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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
     VERS. 2007-1 (JAN. 2007)     *CHECKED AGAINST ALL ENDF/B-VII.  Dictin
                                  *UP TO 500,000 SECTIONS PER TAPE. Dictin
     VERS. 2007-2 (DEC. 2007)     *72 CHARACTER FILE NAMES.         Dictin
     VERS. 2010-1 (Apr. 2010)     *General update based on user feedback Dictin
     VERS. 2012-1 (Aug. 2012)     *Added CODENAME                  Dictin
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                              *32 and 64 bit Compatible           Dictin
                              *Added ERROR stops                  Dictin
VERS. 2015-1 (Jan. 2015)      *Corrected END = it was saying ERROR. Dictin
                              *Replaced ALL 3 way IF Statements.   Dictin
VERS. 2015-2 (Mar. 2015)      *Corrected Seqence Numbers           Dictin
                               1) Restart at 1 for each MAT/MF/MT. Dictin
                               2) 99999 on section end, MT=0       Dictin
                               3)     0 on MF = 0                  Dictin
VERS. 2017-1 (May  2017)      *Updated based on user feedback.     Dictin
                                                                   Dictin
2015-2 Acknowledgment                                              Dictin
====================                                               Dictin
I thank Jean-Christophe Sublet (UKAEA) for contributing MAC        Dictin
executables and Bojan Zefran (IJS, Slovenia) for contributing      Dictin
LINUX (32 or 64 bit) executables. And most of all I must thank     Dictin
Andrej Trkov (NDS, IAEA) for overseeing the entire PREPRO project  Dictin
at IAEA, Vienna. This was a truly International team who worked     Dictin
together to produce PREPRO 2015-2.                                 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
                                                                   Dictin
PRESENT CONTACT INFORMATION                                        Dictin
--------------------------                                         Dictin
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                                                                   Dictin
AUTHORS MESSAGE                                                    Dictin
---------------                                                    Dictin
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
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TERMINOLOGY---ENDF/B TAPE---WILL BE USED. IN FACT THE ACTUAL
MEDIUM MAY BE TAPE, CARDS, DISK, OR ANY OTHER MEDIUM.

ENDF/B FORMAT

THIS PROGRAM ONLY USES THE ENDF/B BCD OR CARD IMAGE FORMAT (AS
OPPOSED TO THE BINARY FORMAT) AND CAN HANDLE DATA IN ANY VERSION
OF THE ENDF/B FORMAT (I.E., ENDF/B-I, II,III, IV, V OR VI FORMAT).

THIS PROGRAM WILL AUTOMATICALLY DETERMINE WHICH VERSION OF THE
ENDF/B FORMAT EACH MAT IS IN AND WILL THEN PROPERLY REPLACE THE
REACTION INDEX FOR EACH MAT. DIFFERENT MATS ON THE SAME TAPE MAY
EVEN BE IN DIFFERENT VERSIONS OF THE ENDF/B FORMAT.

IT IS ASSUMED THAT THE DATA IS CORRECTLY CODED IN THE ENDF/B
FORMAT AND NO ERROR CHECKING IS PERFORMED. IN PARTICULAR IT IS
ASSUMED THAT THE MAT, MF AND MT ON EACH LINE IS CORRECT. SEQUENCE
NUMBERS (COLUMNS 76-80) NEED NOT BE PRESENT ON INPUT, BUT WILL BE
CORRECTLY OUTPUT ON ALL LINES.

ENDF/B FORMAT VERSION

THE ENDF/B FORMAT CAN BE DETERMINED FROM THE SECOND LINE OF
THE HOLLERITH SECTION (MF=1, MT=451).
ENDF/B-IV = N1 - LINE COUNT (POSITIVE)
ENDFB/-V = N1 = N2 =0
ENDF/B-VI = N1 =0, N2= VERSION NUMBER (6 OR MORE)

SECTION SIZE

SINCE THIS PROGRAM ONLY READS THE DATA ONE LINE AT A TIME THERE
IS NO LIMIT TO THE SIZE OF ANY GIVEN SECTION, E.G. THE TOTAL
CROSS SECTION MAY BE DESCRIBED BY 200,000 DATA POINTS.

NUMBER OF SECTIONS PER TAPE

IT IS ASSUMED THAT THE ENDF/B TAPE CONTAINS 100,000 OR FEWER
SECTIONS = 100,000 OR FEWER MAT,MF,MT COMBINATIONS. IF THIS LIMIT
IS EXCEEDED THIS PROGRAM WILL TERMINATE EXECUTION. IF NEED BE THIS
LIMIT CAN EASILY BE CHANGED BY CHANGING THE DIMENSION STATEMENT
BELOW AND RE-DEFINING THE VARIABLE MAXTAB IN THE BELOW DATA
STATEMENT. ALTERNATIVELY THE ENDF/B TAPE MAY BE DIVIDED INTO A
NUMBER SMALLER TAPES EACH CONTAINING 100,000 OR FEWER SECTIONS.
EACH ENDF/B TAPE CAN THEN RUN THROUGH THIS PROGRAM AND THE OUTPUT
FOR EACH ENDF/B TAPE CAN THEN BE RE-COMBINED (I.E., MERGED BACK
TOGETHER).

HOLLERITH SECTION

IF ANY MATERIAL DOES NOT INITIALLY CONATIN A SECTION MF=1, MT=451
A WARNING MESSAGE WILL BE PRINTED AND THE MATERIAL WILL BE COPIED.

IF ANY MATERIAL INITIALLY CONTAINS A SECTION MF=1, MT=451 A NEW
REACTION INDEX WILL BE CREATED AND INSERTED. THE INITIAL SECTION
MF=1, MT=451 MAY OR MAY NOT CONTAIN A REACTION INDEX.

IF THE MATERIAL INITIALLY CONTAINS A REACTION INDEX IT WILL BE
USED TO DEFINE THE MOD NUMBER FOR CORRESPONDING SECTIONS IN THE
NEW REACTION INDEX (I.E. IF A SECTION FROM THE ORIGINAL REACTION
INDEX HAS THE SAME MF/MT NUMBERS AS A SECTION IN THE NEW REACTION
INDEX THE MOD NUMBER FROM THE ORIGINAL REACTION INDEX WILL BE USED
IN THE NEW REACTION INDEX). OTHERWISE THE MOD NUMBER IN THE NEW
REACTION INDEX WILL BE SET EQUAL TO ZERO.

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                                                                      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
      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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