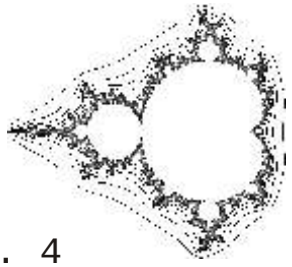
XaoS Notes



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Theory:

XaoS is a free program that generates fractals. Fractals are wonderful complex and chaotic images. Working with fractals can give you a sense of the infinite and the *numinous.*

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To download a copy of XaoS visit the XaoS home page at: http://xaos.sourceforge.net/index.php

Thanks to Victor Rajewski, 2003 GDE student for introducing me to XaoS

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XaoS Notes

Installing XaoS

Note: Each time you want to use XaoS on a computer in one of the University labs you will have to download and install XaoS. If you install it at home you will only have to go through this process once.

1) Start Internet Explorer open my home page velorum.ballarat.edu.au/~rrussell and select tutorials from the menu at the top of the screen.

2) Open the *What are Fractals?* page from the bottom of the contents list.

3) Select the *Windows 98 version 3.1 or XP version as required*
or enter the following address into your browser:

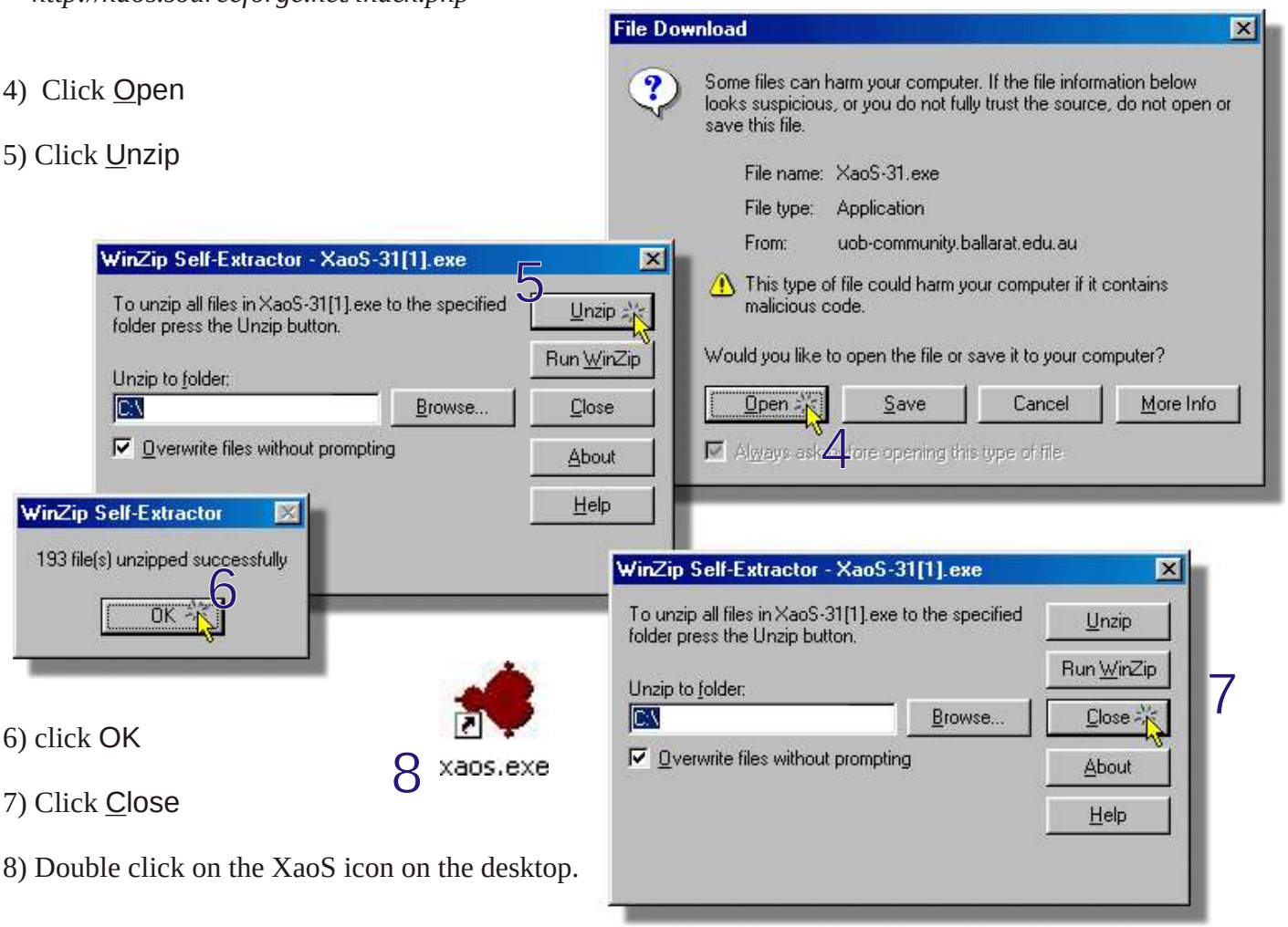
http://velorum.ballarat.edu.au/~rrussell/fractals/WinXaoS31-98.exe

http://velorum.ballarat.edu.au/~rrussell/fractals/WinXaoS31-XP.exe

Note: *If you need a UNIX or Macintosh version for home that are available from: http://xaos.sourceforge.net/index.php*

4) Click Open

5) Click Unzip



6) click OK

7) Click Close

8) Double click on the XaoS icon on the desktop.

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XaoS Notes

Basic controls

Once installed XaoS is easy to use, use the left mouse button to zooms in and the right mouse button to zoom out. Move the mouse around to pan the fractal while zooming or press and hold both mouse buttons together and drag the fractal image around the screen.

Mouse Buttons

Left	Zoom in
Right	Zoom out
Both	Drag the fractal

Keyboard shortcuts

A	Autopilot
D	Default palette
F	Change internal colours from black
H	Help
J	Fast Julia
L	Display ministatus ~ fractal informaion
M	Switch from Mandelbrot to Julia set
O	Rotation submenu
P	Load a random palette
Q	Quit
U	Undo
Y	Colour cycling

Up arrow	Increase zoom speed
Down arrow	Decrease zoom speed
Left arrow	Reduce iterations
Right arrow	Increase iterations

Number keys.

1	The default Mandelbrot Set formula z = z^2 + c
2	Mandelbrot ^ 3 Set z = z ^ 3 + c
3	Mandelbrot ^ 4 Set z = z ^ 4 + c
4	Mandelbrot ^ 5 Set z = z ^ 5 + c
5	Mandelbrot ^ 6 Set z = z ^ 6 + c
6	The octo fractal discovered by Thomas A. K. Kjaer.
7	The Newton.
8	The Barnsley set
9	The Phoenix. It is a very nice and quite famous fractal.
0	The Magnet.

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XaoS Notes

Iterations

Theory:

Because the boundary of the Mandelbrot Set is infinitely complex it would take an infinite amount of time to calculate a single point within the Mandelbrot Set. This would be extremely boring having to wait forever for a single back spot to appear on the screen.

To avoid this programs that generate the Mandelbrot Set usualy allow you to specify a maximum number of iterations or loops through the formula foe each point on the screen.

If the number of iterations is too large it will take too long to calculate each screen and the zooming speed will suffer. If the number of iterations to too small detail will be lost.

By default XaoS set the number of iterations to 170 this number will not be adequate to show sufficient detail if you zoom in deeply. If the edge of the set is looking boring try increasing the number of iterations. To do this press the right arrow on the keyboard.

Use the left and right arrow keys to increase or decrease the number of iterations.

Autopilot

The autopilot is enabled or disabled by pressing the **A** key. or using the menu **UI | Autopilot**

The automatically drives into interesting areas of the set. It will backtrack and zoom out if it moves into boring areas.

Load random example

Loading a random example is a good way see some of the posibilities of using XaoS. Use **File | Load random example** to display preset examples.

When you find an interesting random example you can continue to zoom in or out and play with the fractal as you would any fractal that you generate yourself.

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XaoS Notes

Filters

Filters allow you to control the look of the fractal. There are 11 filters to chose from. Filters can be used individually or combined to produce a wide range of effects.

My personal favorite is edge detection2. If you want even thinner lines try combining it with antialiasing. Antialiasing averages the value of pixels near boundaries. It softens images and reduces jagged edges.

Combining edge detection2, antialiasing and embossing, adding starfield can produce interesting results.

Tutorials

XaoS provides a number of tutorials that will guide you visually through the world of fractals. these are well worth taking a look at.

To access them select **Help** | **Tutorials**

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