

LFrac

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Chapter 1

LFracS

1.1 LFracs Documentation

Welcome to the LFracs V1.0 User Manual

Please choose from the following points your preferred informations and follow the cross-references.

Copyright and Distribution

Address of the author

Introduction

Installation

Menus

Requesters

Program-History

Literature

(c) Alexander Welisch

1.2 LFracs Copyright and Distribution

LFracS (the executable Program, Source and Documentation) ↔
is
Copyright © 1996 Alexander Welisch.
All rights reserved.

LFracS is FREEWARE!

Permission is granted to make and distribute verbatim copies of LFracs, its documentation and sources. The source is included in this package and may be changed in any form for personal use. Such a changed version must NOT be distributed.

Because LFracs is for free, there's NO GUARANTEE for perfect functionality. The author cannot be hold responsible for any loss or damage, that is caused by the use of LFracs. You use LFracs at your own risk.

LFracs must not be sold; Only a copy-fee of not more than 4 \$(US) is permitted. Besides LFracs mustn't be distributed with other commercial products without permission of the author. LFracs may only be distributed if the whole documentation is included and the package is unchanged with the the source-code attached.

See also:

Address of the Author

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1.3 LFracs Address of the author

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1.4 Intentions and Functionality of LFracs

Before you continue to read this paragraph, you should have \leftrightarrow already installed the program on disk (or Harddisk) (see Installing LFracs).

Execute LFracs now (from Shell or Workbench).

At first you'll see the Input-Requester, in which you simply can press the DIR-Button and choose in the following File-Requester the file "Dragon.code". Leave the Input-Requester with the OK-Button.

In the now appearing Drawing-Requester select the field "Depth" and type in a number between 4 and 12. Don't think about the other fields at this time. Simply press the OK-Button again and the Fractal "Dragon" would be calculated in the preferred depth and then drawn on the screen.

At every time (also during a fractal is drawn) you can select a menu-point to choose another fractal (option "New" => Input-Requester) or to draw the same fractal in another depth (option "Draw" => Drawing-Requester). You can stop the drawing of a fractal with the right mouse-button.

Now play a little bit with the "depth"-parameter or load another Code-File in the Input-Requester and you quickly would understand the principles of LFracs.

Perhaps you even don't have to read the
detailed Instructions

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1.5 Detailed Instructions for LFracs

LFracS is a program for drawing L-Fractals (Line-Fractals).

L-Fractals are fractals, that can be generated in the form of a string by recursive expansion of a short origin code (in the following named "Axiom"). After that this string can be translated into (drawed as) a picture.

For example:

Assuming that we type in the Axiom "f", then this string means for the Computer: "Draw a horizontal Line of the length L from left to right".

So the program translates the Axiom into a drawing-command, therefore in a way that should be wellknown for users of the programming-language LOGO:

Think of a small turtle on a big sheet of paper. Our turtle only can go forward (she cannot bend), stop, or turn around her axis. That is to say if the turtle don't want to go only straight forward, she has to stop first, turn around (e.g. for 90°) and then go forward again (at the beginning the turtle stands still).

That turtle does everything that you say to her; if you say "go forward!", she goes a fixed distance forward (e.g. 1 meter - you have to firm this before) and stops after that. You say "Turn left" then she turns left around her own axis with an angle that you fixed before; afterwards she waits for new commands.

The named Axiom consists of commands for the turtle:

(Let $L=1m$ and $w=30^\circ$)
 "f" means "Go a distance forward"
 "-" means "Turn left about w degrees"
 "+" means "Turn right about w degrees"

"f-f+f" means: "Go 1m forward, turn left about 30 degrees, afterwards go forward 1m again, turn around 30 degrees to the right, go forward 1m and stop then."

If you draw the path of the turtle, it would look like that:

Now we want to begin with the Axiom $a = a[0] = "f-f++f-f" \Leftrightarrow _/__$

If you replace each "f" in a with a itself, you'll have a new string:

$a[1] = "f-f++f-f - f-f++f-f ++ f-f++f-f - f-f++f-f"$

as a picture this would be:

To install LFracs, simply unpack LFracs.lha in your preferred directory. Then the directory LFracs and the other Files/Directories will be automatically installed as you see above.

Of importance are the directories "FracsCodes" and "FracsPictures"; the files "#?.code" and "#?.lfpic" are only example-files, they are not necessary for the correct functionality of LFracs.

The source-code is packed in LFracs-Source.lha (if you don't need it, you can delete this file).

If you don't speak german, you can delete the Catalogs-Directory and the LF.deutsch.guide.

1.7 About the Menus

The menu-line of LFracs contains the following entries:

Project	Picture
New	Draw
Quit	Load
	Save
	Print

About the particular menu-points:

New: This menupoint opens the "Input"-Requester, which appears too when starting LFracs (see Requester).

You can enter a new fractal, load an old fractal or save the current one.

Quit: Terminates the program after a security-confirmation.

Draw: Opens the "Drawing"-Requester (see Requester).

Here it's possible to change diverse parameters (steplength, drawing-startpoint, calculation-depth and so on) for drawing a choosed (in the Input-Requester) fractal.

Load: Loads a fractal-picture that was saved before.

Save: Saves the currently shown fractal-picture, so that you don't have to generate a very nice fractal-picture again, for which the computer had to work hard and long.

Remarks: - As "fractal-picture" I think of a ready calculated and drawn picture of a fractal in a particular depth.
 - "Fractal" means the character-code which generates the fractal-picture. You can enter it in the Input-Requester with the Axiom and the belonging expansion-codes.

1.8 About the Requesters

At once when running LFracs you'll see the Input-Requester:

Here you can enter a new fractal yourself (Axiom- and Code-fields), save it (Save-Button) or load predefined fractals (Dir-Button).

Axiom- & Code-Inputfields: Through here you can enter a new fractal yourself. To save it later, you have to fill in the name-field (the fractal would be saved as name.code by pressing the SAVE-Button). After that you have to define the basic structure of the fractal with the Axiom-field (corresponds to $a[0]$ in the chapter

detailed Instructions

).

For example you enter "f++f-f" or "xf+y" in the Axiom-field. For every new character you introduce (e.g. "x" or "y"), you can enter the expansion-code in one of the Code-fields (when calculating $a[1]$ that character is replaced by the expansion-code; e.g. "x:y++f-f" means "replace every x in $a[i]$ by $y++f-f$ to get $a[i+1]$ ").

In the Code-fields the same characters as in the Axiom-field are permitted. Even for the character "f" (which means "go one step forward") you can define an expansion-code (e.g. "f:ff"); the default-expansion-code for "f" is "f:f" as for all other characters (so if you didn't define a expansion-code for "x", "y" you defined as "y:x++f-y" and the Axiom= $a[0]=xf+y$ then $a[1]=xf+x++f-y$).

Predefined characters: "+", "-", "(", ")", "f"

User-definable characters: "a", "b", ..., "e", "f", "g", ..., "x", "y", "z"

SAVE-Button: Don't press it before you have filled in correctly the Name-field, the Axiom-field and, if the occasion arises, the corresponding Code-fields!

The Input-Requester is also accessible with the menu-point "New".

After you filled in the Input-Requester, pressed the OK-Button respectively, you'll see the Drawing-Requester:

You have to decide now, in which depth the fractal has to be calculated and drawn (Depth-field), where the computer should start drawing the fractal (Startpoint), in which size to draw (Step = $xxx \cdot 0.1$ pixels, so "f" means "go $xx.x$ pixels forward"), how much the turtle has to turn for the characters "+" and "-" (Turn), and in what direction she looks at the beginning (Startangle).

The predefined values are reasonable for the most fractals.

Typical values for "Turn"-angle: 24 for treelike fractals

30 or 60 for the Flake- and Sierpinski3-fractal

90 for the Dragon-, Peano-, Hilbert, and Sierpinski4-fractal

xxx all other angles are worth a test

1.9 LFracs Program-History

v0.0 to v0.6: (not published)

- v0.1: First Implementation on an Amiga500 with 512kB and two Floppy-Drives. To save memory, results are saved temporary in packets of 1024 characters (code-length) on disk.
- v0.2: Addition of a grafical user interface (Gadgets and Requesters).
- v0.3: Heavy performance-optimizations; Swaping in packets of 32000 characters. Codes for the fractal-generation can be saved and loaded now.
- v0.4: Modularization of the source-code. Adaption to AmigaOS2.04 and implemентаion on an Amiga1200 with 60MB-Harddisk and 1MB Fast-RAM.
- v0.5: Halved demand for memory during code-generation; So it was possible to do without any swaping.
- v0.6: Now it's possible to save, load and print finished fractal-pictures. Besides the program adapts itself to different screenmodes (resolution-proportion!) and has got a fontsensitive user interface.

- v1.0: First official publication of LFracs
LFracS was fully localized and revised in the design. Added german catalog-file and english documentation.

1.10 Literature-hints for LFracs

I had the idea for LFracs when reading the book

Peitgen & Saupe, "The Beauty of Fractals", Springer Publishing, New York 1988
