

3D SHAPER - TUTORIAL

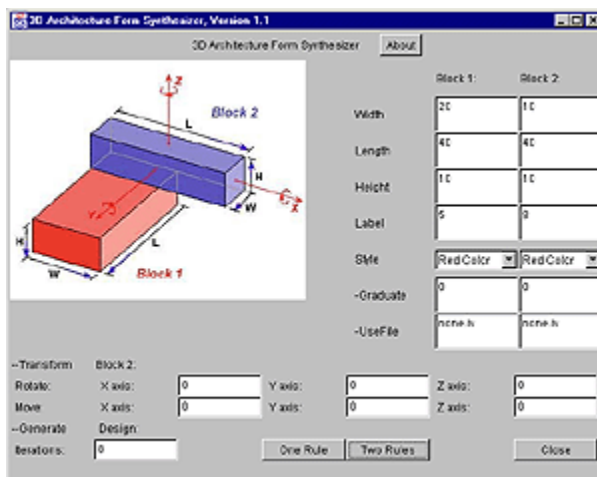
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1. Installing Java

- 1.1 Download **Java 2 Runtime Environment, Standard Edition (including Java Plug-in Version 1.3.0)** from <http://java.sun.com/j2se/1.3/jre/>
- 1.2 Read the instructions carefully, and install Java.

2. Installing and running 3DShaper

- 2.1 Download the self-extractable file 3dshaper.exe from [Archnet](#)'s MIT-MIYAGI group, under Collections and put it in a folder called **shaper**, so the path would be, for example:
C:\shaper
- 2.2 Go to the **shaper** folder in Windows Explorer (start> Windows Explorer) and run **3dshaper.exe** by double clicking on it -- it will extract the source code and files to a sub-directory called **3dshaper**.
- 2.3 Go to the **3dshaper** directory, and run the file **shaper.bat** by double clicking on it. This will launch the 3D Shaper program. You should see the following window:

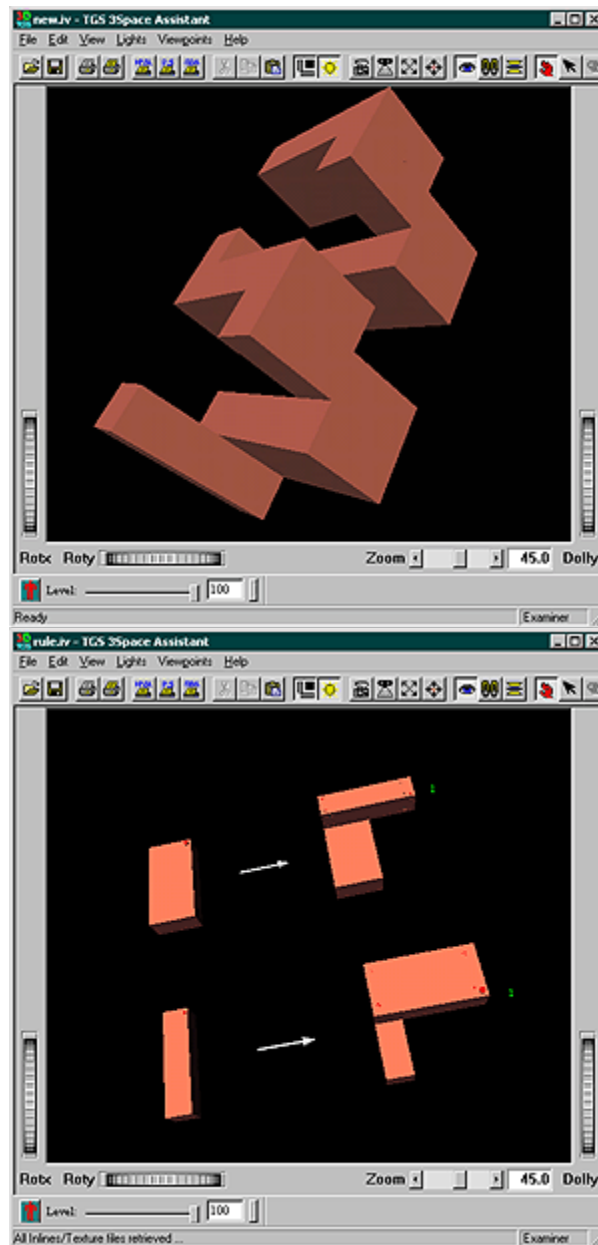


3. 3Space Assistant

- 3.1 To view the .iv files generated by 3DShaper download **3Space Assistant** from <http://www.tgs.com/pro.htm> . You will get an e-mail with an authorization code to run the program for free for 2 weeks.

NOTE: When you request a temporary license for the program, you should say that you need it urgently, as it can sometimes take up to a day to be sent.

- 3.2 In 3Space Assistant Choose File/Open, browse to the c:\Shaper\3dshaper folder, and open the new.iv and rule.iv (open inventor) files. You should see the following windows:



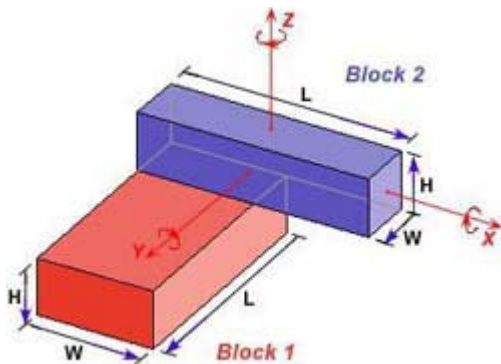
- 3.3 Once the .iv files are in 3Space Assistant they can be saved as .wrl or .bmp. The first can be imported in 3dStudio and then exported to .dwg, whereas .bmp can be used directly in Photoshop. You can also use the 3Space Assistant to view VRML's.

NOTE: 3DShaper always saves the models as new.iv, so you have to open them and save them with another name before running the program again.

4. Introduction to the 3D Shaper User Interface

The layout is composed of five parts: the title bar, the picture, the definition of the blocks, the transformation of Block 2, and the generation of a design.

On the top is the title - **3D Architecture Form Synthesizer**. To the right of the title, there is an **About** button. By clicking on it, a dialogue box will pop up -- a brief introduction to the program is there. Click **OK** to close the dialogue box.



In the main window is a picture illustrating the use of the program.

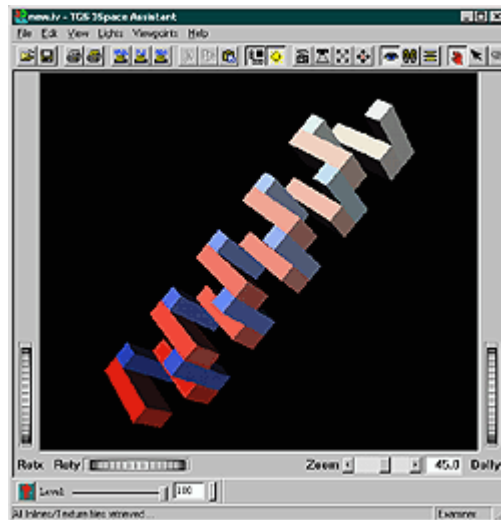
A blue block (**Block 2**) is attached to the top face of a red block (**Block 1**), with two side faces aligned. This shows the pre-defined, default spatial relation of an oblong and a pillar.

Width, Length, and Height (**W, L, H**) define the geometric dimensions of the two blocks. The arrow directions indicate the directions in which the width, length or height may be increased. Because the two blocks keep their default spatial relation, increasing the height of Block 2 will make it grow upwards, instead of downwards, and intersect with Block 1. For the same reason, increasing the length of Block 2 will make it grow longer to the right, while keeping its left face aligned with Block 1. Block 1 follows the same rules. Increasing its height will make it grow downwards, and increasing its length will make it grow longer, while keeping its back face aligned with the back face of Block 2.

	Block 1:	Block 2:
Width	20	10
Length	40	40
Height	10	10
Label	1	1
Style	Red Color	Red Color
-Graduate	0	0
-UseFile	none.iv	none.iv

To the right of the picture is the definition of the two blocks. They are **Width**, **Length**, **Height**, **Label**, and **Style** parameters. In **Style**, there are also **Graduate** and **UseFile** parameters.

The picture does not show where the label is, since it is showing the spatial relation, not the rules. However, the labels can be seen later when 3Space Assistant is launched to actually look at the rules. The default label position is 1 on both blocks, which is in the upper right corner of the block. And since Block 2 is rotated 90 degrees, it looks like Label 1 position is on its lower right corner. We will get a better idea of how each label is located when we view the rules in 3Space Assistant.



Style defines the surface property of each block. There is a pop-up menu for each block. The default is **Red Color**. By clicking on it, we can see that there are four choices for each block: Red Color, Blue Color, Color Cube, and File. Two sub-choices are below: **Graduate** and **UseFile**. By combining the pop-up menu with the sub-choices, we can get many interesting surface styles for the blocks. The default for Graduate is 0, so all the blocks in the resulting design will be the same red or blue color. Graduate can be any positive integer number -- the bigger the number, the slower the graduation of color. Graduate is useful for understanding the construction of designs. Each added block in successively lighter in tone.

--Transform	Block 2:				
Rotate:	X axis:	0	Y axis:	0	Z axis: 0
Move:	X axis:	0	Y axis:	0	Z axis: 0
--Generate	Design:				
Iterations:	8	One Rule	Two Rules		Close

Modifying the two blocks is done by transforming Block 2. Varying the dimensions of the blocks in the default spatial relation can produce a great diversity of designs; however, the design possibilities are still very limited. By translating and rotating Block 2, we can get many more spatial relations between the two blocks.

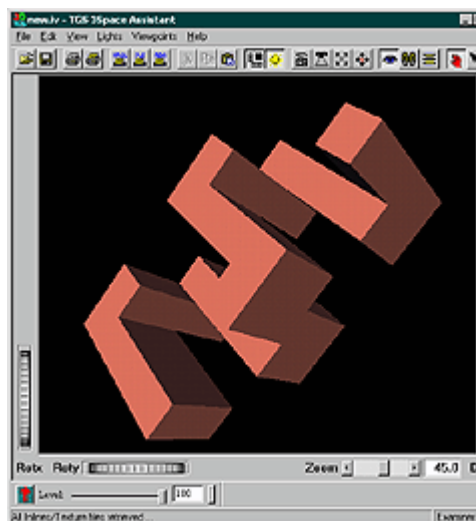
The transformation of Block 2 is relative to the default Block 2 position shown in the picture. There are two kinds of transformation: **Rotate** and **Move**. The rotation and moving axes -- **X**, **Y**, and **Z**, are shown in the picture. The direction of the arrow shows the positive direction of the movement and rotation. Moving and rotating in the opposite direction can be achieved by making the number negative. Rotation is in degrees. We can rotate around any axis, however, if we rotate around all three axis at the same time, there may be some minor discrepancies in the final results.

Once we have input the desired blocks, spatial relation, labels, and rules, we are ready to generate a design. The **Generate Design** part is just below the Transform Block 2. It contains the **Iterations** parameter, **One Rule** button, and **Two Rules** button. Also, there is the **Close** button which will let us quit from the program. The default number of iterations is 8. This means that the program will apply the rule eight times. If Two Rules is selected, it will apply Rule 1 four times and Rule 2 four times. We can increase or decrease the number of iterations. The number of iterations can be increased as high as 40, but the program may crash if it goes beyond 50.

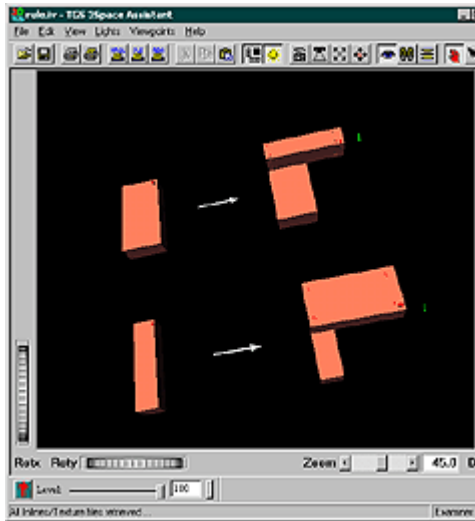
The **One Rule** button is different from the **Two Rules** button, in that it will only run one rule, instead of two rules alternately. **For this workshop we will only be using Two Rules.**

When the **Two Rules** button is clicked, the program will run automatically and generate two files according to our settings. One is called **rule.iv**, and the other is called **new.iv**. It will take several seconds (the length of time depends on the number of Iterations) to generate the files.

In order to view the rules (rule.iv) and the design (new.iv), we need to launch 3Space Assistant.



The new.iv file shows the design generated by the rules. The program will always begin with Block 1 with its initial label on the upper right corner. There we will put Block 2. If the label on Block 2 is 2, the next Block 1 will be put at Block 2's label 2 positions. The new Block 1 (no longer the initial Block 1) will have its defined label, for example label 3. The next added Block 2 will be put on the label 3 position of this Block 1. Also, the new Block 2 has its label 2. The program will continue this process recursively, until it reaches the desired number of iterations.



The rule.iv file shows the rules used by the design. For the two rules, the first one is to add Block 2 to Block 1, and the second is to add Block 1 to Block 2. Labels are shown on the added blocks with red letters. On an oblong block there will be eight labels (1 - 8). On a square or a pillar, there will be sixteen labels (1 - 16). On a cube there will be forty-eight labels (1 - 48). The current label position is shown with a red dot and a number beside it. The label position on the block indicates where the added block will be put according to this one.

Each time Two Rules or One Rule button is clicked, the old new.iv will be overwritten by a new one. It is therefore important to save our design under a new name if we decide to keep it -- this is done by using the File/Save As function in 3Space Assistant menu bar. As mentioned previously, files can also be saved as .wrl or .bmp. The first can be imported in 3dStudio and then exported to .dwg, whereas .bmp can be used directly in Photoshop. VRML files can also be viewed in 3Space Assistant.

To rotate the design in 3Space Assistant, move the cursor over the drawing, press the left mouse button and drag, or use the thumbwheels (located in the south-west corner of the window). To zoom in and out, use the thumbwheel to the right of the display panel.

We can view our design in many different ways in 3Space Assistant. To use a different drawing style, right click on the image in 3Space Assistant and select 'Draw Style' from the pop-up dialogue box. From here we have the choice of several different viewing modes, including hidden line, wire frame, and points.

