71-00003 PROGRAM DESCRIPTION

Program Title LIFE:A

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Program Description (include equations) A familiarity with the game LIFE is assumed.

This lex file contains one keyword: LIFE$. The keyword is a string function that takes a string argument representing a current generation of LIFE (on a rectangular board of arbitrary dimension) and computes the next generation. The keyword is invoked as follows:

LIFE$ (<boardstring>,<row width<,>wrap flag>[,<alt fill char>])

The input parameters are as follows:

<boardstring> String parameter representing the current board. If the board is, for example, 80 columns by 24 rows, the string is 1920 characters long. The cells are in row-major order; that is, assuming the 80 x 24 case, the first 80 characters represent the first row, the next 80 characters represent the second row, etc. Empty cells are represented by a blank, occupied cells are represented by the fill character (which defaults to an "*" if not specified in the fourth parameter).

Necessary Accessories None

Supported Accessories N/A

Operating limits and warnings _____

_____ File name(s) _____

Size of file(s) _____ Additional RAM Requirement to run the program _____

References _____

CHAPTER 1
LIFELEX

New LEX File Indicates "LIFE:A" in VER$ string.

Program Title: LIFE Generation Computation Utility

Category Number(s): F102.

File Name(s): LIFELEX.

Primary Category Name: GAMES.

Size of File(s): 457 bytes.

Additional RAM Requirement: None.

Abstract: This lex file contains a very fast next-generation computer for John Conway's "Life" game. Computation time for a 24 by 80 board (useful if output is going to a typical terminal) is typically under two seconds.

Necessary Accessories: None.

Supported Accessories: N/A.

1.1 Program Description:

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second row, etc. Empty cells are represented by a blank, occupied cells are represented by the fill character (which defaults to an "*" if not specified in the fourth parameter).

<row width> Numeric parameter identifying row width. In the 80 x 24 case discussed above, this would be 80.

<wrap flag> Numeric parameter. Non-zero if the game board wraps around the edges. In other words, if non-zero, the top edge of the board is considered adjacent to the bottom edge and the left edge is adjacent to the right edge. If zero, the board edges are considered the "edge of the world".

<alt fill char> Optional string parameter. Specifies a character to use instead of "*" as the fill character.

The result of LIFE$ is a string representing the next generation playing board. Empty cells are represented by blanks, occupied cells by the fill character.

Error Conditions: LIFE$ will fail with an "Invalid Arg" error if any of the following is true:

- Either numeric argument is not a real finite scalar.
- <row width> is less than 3 or greater than 1048575.
- Length of <boardstring> is not an integer multiple of <row width>.
- Number of rows (length of <boardstring> divided by <row width>) is less than 3.

1.2 Variable Definitions

N/A.

1.3 Sample Usage

The following program demonstrates the use of LIFE$. It was written to send its output to an HP-82163A video interface, and requires an HPIL interface and an 82163A. The program uses cursor control sequences particular to that interface and makes assumptions about the screen size.

Lines 10-70 initialize variables. Lines 90-120 initialize the board to a random pattern (50% filled) of empty and occupied cells. Lines 130-140 print the current generation. Line 150 computes the next generation. Line 160 checks if the board has reached a one- or two-generation stability. The program terminates when one- or two-

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```
10 DESTROY ALL @ RANDOMIZE @ PRINTER IS :DISPLAY
20 PWIDTH INF
30 OPTION BASE 1
40 DIM B$[480],X$(2)[480]
50 G=0
60 X$(1)="" @ X$(2)=""
70 B$=""
80 PRINT CHR$(27)&"H"&CHR$(27)&"JCONSTRUCTING BOARD..."
90 FOR I=1 TO 480
100 B$=B$&"* "[RND+1][1,1]
110 PRINT B$[I,I];
120 NEXT I
130 PRINT CHR$(27)&"H";B$;
140 PRINT "     GENERATION #";G;CHR$(27)&"J"; @ G=G+1
150 B$=LIFE$(B$,32,1)
160 IF B$#X$(1) AND B$#X$(2) THEN X$(2)=X$(1) @ X$(1)=B$ @ GOTO 130
170 PRINT CHR$(27)&"%"&CHR$(0)&CHR$(15)&"STABLE AT GENERATION #";G-1
180 END
```

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(Continuation Page)

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