Cheetah3D

Quick Start Manual

Contents

Cheetah3D

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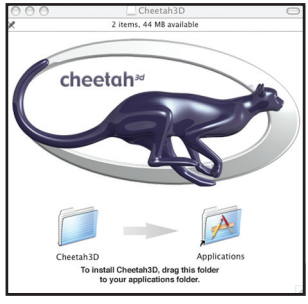
Welcome to Cheetah3D

During this quick start manual you are going to be guided through an easy tutorial of the many features in Cheetah3D. By the end of the quickstart guide you will have a good understanding of the basics which you can apply to your own work.

Installation

Before we can get started with the tutorial we need to install Cheetah3D. Open the Installation disk and drag the Cheetah3D folder onto your Application folder and the software will be copied to your system.



Software Registration

Cheetah3D allows you to try the application in demo mode, everything works but it is save disabled. To unlock the application the registration code has to be entered into the register panel of Cheetah3D's start-up splash screen or in the Cheetah3D context menu labeled 'Register Cheetah3d...'

Working in Modes

Modes are the elements which describe an object in Cheetah3D, the modes are: Point, Edge, Polygon, Object and Pivot. As Modes are used a lot for selection and modification of objects and other scene elements they have been added to the Tool bar.

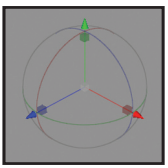
Adding New Objects

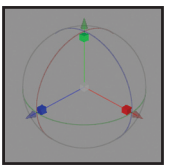
Adding objects into a scene couldn't be easier. Cheetah3D has a group of preset objects which can be found in the Polygon Object menu of the tool bar.

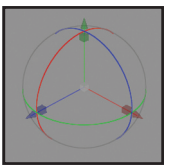
Transform Tool

Now we can add an object to a scene, how can we transform it? That's where the transform tool lets us: move, scale and rotate. Add a box to your scene and select the transform tool.

With the box object highlighted in the object browser menu on the right of the document window, Cheetah3D will display the transform widget for that selected object. Use the widget to move, scale and rotate the object.







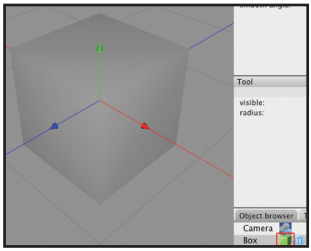
The move and scale widget can also be use to perform a move/scale which is constrained in the direction of a chosen axis. For example if you drag the Y move arrow now the X and Z co-ordinates are locked and the object just moves into the Y direction. However, if you drag the Y arrow while holding the SHIFT key the Y axis will be locked and you can move the object in the X-Z plane.

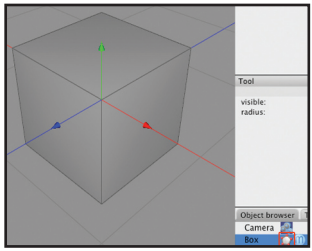
Editable Polygon Objects

Polygon objects are parametric so you can transform the overall attributes such as size, position and polygon face count but you cannot transform the elements which make the object: point, edge or polygon.

As an example, to make a box parametric polygon object editable simple double mouse click on the Parametric Polygon Object tag (this is the green box next to the name of object) and the tag will change to a Polygon Object tag (a pentagon with red dots connected by lines).

In the two illustrations below a parametric box has been created and transformed into an editable polygon object, all the elements of this object can now be transformed.



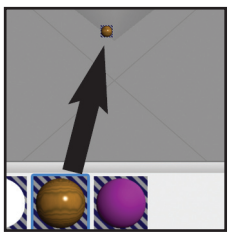


Material Browser

The material browser manages all the materials used in a scene. You can use it to add, delete or find materials.
New materials are added to a scene by using the “Add Material” pull down button. Just click on the button and select the shader you want to use from the menu.

Assigning Materials

There’s more than one way to attach a material to a polygon object, you can drag the desired material onto an object/ polygon selection or drag the material onto the name of the polygon object in the object browser.

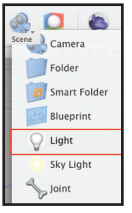


Delete Materials

To delete a material select the material in the material browser and press the delete key (<-). The material browser also lets you search for material names or material types. For example if you enter “Wood” in the upper right search field. Only those materials will be displayed which are either a wood shader or which contain the word “wood” in their name.

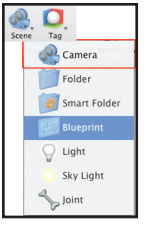
Lights

Every new Cheetah3D document already has one default light source, the camera light. The camera light is a point light with constant attenuation at the position of the camera. This camera light will not appear in the object browser. The camera light should be sufficient for most modelling jobs.
However, if you want to create your own lighting environment you have to use light objects. You can add as many light sources to your scene as you want but only the first 8 lights in the scene will be used in the 3D preview. The renderer works with all light sources.



Camera

When you start Cheetah3D a new document is opened with only one object in it, a camera. Every scene needs at least one camera object. Without a camera object you can see only a grey background in the 3D view. It is possible to put as many cameras as you want into the scene but only one camera can be active at once. The active camera is the camera through which you look. You can add a camera from the scene menu in the top tool bar.



Render

Cheetah3D currently offers a raytracer for rendering which supports radiosity and HDRI renderings. The renderer is fully integrated into Cheetah3D and is multi-threaded so that you can use all of your CPUs if you have a multi- processor Mac. So, you've set up an amazing scene with objects, textures and lights simply hit the render icon and let Cheetah3D do the rest.

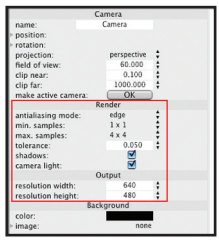
Render Manager

All renders you produce are generated and stored in the render manager for viewing, saving and deleting. Each render you produce is listed in the open job manager drawer. Just click on a listed render and it is displayed in the main render manager window.

The illustration below shows a render with the open job manager drawer listing the renders produced for the scene.

Render setting

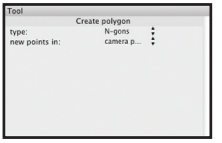
The active scene camera also contains settings which will affect the renders you produce with Cheetah3D. The default camera render settings are fine for most images. You can also attach: Radiosity, HDRI, Fog and DOF tag, from the tag object menu to the camera. This extends the function of the camera.



Polygon Modelling

Cheetah3D uses polygons to model, a polygon is a shape constructed of points and closed edges, which create a face or polygon.

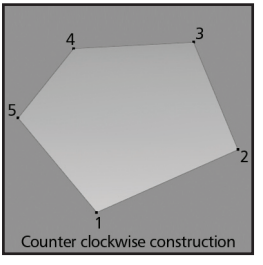
An easy way to create a polygon is using the polygon creation command, go to the object menu in the tool bar at the top of the screen and from the polygon sub menu select polygonobject. This will add a new object to your object browser, make sure you are in polygon mode and select create polygon from the Tool->Polygon menu. Look in the tool menu on the right of the document screen; the properties of the tool are displayed.



We can create ngons which are polygons with more than four points, quads are constructed from 4 points and triangles contain 3 points. New polygons can be created from the camera's perspective so they can be made an all 3 axis or in main plains, which restricts the construction to be perpendicular to 1 axis.

Remember: To reset a tool press the ESC key.

Tip: Construct a new polygon in an anti-clockwise direction so that the normal (All polygons have a direction called a normal) is facing the camera. To close a polygon select the first point you created, this closes the polygon and makes a new polygon face.



Example: Create a new polygon clockwise and another new polygon anti-clockwise. The clockwise polygon will be dark grey and the anti-clockwise polygon will be white.

Tip: To change the direction of a polygon normal use the flip polygon tool. Go into polygon mode, select the polygon you want to flip and right-hand mouse click. From the menu select flip normal.

Adding Polygons

Cheetah3D has a whole range of polygon modelling tools to modify and add polygons. After you've created a polygon you can add additional polygon detail, check out the help menu inside Cheetah3D for a full list of tools. Below are just a couple of tools to get you started.

Tip: All of these tools can be added to a hot key or by right-hand mouse clicking after selecting the polygon you want to modify.

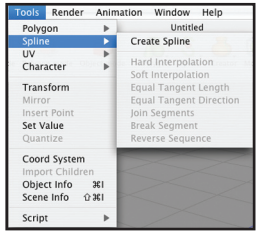
One such tool is the scalpel which works in point, edge and polygon mode and can be used to cut into a polygon.

Example: create a plane; make it editable in polygon mode right-hand mouse click and select scalpel from the pop-up menu. The cut can begin at an edge or point of a polygon and must finish at an edge or point of a polygon.

Spline Modelling

Not only can you model with Parametric Objects and polygons, oh no, another method of modelling is splines. A spline is a line made up of two or more points. There are several types of splines: A linear spline merely travels from one point to the next. For information of the other types, look up the individual definitions of Bezier spline, Bezier curve and NURBS. Once a spline has been produced, it can be used to make a polygon, or to control how some of the Creator Objects behave. But we'll talk about Creator Objects later.
Cheetah3D has a group of preset splines just like the preset parametric objects, they have their own menu in the tool bar.

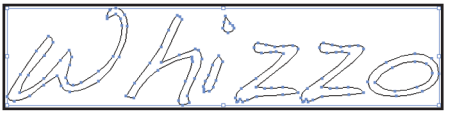
As well as a group of presets there is a way to make your own splines directly in Cheetah3D, simple go to the Tools menu and from the Splines submenu select Create spline. If however you want to modify your newly created parametric spline just double click on the parametric spline tag next to the name of the spline in the object browser and you can transform the points and edges that make up the spline.



Now you can start drawing your spline, when you want to stop simple select another tool, like the select tool, and there it is! An editable spline. Unlike polygons, splines can be open or closed, it doesn't really matter.

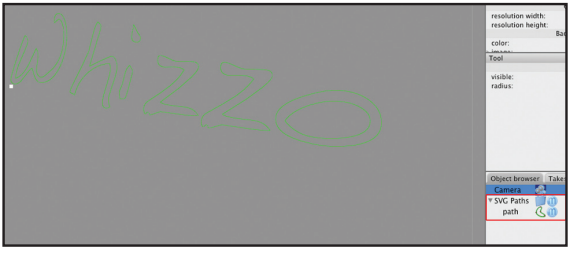
Cheetah3D has a good set of spline tools but if you prefer to work in a dedicated vector drawing application do not worry, luckily Cheetah3D also supports many of the popular vector file formats. Lets have a look at an example. Suppose you have a logo already drawing in a vector application and you want to import it into Cheetah3D and turn it into a whizzo 3D model.

Example: Open your logo in a vector drawing application and convert any text to lines. It's only the lines we can import as splines so any colours, patterns, bitmaps, fonts etc. won't be converted.
The example logo below has a letter 'O', we need to make sure the hole in the centre is knocked out correctly in Cheetah3D. So, in a 2D vector application we'll make the letter 'O' compound.

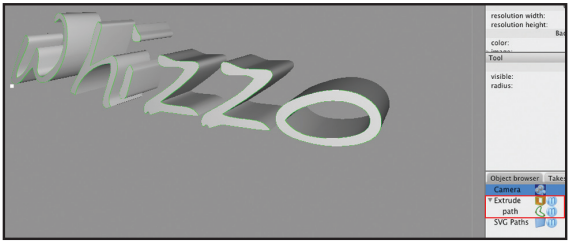


Spline Modelling

All that's left to do is save our logo as a SVG (Cheetah3D can import Adobe Illustrator AI files also) version 1.0 or 1.1 and open up Cheetah3D ready to import our spline logo. In Cheetah3D go to File -> Import and select the logo file, that's it you now have a spline of your logo.



To finish off this example we really need to make the logo 3D so lets attach our spline to an extrusion creator object and give our logo some thickness. To do this select extrude from the creator menu and a new object is added to the object browser, grab the spline of the logo onto the extrude object and we get a 3D logo, nice.



Creator Objects

Well we've already used one so we'd better find out what they are and how to use them. The Creator Objects are a family of special polygon objects. These objects are by themselves empty. You first have to drop in the appropriate child objects (spline or polygon objects) to make them work. The Creator Object then calculates a new object out of the information offered by its child objects (see the above example).
Tip: If you want to edit a Creator Object on the polygon or point level you can make it editable like every other parametric polygon object with the menu command "Objects Make editable". This will collapse the Creator Object and all its children into a single editable object, so only do this if you do not need to make changes to any of its child objects.

Modifier Objects

Modifier Objects are a strange group that don't have any geometry themselves but can alter parent objects. Similar to Creator Objects, their purpose is to modify the geometry of an existing object. However, they differ from Creators in that you drop them inside a polygon object to make them work (instead of the other way around, like a Creator Object). The Modifier Object then calculates a new object out of the information offered by its parent object. If you drop more than one Modifier Object into object the modifiers will be processed one after another like on an assembly line.

Hints and Tips

Here we'll give you some quick hints and tips which will make your use of Cheetah3D quicker, more efficient and easier.

Use the hot keys
Take some time to define suitable hot keys for your most commonly used actions. This will make your use of Cheetah3D much quicker since you'll be using the keyboard a lot. This will reduce the amount of time you'll spend looking through the menus, and means less moving the mouse around, too.

Use the modifier keys for moving the camera
When you hold down the Alt, Command and Shift keys whilst clicking and dragging in the 3D view, you can move the camera around. This is often quicker than using the camera movement icons below the tool bar.

Name everything!
Take some time to change the name of every object in your scene to something logical. This will help you keep track of what you need to edit.

Use folders
Put objects that are related into a folder to simplify arrangements. Folders are also useful for making groups of objects stay together when you transform them. You can make complex sub coordinate systems by nesting folders of objects inside other folders of objects, too.

Making items editable
Double-click on the object icon in the Object Browser to make objects editable. You can also use the Alt-Cmd-C key combination.
Use multiple cameras

If the position of a camera is important in the composition of a scene, use a second camera to help you position objects. You can switch between cameras quickly by double-clicking on the desired camera's icon in the Object Browser. The currently active camera has a light blue background.

File formats
To save your render in a format other than TIFF, just type the extension after your filename when you specify where to save the file (for example, "My Amazing Scene. jpg"). Most common formats are supported: JPG, TIFF, PNG, and even the Mac OS X Icon .icns format!

When you've mastered Cheetah3D's controls and tools, you'll may be interested in making more realistic or aesthetic scenes. Here are a few general tips that might help you make more pleasing renders.

Lighting
A scene will be set alive by proper use of lighting. It's easy to forget about your light

sources, or to add them in last thing and not pay much attention to them. Think about how the lights would be positioned, if they'd be highly directional, and the other characteristics of the light sources, such as their attenuation (realistic light always attenuates!). Also, use more than one light. Cheetah3D can render up to 1024 light sources (although OpenGL cannot), so don't be afraid to be precise.

Shadows
Again, shadows are an integral part of nature. As humans, we instinctively want to live in the shade - it reminds us of shelter. Unless you want that "bright studio look", shadows must be used and considered carefully. What you don't see is as important as what you do.
PS. Even the "bright studio look" relies on shadows to visually balance a scene.
Reflections (the optic kind) A lot of surfaces in reality reflect, even if it's imperceptible. Don't over-do it though, since Cheetah3D cannot simulate complex diffusive reflections without intensive use of bump mapping. Careful use of the reflection properties will give you a lot of realism.

Reflections (the mental kind)
If you're modelling a real object, take a good long look at the actual thing (from all sides, including underneath if you can!) and spend time getting used to it. Understand what the details, imperfections and perfections are. Ask yourself "what colours am I actually seeing?" (regardless of what colour the object is supposed to be). Why would they be different? What colour is the light that is shining on it? It's unlikely to be pure white!

Less is more
Often, a scene doesn't need to be physically full in order to be pleasing. Instead of trying to model every last detail (which will drive you insane!), concentrate on the important parts, and make them detailed. Subtlety will also help, since it is the liminal ("barely visible") variations that we hardly notice that will make us appreciate something subconsciously. Use texture and bump maps to introduce slight variations (not bold statements).

Pick up a real camera
You might learn a lot from Photography tutorials, since photographers treat their work as an artform rather than a science. Considerations such as composition, psychological focus and avoiding visual distractions are important and good photographers understand these before they even get their camera out. Even though you're simulating a scene instead of capturing one, finding out what makes a good photograph will help you produce stunning results. Cheetah3D gives you a lot of power that even professional photographers don't have: A very widely flexible field of view, an infinitely positionable camera, a multitude of lights that can be put anywhere - Photographers would love to have this power over their expensive equipment! You can find some invaluable photography tutorials online at:
http://www.photo.net/

Most importantly, however - have fun. Creating3D scenes can be very rewarding - Happy rendering!

Contact Details

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