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======================================================================= Dictin
                                                                        Dictin
     PROGRAM DICTIN (Renamed from DICTION to eliminate conflict with    Dictin
                     UNIX diction command - 12/22/02)                   Dictin
     ==============                                                     Dictin
     VERSION 81-1 (SEPTEMBER 1981)                                      Dictin
     VERSION 82-1 (JANUARY 1982)                                        Dictin
     VERSION 83-1 (JANUARY 1983)  *KEEP ORIGINAL MOD. NUMBER            Dictin
                                  *NEW, MORE COMPATIBLE I/O UNITS.      Dictin
     VERSION 84-1 (SEPTEMBER 1984)*UPDATED TO HANDLE ENDF/B-VI FORMAT.  Dictin
                                   (PROGRAM WILL NOW WORK ON ALL        Dictin
                                    VERSIONS OF THE ENDF/B FORMAT).     Dictin
     VERSION 85-1 (AUGUST 1985)   *FORTRAN-77/H VERSION                 Dictin
     VERSION 86-1 (JANUARY 1986)  *MAT ORDER CHECK.                     Dictin
                                  *IF NO HOLLERITH SECTION COPY MAT.    Dictin
     VERSION 88-1 (JULY 1988)     *OPTION...INTERNALLY DEFINE ALL I/O   Dictin
                                   FILE NAMES (SEE, SUBROUTINE FILEIO   Dictin
                                   FOR DETAILS).                        Dictin
                                  *IMPROVED BASED ON USER COMMENTS.     Dictin
     VERSION 89-1 (JANUARY 1989)  *PSYCHOANALYZED BY PROGRAM FREUD TO   Dictin
                                   INSURE PROGRAM WILL NOT DO ANYTHING  Dictin
                                   CRAZY.                               Dictin
                                  *IMPROVED BASED ON USER COMMENTS.     Dictin
                                  *ADDED LIVERMORE CIVIC COMPILER       Dictin
                                   CONVENTIONS.                         Dictin
                                  *UPDATED TO USE NEW PROGRAM CONVERT   Dictin
                                   KEYWORDS.                            Dictin
     VERSION 92-1 (JANUARY 1992)  *UPDATED BASED ON USER COMMENTS.      Dictin
                                  *UP TO 6000 SECTIONS PER TAPE.        Dictin
                                  *CHANGED DEFAULT MOD NUMBER FOR NEW   Dictin
                                   SECTIONS FROM 0 TO 1                 Dictin
     VERSION 94-1 (JANUARY 1994)  *VARIABLE ENDF/B DATA FILENAMES       Dictin
                                   TO ALLOW ACCESS TO FILE STRUCTURES   Dictin
                                   (WARNING - INPUT PARAMETER FORMAT    Dictin
                                   HAS BEEN CHANGED)                    Dictin
                                  *CLOSE ALL FILES BEFORE TERMINATING   Dictin
                                   (SEE, SUBROUTINE ENDIT)              Dictin
                                  *ADDED FORTRAN SAVE OPTION            Dictin
     VERSION 96-1 (JANUARY 1996) *COMPLETE RE-WRITE                     Dictin
                                 *IMPROVED COMPUTER INDEPENDENCE        Dictin
                                 *ALL DOUBLE PRECISION                  Dictin
                                 *ON SCREEN OUTPUT                      Dictin
                                 *UNIFORM TREATMENT OF ENDF/B I/O       Dictin
                                 *IMPROVED OUTPUT PRECISION             Dictin
     VERSION 99-1 (MARCH 1999)   *CORRECTED CHARACTER TO FLOATING       Dictin
                                  POINT READ FOR MORE DIGITS            Dictin
                                 *UPDATED TEST FOR ENDF/B FORMAT        Dictin
                                  VERSION BASED ON RECENT FORMAT CHANGE Dictin
                                 *GENERAL IMPROVEMENTS BASED ON         Dictin
                                  USER FEEDBACK                         Dictin
     VERS. 2000-1 (FEBRUARY 2000)*GENERAL IMPROVEMENTS BASED ON         Dictin
                                  USER FEEDBACK                         Dictin
     VERS. 2002-1 (MAY 2002)     *OPTIONAL INPUT PARAMETERS             Dictin
                                 *RENAMED dictin TO ELIMINATE CONFLICT  Dictin
                                  WITH UNIX diction COMMAND.            Dictin
                                 *ADDED DOCUMENTATION LINE TO COMMENTS. Dictin
     VERS. 2004-1 (JAN. 2004)    *GENERAL UPDATE BASED ON USER FEEDBACK Dictin
                                 *UP TO 100,000 SECTIONS PER TAPE.      Dictin
                                                                        Dictin
     OWNED, MAINTAINED AND DISTRIBUTED BY                               Dictin
     ------------------------------------                               Dictin
     THE NUCLEAR DATA SECTION                                           Dictin
     INTERNATIONAL ATOMIC ENERGY AGENCY                                 Dictin
     P.O. BOX 100                                                       Dictin
     A-1400, VIENNA, AUSTRIA                                            Dictin
     EUROPE                                                             Dictin
                                                                        Dictin
     ORIGINALLY WRITTEN BY                                              Dictin
     ------------------------------------                               Dictin
     DERMOTT E. CULLEN                                                  Dictin
     UNIVERSITY OF CALIFORNIA                                           Dictin
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                                                                        Dictin
AUTHORS MESSAGE                                                         Dictin
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THE COMMENTS BELOW SHOULD BE CONSIDERED THE LATEST DOCUMENATION         Dictin
FOR THIS PROGRAM INCLUDING ALL RECENT IMPROVEMENTS. PLEASE READ         Dictin
ALL OF THESE COMMENTS BEFORE IMPLEMENTATION.                            Dictin
                                                                        Dictin
AT THE PRESENT TIME WE ARE ATTEMPTING TO DEVELOP A SET OF COMPUTER      Dictin
INDEPENDENT PROGRAMS THAT CAN EASILY BE IMPLEMENTED ON ANY ONE          Dictin
OF A WIDE VARIETY OF COMPUTERS. IN ORDER TO ASSIST IN THIS PROJECT      Dictin
IT WOULD BE APPECIATED IF YOU WOULD NOTIFY THE AUTHOR OF ANY            Dictin
COMPILER DIAGNOSTICS, OPERATING PROBLEMS OR SUGGESTIONS ON HOW TO       Dictin
IMPROVE THIS PROGRAM. HOPEFULLY, IN THIS WAY FUTURE VERSIONS OF         Dictin
THIS PROGRAM WILL BE COMPLETELY COMPATIBLE FOR USE ON YOUR              Dictin
COMPUTER.                                                               Dictin
                                                                        Dictin
PURPOSE                                                                 Dictin
-------                                                                 Dictin
THIS PROGRAM IS DESIGNED TO CREATE A REACTION INDEX FOR EACH            Dictin
MATERIAL ON AN ENDF/B FORMATTED TAPE AND TO INSERT THIS REACTION        Dictin
INDEX IN FILE 1, SECTION 451 OF EACH MATERIAL.                          Dictin
                                                                        Dictin
IN THE DESCRIPTION THAT FOLLOWS FOR SIMPLICITY THE ENDF/B               Dictin
TERMINOLOGY---ENDF/B TAPE---WILL BE USED. IN FACT THE ACTUAL            Dictin
MEDIUM MAY BE TAPE, CARDS, DISK, OR ANY OTHER MEDIUM.                   Dictin
                                                                        Dictin
ENDF/B FORMAT                                                           Dictin
-------------                                                           Dictin
THIS PROGRAM ONLY USES THE ENDF/B BCD OR CARD IMAGE FORMAT (AS          Dictin
OPPOSED TO THE BINARY FORMAT) AND CAN HANDLE DATA IN ANY VERSION        Dictin
OF THE ENDF/B FORMAT (I.E., ENDF/B-I, II,III, IV, V OR VI FORMAT).      Dictin
                                                                        Dictin
THIS PROGRAM WILL AUTOMATICALLY DETERMINE WHICH VERSION OF THE          Dictin
ENDF/B FORMAT EACH MAT IS IN AND WILL THEN PROPERLY REPLACE THE         Dictin
REACTION INDEX FOR EACH MAT. DIFFERENT MATS ON THE SAME TAPE MAY        Dictin
EVEN BE IN DIFFERENT VERSIONS OF THE ENDF/B FORMAT.                     Dictin
                                                                        Dictin
IT IS ASSUMED THAT THE DATA IS CORRECTLY CODED IN THE ENDF/B            Dictin
FORMAT AND NO ERROR CHECKING IS PERFORMED. IN PARTICULAR IT IS          Dictin
ASSUMED THAT THE MAT, MF AND MT ON EACH LINE IS CORRECT. SEQUENCE       Dictin
NUMBERS (COLUMNS 76-80) NEED NOT BE PRESENT ON INPUT, BUT WILL BE       Dictin
CORRECTLY OUTPUT ON ALL LINES.                                          Dictin
                                                                        Dictin
ENDF/B FORMAT VERSION                                                   Dictin
---------------------                                                   Dictin
THE ENDF/B FORMAT CAN BE DETERMINED FROM THE SECOND LINE OF             Dictin
THE HOLLERITH SECTION (MF=1, MT=451).                                   Dictin
ENDF/B-IV = N1 - LINE COUNT (POSITIVE)                                  Dictin
ENDFB/-V  = N1 = N2 =0                                                  Dictin
ENDF/B-VI = N1 =0, N2= VERSION NUMBER (6 OR MORE)                       Dictin
                                                                        Dictin
SECTION SIZE                                                            Dictin
------------                                                            Dictin
SINCE THIS PROGRAM ONLY READS THE DATA ONE LINE AT A TIME THERE         Dictin
IS NO LIMIT TO THE SIZE OF ANY GIVEN SECTION, E.G. THE TOTAL            Dictin
CROSS SECTION MAY BE DESCRIBED BY 200,000 DATA POINTS.                  Dictin
                                                                        Dictin
NUMBER OF SECTIONS PER TAPE                                             Dictin
---------------------------                                             Dictin
IT IS ASSUMED THAT THE ENDF/B TAPE CONTAINS 100,000 OR FEWER            Dictin
SECTIONS = 100,000 OR FEWER MAT,MF,MT COMBINATIONS. IF THIS LIMIT       Dictin
IS EXCEEDED THIS PROGRAM WILL TERMINATE EXECUTION. IF NEED BE THIS      Dictin
LIMIT CAN EASILY BE CHANGED BY CHANGING THE DIMENSION STATEMENT         Dictin
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    BELOW AND RE-DEFINING THE VARIABLE MAXTAB IN THE BELOW DATA        Dictin
    STATEMENT. ALTERNATIVELY THE ENDF/B TAPE MAY BE DIVIDED INTO A     Dictin
    NUMBER SMALLER TAPES EACH CONTAINING 100,000 OR FEWER SECTIONS.    Dictin
    EACH ENDF/B TAPE CAN THEN RUN THROUGH THIS PROGRAM AND THE OUTPUT  Dictin
    FOR EACH ENDF/B TAPE CAN THEN BE RE-COMBINED (I.E., MERGED BACK    Dictin
    TOGETHER).                                                         Dictin
                                                                       Dictin
    HOLLERITH SECTION                                                  Dictin
    ----------------                                                   Dictin
    IF ANY MATERIAL DOES NOT INITIALLY CONATIN A SECTION MF=1, MT=451  Dictin
    A WARNING MESSAGE WILL BE PRINTED AND THE MATERIAL WILL BE COPIED. Dictin
                                                                       Dictin
    IF ANY MATERIAL INITIALLY CONTAINS A SECTION MF=1, MT=451 A NEW    Dictin
    REACTION INDEX WILL BE CREATED AND INSERTED. THE INITIAL SECTION   Dictin
    MF=1, MT=451 MAY OR MAY NOT CONTAIN A REACTION INDEX.              Dictin
                                                                       Dictin
    IF THE MATERIAL INITIALLY CONTAINS A REACTION INDEX IT WILL BE     Dictin
    USED TO DEFINE THE MOD NUMBER FOR CORRESPONDING SECTIONS IN THE    Dictin
    NEW REACTION INDEX (I.E. IF A SECTION FROM THE ORIGINAL REACTION   Dictin
    INDEX HAS THE SAME MF/MT NUMBERS AS A SECTION IN THE NEW REACTION  Dictin
    INDEX THE MOD NUMBER FROM THE ORIGINAL REACTION INDEX WILL BE USED Dictin
    IN THE NEW REACTION INDEX). OTHERWISE THE MOD NUMBER IN THE NEW    Dictin
    REACTION INDEX WILL BE SET EQUAL TO ZERO.                          Dictin
                                                                       Dictin
    PROGRAM OPERATION                                                  Dictin
    -----------------                                                  Dictin
    THE ENTIRE ENDF/B TAPE IS FIRST READ AND A DICTIONARY ENTRY IS     Dictin
    CREATED FOR EACH SECTION OF THE TAPE. THE ENDF/B TAPE IS THEN      Dictin
    REWOUND AND READ A SECOND TIME. DURING THIS SECOND PASS THE        Dictin
    DICTIONARY OF EACH MAT IS REPLACED. THIS VERSION OF DICTIN         Dictin
    DOES NOT USE SCRATCH FILES AND IS MORE EFFICIENT THAN EARLIER      Dictin
    VERSIONS OF DICTIN.                                                Dictin
                                                                       Dictin
    INPUT LINES                                                        Dictin
    -----------                                                        Dictin
      LINE   COLS.  DESCRIPTION                                        Dictin
      ----   -----  ------------------------------                     Dictin
         1   1-60   ENDF/B INPUT DATA FILENAME                         Dictin
                    (STANDARD OPTION = ENDFB.IN)                       Dictin
         2   1-60   ENDF/B OUTPUT DATA FILENAME                        Dictin
                    (STANDARD OPTION = ENDFB.OUT)                      Dictin
                                                                       Dictin
    EXAMPLE INPUT NO. 1                                                Dictin
    -------------------                                                Dictin
    READ \ENDFB6\K300\ENDFB.IN AND WRITE \ENDFB\K300\ENDFB.OUT. THE    Dictin
    FOLLOWING 2 INPUT LINES ARE REQUIRED,                              Dictin
                                                                       Dictin
\ENDFB6\K300\ENDFB.IN                                                  Dictin
\ENDFB6\K300\ENDFB.OUT                                                 Dictin
                                                                       Dictin
    EXAMPLE INPUT NO. 2                                                Dictin
    -------------------                                                Dictin
    USE THE DEFAULT FILENAMES TO READ ENDFB.IN AND WRITE ENDFB.OUT.    Dictin
    2 BLANK INPUT LINES ARE REQUIRED                                   Dictin
                                                                       Dictin
    INPUT FILES                                                        Dictin
    -----------                                                        Dictin
    UNIT  DESCRIPTION                                                  Dictin
    ----  -----------                                                  Dictin
       2  INPUT PARAMETERS (BCD - 80 CHARACTERS/RECORD)                Dictin
      10  ORIGINAL TAPE OF ENDF/B DATA (BCD - 80 CHARACTERS/RECORD)    Dictin
                                                                       Dictin
    OUTPUT FILES                                                       Dictin
    ------------                                                       Dictin
    UNIT  DESCRIPTION                                                  Dictin
    ----  -----------                                                  Dictin
       3  OUTPUT REPORT (BCD - 120 CHARACTERS/RECORD)                  Dictin
      11  FINAL TAPE OF ENDF/B DATA (BCD - 80 CHARACTERS/RECORD)       Dictin
                                                                       Dictin
    OPTIONAL STANDARD FILE NAMES (SEE SUBROUTINE FILIO1 AND FILIO2)    Dictin
    ------------------------------------------------------------       Dictin
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     UNIT  FILE NAME                                                    Dictin
     ----  ----------                                                   Dictin
       2   DICTIN.INP                                                   Dictin
       3   DICTIN.LST                                                   Dictin
      10   ENDFB.IN                                                     Dictin
      11   ENDFB.OUT                                                    Dictin
                                                                        Dictin
==========================================================================Dictin
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