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Overview

Fractal Landscape Generator (FLG) creates realistic landscapes from random numbers. The user sets parameters for the landscape and the program does the rest. The parameters include: resolution, smoothing, size, how to display, and more. FLG can create stunning mountain ranges as well as simple islands. FLG is an exercise in the beauty of nature AND mathematics.

What is a Fractal

A fractal is based on the idea that a large object is composed of a bunch of little pieces that look like a miniature of the larger object. These little pieces (each a FRACTion of the large object) are also composed of smaller pieces that also look like miniatures of the larger object.

An earthly example of this is a rock looks like a miniature mountain. A cosmic example of this is the solar system. The solar system has the sun with planets revolving around it. The solar system is made up of atoms. An atom is a nucleus with electrons revolving around it. Each atom is like a miniature solar system. (Whoa....just like "Horton Hears a Who"!!!)

Menu Items

Click on the menu item you need help on:

<u>File</u>
<u>Edit</u>
<u>Options</u>
<u>Help</u>

File Menu

Create:
> Generates a new landscape.

Open...:
Opens a previously saved landscape.

Save...:
Saves the current landscape.

Exit:
> Quits Fractal Landscape Generator.

Edit Menu

Copy:

       Copies the current Landscape to the Windows clipboard.

Options Menu

Draw After Computing:
A check mark here causes the landscape to be colored after the "Computing Elevations..." phase. Additionally, it causes any rotations or inverting of the landscape to force a redraw.

Quarter Screen:
This option is if you want the image to take up only a quarter of your screen. Having this option checked will not speed up the drawing of the landscape. It is included for those of you who want to copy and paste a smaller image into other applications. I found that pasting a larger image and then shrinking it down resulted in a really poor image; that's why I added this.

Redraw Now:
Use this option if you have unchecked "Draw After Computing" to color the landscape. Additionally, if you change the way your landscape is to be drawn (ie Blocks to Triangles] you must force a redraw with this option.

Invert Landscape:
Choosing this option causes the ocean to become land and land to become ocean. Use this option if you generate a landscape that seems to be all ocean.

Rot +90, Rot 180, Rot -90:
Rotates the landscape 90°,180°, or -90°, respectively. Enables you to get a different perspective of the current landscape.

Define Landscape:
Brings up the Define Landscape Dialog Box that lets you set the parameters for a Fractal Landscape.

Help Menu

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Starts the Windows Help system with Fractal Landscape Generator Help. (But you probably already knew that since you're reading this!!!)

Help on Help
Starts the Windows Help System with instruction on how to use the Windows Help System.

About...
Displays the Fractal Landscape Generator About Dialog Box. This box contains version number, copyright notice, begging for registration, and system information.

Define Landscape Dialog Box

When the OPTIONS|DEFINE LANDSCAPE menu item is selected, this dialog box appears to allow the user to set various parameters for the Landscape. These parameters are outlined below.

Show Waterline:
When this item is checked, all parts of the landscape that are less than zero (below sea level) are drawn equal to sea level. Unchecking this box causes these negative elevations to be drawn so you can see the sea floor.

Random Landscapes:
A check here causes Fractal Landscape Generator to generate a random landscape whenever the FILE|CREATE menu item is checked.

Landscape Number:
With the Random Landscape box unchecked, you can enter a landscape number. Valid inputs are from 0 to 65535. This option is great when you generate a landscape in a lower resolution and want to see the same landscape in a higher resolution. (See the topic titled Creating a Landscape for procedures on how to do this.) If the Random Landscapes box is checked the Landscape Number box contains the current landscape number.
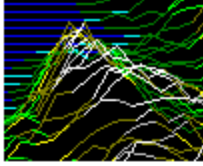
Max Elevation Change:
This controls how much the elevation can change from point to point during the Computing Elevation phase. Valid inputs are from 1 to 9. A low number causes fewer mountains and less undulations. A high number will have many sheer cliffs. In High resolution a lower number is better; in Low resolution a higher number is better.
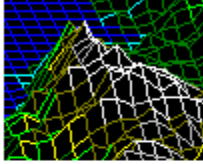
Resolution:
You choose how detailed the landscape will look. Low resolution will create a landscape very quickly and it will look rough. Medium resolution takes a bit longer and will make very nice looking landscapes. High resolution takes the longest but makes incredible looking landscapes. If you make a cool looking landscape in Low resolution you can convert it to a higher resolution. See the Creating a Landscape topic for procedures.
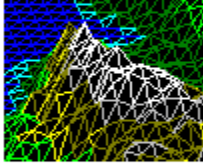
Display as.../ Cross Hatch:
There are 5 different ways to view your landscape: Lines, Solid Blocks, Outlined Blocks, Solid Triangles, and Outlined Triangles. Rather than trying to describe each of them, below are examples of each.
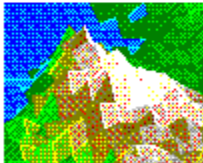
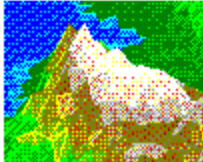Lines: quickly outlines the landscape and makes it appear transparent

Cross Hatch Blocks: defines the landscape changes better.

Cross Hatch Triangles: even better definition.

Solid Blocks: shows the landscape in up to 75 colors; in high resolution 16,384 blocks are drawn.

Solid Triangles: 75 colors; smooths the coloring; in high resolution 32,768 triangles are drawn.

From fastest to slowest draw times: lines, outlined blocks, outlined triangles, solid blocks, then solid triangles. Please note that on a normal 16 color VGA, lines and outlines only use up to 10 colors. Solid blocks and triangles use up to 75 colors. This limitation does not exist if you are using an 256 color SVGA display.

Okay Button:
Closes the Define Landscape Dialog Box and records all changes. If you made a "Display As..." change you must select OPTION|REDRAW NOW.

Cancel Button:
Closes the Define Landscape Dialog Box and discards any changes you made.

Help Button:
If you forget or don't know what an option is for, clicking the Help Button will take you directly to this help topic.

Creating a Landscape

(To make it easier for you to follow the following tutorial, you may want to choose the Always on Top menu item. To do this, choose the HELP menu <u>for this window</u> and click on ALWAYS ON TOP.Then resize the Help Window so you can see both this   and the Fractal Landscape Generator window. It may also help you to choose the <u>OPTIONS| QUARTER SCALE</u> menu item in the Fractal Landscape window.)

To jump right in and create a landscape just choose the <u>FILE|CREATE</u> menu item. A medium resolution landscape will be drawn. The finished landscape will be displayed as solid blocks using up to 75 colors.

Now that a landscape has been drawn, choose the <u>OPTIONS|DEFINE LANDSCAPE</u> menu item. The <u>Define Landscape Dialog Box</u> will appear. If this is the first time you have seen this dialog box it should tell you that the landscape is in medium resolution, displayed as blocks, has a maximum elevation change of 2, shows the water line, and is a random landscape.

Notice the Random Landscapes / Landscape Number area of the dialog box. The Landscape Number is grayed and should be some number between 0 and 65,535. That number is (what else?) the landscape number. Click on the Random Landscapes checkbox to remove the check; you can now alter the Landscape number. Click on the box that has the landscape number in it and clear the number (use the Backspace and/or Delete keys). Enter this number 23250 (I really like this landscape). Now click on low resolution (upper right in the dialog box). Now change the Max Elevation Change to 8 (in Low resolution, a higher number is better.) Click on the OKAY button; the dialog box disappears. Choose FILE|CREATE and wait for the landscape to draw.

You're probably looking at that landscape and saying to yourself, "Self, that's pretty ugly! I can't believe that's his favorite landscape!". BUT WAIT! That's in low resolution. Let's change it to a higher resolution.

Changing a Landscape to a Higher Resolution:

You'd think that all you'd need to do is to change the resolution setting in the Define Landscape Dialog Box. But that would be to easy.

Let's change this landscape to medium resolution. Choose the OPTIONS|DEFINE LANDSCAPE menu item. Click on the medium resolution button. Now change the Max Elevation change to 4. (Make sure the Random Landscapes checkbox is unchecked.) Click OKAY. Now choose FILE|CREATE. You'll notice that the same landscape was drawn but with more detail.

To draw that same landscape in high resolution, change the resolution to high and cut the Max Elevation change in half (in this example 4 / 2 = 2).

To reduce the resolution of a landscape, multiply the Max Elevation Change by 2 for every step in resolution (high to medium:multiply by 2, high to low: multiply by 4).

Why Did the Stupid Programmer Make It So Hard To Change The Resolution?

I'm just a mean type of guy. BUT SERIOUSLY. If high resolution with a max elevation change of 6 had been the same landscape as low resolution with a max elevation change of 6 then only 589,824 different landscapes could be generated (a single landscape generated in high, medium, or low resolution would still be the same landscape). That wasn't enough for me..."No! Scotty wanted more!" (said with sarcasm)

By programming the landscape generation the way I did, 851,968 different landscapes can be generated! And, who knows, maybe one of these 262,144 extra landscapes will be your favorite.

The next question would be why I didn't program it to automatically change the Max Elevation Change whenever you changed the resolution. Well I did...for a while. But it became REALLY annoying! I'd set a Landscape Number in, set the Max Elevation Change, change the resolution, then I'd have to go back and change the Max Elevation again because it got doubled or halved automatically. I figured if it annoyed me then it would probably annoy you.

Registration

Fractal Landscape Generator is NOT freeware; it is shareware. You are allowed to try the program for a period of 30 days. If, after those 30 days, you enjoy Fractal Landscape Generator please register it! The only way for SAWftware Ideas to program what YOU want is by hearing from you. More information on registering (including benefits and additional pleading) are in the file LANDS20.TXT. You can use NOTEPAD to view and print the registration information.

Acknowledgements

First and foremost I want to thank my wife and daughter for letting me spend so much time at my computer.

Thanks to   John L., Ryan L., Larry H., and Dusty R. for beta testing and giving their honest comments and suggestions.

SAWftware Ideas

SAWftware Ideas consist of the following:

    a Tandy 2500 SX/20
    Borland C/C++ for Windows
    Power C for DOS
    and <u>Scott A. White</u>

I'm always looking for new program ideas. Please drop me a line and let me know if you have any ideas for programs that you'd like to see. I can be reached at the address in the LANDS20.TXT file or by Compuserve. My Compuserve address is 74063,465.

Copyright Notice and Legal Stuff

Fractal Landscape Generator version 2.0 is Copyright ©1994 by SAWftware Ideas.
This program is distributed as shareware. You are allowed to try this program for a period of 30 days. If, after those 30 days, you decide to continue using it you are required to <u>register</u> the program with the author.

You are free to copy this program and distribute it to whom ever you want as long as the following conditions are met:

1. You DO NOT charge anything for it (no more than a $5 - $10 disk handling fee is OK as long as the recipient realizes that it is not a registration fee).
2. The program is not changed by you in any way.
3. The files: LANDS20.EXE, LANDS20.HLP, and LANDS20.TXT are all included in their original form.

Caricature by Jake.
(My nose isn't that big! No...REALLY...it isn't!!!)