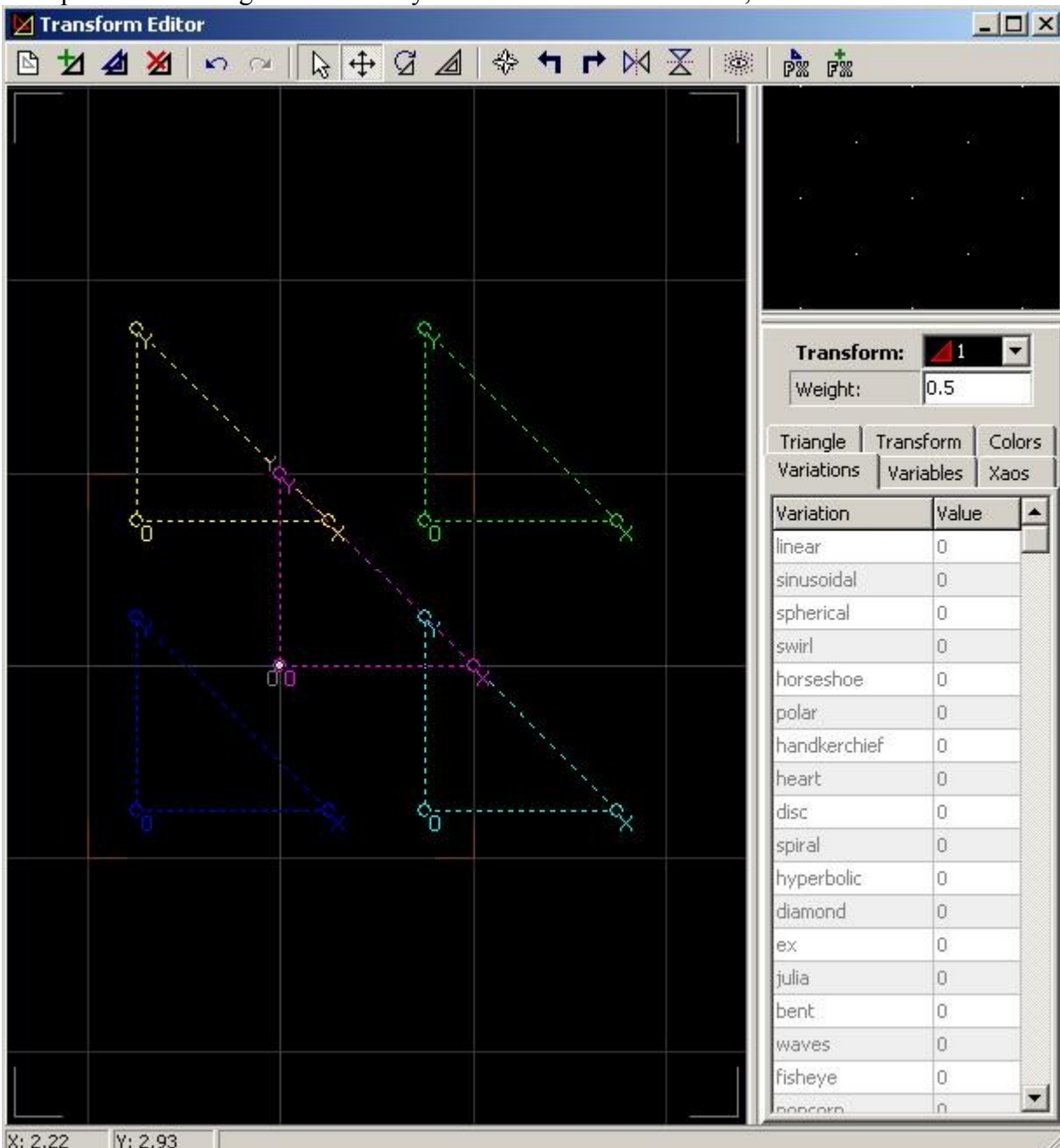# Linear Variation Basics
Lesson 2

Preparation:

This lesson will involve a little more complexity. With this lesson I have included one of my favorite scripts I have wrote. It is called TileItv3.asc. This script will need to be copied to your scripts folder within your Apophysis folder.
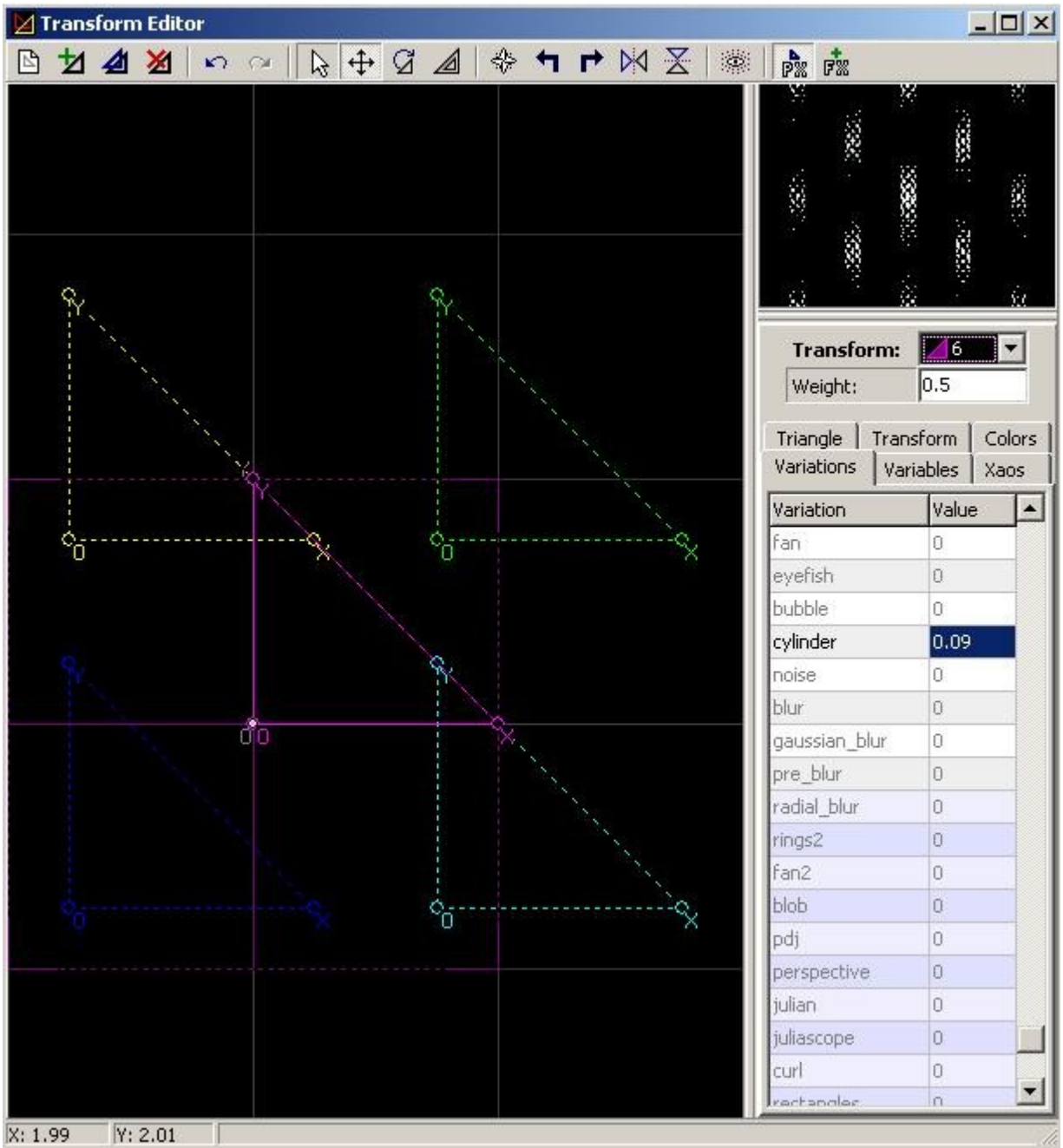
- Open Apophysis.
- Goto the script menu option and choose open.
- Now find the TileItv3.asc and open it.
- Either press the green script play button or press F9.
- The first question is asking if you want to clear the current flame, choose Y.
- The next question is asking about the spacing of the transforms, leave it at 75.
- The next question is asking at what scale you want the transforms to be, leave at 100%.

Now that we have the board prepared the quick and easy way lets open the editor window if you don't have it open already. Here you will now see that we have 6 transforms on the board awaiting your adjustments.
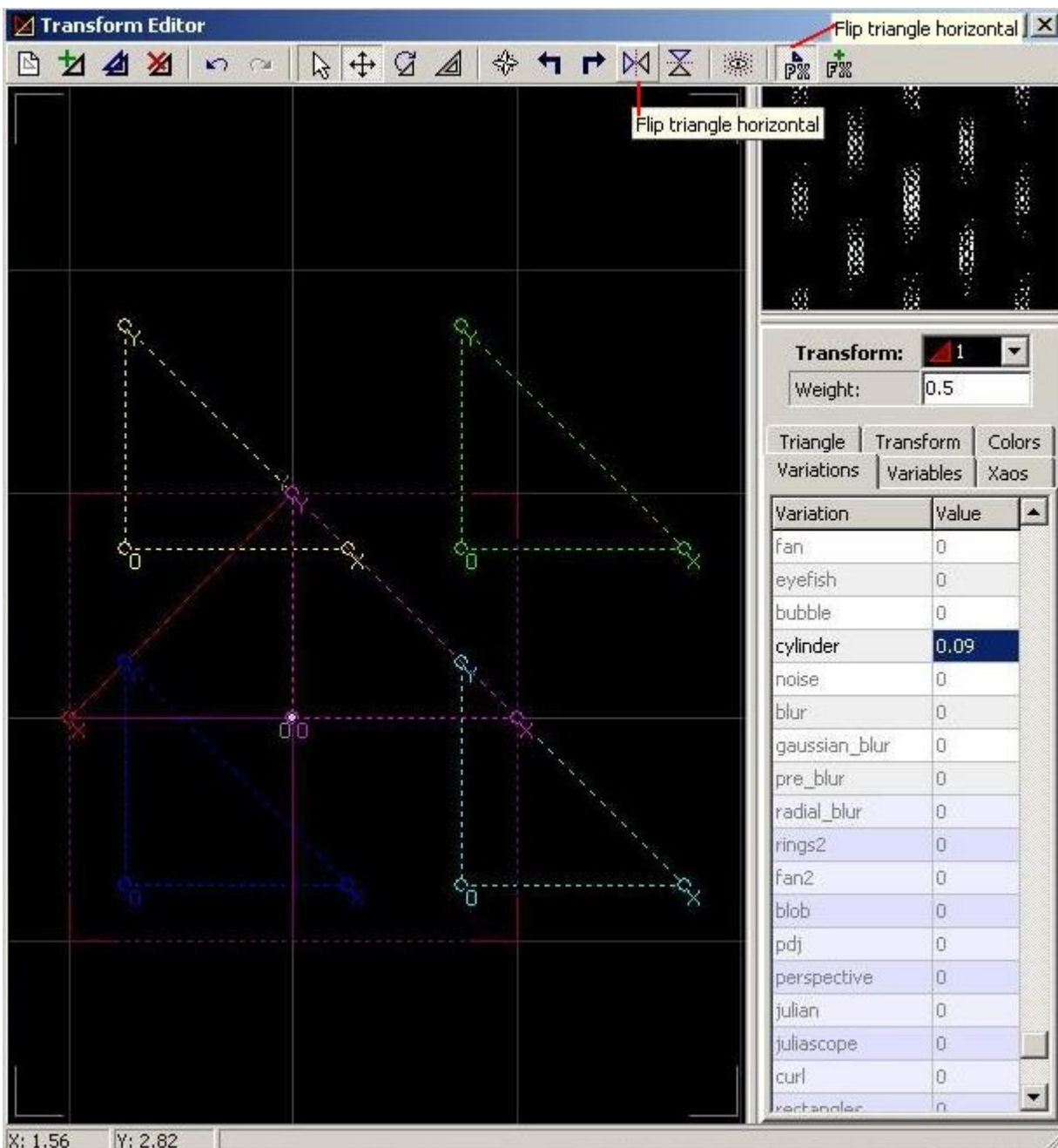
I have chosen to use cylinder as the complimentary variation in this example. So lets get this started. Transforms 2, 3, 4, 5 all have linear equal to 1 already because of the script we used. ;). These transforms are the TILING linear transforms that will duplicate the image we create with transforms 1 and 6. So transforms 2, 3, 4, 5 are NOT going to be moved or changed in any way.

First lets set the variation values on transforms 1 & 6 to the values we need. One thing I have discovered is that you don't always have to have a really high value on a variation to get a good image from it. I usually keep my values at a very low value to accomplish what I want. Set transform 1 and 6 to variation cylinder equal to .09. Set linear equal to zero (0) on transform 1 and 6. You should now have an image similar to below.
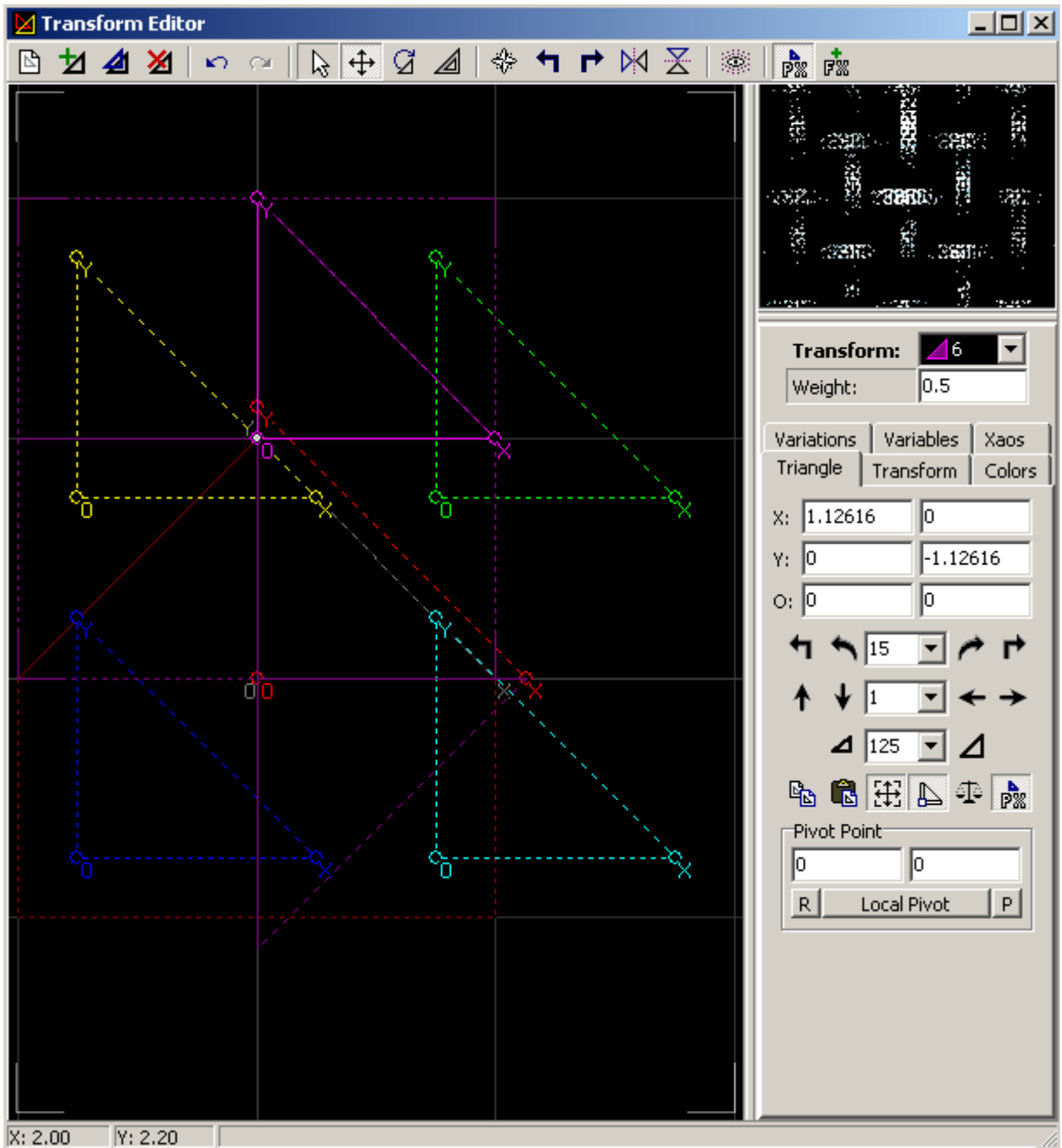
Now lets start the really fun stuff that will make the image interweave and create something more interesting than just the vertical tubes we have. First choose transform 1 and press the "post triangle editing" button now press "flip triangle horizontal" button at the top of the editor window.

Sure it doesn't look like we did much here by using the post triangle editing option but we are setting up the weaving pattern you will see in the end. Post triangle editing is a great tool to move an image over to where you want it without distorting the image from what it looks like. Remember that trick as it will be brought up again and again thru tutorials as it is a very useful tool to learn.

Time to move onto transform 6. With this transform we are going to adjust the position of the triangle. Once you have transform 6 chosen press the flip triangle vertically button, now press the post triangle editing button, and now lets move the post triangle up one unit. Here is what your triangle placement should look like now.

That was your medium difficulty tutorial on using linear variations to accomplish your desired results. There are many more ways to place your tiling transforms that create unique and interesting results. This is just the one I like and prefer. :)

And now as you would expect I did include the flame at the end of the tutorial for your experimental usage. Please do not use my original flame and post it as your own work. This is for learning purposes and you should create your own tilings of your own preference and design.

```xml
<flame name="linear2" version="Apophysis 2.09" size="512 384" center="0 0" scale="128" oversample="1" filter="0.2"
quality="0.1" background="0 0 0" brightness="22.0217391304348" gamma="4" gamma_threshold="0.22063853622106" >
   <xform weight="0.5" color="0.8" cylinder="0.09" coefs="1.125 0 0 1.125 0 0" post="0 -1 1 0 0 0" />
   <xform weight="0.5" color="0" linear="1" coefs="1 0 0 1 -0.75 -0.75" />
   <xform weight="0.5" color="0.2" linear="1" coefs="1 0 0 1 0.75 -0.75" />
   <xform weight="0.5" color="0.4" linear="1" coefs="1 0 0 1 0.75 0.75" />
   <xform weight="0.5" color="0.6" linear="1" coefs="1 0 0 1 -0.75 0.75" />
   <xform weight="0.5" color="1" cylinder="0.09" coefs="1.125 0 0 -1.125 0 0" post="1 0 0 1 0 -1" />
   <palette count="256" format="RGB">
      B8BFC3B6BBBFB7BBBEB8BCBEB9BDBFBABFC1BBC0C3BCC1C5
      C0C8D2BECAD5BCCDD8B3C7D3AAC2CE9EB6C392ABB88CA5B2
      869FAC728B966B838F657B885F77835A747E56717B536E78
      4560673C545B34494F2C3E42243436212E311F292D1D2224
      1E2123232529282A2E2E303434373A3B3E403E4143414447
      5253555C5D5F66686A7073767A7F827E848782898D8A9197
      929B9FA1A9AEA6ADB0ACB1B3AEB2B2B1B3B2B1B2B0B2B2AF
      A9A8A6A0A09E9799968E918F8589888185847E8281777B7A
      7376736E726D6A6F6B676D6A646A686268665C6361575E5D
      4D54554A5050474D4B464C4A454C49444C49444C4A434C4B
      414B4A3B4544364141323E3F313C3D303B3C2F38392F3737
      313939353E3D3A44423E4745424B484B534F535A595D6362
      686D6B7B7D7C80828386888B878A8E888C918A90958B9297
      8D949A90969C94999E959AA0979CA29A9EA59AA0A999A0AD
      97A0AD919FAE909EAD8F9DAD8E9DAC8F9EAC919FAC96A2AD
      9FA7B0A3A8AEA8A9ADA8A8ABA8A8AAA5A5A7A2A2A49E9E9E
      999898918F8B8E8C898C8A8789878487838083807B7A7E78
      69777360706D5769685265654E6262455C5E3E585D3B565E
      3F565F465E6949626C4D6770556F785D7781647E876A838B
      728991758991788A917E8A9181899183889185888F86888E
      86878C85828584818383818280 7F7F7E7C7D7A7A7B75767A
      6D727B6A717A687079656E78626C75616B73626C73656D73
      6871776B747B7279817880897C8691828C9986909E8994A2
      929CA8949EA997A0AA9BA2AB9FA3AAA4A6ABA8A8ADADAAAF
      B3ADAEB6AEADB7AFADB7AFACB6AEAAB3ACA9AFAAA7ACA8A6
      A9A8A6A8A9A8ABABA9AEADA8B1AFAAB3AFABB4B1ACB4B0AC
      B2AFABAEABA9A6A6A69DA1A5959DA48F9AA28B969F89939D
      889199888F94888B8E88898988868686858385838183 8280
      81807F80807F7E7F7E7B7E7D7A7B797878747876717A7770
      7D7970807B72847E7689837C8E898593908E9795949979 98
      99979A98979B98989A979799957999397979195969 90 9495
      95999B9B9FA09FA5A8A4ABAFA9B1B5AEB5B9B3B8BDB6BCC0
   </palette>
</flame>
```

If you don't see the tileitv3.asc file then here is the script you can copy into a text file and save as tileitv3.asc.

```
{**********************************************************************
Tile It - Version 3
by Dave Dartt updated 09/17/06
aka CMPTRWHZ (cmptrwhz.deviantart.com)
email: davedartt@gmail.com
Objective: To create a tiling effect.

I have made it so that you can tile the image you have already
created or create a new tiling base to start a new flame. If you
choose to clear the current flame you just need to change the
variations on transform 1 and 6 to make a tiling you want.  This
script is just a starter script to get your tiling started, the
idea is to tweak and perfect your tiling after running this script.
**********************************************************************}

clearFlame := 'y';
sc := 100;
spacing := 75;
transcount := 0;

if not InputQuery('Tile It','Do you want to clear the current flame? (y/n). The
default is "y" :',clearFlame )then
exit;

if not InputQuery('Tile It','To change the spacing between tiles enter a value (default is 75):',spacing)then
exit;
spacing := spacing/100;

if not InputQuery('Tile It', 'Scale %:', sc) then
exit;
sc := sc * 0.01;

if (clearFlame = 'y') or (clearFlame = 'Y') then
begin
Clear;
```

```
AddTransform;
Transform.a :=1;
Transform.b :=0;
Transform.c :=0;
Transform.d :=1;
Transform.e :=0;
Transform.f :=0;
Transform.Variation[0] := 0;
end;

AddTransform;
Transform.a :=1;
Transform.b :=0;
Transform.c :=0;
Transform.d :=1;
Transform.e :=-1 * spacing;
Transform.f :=-1 * spacing;
Scale(sc);

AddTransform;
Transform.a :=1;
Transform.b :=0;
Transform.c :=0;
Transform.d :=1;
Transform.e :=spacing;
Transform.f :=-1 * spacing;
Scale(sc);

AddTransform;
Transform.a :=1;
Transform.b :=0;
Transform.c :=0;
Transform.d :=1;
Transform.e :=spacing;
Transform.f :=spacing;
Scale(sc);

AddTransform;
Transform.a :=1;
Transform.b :=0;
Transform.c :=0;
Transform.d :=1;
Transform.e :=-1 * spacing;
Transform.f :=spacing;
Scale(sc);

transcount := Transforms-4;
For n := transcount to Transforms-1 do
begin
SetActiveTransform(n);
With Transform do
begin
Weight := 0.5;
Symmetry := 0;
end;
end;

// To remove the final transform:
AddTransform;
SetActiveTransform(transforms);
DeleteTransform;
```