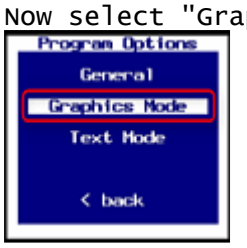
yFract Manual

If you own a printer then I would advice you to print this manual. If you want to use this online manual, I would recommend to turn off "fullscreen mode" to enable quick switching between yFract and this Manual. Follow these instructions to disable fullscreen mode:

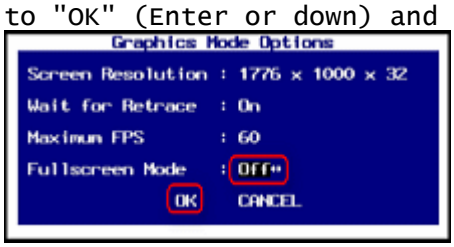
In the Main menu of yFract select the entry "Set Options" with the arrow keys and press enter go to the next menu:



Now select "Graphics Mode" and press enter to go to the next menu:



Go to "Fullscreen Mode" and select "Off" with the arrow keys (right/left), go to "OK" (Enter or down) and press enter to save the changes.



After you turned off fullscreen mode you can switch quickly between yFract and this manual by pressing **Alt-Tab**.

All menus in yFract are controlled like this. You can press ESC to abort the current input, press ESC again and the whole menu/function is aborted. You can also often use Space, Home, End, Page-Up/Down keys in the menus. Play around and you will get used to it. In yFract the mouse cursor is not supported in the menus! This is no limitation, its a feature ;). You can use the mouse for other purpose, this is explained later.

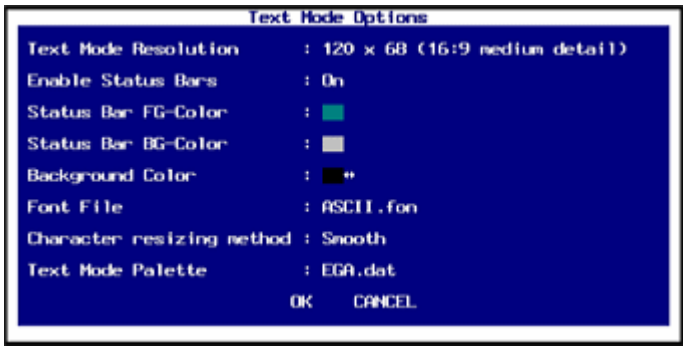
Let's go

The application works in four display/operating modes, called "**Explore Mode**", "**Render Mode**", "**Palette Room**" and "**3D Terrain Mode**". Here is a description of each mode:

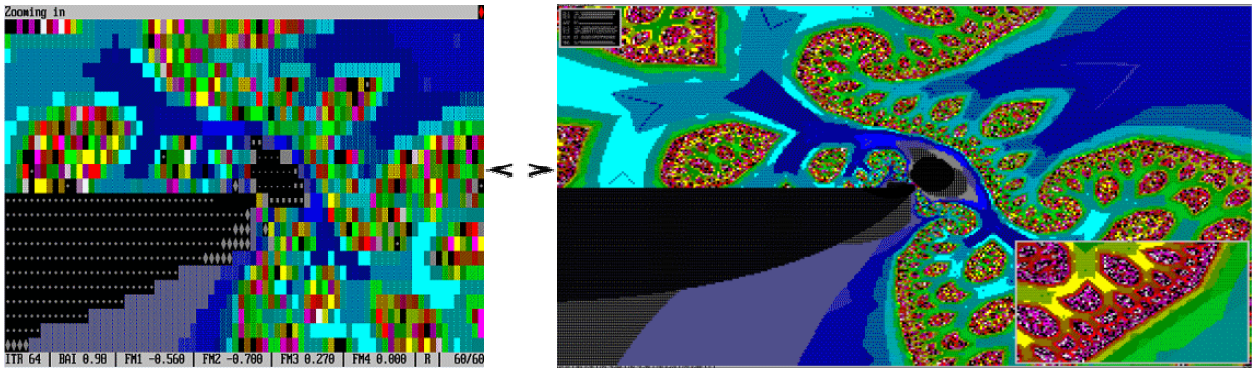
Explore Mode

In "Explore Mode" you move around, zoom in/out and modify the current fractal in real-time until it looks interesting for you. The explore mode simulates an old computer interface that only uses characters instead of graphics. Because of its limitation it has only to compute some pixels (characters) of the current fractal, this enables smooth interactive "playing" with the fractals because of less computing time. The "Explore mode" in full screen offers a unique atmosphere und user interface that a standard applications doesn't provide. Love it or hate it. In Explore Mode you can also create movies by defining waypoints. There is a real-time video preview function build in. But this a advanced function that will be not covered in this manual. Try it out later by yourself if you are interested!

You can setup the text mode according to your hardware or flavor. The user interface is completely dynamic and adapts to the display settings. If you have an old PC or if you are a nostalgic nerd you will probably prefer a lower resolution for smoother exploration. If you like details, own a modern PC or beamer you can switch to higher text mode resolutions. You can set the Text Mode Options in the the Main Menu:



This images demonstrate how the Text Mode Resolution affects on the "Explore Mode":

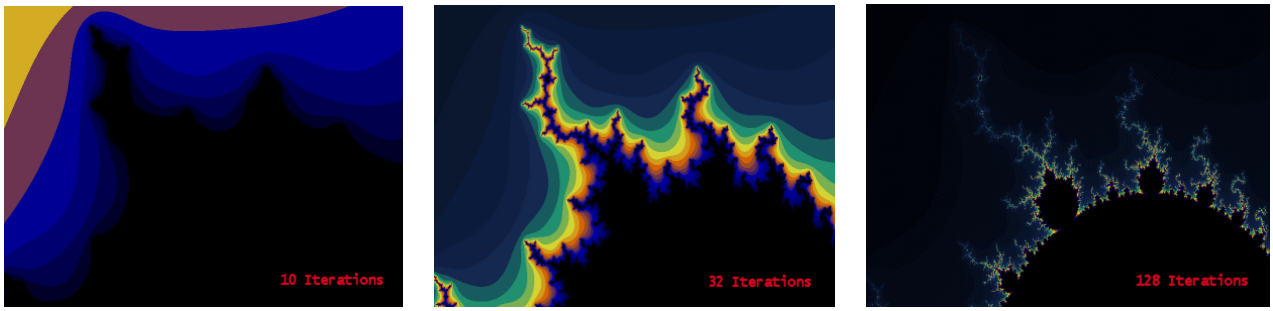


Hint for advanced users: If you want to use a specific text mode resolution that is not listed in yFract then you can edit yFract.ini in the application folder.

A little bit of theory before the fun begins

Iteration Count

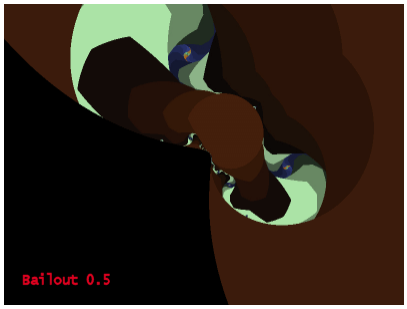
What does "Iteration Count" (ITR) mean?
This value describes the maximum amount of calculation loops for a single pixel. Sounds complicated?, this means in short: The higher this value, the more "**deep**" the fractal is rendered:

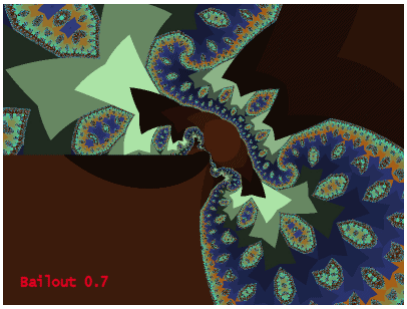


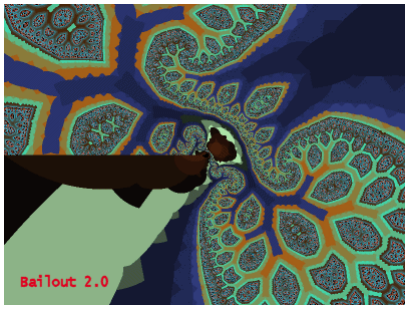
If you zoom into fractals you often have to increase the amount of iterations to get more depth and detail. Press or hold Home/End on the keyboard or use your mouse wheel to change Iteration count. You can also left/right click (and hold) the mouse on "ITR" in the bottom-left corner of the screen in Explore Mode.

Bailout Value

If a pixel is calculated and its representing fractal value reaches the "bailout value", the calculation of this pixel is finished and the next pixel is calculated. Simply saying, this value describes the "**strength**" of the fractal:





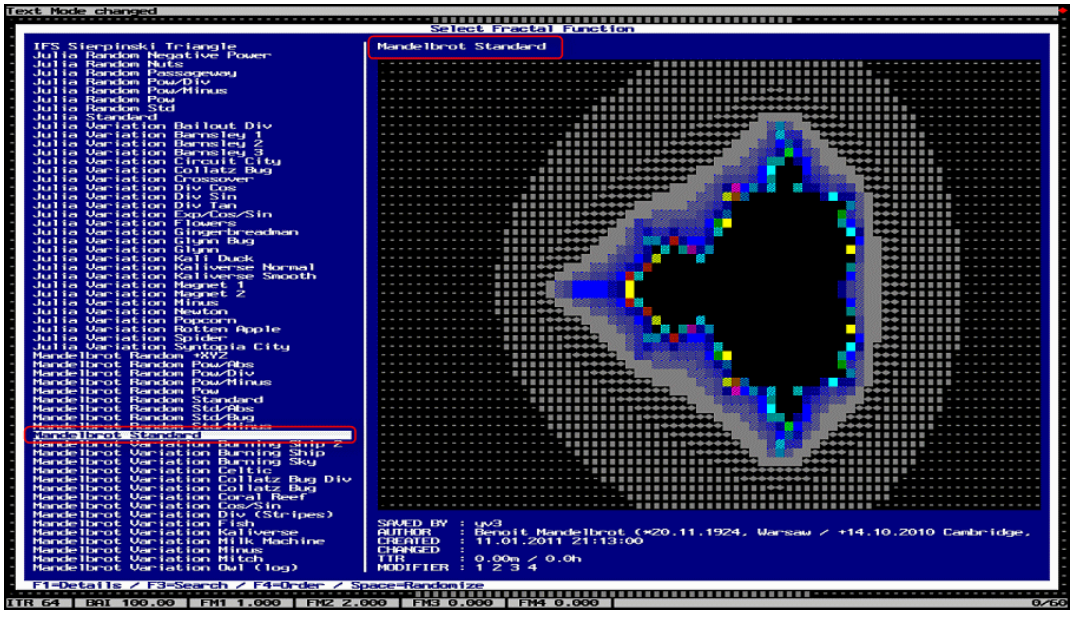


There is no recommendation for a specific iteration count and bailout value. Each fractal behaves different on value change and you have to find out by yourself what is the "right" value in a specific situation. It takes some time until you get the feeling for adjusting this two values. It's like learning how to put a thread through an eye of a needle. The Bailout Value is always positive. You can change the Bailout value by pressing (and holding) Insert/Delete on the keyboard or by left/right-clicking on "BAI" in the bottom-left corner of the screen in Explore Mode.

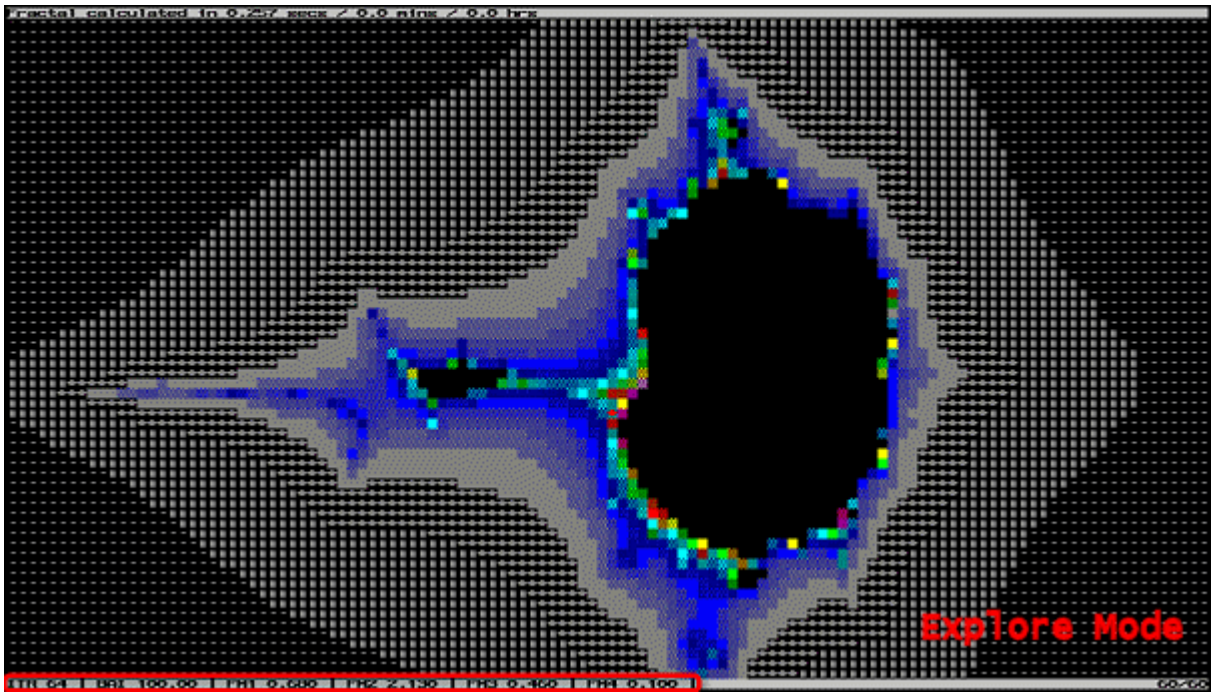
Fractal Modifiers

Each fractal has one to four "Fractal Modifiers". These Modifiers change the shape of the fractal. The change is fractal-specific and therefore I cannot describe in short what these modifiers do. All I can say is that the fractal modifiers are most important for finding new shapes and creating art in yFract. It is also important to know that a modifier can have a negative value and sometimes the modifiers depend on each other.

Enough theory. Now I will explain you in short the basics of yFract so you can create your own images.
First you have to choose a fractal from the main menu or by pressing "n" in the Explore Mode. I would recommend to start with the old famous "Mandelbrot" Fractal that is called "Mandelbrot Standard" in yFract. This Fractal is very fast to render, it has 4 "Fractal Modifiers" to play with and you can zoom deep into it without loss of detail. Select this fractal with the arrow keys and confirm with enter:



Now its playing time. Use the arrow keys to move. Press q or w to zoom in and out. You can hold many keys together to enable moving and zooming at the same time. You can also use the mouse for zooming. Click on the desired region with the left or right mouse button. HOLD Ctrl/Shift while moving/zooming and you can speed up/slow down the movement. Use both hands at the same time! Now let's take a look at the bottom-left part of the screen marked red in the image:



You see all the above mentioned "Fractal Parameters" with their current value. You can click and hold the left or right mouse button on them to increase or decrease their value. Don't forget to use the Ctrl/Shift-Modifier at the same time for fine tuning. Here is a description of the abbreviations and the according key shortcut:

ITR: Iteration Count > Home/End-Key / Mouse Wheel
BAI: Bailout Value > Insert/Delete-Key
FM1: Fractal Modifier 1 > Key 1 and 2 (decrease/increase)
FM2: Fractal Modifier 2 (optional) > Key 3 and 4 (decrease/increase)
FM3: Fractal Modifier 3 (optional) > Key 5 and 6 (decrease/increase)
FM4: Fractal Modifier 4 (optional) > Key 7 and 8 (decrease/increase)
R: Randomize (optional) > Space-key

That were the basics in Explore mode. Here is an overview of ALL controls in Explore Mode:

Explore Mode Controls



Move Around and Explore	
Arrow Keys	Move around
Page up/down	Zoom in/out
Q/W	Zoom in/out
Left Mouse Button	Zoom in
Right Mouse Button	Zoom out
Keypad 7/9	Rotate left/right
Mouse Button 4/5	Rotate left/right
R	Set Rotation manually
Keypad 4/6	Stretch/Shrink horizontally
Keypad 8/2	Stretch/Shrink vertically
Keypad 5	Set Aspect Ratio
Keypad X(*)	Hide/Show Magnifier
Keypad +/-	Adjust Magnifier Zoom
Keypad 0	Invert Palette
Backspace	Jump to previous location
Return	Switch between Explore and Render Mode
Mousewheel press	Switch between Explore and Render Mode

Modify Fractal	
Home/End	Increase/Decrease Iteration Count
Mousewheel Up/Down	Increase/Decrease Iteration Count
Ins/Del	Increase/Decrease Bailout Value
1/2	Decrease/Increase Fractal Modifier 1
3/4	Decrease/Increase Fractal Modifier 2
5/6	Decrease/Increase Fractal Modifier 3
7/8	Decrease/Increase Fractal Modifier 4
Space	Randomize fractal (if supported)
I	Set number of Iterations manually
B	Set Bailout manually
M	Set Fractal Modifiers manually
P	Change Fractal Parameters
N	Select New Fractal
S	Save current Fractal
L	Load Fractal

Fine Tuning	
Hold Shift	Slower Movement/Zoom/Rotation/Value change
Hold Ctrl	Faster Movement/Zoom/Rotation/Value change

Create Images	
F	Render Fractal to file
F12	Set as Desktop Wallpaper
Print Screen	Make Screenshot

Overlay Image Functions	
F9	Select Overlay Image
G/H	Decrease/Increase Overlay Image Zoom
J/K	Decrease/Increase Overlay Image Strength
9/0	Decrease/Increase Overlay Image Injection

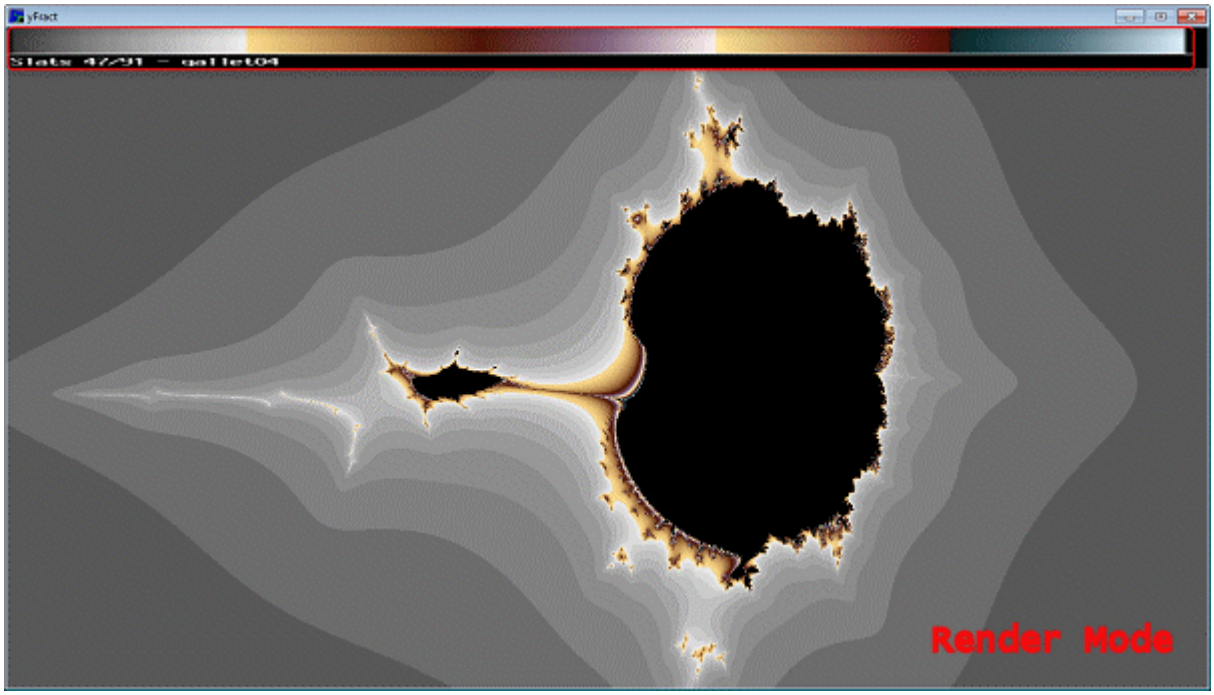
Movie Functions	
Y/Z	Add Movie Waypoint / Jump to last Waypoint
D	Delete last Movie Waypoint / Jump to last Waypoint
F5	Jump to first Waypoint
F6	Jump to previous Waypoint
F7	Jump to next Waypoint
F8	Jump to last Waypoint
T	Change Waypoint Transition Time
C	Preview Movie
V	Create Video

Misc Functions	
ESC	Go back to Main Menu
O	Set Program Options
F1	Show Help
F2	Hide/Show verbose Fractal Information Window
F3	Show Credits
F4	Show Test Screens
Tab	Hide/Show Status Bars
Alt-Tab	Minimize yFract and switch to Windows

Try them all out and try to remember the keys after a while. You can press F1 any time to display the Help for the current operating mode!

Render Mode

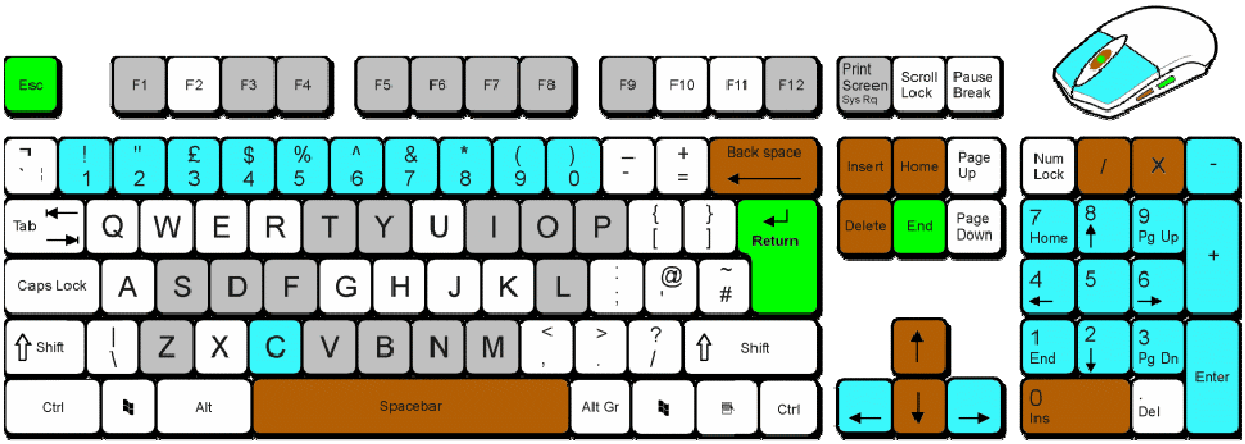
In "Render Mode" you see how the fractal looks like when it's rendered with many pixels instead of characters. The image is colored in the current palette. If you select a new fractal, the palette is randomized for artistic reasons. If you save your own fractals ("S") you can tell yFract to save the palette ("Fixed Palette"-Flag) and prevent randomization when loading your own fractal parameter files.



Press Enter to switch between both modes. In Render mode you can choose from more than 1600 palettes that are stored in different categories. You see more details and you can think about the next step. The image quality in render mode is still not at its best, Anti-Aliasing and Supersampling (explained later) are always turned off to ensure faster exploration.

Here is an overview of the controls that are available in Render Mode:

Render Mode Controls



Change Operating Mode	
Esc / Return	Abort Rendering / Go back to Explore Mode
Mousewheel press	Abort Rendering / Go back to Explore Mode
End	Enter Palette Room
Mouse Button 5	Enter Palette Room

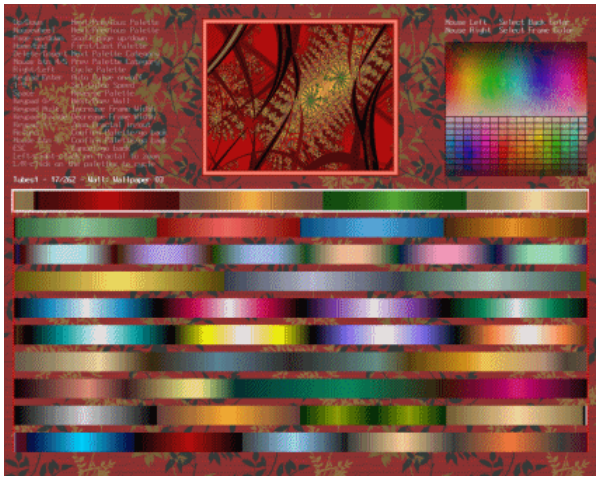
Select Palette	
Arrow Up/Down	Previous/Next Palette
Mousewheel Up/Down	Previous/Next Palette
Keypad / / X(*)	Previous/Next Palette
Delete / Mouse 6	Next Palette Category
Insert	Previous Palette Category
Space	Select random Palette
Backspace	Select previous Palette
Home / Keypad 0	Invert Palette

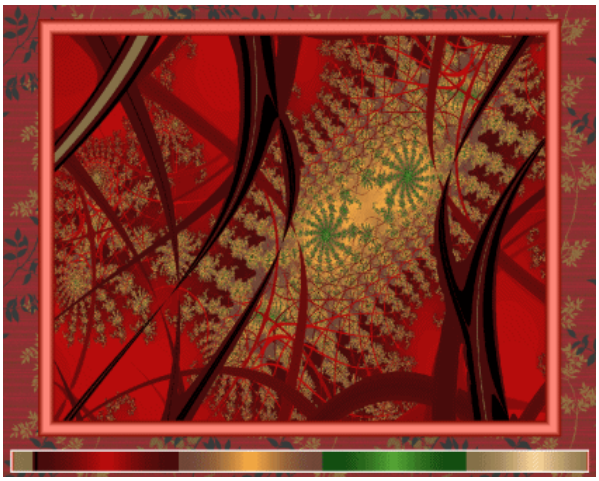
Cycle Palette	
Arrow Right/Left	Color Cycle Up/Down
Keypad +/-	Color Cycle Up/Down
Left Mouse Button	Color Cycle Up
Right Mouse Button	Color Cycle Down
0-9	Set Color Cycling Speed
Enter/C	Toggle Auto Color Cycling

Global Keys
These Keys work in both Explore and Render Mode
See Explore Mode Keys for details

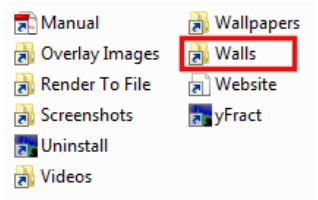
Palette Room

You can reach the “Palette Room” by pressing “End” in Render Mode. This is the final step in preparing printouts. You can choose the background (“Wall”), the width and color of the frame, and of course, the palette. You will see how the artwork will look like when it hangs on a wall:





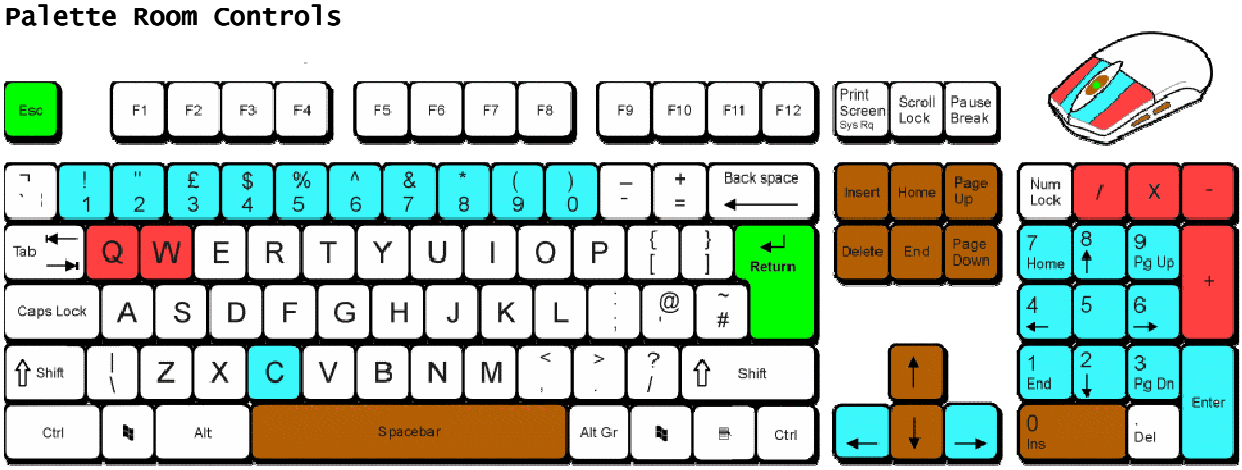
You can add your own wall images to the palette room by copying an image file to the "Wall"-Directory that can be accessed with the according shortcut:



All common image formats are supported (JPG, GIF, PNG...). You have to restart yFract after adding a new wall. Same goes for "Overlay Images".

These are the controls in the Palette Room:

Palette Room Controls



Change Operating Mode	
Return	Confirm Palette/go back to render mode
Mousewheel press	Confirm Palette/go back to render mode
ESC	Cancel Palette selection/go back to render mode

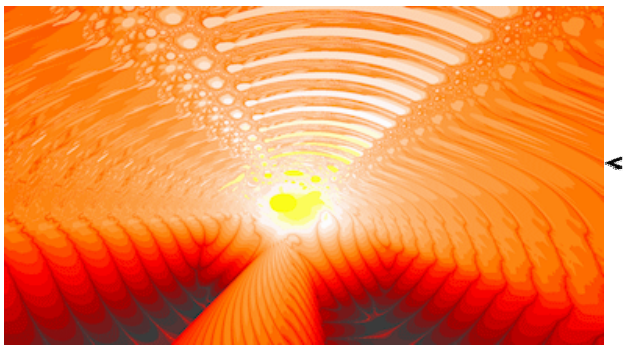
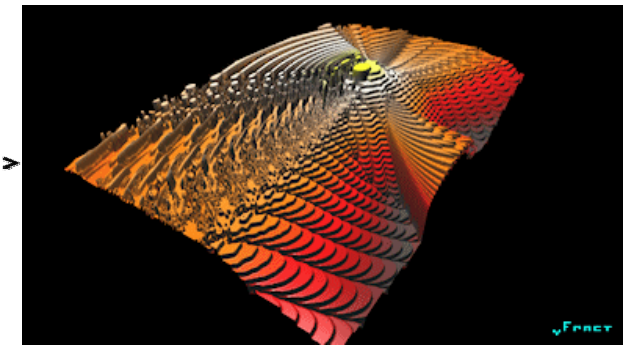
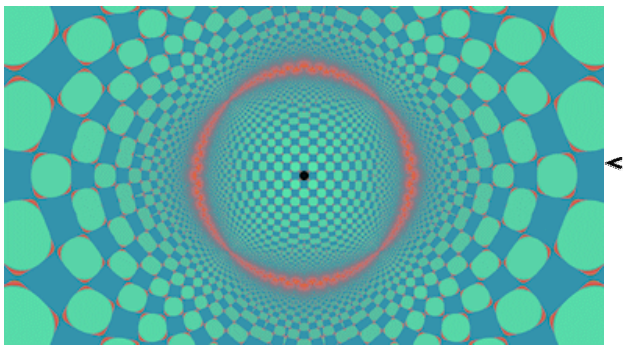
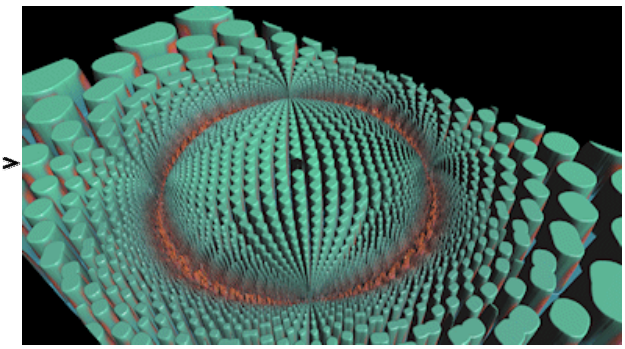
Select Palette	
Arrow Up/Down	Previous/Next Palette
Mousewheel Up/Down	Previous/Next Palette
Page up/down	Scoll page up/down
Home/End	First/Last Palette
Insert/Delete	Prev/Next Palette Category
Mouse btn 4/5	Prev/Next Palette Category
Keypad 0	Reverse Palette
Space	Randomize Palette

Cycle Palette	
Right/Left	Cycle Palette
L/R-click Palettes	Cycle Palette
Keypad Enter/C	Auto Cylce on/off
0-9 / Keypad 1-9	Set Cylce Speed

Prepare Print	
Keypad / / X(*)	Previous/Next Wall
Keypad -/+	Decrase/Increase Frame Width
Q/W	Zoom Fractal in/out
L/R-click Fractal	Zoom Fractal in/out
Left-click Colors	Select Wall/Background Color
Right-click Colors	Select Frame Color

3D Terrain Mode

You can press F10 in Explore Mode or Render Mode to create a 3D Terrain from the current fractal or a given image file. You can fly around and discover the fractal from a different perspective, change its shape and the lightning of the scene:

To view the current fractal as a 3D Terrain you have to be in Render Mode and the rendering must be finished. You can also choose any Image File to create a terrain out of it. The Image must be located in the "Render To File"-Folder.

These are the controls in 3D Terrain Mode:

3D Terrain Mode Controls

Mouse Motion - Change View
Left/Right-Mouse Button - Forward/backward
Left/Right Arrow - Strafe left/right
Up/Down/Mouse Button 4/5 - Fly high/low
W/A/S/D - Strafe left/right / Forward/backward
Q/W - Turn left/right
1/2 - Change Ambient Light
3/4 - Change Diffuse Light
5/6 - Change Shininess Strength
7/8 - Change Material Shininess
Keypad 1-9 - Move Light
Hold Ctrl/Shift - Faster/Slower Change
M - Smooth Terrain
I - Invert Terrain
P - Change Polygon Mode
Page up/down - Adjust Terrain Height
Keypad +/- - Scale Terrain
F - Toggle Fog
G - Toggle Greyscale
H - Toggle Smooth Shading
R - Toggle Wireframe
T - Select Another Terrain
Print Screen - Create Screenshot
ESC / RETURN - Quit Terrain Mode
F1 - Toggle Help

Further Information: When you use yFract's "Render to File"-Function you will be asked to save a "Heightmap". If enabled, an additional Gray scaled TGA-Image-File is created during the rendering. This Image holds information about the last fractal iteration index of each pixel. If an Image has an according

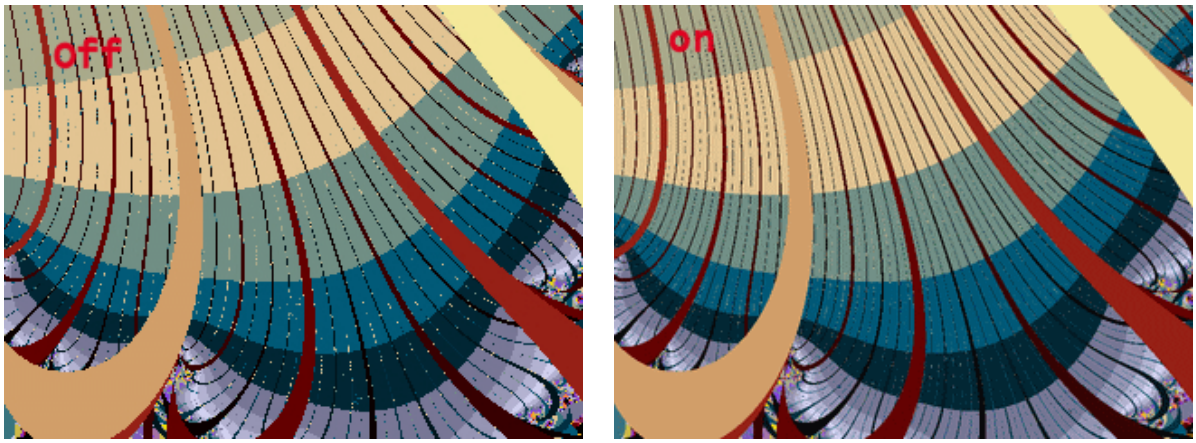
Heightmap-File (the file must be named <IMAGE_NAME>_Heightmap.tga) it can be selected when entering the Terrain Mode so the Terrain structure will represent the fractal instead of the brightness of each pixel. Heightmap files can also be imported into professional 3D Applications to make really nice Landscapes out of them.

Image Finishing

When making printouts ("Render Fractal to File"), Wallpapers ("Set as Wallpaper") and Videos ("Create Fractal Video") you will be asked to enable "Antialiasing" and "Supersampling". What is this? These two techniques increase the quality of the final image in two ways:

Antialiasing

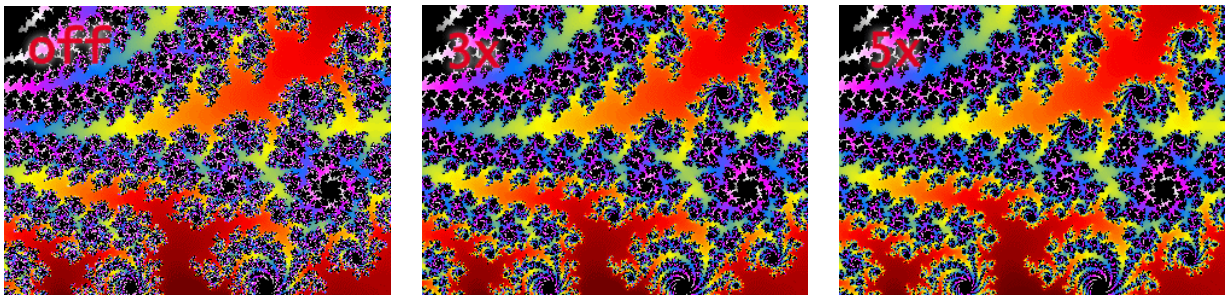
Antialiasing smoothens the image and reduces the distortion of sharp lines:



The rendering will take about twice as long if Antialiasing is enabled. But it is worth it in most cases.

Supersampling

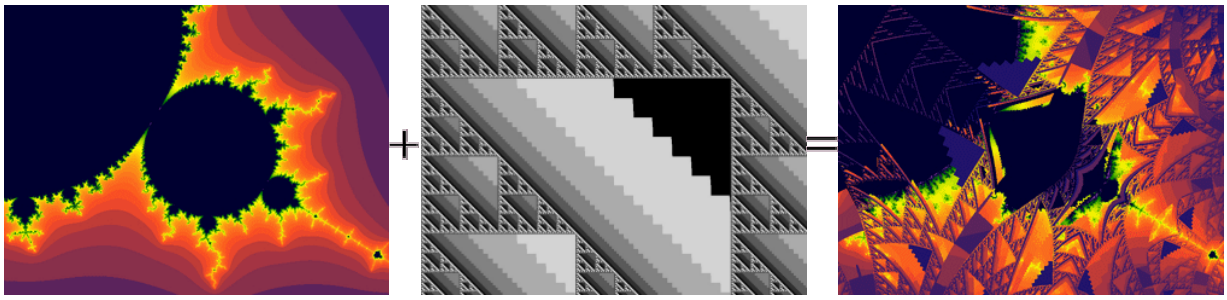
Supersampling decreases noise and increases the depth of the image:



Supersampling slows down the rendering even more than Antialiasing. 3xSupersampling gives a good compromise between speed and quality in most cases.

Overlay Image Injection

You can combine any Fractal with a Image that is located in the Overlay Images-Folder (copy your personal images there). I called this technique "Overlay Image Injection". I advice you to use simple clear images without much detail. Other images result in too much noise in my opinion. Now see how a simple Image of a Sierpinski Triangle affects on the Mandelbrot fractal:



Press F9 in explore mode to select an overlay image. After selecting you will be asked for a "calculation method". Try each method out and remember the keys that change the application of the overlay image:

- Image Zoom: G/H
- Image Strength: J/K
- Injection Level: 9/0

I wish you much relaxation, inspiration and reflection stranger.

Annotations

If you want to make videos you have to consider one thing: don't move and zoom at the same time in a single transition! Divide the movement and zoom into two separate transitions/waypoints. Otherwise the zoom speed will not be constant, it will be exponential. That means, the zoom gets faster and faster until the final spot is reached. I am not a math professor and therefore I probably will never fix this problem.

The 3D Terrain Mode does not support Images bigger than aprox. 3000x3000 (at least on my machine), yFract will probably crash. But of course you can render Fractal Images and Heightmap-Files that are much bigger and import them into a professional 3D application for further processing.

yFract has over 70 fractal types. Each fractal has its modifiers and optional randomness so you can create tons of images. New Fractal types and modifiers are added by the author and released with new versions of yFract. Keep visiting my Website and my Forum for updates and discussion.

Have fun!

Donations

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Last modified: 05.07.2012