FXREF

A PROGRAM TO CREATE CROSS REFERENCE LISTINGS

OF FORTRAN 77 PROGRAMS

TO PRODUCE CROSS REFERENCE LISTINGS OF:

VARIABLE NAMES
STATEMENT NUMBERS
INPUT-OUTPUT UNITS (NUMERICAL & VARIABLE)
CONSTANT TYPES
CHARACTER (LITERALS)
COMPLEX (SINGLE & DOUBLE)
DOUBLE PRECISION
DOUBLE COMPLEX
INTEGER
REAL (SINGLE & DOUBLE)
COMMON DEFINITIONS & RELATIVE ADDRESSES
EQUIVALENCE DEFINITIONS & RELATIVE ADDRESSES
ENTRY, FUNCTION, AND SUBROUTINES USED
A STATISTICAL TABLE SUMMARIZING ALL ITEMS

ACCEPT	**DO WHILE**	**EXTERNAL**	**PRINT**
ASSIGN	**DOUBLE COMPLEX**	**FORMAT**	**PROGRAM**
BACKSPACE	**DOUBLE PRECISION**	**FUNCTION**	**READ**
BLOCK DATA	**ELSE**	**GO TO**	**REAL**
BYTE	**ELSE IF**	**IF**	**RECORD**
CALL	**ENCODE**	**IMPLICIT**	**RETURN**
CHARACTER	**END**	**INCLUDE**	**REWIND**
CLOSE	**END DO**	**INQUIRE**	**SAVE**
COMMON	**ENDFILE**	**INTEGER**	**STOP**
COMPLEX	**END IF**	**INTRINSIC**	**STRUCTURE**
CONTINUE	**END MAP**	**LOGICAL**	**TYPE**
CYCLE	**END STRUCTURE**	**MAP**	**UNION**
DATA	**END UNION**	**NAMELIST**	**VIRTUAL**
DECODE	**ENTRY**	**OPEN**	**VOLITALE**
DIMENSION	**EQUIVALENCE**	**PARAMETER**	**WHILE**
DO	**EXIT**	**PAUSE**	**WRITE**

CHARACTER CONSTANTS (LITERALS)

DELIMITERS

APOSTROPHEES OR QUOTATION MARKS MAY BE USED, EXCEPT APOSTROPHEES ONLY MAY BE USED AS ARGUMENTS IN CALL STATEMENTS

BINARY, OCTAL, & HEXADECIMAL CHARACTER CONSTANTS B, O, OR, Z MAY OCCUR BEFORE OR AFTER THE LEADING OR TRAILING DELIMITER

COMMENT STATEMENTS

A C IN COLUMN 1

AN ASTERISK IN COLUMN 1

AN EXCLAMATION MARK IN ANY COLUMN DESIGNATES ALL TEXT IS IGNORED FROM THAT COLUMN TO THE END OF THE INPUT RECORD EXCEPT WHEN PART OF A LITERAL

HOLLERITH FIELDS

HOLLERITH FIELDS ARE CONVERTED TO CHARACTER CONSTANTS ENCAPSULATED WITHIN APOSTRPOPHEES

VARIABLES

MAXIMUM LENGTH OF ALL VARIABLE NAMES IS 32 CHARACTERS.

COMPOUND VARIABLE NAMES USED TO ACCESS VARIABLES DEFINED WITHIN A STRUCTURE MAY HAVE EACH RECORD NAME AND VARIABLE NAME LENGTH UP TO 32 CHARACTERS

MOST FORTRAN COMPILERS ALLOW A MAXIMUM OF 31 CHARACTERS

IN VARIABLES DEFINED WITHIN A STRUCTURE DEFINITION, RECORD NAMES, AND VARIABLE NAMES OCCURRING IN A COMPOUND VARIABLE NAME MAY BE SEPARATED BY EITHER A PERIOD (.) OR A PERCENTAGE SIGN (%)

NESTING OF STRUCTURE DEFINITIONS MAY BE UP TO 6 DEEP ALLOWING A TOTAL OF 7 LEVELS

FXREF GENERATES INTERNAL VARIABLE NAMES FOR DIAGNOSTIC AND PROCESSING PURPOSES. ALL START WITH C##, AND WILL OCCUR IN SOME GLOBAL DIAGNOSTIC MESSAGES.

PROGRAM CAPACITY FOR A SINGLE FORTRAN MODULE

4000 VARIABLE NAMES
4000 PARAMETER DEFINED NAMED INTEGER CONSTANTS
4000 FLOATING POINT (REAL) CONSTANTS
2000 INTEGER CONSTANTS
1000 DIMENSIONED VARIABLES
1000 STATEMENT NUMBERS
1000 STRUCTURE STATEMENTS
1000 RECORD STATEMENTS
1000 VARIABLE NAMES DEFINED WITHIN ALL STRUCTURES
1000 REFERENCES TO A SINGLE VARIABLE NAME
500 REFERENCES TO A SINGLE STATEMENT NUMBER
500 VARIABLE NAMES WITHIN A SINGLE COMMON BLOCK
200 COMMON BLOCK DEFINITIONS
200 LITERALS IN A SINGLE FORTRAN STATEMENT
256 MAXIMUM CHARACTERS IN A LITERAL
99 INTEGER INPUT-OUTPUT UNITS
99 VARIABLE INPUT-OUTPUT UNITS
99 CONTINUATION RECORDS

PROGRAM CAPACITY FOR A SINGLE FORTRAN MODULE

30 ARGUMENTS FOR A CALL STATEMENT
20 VARIABLE NAMES IN AN EQUIVALENCE GROUP
20 MAP STATEMENTS
20 NESTED UNION STATEMENTS
10 MAXIMUM ARITHMETIC OPERATIONS IN EXPRESSIONS
USING PARAMETER DEFINED CONSTANTS TO SET LENGTH
CHARACTERISTIC DEFINITIONS, DIMENSION SIZE, AND
ANY OTHER PARAMETER DEFINITIONS
DISK CAPACITY FOR LITERALS

THERE ARE NO OTHER LENGTH OR SIZE LIMITATIONS OF SOURCE MODULES, BUT DISK CAPACITY IS A LIMITING FACTOR FOR ALL WORK FILES.

DISK WORK FILES USE THE PATH OF FXREF.EXE

UNIT 1 - CONTROL CARDS (CLOSED AFTER CONTROL CARDS READ)
UNIT 5 - FORTRAN SOURCE CODE TO BE PROCESSED

OUTPUT UNITS REQUIRED

UNIT 6 - OUTPUT LISTING

WORK INPUT-OUTPUT UNITS REQUIRED

UNIT 0 - DIAGNOSTIC & ERROR MESSAGES
UNIT 2 - INPUT-OUTPUT UNITS DEFINED AS VARIABLE NAMES
UNIT 4 - STATEMENT NUMBERS REFERENCED WITHIN A MODULE
UNIT 7 - A VARIABLE NAME & ISNS OCCURRING WITHIN A MODULE
UNIT 8 - NUMERIC INPUT-OUTPUT UNITS & THEIR ISNS
UNIT 9 - LITERALS & THEIR ISNS
UNIT 11 - COMMON BLOCK VARIABLES & THEIR TYPE & LENGTH
UNIT 12 - DEFINED EQUIVALENCE VARIABLES IN COMMON
UNIT 13 - RESERVED FOR DEBUGGING
UNIT 14 - 20 STRUCTURE DEFINITIONS & VARIABLES

UNITS REQUIRED FOR GLOBAL ANALYSIS (OPTIONAL)

UNIT 1 - ALL COMMON BLOCK VARIABLE NAMES
UNIT 3 - ALL SUBROGRAM NAMES DEFINED WITHIN THE PROGRAM
UNIT 10 - ALL SUBPROGRAM NAMES USED IN CALL STATEMENTS

A CONTROL CARD FILE MUST BE CREATED WITH A NAME OF:
FXREF.CCD

IT MUST ACCESSABLE BY THE FILE SEARCH ALGORITHM USED BY THE OPERATING SYSTEM

CONTROL CARD OPTIONS

OUTPUT LISTING MAY HAVE 60 OR 80 LINES PER PAGE

OUTPUT LISTING MAY BE EITHER TEXT OR POSTSCRIPT

PAPER ORIENTATION MAY BE VERTICAL (PORTRAIT) OR HORIZONTAL (LANDSCAPE)

OUTPUT LISTING MAY BE ONE OR TWO FILES FOR POSTSCRIPT OUTPUT CHOICE
ALL PAGES IN A SINGLE FILE
ODD PAGES AND EVEN PAGES WRITTEN TO DIFFERENT FILES
EVEN PAGES FILE MAY BE IN ASCENDING OR DECENDING ORDER

NUMBER OF COLUMNS OF FORTRAN SOURCE CODE MAY BE 72 OR 132

OPTION TO CHOOSE GLOBAL ANALYSIS

REQUIRES INPUT FORTRAN SOURCE CODE FILES PATH & NAME

UP TO TEN FILE NAMES MAY USED AS FORTRAN SOURCE CODE

REQUIRES OUTPUT LISTING PATH & FILE NAME

PROGRAM IS STARTED FROM THE COMMAND LINE

UP TO TEN OUTPUT TABLES MAY BE CREATED
TABLES WITH ZER0 ENTRIES ARE NOT PRINTED

TABLE 1 THE ORIGINAL SOURCE FORTRAN CODE WITH ISNS
TABLE 2 CROSS REFERENCE OF VARIABLE NAMES
TABLE 3 CROSS REFERENCE OF STATEMENT NUMBERS
TABLE 4 CROSS REFERENCE OF ALL INTEGER UNIT NUMBERS FOLLOWED BY ALL VARIABLE UNITS
TABLE 5 CROSS REFERENCE OF ALL INTEGER NUMBERS
TABLE 6 CROSS REFERENCE OF ALL FLOATING POINT NUMBERS LOGARITHMIC NOTATION IS USED. NO DISTINCTION IS MADE BETWEEN SINGLE AND DOUBLE PRECISION.
TABLE 7 CROSS REFERENCE OF ALL CHARACTER CONSTANTS
TABLE 8 ALL VARIABLES OF EACH COMMON BLOCK SHOWING RELATIVE ADDRESSES, DATA TYPE, AND LENGTH PLUS TOTAL LENGTH OF THE COMMON BLOCK
ALL VARIABLES EQUIVALENCED TO VARIABLES IN A COMMON BLOCK ARE LISTED AFTER THE COMMON BLOCK WITH THEIR EXACT RELATIVE ADDRESS WITHIN THE BLOCK
TABLE 9 ALL SUBPROGRAMS CALLED BY A MODULE, INCLUDING FORTRAN INTRINSIC LIBRARY FUNCTIONS
TABLE 10 STATISTICS OF THE TABLES' CONTENTS

ANY MODULE ERROR MESSAGES FOLLOW TABLE 10

ANY GLOBAL ERROR MESSAGES ARE AT THE END OF THE LISTING

ALL FORTRAN INPUT FILES READ TO CREATE A TABLE OF ENTRY, FUNCTION, AND SUBROUTINE STATEMENTS DEFINED BY THE PROGRAM

EACH FORTRAN STATEMENT IS ASSEMBLED FROM INPUT RECORDS

THE STATEMENT HAS ALL LITERALS, STATEMENT NUMBERS, LOGICAL OPERATORS, AND BLANKS REMOVED

EACH STATEMENT IS IDENTIFIED, AND AN ANALYSIS ROUTINE IS CALLED.

THE STATEMENT IS SCANNED BOTH FORWARD AND BACKWARDS TO IDENTIFY AND CATALOG ALL VARIABLE NAMES AND NUMBERS IN 29 INTERNAL TABLES.

DATA NOT NEEDED FOR CURRENT PROCESSING ARE WRITTEN ON WORK UNITS 0, 2, 4, 7, 8, 9,11, & 12, AND USED TO CREATE THE OUTPUT LISTING FOR EACH FORTRAN MODULE

WORK UNITS 1, 3, & 10 ARE USED ONLY WHEN GLOBAL ANALYSIS IS REQUESTED

AFTER PROCESSING ALL STATEMENTS FOR A MODULE, DATA ARE VERIFIED FOR CONSISTANCY

LISTING IS CREATED AND WRITTEN

ALL SORT ROUTINES USE THE HEAP SORT ALGORITHM