



#### ENTERING OR MODIFYING A PATTERN:

When program execution is begun, the screen will clear and the POPULATION and GENERATION numbers will appear on the top line. In the upper left of the display will be a flashing block, this block is the cursor and is used to enter a pattern on the screen. The cursor can be moved anywhere on the screen by using the four arrow keys. Holding any of the keys down will cause the cursor to move in that direction until the key is released. Cells are entered by holding down SHIFT while pressing an arrow key. When SHIFT is down, the cell being vacated will be left on. If SHIFT is not down the cell being vacated will be turned off. Pressing CLEAR will re-initialize the program by erasing the screen and returning the cursor to the upper-left.

#### LOADING AND SAVING PATTERNS:

Patterns may be saved and re-loaded any time the cursor is present on the screen. To save a pattern press S. The screen will clear and the tape version will then ask you to ready the recorder. Set up the recorder to save and press ENTER. The pattern will be written to tape and re-displayed on the screen. The disk version will first ask if output is to disk or tape. If you answer T the program will proceed as above, but if you answer D the program will then prompt for the filename. Enter the name (in standard TRSDOS format) under which you wish to store the pattern. The pattern will then be saved to disk and re-displayed as above.

To load a previously saved pattern press L. The same questions as above will be asked again only this time the pattern will be loaded from tape or disk then displayed on the screen. Please note that the contents of a file being loaded will be added to the current contents of the screen. This means you will usually want to clear the display (by pressing CLEAR) before loading, but will allow two different files to be easily merged if desired.

#### EXECUTING A PATTERN:

Once the desired pattern is displayed, press ENTER. The cursor will disappear and the program will begin updating the pattern according to the rules of LIFE. The generation counter will be incremented with each update and the population counter will show the number of cells currently alive.

The pattern can be paused by pressing the @ key and resumed by pressing ENTER. Pressing down arrow will slow the update to about 1/3 normal rate. Pressing up arrow will return the simulation to normal speed.



## THE GAME OF LIFE:

LIFE is a mathematical simulation of cell colony evolution invented by John Conway and first published by Martin Gardner in SCIENTIFIC AMERICAN (Oct. 70). The colony starts as a set of cells on a rectangular grid. Each cell (or square) may be either alive or dead in any particular generation. The fate of each cell is determined every generation from the status of its neighbors according to the following rules:

Any cell which has exactly three neighbors alive will be alive in the next generation.

A cell which has exactly two neighbors alive will be unchanged in the next generation.

A cell with more than three neighbors will die in the next generation from over-crowding.

A cell with less than two neighbors will die in the next generation from isolation.

A cell's neighbors are the eight cells immediately surrounding it above, below, to the sides, and diagonally. All births and deaths occur simultaneously in successive generations.

## PROGRAM DESCRIPTION:

LIFE 7.4 is a machine language program to simulate Life on your TRS-80. The program displays each generation graphically on a 42 X 62 grid, at a rate of approx. 95 generations per minute. The program can be paused at any point to allow modification of the pattern prior to the next generation. Patterns can be stored on disk or tape to be recalled at any time. The program can also be slowed to about one-third normal speed to allow closer inspection of the pattern or paused indefinitely between any two generations. Current population and generation numbers are constantly displayed and updated.

## PROGRAM LOADING:

The cassette contains the disk version of LIFE. The program is loaded by typing SYSTEM (ENTER). When the ?\* prompt appears, type the DLIFE and (ENTER). When the ?\* prompt reappears type a slash (/) and ENTER.



Pressing CLEAR will erase the screen and return to modify mode and also reset the population and generation counters. Pressing TAB (right arrow) will return to modify mode without erasing the display to allow the pattern to be manually altered or saved to tape or disk prior to continuing.

NOTE: The keyboard is checked for input only once after each generation is updated. Thus it will usually be necessary to hold a key down for a second or so to be sure it has been recognized. This will be especially true during slow speed execution.

#### PUTTING DLIFE ON DISK

DLIFE may be easily transferred to disk using the Radio Shack TAPEDISK program. Addresses are as follows: START=X'7800' END=X'7FAD' ENTRY=X'79D1'.



SUMMARY OF COMMANDS:

MODIFY MODE:

Arrow keys	-	move cursor on screen.
SHIFT arrow keys	-	move cursor and create new cell.
CLEAR	-	clear screen.
S	-	save displayed pattern.
L	-	load pattern from tape or disk.
ENTER	-	goto execute mode.

EXECUTE MODE:

@	-	pause program.
ENTER	-	resume after pause.
Down arrow	-	goto slow speed execution.
Up arrow	-	resume normal speed.
CLEAR	-	erase screen and return to modify mode.
TAB	-	goto modify mode without erase.