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PROGRAM DICTIN (Renamed from DICTION to eliminate conflict with
                UNIX diction command - 12/22/02)
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VERSION 81-1 (SEPTEMBER 1981)
VERSION 82-1 (JANUARY 1982)
VERSION 83-1 (JANUARY 1983) *KEEP ORIGINAL MOD. NUMBER
                             *NEW, MORE COMPATIBLE I/O UNITS.
VERSION 84-1 (SEPTEMBER 1984) *UPDATED TO HANDLE ENDF/B-VI FORMAT.
                             (PROGRAM WILL NOW WORK ON ALL
                             VERSIONS OF THE ENDF/B FORMAT).
VERSION 85-1 (AUGUST 1985) *FORTRAN-77/H VERSION
VERSION 86-1 (JANUARY 1986) *MAT ORDER CHECK.
                             *IF NO HOLLERITH SECTION COPY MAT.
VERSION 88-1 (JULY 1988) *OPTION...INTERNALLY DEFINE ALL I/O
                             FILE NAMES (SEE, SUBROUTINE FILEIO
                             FOR DETAILS).
VERSION 89-1 (JANUARY 1989) *IMPROVED BASED ON USER COMMENTS.
                             *PSYCHOANALYZED BY PROGRAM FREUD TO
                             INSURE PROGRAM WILL NOT DO ANYTHING
                             CRAZY.
                             *IMPROVED BASED ON USER COMMENTS.
                             *ADDED LIVERMORE CIVIC COMPILER
                             CONVENTIONS.
                             *UPDATED TO USE NEW PROGRAM CONVERT
                             KEYWORDS.
VERSION 92-1 (JANUARY 1992) *UPDATED BASED ON USER COMMENTS.
                             *UP TO 6000 SECTIONS PER TAPE.
                             *CHANGED DEFAULT MOD NUMBER FOR NEW
                             SECTIONS FROM 0 TO 1
VERSION 94-1 (JANUARY 1994) *VARIABLE ENDF/B DATA FILENAMES
                             TO ALLOW ACCESS TO FILE STRUCTURES
                             (WARNING - INPUT PARAMETER FORMAT
                             HAS BEEN CHANGED)
                             *CLOSE ALL FILES BEFORE TERMINATING
                             (SEE, SUBROUTINE ENDIT)
                             *ADDED FORTRAN SAVE OPTION
VERSION 96-1 (JANUARY 1996) *COMPLETE RE-WRITE
                             *IMPROVED COMPUTER INDEPENDENCE
                             *ALL DOUBLE PRECISION
                             *ON SCREEN OUTPUT
                             *UNIFORM TREATMENT OF ENDF/B I/O
                             *IMPROVED OUTPUT PRECISION
VERSION 99-1 (MARCH 1999) *CORRECTED CHARACTER TO FLOATING
                             POINT READ FOR MORE DIGITS
                             *UPDATED TEST FOR ENDF/B FORMAT
                             VERSION BASED ON RECENT FORMAT CHANGED
                             *GENERAL IMPROVEMENTS BASED ON
                             USER FEEDBACK
VERS. 2000-1 (FEBRUARY 2000) *GENERAL IMPROVEMENTS BASED ON
                             USER FEEDBACK
VERS. 2002-1 (MAY 2002) *OPTIONAL INPUT PARAMETERS
                             *RENAMED dictin TO ELIMINATE CONFLICT
                             WITH UNIX diction COMMAND.
                             *ADDED DOCUMENTATION LINE TO COMMENTS.
VERS. 2004-1 (JAN. 2004) *GENERAL UPDATE BASED ON USER FEEDBACK
                             *UP TO 100,000 SECTIONS PER TAPE.
VERS. 2007-1 (JAN. 2007) *CHECKED AGAINST ALL ENDF/B-VII.
                             *UP TO 500,000 SECTIONS PER TAPE.
VERS. 2007-2 (DEC. 2007) *72 CHARACTER FILE NAMES.
VERS. 2010-1 (Apr. 2010) *General update based on user feedback
VERS. 2012-1 (Aug. 2012) *Added CODENAME
                             *32 and 64 bit Compatible
                             *Added ERROR stops
VERS. 2015-1 (Jan. 2015) *Corrected END = it was saying ERROR.
                             *Replaced ALL 3 way IF Statements.
VERS. 2015-2 (Mar. 2015) *Corrected Sequence Numbers
                             1) Restart at 1 for each MAT/MF/MT.
                             2) 99999 on section end, MT=0
                             3) 0 on MF = 0
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VERS. 2017-1 (May 2017) \*Updated based on user feedback. DICTIN  
VERS. 2018-1 (Jan. 2018) \*Added on-line output for ALL ENDERRORDICTIN  
VERS. 2020-1 (Feb. 2020) \*Identical to 2018-1. 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

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

ORIGINALLY WRITTEN BY DICTIN  
----- DICTIN

Dermott E. Cullen DICTIN

PRESENT CONTACT INFORMATION DICTIN  
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AUTHORS MESSAGE DICTIN  
----- DICTIN

THE COMMENTS BELOW SHOULD BE CONSIDERED THE LATEST DOCUMENTATION DICTIN  
FOR THIS PROGRAM INCLUDING ALL RECENT IMPROVEMENTS. PLEASE READ DICTIN  
ALL OF THESE COMMENTS BEFORE IMPLEMENTATION. 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 APPRECIATED 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

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

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

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

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  
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.

#### PROGRAM OPERATION

-----  
THE ENTIRE ENDF/B TAPE IS FIRST READ AND A DICTIONARY ENTRY IS  
CREATED FOR EACH SECTION OF THE TAPE. THE ENDF/B TAPE IS THEN  
REWOUND AND READ A SECOND TIME. DURING THIS SECOND PASS THE  
DICTIONARY OF EACH MAT IS REPLACED. THIS VERSION OF DICTIN  
DOES NOT USE SCRATCH FILES AND IS MORE EFFICIENT THAN EARLIER  
VERSIONS OF DICTIN.

#### INPUT LINES

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LINE COLS. DESCRIPTION  
-----  
1 1-60 ENDF/B INPUT DATA FILENAME  
(STANDARD OPTION = ENDFB.IN)  
2 1-60 ENDF/B OUTPUT DATA FILENAME  
(STANDARD OPTION = ENDFB.OUT)

#### EXAMPLE INPUT NO. 1

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READ \ENDFB6\K300\ENDFB.IN AND WRITE \ENDFB\K300\ENDFB.OUT. THE

