## Overview

<table>
<thead>
<tr>
<th>Category</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcl3dCg</td>
<td></td>
</tr>
<tr>
<td>tcl3dFTGL</td>
<td></td>
</tr>
<tr>
<td>tcl3dGauges</td>
<td></td>
</tr>
<tr>
<td>tcl3dOde</td>
<td></td>
</tr>
<tr>
<td>tcl3dOgl</td>
<td></td>
</tr>
<tr>
<td>tcl3dOglExt</td>
<td></td>
</tr>
<tr>
<td>tcl3dSDL</td>
<td></td>
</tr>
<tr>
<td>Tcl3DSpecificDemos</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>CodeSampler</td>
<td></td>
</tr>
<tr>
<td>GameProgrammer</td>
<td></td>
</tr>
<tr>
<td>NeHe</td>
<td></td>
</tr>
<tr>
<td>RedBook</td>
<td></td>
</tr>
<tr>
<td>Category:</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

Available types

- `tcl3dCg`
- `tcl3dFTGL`
- `tcl3dGauges`
- `tcl3dOde`
- `tcl3dOgl`
- `tcl3dOglExt`
- `tcl3dSDL`
- `tcl3dTogl`
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.

<table>
<thead>
<tr>
<th>Available demos</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="cgFireInTheSky" /></td>
</tr>
</tbody>
</table>
**Demo:** cgFireInTheSky

**Type:** tcl3dCg

**Category:** LibrarySpecificDemos

**Root:** Contents

---

**cgFireInTheSky.tcl**

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

Original files are Copyright (c) 2002 Jason Jerald

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.

2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.

3. This notice may not be removed or altered from any source distribution.
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
This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.

2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

Modified for Tcl3D by Paul Obermeier 2005/11/07
See www.tcl3d.org for the Tcl3D extension.
**Demo:** cgTeapot

- **Type:** tcl3dCg
- **Category:** LibrarySpecificDemos
- **Root:** Contents

---

**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 for the Tcl3D extension.
Demo: cgVertexExample
Type: tcl3dCg
Category: LibrarySpecificDemos
Root: Contents

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 for the Tcl3D extension.
This section contains FTGL demo applications written in Tcl3D. The examples cover the demo applications distributed with FTGL.

### Available demos

<table>
<thead>
<tr>
<th>Type:</th>
<th>tcl3dFTGL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category:</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

- ftglDemo
- ftglTest
Demo: ftglDemo
Type: tcl3dFTGL
Category: LibrarySpecificDemos
Root: Contents

This demo demonstrates the different rendering styles available with FTGL. Press <spacebar> 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 for the Tcl3D extension.
A test program showing the 5 different font rendering types.
This section contains demo applications written with Tcl3D extensions packages. The examples cover the tcl3dGauges package, which was supplied by Victor G. Bonilla.

<table>
<thead>
<tr>
<th>Available demos</th>
</tr>
</thead>
<tbody>
<tr>
<td>gaugedemo</td>
</tr>
<tr>
<td>gaugetest</td>
</tr>
<tr>
<td>Demo</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>Type:</td>
</tr>
<tr>
<td>Category:</td>
</tr>
<tr>
<td>Root:</td>
</tr>
</tbody>
</table>

**Demo: gaugedemo**

**Type:** tcl3dGauges  
**Category:** LibrarySpecificDemos  
**Root:** Contents

Copyright: 2005-2006 Paul Obermeier (obermeier@poSoft.de)

See the file "Tcl3D_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

**Module:** Tcl3D -> tcl3dGauges  
**Filename:** gaugedemo.tcl  
**Author:** Paul Obermeier  
**Description:** Demo program showing the use of the Tcl3D extension package gauge.
**Demo:** gaugetest  
**Type:** tcl3dGauges  
**Category:** LibrarySpecificDemos  
**Root:** Contents

<table>
<thead>
<tr>
<th>Type</th>
<th>tcl3dGauges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**Tcl3D demo: Gauge test**

Running on Windows NT with a GeForce FX Go5600/AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.12)

Copyright: 2005-2006 Paul Obermeier (obermeier@poSoft.de)

See the file "Tcl3D_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

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.
This section contains ODE demo applications written in Tcl3D. The examples cover some demo applications distributed with PyOde.

<table>
<thead>
<tr>
<th>Type:</th>
<th>tcl3dOde</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category:</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

Available demos

<table>
<thead>
<tr>
<th>odeGravity</th>
<th>odeJoints</th>
</tr>
</thead>
</table>

Copyright © 2005-2007 by Paul Obermeier. All rights reserved.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>odeGravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>tcl3dOde</td>
</tr>
<tr>
<td>Category:</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**Demo: odeGravity**

- **Type:** tcl3dOde
- **Category:** LibrarySpecificDemos
- **Root:** Contents

---

**Copyright:** 2006 Paul Obermeier (obermeier@poSoft.de)

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.
Demo: odeJoints
Type: tcl3dOde
Category: LibrarySpecificDemos
Root: Contents

Copyright: 2006 Paul Obermeier (obermeier@poSoft.de)

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: odeJoints.tcl
Author: Paul Obermeier

Description: Tcl3D Ode example: Connected bodies with joints
Based on PyODE Tutorial 2 By Matthias Baas.
This section contains OpenGL demo applications from several resources, that have been ported to Tcl3D. The examples cover basic OpenGL programming.
Original sources from different sites. See the documentation for details.

### Available demos

<table>
<thead>
<tr>
<th>GearTrain</th>
<th>Sierpinski</th>
<th>animlogo</th>
<th>atlantis</th>
<th>gluCylinder</th>
</tr>
</thead>
<tbody>
<tr>
<td>glutShapes</td>
<td>multiview</td>
<td>spheres</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Demo:** GearTrain

**Type:** tcl3dOgl

**Category:** LibrarySpecificDemos

**Root:** Contents

---

### GearTrain Simulator - Q Solutions

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

Copyright (C) 1999 Shobhan Kumar Dutta All Rights Reserved. <skdutta@del3.vsnl.net.in>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL SHOBHAN KUMAR DUTTA BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT
```
<table>
<thead>
<tr>
<th>Demo:</th>
<th>Sierpinski</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td><code>tcl3dOgl</code></td>
</tr>
<tr>
<td>Category:</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**Demo: Sierpinski Tetrahedron**

| 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](http://wiki.tcl.tk/11832).

Incorporates optimization functions by Philip Quaife. See the Tcl'ers Wiki [http://wiki.tcl.tk/14820](http://wiki.tcl.tk/14820) for a description of his optimizations.
Demo: animlogo
Type: tcl3dOgl
Category: LibrarySpecificDemos
Root: Contents

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

animlogo.tcl

The animated OpenGL logo

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

Copying, redistributing, etc is permitted as long as this copyright notice and the Dutch variable names :) stay in tact.

Original sources available at:
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 for the Tcl3D extension.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>atlantis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>tcl3dOgl</td>
</tr>
<tr>
<td>Category:</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

atlantis.tcl

Copyright (c) Mark J. Kilgard, 1994. */

(c) Copyright 1993, 1994, Silicon Graphics, Inc.
ALL RIGHTS RESERVED
Permission to use, copy, modify, and distribute this software for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both the copyright notice and this permission notice appear in supporting documentation, and that the name of Silicon Graphics, Inc. not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

THE MATERIAL EMBODIED ON THIS SOFTWARE IS PROVIDED TO YOU "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SILICON GRAPHICS, INC. BE LIABLE TO YOU OR ANYONE ELSE FOR ANY DIRECT, SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, OR ANY DAMAGES WHATSOEVER, INCLUDING WITHOUT LIMITATION, LOSS OF PROFIT, LOSS OF USE, SAVINGS OR REVENUE, OR THE CLAIMS OF
<table>
<thead>
<tr>
<th>Demo</th>
<th>gluCylinder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>tcl3dOgl</td>
</tr>
<tr>
<td>Category</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**Demo:** gluCylinder

**Type:** tcl3dOgl

**Category:** LibrarySpecificDemos

**Root:** Contents

**Copyright:** 2005-2006 Paul Obermeier (obermeier@poSoft.de)

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:** gluCylinder.tcl

**Author:** Paul Obermeier

**Description:** Tcl3D demo showing the use of gluQuadric routines to draw a cylinder.
Demo: glutShapes
Type: tcl3dOgl
Category: LibrarySpecificDemos
Root: Contents

Copyright: 2006-2007 Paul Obermeier (obermeier@poSoft.de)

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: glutShapes.tcl
Author: Paul Obermeier
Date: 2006-12-01
Description: Tcl3D demo showing all supported GLUT shapes.
**Demo:** multiview

**Type:** tcl3dOgl

**Category:** LibrarySpecificDemos

**Root:** Contents

---

**Tcl3D demo: Multiple viewports**

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

---

**Copyright:** 2005-2006 Paul Obermeier (obermeier@poSoft.de)

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:** multiview.tcl

**Author:** Paul Obermeier

**Description:** Tcl3D demo showing the famous teapot in 4 different viewports on a single togl widget.
Demo: spheres
Type: tcl3dOgl
Category: LibrarySpecificDemos
Root: Contents

Copyright: 2005-2006 Paul Obermeier (obermeier@poSoft.de)
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.
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.

<table>
<thead>
<tr>
<th>Available demos</th>
</tr>
</thead>
</table>

extensions
## Demo: extensions

<table>
<thead>
<tr>
<th>Type:</th>
<th>tcl3dOglExt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category:</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

### 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 files from:
http://www.gamedev.net/reference/programming/features/oglext/demo.zip

Modified for Tcl3D by Paul Obermeier 2005/09/05

See www.tcl3d.org for the Tcl3D extension.
This section contains SDL demo applications written in Tcl3D. The examples cover joystick and CD programming with the help of the SDL library.

<table>
<thead>
<tr>
<th>Type:</th>
<th>tcl3dSDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category:</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

Available demos

<table>
<thead>
<tr>
<th>cdplayer</th>
<th>joysticktest</th>
</tr>
</thead>
</table>
Demo: cdplayer
Type: tcl3dSDL
Category: LibrarySpecificDemos
Root: Contents

Copyright: 2006 Paul Obermeier (obermeier@poSoft.de)
See the file "Tcl3D_License.txt" for information on usage and redistribution of this file, and for a DISCLAIRER 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.
Demo: joysticktest
Type: tcl3dSDL
Category: LibrarySpecificDemos
Root: Contents

Copyright: 2005-2006 Paul Obermeier (obermeier@poSoft.de)
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: joysticktest.tcl
Author: Paul Obermeier
Description: Tcl script to test the joystick related functions of the Tcl3D SDL wrapping.
The following demos from the Togl distribution have been ported to Tcl3D. Original sources available at: [http://sourceforge.net/projects/togl/](http://sourceforge.net/projects/togl/)

<table>
<thead>
<tr>
<th>Type</th>
<th>tcl3dTogl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root</td>
<td>Contents</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Available demos</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcl3dDouble</td>
</tr>
<tr>
<td>tcl3dFont</td>
</tr>
<tr>
<td>tcl3dGears</td>
</tr>
<tr>
<td>tcl3dTexture</td>
</tr>
<tr>
<td>tcl3dToglFonts</td>
</tr>
</tbody>
</table>
### Demo: tcl3dDouble

<table>
<thead>
<tr>
<th>Type:</th>
<th>tcl3dTogl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category:</td>
<td>LibrarySpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

#### 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.

Demo: tcl3dFont

- Type: tcl3dTogl
- Category: LibrarySpecificDemos
- Root: Contents

Copyright: 2005-2006 Paul Obermeier (obermeier@poSoft.de)

See the file "Tcl3D_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

Module: Tcl3D -> tcl3dTogl
Filename: tcl3dFont.tcl
Author: Paul Obermeier

Description: Tcl script to select a font. The font is displayed in a Tk widget as well as in an OpenGL window. The font name in XLFD notation is shown in a text widget for copy/paste. This demo shows the usage of the "loadbitmapfont" command built into the Togl widget.

Note: The Tk font might look nicer, because font antialiasing is enabled. On Windows this can be toggled in the display property window (Appearance->Effects).
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 Quaife (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/
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.

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/
Demo: tcl3dToglFonts

Type: tcl3dTogl
Category: LibrarySpecificDemos
Root: Contents

Copyright: 2006 Paul Obermeier (obermeier@poSoft.de)

See the file "Tcl3D_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

Module: Tcl3D -> tcl3dTogl
Filename: tcl3dToglFonts.tcl
Author: Paul Obermeier

Description: Program demonstrating and testing the different possibilities of specifying a bitmap font for the Togl widget.
<table>
<thead>
<tr>
<th>Category:</th>
<th>Tcl3DSpecificDemos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
<tr>
<td></td>
<td>Available types</td>
</tr>
</tbody>
</table>
Demo: bytearray
Type: 
Category: Tcl3DSpecificDemos
Root: Contents

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
Demo: checkerBoard
Type: Category: Tcl3DSpecificDemos
Root: Contents

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
<table>
<thead>
<tr>
<th>Demo:</th>
<th>imgViewer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td></td>
</tr>
<tr>
<td>Category:</td>
<td>Tcl3DSpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**Tcl3D Image Viewer (poLogo200_text.gif)**

<table>
<thead>
<tr>
<th>File</th>
<th>Help</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Image Viewer" /></td>
<td></td>
</tr>
</tbody>
</table>

**Width x Height:** 493 x 429 (Original: 206 x 169)

**Copyright:** 2005-2006 Paul Obermeier (obermeier@poSoft.de)

See the file "Tcl3D_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

**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.
Demo: modelViewer
Type: 
Category: Tcl3DSpecificDemos
Root: Contents

Copyright: 2005-2006 Paul Obermeier (obermeier@poSoft.de)
See the file "Tcl3D_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

Module: Tcl3D
Filename: modelViewer.tcl
Author: Paul Obermeier
Description: Tcl program to display 3D model files in all formats supported by the Tcl3D extension.
**Demo:**

<table>
<thead>
<tr>
<th>tcl3dInfo</th>
</tr>
</thead>
</table>

**Type:**

**Category:** Tcl3DSpecificDemos

**Root:** Contents

---

**Copyright:** 2005-2006 Paul Obermeier (obermeier@poSoft.de)

See the file "Tcl3D_License.txt" for information on usage and redistribution of this file, and for a DISCLAIMER OF ALL WARRANTIES.

**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"

Note: To retrieve all necessary information, an OpenGL
context has to be established. So the batch mode
needs a DISPLAY, too.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>toglInCanvas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td></td>
</tr>
<tr>
<td>Category:</td>
<td>Tcl3DSpecificDemos</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**Demo:**

**toglInCanvas**

**Type:**

**Category:** Tcl3DSpecificDemos

**Root:** Contents

_Tcl3D demo using a Togl window and some button widgets inserted into a canvas._

**Author:** Paul Obermeier

**Date:** 2006-12-08

**Key:**
- **Escape** Exit
- **House-1|2** Start|Stop animation
- **Button** Move Togl window

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

`toglInCanvas.tcl`

_Tcl3D demo using a Togl window and some button widgets inserted into a canvas._

**Author:** Paul Obermeier

**Date:** 2006-12-08
**Demo:** vectormanip

**Type:**

**Category:** Tcl3DSpecificDemos

**Root:** Contents

---

**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 [r,g,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 choosen method and mapped onto the right quad. See functions execMethod? below.

Author: Paul Obermeier
Date: 2006-08-15
<table>
<thead>
<tr>
<th>Category: TutorialsAndBooks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root: Contents</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Available types</td>
</tr>
<tr>
<td>CodeSampler</td>
</tr>
<tr>
<td>GameProgrammer</td>
</tr>
<tr>
<td>NeHe</td>
</tr>
<tr>
<td>RedBook</td>
</tr>
</tbody>
</table>
Several demo applications from Kevin Harris' page have been ported to Tcl3D. The examples cover Cg, GLSL and OpenGL extension programming.
Original sources available at: [http://www.codesampler.com/oglsrc.htm](http://www.codesampler.com/oglsrc.htm)

<table>
<thead>
<tr>
<th>Available demos</th>
</tr>
</thead>
<tbody>
<tr>
<td>ogl_benchmark_sphere</td>
</tr>
<tr>
<td>ogl_fps_controls</td>
</tr>
<tr>
<td>ogl_glslang_simple_vs2ps</td>
</tr>
<tr>
<td>ogl_point_sprites</td>
</tr>
<tr>
<td>ogl_skingning</td>
</tr>
<tr>
<td>ogl_vertex_displacement</td>
</tr>
</tbody>
</table>
Demo: ogl_benchmark_sphere
Type: CodeSampler
Category: TutorialsAndBooks
Root: Contents

ogl_benchmark_sphere.tcl

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.

Original C++ code by Kevin Harris (kevin@codesampler.com) 04/21/05
See 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 for the Tcl3D extension.
**Demo:**

<table>
<thead>
<tr>
<th><strong>Demo:</strong></th>
<th><strong>ogl_fps_controls</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type:</strong></td>
<td>CodeSampler</td>
</tr>
<tr>
<td><strong>Category:</strong></td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td><strong>Root:</strong></td>
<td>Contents</td>
</tr>
</tbody>
</table>

This sample demonstrates how to collect user input and build a custom view matrix for First Person Shooter style controls.

Original C++ code by Kevin Harris (kevin@codesampler.com) 02/01/05
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.
Demo: ogl_glslang_simple_vs2ps
Type: CodeSampler
Category: TutorialsAndBooks
Root: Contents

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

Original C++ code by Kevin Harris (kevin@codesampler.com) 04/21/05
See 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 for the Tcl3D extension.

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.
This sample demonstrates how to create point sprites using OpenGL's 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) 02/01/05
See 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 for the Tcl3D extension.
Demo: ogl_skinning

Type: CodeSampler

Category: TutorialsAndBooks

Root: Contents

ogl_skinning.tcl

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.

Original C++ code by Kevin Harris (kevin@codesampler.com) 04/28/05
See 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 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.
Demo: ogl_vertex_displacement

Type: CodeSampler
Category: TutorialsAndBooks
Root: Contents

This sample demonstrates how to perform mesh deformation or vertex displacement with OpenGL using a Cg and GLSL shader.

Original C++ code by Kevin Harris (kevin@codesampler.com) 04/21/05
See 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 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.
Several demo applications from Vahid Kazemi's page have been ported to Tcl3D. Original sources available at: [http://www.GameProgrammer.org](http://www.GameProgrammer.org)

<table>
<thead>
<tr>
<th>Available demos</th>
</tr>
</thead>
<tbody>
<tr>
<td>GL_Blanding</td>
</tr>
<tr>
<td>GL_Envmap</td>
</tr>
<tr>
<td>GL_Font</td>
</tr>
<tr>
<td>GL_Lighting</td>
</tr>
<tr>
<td>GL_Motionblur</td>
</tr>
<tr>
<td>GL_Primitives</td>
</tr>
<tr>
<td>GL_Shadow</td>
</tr>
<tr>
<td>GL_Texturing</td>
</tr>
<tr>
<td>GL_Viewing</td>
</tr>
</tbody>
</table>
Demo: GL_Blending
Type: GameProgrammer
Category: TutorialsAndBooks
Root: Contents

GL_Blending.tcl

Tutorial from 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 for the Tcl3D extension.
Demo: GL_Envmap

Type: GameProgrammer
Category: TutorialsAndBooks
Root: Contents

Tutorial from 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 for the Tcl3D extension.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>GL_Font</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>GameProgrammer</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**Demo:** GL_Font

**Type:** GameProgrammer

**Category:** TutorialsAndBooks

**Root:** Contents

GL_Font.tcl

Tutorial from 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 for the Tcl3D extension.
GL_Lighting

Tutorial from 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 for the Tcl3D extension.
Demo: GL_Motionblur

<table>
<thead>
<tr>
<th>Type: GameProgrammer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category: TutorialsAndBooks</td>
</tr>
<tr>
<td>Root: Contents</td>
</tr>
</tbody>
</table>

Tutorial from 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 for the Tcl3D extension.
**Demo:**

**GL_Primitives**

**Type:** GameProgrammer

**Category:** TutorialsAndBooks

**Root:** Contents

---

**GL_Primitives.tcl**

Tutorial from 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.
Demo: GL_Shadow

Type: GameProgrammer
Category: TutorialsAndBooks
Root: Contents

GL_Shadow.tcl

Tutorial from 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 for the Tcl3D extension.
**Demo:** GL_Texturing  
**Type:** GameProgrammer  
**Category:** TutorialsAndBooks  
**Root:** Contents

![GL_Texturing screenshot](image)

**GL_Texturing.tcl**

Tutorial from 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 for the Tcl3D extension.
Demo: GL_Viewing
Type: GameProgrammer
Category: TutorialsAndBooks
Root: Contents

GL_Viewing.tcl

Tutorial from 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 for the Tcl3D extension.
### Available demos

<table>
<thead>
<tr>
<th>Lesson01</th>
<th>Lesson02</th>
<th>Lesson03</th>
<th>Lesson04</th>
<th>Lesson05</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Lesson01" /></td>
<td><img src="image2.jpg" alt="Lesson02" /></td>
<td><img src="image3.jpg" alt="Lesson03" /></td>
<td><img src="image4.jpg" alt="Lesson04" /></td>
<td><img src="image5.jpg" alt="Lesson05" /></td>
</tr>
<tr>
<td>Lesson06</td>
<td>Lesson07</td>
<td>Lesson08</td>
<td>Lesson09</td>
<td>Lesson10</td>
</tr>
<tr>
<td><img src="image6.jpg" alt="Lesson06" /></td>
<td><img src="image7.jpg" alt="Lesson07" /></td>
<td><img src="image8.jpg" alt="Lesson08" /></td>
<td><img src="image9.jpg" alt="Lesson09" /></td>
<td><img src="image10.jpg" alt="Lesson10" /></td>
</tr>
<tr>
<td>Lesson11</td>
<td>Lesson12</td>
<td>Lesson13</td>
<td>Lesson14</td>
<td>Lesson16</td>
</tr>
<tr>
<td><img src="image11.jpg" alt="Lesson11" /></td>
<td><img src="image12.jpg" alt="Lesson12" /></td>
<td><img src="image13.jpg" alt="Lesson13" /></td>
<td><img src="image14.jpg" alt="Lesson14" /></td>
<td><img src="image16.jpg" alt="Lesson16" /></td>
</tr>
<tr>
<td>Lesson18</td>
<td>Lesson19</td>
<td>Lesson20</td>
<td>Lesson21</td>
<td>Lesson22</td>
</tr>
<tr>
<td><img src="image18.jpg" alt="Lesson18" /></td>
<td><img src="image19.jpg" alt="Lesson19" /></td>
<td><img src="image20.jpg" alt="Lesson20" /></td>
<td><img src="image21.jpg" alt="Lesson21" /></td>
<td><img src="image22.jpg" alt="Lesson22" /></td>
</tr>
<tr>
<td>Lesson23</td>
<td>Lesson24</td>
<td>Lesson26</td>
<td>Lesson28</td>
<td>Lesson33</td>
</tr>
<tr>
<td><img src="image23.jpg" alt="Lesson23" /></td>
<td><img src="image24.jpg" alt="Lesson24" /></td>
<td><img src="image26.jpg" alt="Lesson26" /></td>
<td><img src="image28.jpg" alt="Lesson28" /></td>
<td><img src="image33.jpg" alt="Lesson33" /></td>
</tr>
<tr>
<td>Lesson36</td>
<td>Lesson37</td>
<td>Lesson41</td>
<td>Lesson45</td>
<td>Lesson46</td>
</tr>
<tr>
<td><img src="image36.jpg" alt="Lesson36" /></td>
<td><img src="image37.jpg" alt="Lesson37" /></td>
<td><img src="image41.jpg" alt="Lesson41" /></td>
<td><img src="image45.jpg" alt="Lesson45" /></td>
<td><img src="image46.jpg" alt="Lesson46" /></td>
</tr>
<tr>
<td>Lesson47</td>
<td>Lesson48</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some of the NeHe OpenGL tutorials have been ported to run with Tcl3D. Currently 32 out of 48 lessons are available. Original sources available at: [http://nehe.gamedev.net/](http://nehe.gamedev.net/)
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

Modified for Tcl3D by Paul Obermeier 2006/01/25
See www.tcl3d.org for the Tcl3D extension.
Lesson02.tcl

NeHe's First Polygon 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.
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.
Lesson04.tcl

NeHe's Rotation 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.
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!
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.
Demo: Lesson06

Type: NeHe
Category: TutorialsAndBooks
Root: Contents

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

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

<table>
<thead>
<tr>
<th>Demo</th>
<th>Lesson07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>NeHe</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

#### 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

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

Lesson08

Type:

NeHe

Category:

TutorialsAndBooks

Root:

Contents

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

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

<table>
<thead>
<tr>
<th>Lesson09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
</tr>
<tr>
<td>Category:</td>
</tr>
<tr>
<td>Root:</td>
</tr>
</tbody>
</table>

### 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

Modified for Tcl3D by Paul Obermeier 2006/01/25
See www.tcl3d.org for the Tcl3D extension.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>Lesson10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>NeHe</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

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

Modified for Tcl3D by Paul Obermeier 2006/01/25
See www.tcl3d.org for the Tcl3D extension.
<table>
<thead>
<tr>
<th>Demo</th>
<th>Lesson11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>NeHe</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

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

Modified for Tcl3D by Paul Obermeier 2006/01/25
See www.tcl3d.org for the Tcl3D extension.
Lesson 12

Type: NeHe
Category: TutorialsAndBooks
Root: Contents

Lesson12.tcl

NeHe’s Display List 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.
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

Modified for Tcl3D by Paul Obermeier 2006/01/25
See www.tcl3d.org for the Tcl3D extension.
Lesson14

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

Modified for Tcl3D by Paul Obermeier 2006/08/26
See www.tcl3d.org for the Tcl3D extension.
### Demo: Lesson16

<table>
<thead>
<tr>
<th>Type:</th>
<th>NeHe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

#### Lesson16.tcl

**Chris Aliotta & NeHe's Fog Tutorial**

This Code Was Created By Christopher Aliotta & Jeff Molofee 2000
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.
**Demo:**

**Lesson18**

**Type:** NeHe

**Category:** TutorialsAndBooks

**Root:** Contents

---

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

![Image of a 3D object with controls]

**Key-Escape** Exit

**Key-F1** Toggle window mode

**Key-1** Toggle lighting

**Key-f** Toggle filter

**Key-Space** Toggle quadratics

**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

---

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 and nehe.gamedev.net

Modified for Tcl3D by Paul Obermeier 2006/01/25

See www.tcl3d.org for the Tcl3D extension.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>Lesson19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>NeHe</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**Tcl3D demo: NeHe's Particle Tutorial (Lesson 19)**

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-8|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 RX 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

Modified for Tcl3D by Paul Obermeier 2006/03/14
See www.tcl3d.org for the Tcl3D extension.
Lesson20

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

Modified for Tcl3D by Paul Obermeier 2006/03/14
See www.tcl3d.org for the Tcl3D extension.
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

Modified for Tcl3D by Paul Obermeier 2006/03/14
See www.tcl3d.org for the Tcl3D extension.
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

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

Modified for Tcl3D by Paul Obermeier 2006/08/16
See www.tcl3d.org for the Tcl3D extension.
Demo:

Lesson23

Type: NeHe

Category: TutorialsAndBooks

Root: Contents

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 and nehe.gamedev.net

Modified for Tcl3D by Paul Obermeier 2006/08/27
See www.tcl3d.org for the Tcl3D extension.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>Lesson24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>NeHe</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

### 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

Modified for Tcl3D by Paul Obermeier 2006/08/25

See www.tcl3d.org for the Tcl3D extension.

---

See www.tcl3d.org for the Tcl3D extension.
Demo: Lesson26
Type: NeHe
Category: TutorialsAndBooks
Root: Contents

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

Modified for Tcl3D by Paul Obermeier 2006/08/16
See www.tcl3d.org for the Tcl3D extension.
Demo: Lesson28

Type: NeHe
Category: TutorialsAndBooks
Root: Contents

David Nikdel & NeHe's Bezier Tutorial

This Code Was Published By Jeff Molofee 2000
Code Was Created By David Nikdel For NeHe Productions
If You've Found This Code Useful, Please Let Me Know.
Visit My Site At nehe.gamedev.net

Modified for Tcl3D by Paul Obermeier 2006/08/29
See www.tcl3d.org for the Tcl3D extension.
Lesson33.tcl

NeHe & Evan "terminate" Pipho's TGA Loading Tutorial

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

This Code Was Created By Evan Pipho
If You've Found This Code Useful, Please Let Me Know.
Visit My Site At nehe.gamedev.net

Modified for Tcl3D by Paul Obermeier 2006/08/16
See www.tcl3d.org for the Tcl3D extension.
Demo: Lesson36
Type: NeHe
Category: TutorialsAndBooks
Root: Contents

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

Modified for Tcl3D by Paul Obermeier 2006/08/23
See www.tcl3d.org for the Tcl3D extension.
### Demo: Lesson 37

<table>
<thead>
<tr>
<th>Type:</th>
<th>NeHe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

#### Tcl3D demo: Sami Hamlaoui’s Cel-Shading Tutorial (Lesson 37)

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

Modified for Tcl3D by Paul Obermeier 2006/08/22
See www.tcl3d.org for the Tcl3D extension.
Lesson 41

Type: NeHe
Category: TutorialsAndBooks
Root: Contents

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

Modified for Tcl3D by Paul Obermeier 2006/08/27
See www.tcl3d.org for the Tcl3D extension.
Demo: Lesson45
Type: NeHe
Category: TutorialsAndBooks
Root: Contents

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

Modified for Tcl3D by Paul Obermeier 2006/08/17
See www.tcl3d.org for the Tcl3D extension.
Demo: Lesson46

Type: NeHe

Category: TutorialsAndBooks

Root: Contents

---

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

Modified for Tcl3D by Paul Obermeier 2006/08/13
See 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.
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

Modified for Tcl3D by Paul Obermeier 2006/09/05
See www.tcl3d.org for the Tcl3D extension.
Lesson 48

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

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


### Available demos

<table>
<thead>
<tr>
<th>Type</th>
<th>RedBook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root</td>
<td>Contents</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>aapoly</th>
<th>aapolyStride</th>
<th>aarbg</th>
<th>accanti</th>
<th>accpersp</th>
</tr>
</thead>
<tbody>
<tr>
<td>alpha</td>
<td>alpha3D</td>
<td>bezcurve</td>
<td>bezmesh</td>
<td>bezsulf</td>
</tr>
<tr>
<td>blendeqn</td>
<td>checker</td>
<td>clip</td>
<td>colormat</td>
<td>colormatrix</td>
</tr>
<tr>
<td>colortable</td>
<td>combiner</td>
<td>convolution</td>
<td>cube</td>
<td>cubemap</td>
</tr>
<tr>
<td>dof</td>
<td>double</td>
<td>drawf</td>
<td>feedback</td>
<td>fog</td>
</tr>
<tr>
<td>fogcoord</td>
<td>font</td>
<td>hello</td>
<td>histogram</td>
<td>image</td>
</tr>
<tr>
<td>light</td>
<td>lines</td>
<td>list</td>
<td>material</td>
<td>minmax</td>
</tr>
<tr>
<td>mipmap</td>
<td>model</td>
<td>movelight</td>
<td>multisamp</td>
<td>multitex</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>-----------</td>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td>marray</td>
<td>pickdepth</td>
<td>picksquare</td>
<td>planet</td>
<td>pointp</td>
</tr>
<tr>
<td>polyoff</td>
<td>polys</td>
<td>quadric</td>
<td>robot</td>
<td>scene</td>
</tr>
<tr>
<td>select</td>
<td>shadowmap</td>
<td>smooth</td>
<td>stencil</td>
<td>stroke</td>
</tr>
<tr>
<td>surface</td>
<td>teapots</td>
<td>texbind</td>
<td>texgen</td>
<td>texprox</td>
</tr>
<tr>
<td>texsub</td>
<td>texture3d</td>
<td>texturesurf</td>
<td>torus</td>
<td>trim</td>
</tr>
<tr>
<td>unproject</td>
<td>varray</td>
<td>wrap</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.
Demo: aapolyStride
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>aargb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>RedBook</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**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.
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.
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().
α

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

Tcl3D demo: OpenGL Red Book example alpha

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.
Demo: alpha3D
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
bezcurve.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 draw a Bezier curve.
bezmesh.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 lighted, filled Bezier surface, using two-dimensional evaluators.
Demo: bezsurf

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
See file LICENSE for complete license information.

This program renders a wireframe Bezier surface,
using two-dimensional evaluators.
Demo: blendeqn

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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

Extension function: glBlendEquation OpenGL 1.2
Demo: checker
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
Demo: clip

Type: RedBook

Category: TutorialsAndBooks

Root: Contents

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 arbitrary clipping planes.
Demo:
colormat

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
Demo: colormatrix

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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
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.
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.
Demo: convolution

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
See file LICENSE for complete license information.

Use various 2D convolutions filters to find edges in an image.
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.
Demo: cubemap
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
Demo: dof

Type: RedBook

Category: TutorialsAndBooks

Root: Contents

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.
Demo: double

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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

This is a simple double buffered program.
Pressing the left mouse button rotates the rectangle.
Pressing the middle mouse button stops the rotation.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>drawf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>RedBook</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**drawf.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 the bitmapped letter F on the screen (several times).
This demonstrates use of the glBitmap() call.
Demo: feedback

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
### Demo: fog

<table>
<thead>
<tr>
<th>Type</th>
<th>RedBook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root</td>
<td>Contents</td>
</tr>
</tbody>
</table>

#### 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.

Running on Windows NT with a GeForce RX Go5600/AGP/SSE2 (OpenGL 1.1.4, Tcl 8.4.13)
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 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.

Extension function: glFogCoordfEXT
### Demo: font

<table>
<thead>
<tr>
<th>Type</th>
<th>RedBook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**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.
hello.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 a simple, introductory OpenGL program.
Demo: histogram

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.

Compute the histogram of the image. This program illustrates the use of the glHistogram() function.
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.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>RedBook</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

---

**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.
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 geometric primitives and their attributes.
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.
See file LICENSE for complete license information.

This program demonstrates how to make and execute a display list. Note that attributes, such as current color and matrix, are changed.
Demo: material
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
Several objects are drawn using different material characteristics.
A single light source illuminates the objects.
### Demo: minmax

<table>
<thead>
<tr>
<th>Type</th>
<th>RedBook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**minmax.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.

Determine the minimum and maximum values of a group of pixels. This demonstrates use of the `glMinmax()` call.

![Image of minmax demo](demo.png)

Running on Windows NT with a GeForce RX 5600 AGP/SSE2 (OpenGL 1.4.0, Tcl 8.4.13)
**Demo:** mipmap

<table>
<thead>
<tr>
<th>Type:</th>
<th>RedBook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**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.
Demo: model
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

model.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 modeling transformations.
Demo: movelight
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
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.
### multitex

**Type:** RedBook  
**Category:** TutorialsAndBooks  
**Root:** Contents

#### multitex.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.
Demo:
mvarray
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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 multiple vertex arrays,
specifically the OpenGL routine glMultiDrawElements().
Demo:

pickdepth

Type: RedBook

Category: TutorialsAndBooks

Root: Contents

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.
Demo: picksquare
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
Demo: planet
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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 models.
Interaction: pressing the d and y keys (day and year) alters the rotation of the planet around the sun.
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.
Demo: polyoff

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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").
**Demo:** polys

<table>
<thead>
<tr>
<th>Type</th>
<th>RedBook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root</td>
<td>Contents</td>
</tr>
</tbody>
</table>

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.
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.
Demo: robot
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
## Demo: scene

<table>
<thead>
<tr>
<th>Type</th>
<th>RedBook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root</td>
<td>Contents</td>
</tr>
</tbody>
</table>

### 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.
Demo: select
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
<table>
<thead>
<tr>
<th>Demo:</th>
<th>shadowmap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>RedBook</td>
</tr>
<tr>
<td>Category:</td>
<td>TutorialsAndBooks</td>
</tr>
<tr>
<td>Root:</td>
<td>Contents</td>
</tr>
</tbody>
</table>

**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.
Demo: smooth
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
See file LICENSE for complete license information.

This program demonstrates smooth shading.
A smooth shaded polygon is drawn in a 2-D projection.
Stencil Buffer

Stencil Buffer in 3D

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.
Demo: stroke
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
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.
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.
Demo: texbind
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
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.
Demo:  texprox
Type:  RedBook
Category:  TutorialsAndBooks
Root:  Contents

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.
Demo: texsub

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

法院 texsub

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.
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.
Demo: texturesurf

Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.
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.
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, using both a NURBS curve and pwl
(piecewise linear) curve to trim part of the surface.
Demo: unproject

Type: RedBook

Category: TutorialsAndBooks

Root: Contents

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.
**Demo:**

<table>
<thead>
<tr>
<th>varray</th>
</tr>
</thead>
</table>

**Type:** RedBook

| Category: | TutorialsAndBooks |

| Root: | Contents |

---

**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.
Demo: wrap
Type: RedBook
Category: TutorialsAndBooks
Root: Contents

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.