHAR} (A, B, L [,I], & n)

where: A contains the one byte value for which the search is made,

B is the byte string to be searched,

L is the length of B,

I is, when a match is found, the relative byte in B at which the match occurred,

n is the statement number to which control is passed when a match is made or a match is not made depending on entry being made at CHAR or RHAR, respectively.

Program Logic:

- Initialize flag to indicate no match - zero when entering at CHAR, four when entering RHAR.
- Terminate if length of byte string is defined as less than one.
- Sequentially search the byte string for the specified value. When not found, terminate. When found, invert the flag by exclusively ORing with a four, store the relative byte number in the fourth argument if present, and terminate.
- When terminating, load general purpose register fifteen with the flag value.

Language: OS/360 Assembler

Author: A. H. Dobyns - R. S. Wood

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Title Subroutine: RHAR

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JOSHUA

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Title Subroutine: SHIFTB

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Purpose: To pack a name string.

Usage: CALL SHIFTB (S,BUF), where
S = name string of double words
BUF = buffer of packed names

Program Logic: The addresses of the name string (S) and the buffer (BUF) are received via the argument list. The double word argument name in S are moved to the buffer (BUF) such that there is only a period (no blanks between names). The names are moved until a double work of HEX 5's is found or until the end of a buffer line is reached; on finding either of these, a return is issued.

Language: Assembler

Author: R. L. Boyce, Jr.

JOSHUA DPSTM-500	Title Subroutine: SHIFTB	Vol. IX	Page E. 2.134
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(Blank)

Purpose:

To place in contiguous doublewords a series of qualifiers separated by periods.

Usage:

Call SHIFTN (S)

where, S is the string of qualifiers.
The area defined by S should be on a doubleword boundary and be sixteen doublewords in length.

Program Logic:

- ° The input string is defined

$$\langle S \rangle = \{ \langle d \rangle | \langle 9 \rangle \{ ((\langle 9 \rangle)^3 \{ (\langle d \rangle) | \text{blank} \}) | (\langle 9 \rangle)^4 \} \}$$

where

$$\langle d \rangle = \{ \cdot | \text{blank} \}$$

$$\langle 9 \rangle = (\langle x \rangle)_1^n (\text{blank})_0^{8-n} \text{ where } 0 \leq n \leq 8$$

$\langle x \rangle$ = any configuration except blank and period

- ° The qualifiers are placed in successive doublewords in a local area.
- ° When all qualifiers have been picked up or when an error is sensed, the doubleword following the last to receive a valid qualifier is filled with hexadecimal 55's.
- ° Only those doublewords thru the appended one containing hexadecimal 55's are transferred back to S.
- ° Register 15 returns a zero for normal completion, a four when an error is sensed.

Language:

S/360 Assembler

Author:

R. C. Haywood

JOSHUA

DPSTM-500

Title

Subroutine: TRNSLT

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Rev.

1

Date

6/73

Purpose: To make value-for-value exchanges in a byte string.

Attribute: Reusable

Usage: The general Fortran usage is:

CALL TRNSLT (A,B,I,C,K)

where: A is a byte string containing the existing values;

B is a byte string defining the values with which each occurrence of the respectively positioned value defined in A is to be replaced;

I is the number of bytes each in A and B.

C is the field in which the translations are to be made; and

K is the length, in bytes, of C.

I and K are both integers; A, B, and C are not restricted as to type.

Program Logic:

- If either I or K is less than one, control is returned to the caller.
- A translate table is built using the bytes in B as function bytes.
- A translate instruction is executed to cover the number of bytes in C resulting as the division remainder of K/256. Translation on any remaining bytes is then performed in sets of 256.

Language: OS/360 Assembler

Author: R. C. Haywood

JOSHUA

DPSTM-500

Title

Subroutine: WDUMP

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1

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Purpose: To provide a hexadecimal dump of a core storage area defined in the parameter list.

Usage: CALL WDUMP (A,N), where
A = Variable whose address begins dump
N = Integer *4 variable that gives number of contiguous bytes to dump

Communication Area: DCB for SYSPRINT Data Set.

External References: OPEN, WRITE, CHECK

Data Sets: SYSPRINT Data Set.

Program Logic: The addresses of the arguments are received. The contents desired is then written to the SYSPRINT Data Set via the WRITE macro. A translation is done so that the proper characters are designated. After writing last line out, a return is issued.

Referenced by: Calling routine.

Language: Assembler

Author: J. L. Kilpatrick

Purpose: To analyze a template I/O list into sets of nested DO-loops, establish loop limits, and define variable.

Attribute: Nonreusable

Usage: CALL XLIST (LIMIT, EOL, NLOC, NLOX, MAXCAR, NESTS, NBL, NVMAX, NERR, BOL, LOOPS, FLAG, CD)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
LIMIT	Integer*2	Six halfwords per loop. For any loop L of a possible twelve loops, LIMIT(1,L) returns the number of variables in that loop.
EOL	Integer*2	For any loop L, EOL(L) returns the end point of the loop. For explicitly indexed loops, this is the location of the equal sign preceding the limits of that loop.
NLOC	Integer*2	For any variable N, NLOC(N) returns the starting location of that variable.
NLOX	Integer*2	For any variable N, NLOX(N) returns the ending location of that variable.
MAXCAR	Integer*2	Specifies the length of the I/O list. Value will be altered due to the addition of up to two positions to the list.
NESTS	Integer*2	Returns the number of nests.
NBL	Integer*2	Returns the total number of loops.
NVMAX	Integer*2	Returns the total number of variables.
NERR	Integer*2	Returns the location of a syntax error in the I/O list.
BOL	Integer*2	For any loop L, BOL(L) returns the starting location of that loop. A pseudo-loop-start at BOL(NBL+1) defines the end of the list (i.e., BOL(NBL+1)=MAXCAR).
LOOPS	Integer*2	For any nest N, LOOPS(N) returns the number of loops in that nest.

FLAG

Integer*2

On input, it indicates whether a certain syntax error should result in a request for correction or truncation of the list at the point of error. The error is the failure, after a nest has ended, for the continuation to be a comma.

On output, a zero indicates successful execution; a one an error.

CD

Logical*1

The template I/O list. It may contain no embedded blanks. It will have two blanks added to the end when returned.

Program Logic:

- The start of the list marks the start of the first loop (and nest). Additional loop starts are determined by the occurrence of a left parenthesis or comma either before any indexing has begun for loops in the same nest or after all required indexing to that point has been completed. In the latter case the loop would also mark the start of a new nest.
- Loop ending positions are recorded as either the position immediately preceding the start of a new loop (when ending a loop for which there is no explicit indexing), the equal sign in the indexing parameter, or the end of the list (before blank padding of the list).
- Variables are defined as strings starting with alphabetic characters and ending immediately before the first space, left parenthesis, or comma. Such a string ended by an equal sign is ignored.

Terminating Conditions:

1. Syntax errors.
2. Number of nest exceeding five.
3. Number of loops exceeding twelve.
4. Number of variables exceeding twenty.

Language:

Fortran IV

Author:

R. C. Haywood - J. E. Suich

JOSHUA

DPSTM-500

Title Subroutine: XLIST

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JOSHUA

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Title

Subroutine: XLOC

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Purpose: To provide the absolute address of a variable.

Attribute: Reusable

Entry: XLOC

Usage: The general form in Fortran is

L = XLOC(X)

where: X is the variable whose address is desired,

L is the variable receiving the address,

XLOC is typed as INTEGER.

Program Logic: The high-order byte of the fullword addressed by register one is cleared and the contents of that word are then loaded into general purpose register zero.

Language: OS/360 Assembler

Author: R. S. Wood - A. H. Dobyns

JOSHUA
DPSTM-500

Title Subroutine: XLOC

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DPSTM-500

Title Subroutine: XNSTID

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1

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Purpose: To place in the last line of the buffer the portion of a template I/O list associated with a specified nest.

Attribute: Nonreusable

Usage: CALL XNSTID (LIST,LITNO,BOL,LOOPS,CD)

Arguments:

<u>Mnemonic</u>	<u>Type</u>	<u>Description</u>
LIST	Logical*1	The template I/O list.
LITNO	Integer*2	The number of nests preceding the nest of interest.
BOL	Integer*2	An array specifying the starting point in LIST of each loop.
LOOPS	Integer*2	An array defining for each nest the number of loops in the nest.
CD	Logical*1	A nine hundred sixty byte field considered to be, but not necessarily, the terminal buffer. The specified portion of the list will be placed in 77 positions starting at byte 883, truncating when necessary.

Program Logic:

- The beginning or ending positions in LIST of the first and last loop, respectively, in the nest of interest are determined.
- Bytes 881 - 960 of CD are blanked.
- The specified portion of the list is placed in CD starting at byte 883. When the segment exceeds 77 bytes, it is truncated to 72 and the literal ',ETC.' loaded starting at byte 956.

Language: Fortran IV

Author: J. E. Suich

Purpose: To convert from the patch/point representation of a hexagonal lattice (GAUGE indexing) to SRP X,Y coordinate representation.

Usage: CALL XYHEX(IX,IY,IP,IPT,IBC,IR,IQ,IXP,IYP)

where:

IX: X coordinate of the point

IY: Y coordinate of the point

IP: patch number

IPT: point number in patch

IBC: boundary flag (= 1 if 5 point or corner patch; = 0 otherwise)

IR: ring number

IQ: sector number

IXP: X coordinate of patch center

IYP: Y coordinate of patch center

IP and IPT are transmitted to the subroutine; all other variables are calculated by XYHEX. All arguments are integer*4 variables.

The GAUGE indexing scheme used is that in the original code with three points per hex and a full six sectors in the geometry. The interior points of a patch are numbered 1 to 13 as in GAUGE; the boundary points are given negative indexes which will run from -1 to -5 or -8 depending on the patch. [The one point per hex coordinates can also be obtained from XYHEX. If IP and IPT refer to a hex in superpatch coordinates, then the proper X-coordinate will be -3.IY and the proper Y-coordinate will be IX. For a problem with only n sectors in the geometry, line 8 in the program should be changed to $N1=2*(IP-2)/n$.]

The X-Y coordinate system is that used at SRP except that the origin has been translated to the center of the reactor.

JOSHUA DPSTM-500	Title Subroutine: XYHEX	Vol. IX	Page E.2.150
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Data Constants:

PATCHO(2,6) - The vector along the line through the centers of the 'corner' patches; length equal to the spacing from one ring to the next.

DELTA(2,6) - The vectors from the center of a patch to the center of the next patch in the same ring.

For PATCHO and DELTA, the second subscript is the sector number and the first subscript is the coordinate. For PATCHO and DELTA, X = 1 and Y = 2.

QTST(3) - Values associated with each bisector in using the decision table to determine the sector number.

GAGEPT(13) - Index in the CORR array for each interior point.

GAGEBD(8) - Index in the CORR array for each boundary point.

CORR(2,20,3) - Vector displacement from point to center of patch. First subscript is coordinate (X=1, Y=2), second subscript is point index (in order of XYPTS array (not defined here), with central point omitted), and third subscript is sector (sectors 4 - 6 are the negative of 1 - 3).

Program Logic:

The patch numbers, IP, for the patches in ring IR obey the relationship

$$3 \text{ IR (IR-1) } + 2 \leq \text{IP} < 3 \text{ IR (IR+1) } + 2$$

$$\text{IR(IR-1)} \leq \frac{\text{IP}-2}{3} < \text{IR (IR+1)}$$

$$(\text{IR})^2 - \text{IR} + \frac{1}{4} \leq \frac{\text{IP}-2}{3} + \frac{1}{4} < (\text{IR})^2 + \text{IR} + \frac{1}{4}$$

$$(\text{IR} - 1/2)^2 \leq \frac{4 \cdot \text{IP} - 5}{12} < (\text{IR} + \frac{1}{2})^2$$

$$\text{Therefore, } \text{IR} \leq \frac{4 \cdot \text{IP} - 5}{12} + \frac{1}{2} < \text{IR} + 1 \quad (1)$$

This formula is true for real numbers. Using an approximation* which works for integers as long as $IR < 10$, the ring number is determined. Once the ring index is known, it is fairly simple to determine IQ, the sector number, and IN3, the index of location in the sector. Simply subtract the number of patches up to ring IR and divide the result by IR. The quotient (plus 1) will be IQ and the remainder will be IN3. $0 \leq IN3 < IR$. If $IN3 = 0$, the patch is a 'corner' or '5-point' patch and the boundary flag, IBC, is set to 1.

Next the X-Y coordinates of the center of the patch are determined. The patch centers lie on a triangular mesh. In each sector, the centers of the 'corner' patches lie at equal distances on a straight line out from the origin. See Figure 1. The vectors denoting a unit distance on each of these lines are contained in the data array PATCHO. The center of the corner patch in the same ring as the desired patch then has coordinates:

$$\begin{aligned} IXP_c &= IR \text{ PATCHO}(1, IQ) \\ IYP_c &= IR \text{ PATCHO}(2, IQ) \end{aligned} \quad (2a)$$

From the 'corner' patch, the centers of the 'side' patches in the same ring lie on another straight line, which makes a 60° angle with the line of 'corner' patch centers. The vector denoting the unit on this line is stored in the data array DELTA.

* $IR = (N2 + 25 + 478 N1/N2)/44$

where:

$$N1 = \frac{4 \cdot IP - 5}{12} \text{ and } N2 = 2 N1 + 51$$

Figure 1. The arrangement of patch centers in a single sector.

The coordinates of the desired patch center are then:

$$IXP = IXP_c + IN3 \text{ DELTA}(1, IQ) \quad (2b)$$

$$IYP = IYP_c + IN3 \text{ DELTA}(2, IQ)$$

From the center of the patch, the various points in the patch lie at distances which are fixed for all patches in the same sector (and rotate 60° from one sector to the next). A table lookup is used to determine the difference in coordinates from the patch center to the desired point. Advantage is taken of the symmetry to reduce the table size by two, as the coordinate vectors for the last three sectors are the negative of those for the first three sectors. To further reduce the size of tables stored, the CORR array needed for the HEXXY routine is also used in XYHEX for the table of coordinates from the patch center to the individual point. This necessitates doing the table lookup in two steps. First a table lookup (using GAGEPT and GAGEBD) translates the point number from the GAUGE indexing scheme to the order used in the CORR array. Then the values in the CORR array are added to the coordinates of the patch center to get the coordinates of the particular point.

Language: Fortran IV

Author: J. E. Suich

Restrictions: The approximation used to replace the square root in determining the ring index limits the routine to less than ten rings in the reactor lattice.

JOSHUA DPSTM-500	Title Subroutine: ZCOMP	Vol. IX	Page E.2.155
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Purpose: To perform a logical compare of two fields of equal length.

Attribute: Reusable.

Entry: ZCOMP

Usage: The general form in FORTRAN is

CALL ZCOMP (A,B,L,I[,N[,M]])

where: A is the first field for the comparison,

B is the second field,

L is the number of contiguous bytes in each field participating in the test,

I indicates the result of the test as follows:

1. A < B

2. A = B

3. A > B

N is the relative byte in fields A and B which the comparison is to start,

M is the relative byte in field B at which the comparison is to start thus overriding N as it relates to field B.

Program Logic:

- The starting points in fields A and B are established.
- If the length of the comparison is defined as less than one, the return code is set to two and the subroutine is terminated.
- The two fields are compared first in blocks of 256 bytes until less than 256 bytes remain and then the remainder are tested. After all but the final test, if the result shows A less than B or A greater than B the return code is set and the subroutine terminated. After the final compare, the proper return code is set and the subroutine terminated.

Language: OS/360 Assembler

Author: R. S. Wood - L. F. Zimmerman

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