

# Tcl3D demos at a glance

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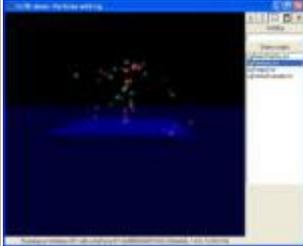
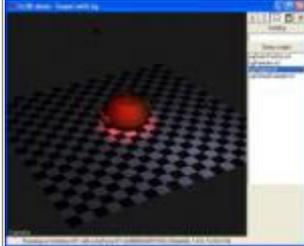
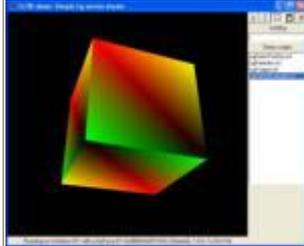
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Document generated with Tcl 8.4.16 on 2009/08/19 01:01:21

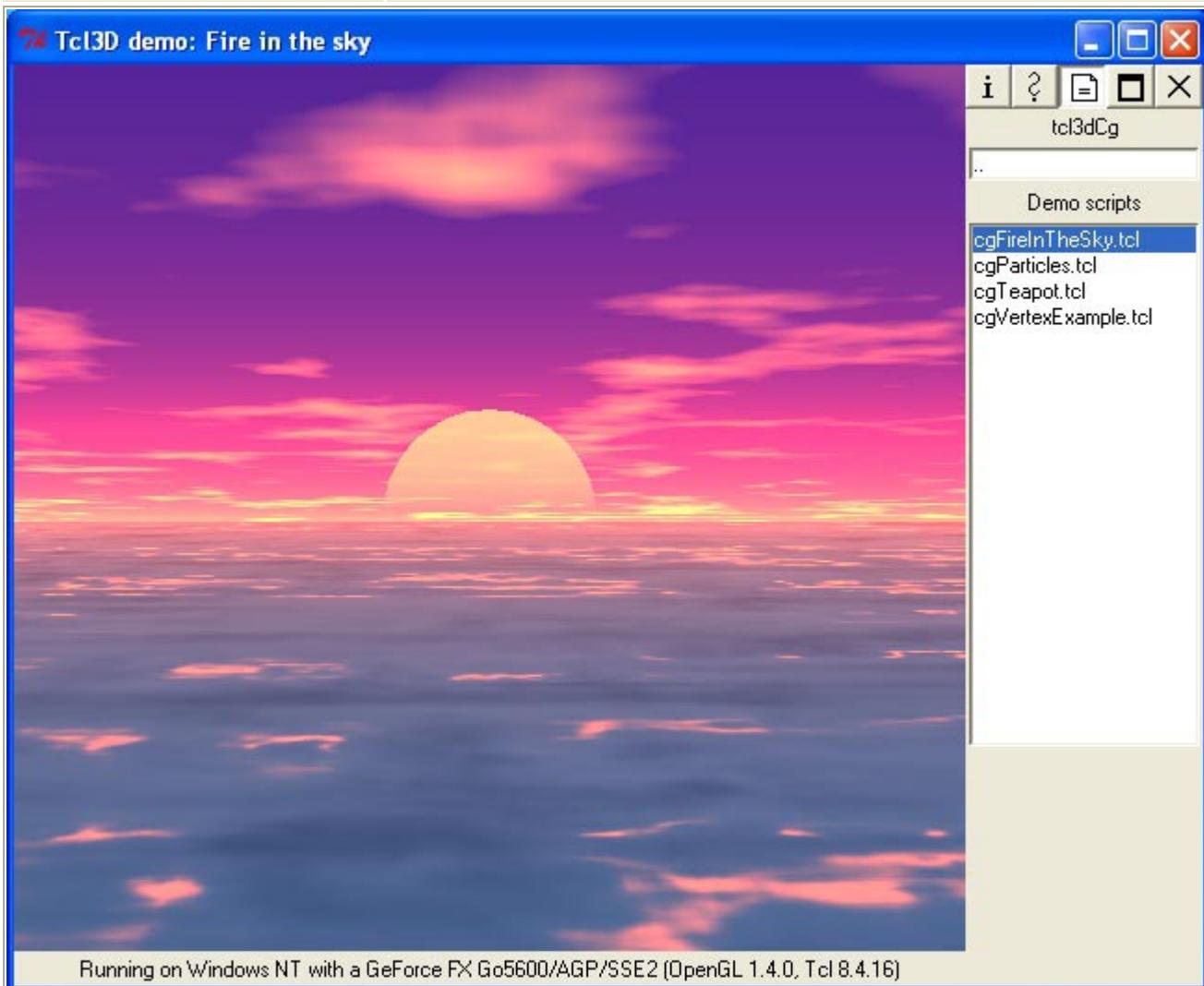
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Overview	
Category	Type
<a href="#">LibrarySpecificDemos</a>	<a href="#">tcl3dCg</a>
	<a href="#">tcl3dFTGL</a>
	<a href="#">tcl3dGauges</a>
	<a href="#">tcl3dOde</a>
	<a href="#">tcl3dOgl</a>
	<a href="#">tcl3dOglExt</a>
	<a href="#">tcl3dSDL</a>
	<a href="#">tcl3dTogl</a>
<a href="#">Tcl3DSpecificDemos</a>	<a href="#">rtVis</a>
<a href="#">TutorialsAndBooks</a>	<a href="#">CodeSampler</a>
	<a href="#">GameProgrammer</a>
	<a href="#">NeHe</a>
	<a href="#">RedBook</a>
<a href="#">OpenSceneGraph</a>	<a href="#">FopingTutorials</a>
	<a href="#">NPS-Tutorials</a>

Category:	LibrarySpecificDemos
Root:	<a href="#">Contents</a>
	Available types
	<a href="#">tcl3dCg</a>
	<a href="#">tcl3dFTGL</a>
	<a href="#">tcl3dGauges</a>
	<a href="#">tcl3dOde</a>
	<a href="#">tcl3dOgl</a>
	<a href="#">tcl3dOglExt</a>
	<a href="#">tcl3dSDL</a>
	<a href="#">tcl3dTogl</a>

Type:	<b>tcl3dCg</b>		
Category:	<a href="#">LibrarySpecificDemos</a>		
Root:	<a href="#">Contents</a>		
<p>This section contains Cg demo applications from several resources, that have been ported to Tcl3D. The examples cover vertex and fragment shader programming in Cg. Original sources from different sites. See the documentation for details.</p>			
Available demos			
			
<a href="#">cgFireInTheSky</a>	<a href="#">cgParticles</a>	<a href="#">cgTeapot</a>	<a href="#">cgVertexExample</a>

<b>Demo:</b>	<b>cgFireInTheSky</b>
Type:	<a href="#">tcl3dCg</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>



cgFireInTheSky.tcl

Original files from: <http://www.shadertech.com/shaders/FireInTheSky-src.zip>

Original files are Copyright (c) 2002 Jason Jerald

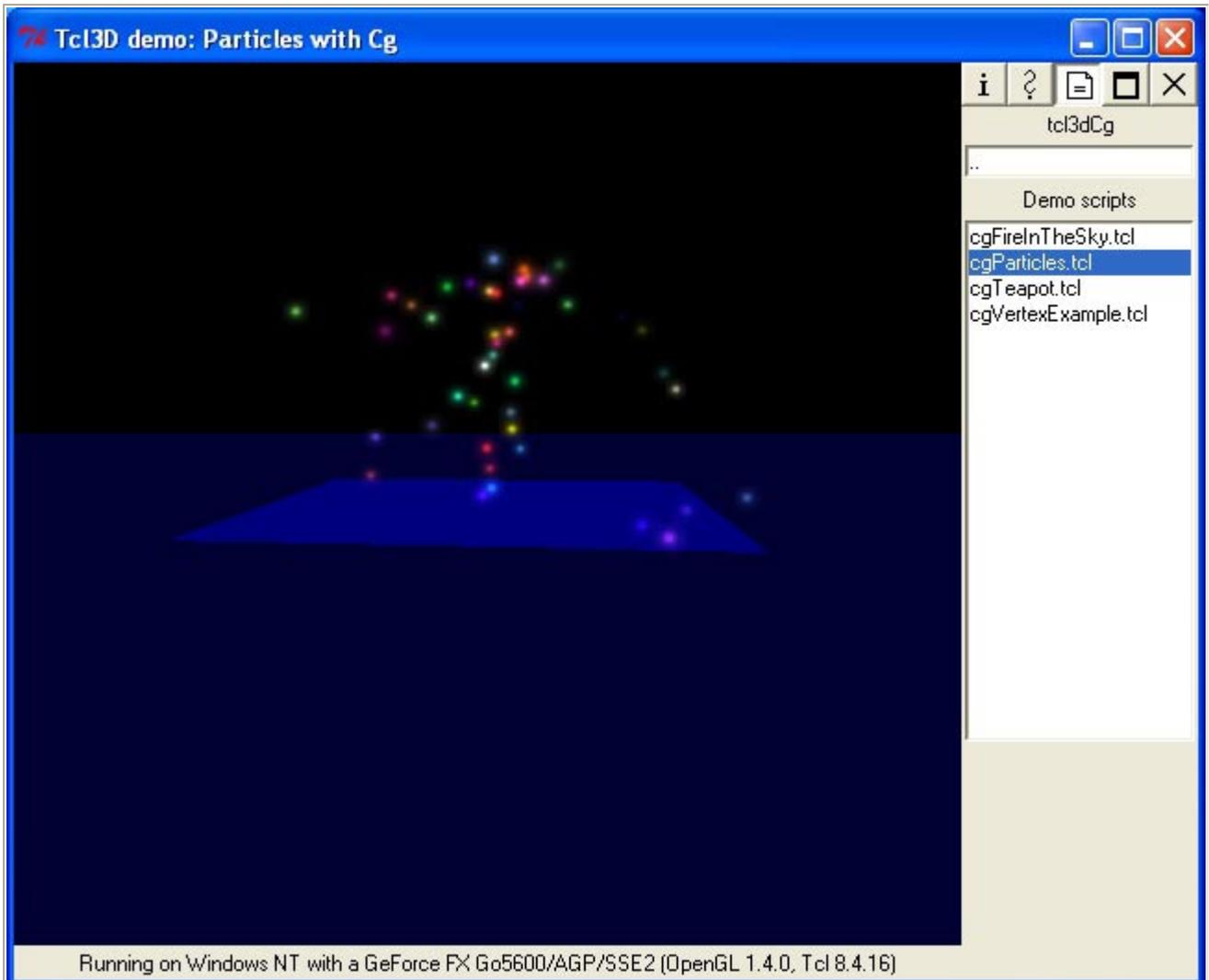
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Modified for Tcl3D by Paul Obermeier 2005/11/07  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>cgParticles</b>
Type:	<a href="#">tcl3dCg</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>



cgParticles.tcl

Particle Effects using CG and OpenGL

Original files from: <http://www.shadertech.com/shaders/ParticleSystem-src.zip>

Original files are Copyright (c) 20002 Arkadiusz Waliszewski

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Modified for Tcl3D by Paul Obermeier 2005/11/07  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>cgTeapot</b>
Type:	<a href="#">tcl3dCg</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Camera

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)

cgTeapot.tcl

Original files from: <http://developer.nvidia.com/Cg>  
This is the example called interfaces\_ogl as included in the Cg Toolkit.

Modified for Tcl3D by Paul Obermeier 2005/11/07  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

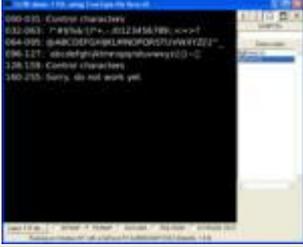
<b>Demo:</b>	<b>cgVertexExample</b>
Type:	<a href="#">tcl3dCg</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)

cgVertexExample.tcl

Original files from: <http://developer.nvidia.com/Cg>  
This is the example called runtime\_ogl as included in the Cg Toolkit.

Modified for Tcl3D by Paul Obermeier 2005/11/07  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Type:</b>	<b>tcl3dFTGL</b>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>
<p>This section contains FTGL demo applications written in Tcl3D. The examples cover the demo applications distributed with FTGL.</p>	
Available demos	
	
<a href="#">ftglDemo</a>	<a href="#">ftglTest</a>

<b>Demo:</b>	<b>ftglDemo</b>
Type:	<a href="#">tcl3dFTGL</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-Return Switch to (and leave) edit mode  
 Key-Space Toggle font types

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

```
ftglDemo.tcl
```

This demo demonstrates the different rendering styles available with FTGL.  
 Press <n> to change the font rendering style.  
 Press <enter> to enable edit mode.

Please contact me if you have any suggestions, feature requests, or problems.

Henry Maddocks  
 henryj@paradise.net.nz  
<http://homepages.paradise.net.nz/henryj/>

Modified for Tcl3D by Paul Obermeier 2006/01/18  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

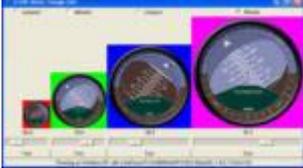
<b>Demo:</b>	<b>ftglTest</b>
Type:	<a href="#">tcl3dFTGL</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

ftglTest.tcl

C++ source changed by mrn@paus.ch/ max rheiner  
original source: henryj@paradise.net.nz

Modified for Tcl3D by Paul Obermeier 2006/01/18  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

A test program showing the 5 different font rendering types.

<b>Type:</b>	<b>tcl3dGauges</b>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>
<p>This section contains demo applications written with Tcl3D extensions packages. The examples cover the tcl3dGauges package, which was supplied by Victor G. Bonilla.</p>	
<p>Available demos</p>	
	
<p><a href="#">gaugedemo</a></p>	<p><a href="#">gaugetest</a></p>

<b>Demo:</b>	<b>gaugedemo</b>
Type:	<a href="#">tcl3dGauges</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>



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Module: Tcl3D -> tcl3dGauges  
 Filename: gaugedemo.tcl

Author: Paul Obermeier

Description: Demo program showing the use of the Tcl3D extension package gauge.

<b>Demo:</b>	<b>gaugetest</b>
Type:	<a href="#">tcl3dGauges</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

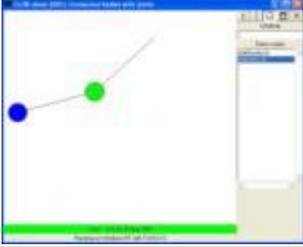
Copyright: 2005-2009 Paul Obermeier (obermeier@tcl3d.org)

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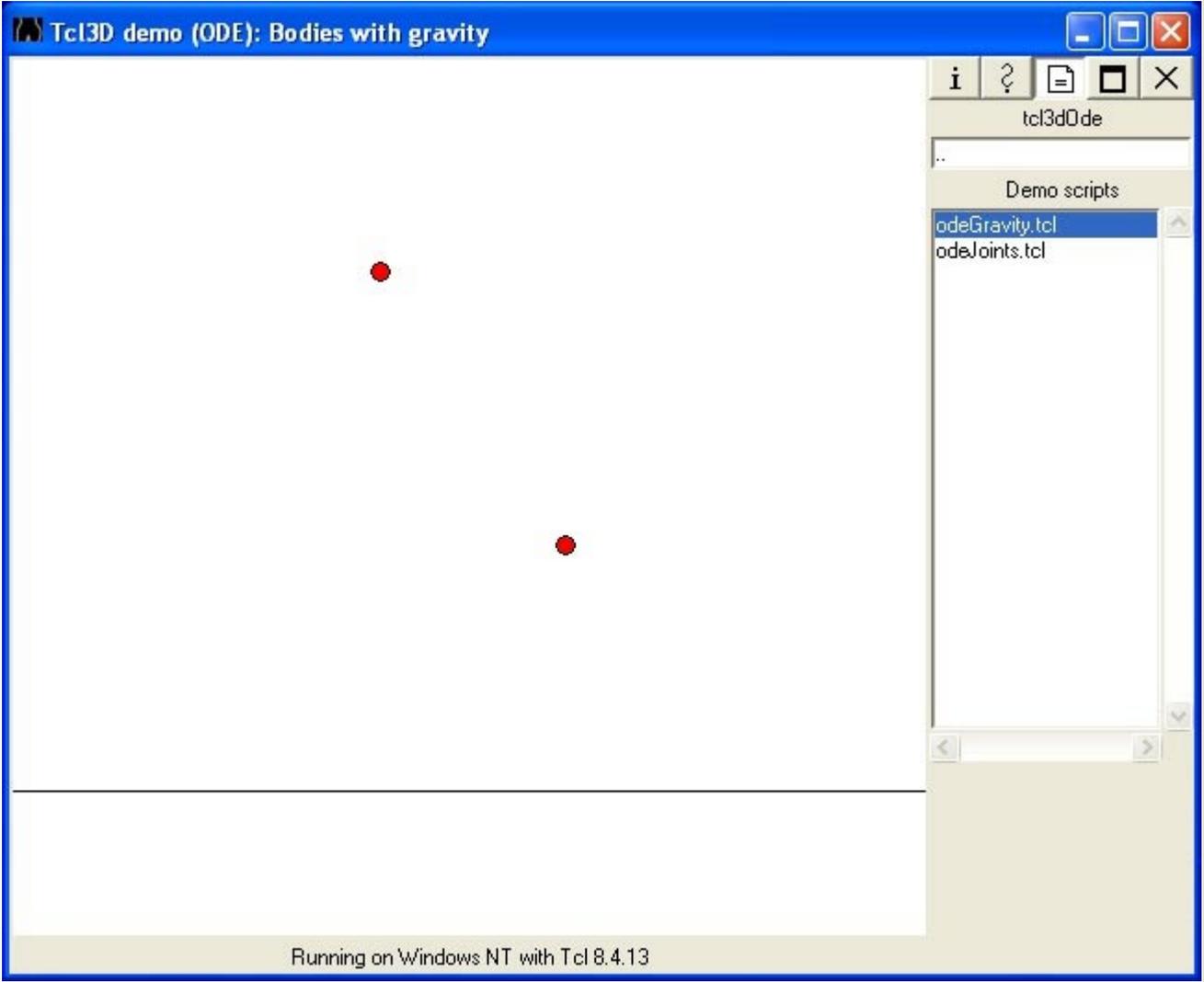
Module: Tcl3D -> tcl3dGauges  
 Filename: gaugetest.tcl

Author: Paul Obermeier

Description: Test program for the Tcl3D extension package gauge. The program allows to show the 4 gauges at different sizes.

Type:	tcl3dOde
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>
<p>This section contains ODE demo applications written in Tcl3D. The examples cover some demo applications distributed with PyOde.</p>	
Available demos	
	
<a href="#">odeGravity</a>	<a href="#">odeJoints</a>

<b>Demo:</b>	<b>odeGravity</b>
Type:	<a href="#">tcl3dOde</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Running on Windows NT with Tcl 8.4.13

Copyright: 2006-2009 Paul Obermeier (obermeier@tcl3d.org)

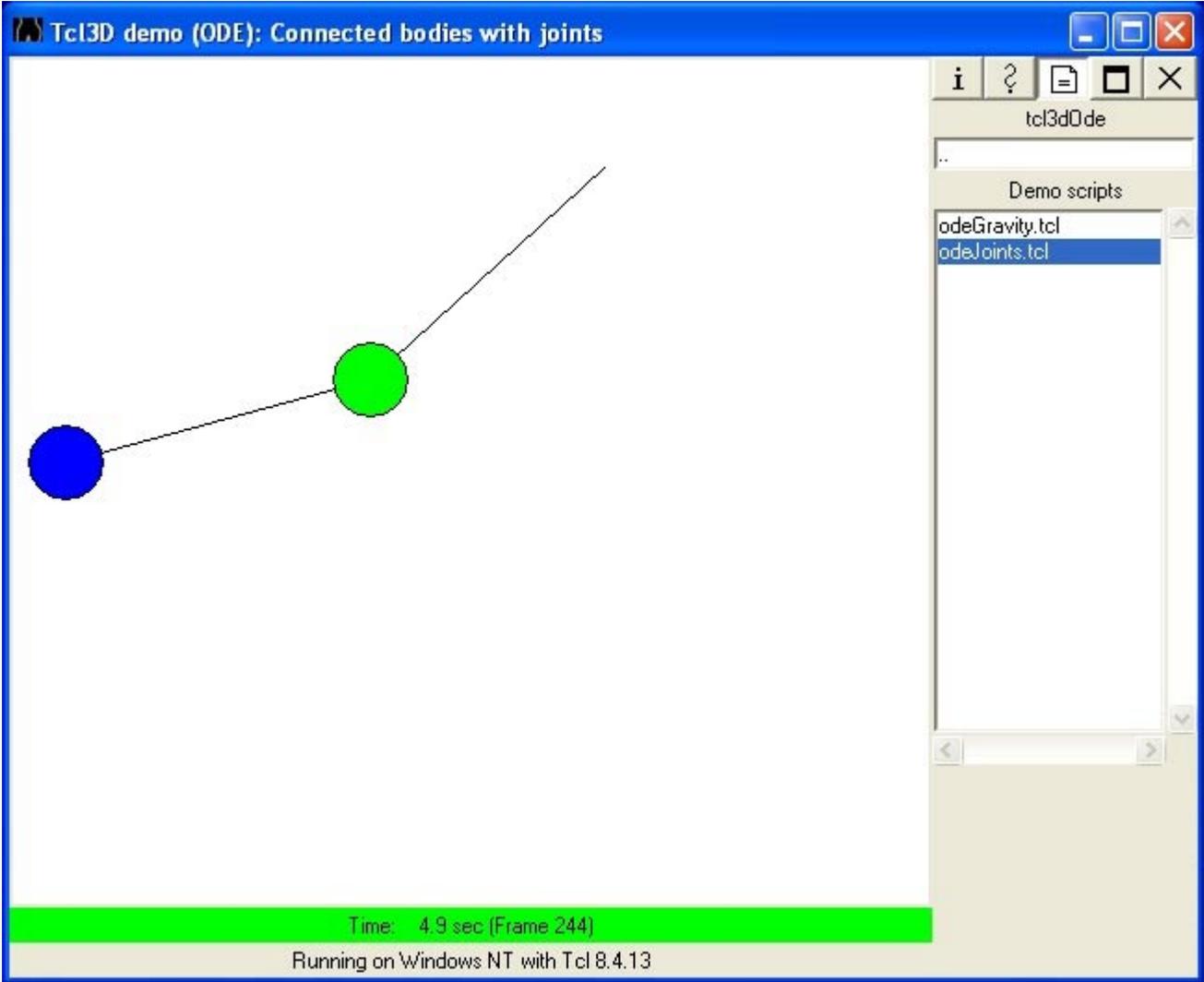
See the file "Tcl3D\_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

Module: Tcl3D -> tcl3dOde  
 Filename: odeGravity.tcl

Author: Paul Obermeier

Description: Tcl3D Ode example: Bodies influenced by gravity. Based on PyODE Tutorial 1 By Matthias Baas.

<b>Demo:</b>	<b>odeJoints</b>
Type:	<a href="#">tcl3dOde</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

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Module: Tcl3D -> tcl3dOde  
 Filename: odeJoints.tcl

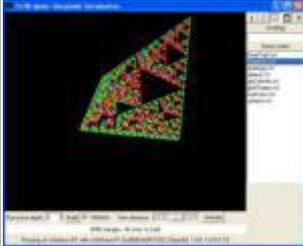
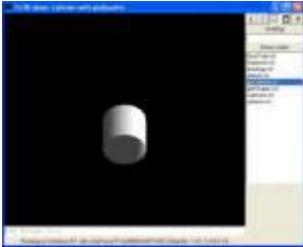
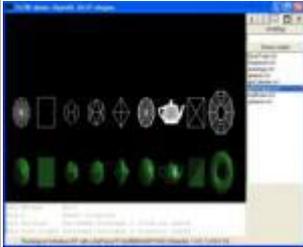
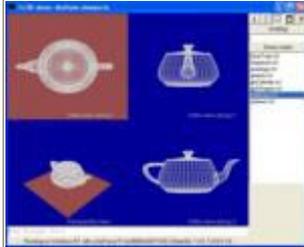
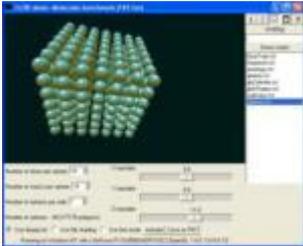
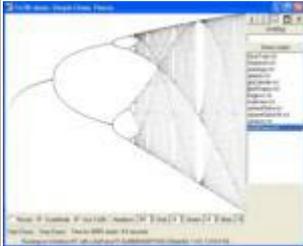
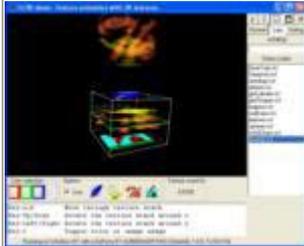
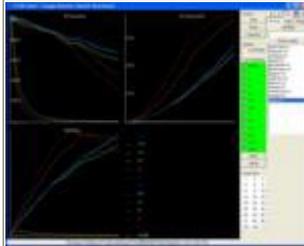
Author: Paul Obermeier

Description: Tcl3D Ode example: Connected bodies with joints  
 Based on PyODE Tutorial 2 By Matthias Baas.

Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

This section contains OpenGL demo applications from several resources, that have been ported to Tcl3D. They cover basic OpenGL programming.  
Original sources from different sites. See the documentation for details.

Available demos

				
<a href="#">GearTrain</a>	<a href="#">Sierpinski</a>	<a href="#">animlogo</a>	<a href="#">atlantis</a>	<a href="#">drawRect</a>
				
<a href="#">gluCylinder</a>	<a href="#">glutShapes</a>	<a href="#">imgproc</a>	<a href="#">multiview</a>	<a href="#">plate</a>
				
<a href="#">spheres</a>	<a href="#">tcl3dChaos</a>	<a href="#">texanim</a>	<a href="#">trislam</a>	

<b>Demo:</b>	<b>GearTrain</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 B1-Motion Rotate  
 B2-Motion Zoom

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

GearTrain.tcl

GearTrain Simulator \* Version: 1.00

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 <skdutta@del3.vsnl.net.in>

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Tcl conversion Copyright Philip Quaife August 2005.

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Slightly modified for Tcl3D presentation by Paul Obermeier 2006/08/02  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Sierpinski</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Recursive depth  Build  Optimize View distance  Animate

4096 triangles: 46 msec to build

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Copyright: 2005-2009 Paul Obermeier (obermeier@tcl3d.org)

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Module: Tcl3D -> tcl3dOgl

Filename: Sierpinski.tcl

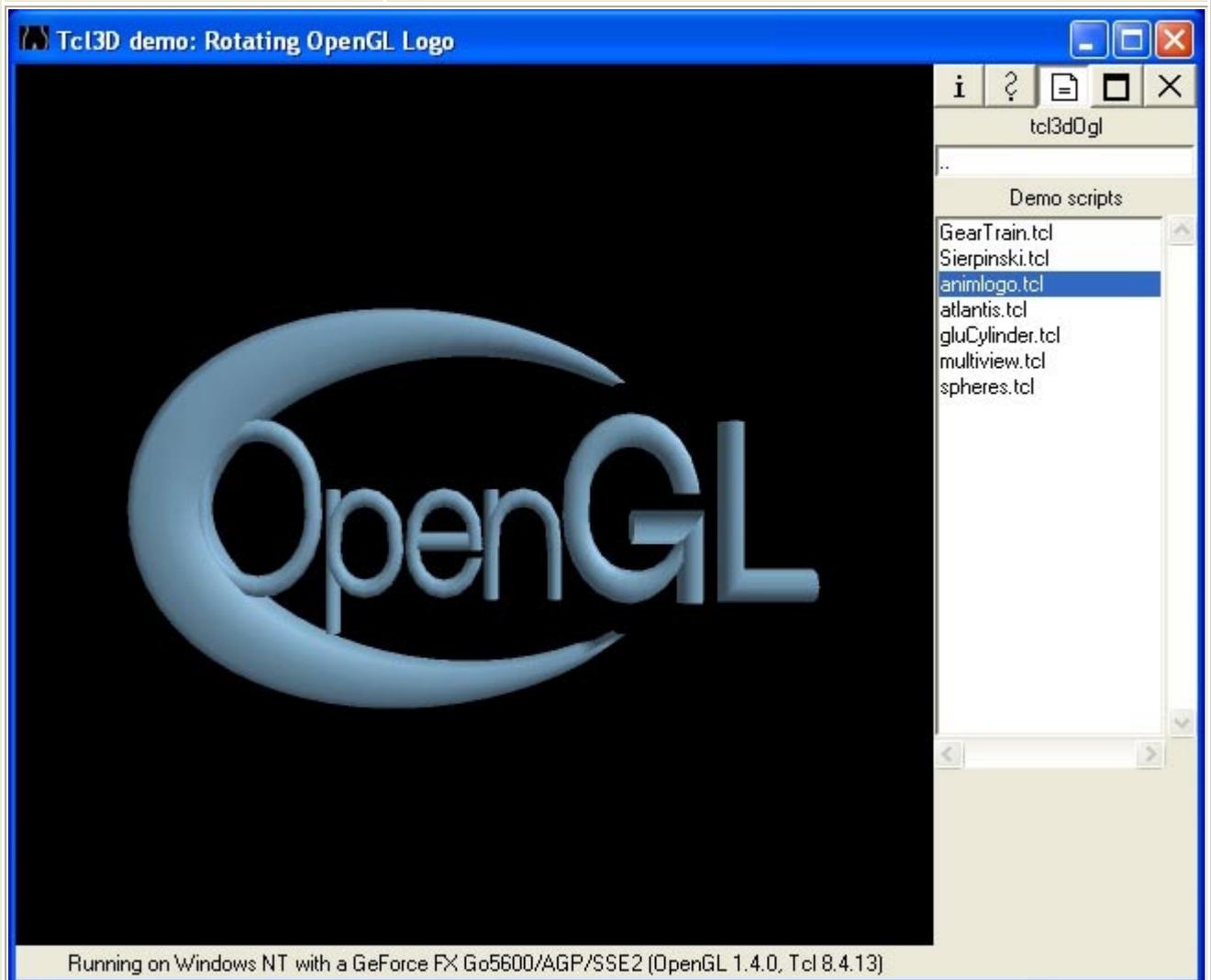
Author: Paul Obermeier

Description: Tcl3D demo displaying a 3D Sierpinski Tetrahedron.

Derived from a demo by Gerard Sookahet (tetra-3dc.tcl), which used the 3dcanvas package.  
The original version is at: <http://wiki.tcl.tk/11832>.

Incorporates optimization functions by Philip Quaife. See the Tcl'ers Wiki <http://wiki.tcl.tk/14820> for a description of his optimizations.

<b>Demo:</b>	<b>animlogo</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>



animlogo.tcl

The animated OpenGL logo

This file is part of the OpenGL-logo demo.  
(c) Henk Kok (kok@wins.uva.nl)

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Original sources available at:

[http://www.opengl.org/resources/code/samples/glut\\_examples/demos/demos.html](http://www.opengl.org/resources/code/samples/glut_examples/demos/demos.html)

Modified for Tcl3D by Paul Obermeier 2006/08/02  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>atlantis</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Mouse-3    PopupMenu  
 Key-s      Stop  
 Key-p      Play  
 Key-Space    Step  
 Key-Escape    Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

atlantis.tcl

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OpenGL(TM) is a trademark of Silicon Graphics, Inc.

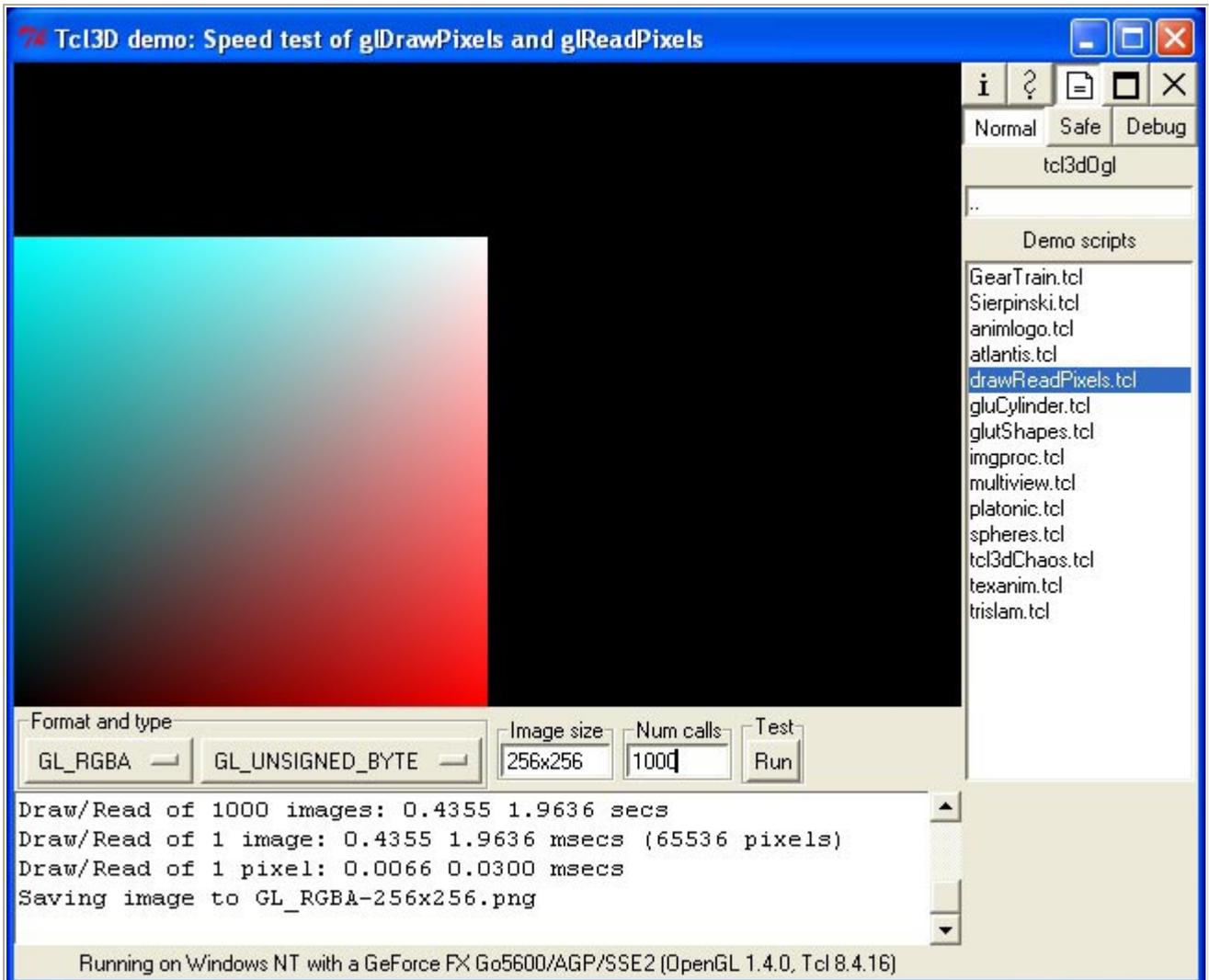
Original sources available at:

[http://www.opengl.org/resources/code/samples/glut\\_examples/demos/demos.html](http://www.opengl.org/resources/code/samples/glut_examples/demos/demos.html)

Modified for Tcl3D by Paul Obermeier 2005/08/14

See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>drawReadPixels</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>



Format and type: GL\_RGBA, GL\_UNSIGNED\_BYTE, Image size: 256x256, Num calls: 1000, Test: Run

Draw/Read of 1000 images: 0.4355 1.9636 secs  
 Draw/Read of 1 image: 0.4355 1.9636 msecs (65536 pixels)  
 Draw/Read of 1 pixel: 0.0066 0.0300 msecs  
 Saving image to GL\_RGBA-256x256.png

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)

testDrawReadPixels.tcl

Tcl3D demo testing the speed of the glDrawPixels and glReadPixels functions. The program generates a color gradient image of a specified size.

If the image size is greater than 256x256, the color gradient is tiled.

This image is then drawn into the framebuffer with glDrawPixels and read back with glReadPixels several times.

The time needed for drawing and reading back is reported into a text widget and onto stdout (for batch processing).

The format and type of the image data can be specified for testing the differences in speed.

Currently the following formats and types are implemented:

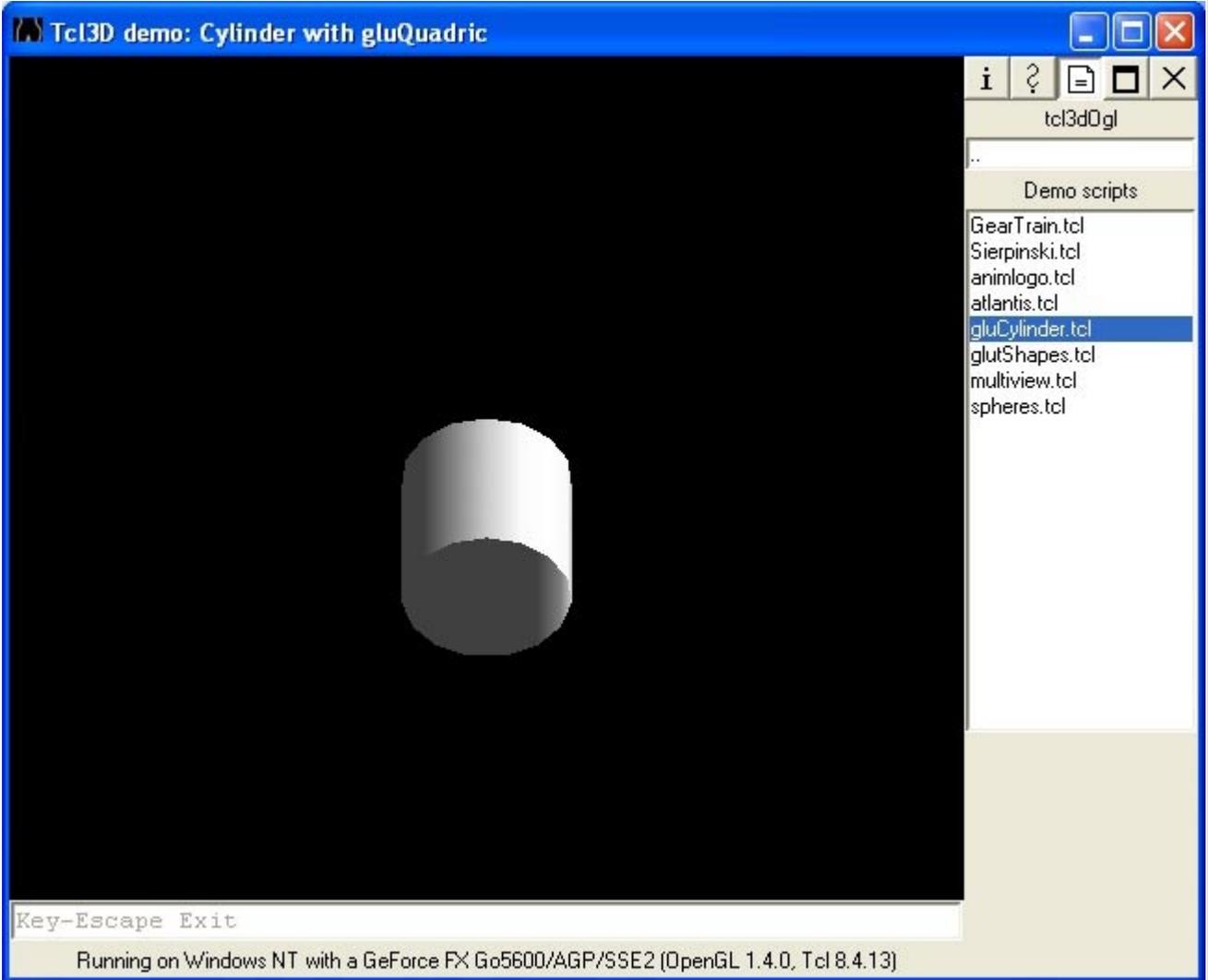
Formats: GL\_RGB, GL\_BGR, GL\_RGBA, GL\_BGRA.

Types : GL\_UNSIGNED\_BYTE

Author: Paul Obermeier

Date: 2009-07-16

<b>Demo:</b>	<b>gluCylinder</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Copyright: 2005-2009 Paul Obermeier (obermeier@tcl3d.org)

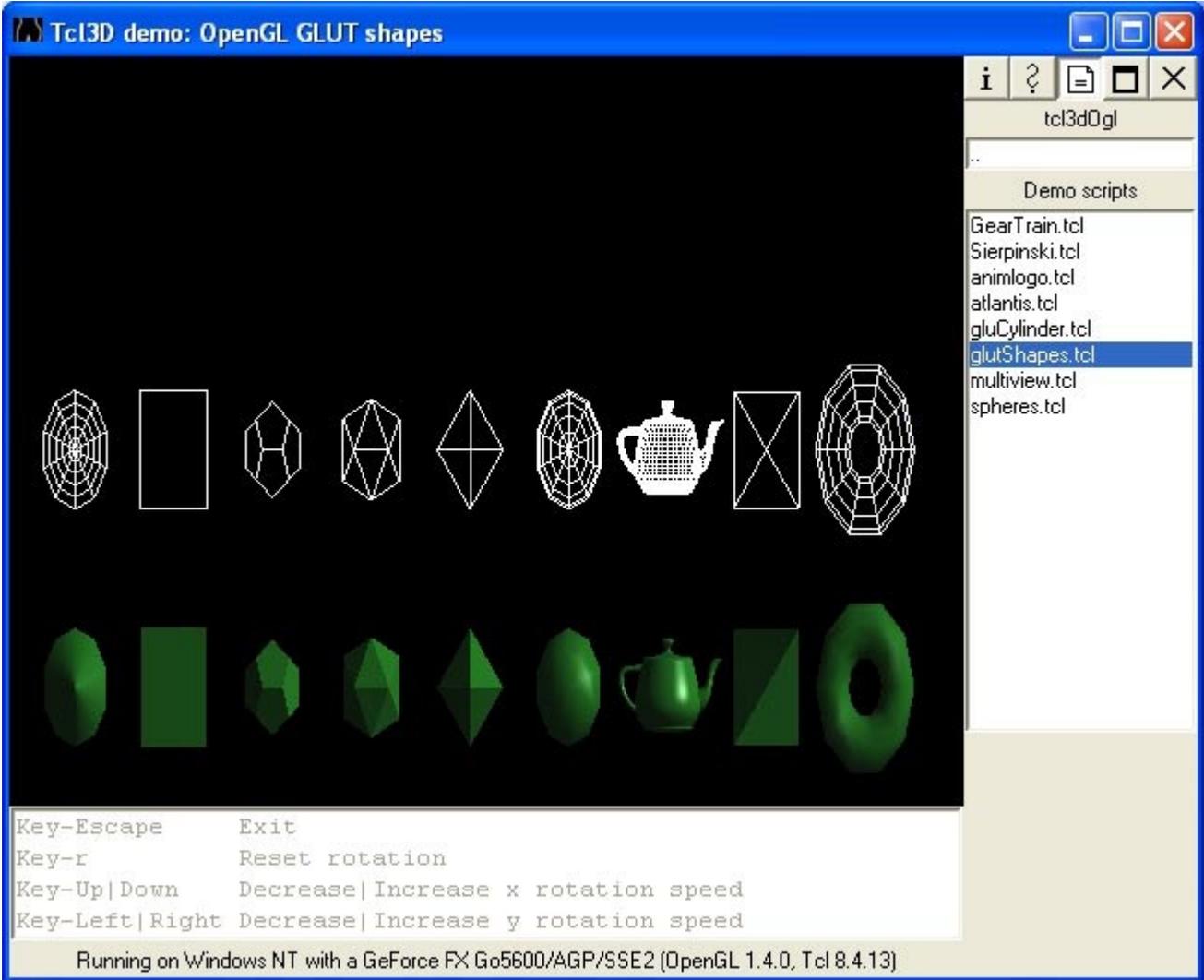
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Module: Tcl3D -> tcl3dOgl  
 Filename: gluCylinder.tcl

Author: Paul Obermeier

Description: Tcl3D demo showing the use of gluQuadric routines to draw a cylinder.

<b>Demo:</b>	<b>glutShapes</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Key-Escape      Exit  
 Key-r            Reset rotation  
 Key-Up|Down    Decrease|Increase x rotation speed  
 Key-Left|Right Decrease|Increase y rotation speed

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Copyright:        2006-2009 Paul Obermeier (obermeier@tcl3d.org)

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 DISCLAIMER OF ALL WARRANTIES.

Module:           Tcl3D -> tcl3dOgl  
 Filename:         glutShapes.tcl

Author:           Paul Obermeier  
 Date:             2006-12-01

Description:      Tcl3D demo showing all supported GLUT shapes.

<b>Demo:</b>	<b>imgproc</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

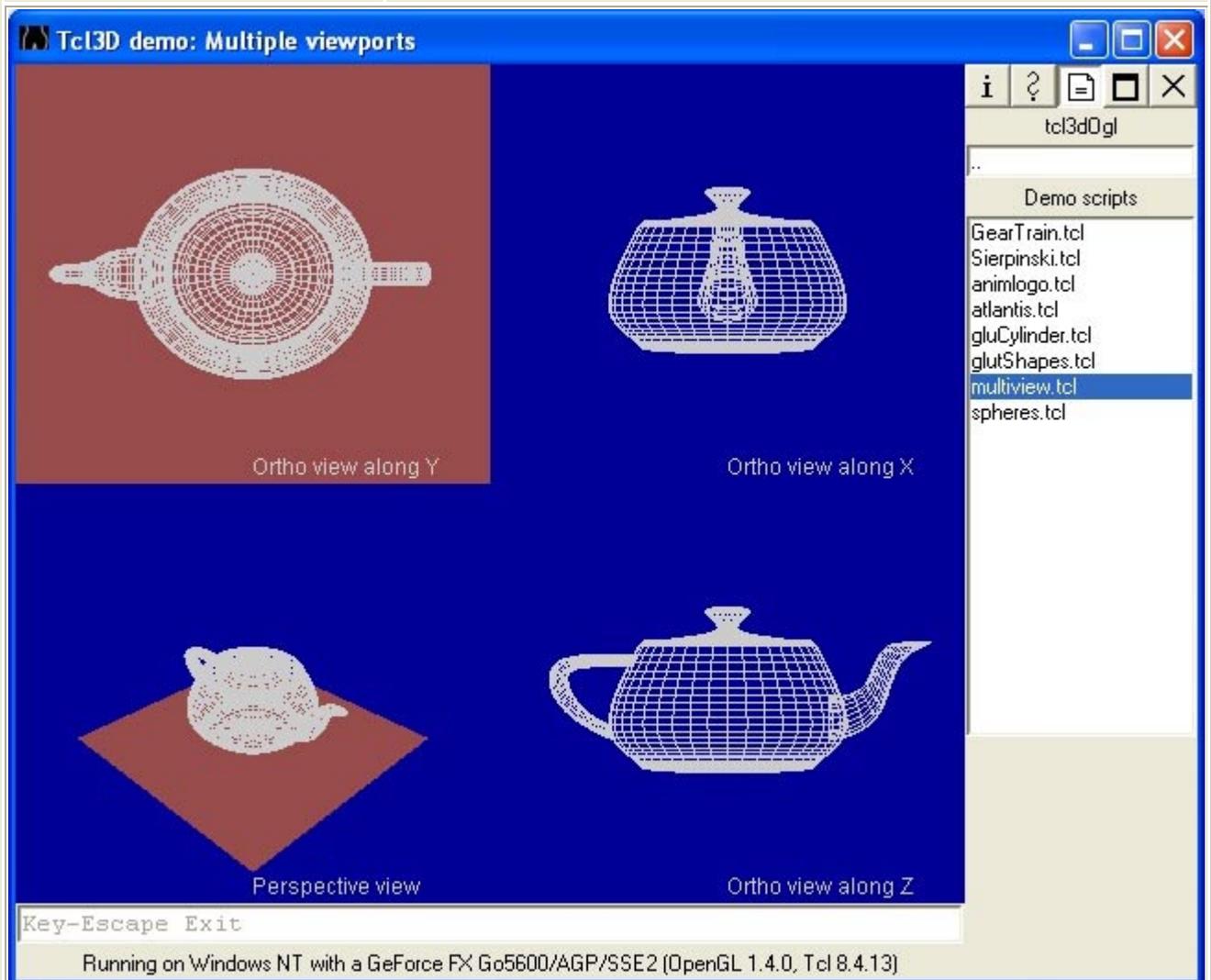
imgproc.c - by David Blythe, SGI

Examples of various image processing operations coded as OpenGL accumulation buffer operations. This allows extremely fast image processing on machines with hardware accumulation buffers (RealityEngine, InfiniteReality, VGX).

This demo is part of the advanced glut demos.  
See [http://www.opengl.org/resources/code/samples/glut\\_examples/advanced/advanced.html](http://www.opengl.org/resources/code/samples/glut_examples/advanced/advanced.html)

Modified for Tcl3D by Paul Obermeier 2007/07/28  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>multiview</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>



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Module: Tcl3D -> tcl3dOgl

Filename: multiview.tcl

Author: Paul Obermeier

Description: Tcl3D demo showing the famous teapot in 4 different viewports on a single togl widget.

<b>Demo:</b>	<b>platonic</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Mouse-L|MR Start|Stop animation  
 Key-m Toggle mirror  
 Key-p Toggle teapotahedron  
 Key-t Toggle textures  
 Key-0 Toggle light 0  
 Key-1 Toggle light 1  
 Key-+|- Increment|Decrement camera speed

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)

platonic.c - An OpenGL demonstration that draws the six platonic solids: The tetrahedron, the cube, the dodecahedron, the octahedron, the icosahedron and the teapotahedron. :-)  
 The ray-traced image by Arvo and Kirk on the front cover of "An Introduction to Ray Tracing" (A. S. Glassner (ed.), Academic Press) inspired me to write this demo.  
 A menu with a number of options is tied to the left mouse button.

Author: Gustav Taxen, nv91-gta@nada.kth.se

Notes: The code is not very pretty, nor is it optimized wrt OpenGL. Should add shadows as well, but I'll save that for the next version...

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Original C code taken from:

<http://www.student.nada.kth.se/~nv91-gta/OpenGL/projects/platonic/>

Modified for Tcl3D by Paul Obermeier 2008/12/21

See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

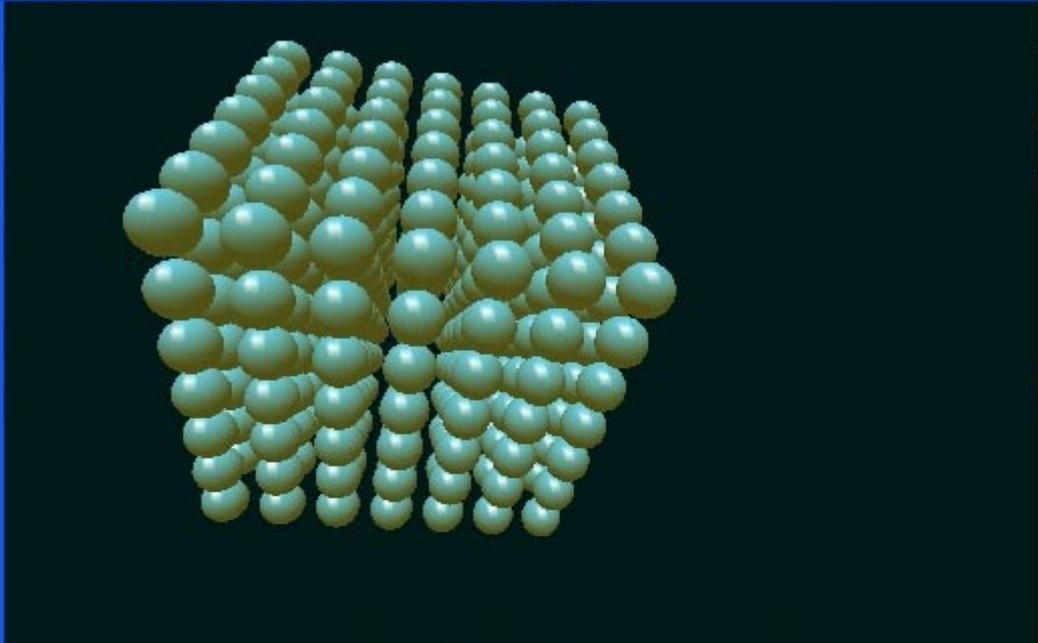
See <http://design.osu.edu/carlson/history/lesson20.html> about the history of the famous Utah teapot. This page also contains an image of the original ray-traced scene by Arvo and Kirk.

The image is also on the front page of Glassner's book "An Introduction to Ray Tracing".

For a mathematical description of the five platonic solids see [http://en.wikipedia.org/wiki/Platonic\\_solid](http://en.wikipedia.org/wiki/Platonic_solid)

<b>Demo:</b>	<b>spheres</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Molecules benchmark (182 fps)**



Number of slices per sphere:  X translate:

Number of stacks per sphere:  Y translate:

Number of spheres per side:  Z translate:

Number of spheres: 343 (77175 polygons)

Use display list  Use flat shading  Use line mode

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Copyright: 2005-2009 Paul Obermeier (obermeier@tcl3d.org)

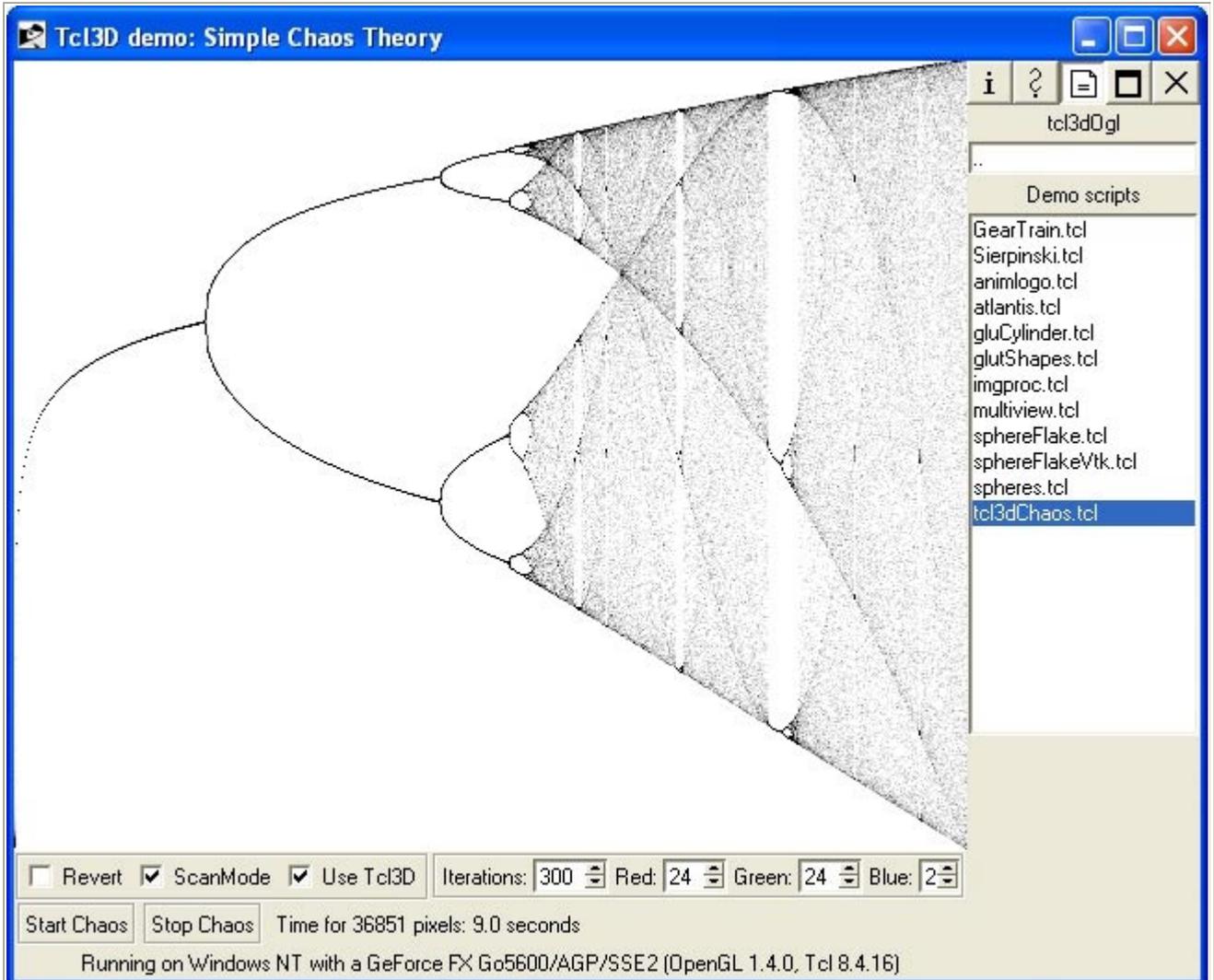
See the file "Tcl3D\_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

Module: Tcl3D -> tcl3dOgl  
 Filename: spheres.tcl

Author: Paul Obermeier

Description: Tcl3D demo displaying spheres in various modes.

<b>Demo:</b>	<b>tcl3dChaos</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>



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Module: Tcl3D -> tcl3dOgl

Filename: tcl3dChaos.tcl

Author: Paul Obermeier

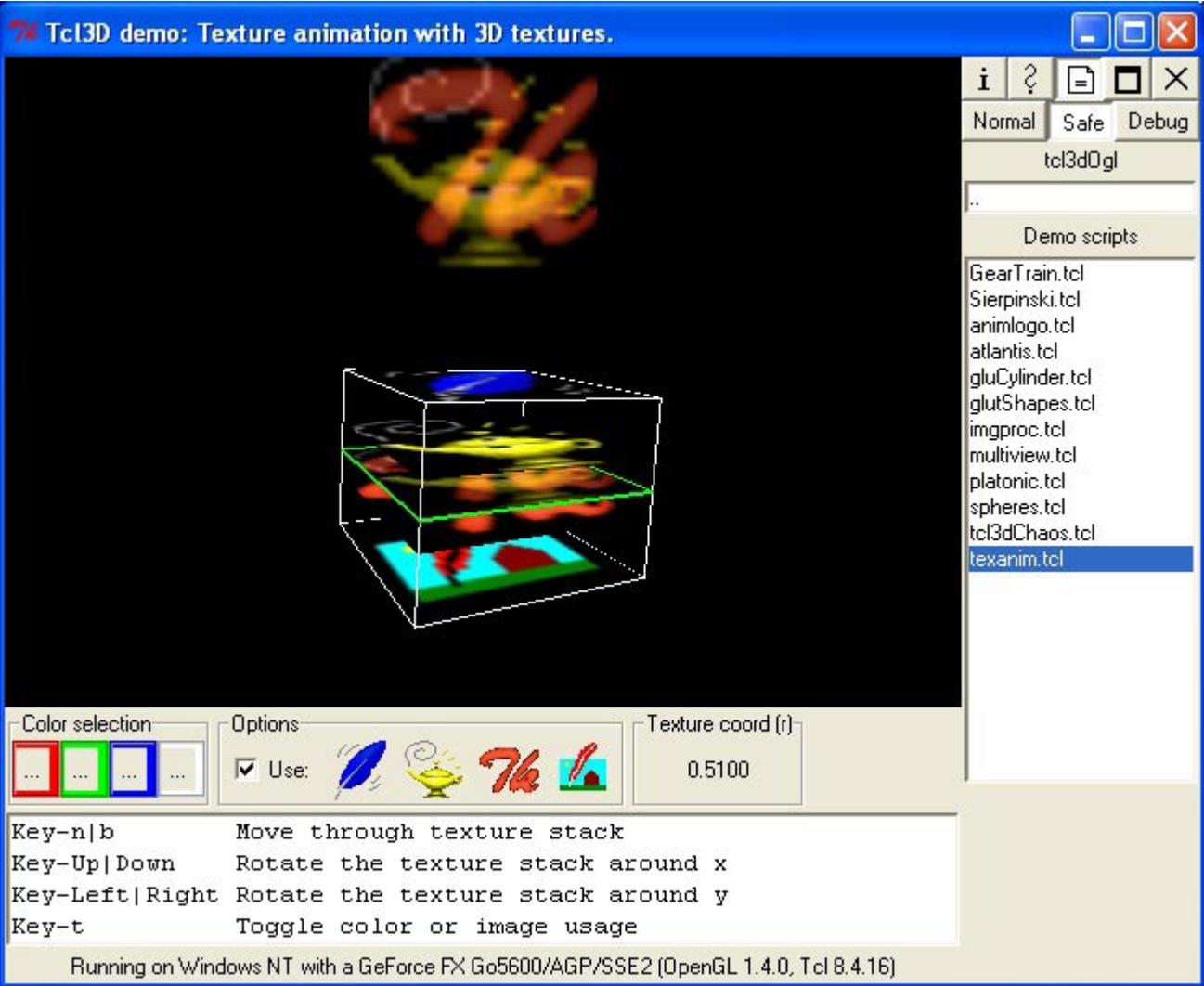
Description: Implementation of algorithm described on Wiki page "Simple Chaos Theory with Tcl" (<http://wiki.tcl.tk/11887>) using Tcl3D.

Interesting values:

```
2000  8 10 14  revert
6300  3  3  3  revert
```

<b>Demo:</b>	<b>texanim</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Texture animation with 3D textures.**



Color selection:

Options:  Use:    

Texture coord (r): 0.5100

Key-n|b      Move through texture stack  
 Key-Up|Down      Rotate the texture stack around x  
 Key-Left|Right      Rotate the texture stack around y  
 Key-t      Toggle color or image usage

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)

texanim.tcl

Tcl3D demo showing the usage of a 3D texture for animation. In the upper part of the window, a quad is drawn, which shows the actual texture animation. In the lower half of the window, the 3D texture is visualized as a stack of quads. The sampling of the 3D texture is shown by a quad moving through the texture stack. Either 4 predefined images can be used as textures or 4 choosable colors.

Author: Paul Obermeier  
 Date: 2009-01-16

<b>Demo:</b>	<b>trislam</b>
Type:	<a href="#">tcl3dOgl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)

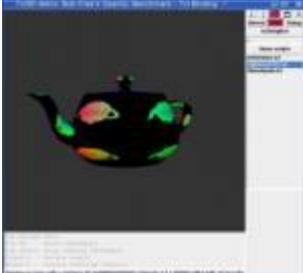
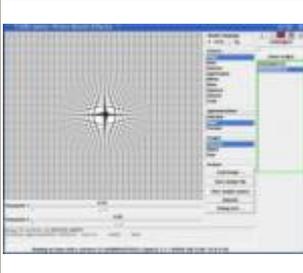
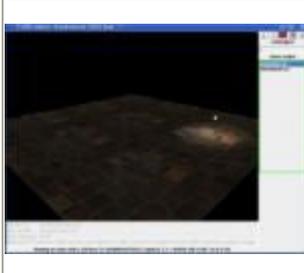
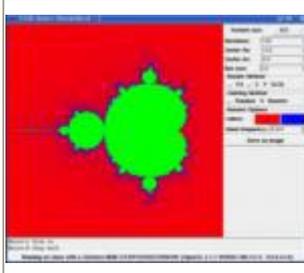
trislam.tcl

Purpose: Determine performance curves for various methods of pushing triangles and quads through the OpenGL pipeline

Copyright (c) 2004-2006, Geoff Broadwell; this script is released as open source and may be distributed and modified under the terms of either the Artistic License or the GNU General Public License, in the same manner as Perl itself. These licenses should have been distributed to you as part of your Perl distribution, and can be read using ``perldoc perlartistic`` and ``perldoc perlgl`` respectively.

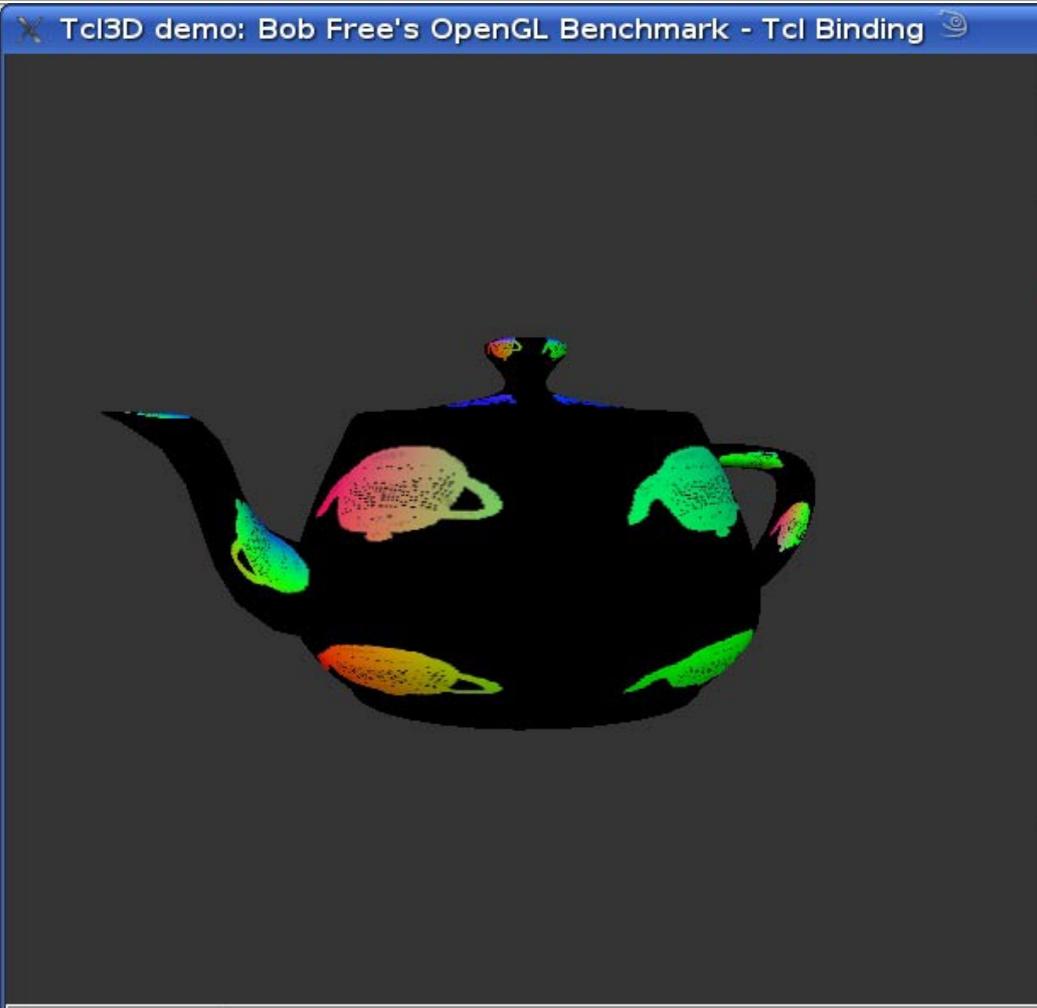
Rewritten in Python by Bob Free

Rewritten and extended for Tcl3D by Paul Obermeier, 2008

Type:	<b>tcl3dOglExt</b>		
Category:	<a href="#">LibrarySpecificDemos</a>		
Root:	<a href="#">Contents</a>		
<p>This section contains OpenGL demo applications from several resources, that have been ported to Tcl3D. The examples cover OpenGL extension programming. Original sources from different sites. See the documentation for details.</p>			
Available demos			
			
<a href="#">OglBenchFBO</a>	<a href="#">PhotoBooth</a>	<a href="#">extensions</a>	<a href="#">mandelbrot</a>

<b>Demo:</b>	<b>OglBenchFBO</b>
Type:	<a href="#">tcl3dOglExt</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: Bob Free's OpenGL Benchmark - Tcl Binding



Normal Safe Debug  
tcl3dOglExt

..

Demo scripts

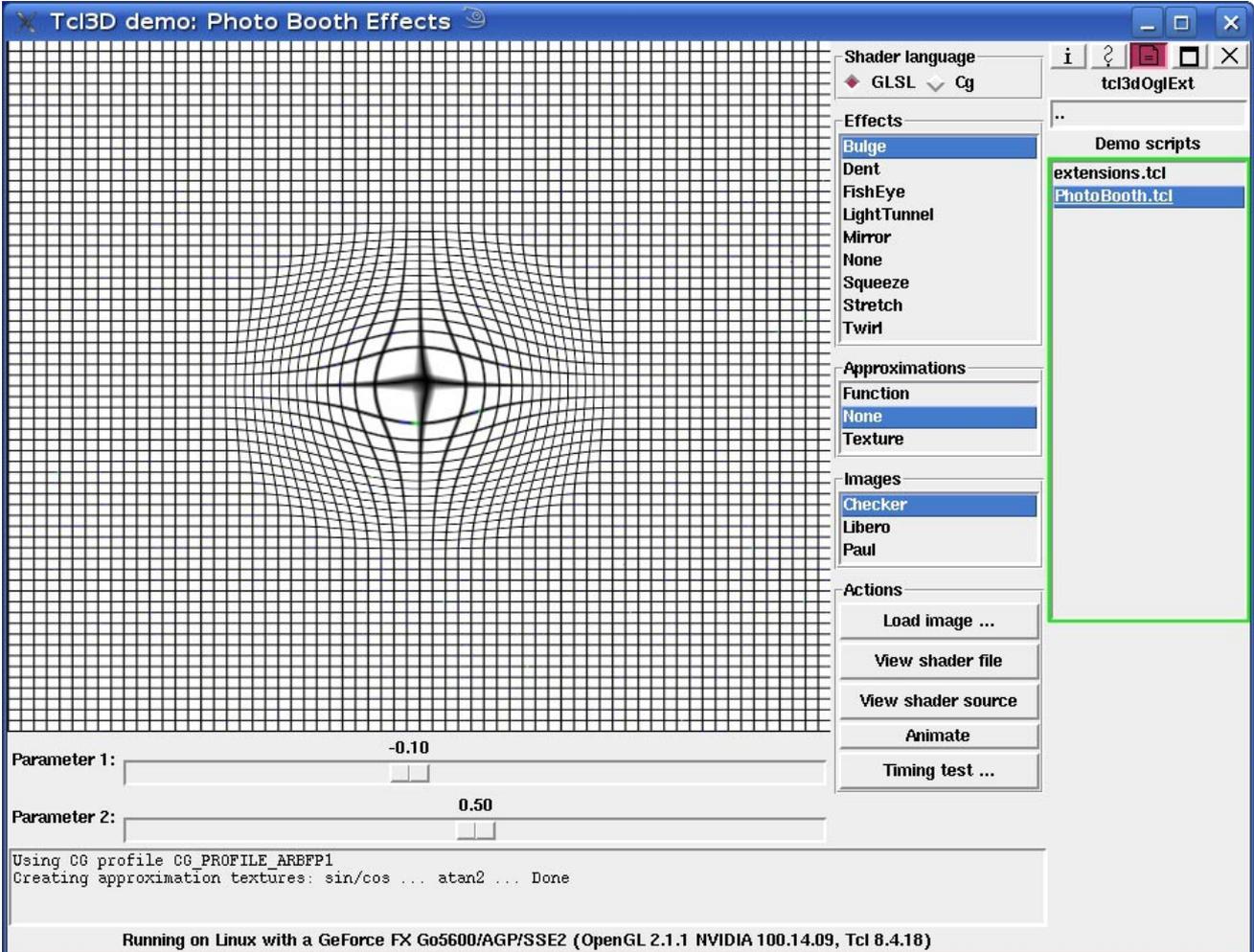
extensions.tcl  
OglBenchFBO.tcl  
PhotoBooth.tcl

Key-Escape Exit  
Key-F6 Start benchmark  
Key-Space Stop running benchmark  
Mouse-1 Rotate teapot  
Mouse-2 Rotate textured teapots

**Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)**

ogl\_bench v1.0 - Copyright 2007 - Graphcomp  
Bob Free bfree@graphcomp.com  
<http://graphcomp.com/opengl>

<b>Demo:</b>	<b>PhotoBooth</b>
Type:	<a href="#">tcl3dOglExt</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Parameter 1:

Parameter 2:

Using CG profile CG\_PROFILE\_ARBFP1  
Creating approximation textures: sin/cos ... atan2 ... Done

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

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PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Modified for Tcl3D by Paul Obermeier 2007/04/14  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

The demo has been modified to allow up to 2 parameters to be changed interactively via a slider.

The parameter range of the two sliders can be provided as comment lines at the top of the shader source files.

Further enhancements include:

Loading of image files of any size via the "Load image" button. All image files with an extension of .jpg or .tga in the directory of the script are automatically

recognized and inserted into the "Images" labelframe.

Add your own shader without modifying the Tcl script by adding a new file with extension

.frag in the directory of the script.

A description of the effect shaders and the original sources are available at <http://dem.ocracy.org/libero/photobooth/>

<b>Demo:</b>	<b>extensions</b>
Type:	<a href="#">tcl3dOglExt</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Mouse-L StartAnimation  
 Mouse-MR StopAnimation  
 Key-Escape Exit  
 ARB\_multitexture EXT\_point\_parameters ARB\_texture\_compression EXT\_texture\_edge\_clamp  
 Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

extensions.tcl

Program to demonstrate the use of extensions.

Extensions used:

```

  GL_ARB_multitexture
  GL_EXT_point_parameters
  GL_ARB_texture_compression
  GL_EXT_texture_edge_clamp

```

Original C++ code by Dave Astle 2/1/2002

Original <http://www.gamedev.net/reference/programming/features/oglext/demo.zip> files from:

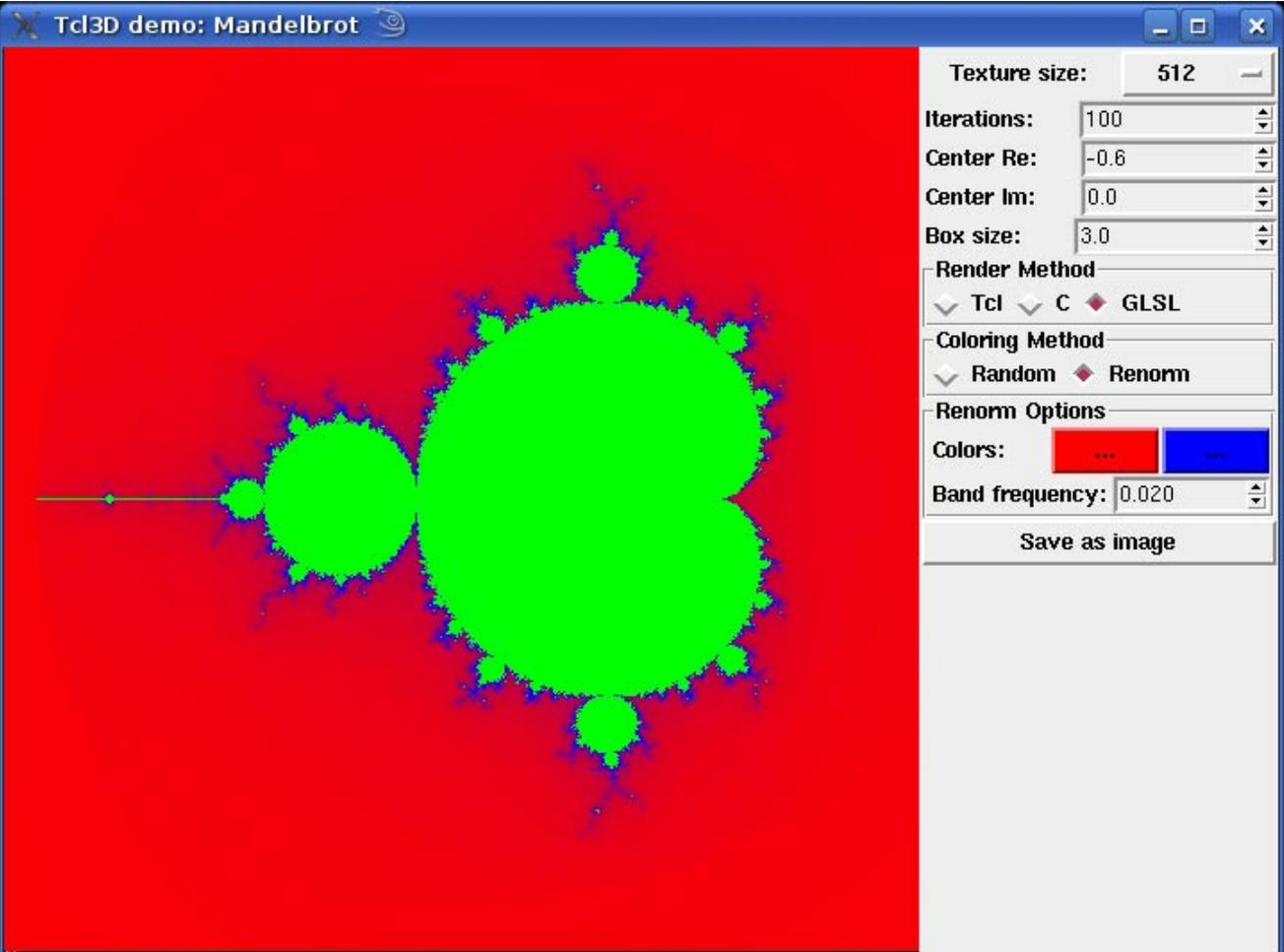
Modified for Tcl3D by Paul Obermeier 2005/09/05

See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>mandelbrot</b>
Type:	<a href="#">tcl3dOglExt</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: Mandelbrot



Texture size: 512

Iterations: 100

Center Re: -0.6

Center Im: 0.0

Box size: 3.0

Render Method  
 Tcl  C  GLSL

Coloring Method  
 Random  Renorm

Renorm Options  
 Colors:

Band frequency: 0.020

Save as image

Mouse-L Zoom in  
 Mouse-R Step back

Running on Linux with a GeForce 8600 GTS/PCI/SSE2/3DNow! (OpenGL 2.1.1 NVIDIA 100.14.11, Tcl 8.4.14)

Mandelbrot shader using GPGPU techniques

Author: Gabriel Zachmann, June 2007

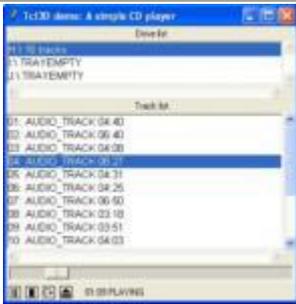
The code is derived from ../fbo\_demo/saxpy.cpp

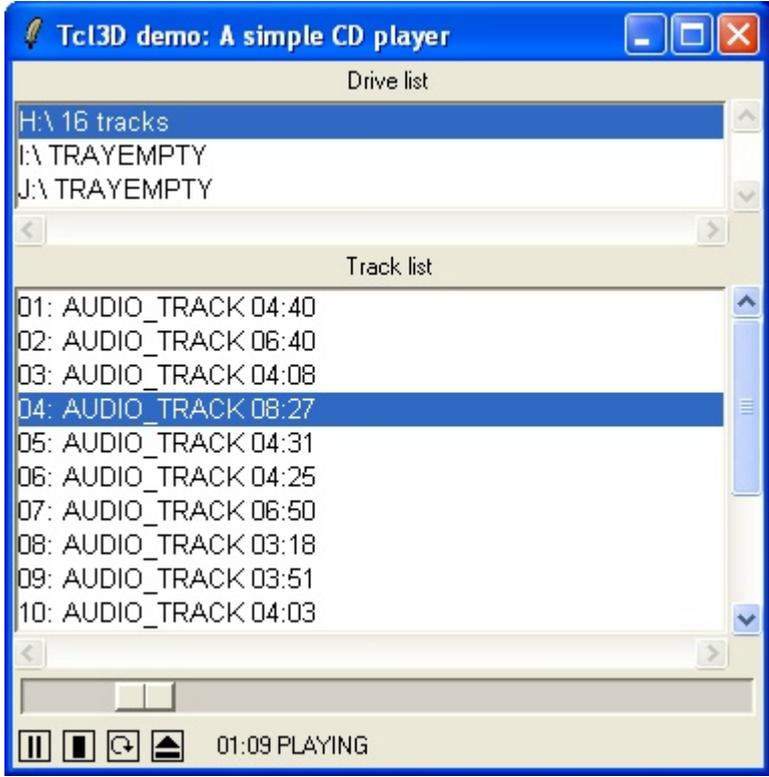
The original code can be found at:

[http://zach.in.tu-clausthal.de/teaching/cg2\\_08/downloads/simple\\_glsl\\_demos.tar.gz](http://zach.in.tu-clausthal.de/teaching/cg2_08/downloads/simple_glsl_demos.tar.gz)

Modified and extended for Tcl3D by Paul Obermeier 2009/01/04

See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Type:</b>	<b>tcl3dSDL</b>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>
<p>This section contains SDL demo applications written in Tcl3D. The examples cover joystick and CD programming with the help of the SDL library.</p>	
Available demos	
	
<a href="#">cdplayer</a>	<a href="#">joysticktest</a>

<b>Demo:</b>	<b>cdplayer</b>
Type:	<a href="#">tcl3dSDL</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>
	
Copyright:	2006-2009 Paul Obermeier (obermeier@tcl3d.org)  See the file "Tcl3D_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.
Module:	Tcl3D -> tcl3dSDL
Filename:	cdplayer.tcl
Author:	Paul Obermeier
Description:	Tcl script implementing a simple CD player to test the CD related functions (SDL_CD*) of the Tcl3D SDL wrapping.

<b>Demo:</b>	<b>joysticktest</b>
Type:	<a href="#">tcl3dSDL</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

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Module: Tcl3D -> tcl3dSDL  
 Filename: joysticktest.tcl

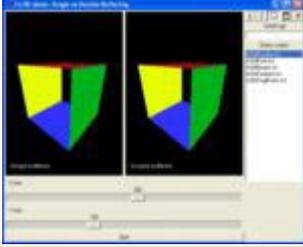
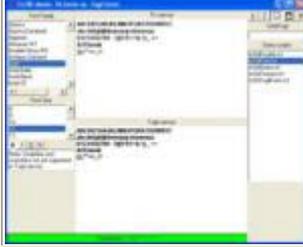
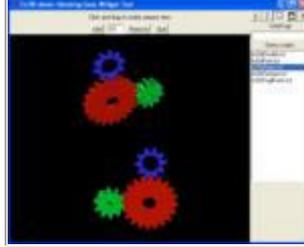
Author: Paul Obermeier

Description: Tcl script to test the joystick related functions of the Tcl3D SDL wrapping.

Type:	<b>tcl3dTogl</b>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

The following demos from the Togl distribution have been ported to Tcl3D.  
 Original sources available at: <http://sourceforge.net/projects/togl/>

Available demos

				
<a href="#">tcl3dDouble</a>	<a href="#">tcl3dFont</a>	<a href="#">tcl3dGears</a>	<a href="#">tcl3dTexture</a>	<a href="#">tcl3dTo</a>

<b>Demo:</b>	<b>tcl3dDouble</b>
Type:	<a href="#">tcl3dTogl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

tcl3dDouble.tcl

A Tcl3D widget demo with two windows, one single buffered and the other double buffered.

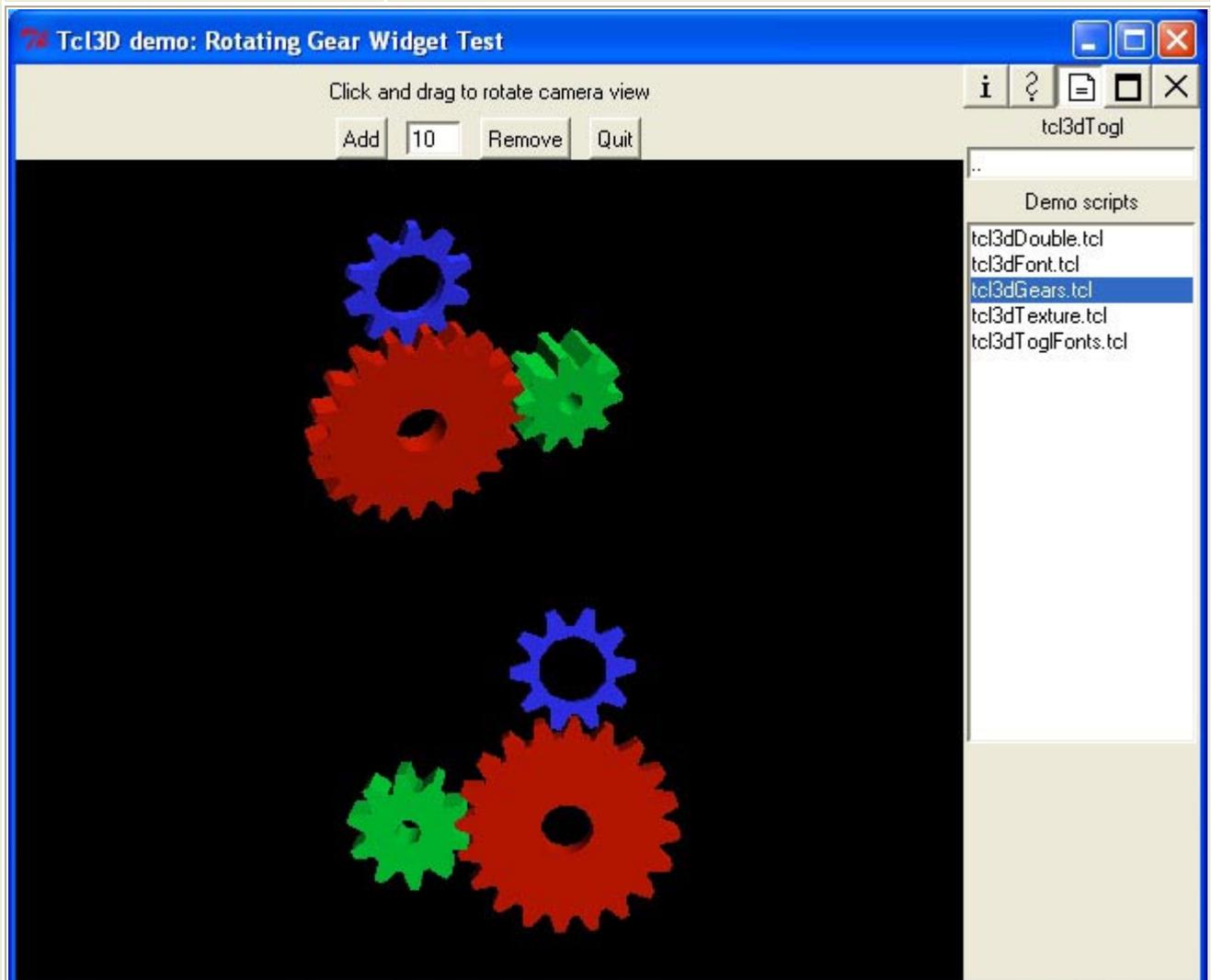
This is a version of the original Togl double demo written entirely in Tcl with the help of the Tcl3D package.

Copyright (C) 1996 Brian Paul and Ben Bederson (Original C/Tcl version)  
 Copyright (C) 2005 Paul Obermeier (Tcl3D version)  
 See the LICENSE file for copyright details.

Original sources available at: <http://sourceforge.net/projects/togl/>



<b>Demo:</b>	<b>tcl3dGears</b>
Type:	<a href="#">tcl3dTogl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>



```
tcl3dGears.tcl
```

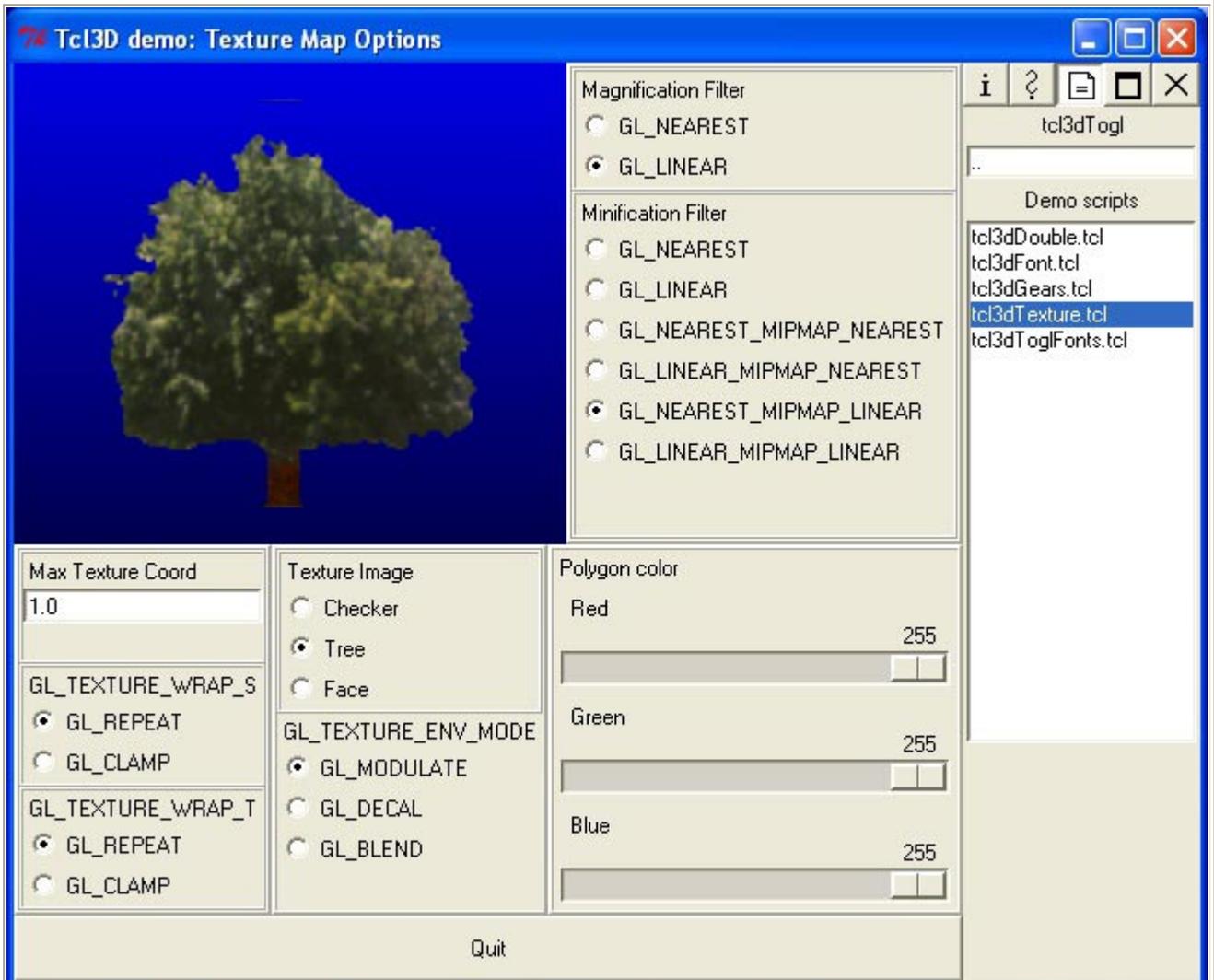
```
Test Togl using GL Gears Demo
```

```
This is a version of the original Togl gears demo written entirely in Tcl  
with the help of the Tcl3D package.
```

```
Copyright (C) 1997 Philip Quaipe (Original C/Tcl version)  
Copyright (C) 2005 Paul Obermeier (Tcl3D version)  
See the LICENSE file for copyright details.
```

```
Original sources available at: http://sourceforge.net/projects/togl/
```

<b>Demo:</b>	<b>tcl3dTexture</b>
Type:	<a href="#">tcl3dTogl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>



```
tcl3dTexture.tcl
```

```
Togl texture map demo
```

This is a version of the original Togl texture demo written entirely in Tcl with the help of the Tcl3D package.

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Original sources available at: <http://sourceforge.net/projects/togl/>

<b>Demo:</b>	<b>tcl3dTogIFonts</b>
Type:	<a href="#">tcl3dTogl</a>
Category:	<a href="#">LibrarySpecificDemos</a>
Root:	<a href="#">Contents</a>

```

loadbitmapfont
loadbitmapfont -family courier
loadbitmapfont -family times
loadbitmapfont -family fixed -size 12 -weight medium -slant regular
loadbitmapfont -family fixed -size 12 -weight bold -slant italic
loadbitmapfont -slant xyz
loadbitmapfont -weight xyz
loadbitmapfont -size 20
loadbitmapfont -size 20 -weight bold
loadbitmapfont -size 20 -slant italic
loadbitmapfont -*-courier-bold-r-**-10-***-***-***-***
loadbitmapfont -family 8x13
loadbitmapfont 8x13
loadbitmapfont -family a-b
loadbitmapfont a-b
loadbitmapfont -family
loadbitmapfont -family -weight -slant (Could not allocate font "-weight")
loadbitmapfont -unknownoption (Could not allocate font "-unknownoption")
Key-Escape Exit
Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)

```

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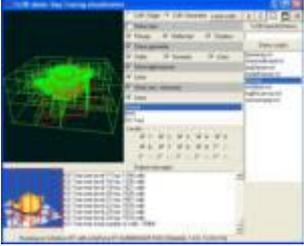
Module: Tcl3D -> tcl3dTogl

Filename: tcl3dTogIFonts.tcl

Author: Paul Obermeier

Description: Program demonstrating and testing the different possibilities of specifying a bitmap font for the Togl widget.

<b>Category:</b>	<b>Tcl3DSpecificDemos</b>
Root:	<a href="#">Contents</a>
Available types	
<a href="#">rtVis</a>	

<b>Type:</b>	<b>rtVis</b>
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>
Available demos	
	
<a href="#">rtVis</a>	

<b>Demo:</b>	<b>rtVis</b>
Type:	<a href="#">rtVis</a>
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>

The screenshot shows the 'Tcl3D demo: Ray-Tracing visualization' window. The main view displays a 3D scene with a teapot on a checkered floor, overlaid with a green wireframe grid. The control panel on the right includes options for 'CoR: Origin' and 'CoR: Geometry', checkboxes for 'Show rays', 'Primary', 'Reflected', 'Shadow', 'Show geometry', 'Static', 'Dynamic', 'Lines', 'Show lightsources', 'Show acc. structures', and 'Levels' (1-15). A list of 'Demo scripts' is shown, with 'rtVis.tcl' selected. The 'Output messages' window at the bottom displays the following text:

```

KD-Tree tree level 17 has 1194 cells
KD-Tree tree level 18 has 1328 cells
KD-Tree tree level 19 has 1421 cells
KD-Tree tree level 20 has 1525 cells
KD-Tree tree level 21 has 1657 cells
KD-Tree tree level 22 has 1670 cells
KD-Tree tree level 23 has 1672 cells
KD-Tree tree level 24 has 1579 cells
KD-Tree tree total number of cells: 15984
    
```

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)

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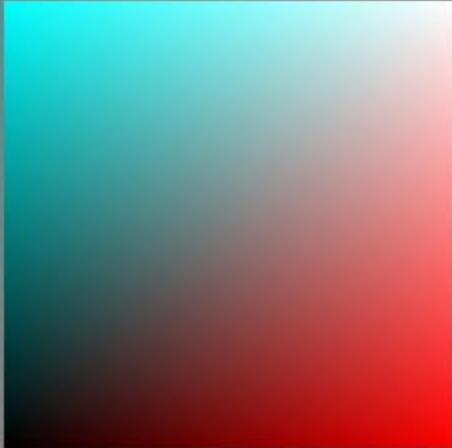
Module: Tcl3DSpecificDemos  
 Filename: rtVis.tcl

Author: Paul Obermeier

Description: Ray Tracing visualization program.  
 The comments of the rtvis\* procedures explain how to use the ray-tracing visualization commands.

<b>Demo:</b>	<b>bytearray</b>
Type:	
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Creating textures from byte arrays (Test 5)**



Key-1: Gradient with tcl3dVector (slow)  
 Key-2: Gradient with tcl3dVectorFromByteArray (fast)  
 Key-3: Gradient with tcl3dVectorFromByteArray (faster)  
 Key-4: Gradient with tcl3dVectorFromByteArray (fastest)  
 Key-5: Color gradient with tcl3dVectorFromByteArray  
 Key-6: Gradient readback with tcl3dVectorToByteArray  
 Key-Escape: Exit

27502 microseconds per iteration

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

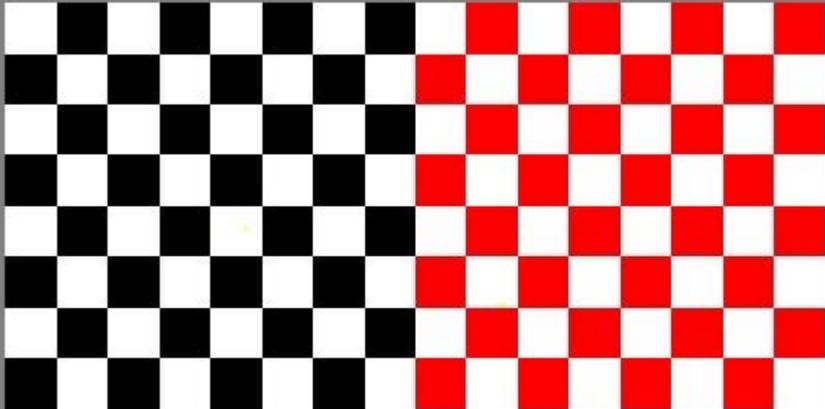
bytearray.tcl

Tcl3D demo showing the use of the tcl3dByteArray2Vector function, introduced in Version 0.3.  
 The program texture maps an image generated with Tcl onto a quad.

Author: Paul Obermeier  
 Date: 2006-02-01

<b>Demo:</b>	<b>checkerBoard</b>
Type:	
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Texture generation comparison**



Key-Escape Exit  
 Black checker: 243764 microseconds per iteration  
 Red checker: 825 microseconds per iteration

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

checkerBoard.tcl

This program creates a checkerboard image in two ways.  
 The first texture is created with an algorithm, as used in some of the RedBook examples (ex. checker.tcl). This algorithm has been converted 1:1 from C to Tcl. Very slow.  
 The second image is created using the Img extension, which is essentially faster.

Author: Paul Obermeier  
 Date: 2006-09-22

<b>Demo:</b>	<b>imgViewer</b>
Type:	
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>

Width x Height: 508 x 429 (Original: 512 x 512)

Copyright: 2005-2009 Paul Obermeier (obermeier@tcl3d.org)

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Module: Tcl3D  
 Filename: imgViewer.tcl

Author: Paul Obermeier

Description: Tcl program to display images and stretch them in realtime with the use of OpenGL textures. The images can be read from files in all formats supported by the Img extension. The stretched image may also be written out to an image file.

<b>Demo:</b>	<b>modelViewer</b>
Type:	
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>

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Module: Tcl3D  
 Filename: modelViewer.tcl

Author: Paul Obermeier

Description: Tcl program to display 3D model files in all formats supported by the Tcl3D extension.

<b>Demo:</b>	<b>oglmodes</b>
Type:	
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: OpenGL execution modes

Normal Safe Debug

Tcl3DSpecificDemos

Demo scripts

- bytearray.tcl
- checkerBoard.tcl
- imgViewer.tcl
- modelViewer.tcl
- oglmodes.tcl**
- rtVis.tcl
- tcl3dInfo.tcl
- toggleCanvas.tcl
- vectormanip.tcl

Execution modes:  Normal  Safe  Debug

Settings: Call glEndTransformFeedback

Commands: Clear Show Step Animate

```
glEnd
glLoadIdentity
glTranslatef 1.5 0.0 -6.0
glRotatef -196.5 1.0 0.0 0.0
glColor3f 0.5 0.5 1.0
glBegin GL_QUADS
glVertex3f -1.0 1.0 0.0
glVertex3f 1.0 1.0 0.0
glVertex3f 1.0 -1.0 0.0
glVertex3f -1.0 -1.0 0.0
glEnd
```

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)

oglmodes.tcl

Tcl3D demo showing 3 possible modes of OpenGL execution:

- Normal mode: Use the OpenGL functions as wrapped by SWIG. This is the fastest mode. If using an OpenGL function not available in the used driver implementation, this mode will dump core.
- Safe mode: In this mode every OpenGL function is checked for availability in the driver before execution. If it's not available, a message is printed out.
- Debug mode: This mode checks the availability of an OpenGL function like the safe mode, and additionally prints out each OpenGL function before execution.

The program allows to insert an unavailable command in the display callback to see the impact on execution. Currently this command is set to "glEndTransformFeedback", which is an OpenGL 3.0 feature and therefore should not be available in most driver implementations currently in the wild.

Author: Paul Obermeier

Date: 2009-01-10

<b>Demo:</b>	<b>rtVis</b>
Type:	
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>

The screenshot shows the 'Tcl3D demo: Ray-Tracing visualization' window. The main view displays a 3D scene with a teapot on a checkered floor, overlaid with a green wireframe grid. The control panel on the right includes options for 'CoR: Origin' and 'CoR: Geometry', checkboxes for 'Show rays', 'Primary', 'Reflected', 'Shadow', 'Show geometry', 'Static', 'Dynamic', 'Lines', 'Show lightsources', 'Lines', 'Show acc. structures', and 'Lines'. Below these are 'Octree', 'BVH', and 'KD-Tree' options, with a 'Levels' section containing checkboxes for levels 1 through 15. The 'Output messages' window at the bottom shows the following text:

```

KD-Tree tree level 17 has 1194 cells
KD-Tree tree level 18 has 1328 cells
KD-Tree tree level 19 has 1421 cells
KD-Tree tree level 20 has 1525 cells
KD-Tree tree level 21 has 1657 cells
KD-Tree tree level 22 has 1670 cells
KD-Tree tree level 23 has 1672 cells
KD-Tree tree level 24 has 1579 cells
KD-Tree tree total number of cells: 15984
    
```

At the bottom of the window, it says: 'Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.16)'.

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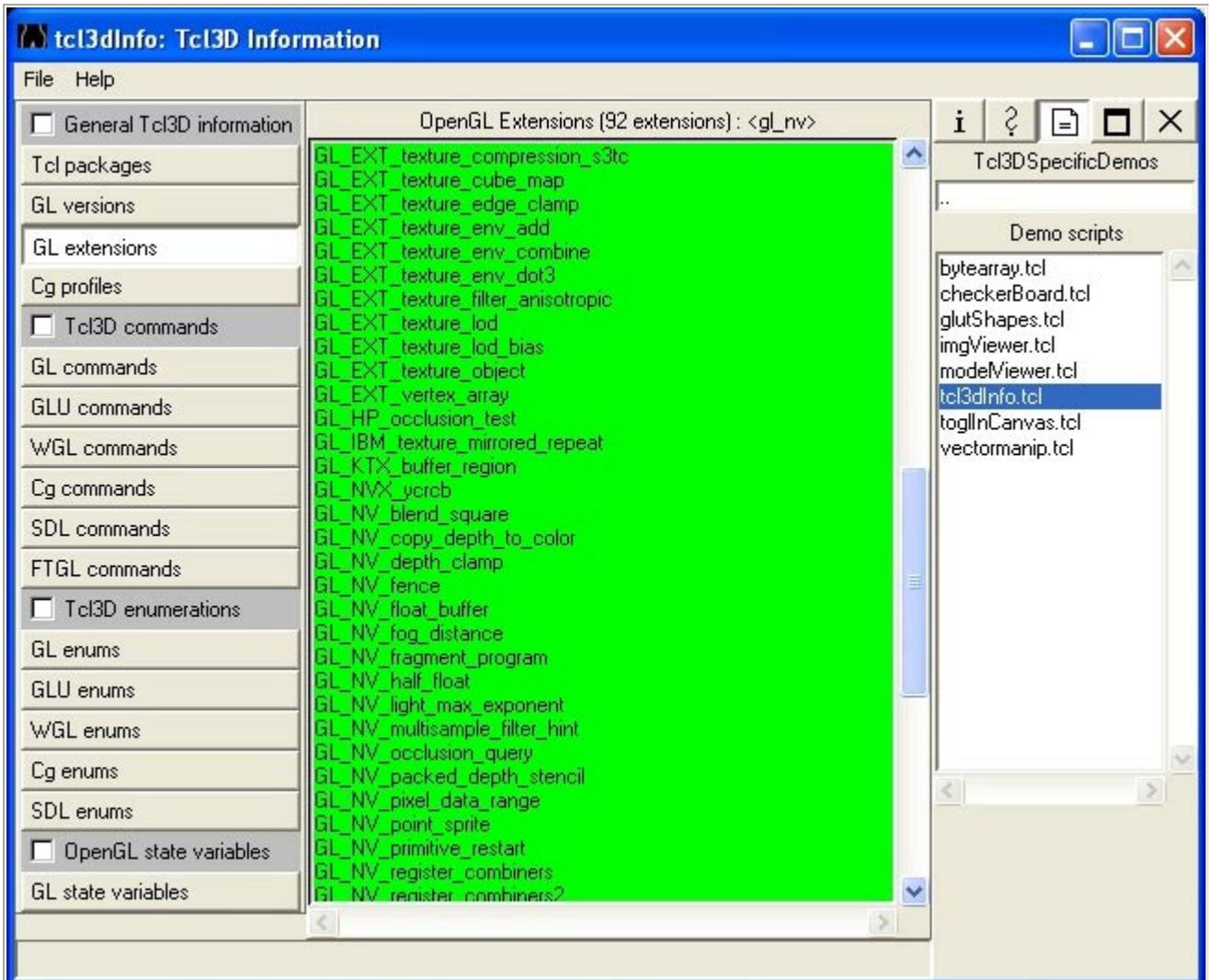
See the file "Tcl3D\_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

Module: Tcl3DSpecificDemos  
 Filename: rtVis.tcl

Author: Paul Obermeier

Description: Ray Tracing visualization program.  
 The comments of the rtvis\* procedures explain how to use the ray-tracing visualization commands.

<b>Demo:</b>	<b>tcl3dInfo</b>
Type:	
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>



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Module: Tcl3D  
 Filename: tcl3dInfo.tcl

Author: Paul Obermeier

Description: Tcl script to display OpenGL related information. When called without arguments, a window is opened with buttons to display OpenGL information for the following categories:

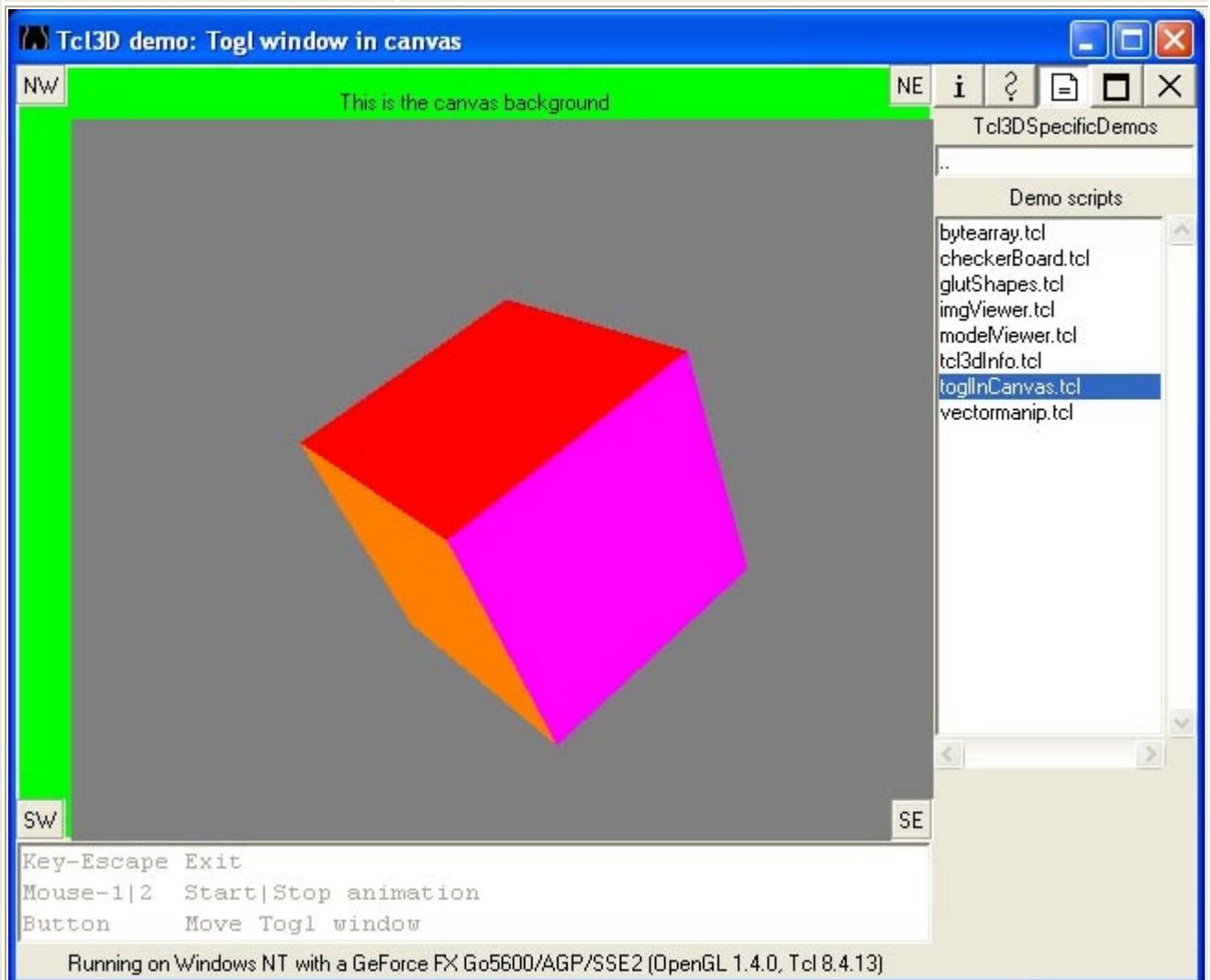
- General information (-info)
- Available OpenGL commands in Tcl (-cmd)
- Available OpenGL enumerations in Tcl (-enum)
- Current values of OpenGL state variables (-state)

The information texts can also be printed to stdout without opening a GUI, if calling this Tcl script

with any of the above listed command line options.  
To display all four categories, the option "-all"  
can be used.

Note: To retrieve all necessary information, an OpenGL  
context has to be established. So the batch mode  
needs a DISPLAY, too.

<b>Demo:</b>	<b>toglInCanvas</b>
Type:	
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>



`toglInCanvas.tcl`

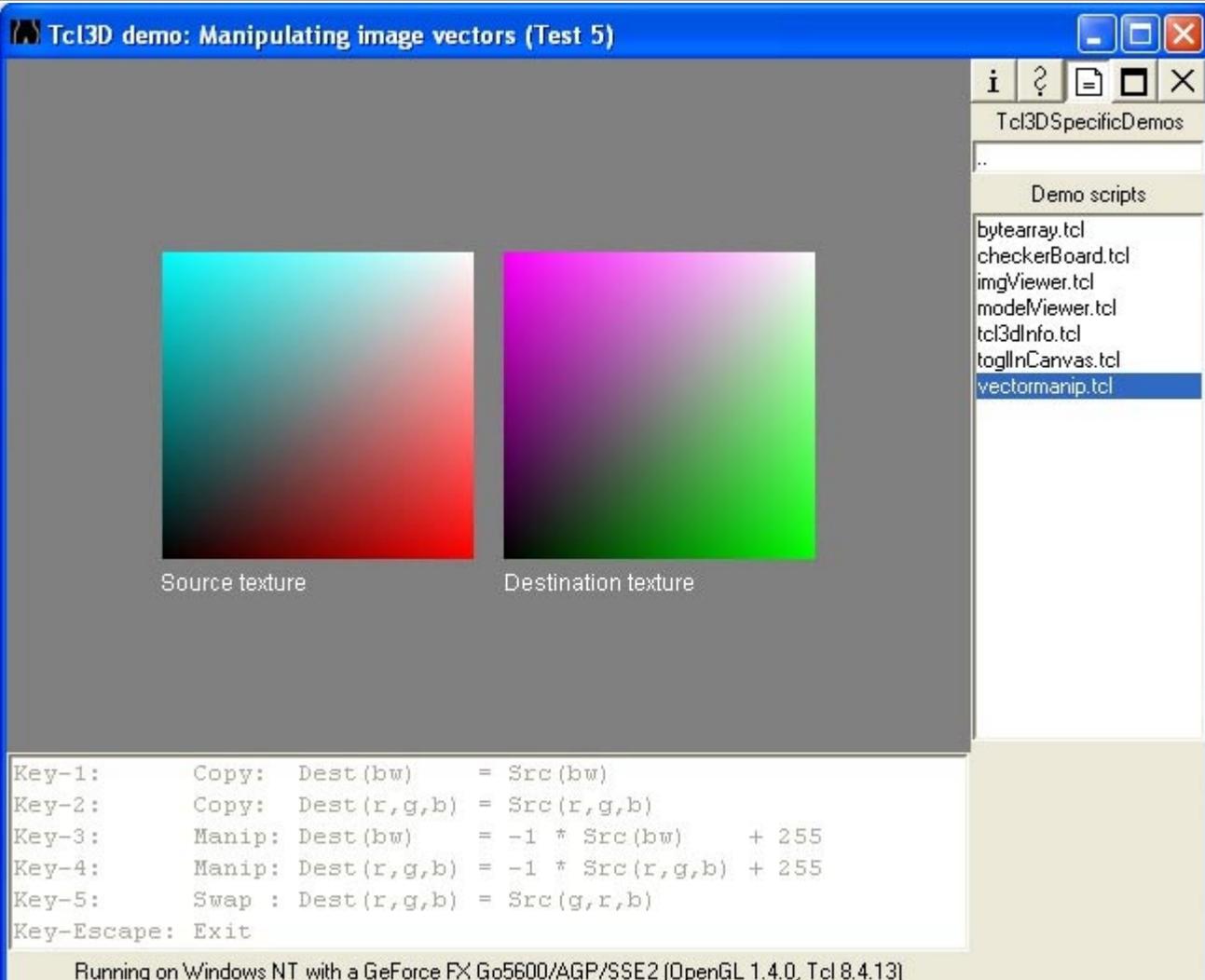
Tcl3D demo using a Togl window and some button widgets inserted into a canvas.

Author: Paul Obermeier

Date: 2006-12-08

<b>Demo:</b>	<b>vectormanip</b>
Type:	
Category:	<a href="#">Tcl3DSpecificDemos</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Manipulating image vectors (Test 5)**



```

Key-1:      Copy:  Dest (bw)      = Src (bw)
Key-2:      Copy:  Dest (r,g,b)   = Src (r,g,b)
Key-3:      Manip: Dest (bw)      = -1 * Src (bw)      + 255
Key-4:      Manip: Dest (r,g,b)   = -1 * Src (r,g,b)   + 255
Key-5:      Swap  : Dest (r,g,b)   = Src (g,r,b)
Key-Escape: Exit

```

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

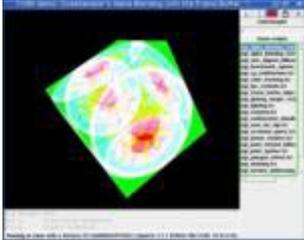
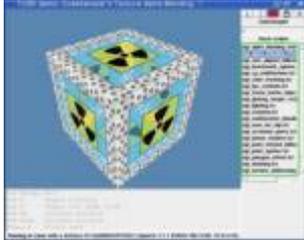
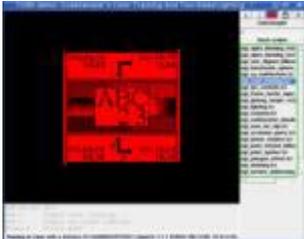
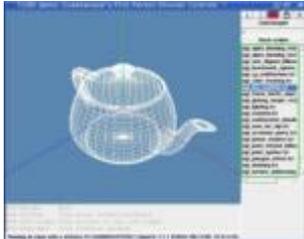
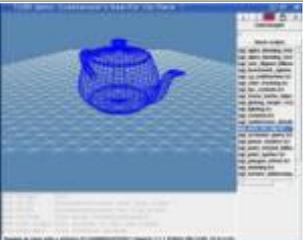
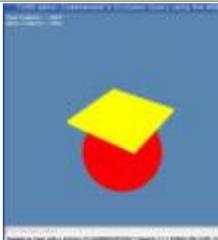
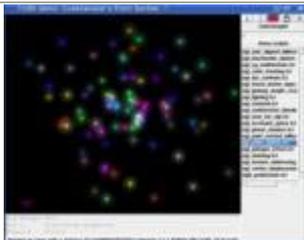
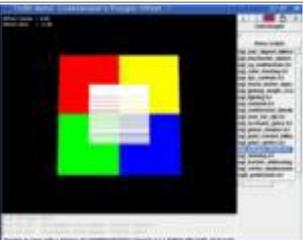
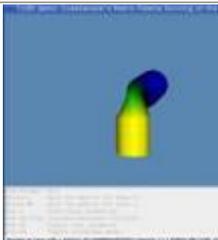
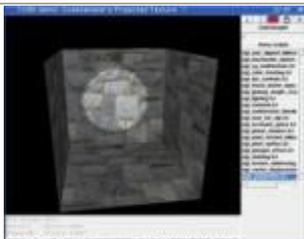
**vectormanip.tcl**

Tcl3D demo showing the use of the Vector manipulation functions, introduced in Version 0.3.2.

The program texture maps an image generated with Tcl (the source) onto the left quad. The source texture is manipulated with the vector functions according to the chosen method and mapped onto the right quad. See functions `execMethod?` below.

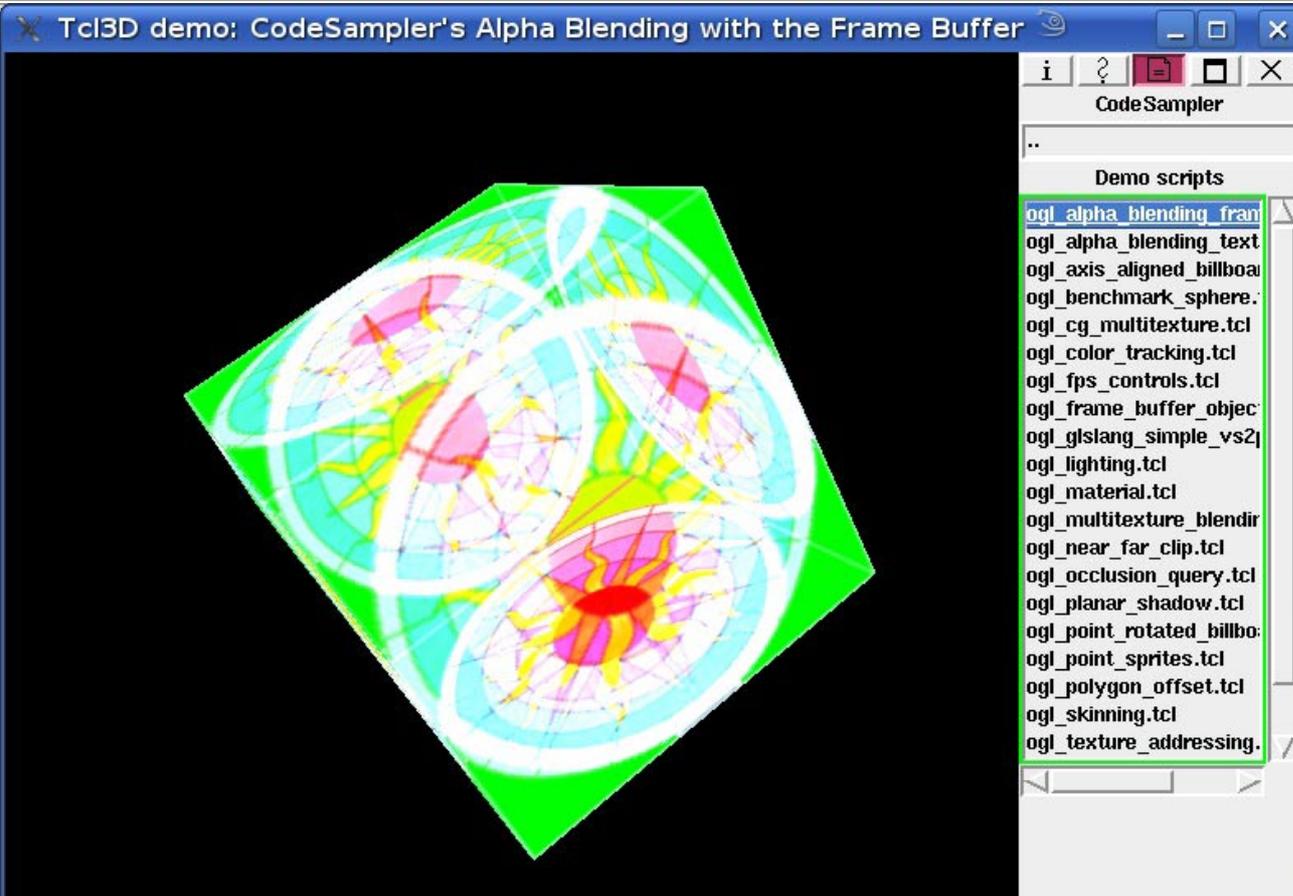
Author: Paul Obermeier  
Date: 2006-08-15

<b>Category:</b>	<b>TutorialsAndBooks</b>
Root:	<a href="#">Contents</a>
	<a href="#">Available types</a>
	<a href="#">CodeSampler</a>
	<a href="#">GameProgrammer</a>
	<a href="#">NeHe</a>
	<a href="#">RedBook</a>

<b>Type:</b>		<b>CodeSampler</b>	
Category:		<a href="#">TutorialsAndBooks</a>	
Root:		<a href="#">Contents</a>	
<p>Several demo applications from Kevin Harris' page have been ported to Tcl3D. The examples cover Cg programming.</p> <p>Original sources available at: <a href="http://www.codesampler.com/oglsrc.htm">http://www.codesampler.com/oglsrc.htm</a></p>			
Available demos			
			
<a href="#">ogl alpha blending framebuffer</a>	<a href="#">ogl alpha blending texture</a>	<a href="#">ogl axis aligned billboard</a>	<a href="#">ogl benchmark</a>
			
<a href="#">ogl color tracking</a>	<a href="#">ogl fps controls</a>	<a href="#">ogl frame buffer object</a>	<a href="#">ogl glslang simple</a>
			
<a href="#">ogl material</a>	<a href="#">ogl multitexture blending</a>	<a href="#">ogl near far clip</a>	<a href="#">ogl occlusion</a>
			
<a href="#">ogl point rotated billboard</a>	<a href="#">ogl point sprites</a>	<a href="#">ogl polygon offset</a>	<a href="#">ogl skinning</a>
			
<a href="#">ogl vertex displacement</a>	<a href="#">oglu projtexture</a>		

<b>Demo:</b>	<b>ogl_alpha_blending_framebuffer</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: CodeSampler's Alpha Blending with the Frame Buffer



Key-Escape Exit  
 Key-s Start|Stop Animation  
 Key-b Toggle blending

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

Name: `ogl_alpha_blending_framebuffer.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 03/25/05

Description: This sample demonstrates how to perform alpha-blending in the frame-buffer. The sample renders a textured cube which is alpha-blended into the frame-buffer in such a way as to create a translucent effect.

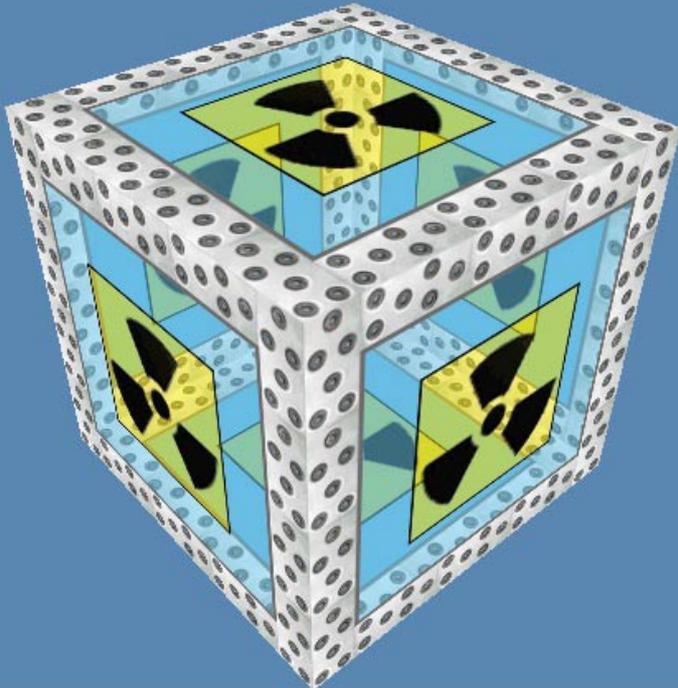
Control Keys: b - Toggle blending

Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 4: Alpha Blending in the Frame buffer  
[http://www.codesampler.com/oglsrc/oglsrc\\_4.htm#ogl\\_alpha\\_blending\\_framebuffer](http://www.codesampler.com/oglsrc/oglsrc_4.htm#ogl_alpha_blending_framebuffer)

Modified for Tcl3D by Paul Obermeier 2008/05/01  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_alpha_blending_texture</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: CodeSampler's Texture Alpha Blending



CodeSampler

..

Demo scripts

- ogl\_alpha\_blending\_fran
- ogl\_alpha\_blending\_text
- ogl\_axis\_aligned\_billboa
- ogl\_benchmark\_sphere.
- ogl\_cg\_multitexture.tcl
- ogl\_color\_tracking.tcl
- ogl\_fps\_controls.tcl
- ogl\_frame\_buffer\_objec
- ogl\_glslang\_simple\_vs2j
- ogl\_lighting.tcl
- ogl\_material.tcl
- ogl\_multitexture\_blendir
- ogl\_near\_far\_clip.tcl
- ogl\_occlusion\_query.tcl
- ogl\_planar\_shadow.tcl
- ogl\_point\_rotated\_billbo
- ogl\_point\_sprites.tcl
- ogl\_polygon\_offset.tcl
- ogl\_skinning.tcl
- ogl\_texture\_addressing.

Key-Escape Exit  
 Key-b Toggle blending  
 Key-s Toggle cull mode trick  
 Key-Up Increase distance  
 Key-Down Decrease distance  
 Mouse-L Rotate cube

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

Name: `ogl_alpha_blending_texture.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 03/25/05  
 Description: This sample demonstrates how to perform alpha blending using the alpha channel of a standard .tga texture. For proper alpha blending, the sample uses a cull-mode sorting trick to ensure the sides of the textured cube get rendered in back-to-front order.

Control Keys: b - Toggle blending  
 s - Toggle usage of cull-mode sorting trick  
 Up Arrow - Move the test cube closer  
 Down Arrow - Move the test cube away

Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 3: Alpha Texture Blending  
[http://www.codesampler.com/oglsrc/oglsrc\\_3.htm#ogl\\_alpha\\_blending\\_texture](http://www.codesampler.com/oglsrc/oglsrc_3.htm#ogl_alpha_blending_texture)

Modified for Tcl3D by Paul Obermeier 2008/05/01

See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_axis_aligned_billboard</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape    Exit  
 Key-F1        Toggle billboard  
 Key-Up|Down   View moves forward|backward  
 Key-Left|Right View strafes to the left|right  
 Key-Home|End   View elevates up|down  
 Billboarding is on

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

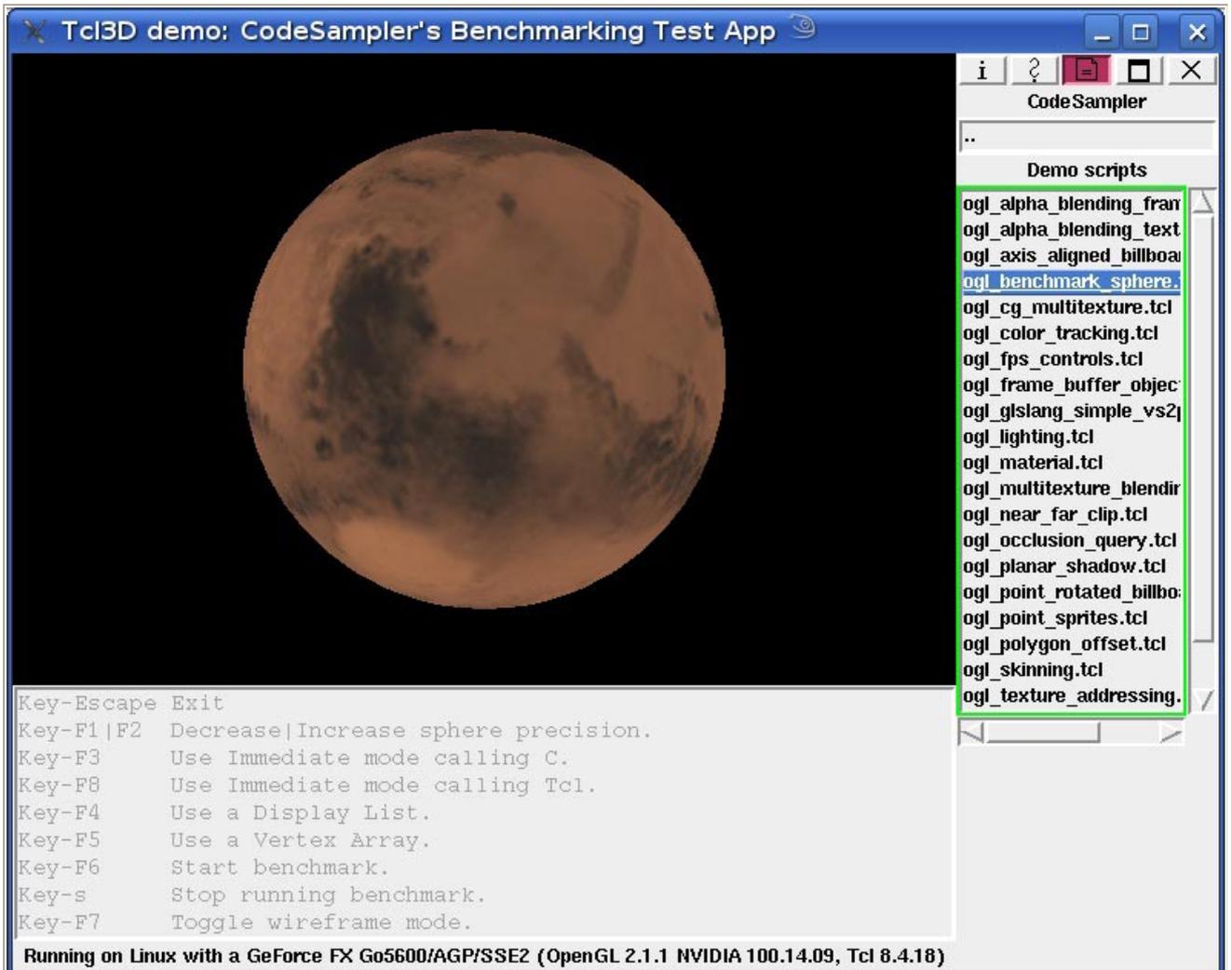
-----  
 Name: `ogl_axis_aligned_billboard.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 02/01/05  
 Description: An example of axis aligned billboarding.

Control Keys: F1            - Toggle billboarding  
                   Up            - View moves forward  
                   Down        - View moves backward  
                   Left         - View strafes left  
                   Right        - View strafes Right  
                   Left Mouse - Perform looking  
                   Mouse        - Look about the scene

-----  
 Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 8: Axis-Aligned Billboards

Modified for Tcl3D by Paul Obermeier 2007/03/10  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_benchmark_sphere</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



Key-Escape Exit  
 Key-F1|F2 Decrease|Increase sphere precision.  
 Key-F3 Use Immediate mode calling C.  
 Key-F8 Use Immediate mode calling Tcl.  
 Key-F4 Use a Display List.  
 Key-F5 Use a Vertex Array.  
 Key-F6 Start benchmark.  
 Key-s Stop running benchmark.  
 Key-F7 Toggle wireframe mode.

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----  
 Name: `ogl_benchmark_sphere.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 04/21/05  
 Description: Renders a textured sphere using either Immediate Mode calls, Immediate Mode calls cached in a Display List, or as a collection of geometric data stored in an interleaved fashion within a Vertex Array.

Control Keys: Left Mouse Button - Spin the view.  
 F1 - Decrease sphere precision.  
 F2 - Increase sphere precision.  
 F3 - Use Immediate mode  
 F4 - Use a Display List  
 F5 - Use a Vertex Array  
 F6 - Perform Benchmarking  
 F7 - Toggle wire-frame mode.

-----  
 Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 9: Benchmarking Test App

Modified for Tcl3D by Paul Obermeier 2005/11/07  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_cg_multitexture</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a 3D rendering window titled "Tcl3D demo: CodeSampler's Multi-Texturing Using Cg". The main display area shows a checkerboard pattern with a central text box containing "ABC" and "123". The checkerboard is divided into four quadrants, each with a different color and texture. The top-left quadrant is purple and contains the text "OGL 0.0, 1.0" and "D3D 0.0, 0.0". The top-right quadrant is yellow and contains "OGL 1.0, 1.0" and "D3D 1.0, 0.0". The bottom-left quadrant is green and contains "OGL 0.0, 0.0" and "D3D 0.0, 1.0". The bottom-right quadrant is blue and contains "OGL 1.0, 0.0" and "D3D 1.0, 1.0". A small red arrow points from the top-left to the top-right, and a green arrow points from the bottom-left to the bottom-right. A small "U" and "S" are also visible. On the right side of the window, there is a list of demo scripts, with "ogl\_cg\_multitexture.tcl" selected. The bottom status bar shows "Profile: CG\_PROFILE\_ARBFPI File: ogl\_cg\_multitexture-gl.cg Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)".

-----

Name: `ogl_cg_multitexture.cpp`  
 Author: Kevin Harris  
 Last Modified: 04/26/05  
 Description: This sample demonstrates how to blend two textures together with Cg using either OpenGL's native multi-texture support (using semantics) or by using Cg's special texture functions: `cgGLSetTextureParameter`, `cgGLEnableTextureParameter`, and `cgGLDisableTextureParameter`.

-----

Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 10: Multi-Texturing with Cg

Modified for Tcl3D by Paul Obermeier 2007/05/22  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

The original demo has been extended with a little GUI to allow switching between the two call semantics at runtime.  
 To visualize, that a different shader program is active, the OpenGL semantics shader adds only half of the checker image color.

<b>Demo:</b>	<b>ogl_color_tracking</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-c Toggle color tracking  
 Key-l Toggle two sided lighting  
 Mouse-L Rotate quad

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

Name: `ogl_color_tracking.cpp`

Author: Kevin Harris (kevin@codesampler.com)

Last Modified: 04/28/05

Description: This sample demonstrates color-tracking and two-sided lighting in OpenGL.

Color tracking allows us to substitute the color of our vertices for one or more of the material colors used by OpenGL's lighting equation. This feature is typically not used much anymore as since modelers today use textures to color their geometry - not vertex colors. Of course, this technique is alive and kicking in a billion lines of legacy code so it's good to understand this technique just in case you run across it.

Two-sided lighting basically means that we want OpenGL to light both sides of our geometry instead of just the front faces. Again, this feature is typically not used much anymore since it's very inefficient to light both sides of every triangle but there are some cases where this is helpful to know.

Control Keys: c - Toggle between a material color or color tracking the  
                  vertices  
                  l - Toggle two-sided lighting

---

Original C++ code by Kevin Harris (kevin@codesampler.com)  
See [www.codesampler.com](http://www.codesampler.com) for the original files  
OpenGL samples page 5: Color Tracking and Two-Sided lighting  
[http://www.codesampler.com/oglsrc/oglsrc\\_5.htm#ogl\\_color\\_tracking](http://www.codesampler.com/oglsrc/oglsrc_5.htm#ogl_color_tracking)

Modified for Tcl3D by Paul Obermeier 2008/05/01  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_fps_controls</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape      Exit  
 Key-Up|Down    View moves forward|backward  
 Key-Left|Right View strafes to the left|right  
 Key-Home|End    View elevates up|down

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----

Name: `ogl_fps_controls.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 02/01/05  
 Description: This sample demonstrates how to collect user input and build a custom view matrix for First Person Shooter style controls.

Control Keys: Up            - View moves forward  
 Down            - View moves backward  
 Left            - View strafes left  
 Right           - View strafes Right  
 Left Mouse     - Perform looking  
 Mouse          - Look about the scene  
 Home           - View moves up  
 End            - View moves down

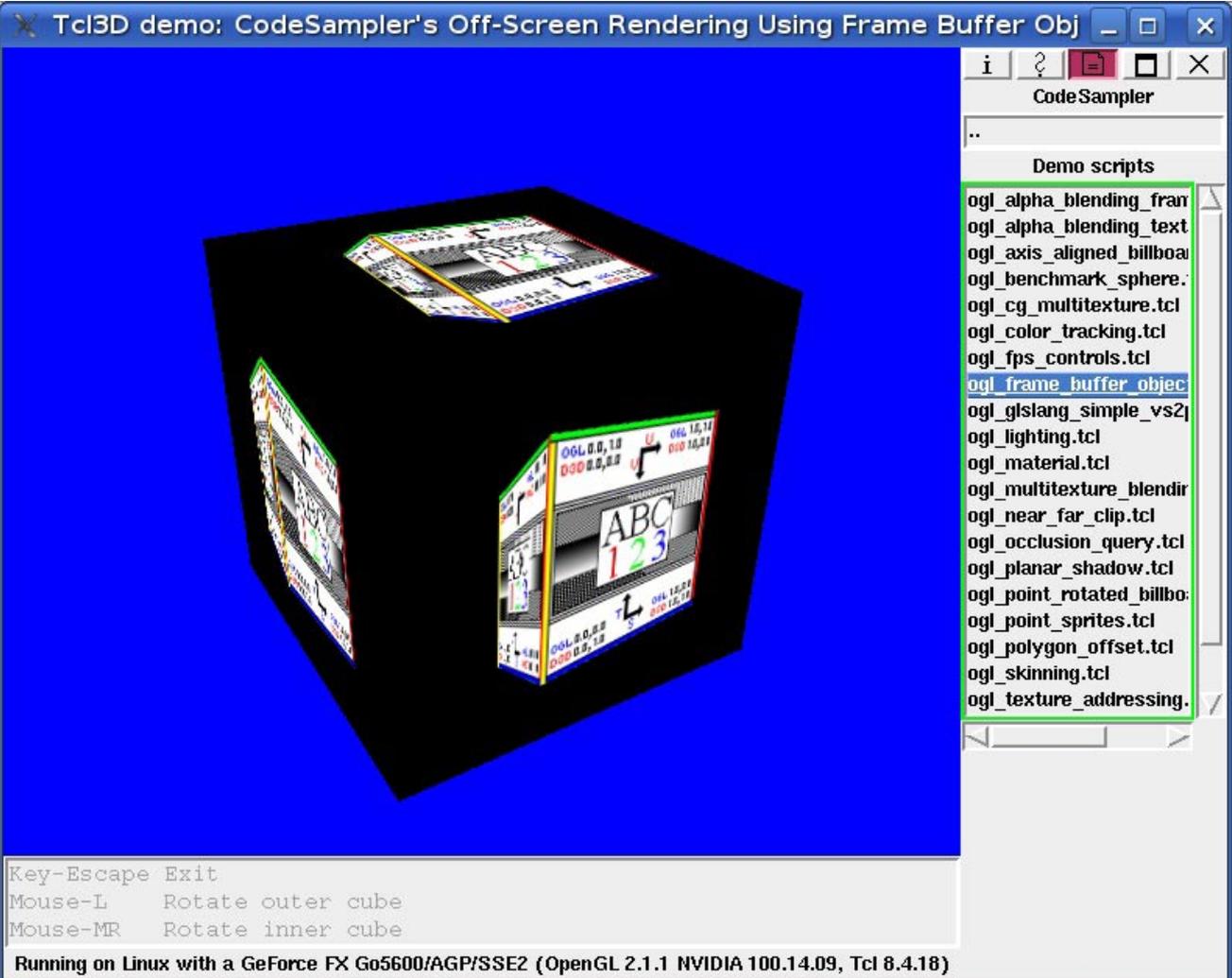
-----

Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 5: First Person Shooter Controls

Modified for Tcl3D by Paul Obermeier 2005/11/05  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_frame_buffer_object</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: CodeSampler's Off-Screen Rendering Using Frame Buffer Obj



Key-Escape Exit  
 Mouse-L Rotate outer cube  
 Mouse-MR Rotate inner cube

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

Name: `ogl_frame_buffer_object.cpp`

Author: Kevin Harris (kevin@codesampler.com)

Last Modified: 07/06/05

Description: This sample demonstrates how to create dynamic textures through off-screen rendering. The off-screen rendering step is accomplished using a frame-buffer and render-buffer object, which is created using OpenGL's `EXT_framebuffer_object` extension.

As a demonstration, a spinning textured cube is rendered to a frame-buffer object, which is in turn, used to create a dynamic texture. The dynamic texture is then used to texture a second spinning cube, which will be rendered to the application's window.

Control Keys: Left Mouse Button - Spin the large, black cube.  
 Right Mouse Button - Spin the textured cube being rendered into the p-buffer.

Note: The EXT\_framebuffer\_object extension is an excellent replacement for the WGL\_ARB\_pbuffer and WGL\_ARB\_render\_texture combo which is normally used to create dynamic textures. An example of this older technique can be found here:

[http://www.codesampler.com/oglsrc/oglsrc\\_7.htm#ogl\\_offscreen\\_rendering](http://www.codesampler.com/oglsrc/oglsrc_7.htm#ogl_offscreen_rendering)

---

Original C++ code by Kevin Harris (kevin@codesampler.com)

See [www.codesampler.com](http://www.codesampler.com) for the original files

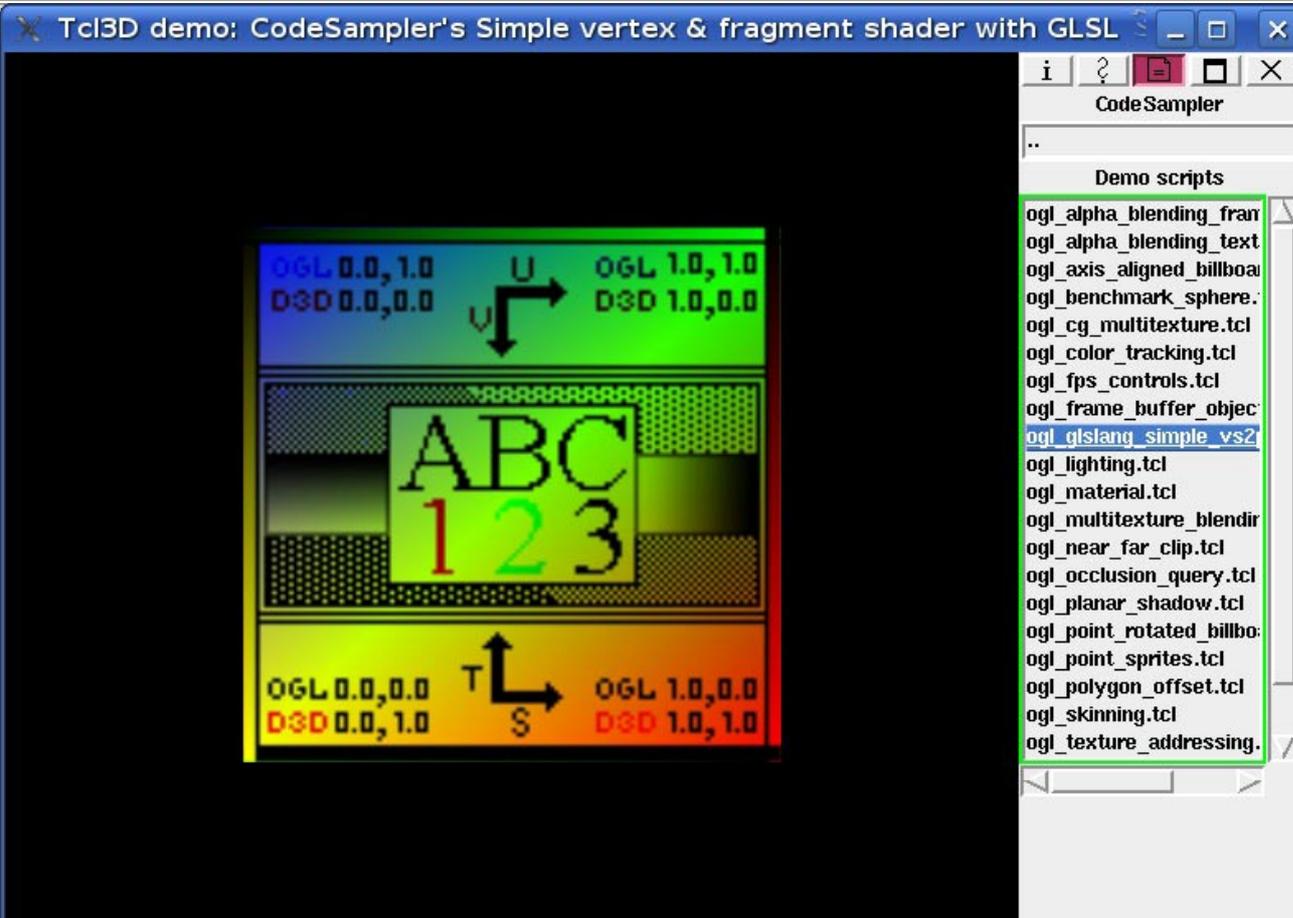
OpenGL samples page 14: Off-screen Rendering Using Frame-Buffer Objects

Modified for Tcl3D by Paul Obermeier 2007/02/25

See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_glslang_simple_vs2ps</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: CodeSampler's Simple vertex & fragment shader with GLSL



Key-Escape Exit  
Key-F1 Toggle shaders

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

Name: `ogl_glslang_simple_vs2ps.cpp`

Author: Kevin Harris (kevin@codesampler.com)

Last Modified: 04/21/05

Description: This sample demonstrates how to write vertex and fragment shaders using OpenGL's new high-level shading language GLSLang.

Control Keys: F1 - Toggle usage of vertex and fragment shaders.

Note: The fragment shader has been changed slightly from what the fixed-function pipeline does by default so you can see a noticeable change when toggling the shaders on and off. Instead of modulating the vertex color with the texture's texel, the fragment shader adds the two together, which causes the fragment shader to produce a brighter, washed-out image. This modification can be switched back in the fragment shader file.

Original C++ code by Kevin Harris (kevin@codesampler.com)

See [www.codesampler.com](http://www.codesampler.com) for the original files

OpenGL samples page 10: Simple Vertex & Fragment Shader (GLSLang)

Modified for Tcl3D by Paul Obermeier 2005/11/05  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_lighting</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-s Start|Stop Animation  
 Key-d Change to directional light  
 Key-o Change to spot light  
 Key-p Change to point light  
 Key-w Toggle wireframe mode

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----

Name: `ogl_lighting.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 02/01/05  
 Description: This sample demonstrates the three basic types of lights that are available in OpenGL: directional, spot, and point.

Control Keys: l - Changes the light's type  
 w - Toggles wire frame mode

-----

Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 5: Lighting  
[http://www.codesampler.com/oglsrc/oglsrc\\_5.htm#ogl\\_lighting](http://www.codesampler.com/oglsrc/oglsrc_5.htm#ogl_lighting)

Modified for Tcl3D by Paul Obermeier 2008/05/01  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_material</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-c Toggle GL\_COLOR\_MATERIAL  
 Mouse-L Rotate teapots

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----  
 Name: `ogl_material.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 04/28/05  
 Description: This sample demonstrates how to use materials with lighting to produce different surface effects.

Control Keys: Left Mouse Button - Spin the view

-----

Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 5: Materials  
[http://www.codesampler.com/oglsrc/oglsrc\\_5.htm#ogl\\_material](http://www.codesampler.com/oglsrc/oglsrc_5.htm#ogl_material)

Modified for Tcl3D by Paul Obermeier 2008/04/28  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_multitexture_blending</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: CodeSampler's Multi-Texture Blending

Contribution of each texture for blending:  
 Contribution of Tex 0 = 0.540  
 Contribution of Tex 1 = 0.130 (Inferred by the values of Tex 0 & Tex 2)  
 Contribution of Tex 2 = 0.330



RGB values passed for interpolation of texture stage 1  
 Red = 0.806  
 Green = 0.806  
 Blue = 0.806  
 ALPHA value passed for interpolation of texture stage 2  
 Alpha = 0.670

Key-Escape Exit  
 Key-F1|F2 Increment|Decrement contribution of texture 0  
 Key-F3|F4 Increment|Decrement contribution of texture 2  
 Key-F5 Toggle wireframe mode  
 Key-Up|Down Decrease|Increase distance

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----

Name: `ogl_multitexture_blending.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 02/08/05  
 Description: This sample demonstrates how to use the OpenGL extensions `GL_ARB_multitexture` and `GL_ARB_texture_env_combine` in conjunction with specially encoded vertex colors to blend three textures together.

This technique is very popular in terrain rendering engines which use it to blend dramatically different textures such as rock and grass together with out creating a noticeable edge. For example, with three textures consisting of stone, grass, and sand you can render a mountain that blends in patches of grass and sand at its base.

Of course, while this technique remains popular as a fall-back for older hardware, shaders make this task a lot easier and are quickly becoming the preferred method for terrain texture blending.

The technique basically consists of the following steps:

Step 1: Take the desired contribution of the three textures and encode them into the vertex's color such that the RGB portion of the color controls the interpolation between texture stages 0 and 1, and the color's ALPHA controls the interpolation between texture stages 1 and 2.

Step 2: Use `GL_ARB_multitexture` to apply three textures simultaneously to our geometry.

Step 3: Set the first texture on texture stage 0.

Step 4: During texture stage 1, use `GL_INTERPOLATE_ARB` to linearly interpolate between the output of stage 0 and the texture of stage 1 with `GL_SRC_COLOR` (i.e. the RGB part of the color).

Step 4: During texture stage 2, use `GL_INTERPOLATE_ARB` to linearly interpolate between the output of stage 1 and the texture of stage 2 with `GL_SRC_ALPHA` (i.e. the ALPHA part of the color).

Control Keys: F1 - Increase contribution of texture 0  
F2 - Decrease contribution of texture 0  
F3 - Increase contribution of texture 2  
F4 - Decrease contribution of texture 2  
F5 - Toggle wire-frame mode.  
Up - View moves forward  
Down - View moves backward

Note: I tried to create an intuitive way to set the contribution of each texture at run-time using the function keys, but this system is still a little confusing since I only allow the contribution of texture 0 and texture 2 to be adjusted. This is due to the fact that the equation for encoding the blending info into the vertex color simply infers the contribution value of texture 1 based on the values for textures 0 and 2. Therefore, the contribution value of texture 1 must be indirectly set by adjusting the contributions of textures 0 and 2.

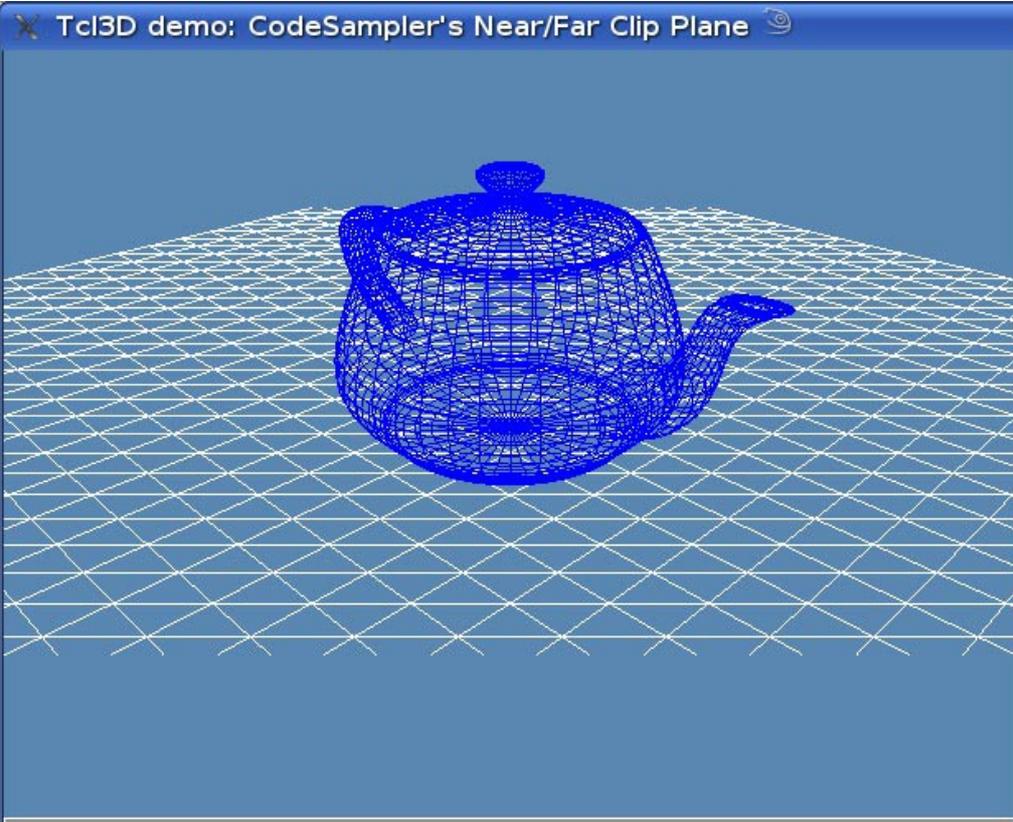
---

Original C++ code by Kevin Harris (kevin@codesampler.com)  
See [www.codesampler.com](http://www.codesampler.com) for the original files  
OpenGL samples page 4: Multi-Texture Blending

Modified for Tcl3D by Paul Obermeier 2007/03/10  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_near_far_clip</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: CodeSampler's Near/Far Clip Plane



CodeSampler

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Demo scripts

- ogl\_alpha\_blending\_fran
- ogl\_alpha\_blending\_text
- ogl\_axis\_aligned\_billboa
- ogl\_benchmark\_sphere.
- ogl\_cg\_multitexture.tcl
- ogl\_color\_tracking.tcl
- ogl\_fps\_controls.tcl
- ogl\_frame\_buffer\_objec
- ogl\_glslang\_simple\_vs2
- ogl\_lighting.tcl
- ogl\_material.tcl
- ogl\_multitexture\_blendir
- ogl\_near\_far\_clip.tcl**
- ogl\_occlusion\_query.tcl
- ogl\_planar\_shadow.tcl
- ogl\_point\_rotated\_billbo
- ogl\_point\_sprites.tcl
- ogl\_polygon\_offset.tcl
- ogl\_skinning.tcl
- ogl\_texture\_addressing.

Key-Escape      Exit  
Key-F1|F2        Increase|Decrease near clip plane  
Key-F3|F4        Increase|Decrease far clip plane  
Key-Up|Down     View moves forward|backward  
Key-Left|Right  View strafes to the left|right  
Key-Home|End    View elevates up|down

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----

Name: `ogl_near_far_clip.cpp`  
Author: Kevin Harris (kevin@codesampler.com)  
Last Modified: 02/01/05  
Description: This sample demonstrates how adjustments to OpenGL's near and far clip planes effect the view.

Control Keys:

Up	- View moves forward
Down	- View moves backward
Left	- View strafes left
Right	- View strafes Right
Left Mouse	- Perform looking
Mouse	- Look about the scene
F1	- Increase near clip value
F2	- Decrease near clip value
F3	- Increase far clip value
F4	- Decrease far clip value

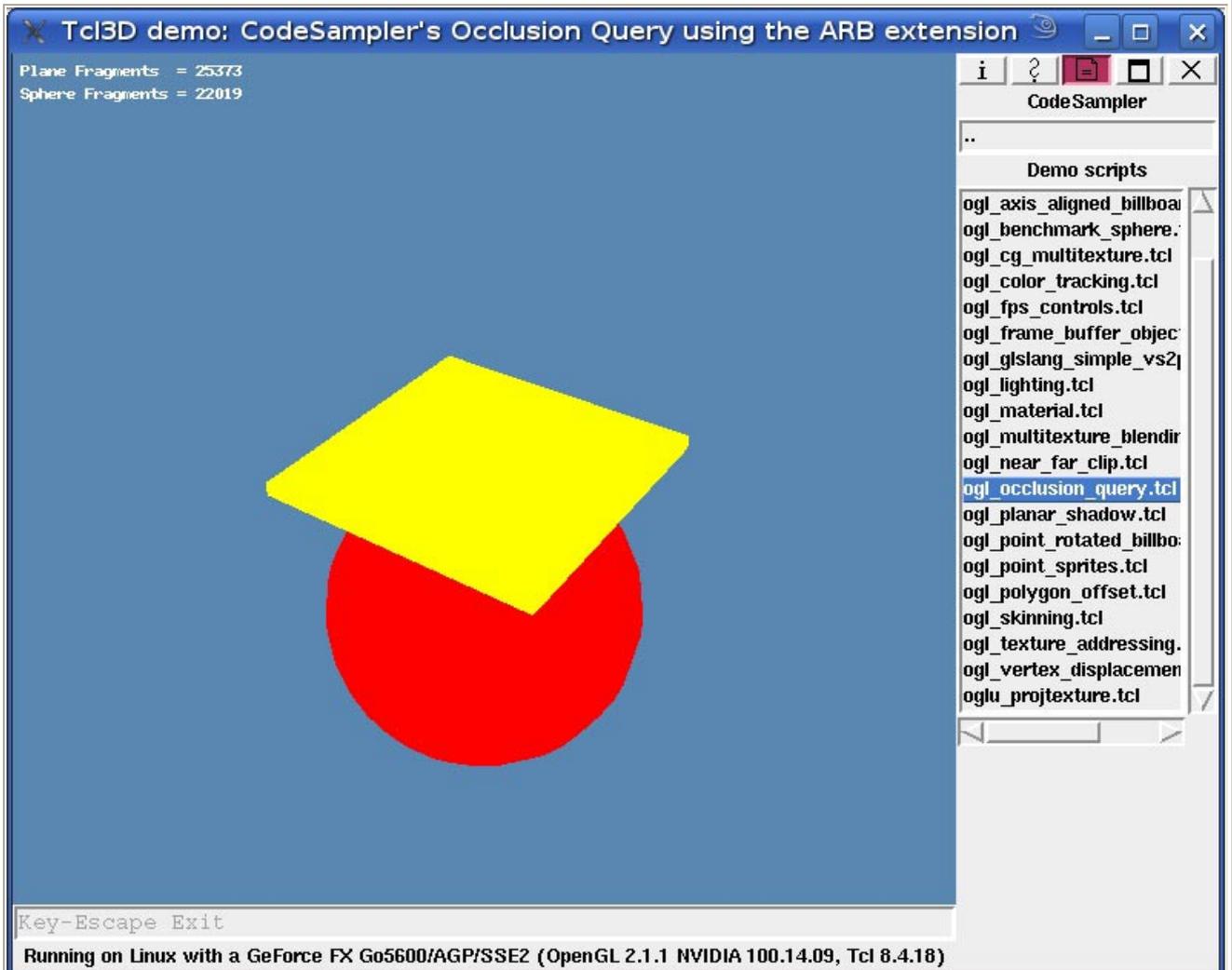
-----

Original C++ code by Kevin Harris (kevin@codesampler.com)  
See [www.codesampler.com](http://www.codesampler.com) for the original files

OpenGL samples page 2: Near/Far Clipping Plane

Modified for Tcl3D by Paul Obermeier 2007/03/10  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_occlusion_query</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



-----

Name: `ogl_occlusion_query_arb.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 02/01/05  
 Description: This sample demonstrates how to use OpenGL's new extension,  
 ARB\_occlusion\_query and NV\_occlusion\_query.

Control Keys: Left Mouse Button - Spin the view

-----

Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 7: Occlusion Query

Modified for Tcl3D by Paul Obermeier 2007/03/10  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

This sample integrates ARB\_occlusion\_query and NV\_occlusion\_query code into one file.

If called with no command line arguments, it uses the ARB\_occlusion\_query extension.

Use "nv" as parameter to use the NV\_occlusion\_query extension.

<b>Demo:</b>	<b>ogl_planar_shadow</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: CodeSampler's Planar Shadows**



Code Sampler

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Demo scripts

- ogl\_axis\_aligned\_billboa
- ogl\_benchmark\_sphere.
- ogl\_cg\_multitexture.tcl
- ogl\_color\_tracking.tcl
- ogl\_fps\_controls.tcl
- ogl\_frame\_buffer\_objec
- ogl\_glslang\_simple\_vs2
- ogl\_lighting.tcl
- ogl\_material.tcl
- ogl\_multitexture\_blendir
- ogl\_near\_far\_clip.tcl
- ogl\_occlusion\_query.tcl
- ogl\_planar\_shadow.tcl**
- ogl\_point\_rotated\_billbo
- ogl\_point\_sprites.tcl
- ogl\_polygon\_offset.tcl
- ogl\_skinning.tcl
- ogl\_texture\_addressing.
- ogl\_vertex\_displacemen
- oglu\_projtexture.tcl

Key-Escape Exit  
 Key-Up|Down Move light up|down  
 Key-Left|Right Move light left|right  
 Key-s Toggle stencil usage  
 Mouse-L Spin the view  
 Mouse-MR Spin the teapot  
 Stencil is ON

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----

Name: `ogl_planar_shadow.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 02/01/05  
 Description: This sample demonstrates how to create planar shadows under OpenGL.

Planar shadows are created by building a special projection matrix which flattens an object's geometry into a plane when rendered.

If the plane, which the geometry is flattened into, matches up with another planar surface like a floor or a wall, the flattened geometry can be made to resemble a shadow on that surface.

Control Keys: Up - Light moves up  
 Down - Light moves down  
 Left - Light moves left  
 Right - Light moves right

Left Mouse Button - Spin the view

Right Mouse Button - Spin the teapot

---

Original C++ code by Kevin Harris (kevin@codesampler.com)  
See [www.codesampler.com](http://www.codesampler.com) for the original files  
OpenGL samples page 7: Planar Shadows  
[http://www.codesampler.com/oglsrc/oglsrc\\_7.htm#ogl\\_planar\\_shadow](http://www.codesampler.com/oglsrc/oglsrc_7.htm#ogl_planar_shadow)

Modified for Tcl3D by Paul Obermeier 2008/05/02  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_point_rotated_billboard</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape    Exit  
 Key-F1        Toggle billboard  
 Key-Up|Down  View moves forward|backward  
 Key-Left|Down View strafes to the left|right  
 Key-Home|End View elevates up|down  
 Billboarding is on

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----  
 Name: ogl\_point\_rotated\_billboard.cpp  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 02/01/05  
 Description: An example of point rotated billboarding.

Control Keys: F1            - Toggle billboarding  
                   Up            - View moves forward  
                   Down        - View moves backward  
                   Left         - View strafes left  
                   Right        - View strafes Right  
                   Left Mouse - Perform looking  
                   Mouse        - Look about the scene

-----  
 Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 8: Point-Rotated Billboards

Modified for Tcl3D by Paul Obermeier 2007/03/10  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_point_sprites</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-s Start|Stop Animation  
 Mouse-L Rotate

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----

Name: `ogl_point_sprites.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 02/01/05  
 Description: This sample demonstrates how to create point sprites using OpenGL's new `GL_ARB_point_sprite` extension, which can be used to create point-rotated billboards on the GPU.

-----

Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 6: Point Sprites

Modified for Tcl3D by Paul Obermeier 2005/11/08  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_polygon_offset</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Offset Factor = 0.04  
Offset Unit = -1.00

Key-Escape Exit  
Key-F1|F2 Increment|Decrement offset factor  
Key-F3|F4 Increment|Decrement offset unit

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----  
Name: `ogl_polygon_offset.cpp`

Author: Kevin Harris (kevin@codesampler.com)

Last Modified: 02/01/05

Description: This sample demonstrates how to eliminate z-fighting when rendering polygons directly on top of other polygons.

Control Keys: Left Mouse Button - Spin the view  
 F1 - Increase Offset Factor  
 F2 - Decrease Offset Factor  
 F3 - Increase Offset Unit  
 F4 - Decrease Offset Unit

-----

Original C++ code by Kevin Harris (kevin@codesampler.com)

See [www.codesampler.com](http://www.codesampler.com) for the original files

OpenGL samples page 5: Polygon Offset

Modified for Tcl3D by Paul Obermeier 2007/03/05

See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

See <http://www.opengl.org/sdk/docs/man/xhtml/glPolygonOffset.xml>

for the `glPolygonOffset` command.

<b>Demo:</b>	<b>ogl_skinning</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Mouse-L Spin the matrix for bone 0.  
 Mouse-MR Spin the matrix for bone 1.  
 Key-s Start|Stop animation.  
 Key-Up|Down Increase|Decrease distance.  
 Key-F1 Toggle test geometry.  
 Key-F2 Toggle wireframe mode.

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----

Name: `ogl_cg_skinning.cpp` `ogl_glslang_skinning.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 04/28/05

Description: This sample demonstrates how to skin a mesh on the hardware using a Cg or GLSL shader. To keep things simple, the skeletal system used in this sample is very simple and only consists of two bones or bone matrices.

Special thanks go out to Cyril Zeller, and Matthias Wloka of nVIDIA for their help in straightening out a few oddities that my sample was suffering from. In short, Cg works fine and I'm occasionally a big dummy! ;)

Control Keys: Left Mouse Button - Spin the matrix for bone0.  
 Right Mouse Button - Spin the matrix for bone1.

F1 - Toggle test geometry between a cylinder and a simple grouping of 3 quads.  
 F2 - Toggle wire-frame mode

-----

Original C++ code by Kevin Harris (kevin@codesampler.com)  
See [www.codesampler.com](http://www.codesampler.com) for the original files  
OpenGL samples page 11: Matrix Palette Skinning on the Hardware

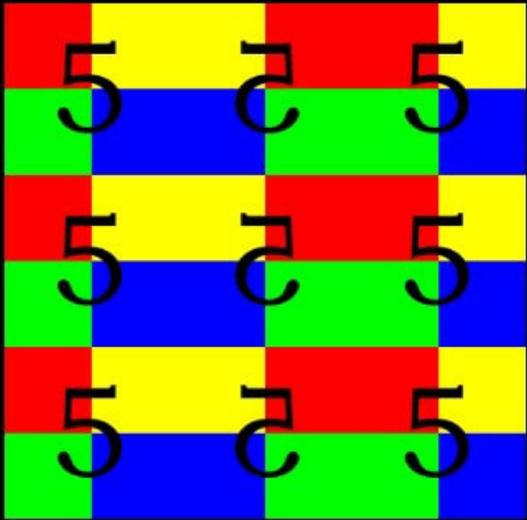
Modified for Tcl3D by Paul Obermeier 2005/11/05  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

This sample integrates Cg and GLSL code into one file.  
If called with no command line arguments, it uses the Cg shader.  
Use "glsl" as parameter to use the GLSL shader.

<b>Demo:</b>	<b>ogl_texture_addressing</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: CodeSampler's Texture Addressing

```
GL_TEXTURE_WRAP_S = GL_MIRRORED_REPEAT_ARB
GL_TEXTURE_WRAP_T = GL_REPEAT
```



Key-Escape Exit  
Key-F1 Next S texture addressing method  
Key-F2 Next T texture addressing method

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

Code Sampler

Demo scripts

- ogl\_axis\_aligned\_billboa
- ogl\_benchmark\_sphere.
- ogl\_cg\_multitexture.tcl
- ogl\_color\_tracking.tcl
- ogl\_fps\_controls.tcl
- ogl\_frame\_buffer\_objec
- ogl\_glslang\_simple\_vs2j
- ogl\_lighting.tcl
- ogl\_material.tcl
- ogl\_multitexture\_blendir
- ogl\_near\_far\_clip.tcl
- ogl\_occlusion\_query.tcl
- ogl\_planar\_shadow.tcl
- ogl\_point\_rotated\_billbo
- ogl\_point\_sprites.tcl
- ogl\_polygon\_offset.tcl
- ogl\_skinning.tcl
- ogl\_texture\_addressing**
- ogl\_vertex\_displacemen
- oglu\_projtexture.tcl

```
-----
Name: ogl_texture_addressing.cpp
Author: Kevin Harris (kevin@codesampler.com)
Last Modified: 02/01/05
Description: This sample demonstrates the two methods of texture
addressing that are available under OpenGL:

GL_REPEAT
GL_CLAMP
GL_MIRRORED_REPEAT_ARB ( GL_ARB_texture_mirrored_repeat )
GL_CLAMP_TO_BORDER_ARB ( GL_ARB_texture_border_clamp )
GL_CLAMP_TO_EDGE      ( GL_SGIS_texture_edge_clamp )

Control Keys: F1 - Changes addressing method for the S coordinates
              F2 - Changes addressing method for the T coordinates
-----
```

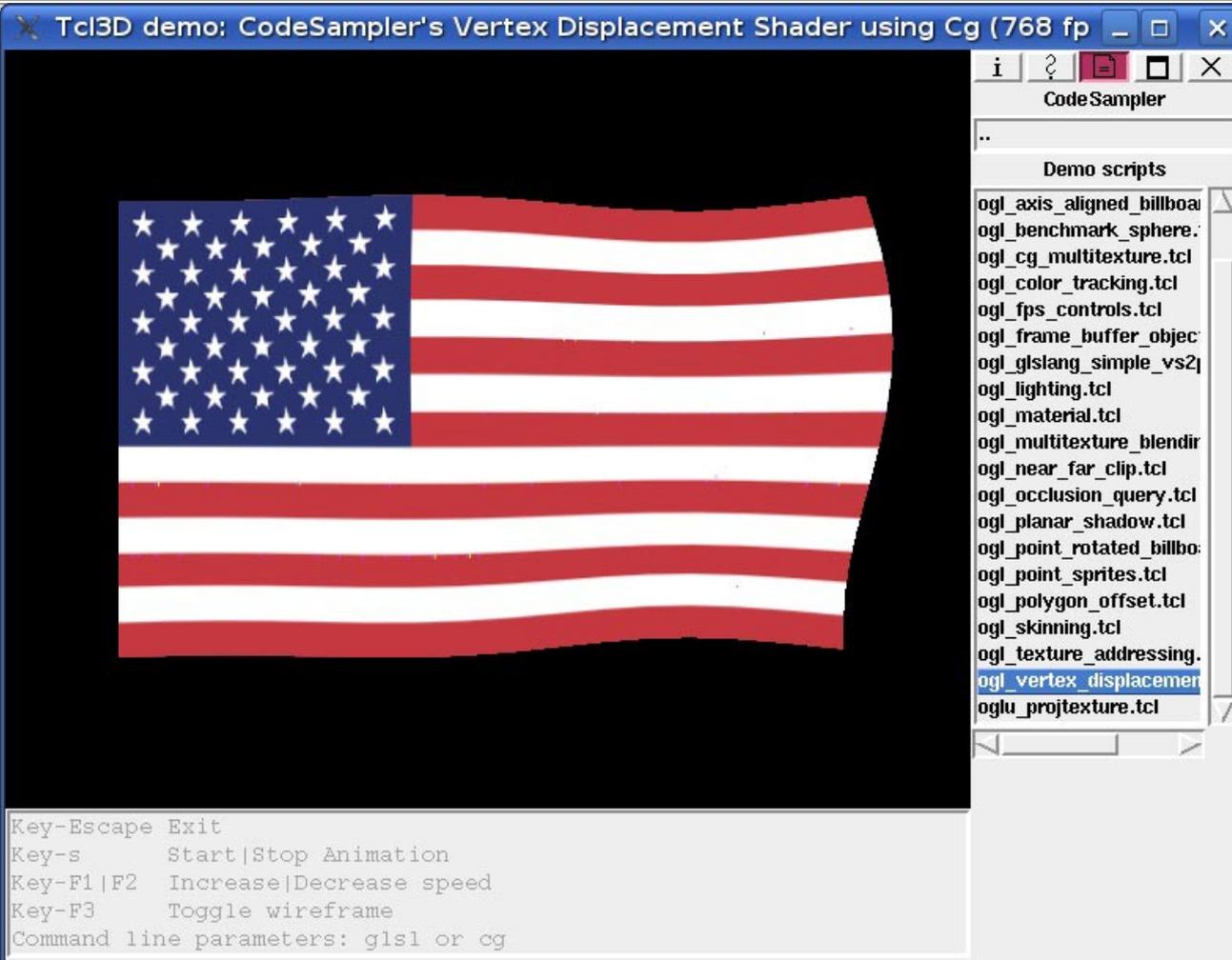
```
Original C++ code by Kevin Harris (kevin@codesampler.com)
See www.codesampler.com for the original files
OpenGL samples page 3: Texture Addressing
```

```
Modified for Tcl3D by Paul Obermeier 2007/03/06
```

See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>ogl_vertex_displacement</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: CodeSampler's Vertex Displacement Shader using Cg (768 fp)



Key-Escape Exit  
 Key-s Start|Stop Animation  
 Key-F1|F2 Increase|Decrease speed  
 Key-F3 Toggle wireframe  
 Command line parameters: glsl or cg

Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)

-----

Name: `ogl_cg_vertex_displacement.cpp`  
`ogl_glslang_vertex_displacement.cpp`  
 Author: Kevin Harris (kevin@codesampler.com)  
 Last Modified: 04/21/05  
 Description: This sample demonstrates how to perform mesh deformation or vertex displacement with OpenGL using a Cg or GLSL shader.

Control Keys: F1 - Increase flag motion  
 F2 - Decrease flag motion  
 F3 - Toggle wire-frame mode

-----

Original C++ code by Kevin Harris (kevin@codesampler.com)  
 See [www.codesampler.com](http://www.codesampler.com) for the original files  
 OpenGL samples page 11: Vertex Displacement or Mesh Deformation Shader

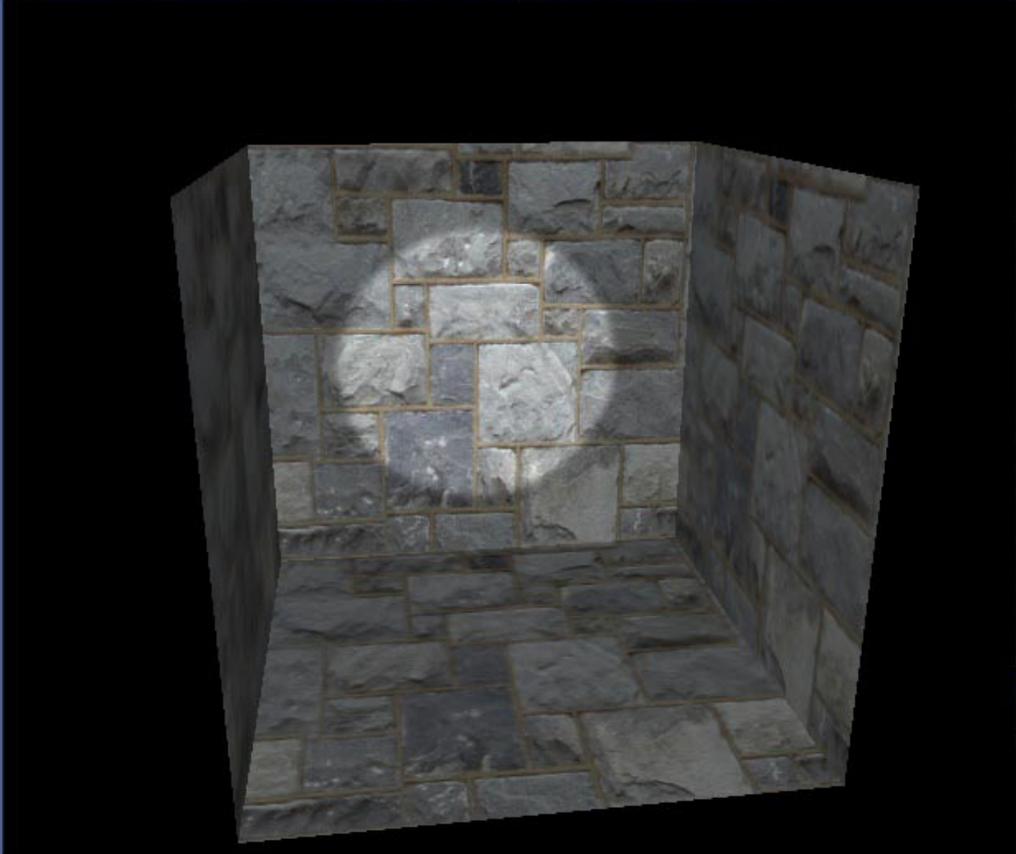
Modified for Tcl3D by Paul Obermeier 2005/11/05  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

This sample integrates the Cg and GLSL code into one file.  
 If called with no command line arguments, it uses the Cg shader.

Use "glsl" as parameter to use the GLSL shader.

<b>Demo:</b>	<b>oglu_projtexture</b>
Type:	<a href="#">CodeSampler</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: CodeSampler's Projected Texture
Code Sampler



..

Demo scripts

- ogl\_axis\_aligned\_billboa
- ogl\_benchmark\_sphere.
- ogl\_cg\_multitexture.tcl
- ogl\_color\_tracking.tcl
- ogl\_fps\_controls.tcl
- ogl\_frame\_buffer\_objec
- ogl\_glslang\_simple\_vs2j
- ogl\_lighting.tcl
- ogl\_material.tcl
- ogl\_multitexture\_blendir
- ogl\_near\_far\_clip.tcl
- ogl\_occlusion\_query.tcl
- ogl\_planar\_shadow.tcl
- ogl\_point\_rotated\_billbo
- ogl\_point\_sprites.tcl
- ogl\_polygon\_offset.tcl
- ogl\_skinning.tcl
- ogl\_texture\_addressing.
- ogl\_vertex\_displacemen
- oglu\_projtexture.tcl**

Key-Escape Exit

Mouse-L Rotate cube

Mouse-MR Rotate light

**Running on Linux with a GeForce FX Go5600/AGP/SSE2 (OpenGL 2.1.1 NVIDIA 100.14.09, Tcl 8.4.18)**

This program demonstrates how one would go about doing a projected texture. The sample here shows how a projected texture technique can be used to produce a light map.

The point is that even though you have very few vertices available for the fixed function

pipeline lighting solution, you can achieve nice per pixel lighting even though the surface

has only a handful of vertices.

This sample draws a cube, only allowing the inside being visible via culling front facing polys,

and then projects the light map texture on the second texture stage all through the fixed

function pipeline.

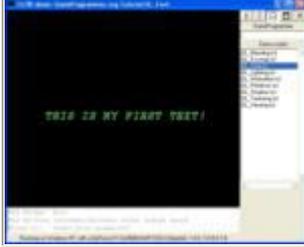
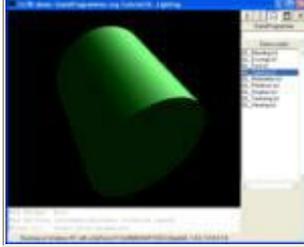
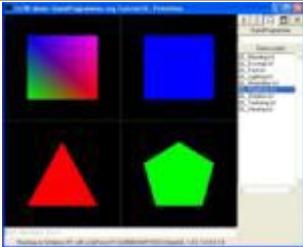
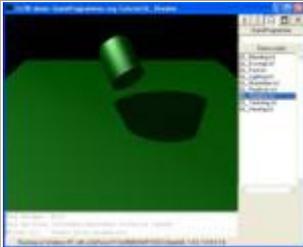
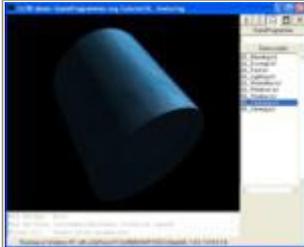
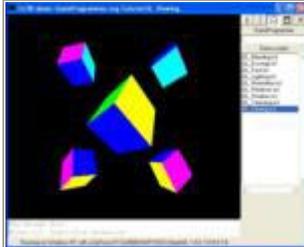
The left mouse button will move the cube around and the right mouse button will move the

projected # light map around.

Type:	GameProgrammer
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Several demo applications from Vahid Kazemi's page have been ported to Tcl3D.  
 Original sources available at: <http://www.GameProgrammer.org>

Available demos

				
<a href="#">GL Blending</a>	<a href="#">GL Envmap</a>	<a href="#">GL Font</a>	<a href="#">GL Lighting</a>	<a href="#">GL Mo</a>
				
<a href="#">GL Primitives</a>	<a href="#">GL Shadow</a>	<a href="#">GL Texturing</a>	<a href="#">GL Viewing</a>	

<b>Demo:</b>	<b>GL_Blending</b>
Type:	<a href="#">GameProgrammer</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

GL\_Blending.tcl

Tutorial from [www.GameProgrammer.org](http://www.GameProgrammer.org)  
Blending demo

Original code Copyright 2005 by Vahid Kazemi

Modified for Tcl3D by Paul Obermeier 2006/09/12  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>GL_Envmap</b>
Type:	<a href="#">GameProgrammer</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: GameProgrammer.org Tutorial GL\_Texturing



Key-Escape Exit  
Key-Up|Down Increase|Decrease rotation speed  
Mouse-1|2 Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

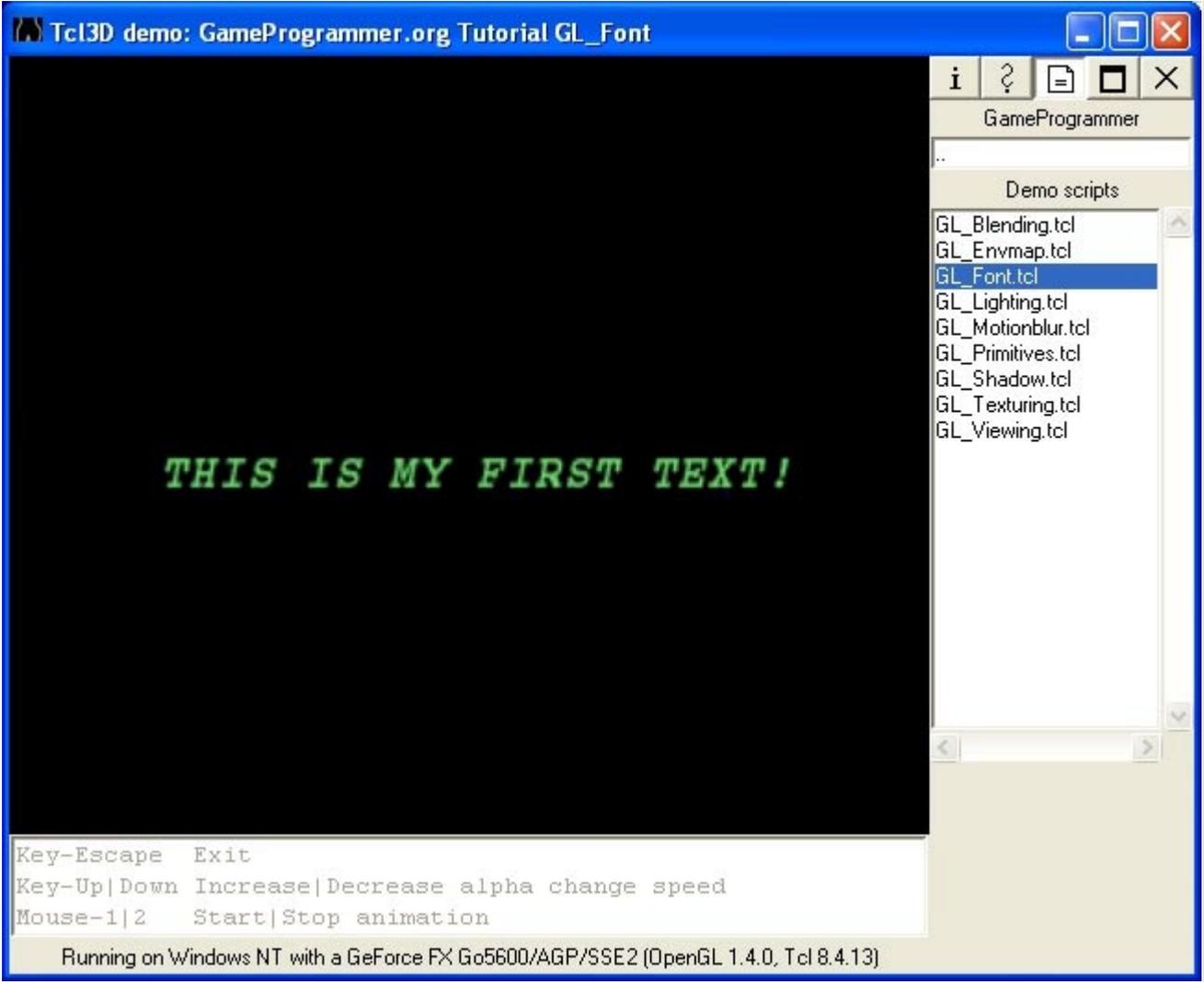
GL\_Texturing.tcl

Tutorial from [www.GameProgrammer.org](http://www.GameProgrammer.org)  
Using Textures

Original code Copyright 2004 by Vahid Kazemi

Modified for Tcl3D by Paul Obermeier 2006/09/12  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>GL_Font</b>
Type:	<a href="#">GameProgrammer</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



GL\_Font.tcl

Tutorial from [www.GameProgrammer.org](http://www.GameProgrammer.org)  
 Bitmap fonts

Original code Copyright 2005 by Vahid Kazemi

Modified for Tcl3D by Paul Obermeier 2006/09/15  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>GL_Lighting</b>
Type:	<a href="#">GameProgrammer</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-Up|Down Increase|Decrease rotation speed  
 Mouse-1|2 Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

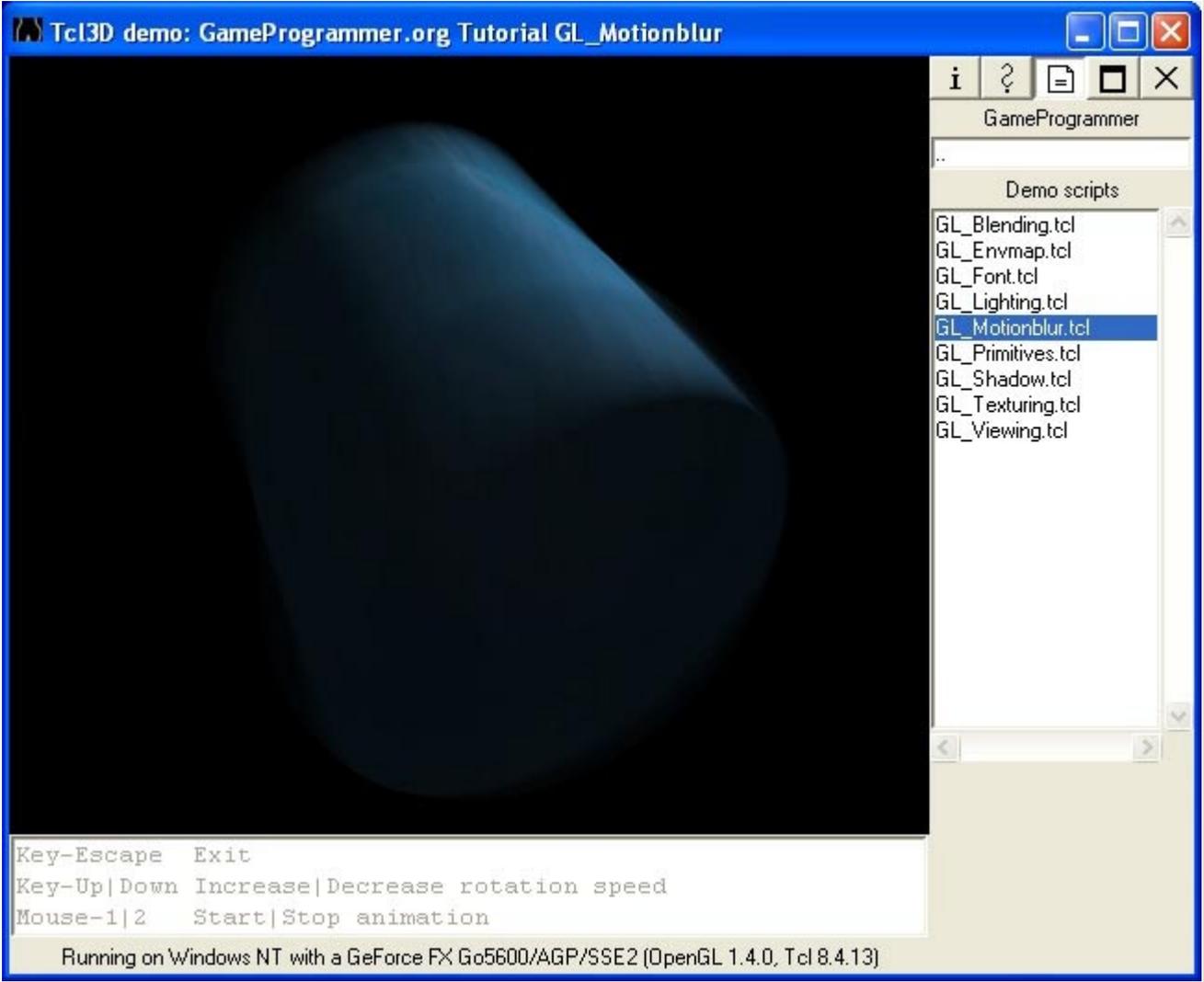
GL\_Lighting.tcl

Tutorial from [www.GameProgrammer.org](http://www.GameProgrammer.org)  
 Turn the lights on!

Original code Copyright 2004 by Vahid Kazemi

Modified for Tcl3D by Paul Obermeier 2006/09/11  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>GL_Motionblur</b>
Type:	<a href="#">GameProgrammer</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



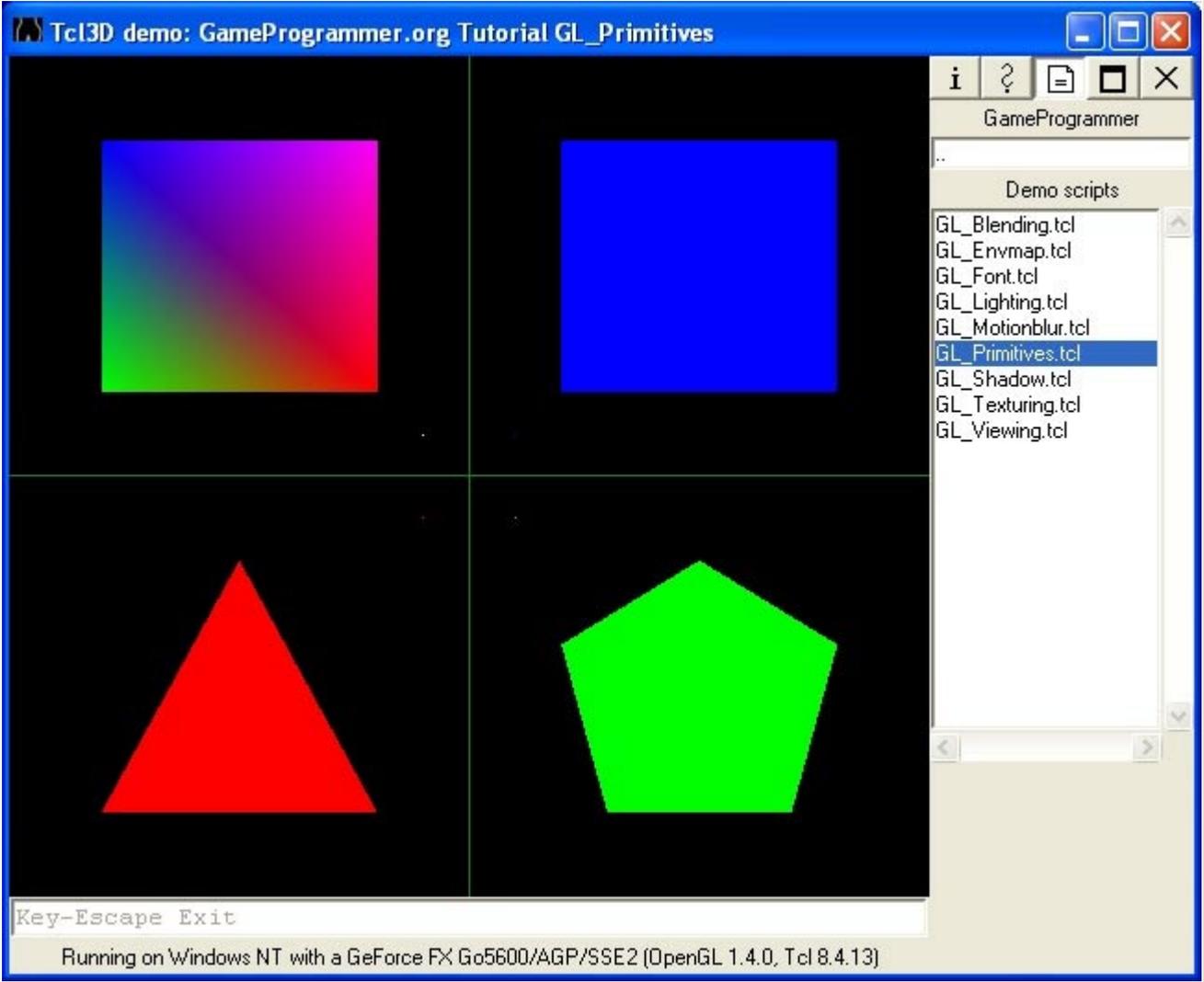
GL\_Motionblur.tcl

Tutorial from [www.GameProgrammer.org](http://www.GameProgrammer.org)  
Using Textures

Original code Copyright 2006 by Vahid Kazemi

Modified for Tcl3D by Paul Obermeier 2006/09/14  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>GL_Primitives</b>
Type:	<a href="#">GameProgrammer</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



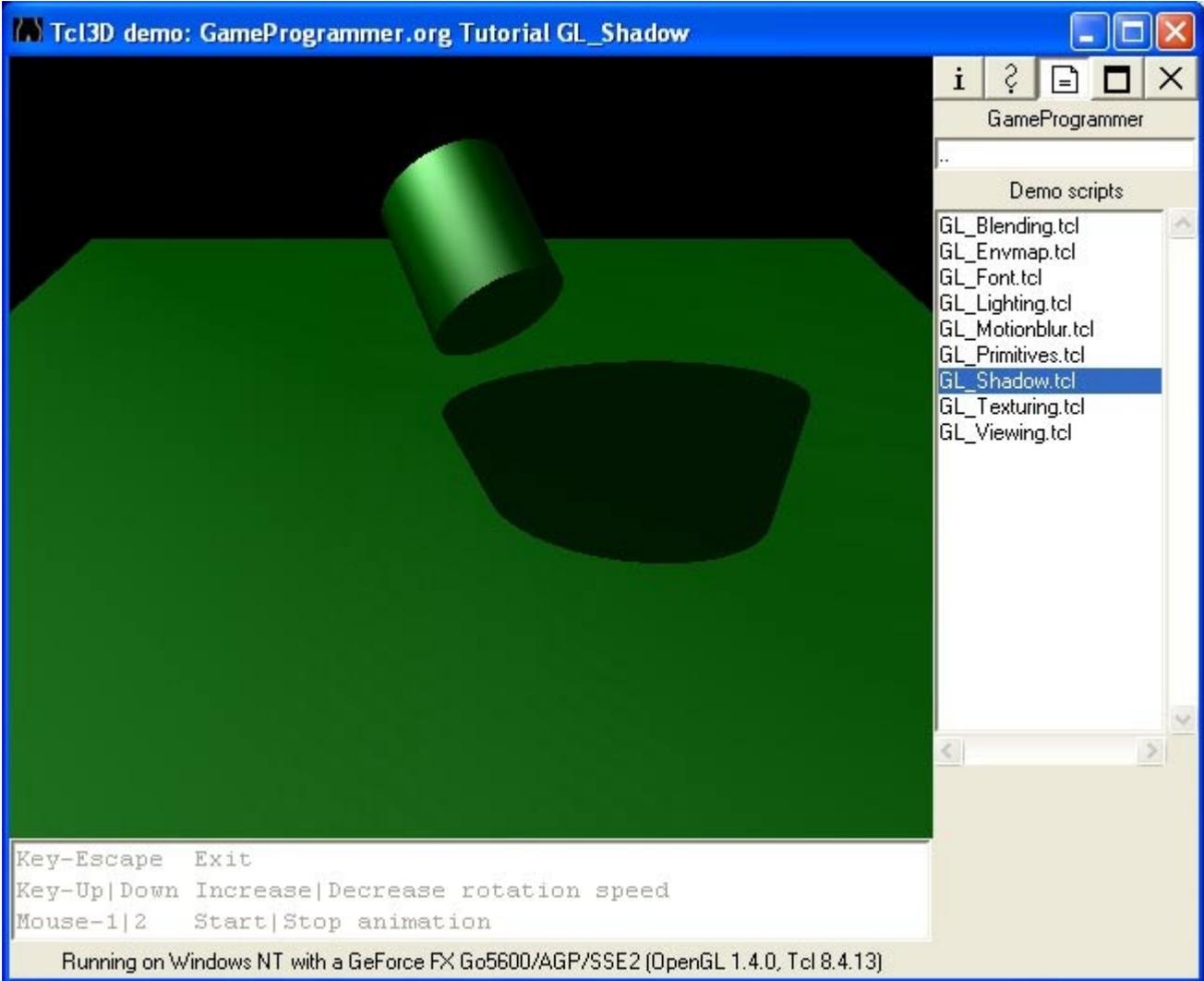
GL\_Primitives.tcl

Tutorial from [www.GameProgrammer.org](http://www.GameProgrammer.org)  
OpenGL Primitives.

Original code Copyright 2004 by Vahid Kazemi

Modified for Tcl3D by Paul Obermeier 2006/09/11  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>GL_Shadow</b>
Type:	<a href="#">GameProgrammer</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



GL\_Shadow.tcl

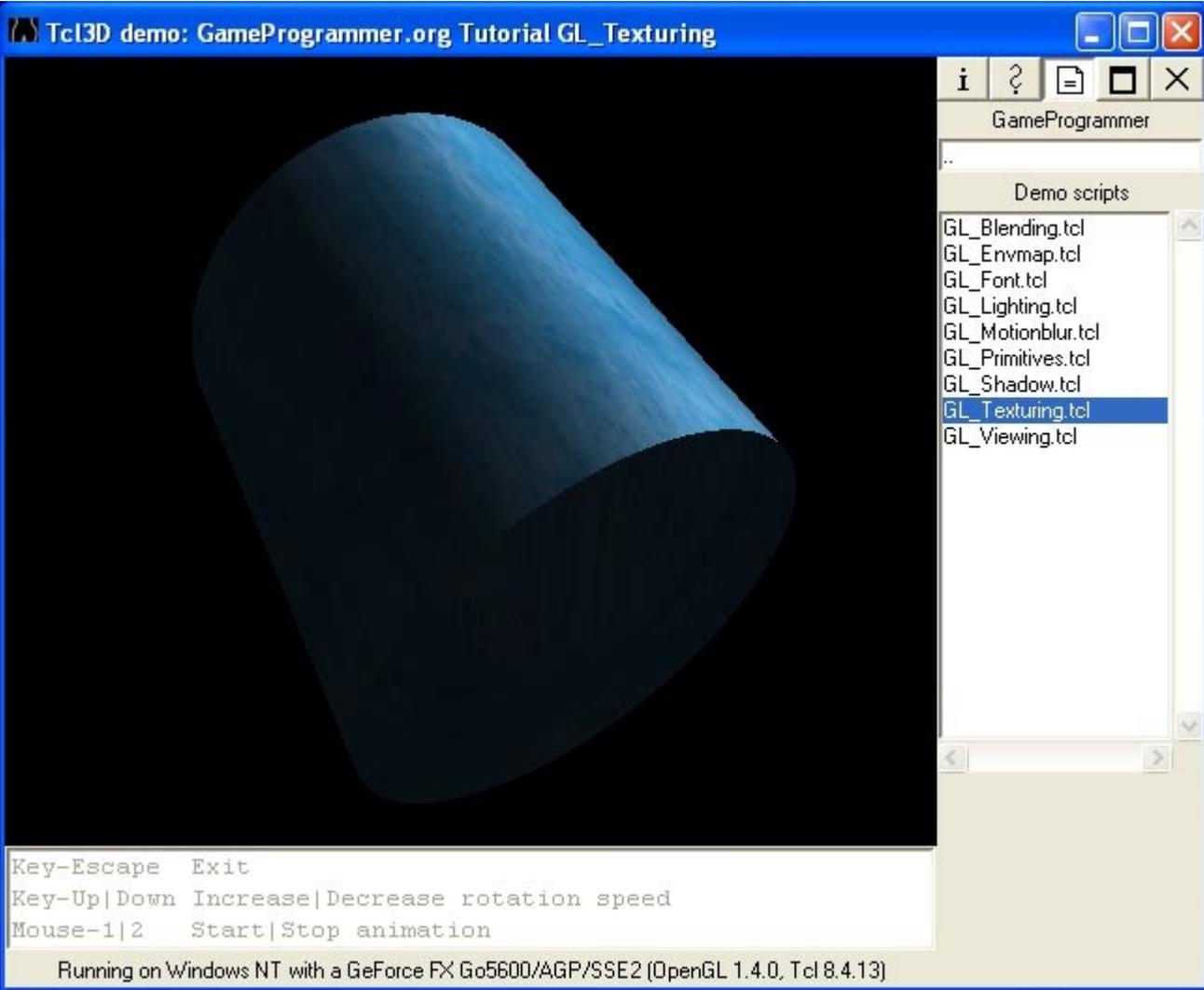
Tutorial from [www.GameProgrammer.org](http://www.GameProgrammer.org)  
Stencil shadows.

Original code Copyright 2005 by Vahid Kazemi

Modified for Tcl3D by Paul Obermeier 2006/09/10  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>GL_Texturing</b>
Type:	<a href="#">GameProgrammer</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: GameProgrammer.org Tutorial GL\_Texturing



Key-Escape Exit  
 Key-Up|Down Increase|Decrease rotation speed  
 Mouse-1|2 Start|Stop animation  
 Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

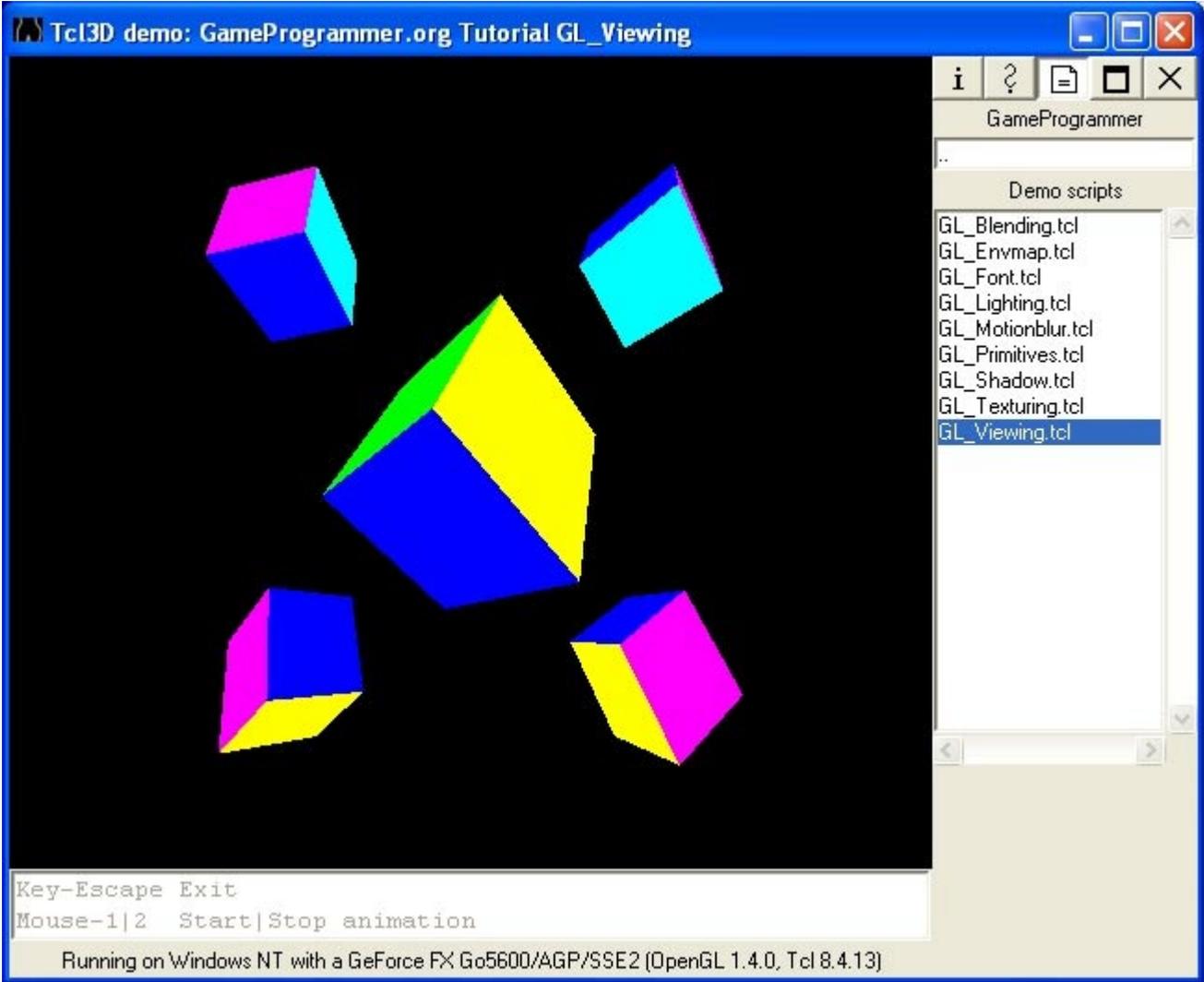
GL\_Texturing.tcl

Tutorial from [www.GameProgrammer.org](http://www.GameProgrammer.org)  
 Using Textures

Original code Copyright 2004 by Vahid Kazemi

Modified for Tcl3D by Paul Obermeier 2006/09/12  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>GL_Viewing</b>
Type:	<a href="#">GameProgrammer</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



GL\_Viewing.tcl

Tutorial from [www.GameProgrammer.org](http://www.GameProgrammer.org)  
Viewing and Transformations.

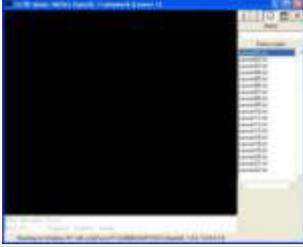
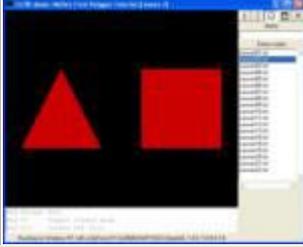
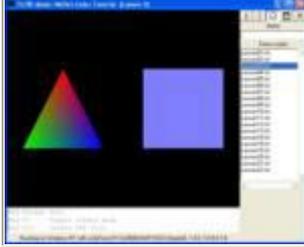
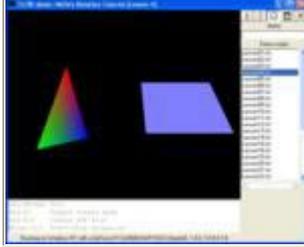
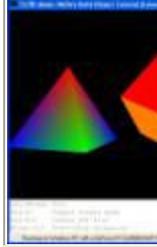
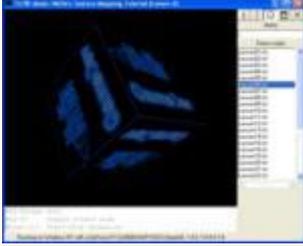
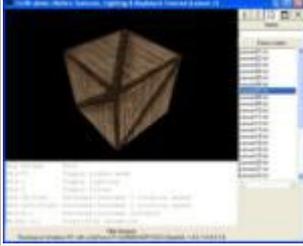
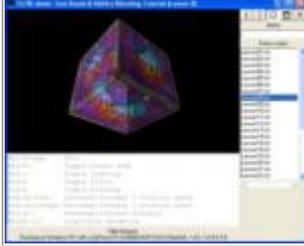
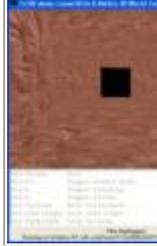
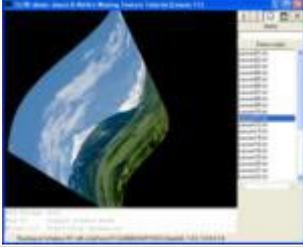
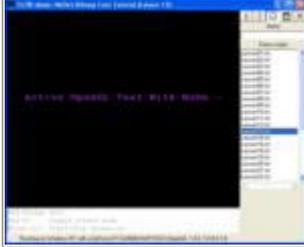
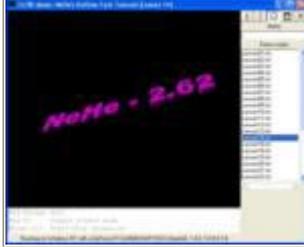
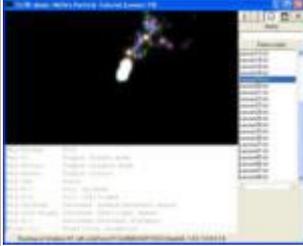
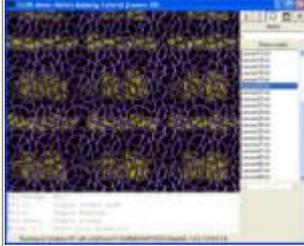
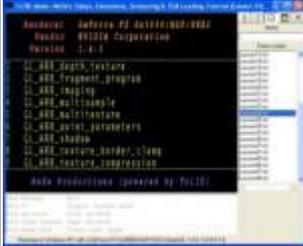
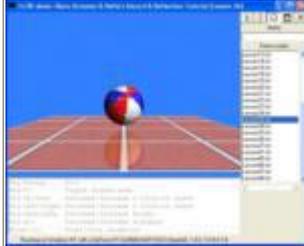
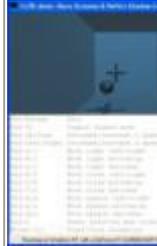
Original code Copyright 2004 by Vahid Kazemi

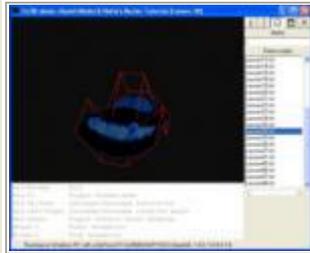
Modified for Tcl3D by Paul Obermeier 2006/09/11  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

Type:	NeHe
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

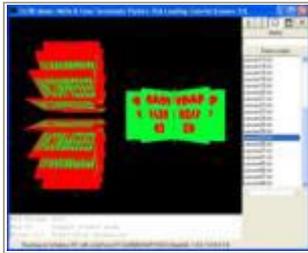
Some of the NeHe OpenGL tutorials have been ported to run with Tcl3D. Currently 34 out of 48 lessons are available. Original sources available at: <http://nehe.gamedev.net/>

Available demos

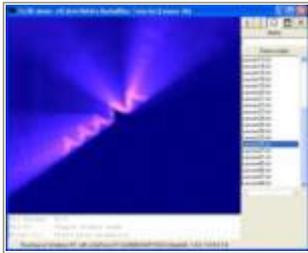
				
<a href="#">Lesson01</a>	<a href="#">Lesson02</a>	<a href="#">Lesson03</a>	<a href="#">Lesson04</a>	<a href="#">Lesson05</a>
				
<a href="#">Lesson06</a>	<a href="#">Lesson07</a>	<a href="#">Lesson08</a>	<a href="#">Lesson09</a>	<a href="#">Lesson10</a>
				
<a href="#">Lesson11</a>	<a href="#">Lesson12</a>	<a href="#">Lesson13</a>	<a href="#">Lesson14</a>	<a href="#">Lesson15</a>
				
<a href="#">Lesson18</a>	<a href="#">Lesson19</a>	<a href="#">Lesson20</a>	<a href="#">Lesson21</a>	<a href="#">Lesson22</a>
				
<a href="#">Lesson23</a>	<a href="#">Lesson24</a>	<a href="#">Lesson25</a>	<a href="#">Lesson26</a>	<a href="#">Lesson27</a>



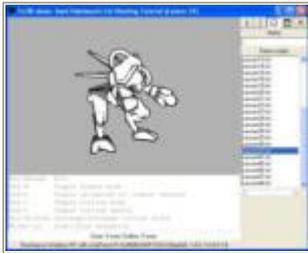
[Lesson28](#)



[Lesson33](#)



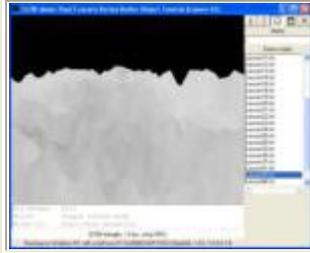
[Lesson36](#)



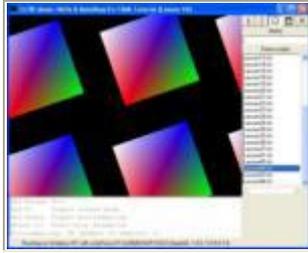
[Lesson37](#)



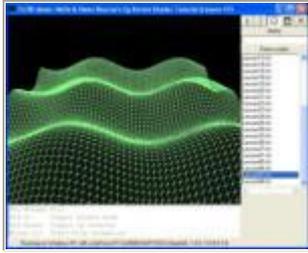
[Less](#)



[Lesson45](#)



[Lesson46](#)

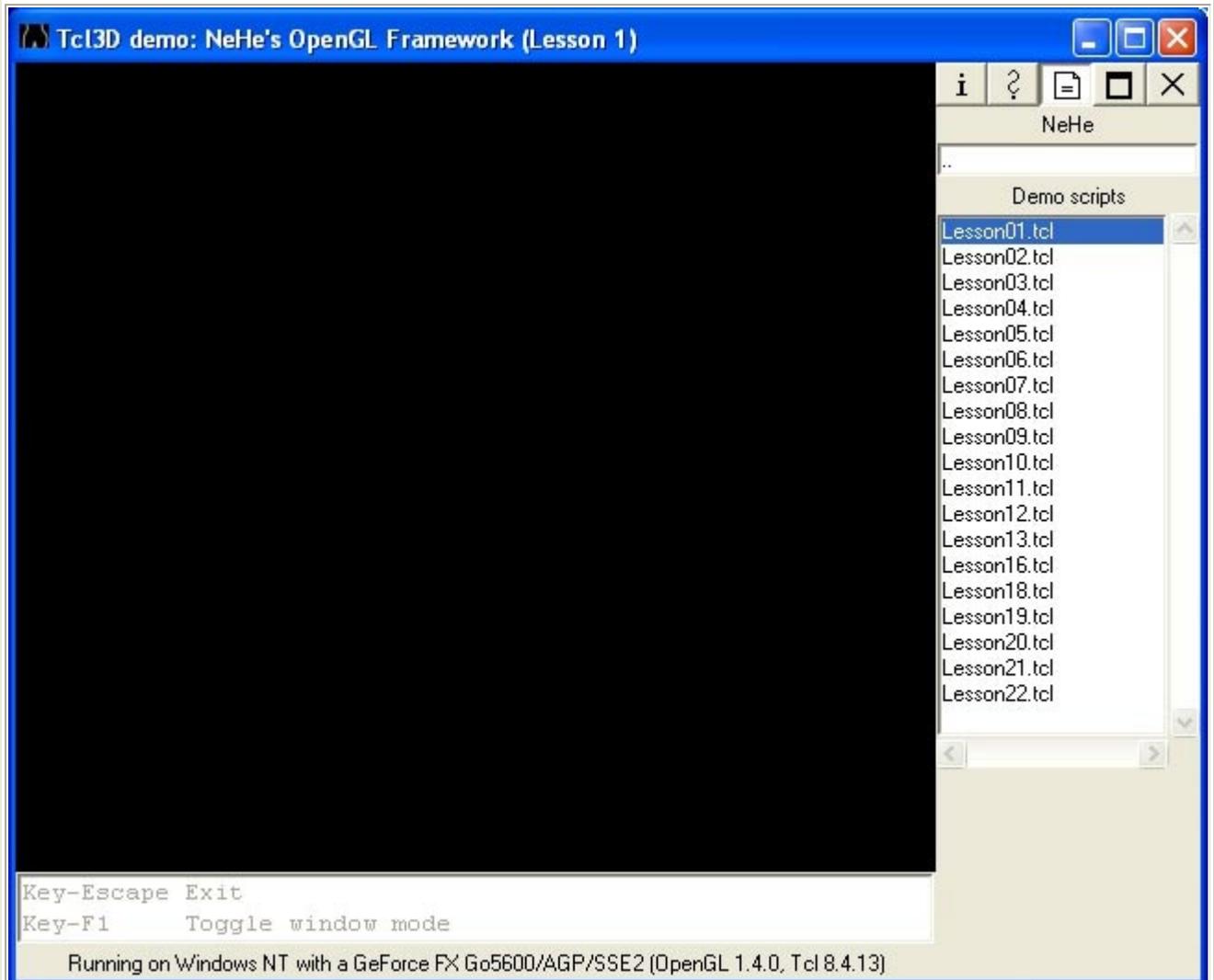


[Lesson47](#)



[Lesson48](#)

<b>Demo:</b>	<b>Lesson01</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



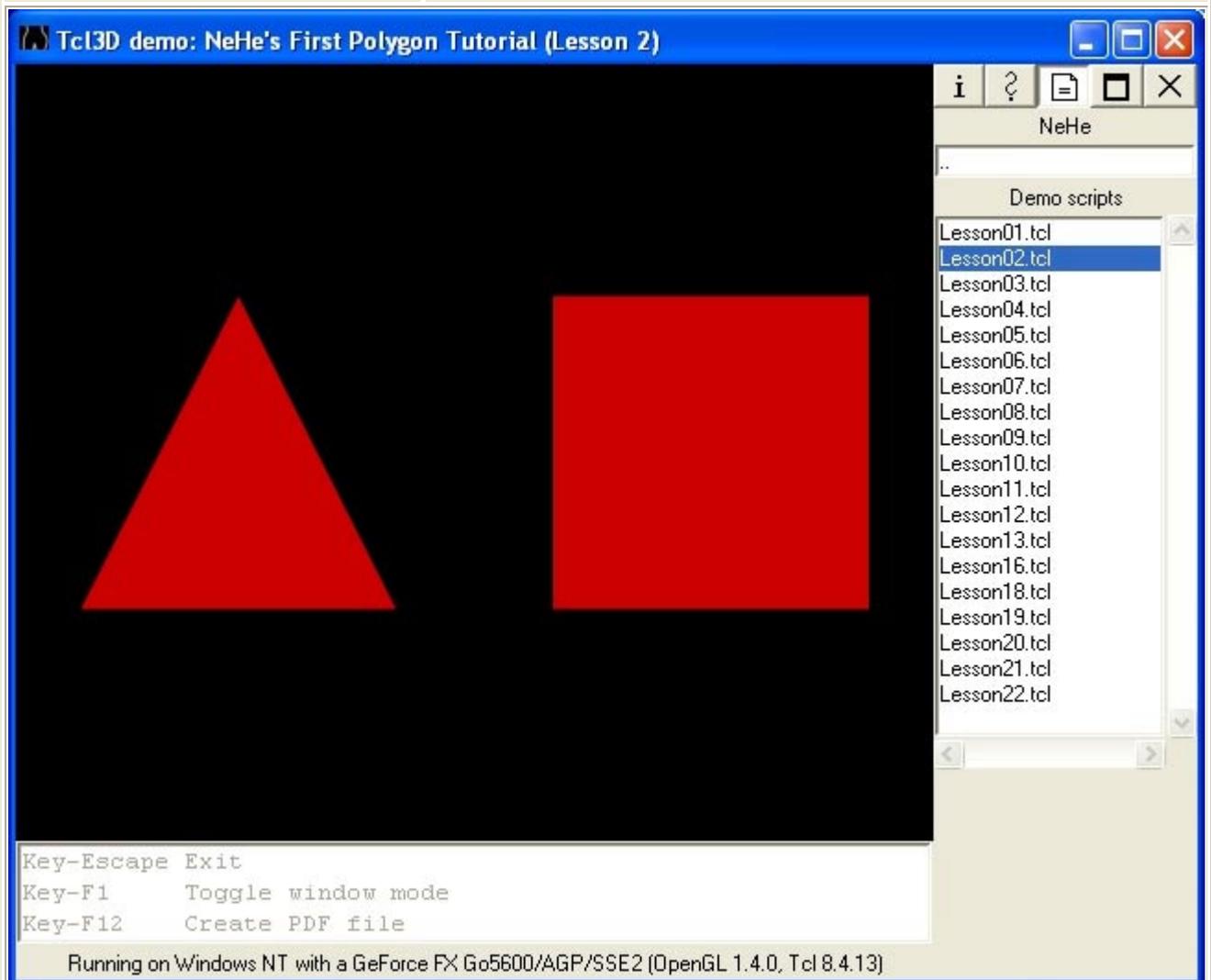
Lesson01.tcl

NeHe's OpenGL Framework

This Code Was Created By Jeff Molofee 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson02</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



Lesson02.tcl

NeHe's First Polygon Tutorial

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 And Optimizing This Code, Making It More Flexible!  
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Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson03</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

```

Lesson03.tcl

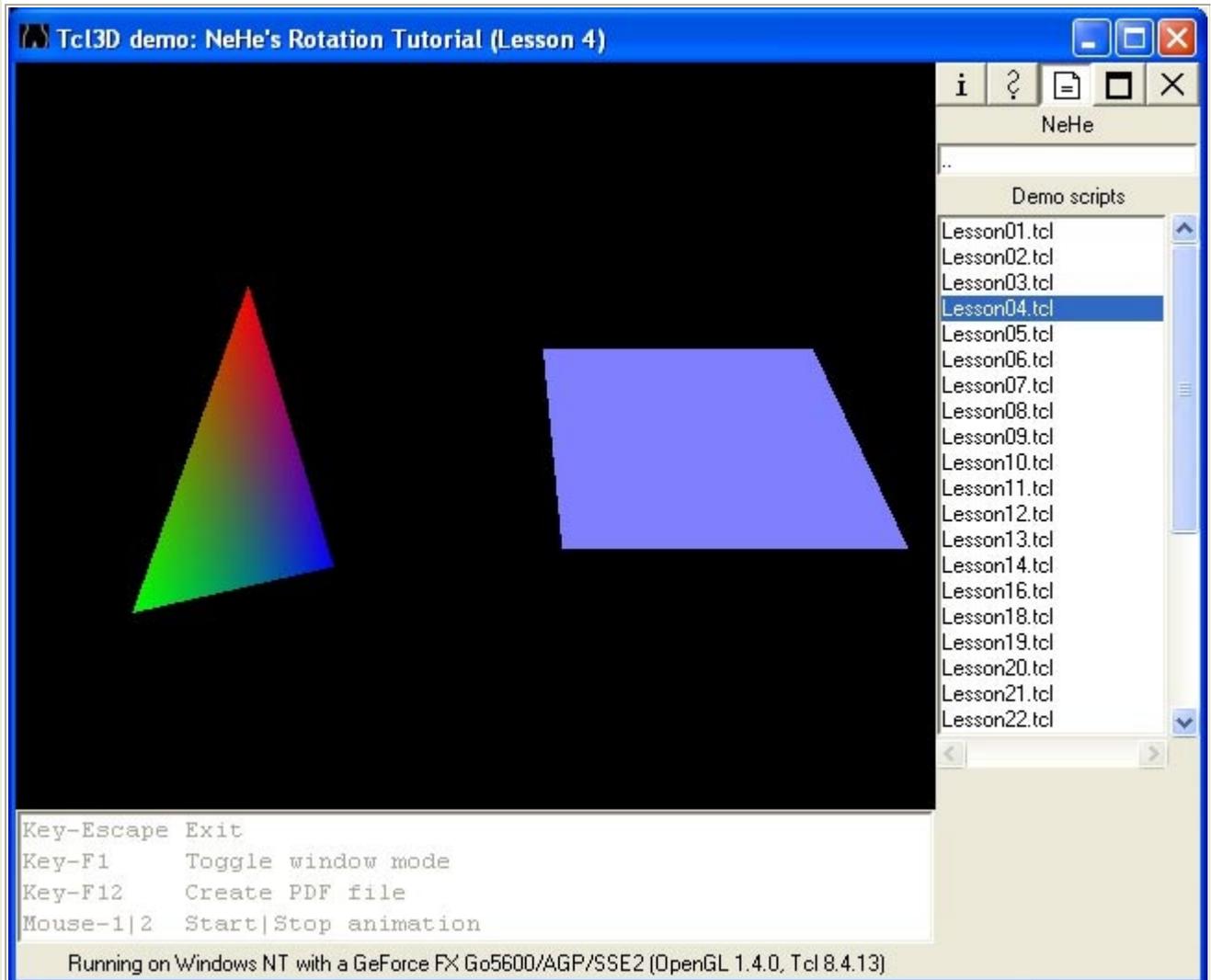
NeHe's Color Tutorial

This Code Was Created By Jeff Molofee 2000
A HUGE Thanks To Fredric Echols For Cleaning Up
And Optimizing This Code, Making It More Flexible!
If You've Found This Code Useful, Please Let Me Know.
Visit My Site At nehe.gamedev.net

Modified for Tcl3D by Paul Obermeier 2006/01/25
See www.tcl3d.org for the Tcl3D extension.

```

<b>Demo:</b>	<b>Lesson04</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



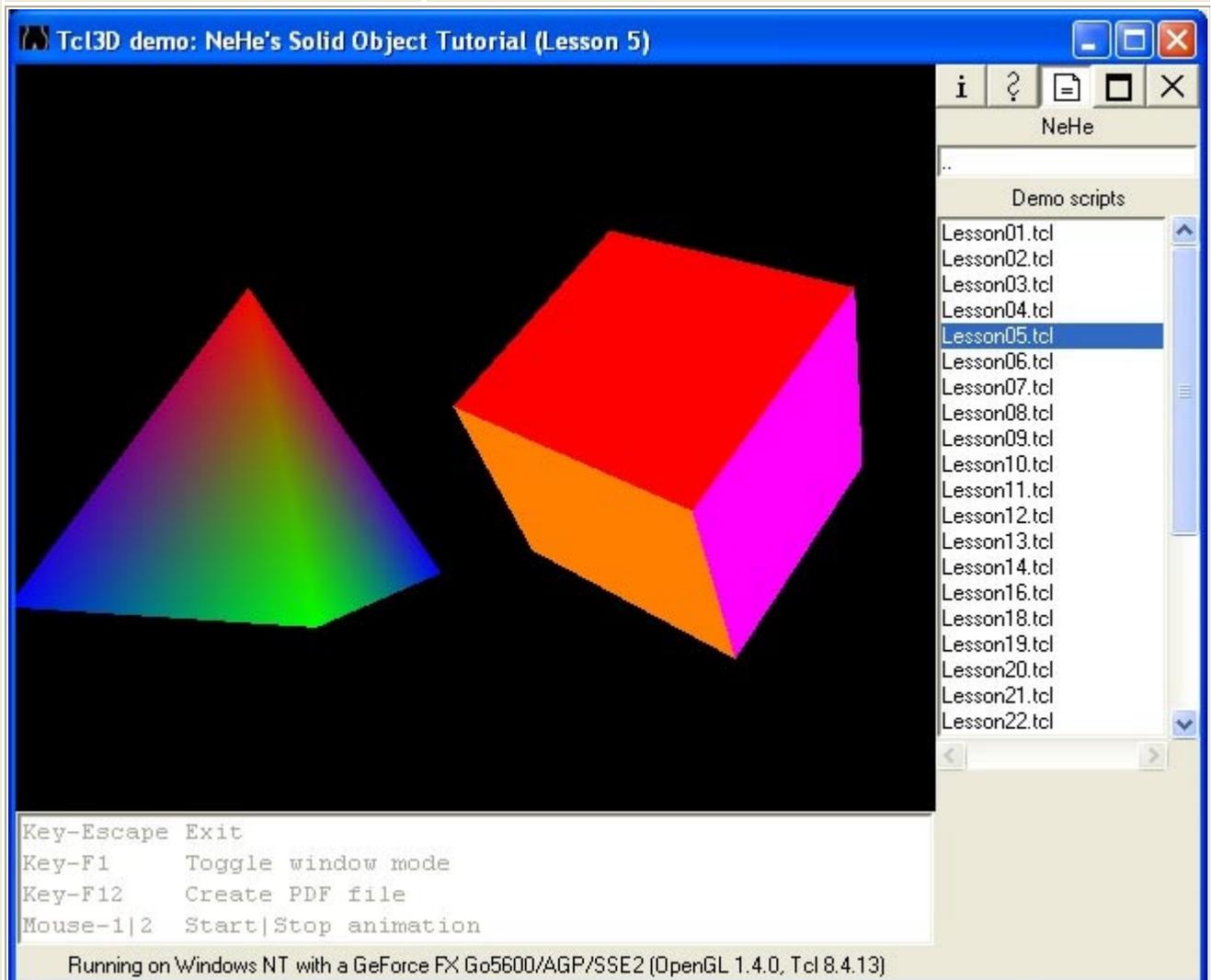
Lesson04.tcl

NeHe's Rotation Tutorial

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 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
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 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson05</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



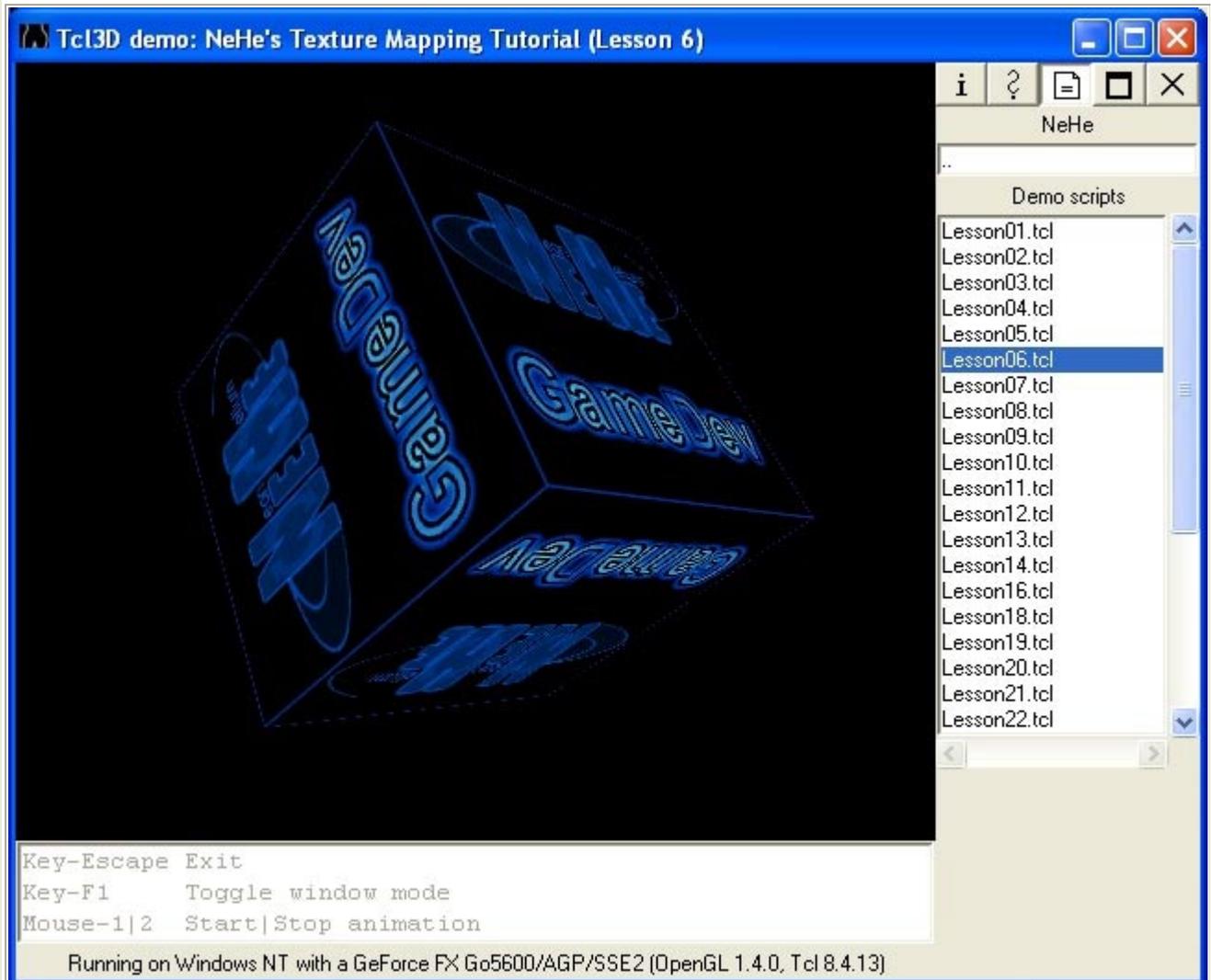
Lesson05.tcl

NeHe's Solid Object Tutorial

This Code Was Created By Jeff Molofee 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
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 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson06</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



Lesson06.tcl

NeHe's Texture Mapping Tutorial

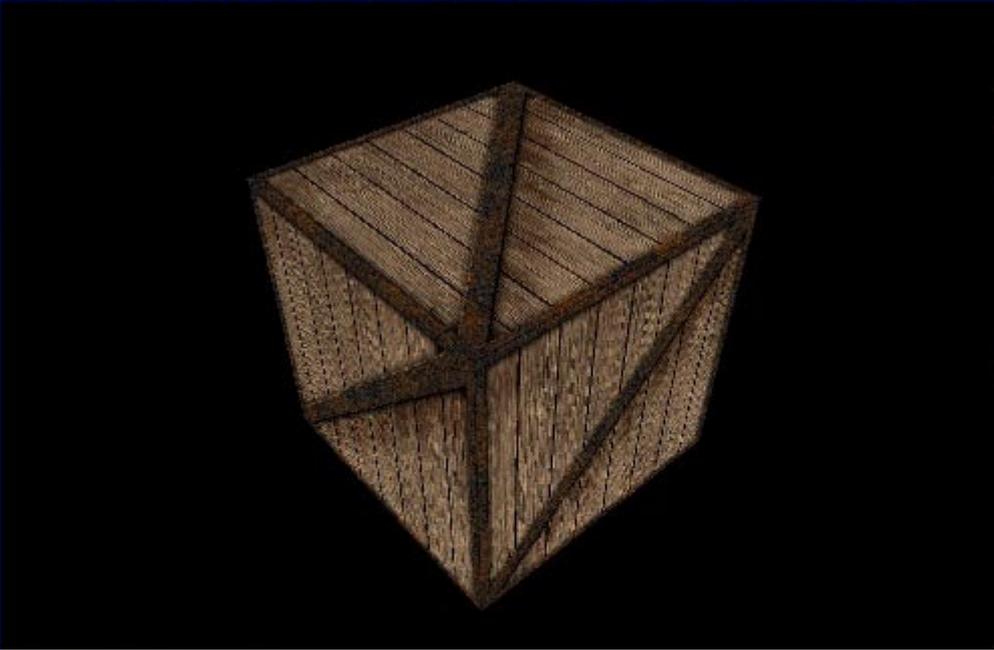
This Code Was Created By Jeff Molofee 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson07</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: NeHe's Textures, Lighting & Keyboard Tutorial (Lesson 7)**



<pre> Key-Escape      Exit Key-F1          Toggle window mode Key-l           Toggle lighting Key-f           Toggle filter Key-Up Down    Decrease Increase x rotation speed Key-Left Right Decrease Increase y rotation speed Key-d i        Decrease Increase distance Mouse-1 2      Start Stop animation           </pre>	<p style="text-align: center;">Filter Nearest</p> <p style="text-align: center;">Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)</p>
--	---

Lesson07.tcl

NeHe's Textures, Lighting & Keyboard Tutorial

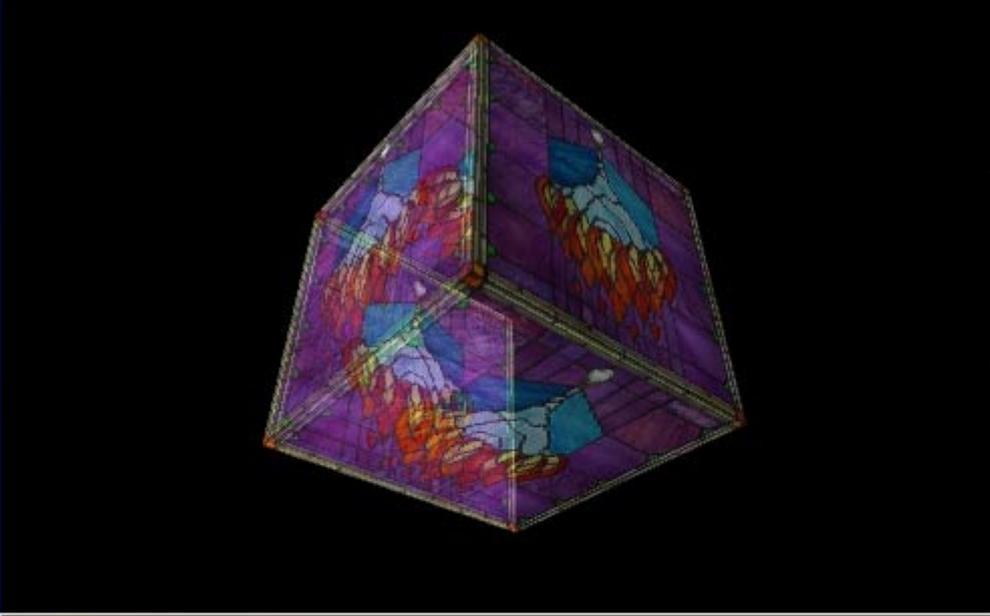
This Code Was Created By Jeff Molofee 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson08</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Tom Stanis & NeHe's Blending Tutorial (Lesson 8)**



Key-Escape      Exit  
 Key-F1          Toggle window mode  
 Key-l            Toggle lighting  
 Key-f            Toggle filter  
 Key-b            Toggle blending  
 Key-Up|Down    Decrease|Increase x rotation speed  
 Key-Left|Right Decrease|Increase y rotation speed  
 Key-d|i          Decrease|Increase distance  
 Mouse-1|2       Start|Stop animation

Filter Nearest  
 Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson08.tcl

Tom Stanis & NeHe's Blending Tutorial

This Code Was Created By Tom Stanis / Jeff Molofee 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson09</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: NeHe's Animated Blended Textures Tutorial (Lesson 9)

NeHe

Demo scripts

- Lesson01.tcl
- Lesson02.tcl
- Lesson03.tcl
- Lesson04.tcl
- Lesson05.tcl
- Lesson06.tcl
- Lesson07.tcl
- Lesson08.tcl
- Lesson09.tcl**
- Lesson10.tcl
- Lesson11.tcl
- Lesson12.tcl
- Lesson13.tcl
- Lesson14.tcl
- Lesson16.tcl
- Lesson18.tcl
- Lesson19.tcl
- Lesson20.tcl
- Lesson21.tcl
- Lesson22.tcl

Key-Escape Exit  
 Key-F1 Toggle window mode  
 Key-t Toggle twinkle  
 Key-Up|Down Decrease|Increase tilt  
 Key-d|i Decrease|Increase distance  
 Mouse-1|2 Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson09.tcl

NeHe's Animated Blended Textures Tutorial

This Code Was Created By Jeff Molofee 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson10</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape      Exit  
 Key-F1          Toggle window mode  
 Key-b          Toggle blending  
 Key-f          Toggle filter  
 Key-Up|Down    Move forth|back  
 Key-Left|Right Look left|right  
 Key-PgUp|PgDn Look up|down

Filter MipMapped  
 Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson10.tcl

Lionel Brits & NeHe's 3D World Tutorial

This Code Was Created By Lionel Brits & Jeff Molofee 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson11</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Lesson11.tcl

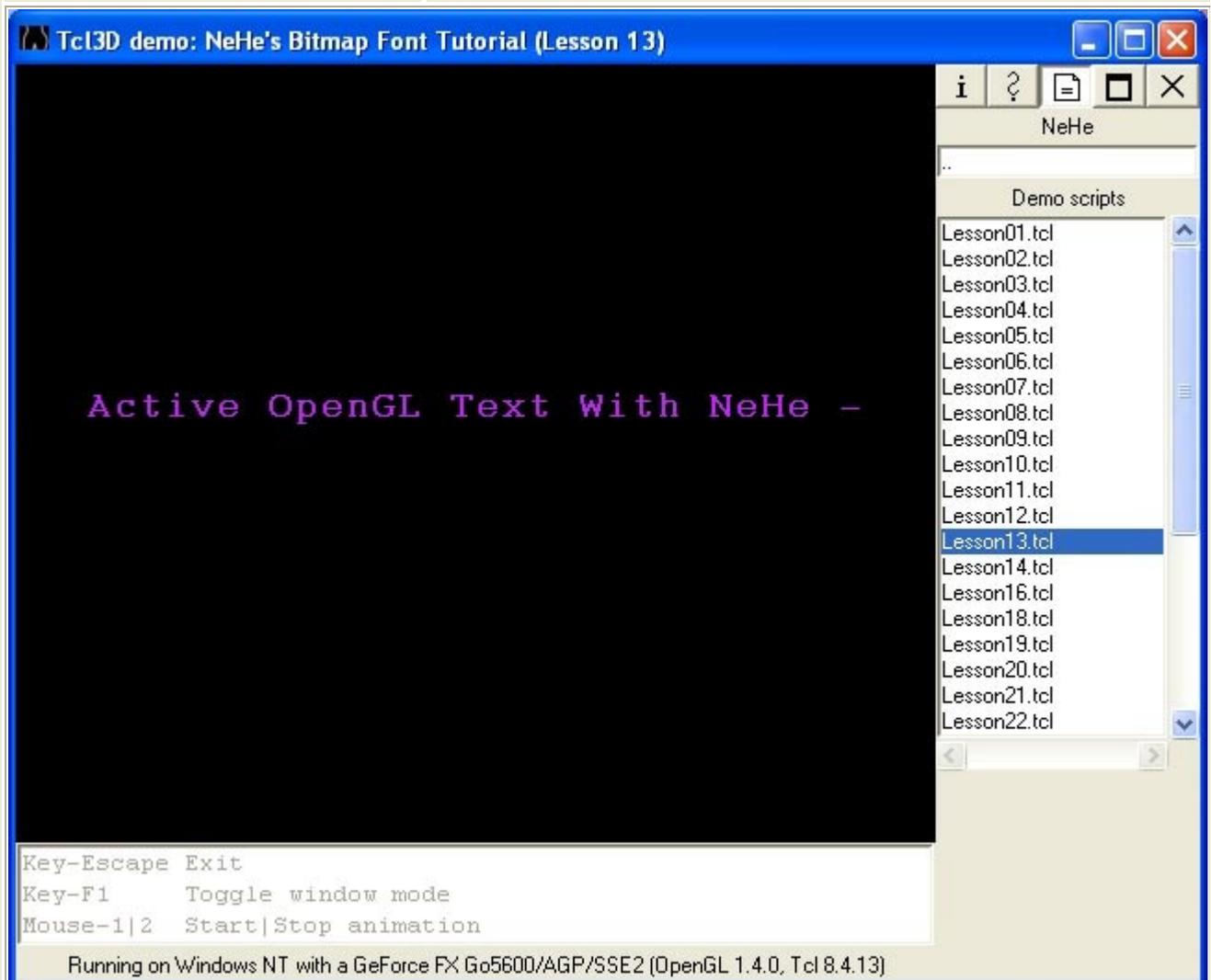
bosco & NeHe's Waving Texture Tutorial

This Code Was Created By bosco / Jeff Molofee 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.



<b>Demo:</b>	<b>Lesson13</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



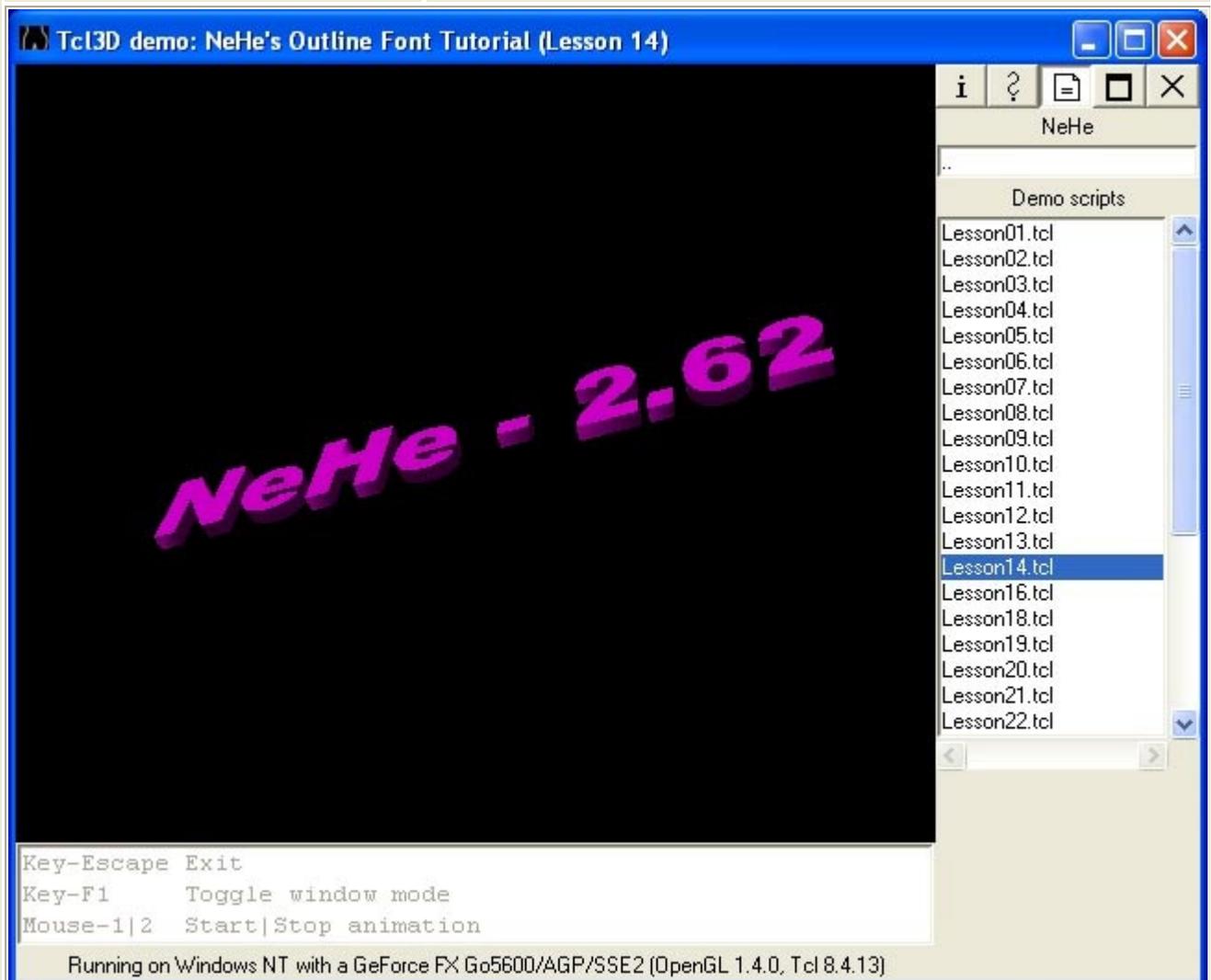
Lesson13.tcl

NeHe's Bitmap Font Tutorial

This Code Was Created By Jeff Molofee 2000  
 Modified by Shawn T. to handle (%3.2f, num) parameters.  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing The Base Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson14</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



Lesson14.tcl

NeHe's Outline Font Tutorial

This Code Was Created By Jeff Molofee 2000  
 Modified by Shawn T. to handle (%3.2f, num) parameters.  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing The Base Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/26  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson16</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: Chris Aliotta & NeHe's Fog Tutorial (Lesson 16)". The main area displays a 3D wireframe cube. Below the cube is a keyboard control list:

Key-Escape	Exit
Key-F1	Toggle window mode
Key-l	Toggle lighting
Key-f	Toggle texture filter
Key-g	Toggle fog filter
Key-Up Down	Decrease Increase x rotation speed
Key-Left Right	Decrease Increase y rotation speed
Key-d i	Decrease Increase distance
Mouse-1 2	Start Stop animation

At the bottom of the window, it says "Fog GL\_EXP2" and "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)".

On the right side, there is a file list titled "Demo scripts" with the following files:

- Lesson01.tcl
- Lesson02.tcl
- Lesson03.tcl
- Lesson04.tcl
- Lesson05.tcl
- Lesson06.tcl
- Lesson07.tcl
- Lesson08.tcl
- Lesson09.tcl
- Lesson10.tcl
- Lesson11.tcl
- Lesson12.tcl
- Lesson13.tcl
- Lesson14.tcl
- Lesson16.tcl**
- Lesson18.tcl
- Lesson19.tcl
- Lesson20.tcl
- Lesson21.tcl
- Lesson22.tcl

Lesson16.tcl

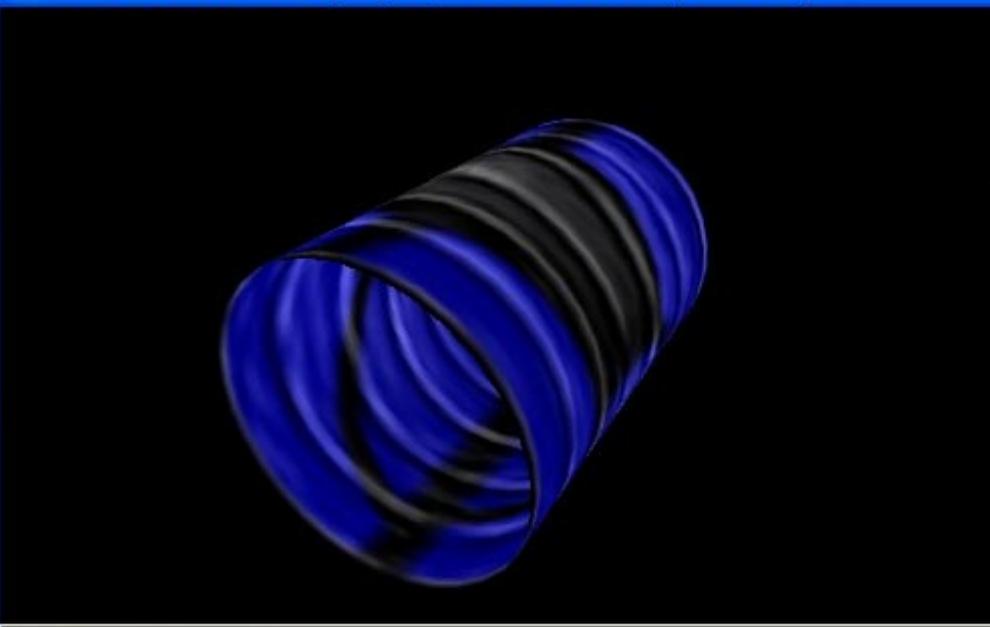
Chris Aliotta & NeHe's Fog Tutorial

This Code Was Created By Christopher Aliotta & Jeff Molofee 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson18</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: NeHe & TipTup's Quadratics Tutorial (Lesson 18)**



Key-Escape	Exit
Key-F1	Toggle window mode
Key-l	Toggle lighting
Key-f	Toggle filter
Key-Space	Toggle quadrics
Key-Up Down	Decrease Increase x rotation speed
Key-Left Right	Decrease Increase y rotation speed
Key-d i	Decrease Increase distance
Mouse-1 2	Start Stop animation

Object Cylinder  
Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson18.tcl

NeHe & TipTup's Quadratics Tutorial

This Code Was Created By Jeff Molofee and GB Schmick 2000  
 A HUGE Thanks To Fredric Echols For Cleaning Up  
 And Optimizing This Code, Making It More Flexible!  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit Our Sites At [www.tiptup.com](http://www.tiptup.com) and [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/01/25  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson19</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape      Exit  
 Key-F1          Toggle window mode  
 Key-Return      Toggle rainbow mode  
 Key-space        Toggle colors  
 Key-Tab         Burst  
 Key-8|2         Pull up|down  
 Key-6|4         Pull left|right  
 Key-Up|Down     Increase upward|downward speed  
 Key-Left|Right  Increase left|right speed  
 Key-d|i          Decrease|Increase distance  
 Mouse-1|2        Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson19.tcl

NeHe's Particle Tutorial

This Code Was Created By Jeff Molofee 2000  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/03/14  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson20</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Lesson20.tcl

NeHe's Masking Tutorial

This Code Was Created By Jeff Molofee 2000  
 And Modified By Giuseppe D'Agata (waveform@tiscalinet.it)  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/03/14  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson21</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Lesson21.tcl

NeHe's Line Tutorial

This Code Was Created By Jeff Molofee 2000  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/03/14  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson22</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape      Exit  
 Key-F1          Toggle window mode  
 Key-e            Toggle emboss  
 Key-m            Toggle multitexturing  
 Key-b            Toggle bump maps  
 Key-f            Toggle filter  
 Key-Up|Down    Decrease|Increase x rotation speed  
 Key-Left|Right Decrease|Increase y rotation speed  
 Key-d|i         Decrease|Increase distance  
 Mouse-1|2      Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson22.tcl

NeHe's GL\_ARB\_multitexture & Bump Mapping Tutorial

This Code Was Created by Jens Schneider (WizardSoft) 2000  
 Lesson22 to the series of OpenGL tutorials by NeHe-Production

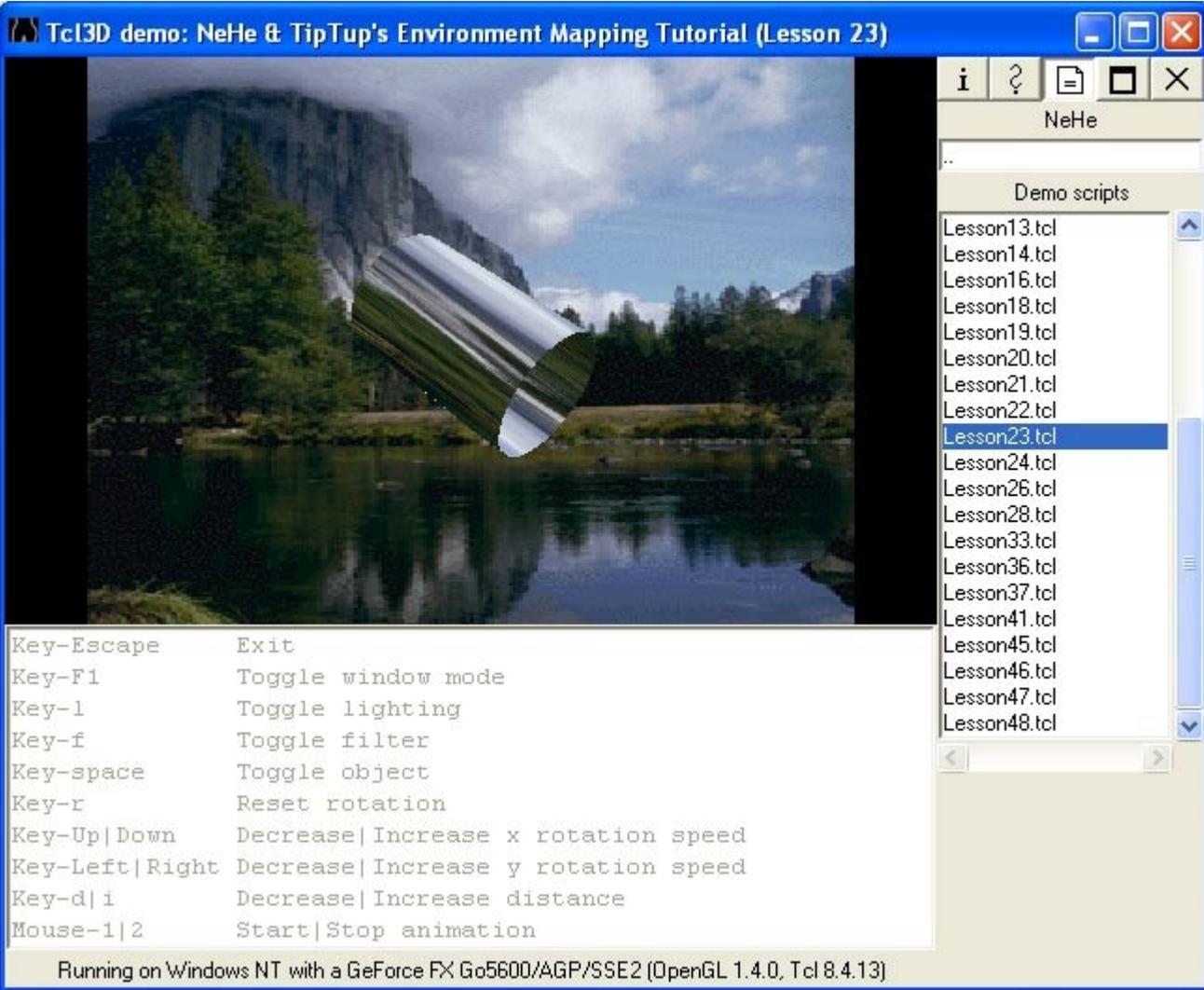
This Code is loosely based upon Lesson06 by Jeff Molofee.  
 contact me at: [schneide@pool.informatik.rwth-aachen.de](mailto:schneide@pool.informatik.rwth-aachen.de)

Basecode Was Created By Jeff Molofee 2000  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/16  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson23</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: NeHe & TipTup's Environment Mapping Tutorial (Lesson 23)**



Key-Escape      Exit  
Key-F1            Toggle window mode  
Key-l             Toggle lighting  
Key-f             Toggle filter  
Key-space        Toggle object  
Key-r             Reset rotation  
Key-Up|Down     Decrease|Increase x rotation speed  
Key-Left|Right   Decrease|Increase y rotation speed  
Key-d|i           Decrease|Increase distance  
Mouse-1|2        Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson23.tcl

NeHe & TipTup's Environment Mapping Tutorial

This Code Was Created By Jeff Molofee and GB Schmick 2000  
A HUGE Thanks To Fredric Echols For Cleaning Up  
And Optimizing The Base Code, Making It More Flexible!  
If You've Found This Code Useful, Please Let Me Know.  
Visit Our Sites At [www.tiptup.com](http://www.tiptup.com) and [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/27  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson24</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Renderer *GeForce FX Go5600/AGP/SSE2*  
Vendor *NVIDIA Corporation*  
Version *1.4.0*

1 *GL\_ARB\_depth\_texture*  
2 *GL\_ARB\_fragment\_program*  
3 *GL\_ARB\_imaging*  
4 *GL\_ARB\_multisample*  
5 *GL\_ARB\_multitexture*  
6 *GL\_ARB\_point\_parameters*  
7 *GL\_ARB\_shadow*  
8 *GL\_ARB\_texture\_border\_clamp*  
9 *GL\_ARB\_texture\_compression*

*NeHe Productions (powered by Tcl3D)*

Key-Escape      Exit  
Key-F1            Toggle window mode  
Key-Up|Down     Line up|down  
Key-PgUp|PgDown Page up|down  
Key-Home|End    First|last page

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

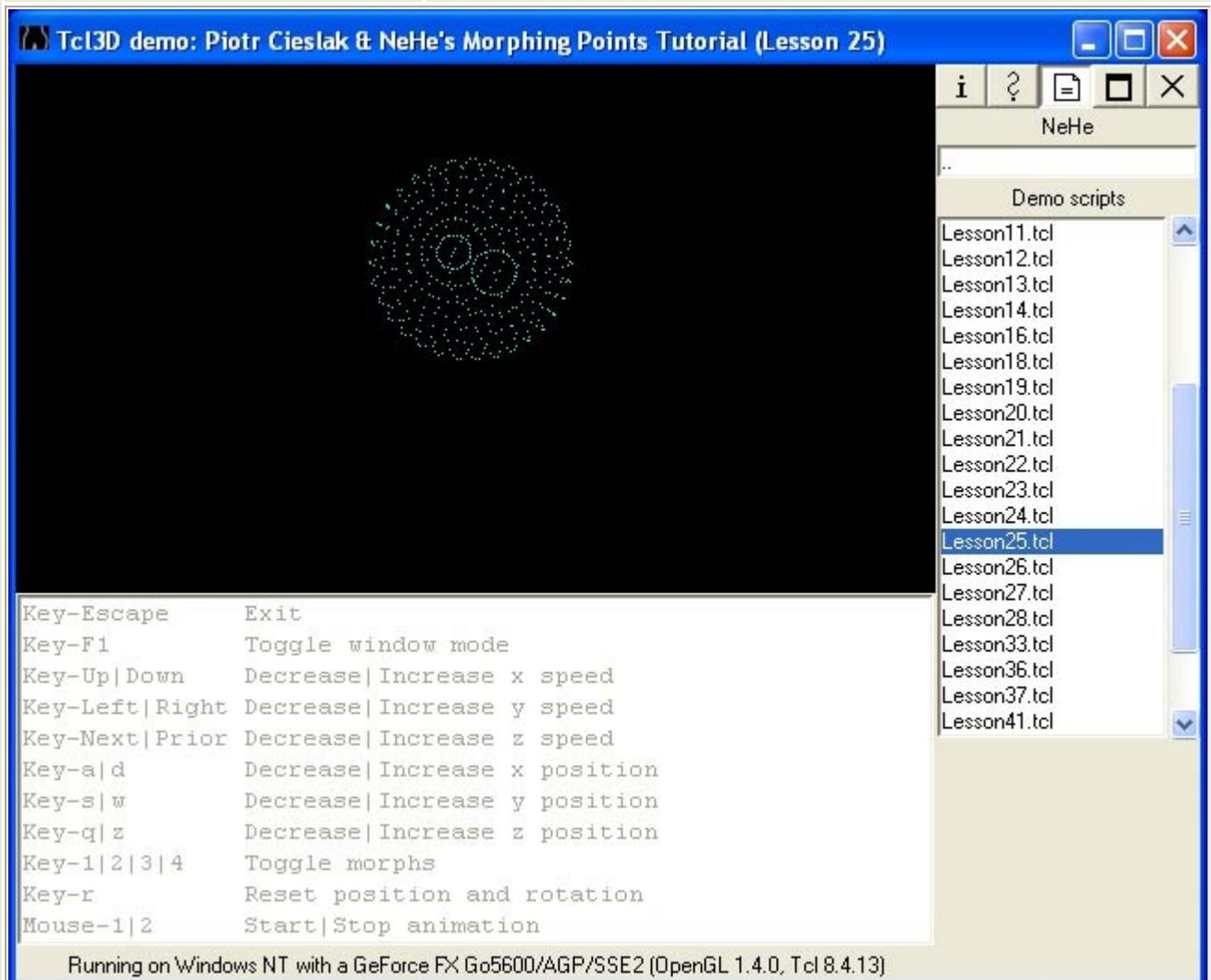
Lesson24.tcl

NeHe's Token, Extensions, Scissoring & TGA Loading Tutorial

This Code Was Created By Jeff Molofee 2000  
If You've Found This Code Useful, Please Let Me Know.  
Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/25  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson25</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



Key-Escape      Exit  
Key-F1            Toggle window mode  
Key-Up|Down     Decrease|Increase x speed  
Key-Left|Right   Decrease|Increase y speed  
Key-Next|Prior   Decrease|Increase z speed  
Key-a|d           Decrease|Increase x position  
Key-s|w           Decrease|Increase y position  
Key-q|z           Decrease|Increase z position  
Key-1|2|3|4      Toggle morphs  
Key-r             Reset position and rotation  
Mouse-1|2        Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson25.tcl

Piotr Cieslak & NeHe's Morphing Points Tutorial

This Code Was Created By Pet & Commented/Cleaned Up By Jeff Molofee  
If You've Found This Code Useful, Please Let Me Know.  
Visit NeHe Productions At <http://nehe.gamedev.net>

Modified for Tcl3D by Paul Obermeier 2007/03/03  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson26</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Banu Octavian & NeHe's Stencil & Reflection Tutorial (Lesson 26)**

Key-Escape      Exit  
Key-F1            Toggle window mode  
Key-Up|Down     Decrease|Increase x rotation speed  
Key-Left|Right   Decrease|Increase y rotation speed  
Key-PgDn|PgUp   Decrease|Increase height  
Key-d|i          Decrease|Increase distance  
Mouse-1|2        Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson26.tcl

Banu Octavian & NeHe's Stencil & Reflection Tutorial

This code has been created by Banu Octavian aka Choko - 20 may 2000 and uses NeHe tutorials as a starting point (window initialization, texture loading, GL initialization and code for keypresses) - very good tutorials, Jeff. If anyone is interested about the presented algorithm please e-mail me at boct@romwest.ro

Code Commenting And Clean Up By Jeff Molofee ( NeHe )  
If You've Found This Code Useful, Please Let Me Know.  
Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/16  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson27</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape      Exit  
 Key-F1          Toggle window mode  
 Key-Up|Down    Decrease|Increase x speed  
 Key-Left|Right Decrease|Increase y speed  
 Key-j|l        Move light left|right  
 Key-k|i        Move light bottom|up  
 Key-u|o        Move light far|near  
 Key-4|6        Move cross left|right  
 Key-5|8        Move cross bottom|up  
 Key-7|9        Move cross far|near  
 Key-a|d        Move sphere left|right  
 Key-s|w        Move sphere bottom|up  
 Key-q|e        Move sphere far|near  
 Key-r          Reset position and rotation  
 Mouse-1|2      Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson27.tcl

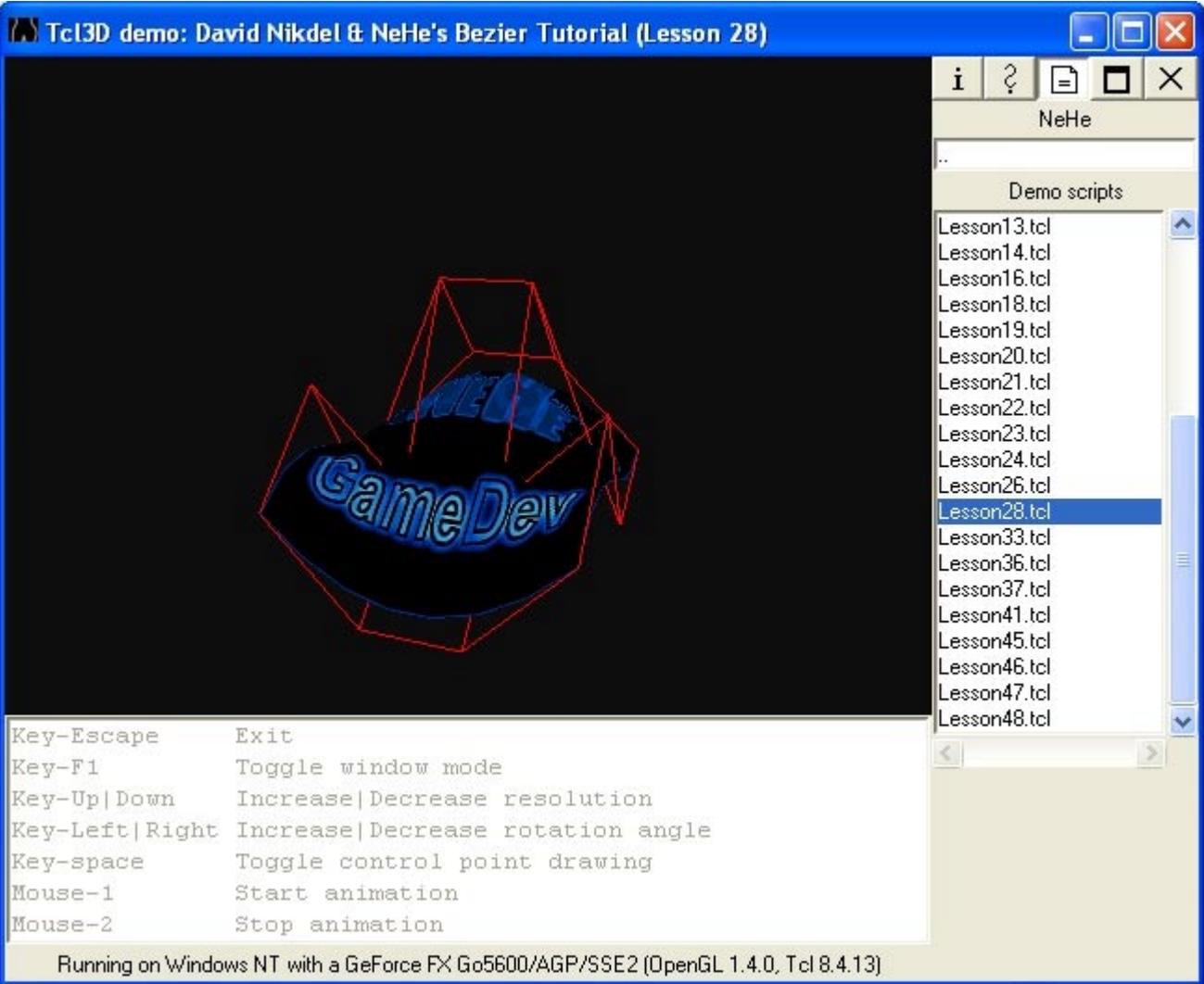
"Banu Octavian & NeHe's Shadow Casting Tutorial"

This code has been created by Banu Octavian aka Choko - 20 may 2000 and uses NeHe tutorials as a starting point (window initialization, texture loading, GL initialization and code for keypresses) - very good tutorials, Jeff. If anyone is interested about the presented algorithm please e-mail me at boct@romwest.ro  
 Attention!!! This code is not for beginners.

Modified for Tcl3D by Paul Obermeier 2007/02/27  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson28</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: David Nikdel & NeHe's Bezier Tutorial (Lesson 28)**



Key-Escape      Exit  
Key-F1            Toggle window mode  
Key-Up|Down     Increase|Decrease resolution  
Key-Left|Right   Increase|Decrease rotation angle  
Key-space        Toggle control point drawing  
Mouse-1          Start animation  
Mouse-2          Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson28.tcl

David Nikdel & NeHe's Bezier Tutorial

This Code Was Published By Jeff Molofee 2000  
Code Was Created By David Nikdel For NeHe Productions  
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Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/29  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson33</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-F1 Toggle window mode  
 Mouse-1|2 Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson33.tcl

NeHe & Evan 'terminate' Piphos TGA Loading Tutorial

Loading Uncompressed and Compressed .TGA Files with the Img extension.

This Code Was Created By Evan Piphos  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/16  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson36</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-F1 Toggle window mode  
 Mouse-1|2 Start|Stop animation

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson36.tcl

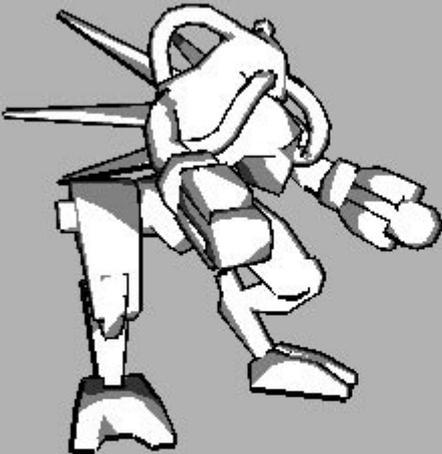
Dario Corno's Radial Blur & Rendering To A Texture Tutorial

If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/23  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson37</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Sami Hamlaoui's Cel-Shading Tutorial (Lesson 37)**



Key-Escape Exit  
 Key-F1 Toggle window mode  
 Key-o Toggle optimized vs. simple version  
 Key-1 Toggle outline draw  
 Key-2 Toggle outline smooth  
 Key-Up|Down Increase|Decrease outline width  
 Mouse-1|2 Start|Stop animation

Draw: 0 msec Outline: 0 msec

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson37.tcl

Sami Hamlaoui's Cel-Shading Code

Note: The original article for this code can be found at:  
<http://www.gamedev.net/reference/programming/features/celshading>

If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/22  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson41</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>


Lesson41.tcl

NeHe's Volumetric Fog Tutorial

This Code Was Created By Jeff Molofee 2003  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/27  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson45</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Lesson45.tcl

Paul Frazee's Vertex Buffer Object Tutorial

Code Commenting And Clean Up By Jeff Molofee ( NeHe )  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/17  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson46</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-F1 Toggle window mode  
 Key-Space Toggle multisampling  
 Mouse-1|2 Start|Stop animation  
 Multisampling: ON (Number of samples: 2)

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

Lesson46.tcl

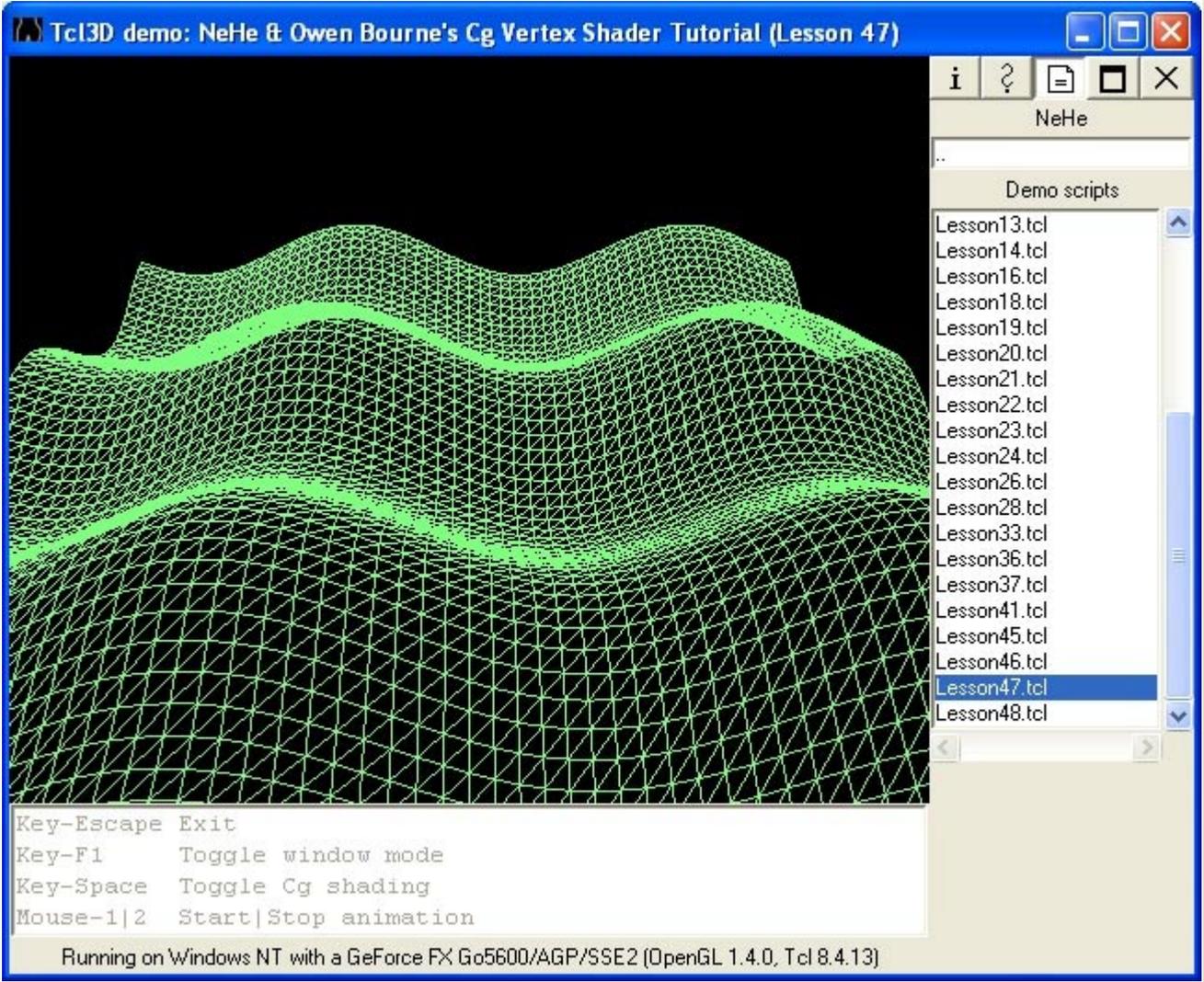
NeHe & MainRoach's FSAA Tutorial

This Code Was Created By Jeff Molofee 2001  
 and Colt McAnlis ( MainRoach ).  
 If You've Found This Code Useful, Please Let Me Know.  
 Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/08/13  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

This demo uses the multisampling options built into tcl3dTogl starting from version 0.3.2.  
 Another way to set the number of samples is via the driver specific GUI under Windows, or by setting the environment variable `__GL_FSAA_MODE` under Linux.

<b>Demo:</b>	<b>Lesson47</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Lesson47.tcl

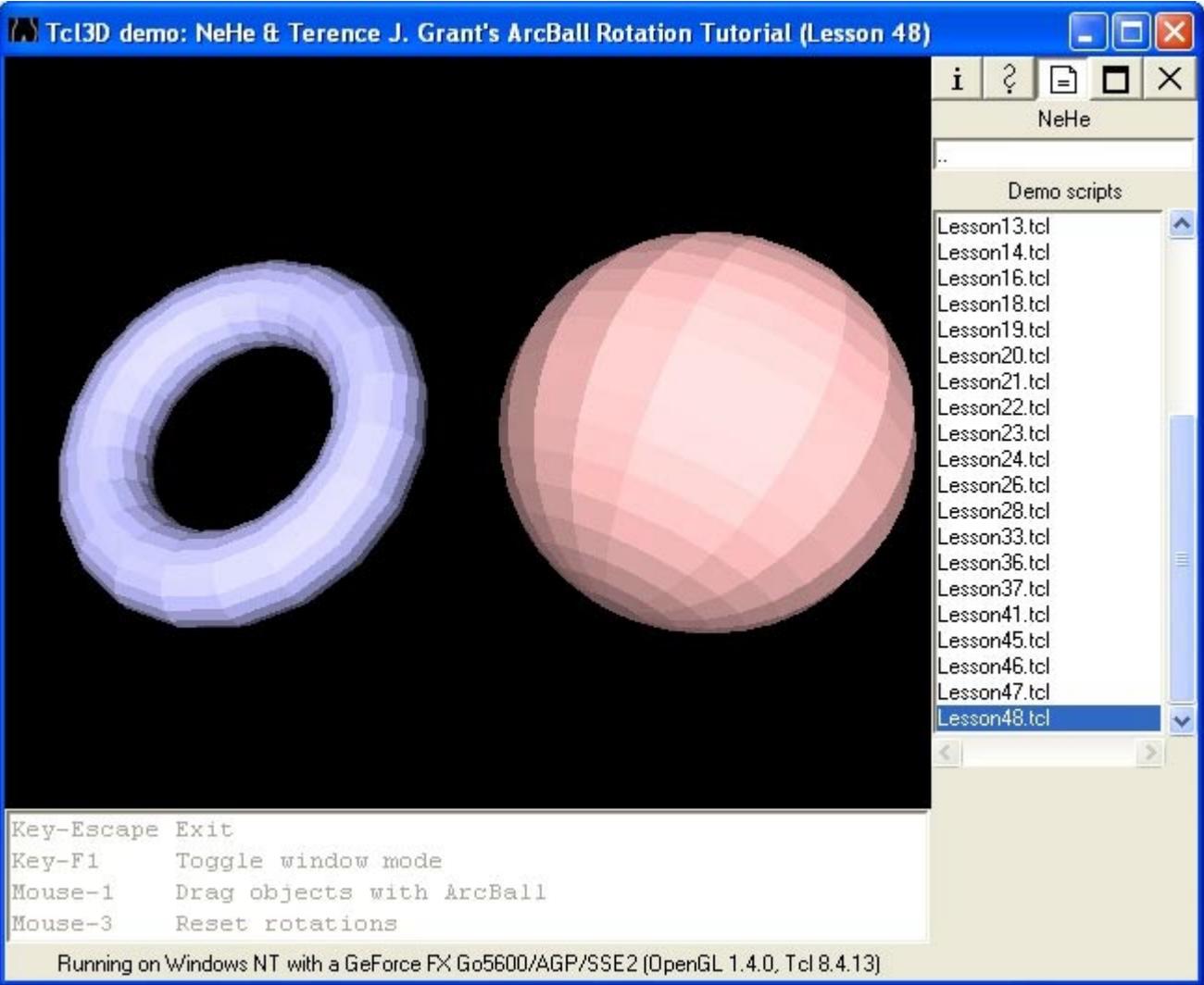
NeHe & Owen Bourne's Cg Vertex Shader Tutorial

If You've Found This Code Useful, Please Let Me Know.  
Visit My Site At [nehe.gamedev.net](http://nehe.gamedev.net)

Modified for Tcl3D by Paul Obermeier 2006/09/05  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Lesson48</b>
Type:	<a href="#">NeHe</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: NeHe & Terence J. Grant's ArcBall Rotation Tutorial (Lesson 48)**



Key-Escape Exit  
 Key-F1 Toggle window mode  
 Mouse-1 Drag objects with ArcBall  
 Mouse-3 Reset rotations

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

```
Lesson48.tcl

NeHe & Terence J. Grant's ArcBall Rotation Tutorial

Authors Name: Terence J. Grant

NeHe Productions 1997-2004
If You've Found This Code Useful, Please Let Me Know.
Visit My Site At nehe.gamedev.net

Modified for Tcl3D by Paul Obermeier 2006/08/31
See www.tcl3d.org for the Tcl3D extension.
```

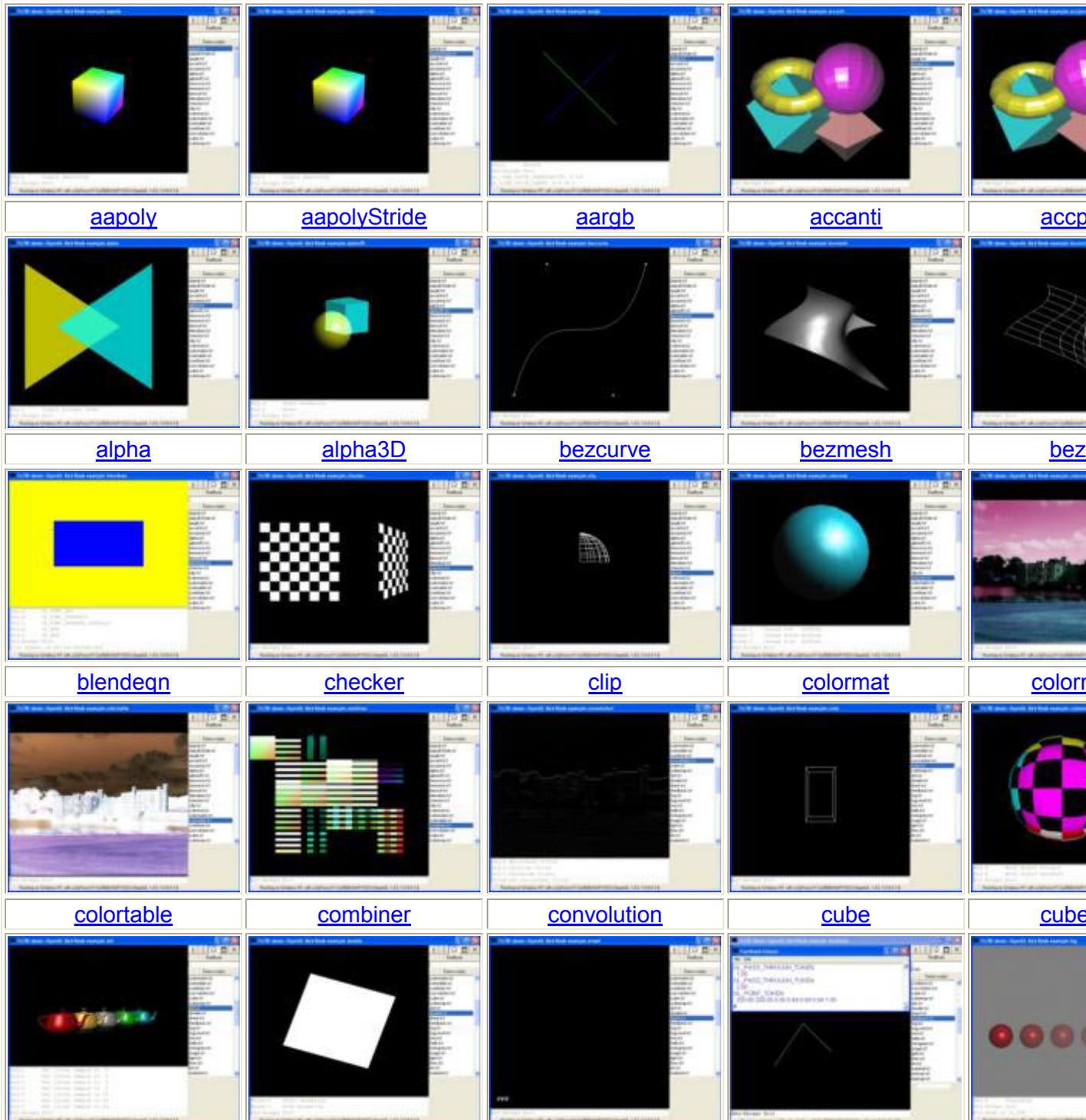
Type:	RedBook
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

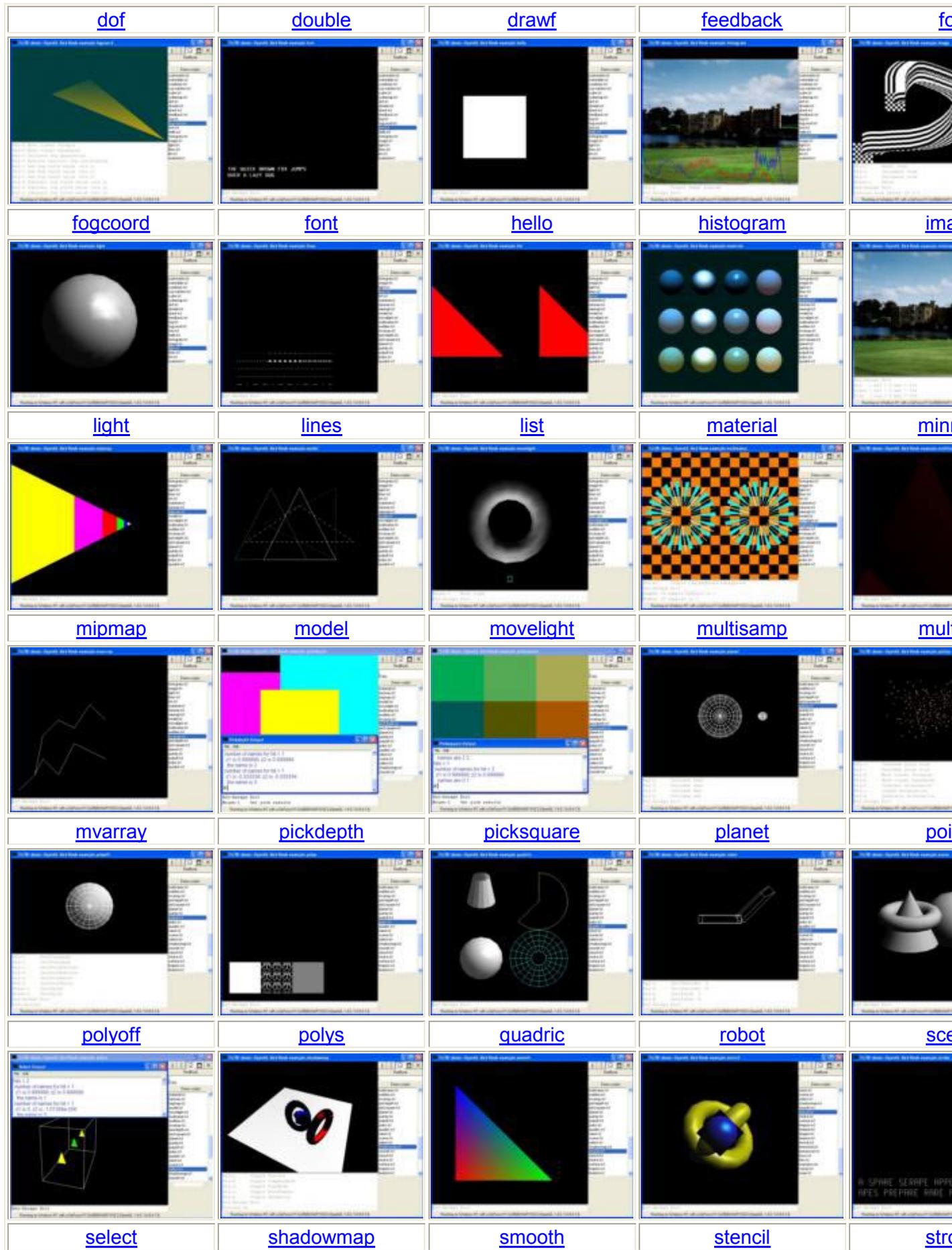
The Redbook describing OpenGL Version 1.4 contains 72 examples written in C. 67 of them have been converted into equivalent Tcl3D scripts and the results compared on several operating systems and computers with the C version.

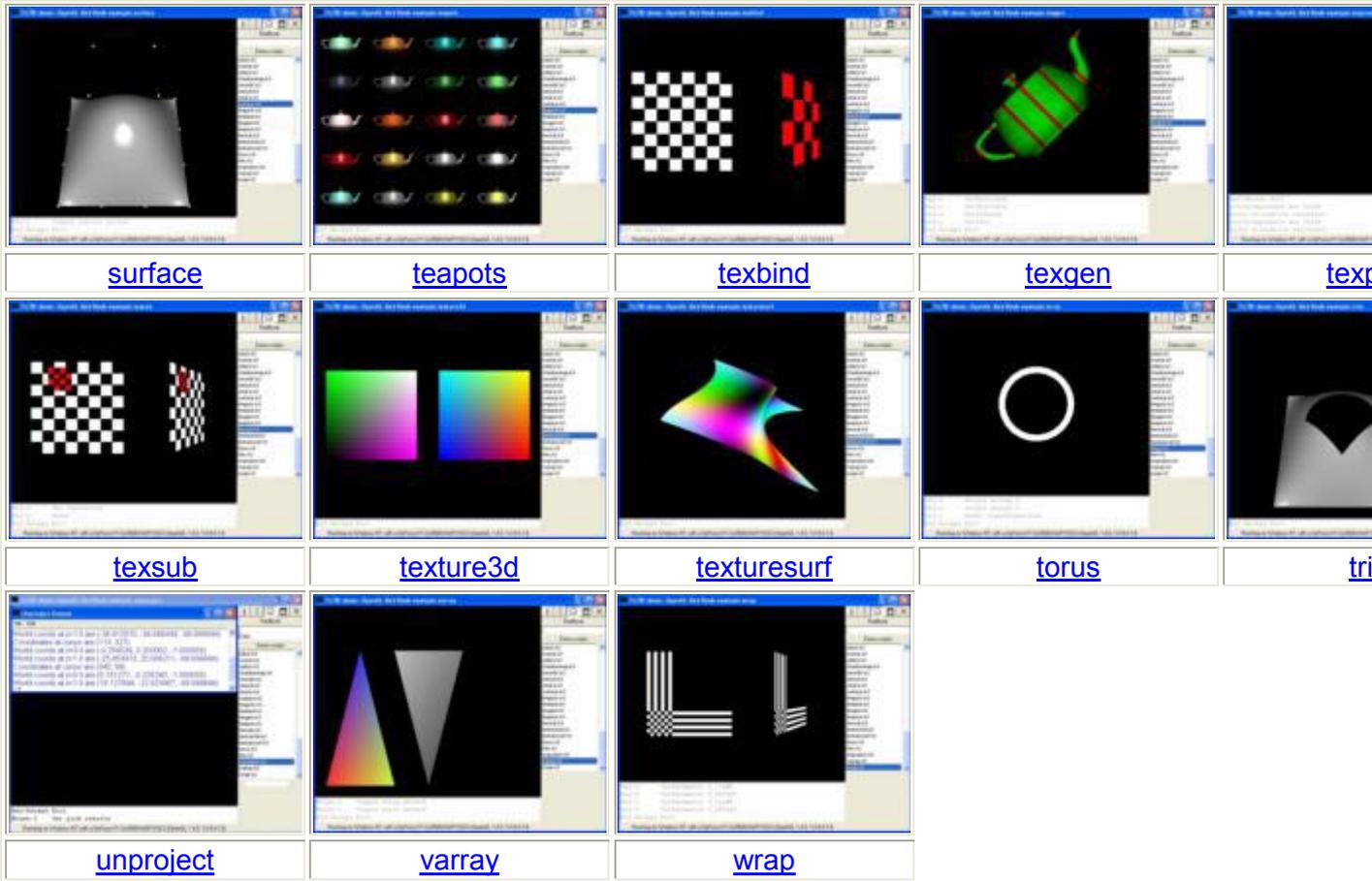
Three of the missing five examples (surfpoints, tess, tesswin) deal with tessellation, which is currently not implemented in the tcl3dTogl widget. The other two test programs (aaindex, fogindex) not yet ported deal with color index mode, which is not implemented in the tcl3dTogl widget.

Original sources available at: <http://www.opengl-redbook.com/source/>

Available demos







<b>Demo:</b>	<b>aapoly</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-t Toggle smoothing  
Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

aapoly.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
See file LICENSE for complete license information.

This program draws filled polygons with antialiased edges. The special `GL_SRC_ALPHA_SATURATE` blending function is used.  
Pressing the 't' key turns the antialiasing on and off.

<b>Demo:</b>	<b>aapolyStride</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-t Toggle smoothing  
Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

aapoly.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
See file LICENSE for complete license information.

This program draws filled polygons with antialiased edges. The special GL\_SRC\_ALPHA\_SATURATE blending function is used.  
Pressing the 't' key turns the antialiasing on and off.

<b>Demo:</b>	<b>aargb</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-r Rotate  
Key-Escape Exit  
GL\_LINE\_WIDTH\_GRANULARITY: 0.125  
GL\_LINE\_WIDTH\_RANGE: 0.5 10.0

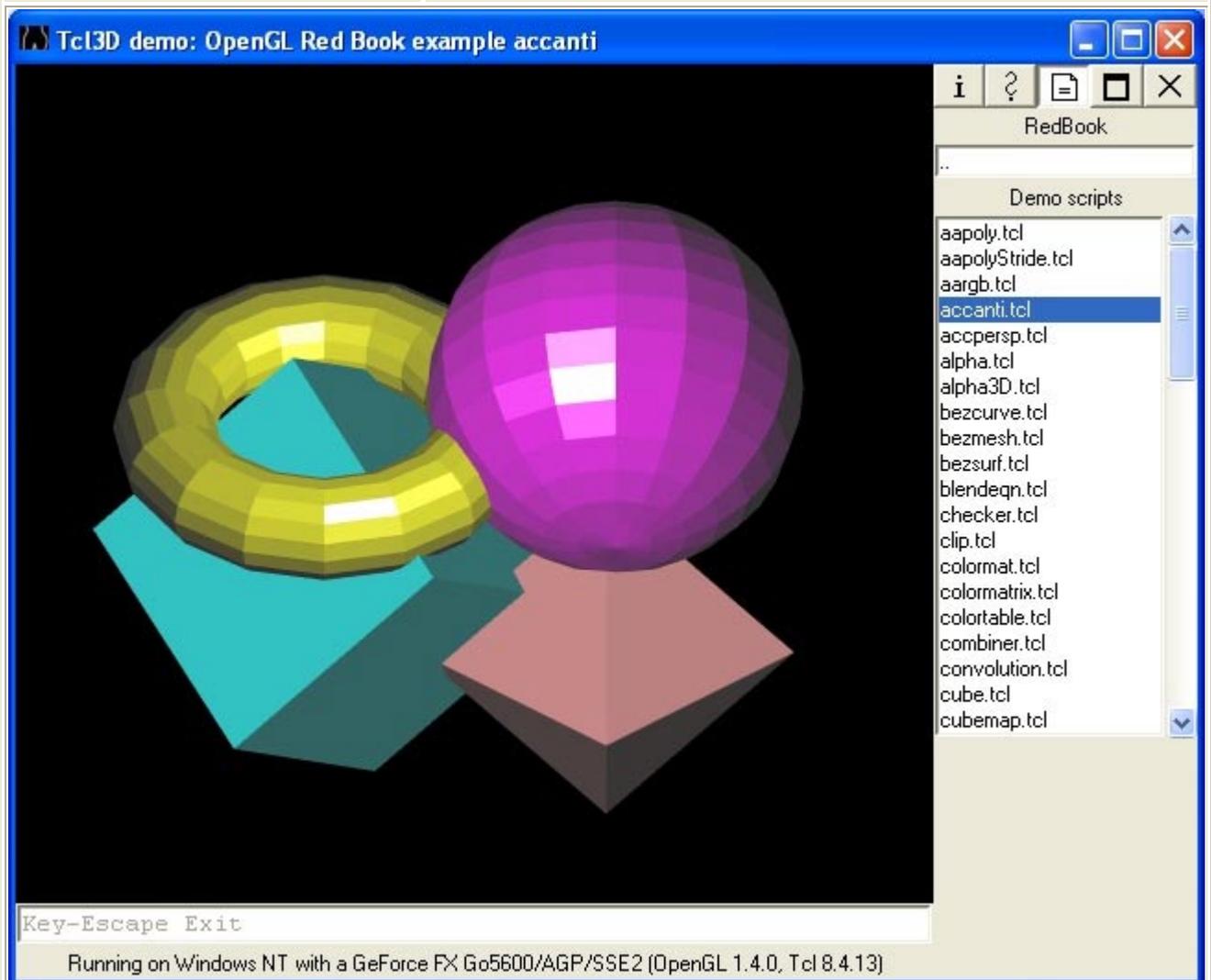
Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

#### aargb.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program draws shows how to draw anti-aliased lines. It draws two diagonal lines to form an X; when 'r' is typed in the window, the lines are rotated in opposite directions.

<b>Demo:</b>	<b>accanti</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

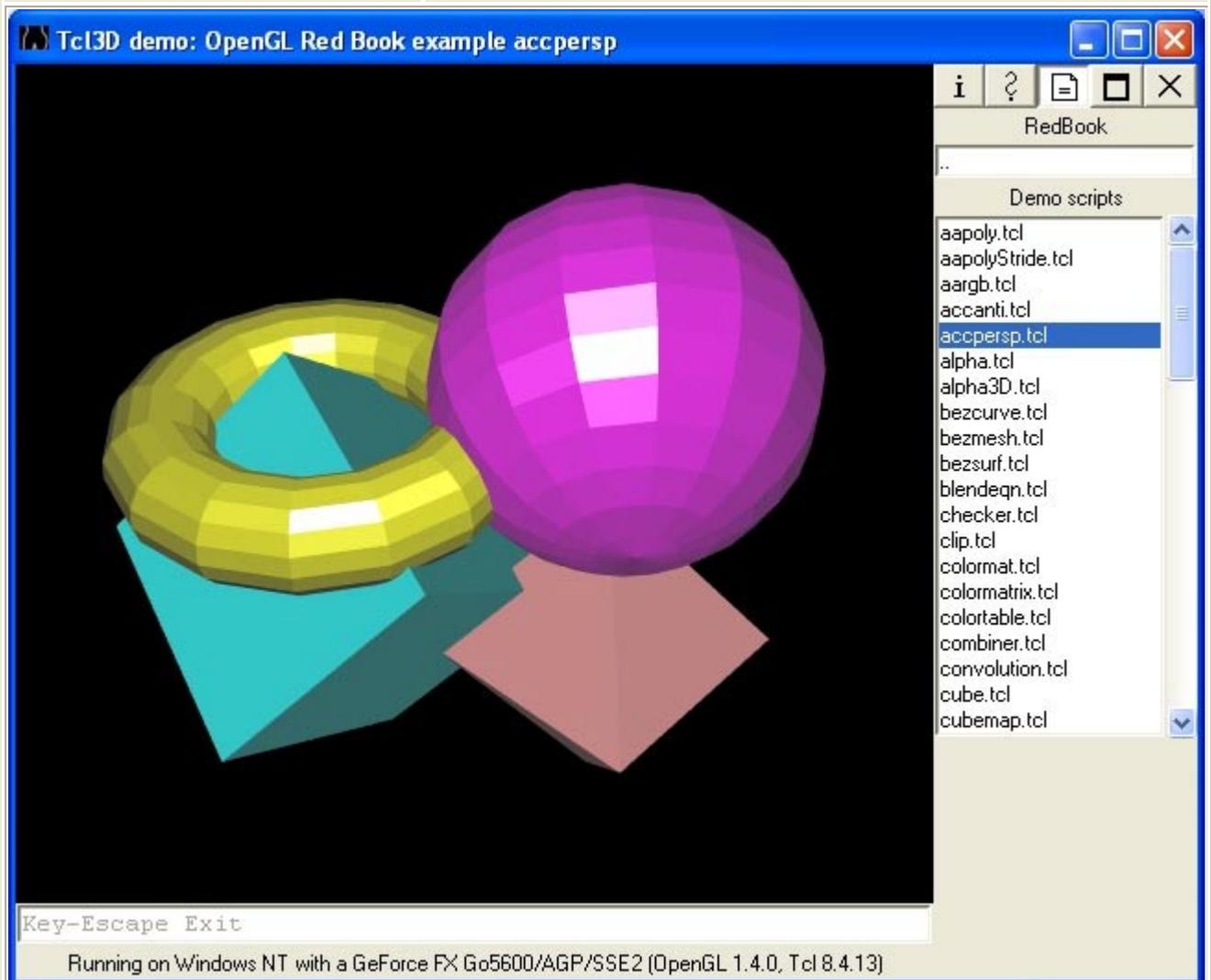


accanti.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

Use the accumulation buffer to do full-scene antialiasing  
 on a scene with orthographic parallel projection.

<b>Demo:</b>	<b>accpersp</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



accpersp.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

Use the accumulation buffer to do full-scene antialiasing  
 on a scene with perspective projection, using the special  
 routines `accFrustum()` and `accPerspective()`.

<b>Demo:</b>	<b>alpha</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-t Toggle polygon order  
Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

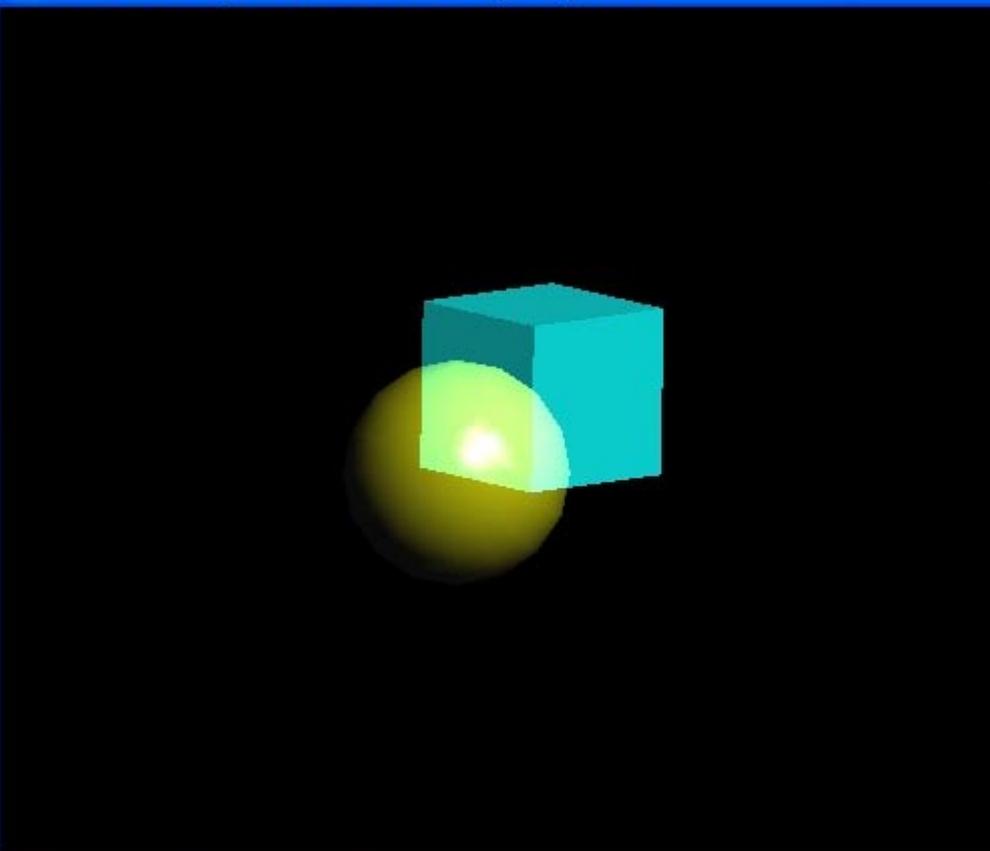
alpha.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
See file LICENSE for complete license information.

This program draws several overlapping filled polygons  
to demonstrate the effect order has on alpha blending results.  
Use the 't' key to toggle the order of drawing polygons.

<b>Demo:</b>	<b>alpha3D</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example alpha3D**



Key-a Start animation  
Key-r Reset  
Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

RedBook

Demo scripts

- aapoly.tcl
- aapolyStride.tcl
- aargb.tcl
- accanti.tcl
- accpersp.tcl
- alpha.tcl
- alpha3D.tcl**
- bezcurve.tcl
- bezmesh.tcl
- bezsurf.tcl
- blendeqn.tcl
- checker.tcl
- clip.tcl
- colormat.tcl
- colormatrix.tcl
- colortable.tcl
- combiner.tcl
- convolution.tcl
- cube.tcl
- cubemap.tcl

#### alpha3D.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates how to intermix opaque and alpha blended polygons in the same scene, by using `glDepthMask`. Press the 'a' key to animate moving the transparent object through the opaque object. Press the 'r' key to reset the scene.

<b>Demo:</b>	<b>bezcurve</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

bezcurve.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program uses evaluators to draw a Bezier curve.

<b>Demo:</b>	<b>bezmesh</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

bezmesh.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
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This program renders a lighted, filled Bezier surface,  
 using two-dimensional evaluators.

<b>Demo:</b>	<b>bezsurf</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a 3D rendering window with a blue title bar. The main area displays a white wireframe grid on a black background, representing a curved surface. To the right is a file browser window titled 'RedBook' with a sub-window 'Demo scripts' containing a list of .tcl files. 'bezsurf.tcl' is highlighted. At the bottom of the main window, there is a status bar with the text 'Key-Escape Exit' and 'Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)'.

bezsurf.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
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This program renders a wireframe Bezier surface,  
 using two-dimensional evaluators.

<b>Demo:</b>	<b>blendeqn</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-a GL\_FUNC\_ADD  
 Key-s GL\_FUNC\_SUBTRACT  
 Key-r GL\_FUNC\_REVERSE\_SUBTRACT  
 Key-m GL\_MIN  
 Key-x GL\_MAX  
 Key-Escape Exit  
 blue square on yellow background

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

blendeqn.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

Demonstrate the different blending functions available with the OpenGL imaging subset. This program demonstrates use of the glBlendEquation call.

The following keys change the selected blend equation function:

```
'a' -> GL_FUNC_ADD
's' -> GL_FUNC_SUBTRACT
'r' -> GL_FUNC_REVERSE_SUBTRACT
'm' -> GL_MIN
'x' -> GL_MAX
```

<b>Demo:</b>	<b>checker</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example checker". The main display area shows a black background with two white checkerboard patterns. The pattern on the left is a flat 4x4 grid. The pattern on the right is a 4x4 grid that appears to be on a slightly curved or perspective-distorted surface. To the right of the main display is a file browser window titled "RedBook" showing a list of "Demo scripts". The script "checker.tcl" is highlighted in blue. Below the main display, there is a text area with the text "Key-Escape Exit" and a status bar at the bottom that reads "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)".

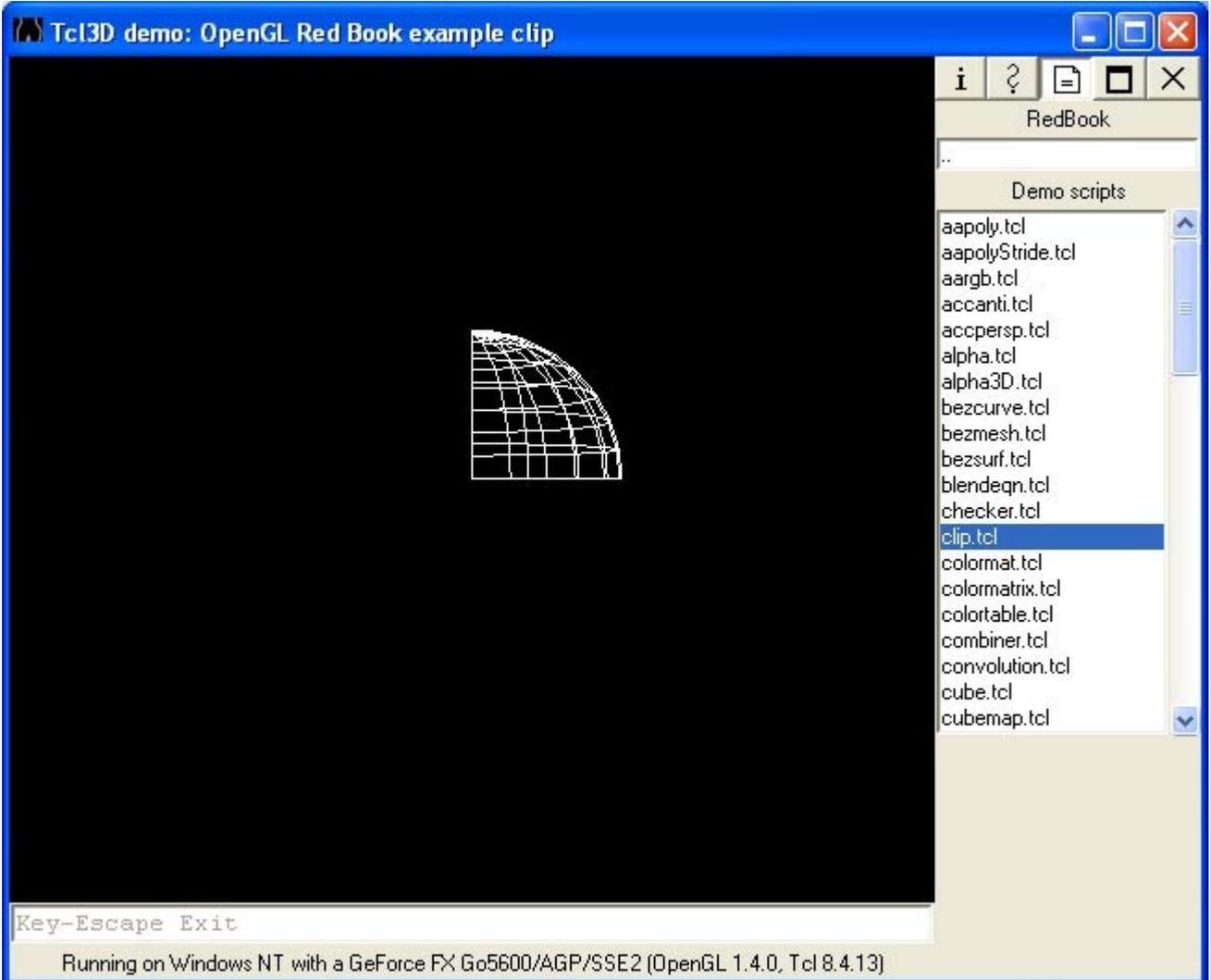
checker.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program texture maps a checkerboard image onto two rectangles.

If running this program on OpenGL 1.0, texture objects are not used.

<b>Demo:</b>	<b>clip</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example clip". The main display area shows a 3D wireframe sphere. To the right is a file browser window titled "RedBook" showing a list of "Demo scripts". The file "clip.tcl" is selected. At the bottom of the window, a status bar reads "Key-Escape Exit" and "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)".

clip.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
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This program demonstrates arbitrary clipping planes.

<b>Demo:</b>	<b>colormat</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example colormat". The main area displays a 3D sphere with a cyan-to-blue gradient. To the right is a file browser showing a list of "Demo scripts" with "colormat.tcl" selected. Below the sphere is a control panel with the following text:

```

Mouse-1   Change red   diffuse
Mouse-2   Change green diffuse
Mouse-3   Change blue  diffuse
Key-Escape Exit

```

At the bottom of the window, it says "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)".

colormat.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
See file LICENSE for complete license information.

After initialization, the program will be in  
ColorMaterial mode. Interaction: pressing the  
mouse buttons will change the diffuse reflection values.

<b>Demo:</b>	<b>colormatrix</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example colormatrix". The main area displays a 3D rendered scene of a castle with a blue sky and a green field. A file explorer window titled "RedBook" is open on the right, showing a list of demo scripts. The script "colormatrix.tcl" is selected. Below the main window, a status bar indicates "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)".

```
colormatrix.tcl
```

An example of the OpenGL red book modified to work with Tcl3D.  
The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
See file LICENSE for complete license information.

This program uses the color matrix to exchange the color channels of an image.

```
Red   -> Green
Green -> Blue
Blue  -> Red
```

<b>Demo:</b>	<b>colortable</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



colortable.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

Invert a passed block of pixels. This program illustrates the use of the `glColorTable()` function.

<b>Demo:</b>	<b>combiner</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

combiner.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program renders a variety of quads showing different effects of texture combiner functions.

The first row renders an untextured polygon (so you can compare the fragment colors) and then the 2 textures. The second row shows several different combiner functions on a single texture: replace, modulate, add, add-signed, and subtract.

The third row shows the interpolate combiner function on a single texture with a constant color/alpha value, varying the amount of interpolation.

The fourth row uses multitexturing with two textures and different combiner functions.

The fifth row are some combiner experiments: using the scaling factor and reversing the order of subtraction

for a combination function.

<b>Demo:</b>	<b>convolution</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: OpenGL Red Book example convolution

RedBook

Demo scripts

- colormatrix.tcl
- colortable.tcl
- combiner.tcl
- convolution.tcl**
- cube.tcl
- cubemap.tcl
- dof.tcl
- double.tcl
- drawf.tcl
- feedback.tcl
- fog.tcl
- fogcoord.tcl
- font.tcl
- hello.tcl
- histogram.tcl
- image.tcl
- light.tcl
- lines.tcl
- list.tcl
- material.tcl

Key-h Horizontal filter  
 Key-v Vertical filter  
 Key-l Laplacian filter  
 Using the horizontal filter

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

convolution.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
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Use various 2D convolutions filters to find edges in an image.

<b>Demo:</b>	<b>cube</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

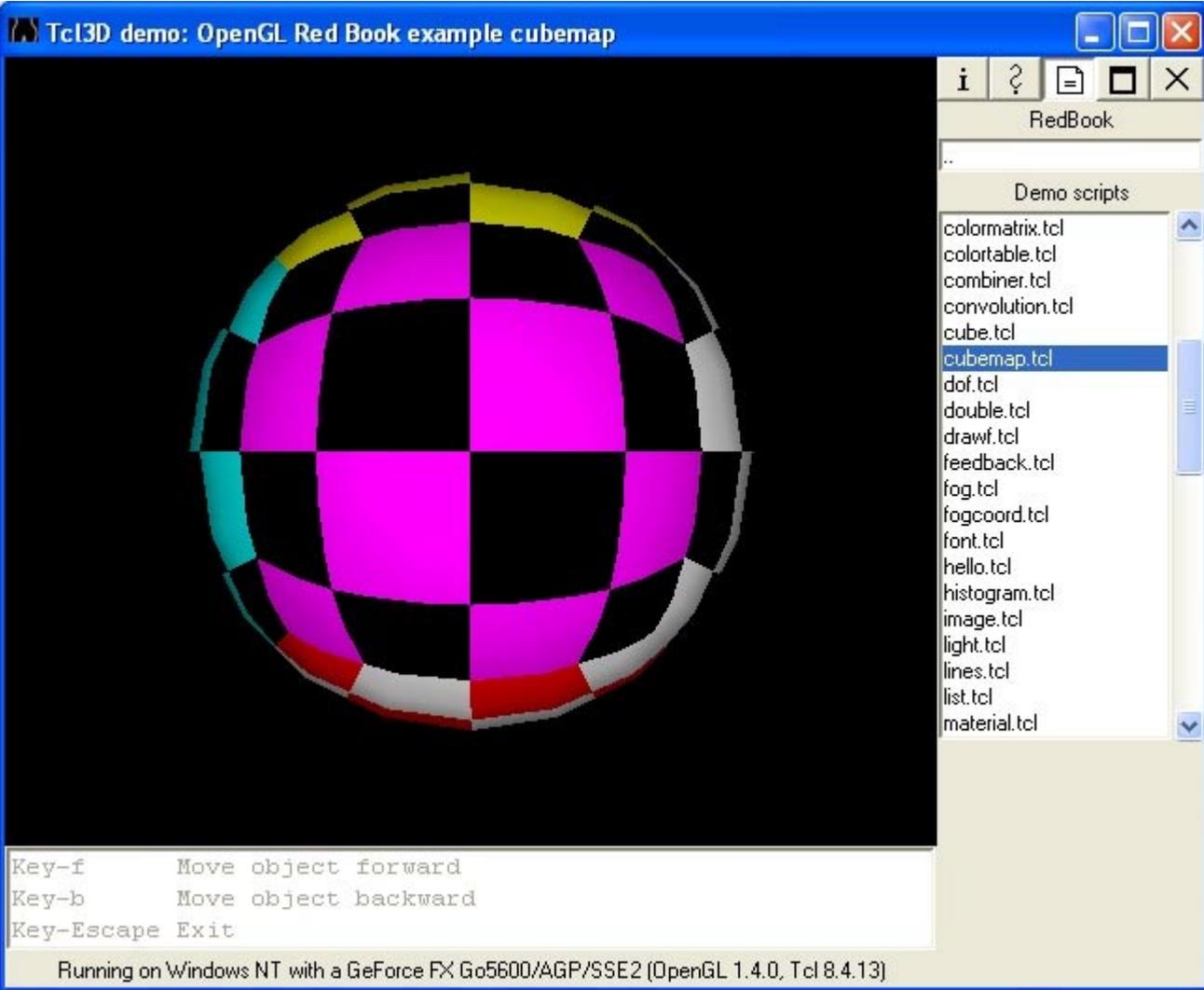
cube.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program demonstrates a single modeling transformation, `glScalef()` and a single viewing transformation, `gluLookAt()`.  
 A wireframe cube is rendered.

<b>Demo:</b>	<b>cubemap</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example cubemap**



Key-f Move object forward  
 Key-b Move object backward  
 Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

`cubemap.tcl`

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates cube map textures. Six different colored checker board textures are created and applied to a lit sphere.

Pressing the 'f' and 'b' keys translate the object forward and backward.

<b>Demo:</b>	<b>dof</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

```

Key-1      Set jitter sample to 2
Key-2      Set jitter sample to 3
Key-3      Set jitter sample to 4
Key-4      Set jitter sample to 8
Key-5      Set jitter sample to 15
Key-6      Set jitter sample to 24
Key-7      Set jitter sample to 66
Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

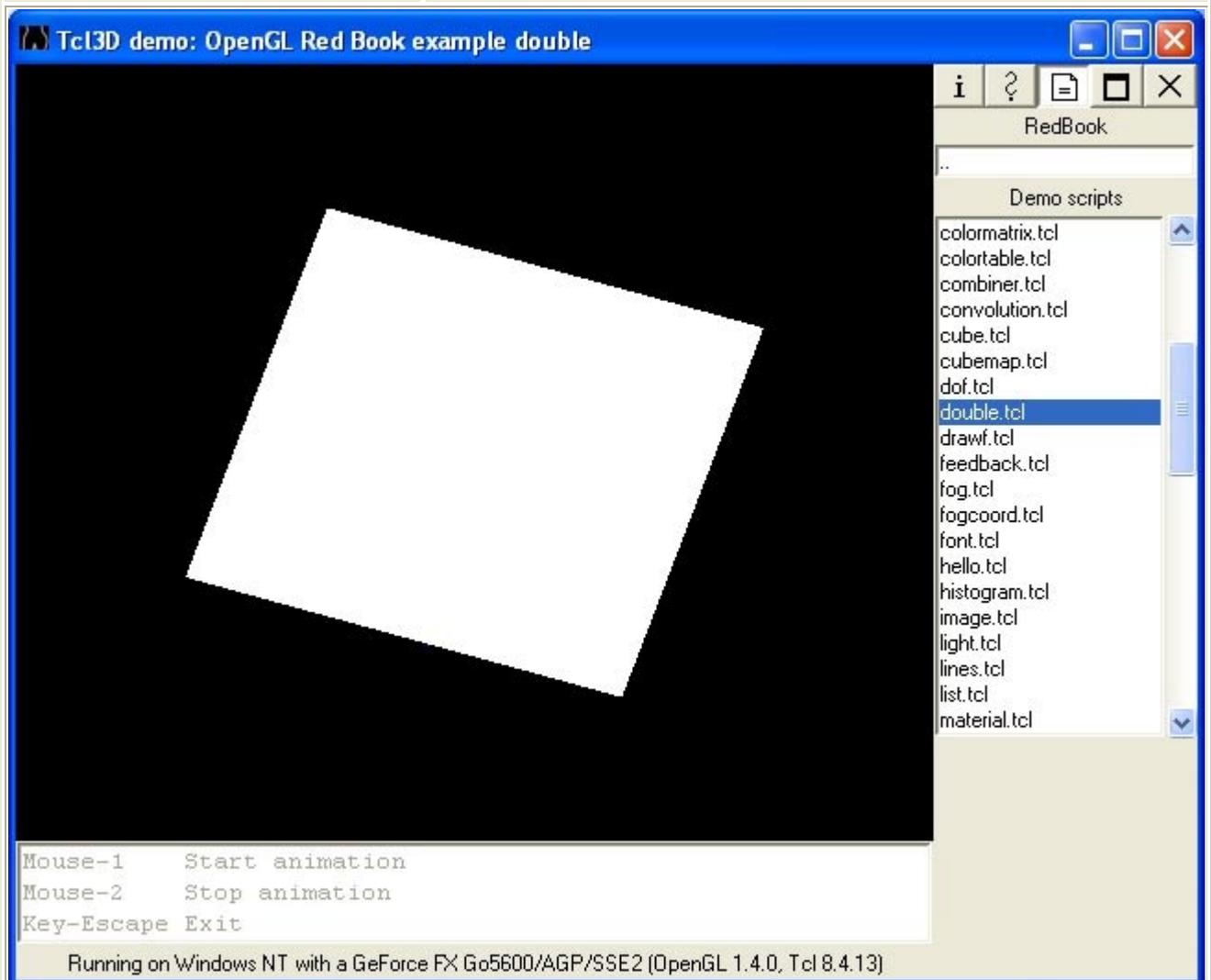
```

## dof.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates use of the accumulation buffer to create an out-of-focus depth-of-field effect. The teapots are drawn several times into the accumulation buffer. The viewing volume is jittered, except at the focal point, where the viewing volume is at the same position, each time. In this case, the gold teapot remains in focus.

<b>Demo:</b>	<b>double</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



double.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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This is a simple double buffered program.  
Pressing the left mouse button rotates the rectangle.  
Pressing the middle mouse button stops the rotation.

<b>Demo:</b>	<b>drawf</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example drawf". The main area is a black canvas with the text "FFF" in white. To the right is a file explorer showing a list of demo scripts, with "drawf.tcl" selected. The status bar at the bottom of the window reads "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)".

drawf.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
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Draws the bitmapped letter F on the screen (several times).  
 This demonstrates use of the glBitmap() call.

<b>Demo:</b>	<b>feedback</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

feedback.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates use of OpenGL feedback. First, a lighting environment is set up and a few lines are drawn. Then feedback mode is entered, and the same lines are drawn. The results in the feedback buffer are printed.

<b>Demo:</b>	<b>fog</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

## fog.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program draws 5 red spheres, each at a different z distance from the eye, in different types of fog. Pressing the f key chooses between 3 types of fog: exponential, exponential squared, and linear. In this program, there is a fixed density value, as well as fixed start and end values for the linear fog.

<b>Demo:</b>	<b>fogcoord</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-f Move viewer forward  
 Key-b Move viewer backwards  
 Key-c Initiate fog generation  
 Key-C Restore explicit fog coordinates  
 Key-1 Add fog coord value (vtx 1)  
 Key-2 Add fog coord value (vtx 2)  
 Key-3 Add fog coord value (vtx 3)  
 Key-8 Subtract fog coord value (vtx 1)  
 Key-9 Subtract fog coord value (vtx 2)  
 Key-0 Subtract fog coord value (vtx 3)

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

#### fogcoord.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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This program demonstrates the use of explicit fog coordinates. You can press the keyboard and change the fog coordinate value at any vertex. You can also switch between using explicit fog coordinates and the default fog generation mode.

Pressing the 'f' and 'b' keys move the viewer forward and backwards.

Pressing 'c' initiates the default fog generation.  
 Pressing capital 'C' restores explicit fog coordinates.  
 Pressing '1', '2', '3', '8', '9', and '0' add or subtract from the fog coordinate values at one of the three vertices of the triangle.

<b>Demo:</b>	<b>font</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

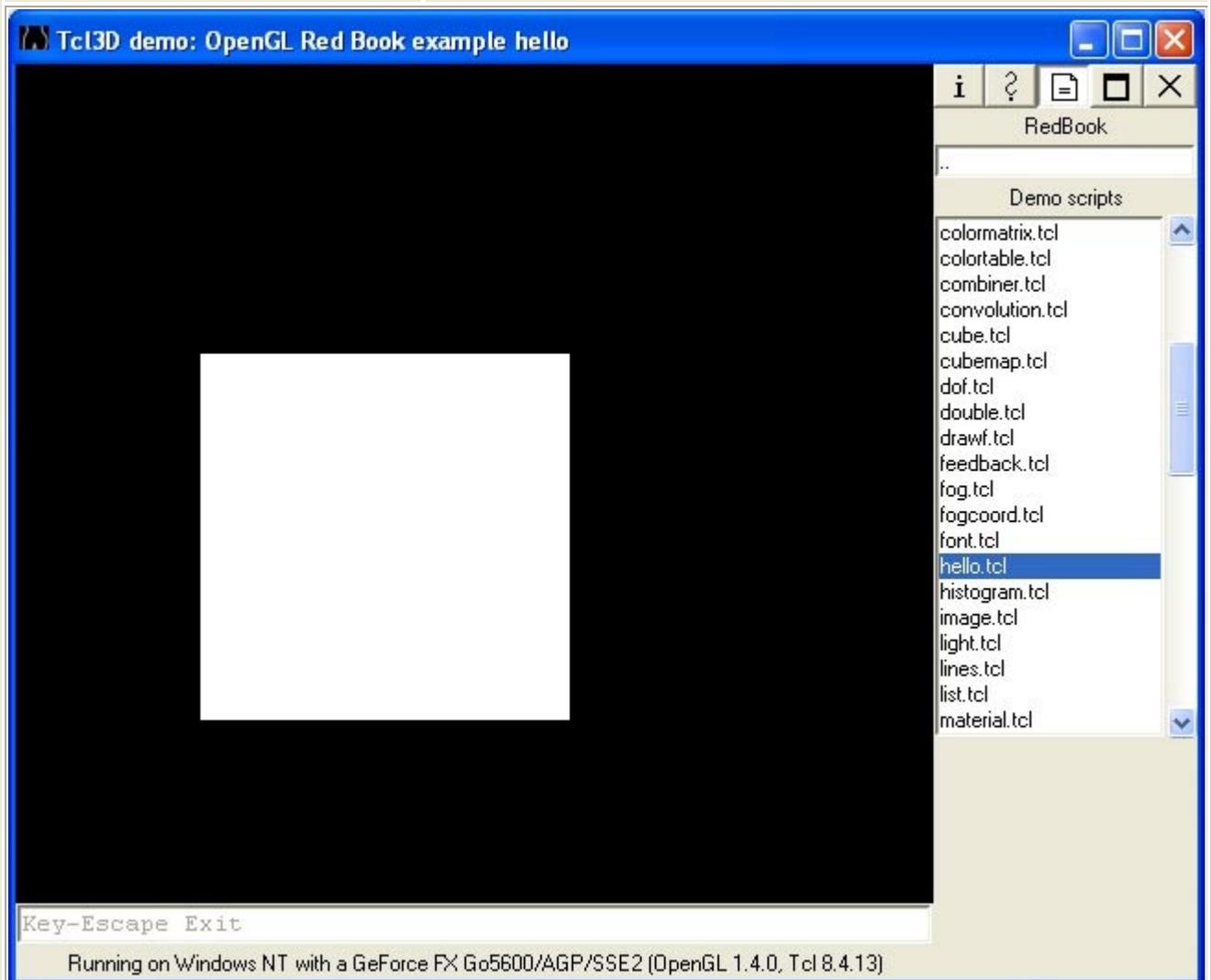
The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example font". The main area is black with the text "THE QUICK BROWN FOX JUMPS OVER A LAZY DOG" in a white, pixelated font. Below the text, it says "Key-Escape Exit" and "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)". On the right side, there is a file explorer showing a list of demo scripts, with "font.tcl" selected.

font.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

Draws some text in a bitmapped font. Uses `glBitmap()` and other pixel routines. Also demonstrates use of display lists.

<b>Demo:</b>	<b>hello</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



hello.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
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This is a simple, introductory OpenGL program.

<b>Demo:</b>	<b>histogram</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-s Toggle image display  
Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

#### histogram.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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Compute the histogram of the image. This program illustrates the use of the `glHistogram()` function.

<b>Demo:</b>	<b>image</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example image**

Key-r      Reset zoom  
 Key-z      Increment zoom  
 Key-Z      Decrement zoom  
 Mouse-1    Paint  
 Key-Escape Exit  
 Initial zoom factor is 1.0

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

#### image.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates drawing pixels and shows the effect of `glDrawPixels()`, `glCopyPixels()`, and `glPixelZoom()`. Interaction: moving the mouse while pressing the mouse button will copy the image in the lower-left corner of the window to the mouse position, using the current pixel zoom factors. There is no attempt to prevent you from drawing over the original image. If you press the 'r' key, the original image and zoom factors are reset. If you press the 'z' or 'Z' keys, you change the zoom factors.

<b>Demo:</b>	<b>light</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

### light.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates the use of the OpenGL lighting model. A sphere is drawn using a grey material characteristic. A single light source illuminates the object.

<b>Demo:</b>	<b>lines</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example lines". The main area is a black 3D viewport with a white grid of points. A status bar at the bottom of the window reads "Key-Escape Exit" and "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)". On the right side, there is a file browser window titled "RedBook" showing a list of "Demo scripts". The script "lines.tcl" is selected and highlighted in blue. Other scripts in the list include histogram.tcl, image.tcl, light.tcl, list.tcl, material.tcl, minmax.tcl, mipmap.tcl, model.tcl, movelight.tcl, multisamp.tcl, multitex.tcl, mvarray.tcl, pickdepth.tcl, picksquare.tcl, planet.tcl, pointp.tcl, polyoff.tcl, polys.tcl, and quadric.tcl.

lines.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program demonstrates geometric primitives and their attributes.

<b>Demo:</b>	<b>list</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example list". The main area displays a 3D scene with two red triangles on a black background. A file browser on the right shows a list of demo scripts, with "list.tcl" selected. The status bar at the bottom indicates "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)".

list.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
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This program demonstrates how to make and execute a display list. Note that attributes, such as current color and matrix, are changed.

<b>Demo:</b>	<b>material</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example material". The main area contains a 3x4 grid of spheres. The top row shows spheres with different material properties (e.g., blue, white, red). The middle row shows spheres with different lighting effects. The bottom row shows spheres with different colors (e.g., cyan, yellow). To the right of the main area is a file list titled "RedBook" and "Demo scripts". The file "material.tcl" is selected. The status bar at the bottom of the window reads "Key-Escape Exit" and "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)".

material.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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This program demonstrates the use of the GL lighting model.  
 Several objects are drawn using different material characteristics.  
 A single light source illuminates the objects.

<b>Demo:</b>	<b>minmax</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

```

Red   : min = 0 max = 232
Green : min = 0 max = 244
Blue  : min = 0 max = 245

```

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

minmax.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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Determine the minimum and maximum values of a group of pixels.  
This demonstrates use of the glMinMax() call.

<b>Demo:</b>	<b>mipmap</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

mipmap.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates using mipmaps for texture maps. To overtly show the effect of mipmaps, each mipmap reduction level has a solidly colored, contrasting texture image. Thus, the quadrilateral which is drawn is drawn with several different colors.

<b>Demo:</b>	<b>model</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

model.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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This program demonstrates modeling transformations

<b>Demo:</b>	<b>movelight</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Mouse-1 Move light  
Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

movelight.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates when to issue lighting and transformation commands to render a model with a light which is moved by a modeling transformation (rotate or translate). The light position is reset after the modeling transformation is called. The eye position does not change.

A sphere is drawn using a grey material characteristic. A single light source illuminates the object.

Interaction: pressing the left mouse button alters the modeling transformation (x rotation) by 30 degrees. The scene is then redrawn with the light in a new position.

<b>Demo:</b>	<b>multisamp</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-b> Toggle checkerboard background  
 Key-Escape Exit  
 Number of sample buffers is 1  
 Number of samples is 2

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

#### multisamp.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

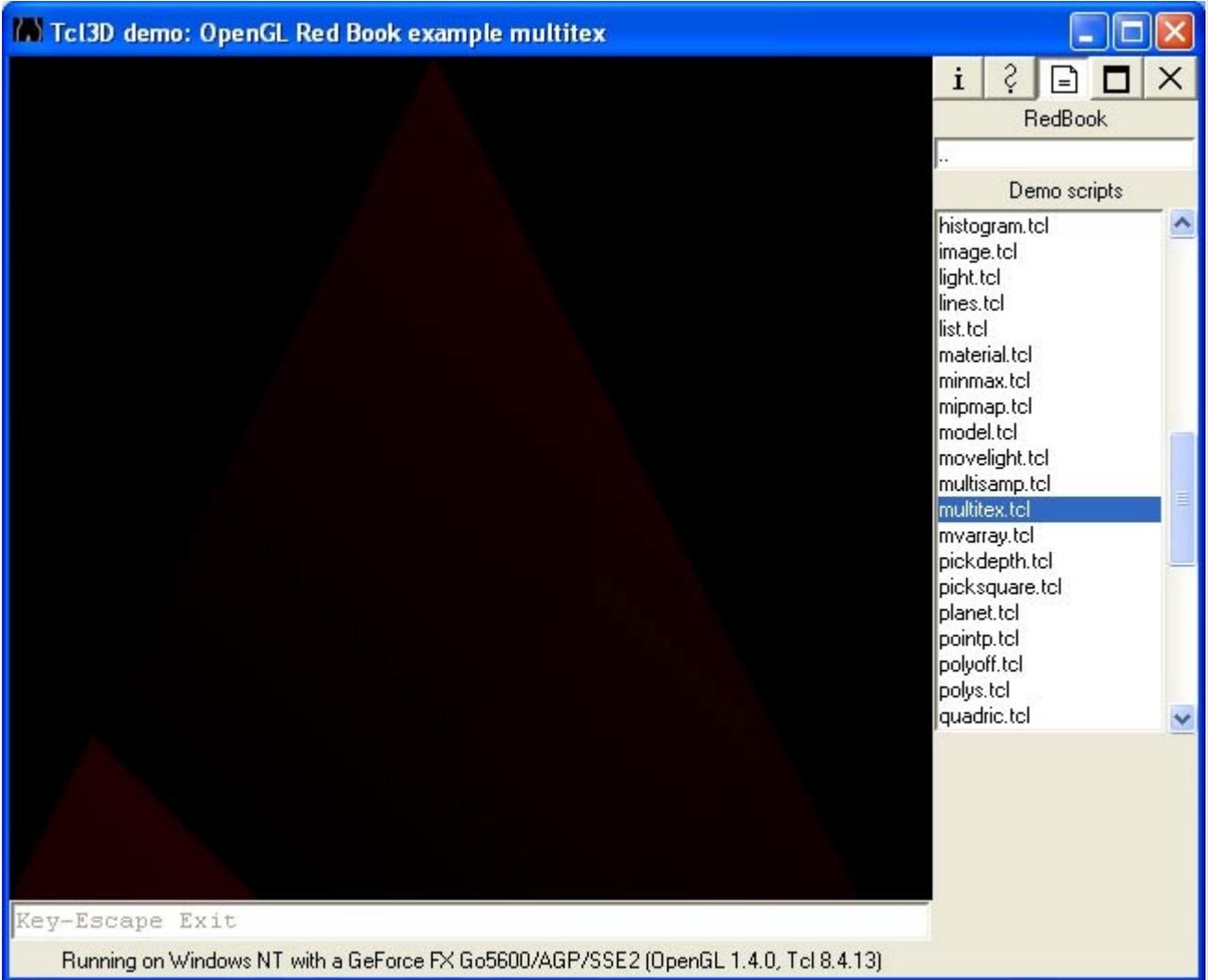
This program draws shows how to use multisampling to draw anti-aliased geometric primitives. The same display list, a pinwheel of triangles and lines of varying widths, is rendered twice. Multisampling is enabled when the left side is drawn. Multisampling is disabled when the right side is drawn.

Pressing the 'b' key toggles drawing of the checkerboard background. Antialiasing is sometimes easier to see when objects are rendered over a contrasting background.

This demo uses the multisampling options built into tcl3dTogl starting from version 0.3.2.

Another way to set the number of samples is via the driver specific GUI under Windows, or by setting the environment variable `__GL_FSAA_MODE` under Linux.

<b>Demo:</b>	<b>multitex</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



multitex.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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<b>Demo:</b>	<b>mvarray</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

#### mvarray.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
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This program demonstrates multiple vertex arrays,  
 specifically the OpenGL routine `glMultiDrawElements()`.

<b>Demo:</b>	<b>pickdepth</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a Tcl3D demo window titled "Tcl3D demo: OpenGL Red Book example pickdepth". The main window displays a 3D scene with three overlapping rectangles: a black one at the top left, a magenta one below it, and a yellow one to the right of the magenta one. The background is cyan. A "Pickdepth Output" window is open in the foreground, showing the following text:

```

File Edit
number of names for hit = 1
z1 is 0.999999; z2 is 0.999999
the name is 2
number of names for hit = 1
z1 is -0.333334; z2 is -0.333334
the name is 3
#|
Key-Escape Exit
Mouse-1 Get pick results
Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

```

On the right side of the demo window, there is a file browser titled "RedBook" showing a list of demo scripts. "pickdepth.tcl" is selected and highlighted in blue.

pickdepth.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

Picking is demonstrated in this program. In rendering mode, three overlapping rectangles are drawn. When the left mouse button is pressed, selection mode is entered with the picking matrix. Rectangles which are drawn under the cursor position are "picked." Pay special attention to the depth value range, which is returned.

<b>Demo:</b>	<b>picksquare</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows the Tcl3D demo window titled "Tcl3D demo: OpenGL Red Book example picksquare". The main window displays a 3x3 grid of colored squares. A smaller window titled "Picksquare Output" is open in the foreground, showing the following text:

```

File Edit
names are 2 2
hits = 1
number of names for hit = 2
z1 is 0.999999; z2 is 0.999999
names are 0 1
#|

```

Below the output window, the following text is visible:

```

Key-Escape Exit
Mouse-1 Get pick results
Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

```

On the right side of the demo window, there is a file browser showing a list of demo scripts, with "picksquare.tcl" selected.

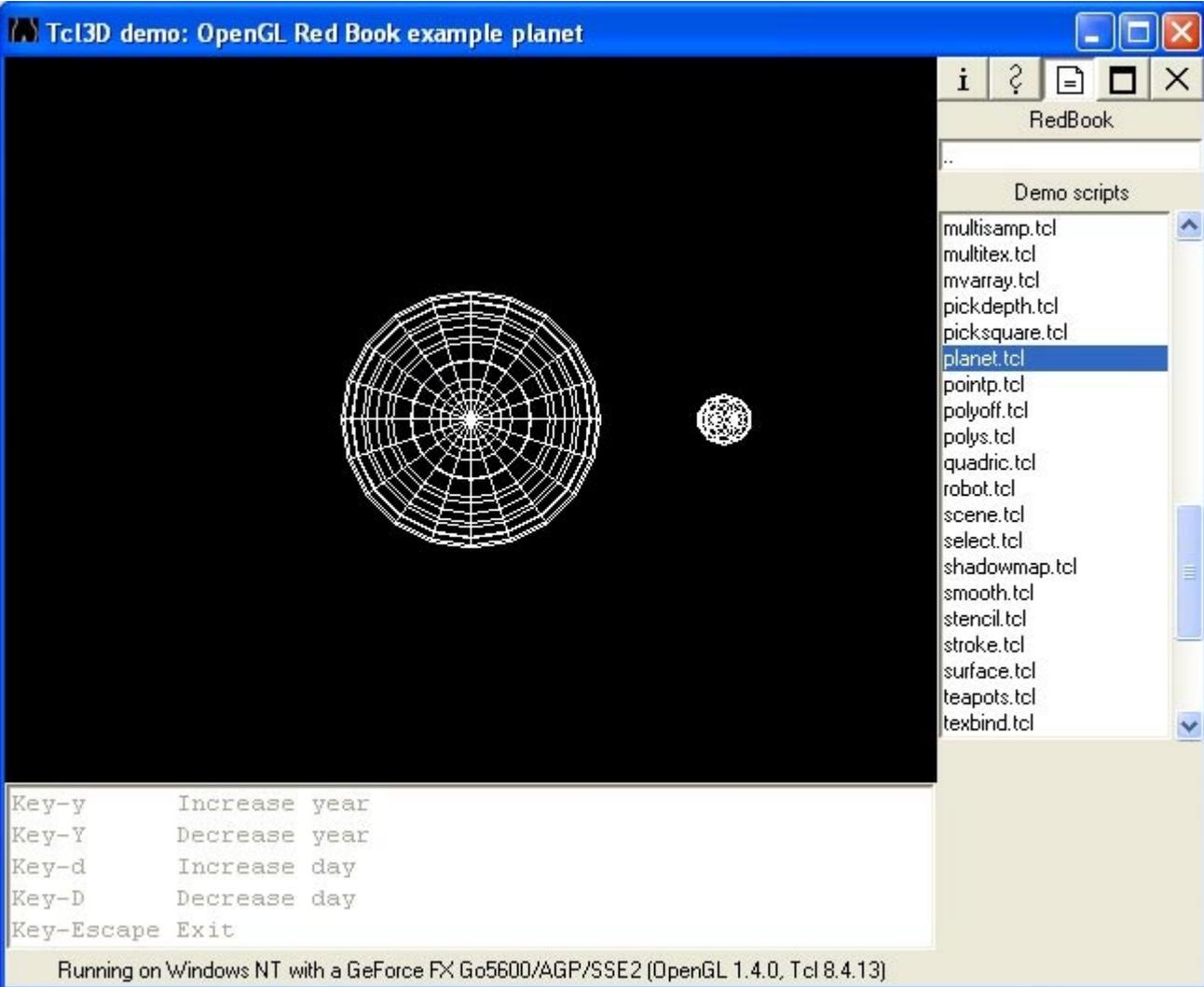
picksquare.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

Use of multiple names and picking are demonstrated. A 3x3 grid of squares is drawn. When the left mouse button is pressed, all squares under the cursor position have their color changed.

<b>Demo:</b>	<b>planet</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example planet**



Key-y      Increase year  
 Key-Y      Decrease year  
 Key-d      Increase day  
 Key-D      Decrease day  
 Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

planet.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
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This program shows how to composite modeling transformations  
 to draw translated and rotated models.

Interaction: pressing the d and y keys (day and year)  
 alters the rotation of the planet around the sun.

<b>Demo:</b>	<b>pointp</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example pointp". The main area displays a 3D point cloud of approximately 250 points, rendered in various colors (red, yellow, green, blue) against a black background. The points are distributed in a roughly spherical shape. To the right of the main window is a file browser titled "RedBook" showing a list of "Demo scripts". The file "pointp.tcl" is selected and highlighted in blue. Below the main window, a list of keyboard shortcuts is displayed:

```

Key-+      Increase point size
Key--      Decrease point size
Key-f      Move viewer forwards
Key-b      Move viewer backwards
Key-c      Constant attenuation
Key-l      Linear attenuation
Key-q      Quadratic attenuation
Key-Escape Exit

```

At the bottom of the window, it says "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)".

#### pointp.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates point parameters and their effect on point primitives. 250 points are randomly generated within a 10 by 10 by 40 region, centered at the origin. In some modes (including the default), points that are closer to the viewer will appear larger.

Pressing the 'l', 'q', and 'c' keys switch the point parameters attenuation mode to linear, quadratic, or constant, respectively.

Pressing the 'f' and 'b' keys move the viewer forward and backwards. In either linear or quadratic attenuation mode, the distance from the viewer to the point will change the size of the point primitive.

Pressing the '+' and '-' keys will change the current point size. In this program, the point size is bounded, so it

will not get less than 2.0, nor greater than GL\_POINT\_SIZE\_MAX.

<b>Demo:</b>	<b>polyoff</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-t DecrDistance  
 Key-T IncrDistance  
 Key-f DecrPolyFactors  
 Key-F IncrPolyFactors  
 Key-u DecrPolyUnits  
 Key-U IncrPolyUnits  
 Mouse-1 IncrSpinX  
 Mouse-2 IncrSpinY  
 Key-Escape Exit  
 Initialized

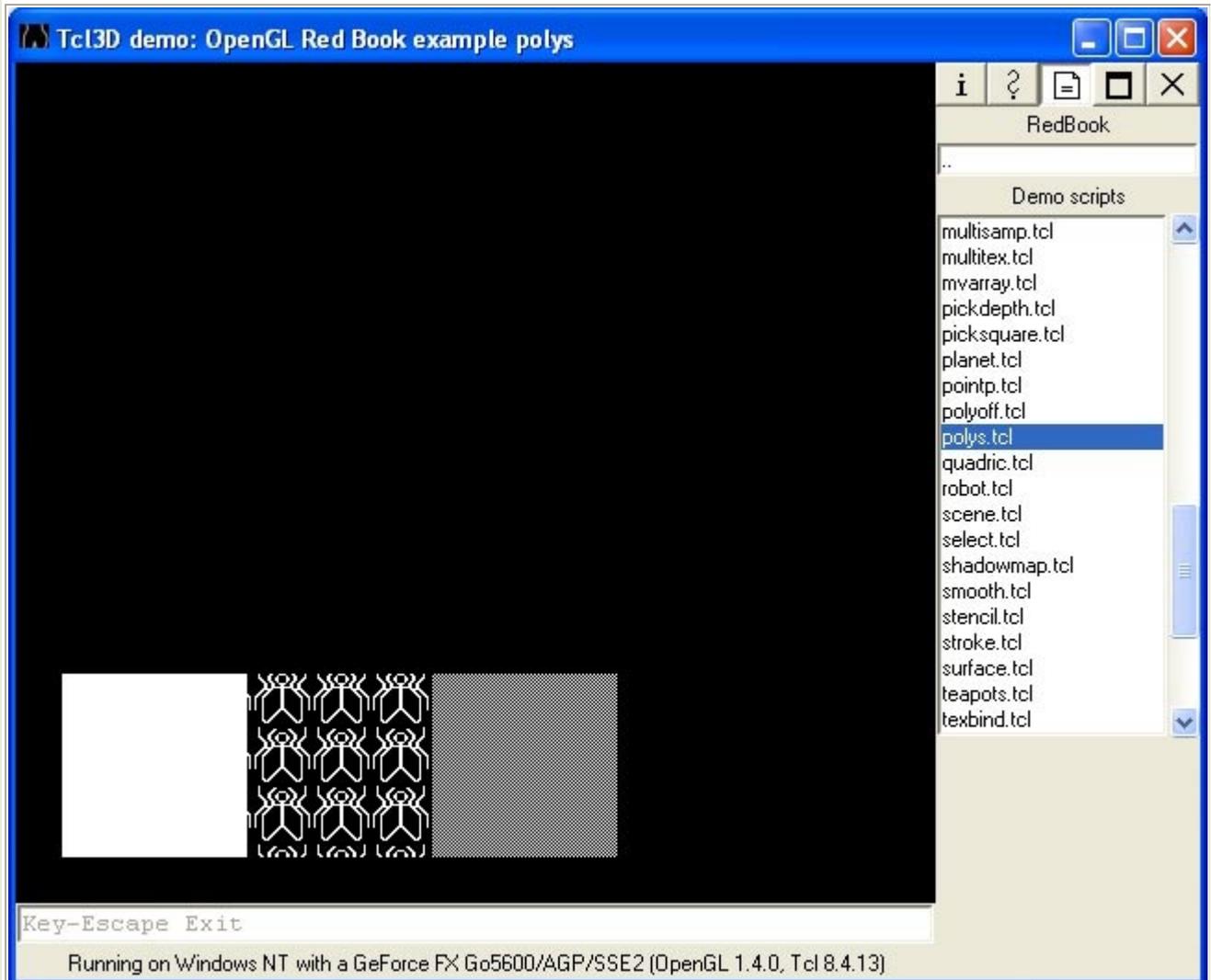
Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

#### polyoff.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program demonstrates polygon offset to draw a shaded polygon and its wireframe counterpart without ugly visual artifacts ("stitching").

<b>Demo:</b>	<b>polys</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



polys.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program demonstrates polygon stippling.

<b>Demo:</b>	<b>quadric</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

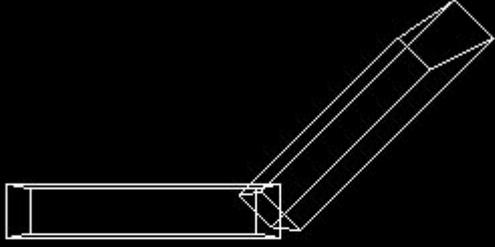
#### quadric.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates the use of some of the `gluQuadric*` routines. Quadric objects are created with some `quadric` properties and the callback routine to handle errors. Note that the cylinder has no top or bottom and the circle has a hole in it.

<b>Demo:</b>	<b>robot</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example robot**



Key-s      IncrShoulder    5  
 Key-S      IncrShoulder    -5  
 Key-e      IncrElbow        5  
 Key-E      IncrElbow        -5  
 Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

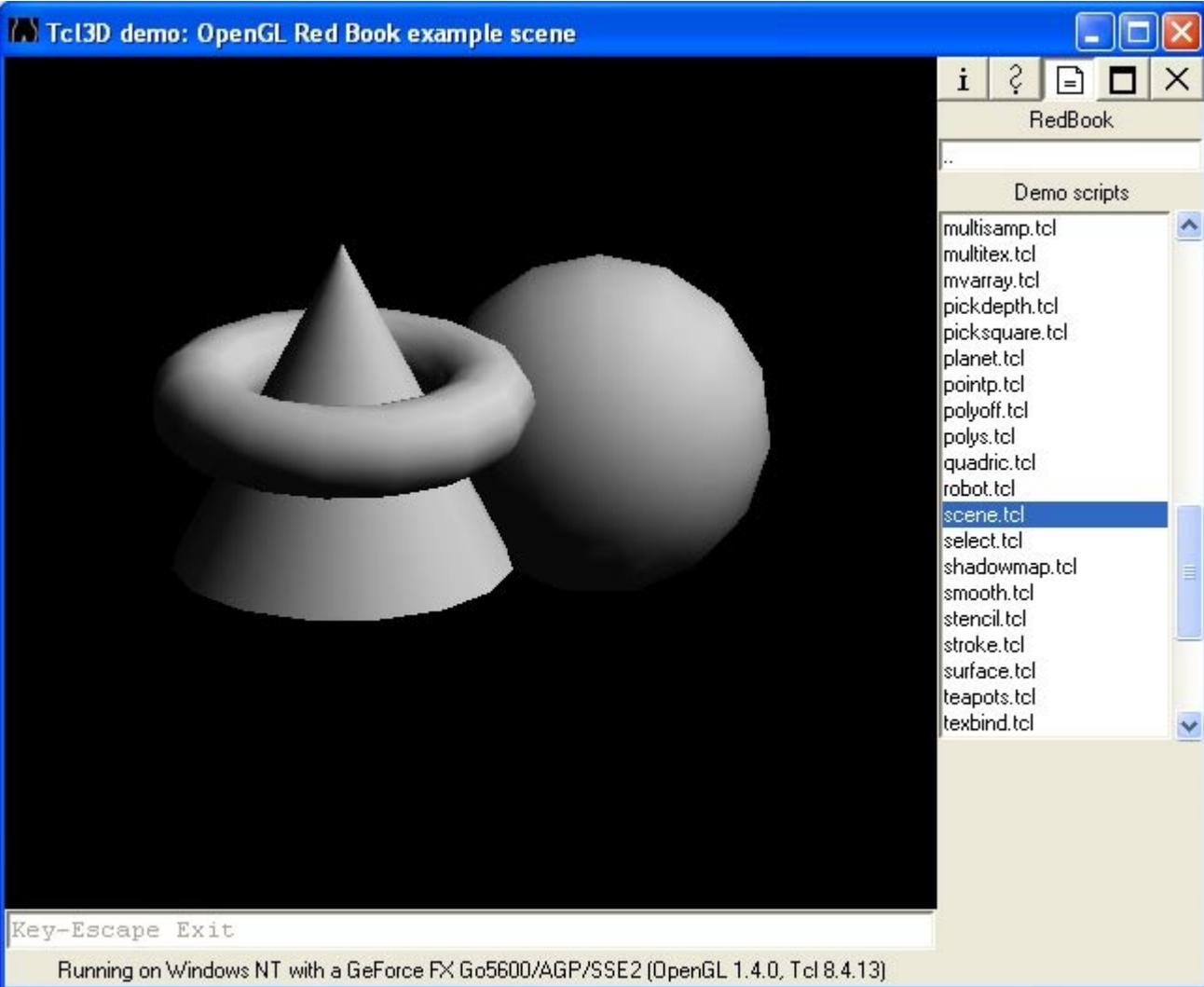
robot.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program shows how to composite modeling transformations  
 to draw translated and rotated hierarchical models.  
 Interaction: pressing the s and e keys (shoulder and elbow)  
 alters the rotation of the robot arm.

<b>Demo:</b>	<b>scene</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example scene**



Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

scene.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

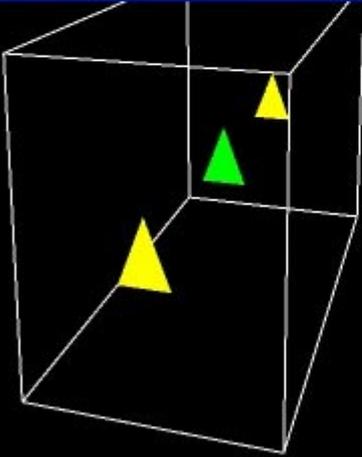
This program demonstrates the use of the GL lighting model.  
 Objects are drawn using a grey material characteristic.  
 A single light source illuminates the objects.

<b>Demo:</b>	<b>select</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: OpenGL Red Book example select

Select Output

```
File Edit
hits = 2
number of names for hit = 1
z1 is 0.999999; z2 is 0.999999
the name is 1
number of names for hit = 1
z1 is 0; z2 is -1.07288e-006
the name is 3
```



Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

RedBook

..

Data

Demo scripts

- material.tcl
- minmax.tcl
- mipmap.tcl
- model.tcl
- movelight.tcl
- multisamp.tcl
- multitex.tcl
- mvarray.tcl
- pickdepth.tcl
- picksquare.tcl
- planet.tcl
- pointp.tcl
- polyoff.tcl
- polys.tcl
- quadratic.tcl
- robot.tcl
- scene.tcl
- select.tcl**
- shadowmap.tcl
- smooth.tcl

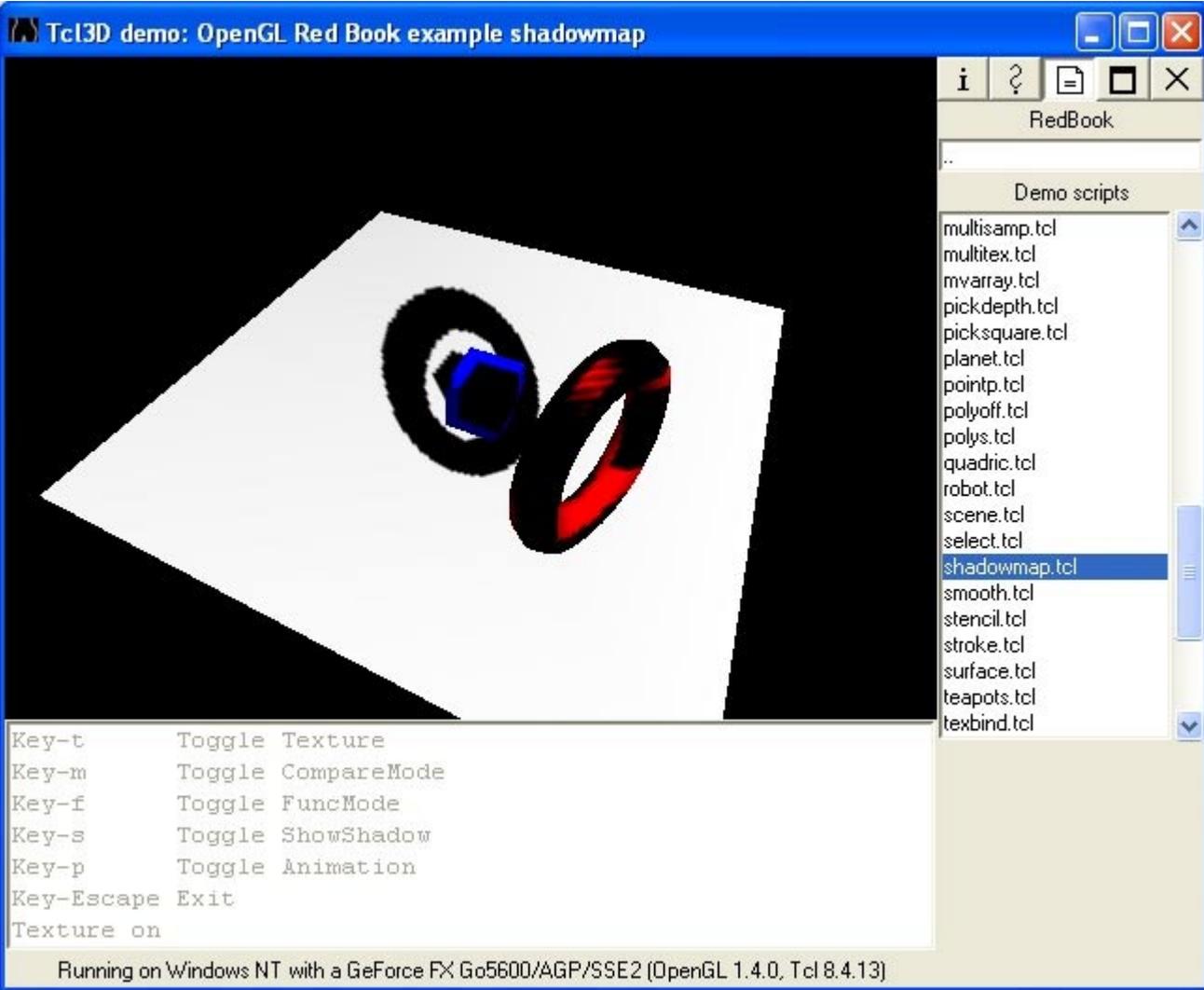
select.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This is an illustration of the selection mode and name stack, which detects whether objects which collide with a viewing volume. First, four triangles and a rectangular box representing a viewing volume are drawn (drawScene routine). The green triangle and yellow triangles appear to lie within the viewing volume, but the red triangle appears to lie outside it. Then the selection mode is entered (selectObjects routine). Drawing to the screen ceases. To see if any collisions occur, the four triangles are called. In this example, the green triangle causes one hit with the name 1, and the yellow triangles cause one hit with the name 3.

<b>Demo:</b>	<b>shadowmap</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example shadowmap**



Key-t Toggle Texture  
Key-m Toggle CompareMode  
Key-f Toggle FuncMode  
Key-s Toggle ShowShadow  
Key-p Toggle Animation  
Key-Escape Exit  
Texture on

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

shadowmap.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
See file LICENSE for complete license information.

<b>Demo:</b>	<b>smooth</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

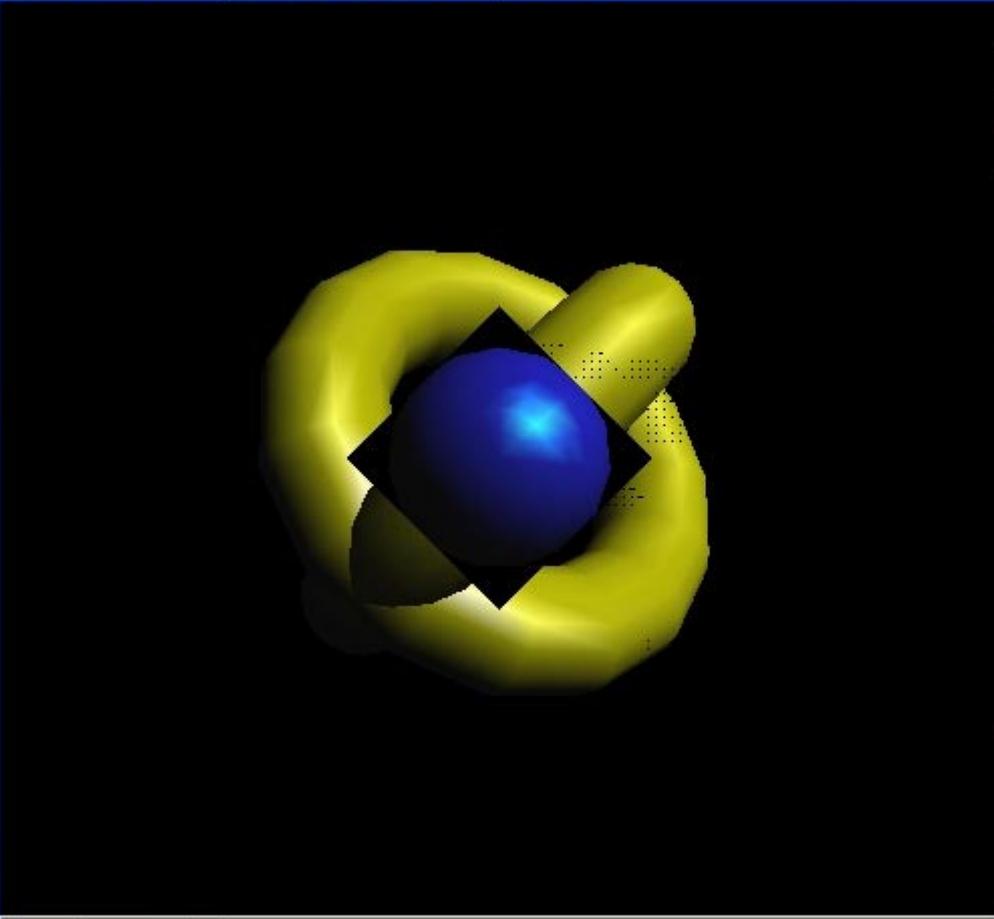
smooth.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
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This program demonstrates smooth shading.  
 A smooth shaded polygon is drawn in a 2-D projection.

<b>Demo:</b>	<b>stencil</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example stencil**



Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

RedBook

Demo scripts

- robot.tcl
- scene.tcl
- select.tcl
- shadowmap.tcl
- smooth.tcl
- stencil.tcl**
- stroke.tcl
- surface.tcl
- teapots.tcl
- texbind.tcl
- texgen.tcl
- texprox.tcl
- texsub.tcl
- texture3d.tcl
- texturesurf.tcl
- torus.tcl
- trim.tcl
- unproject.tcl
- varray.tcl
- wrap.tcl

#### stencil.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program demonstrates use of the stencil buffer for masking nonrectangular regions. Whenever the window is redrawn, a value of 1 is drawn into a diamond-shaped region in the stencil buffer. Elsewhere in the stencil buffer, the value is 0. Then a blue sphere is drawn where the stencil value is 1, and yellow torii are drawn where the stencil value is not 1.

<b>Demo:</b>	<b>stroke</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example stroke". The main display area is black with white text that reads "A SPARE SERAPE APPEARS AS APES PREPARE RARE PEPPERS". Below the display is a status bar that says "Key-Escape Exit" and "Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)". To the right of the main display is a file browser window titled "RedBook" showing a list of "Demo scripts". The file "stroke.tcl" is selected and highlighted in blue. Other files in the list include robot.tcl, scene.tcl, select.tcl, shadowmap.tcl, smooth.tcl, stencil.tcl, surface.tcl, teapots.tcl, texbind.tcl, texgen.tcl, texprox.tcl, texsub.tcl, texture3d.tcl, texturesurf.tcl, torus.tcl, trim.tcl, unproject.tcl, varray.tcl, and wrap.tcl.

stroke.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program demonstrates some characters of a stroke (vector) font. The characters are represented by display lists, which are given numbers which correspond to the ASCII values of the characters. Use of `glCallLists()` is demonstrated.

<b>Demo:</b>	<b>surface</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-c Toggle control points  
Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

surface.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program draws a NURBS surface in the shape of a symmetrical hill. The 'c' keyboard key allows you to toggle the visibility of the control points themselves. Note that some of the control points are hidden by the surface itself.

<b>Demo:</b>	<b>teapots</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

teapots.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program demonstrates lots of material properties.  
 A single light source illuminates the objects.

<b>Demo:</b>	<b>texbind</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

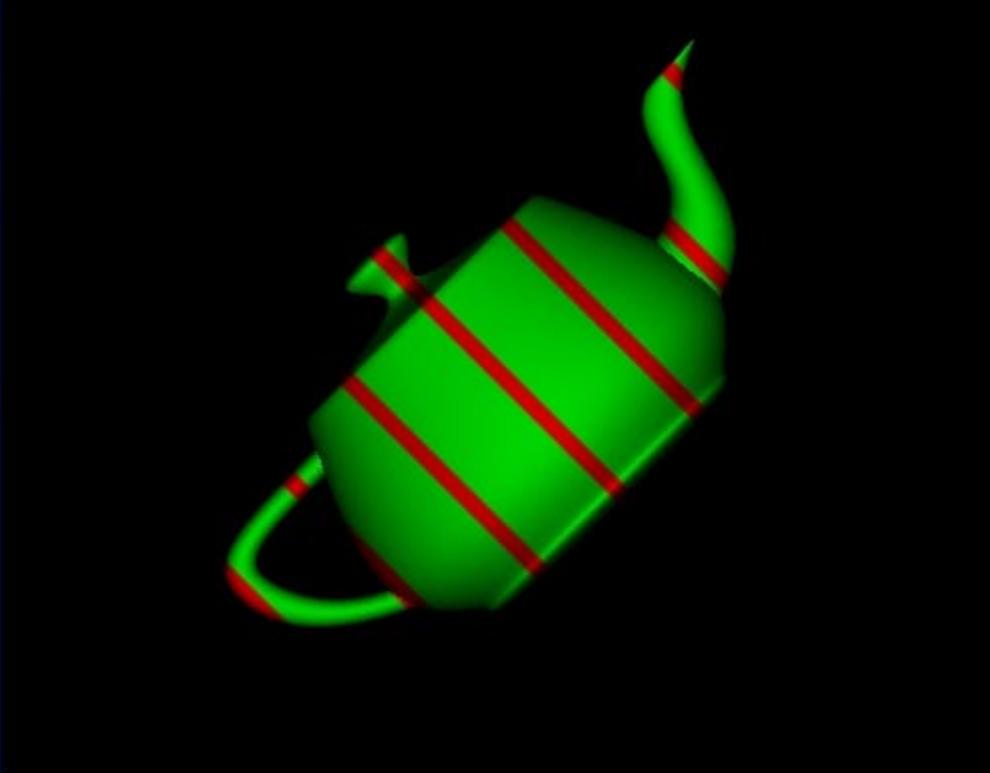
texbind.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program demonstrates using `glBindTexture()` by creating and managing two textures.

<b>Demo:</b>	<b>texgen</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example texgen**



Key-e      SetEyeLinear  
 Key-o      SetObjLinear  
 Key-s      SetSlanted  
 Key-x      SetZero  
 Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

RedBook

Demo scripts

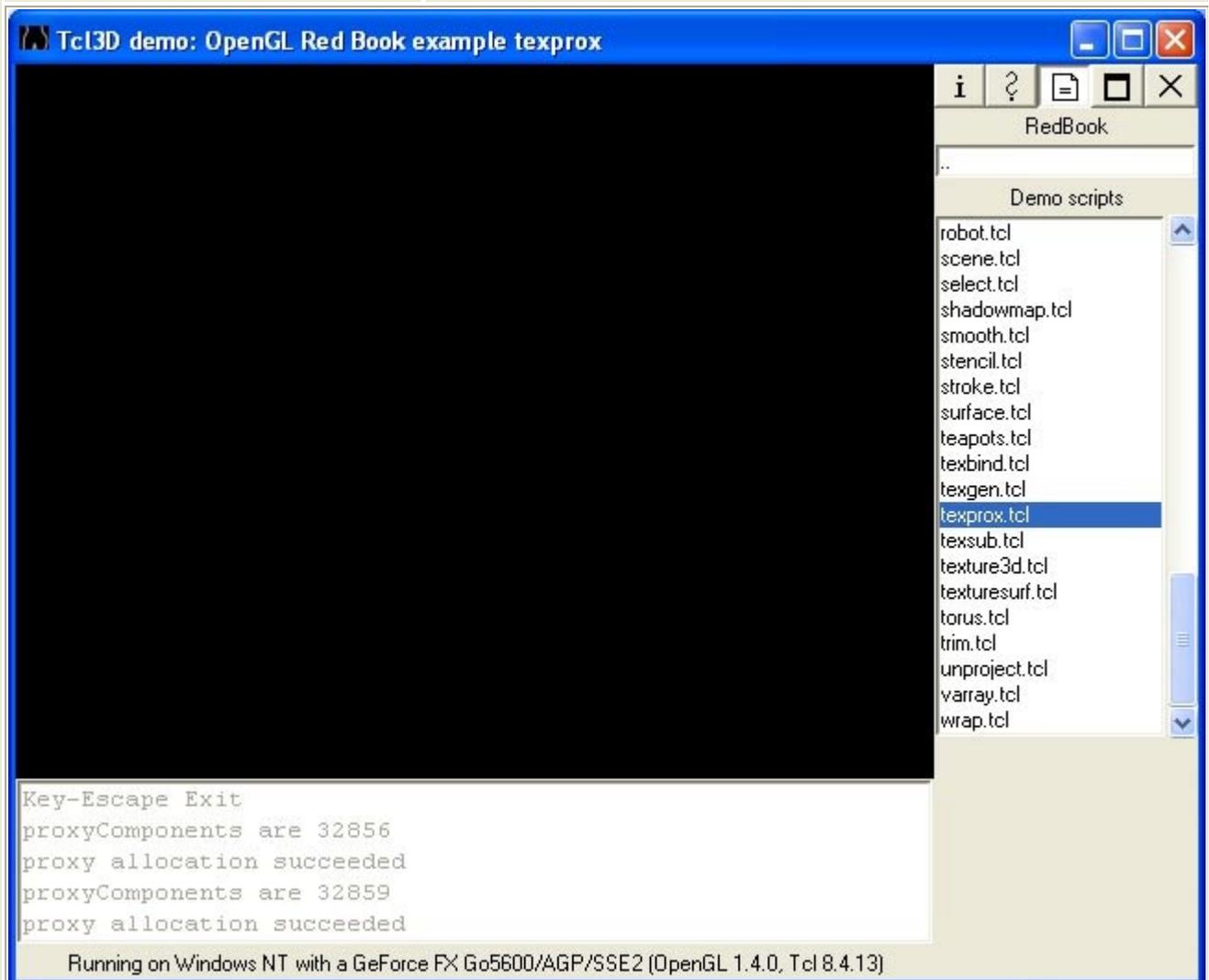
- robot.tcl
- scene.tcl
- select.tcl
- shadowmap.tcl
- smooth.tcl
- stencil.tcl
- stroke.tcl
- surface.tcl
- teapots.tcl
- texbind.tcl
- texgen.tcl**
- texprox.tcl
- texsub.tcl
- texture3d.tcl
- texturesurf.tcl
- torus.tcl
- trim.tcl
- unproject.tcl
- varray.tcl
- wrap.tcl

#### texgen.c

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program draws a texture mapped teapot with automatically generated texture coordinates. The texture is rendered as stripes on the teapot. Initially, the object is drawn with texture coordinates based upon the object coordinates of the vertex and distance from the plane  $x = 0$ . Pressing the 'e' key changes the coordinate generation to eye coordinates of the vertex. Pressing the 'o' key switches it back to the object coordinates. Pressing the 's' key changes the plane to a slanted one ( $x + y + z = 0$ ). Pressing the 'x' key switches it back to  $x = 0$ .

<b>Demo:</b>	<b>texprox</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>



texprox.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

The brief program illustrates use of texture proxies.  
 This program only prints out some messages about whether  
 certain size textures are supported and then exits.

<b>Demo:</b>	<b>texsub</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example texsub**

Key-s Set Subtexture  
Key-r Reset  
Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

texsub.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program texture maps a checkerboard image onto two rectangles. This program clamps the texture, if the texture coordinates fall outside 0.0 and 1.0. If the s key is pressed, a texture subimage is used to alter the original texture. If the r key is pressed, the original texture is restored.

<b>Demo:</b>	<b>texture3d</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

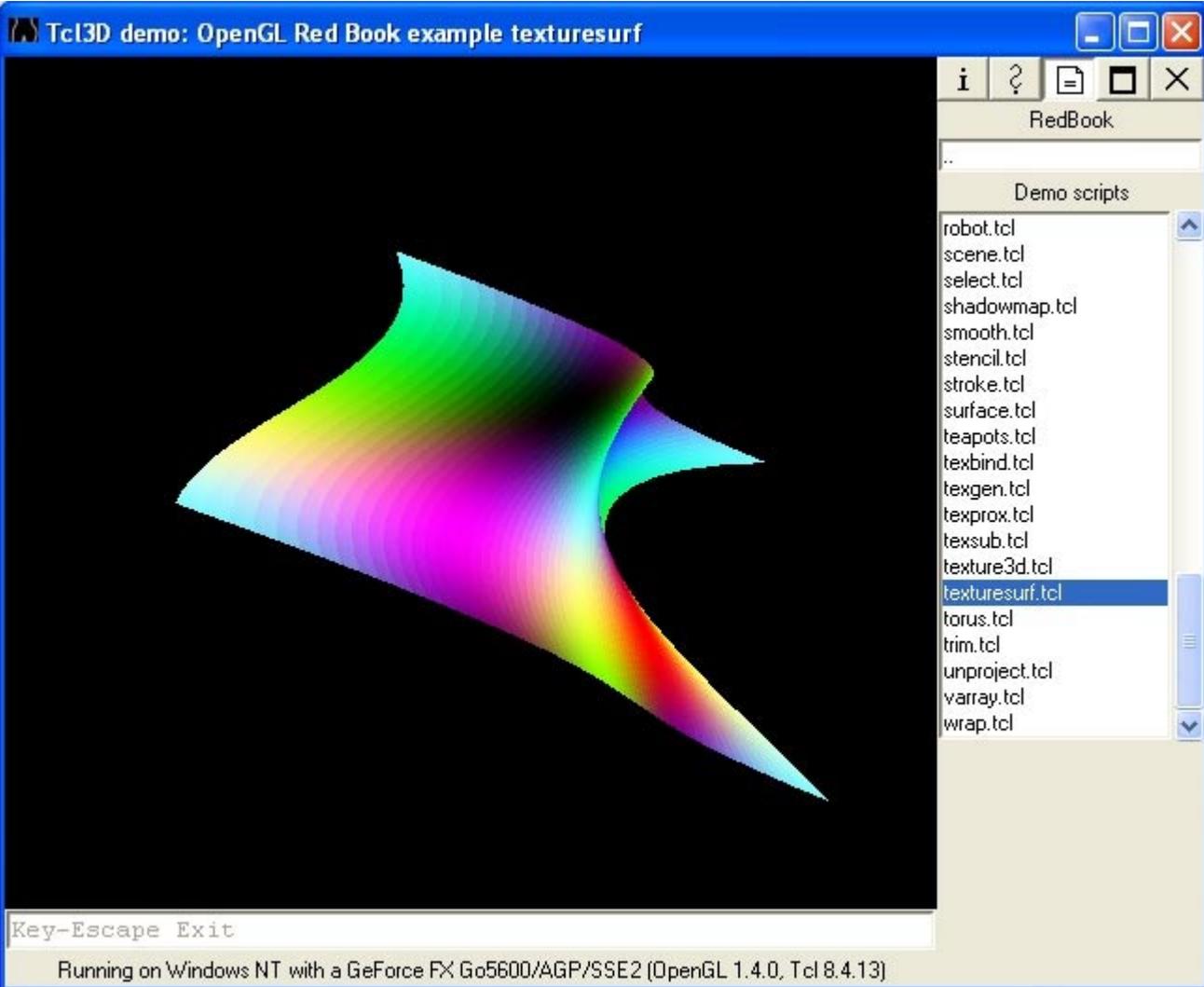
texture3d.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program demonstrates using a three-dimensional texture.  
 It creates a 3D texture and then renders two rectangles  
 with different texture coordinates to obtain different  
 "slices" of the 3D texture.

<b>Demo:</b>	<b>texturesurf</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example texturesurf**



Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

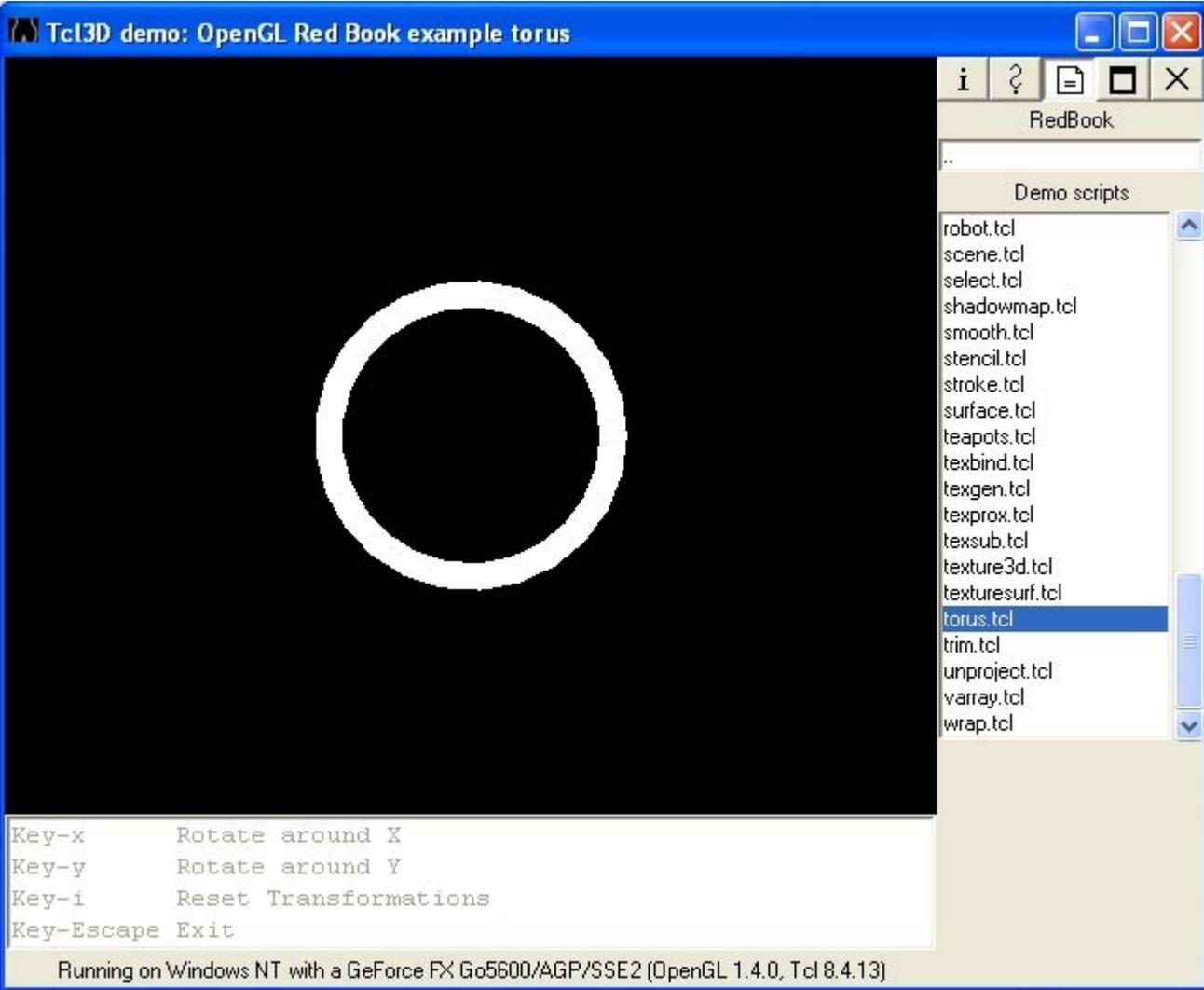
texturesurf.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program uses evaluators to generate a curved surface and automatically generated texture coordinates.

<b>Demo:</b>	<b>torus</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example torus**



Key-x Rotate around X  
 Key-y Rotate around Y  
 Key-i Reset Transformations  
 Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

torus.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

This program demonstrates the creation of a display list.

<b>Demo:</b>	<b>trim</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit

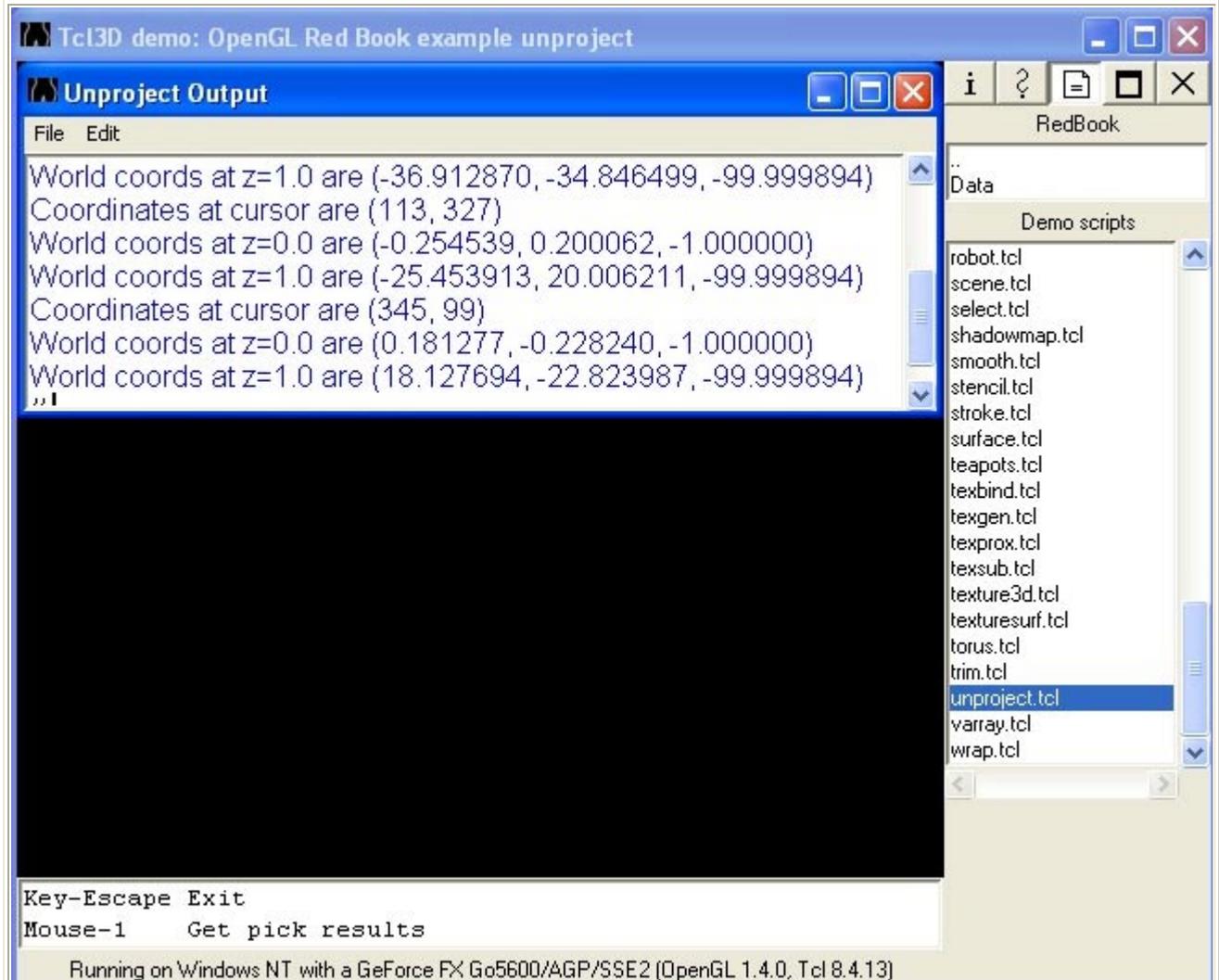
Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

trim.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
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This program draws a NURBS surface in the shape of a symmetrical hill, using both a NURBS curve and pwl (piecewise linear) curve to trim part of the surface.

<b>Demo:</b>	<b>unproject</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Mouse-1 Get pick results

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

unproject.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
 The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
 The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
 See file LICENSE for complete license information.

When the left mouse button is pressed, this program reads the mouse position and determines two 3D points from which it was transformed. Very little is displayed.

<b>Demo:</b>	<b>varray</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

The screenshot shows a window titled "Tcl3D demo: OpenGL Red Book example varray". The main display area shows two triangles on a black background. The left triangle is a rainbow gradient, and the right triangle is gray. To the right of the main display is a file browser window titled "RedBook" showing a list of "Demo scripts" including robot.tcl, scene.tcl, select.tcl, shadowmap.tcl, smooth.tcl, stencil.tcl, stroke.tcl, surface.tcl, teapots.tcl, texbind.tcl, texgen.tcl, texprox.tcl, texsub.tcl, texture3d.tcl, texturesurf.tcl, torus.tcl, trim.tcl, unproject.tcl, varray.tcl (highlighted), and wrap.tcl. Below the main display is a control panel with the following text:

```

Mouse-1   Toggle setup method
Mouse-2   Toggle deref method
Key-Escape Exit
Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

```

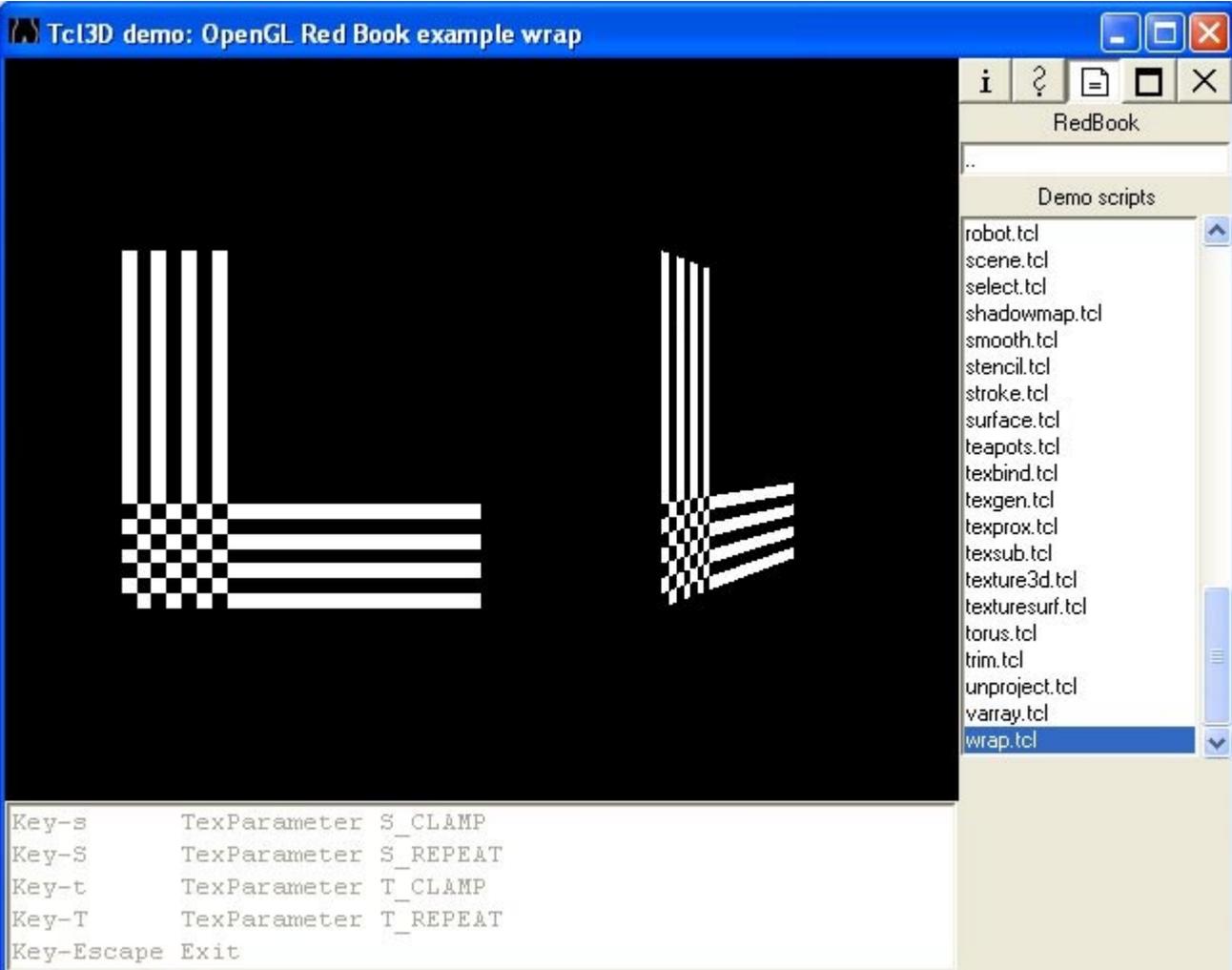
varray.tcl

An example of the OpenGL red book modified to work with Tcl3D.  
The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc.  
The Tcl3D sources are Copyright (c) 2005, Paul Obermeier.  
See file LICENSE for complete license information.

This program demonstrates vertex arrays.

<b>Demo:</b>	<b>wrap</b>
Type:	<a href="#">RedBook</a>
Category:	<a href="#">TutorialsAndBooks</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: OpenGL Red Book example wrap**



Key-s      TexParameter S\_CLAMP  
 Key-S      TexParameter S\_REPEAT  
 Key-t      TexParameter T\_CLAMP  
 Key-T      TexParameter T\_REPEAT  
 Key-Escape Exit

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)

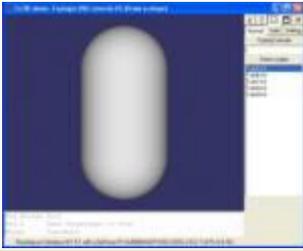
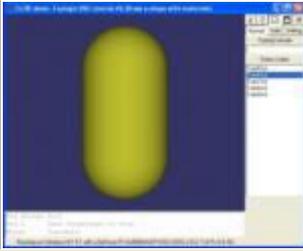
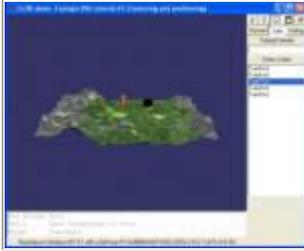
wrap.tcl

An example of the OpenGL red book modified to work with Tcl3D. The original C sources are Copyright (c) 1993-2003, Silicon Graphics, Inc. The Tcl3D sources are Copyright (c) 2005, Paul Obermeier. See file LICENSE for complete license information.

This program texture maps a checkerboard image onto two rectangles. This program demonstrates the wrapping modes, if the texture coordinates fall outside 0.0 and 1.0. Interaction: Pressing the 's' and 'S' keys switch the wrapping between clamping and repeating for the s parameter. The 't' and 'T' keys control the wrapping for the t parameter.

If running this program on OpenGL 1.0, texture objects are not used.

<b>Category:</b>	<b>OpenSceneGraph</b>
Root:	<a href="#">Contents</a>
	<a href="#">Available types</a>
	<a href="#">FopingTutorials</a>
	<a href="#">NPS-Tutorials</a>

<b>Type:</b>	<b>FopingTutorials</b>			
Category:	<a href="#">OpenSceneGraph</a>			
Root:	<a href="#">Contents</a>			
<p>Some of the OpenSceneGraph tutorials from Franclin Foping have been ported to run with Tcl3D. Original sources available at: <a href="http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials/">http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials/</a></p>				
<p>Available demos</p>				
				
<a href="#">Tuto5</a>	<a href="#">Tuto6</a>	<a href="#">Tuto7</a>	<a href="#">Tuto8</a>	<a href="#">Tu</a>

<b>Demo:</b>	<b>Tuto5</b>
Type:	<a href="#">FopingTutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Foping's OSG tutorial #5 (Draw a shape)**

Key-Escape Exit  
Key-f Save SceneGraph to file  
Mouse Trackball

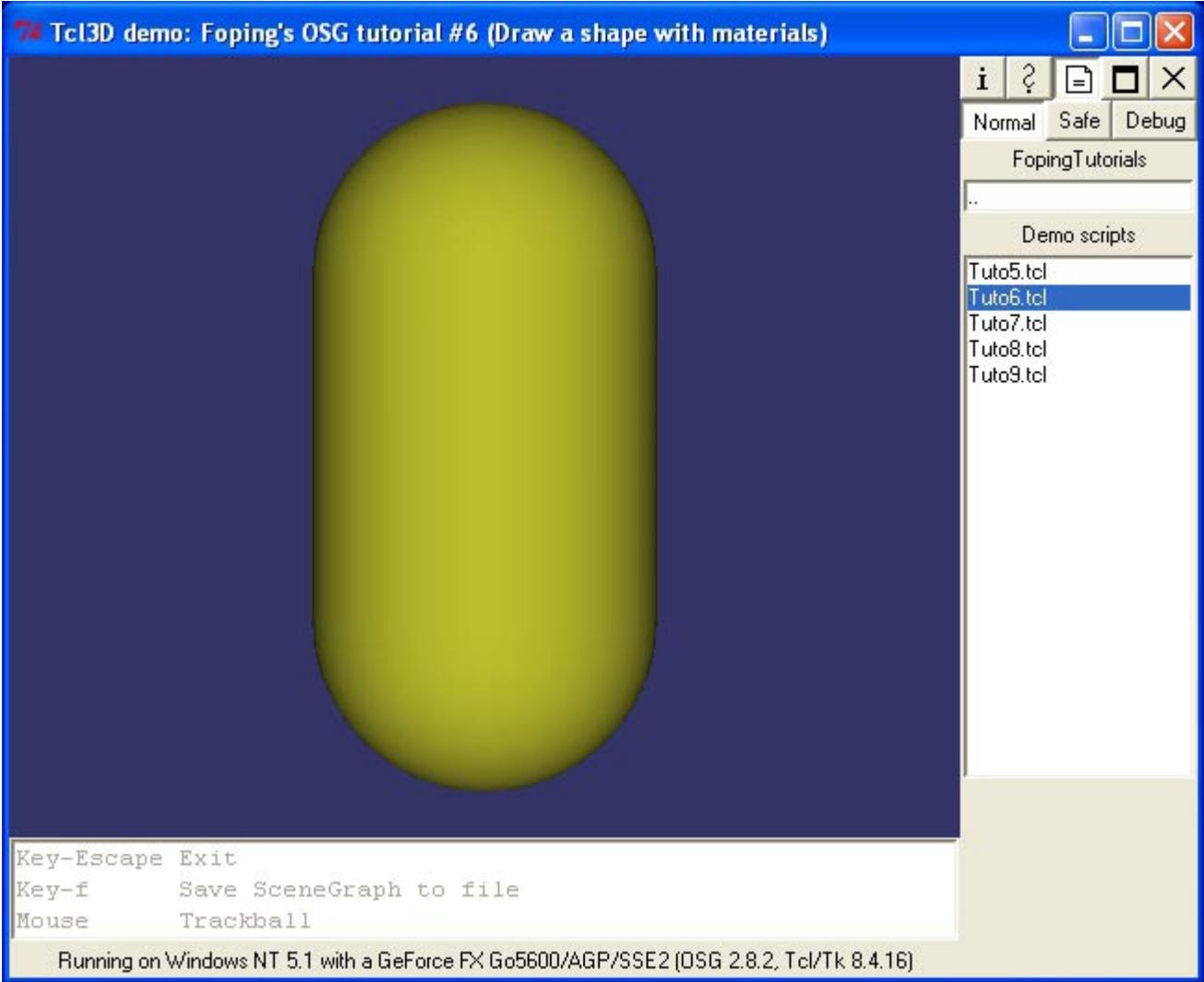
Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

Tuto5.tcl: Draw a shape

Original C++ code by Franclin Foping.  
See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Tuto6</b>
Type:	<a href="#">FopingTutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>



Key-Escape Exit  
 Key-f Save SceneGraph to file  
 Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

Tuto6.tcl: Draw a shape with materials.

Original C++ code by Franclin Foping.  
 See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
 for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Tuto7</b>
Type:	<a href="#">FopingTutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Foping's OSG tutorial #7 (Texturing and positioning)**

Key-Escape Exit  
Key-f Save SceneGraph to file  
Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

Tuto7.tcl: Texturing and positioning

Original C++ code by Franclin Foping.  
See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Tuto8</b>
Type:	<a href="#">FopingTutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Foping's OSG tutorial #8 (Draw a shape with fog)**



Normal Safe Debug

FopingTutorials

..

Demo scripts

- Tuto5.tcl
- Tuto6.tcl
- Tuto7.tcl
- Tuto8.tcl**
- Tuto9.tcl

Key-Escape Exit  
 Key-f Save SceneGraph to file  
 Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

Tuto8.tcl: Draw a shape with fog.

Original C++ code by Franclin Foping.  
 See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
 for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>Tuto9</b>
Type:	<a href="#">FopingTutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-f Save SceneGraph to file  
 Mouse Trackball

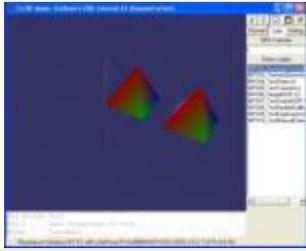
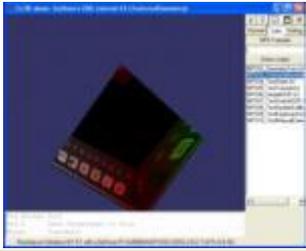
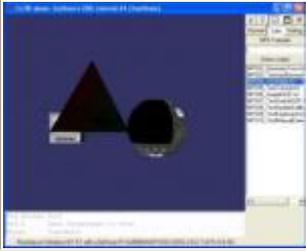
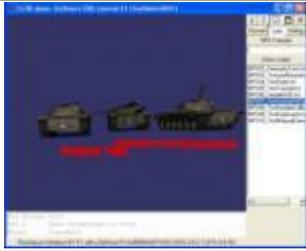
Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

Tuto9.tcl: OSG Lighting example

This simple example will show how to easily shade your scene. We will be making use of 2 light sources, one is red and the other one is green. We will also render light markers to help you locate light source in the scene. This is helpful for debugging purposes.

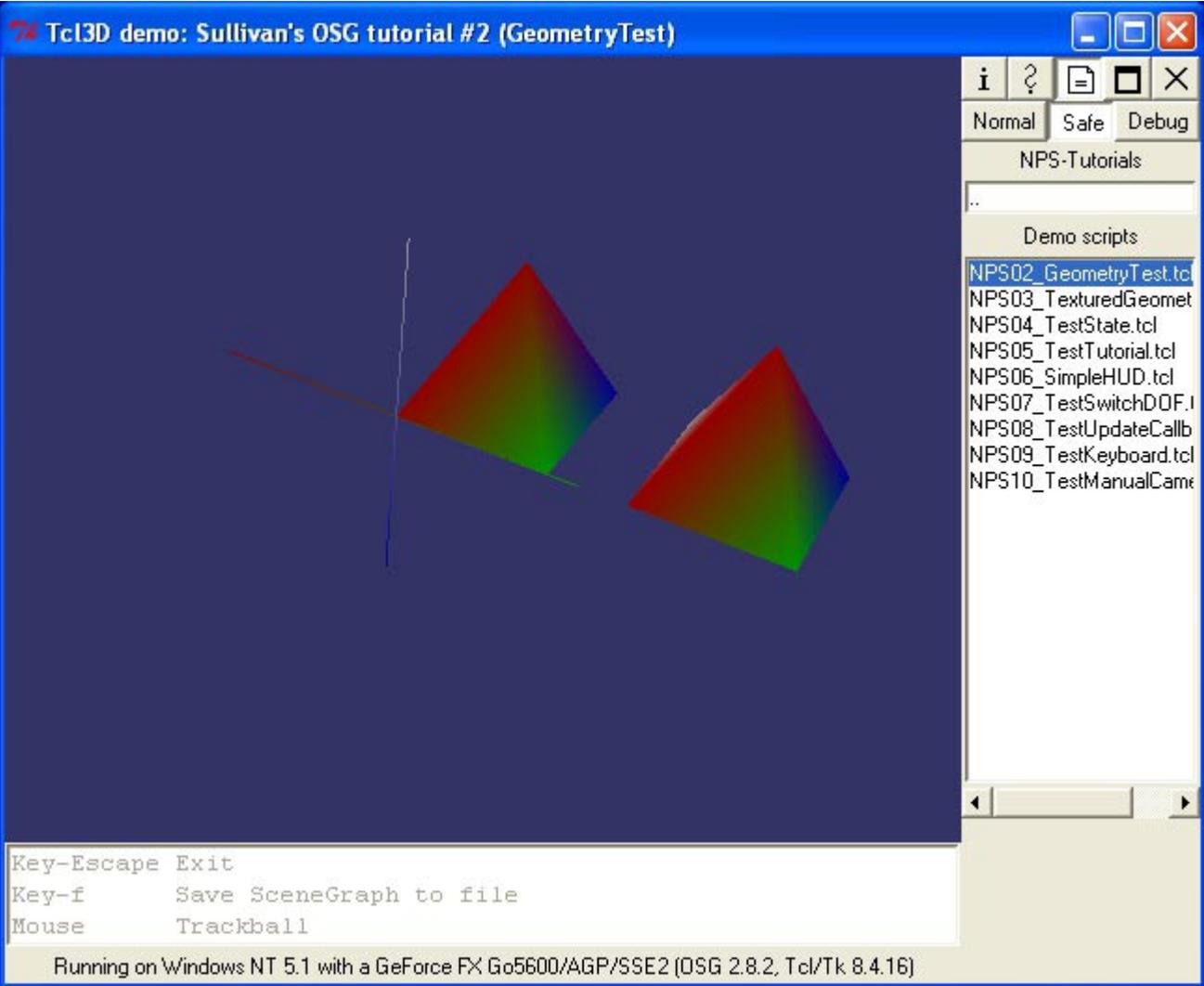
Original C++ code by Franclin Foping.  
 See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials> for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

Type:	NPS-Tutorials		
Category:	<a href="#">OpenSceneGraph</a>		
Root:	<a href="#">Contents</a>		
Some of the OpenSceneGraph tutorials from Joseph Sullivan have been ported to run with Tcl3D. Original sources available at: <a href="http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials/">http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials/</a>			
Available demos			
			
<a href="#">NPS02_GeometryTest</a>	<a href="#">NPS03_TexturedGeometry</a>	<a href="#">NPS04_TestState</a>	<a href="#">NPS05_TestTutorial</a>
			
<a href="#">NPS07_TestSwitchDOF</a>	<a href="#">NPS08_TestUpdateCallback</a>	<a href="#">NPS09_TestKeyboard</a>	<a href="#">NPS10_TestManualCamera</a>

<b>Demo:</b>	<b>NPS02_GeometryTest</b>
Type:	<a href="#">NPS-Tutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

Tcl3D demo: Sullivan's OSG tutorial #2 (GeometryTest)



Key-Escape Exit  
Key-f Save SceneGraph to file  
Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

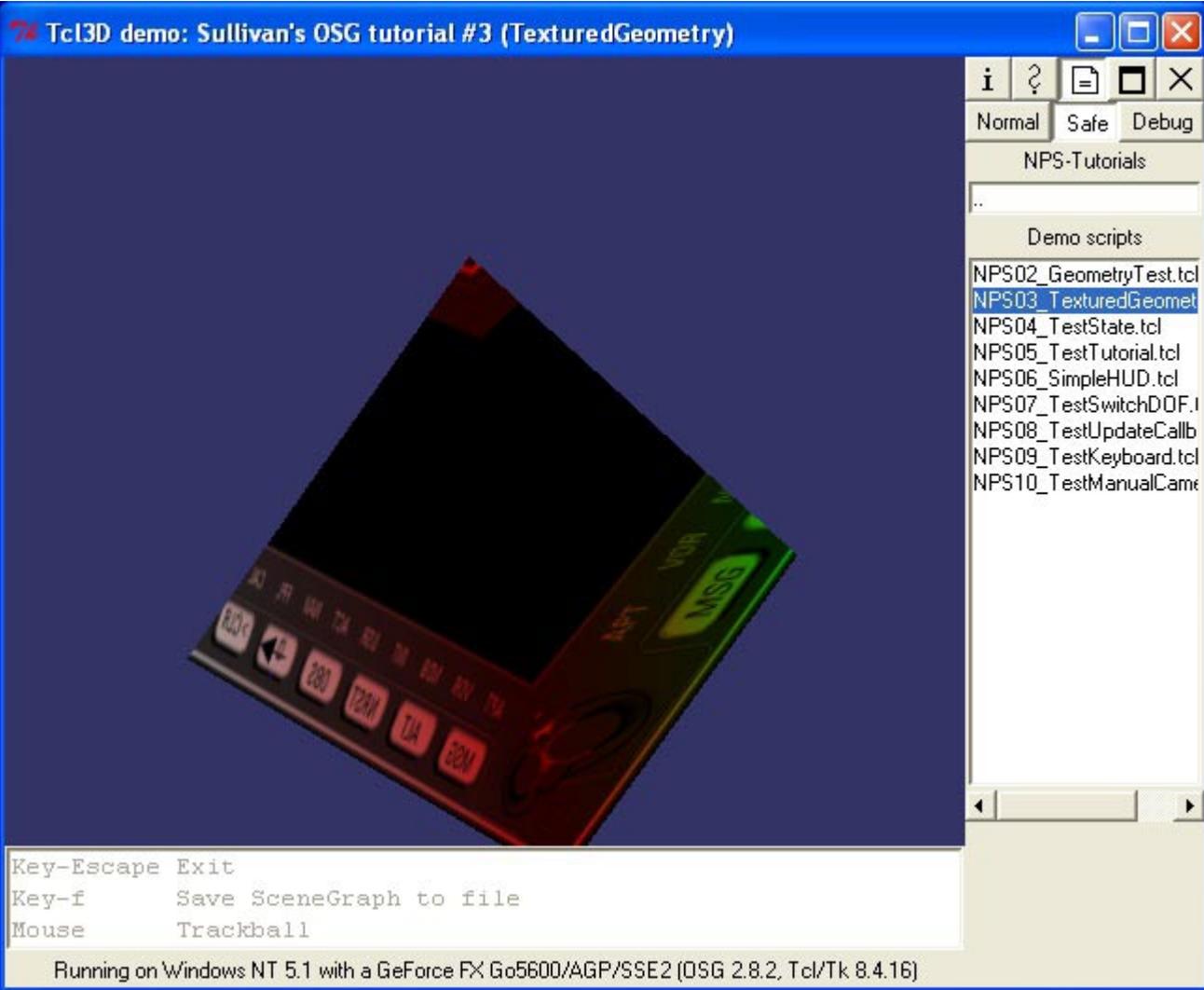
NPS02\_GeometryTest.tcl

Original C++ code by Joseph Sullivan.  
See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>NPS03_TexturedGeometry</b>
Type:	<a href="#">NPS-Tutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Sullivan's OSG tutorial #3 (TexturedGeometry)**



Key-Escape Exit  
 Key-f Save SceneGraph to file  
 Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

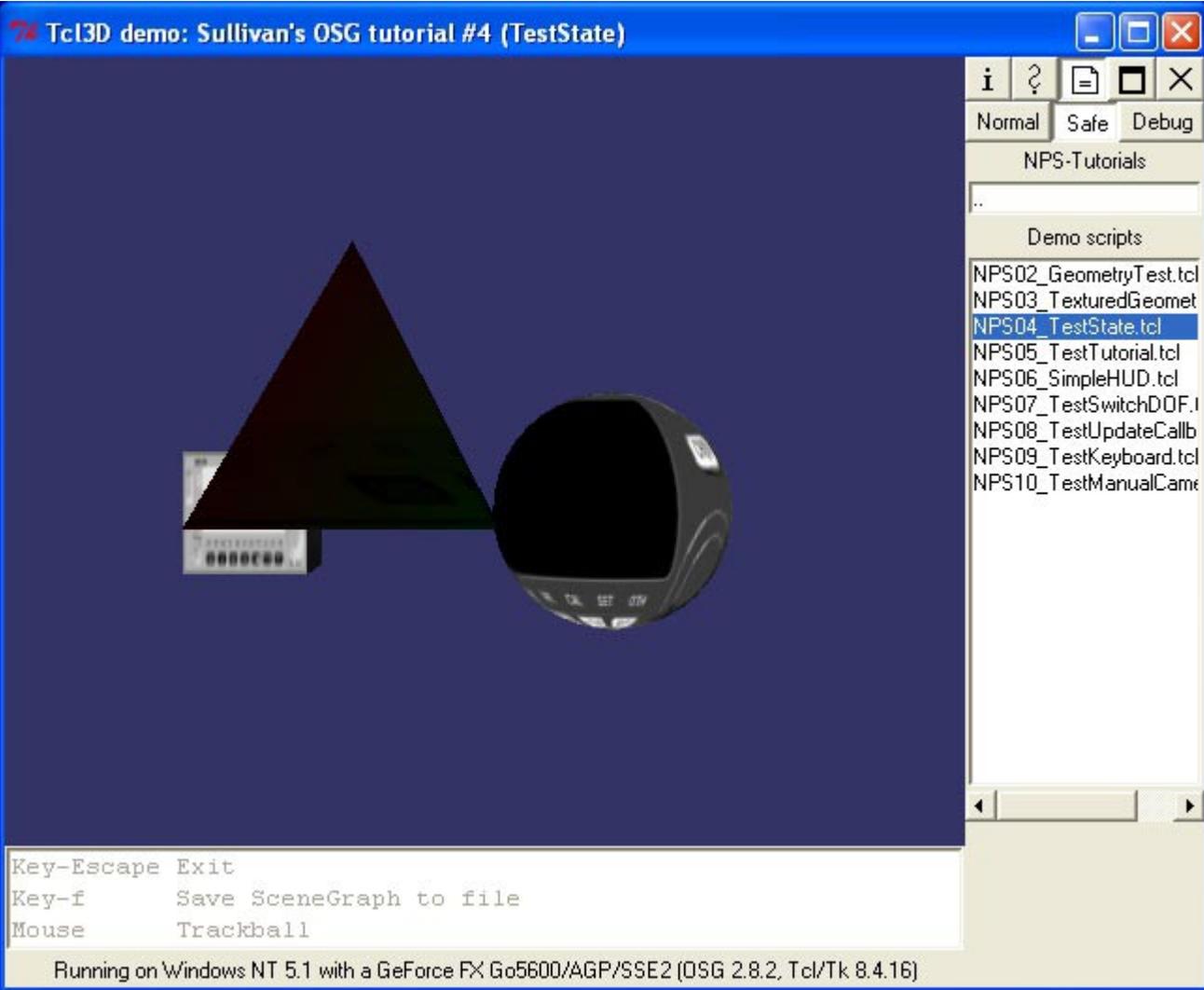
NPS03\_TexturedGeometry.tcl

Original C++ code by Joseph Sullivan.  
 See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
 for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>NPS04_TestState</b>
Type:	<a href="#">NPS-Tutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Sullivan's OSG tutorial #4 (TestState)**



Key-Escape Exit  
 Key-f Save SceneGraph to file  
 Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

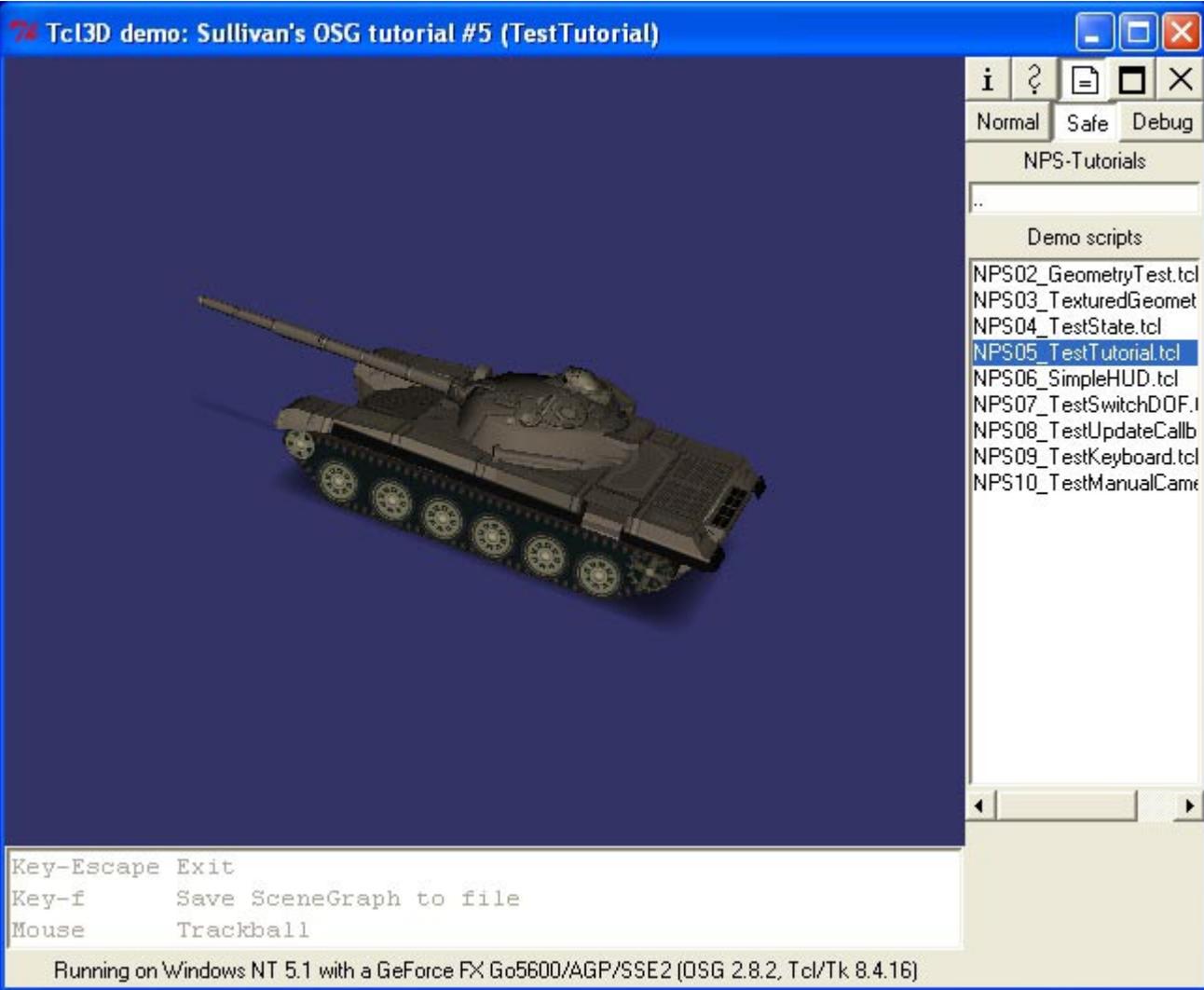
NPS04\_TestState.tcl

Original C++ code by Joseph Sullivan.  
 See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
 for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>NPS05_TestTutorial</b>
Type:	<a href="#">NPS-Tutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Sullivan's OSG tutorial #5 (TestTutorial)**



Key-Escape Exit  
 Key-f Save SceneGraph to file  
 Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

NPS05\_TestTutorial.tcl

Original C++ code by Joseph Sullivan.  
 See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
 for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>NPS06_SimpleHUD</b>
Type:	<a href="#">NPS-Tutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-f Save SceneGraph to file  
 Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

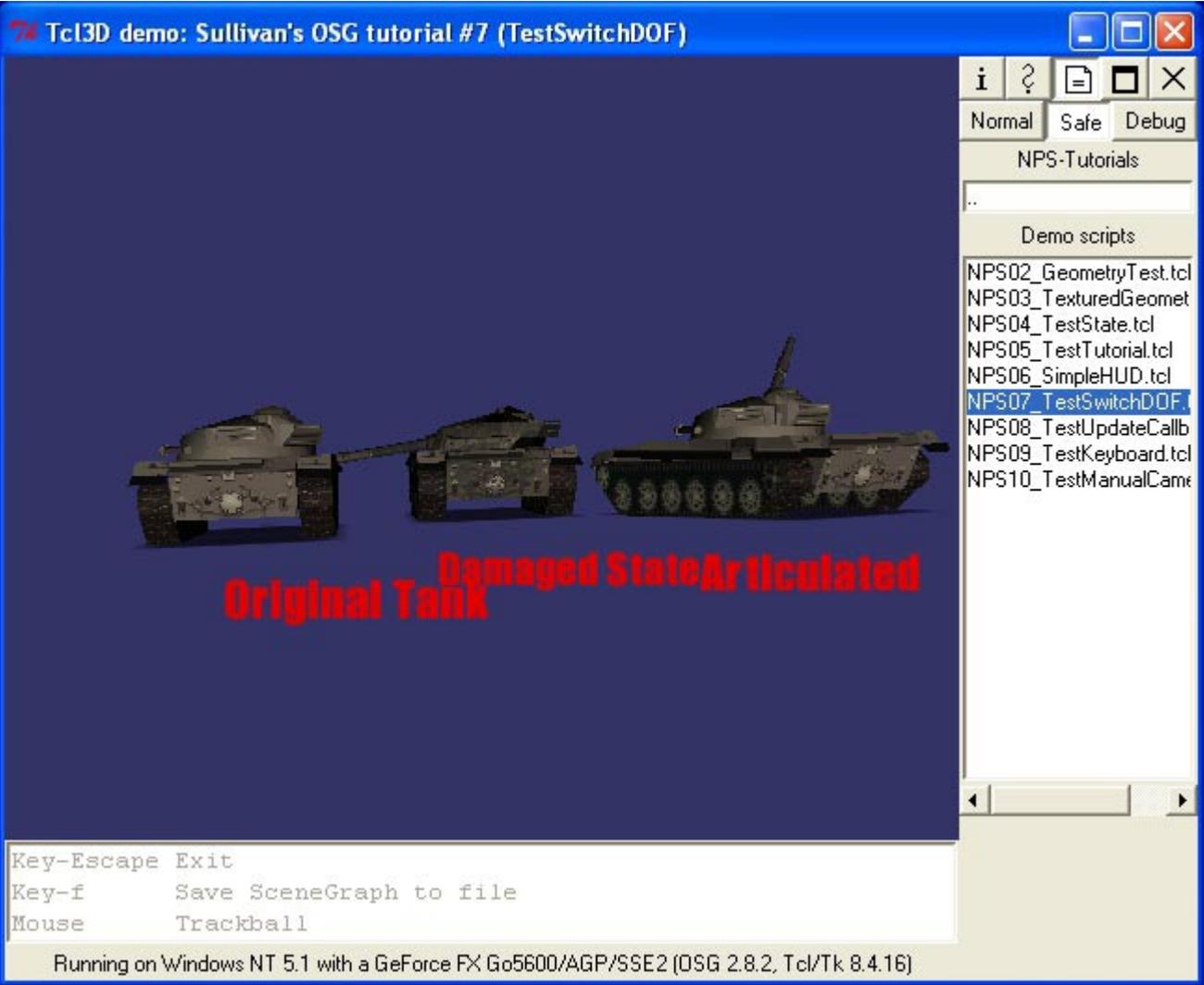
NPS06\_SimpleHUD.tcl

Original C++ code by Joseph Sullivan.  
 See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
 for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>NPS07_TestSwitchDOF</b>
Type:	<a href="#">NPS-Tutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Sullivan's OSG tutorial #7 (TestSwitchDOF)**



Key-Escape Exit  
Key-f Save SceneGraph to file  
Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

NPS07\_TestSwitchDOF.tcl

Original C++ code by Joseph Sullivan.  
See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>NPS08_TestUpdateCallback</b>
Type:	<a href="#">NPS-Tutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-f Save SceneGraph to file  
 Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

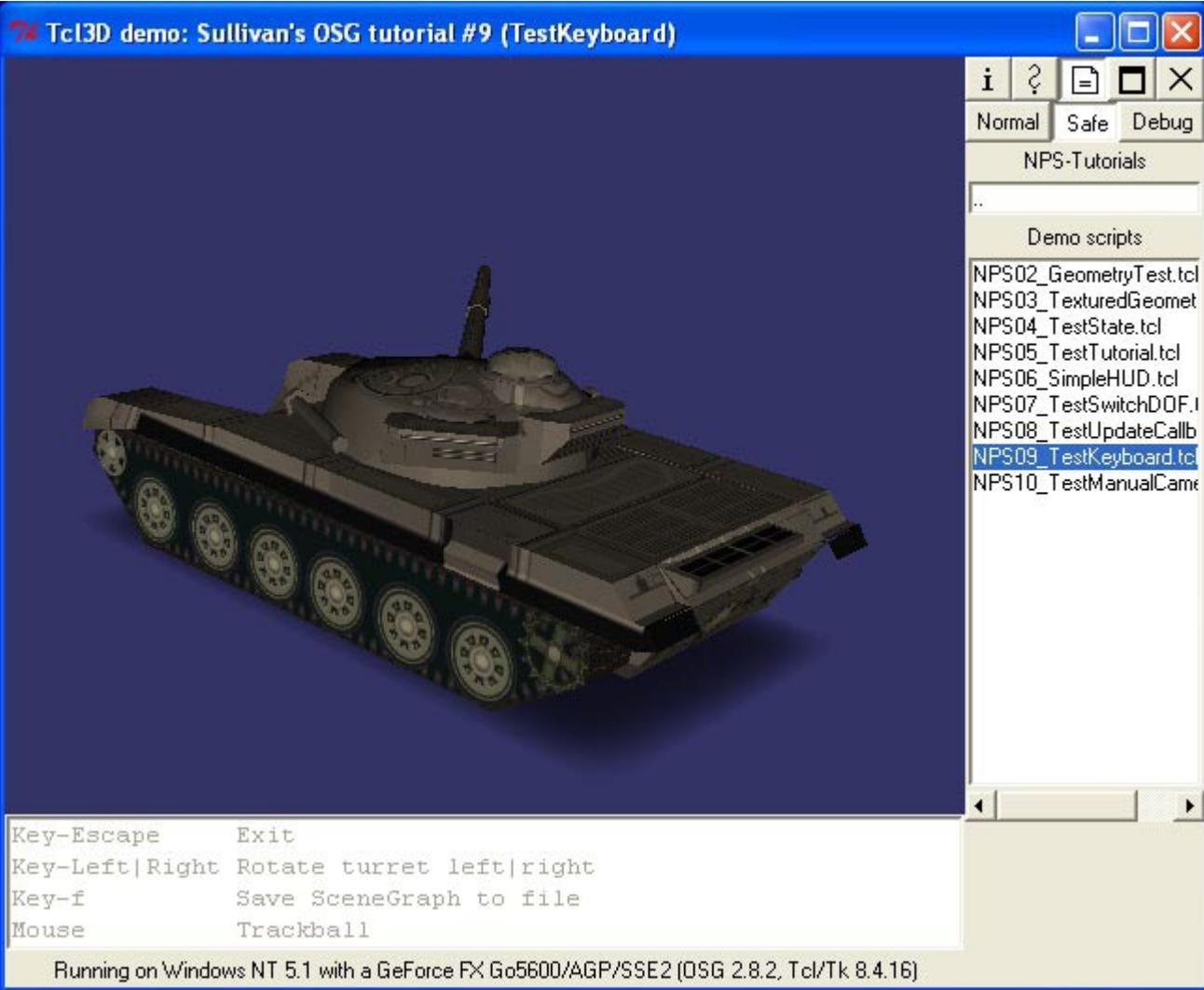
NPS08\_TestUpdateCallback.tcl

Original C++ code by Joseph Sullivan.  
 See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
 for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>NPS09_TestKeyboard</b>
Type:	<a href="#">NPS-Tutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

**Tcl3D demo: Sullivan's OSG tutorial #9 (TestKeyboard)**



Key-Escape      Exit  
Key-Left|Right    Rotate turret left|right  
Key-f             Save SceneGraph to file  
Mouse             Trackball

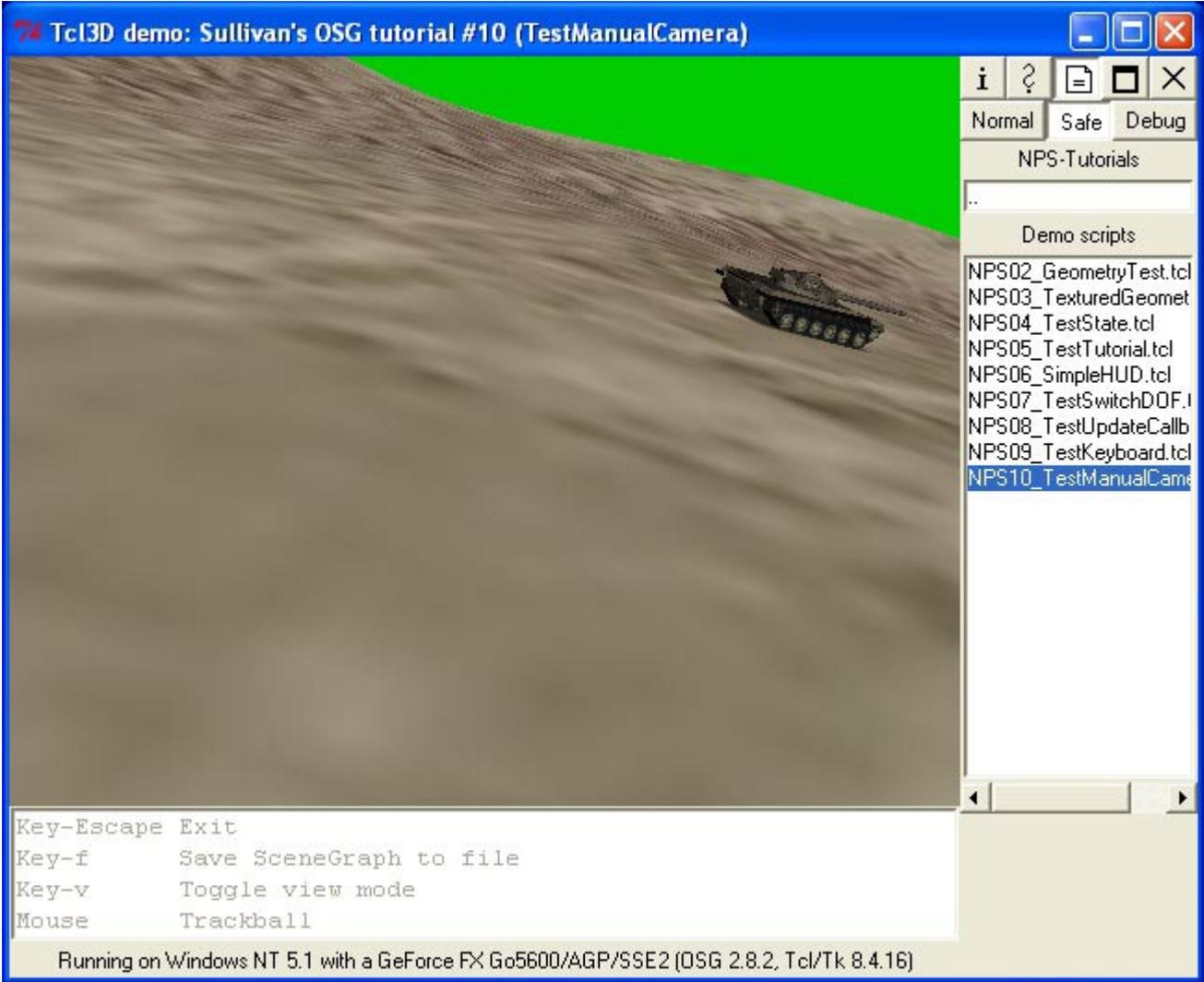
Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

NPS09\_TestKeyboard.tcl

Original C++ code by Joseph Sullivan.  
See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
for the original files.

Modified for Tcl3D by Paul Obermeier 2009/03/20.  
See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.

<b>Demo:</b>	<b>NPS10_TestManualCamera</b>
Type:	<a href="#">NPS-Tutorials</a>
Category:	<a href="#">OpenSceneGraph</a>
Root:	<a href="#">Contents</a>

Key-Escape Exit  
 Key-f Save SceneGraph to file  
 Key-v Toggle view mode  
 Mouse Trackball

Running on Windows NT 5.1 with a GeForce FX Go5600/AGP/SSE2 (OSG 2.8.2, Tcl/Tk 8.4.16)

NPS10\_TestManualCamera.tcl

Original C++ code by Joseph Sullivan.  
 See <http://www.openscenegraph.org/projects/osg/wiki/Support/Tutorials>  
 for the original files.

Modified for Tcl3D by Paul Obermeier 2009/05/01.  
 See [www.tcl3d.org](http://www.tcl3d.org) for the Tcl3D extension.