

TECHNICAL INFORMATION AND FAQ

Frequently Asked Questions

I. What is it?

A Fractal Experience is an instructional program designed to give students a basic understanding behind the amazing phenomenon of fractals.¹

It may be freely distributed as an educational resource. Additions to the package are appreciated, but please send all additions to the below address so they will be included in later releases.

II. Who is it for?

While anyone can use the program and get an appreciation of the beauty of fractals, a strong math background is required to understand the mathematics taking place behind them.

Any student who has taken Algebra I or higher should be able to get a basic understanding of the process. Students who have taken Algebra II should be able to understand all the math that is used.

While the algorithms used in the program are far from refined (in fact, they are unoptimized and slow!) I believe that A Fractal Experience is one of the most advanced and most customizable Windows based fractal viewing programs available. If you are skilled with both fractals and programming, please e-mail me, as I can use all the help I can get writing optimized routines for the next version.

III. What do I need to run it?

I was afraid you would ask that! I am blessed with a very powerful computer system, but I realize that many people, especially in the academic community are not as lucky. As such, I fully intend to rewrite the fractal algorithms at my earliest convenience. As it stands now, if it runs, it runs, but here is what is **recommended**:

- * A Pentium 100 or faster PC
- * 8MB RAM (although I have never gotten an out-of-memory error on any machine)
- * 3-5MB of disk space
- * A PCI video card running in 800x600x64k or more colors (I spent 4 weeks getting it to work reasonably in 256 colors however)
- * Windows 95 (or later)

1~BMP: dave1.bmp

IIIb. Will it ever run on my 486?

In my opinion, Windows 95 barely runs on a 486, but I will try to streamline it to work (better) in the next version.

IV. How does it work?

To start the program, click the icon under your START-PROGRAMS menu.

After the title screen you are presented with a list of options:

-Teach Me

Used to display lessons relating to fractal topics. Several lessons are included, but others can easily be added. Simply create a .rtf file in the format described below and place it in the directory. Select "other" from the teach me menu to load it.

Once in the view, you will see the lesson to the right, and any fractal or picture links included in the lesson listed on the left. Double click them to view.

-Show Me

Used to display interactive presentations of fractals. Other examples can easily be added by adding on to the existing .fee files or creating new ones. See the .fee format described below.

In the open file box, select one of the .fee files listed (I suggest example.fee to start). Single click one of the fractals on the left to see a description. Double click it to view.

-Let me Play

Allows the user to display a fractal and interact with it.

While most of the options available are either obvious or nonessential, here are the functions of some of the more obscure ones:

Number of iterations: This determines how detailed a fractal will be drawn. If you expect to be zooming in much, type a number in the thousands. If the fractal you are looking at seems to be losing detail (or you see a circle where there should be a minibrot) as you zoom in you have either 1. Reached the zooming limit or 2. Not entered enough iterations.

Number of divisions: When the fractal is drawn, it is drawn in multiple passes. If you take this number and square it, you will have the number of passes it takes to draw the fractal. A smaller number usually renders faster (only if quickview is off, see below), a larger number displays a rough outline faster.

Quickview: If Quickview is enabled, the first pass will fill in adjoining pixels to remove black space. Many times this means that a fractal being drawn in 16 passes is recognizable after only one. The cost is that the first pass is slower however.

Palette File: The program uses .map 256 color palette files to determine the colors used to draw the fractal, double click to select an alternate color set. Select random to use a random palette (looks best

on plasma fractals).

Reset: Resets all settings to their default values.

Save: This option saves all your current settings as a .fee file (or appends the file if it already exists) You must name your fractal (no spaces) and can add an optional description that will be displayed in the Show Me! viewer. If you used a random palette, you have the option of saving it for later use by double clicking the palette name box. If you used a random palette, and do not save it, *it will not be displayed later.*

In the viewing screen

While the fractal is drawing, you may click the right mouse button at any time to stop.

Once in the viewing screen a toolbar will appear on the left and a menu will be available. On the toolbar, the tools available are (from top to bottom):

Plus magnifying glass: When selected, a left click will zoom in on the indicated portion of the fractal. A right click will zoom out.

Minus magnifying glass: When selected, a left click will zoom out on the indicated portion of the fractal. A right click will zoom in.

Magnifying box: You may drag a box with the left button depressed. The window will be zoomed to that area. A right click will zoom out.

Magnifying hand: NEW! Real-time zoom. Click the left mouse button while over the fractal. Moving the mouse right to left will zoom in on the fractal as you do it, moving from left to right will zoom out. Holding **SHIFT** down while still holding the mouse down will allow you to **SCROLL the fractal**. Holding **CTRL** down while holding the mouse button down will allow you to **MOVE the mouse** without changing the fractal (when you reach the edge of your mouse pad for instance).

Numeric spin control: Adjust the zooming speed, a higher number will allow you to zoom in/out faster.

Paintbrush with arrow: Redraw the current view, when you have resized the viewing window, or made some other change.

Percent bar: Used to display progress while drawing fractal (NOTE: not 100% accurate on plasma fractals yet!)

Pencil/Paper: Brings up settings box with current window coordinates. Used to save your current view or change an option.

The Menu:

File-Save: Saves a BMP file of the current view.

File-Save as FEE file: Saves the current SETTINGS to an fee example file.

File-Save as Wallpaper: Saves a BMP in your Windows directory (fracexp.bmp) and sets it as your desktop wallpaper.

Edit-Settings: Brings up the settings box (same a pencil/paper)

Edit-Copy: Copies the image to the clipboard

Exit: Closes the viewing window (same as clicking on top right x)

-Email / About

This is where you will find the revision number and build date of the program. Clicking on the button with my E-mail address will allow you to send me a message, you can even attach files if you want! You need to have a TCP/IP connection of some sort for this to work properly. Windows 95 dial-up networking works fine.

V. *I meant, how does it draw the fractals?*

Be sure to see the included lessons on fractals to learn how.

VI. *How far can I zoom in?*

A LOOOOONG way.

Let me put it this way:

You can zoom in on an **ELECTRON** sized portion of the original fractal, and the **original fractal** will be the **size of THE ENTIRE VISIBLE UNIVERSE** (obviously you would be viewing only a small portion of it on your screen)

When you reach the zoom limit, the screen will get very blocky and will not be refined any more as you zoom in.

If you continue to zoom in, you may get a floating point error. So don't.

VII. *What file formats are used?*

The primary formats used by the program are .bmp .map .rtf and .fee

.bmp -Standard Windows bitmap file, any number of colors, any resolution, must NOT be RLE compressed.

.map -Color palette file, 256 lines each with 3 numbers 0 - 255 representing the red blue green values of each color. Same format as used by Fractint.

.rtf -Fractal Experience instructional/informational file. Actually, it *IS* an RichTextFile. They can be viewed, edited, or created in just about any Windows word processor (including Wordpad, although I recommend WordPerfect or MS Word).

To embed fractal images or bitmaps into the .rtf file, simply insert a

footnote (anywhere in the document) that says: “~BMP: picturename.bmp” or “~FEE: examplefile.fee exemplename” You must be using MS Word or WordPerfect to create RTF footnotes. Be sure and look at the included RTF files for examples.

.fee -Fractal Experience Example/Slide show file.

The .fee file is a text file with the descriptions of fractals to be displayed.

Each .fee file can have an unlimited number of examples. Each example includes 1 fractal and 1 description

The following is the format used:

---BEGIN FILE---

@ - START RECORD

[EXAMPLENAME]

- FIELD DELIMITER

[DESCRIPTION] - *As many lines as you want. Plain text only.*

- FIELD DELIMITER

colorfile.map (default.map or other)

type (m,j,p) top-left-X top-left-Y bottom-right-X bottom-right-Y real-part
complex-part maxiterations (*type through maxiterations all on one line*)

-END RECORD

@ Begin next example here

---END FILE---

Be sure to see the included .fee files for clarification.

VIII. Is creating .fee files really that tough?

Not any more! The correct format is automatically generated when you select SAVE from the settings box of a fractal.

All you have to do is experiment until you find a fractal you want to save as an example, then bring up the settings box and select SAVE. You can input the fractal name (a.k.a the example name) and a description right there! When you save, you can either create a new file, or append an existing one (just select an existing file in the save dialog box).

IX. Where can I go for further information?

Your local or school library is sure to have many different books on fractals.

If you are looking for online resources, check out the Fractal Experience Page at:

<http://www.mnsinc.com/wgwright/fracexp>

also, browse the Yahoo! Fractal page at:

http://www.yahoo.com/Arts/Visual_Arts/Computer_Generated/Fractals/

X. *Why are there always ten points?*

For an excellent discussion of this question, check out *A Mathematician Reads the Newspaper* by John Allen Paulos.

The tenth point:

A Fractal Experience (the program) is Copyright 1997, by David Wright (the author). The program may be freely distributed as an educational resource. No charge may be made for the program, unless approved by the author. Modifications to the program itself are strictly prohibited. Additions in the form of .RTF and .FEE files are welcome, and should be directed to the author for inclusion in later releases. Derivatives, wholly or partially based on the source code or information provided in or with the program, are allowed, but must give full credit to the author where appropriate. The author bears no responsibility for any damages (hardware, software, or mental trauma) that result from using this program. Images produced by fractals are strictly fictitious, and bear no intentional resemblance to any person, living or dead. I have never seen Elvis in a fractal.

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