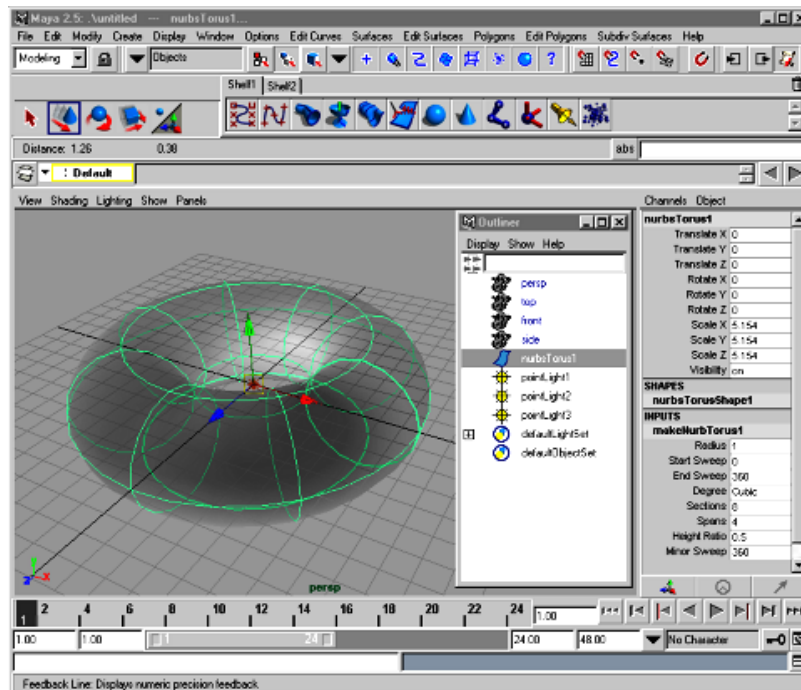


Maya Fundamentals

This tutorial covers the basic layout of the Maya user interface and is intended to get you up to speed on Maya terminology and usage techniques.

In this tutorial:

- Maya's user interface components
- Commonly used UI windows
- Working in Maya's camera viewport
- Selecting and manipulating objects in Maya
- Using Maya, Selection/Action vs. Tool based interactions



Note: **Before you start:** This tutorial requires Maya scene files. If you haven't installed the tutorial files go to the "Try Maya" section of the "Taste of Maya" CDROM to install.

Starting Maya: You can start Maya by double-clicking the **Maya 2.5 Evaluation** icon on the desktop or from **Start** → **Programs** → **Maya 2.5 Evaluation** → **Maya**.

In Maya: Once the tutorial files have been installed you will need to set the current project in order to access the Maya scene files. To set the current project from within Maya select **File** → **Project** → **Set...** and Navigate to the directory where you installed the Maya scene files. Select the directory: *Maya_tutorial_data* and press **OK**.

Maya's User Interface

Maya's user interface is an amazing step forward in 3D graphics applications.

The first impression of Maya can be overwhelming. Maya has a huge range of capabilities and the UI (User Interface) will reflect this fact. When you understand how it all fits together and the common modes of functionality that run through Maya you will begin to see a pattern of usability. This pattern will enable you to explore any aspect of Maya on firm footing.

Sections inside this tutorial:

User Interface Components

The first section of this tutorial explores the main menu sets, windows and editors as well as components of Maya's UI.

Working with Objects and Cameras

The second section focuses on selecting and manipulating objects and cameras. Selection-action and tool based commands are discussed.

The Components of Maya's User Interface

In the following tutorial steps you will be exploring Maya's user interface or **UI** for short.

1 Open Maya and a new scene file

- Start Maya

There are several ways to start Maya in Windows NT:

Double click the Maya **program icon** on the desktop.

Double click a Maya **scene file** from the explorer window.

Navigate from the start menu to **Programs** → **Maya 2.5 Evaluation** → **Maya**.

- A **New Untitled** scene file is opened automatically to provide a clean slate to start with.

For the process of getting familiar with the interface you will **turn off** all of the interface and one by one **turn on** each component.

2 Pop-up help

In Maya if you hold the mouse cursor over an icon in the user interface without moving it for a second a pop up help will show up with the name of the tool you are over.

3 Turn off all of the UI components

To turn off the UI components you will use the **Options** menu pull down.

- Select the Options menu.
- Notice the two parallel bars at the top of the **Options** menu. If you **LMB** (Left Mouse Button) click on these bars you can detach the menu.

Detach the menu and drag it to the side out of the way.

This menu contains menus and UI components for customizing your UI and Maya preferences. It also contains two commands for quickly showing and hiding pieces of the UI:

Show Only Viewing Panes

Show All Panes

- Select **Show Only Viewing Panes**

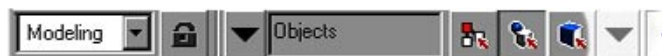
This will turn **off** all of the elements that are listed above the command in the **Options** menu. The remaining elements are the camera viewport and the main menu.

4 Turn on individual UI components

- One by one select the UI elements that make up the list in the Options menu starting with the **Status Line**:



Status Line



Modeling Menu Set Selected

Status Line with Menu Set selector highlighted

- **Status Line:** The Status Line contains many useful items, from left to right:

Main menu set selection

Selection locking

Selection masking

Hierarchy, Object, Components selection

Pick Mask

Snapping: Grid, Curve, Point, and View Planes

Make selected object live

Input and Output operations lists

Toggle construction history on/off



Shelf



QWERTY Select and Move Tools

- **Shelf:** The Shelf UI is comprised of two sections. The Mini-Bar section on the far left-hand side and the user-defined “shelf” or tabbed command storage sections on the right hand side.

The mini bar contains commonly used tools including Selection, Move, Rotate, Scale, the Show Manipulator Tool, and the Currently Active Tool. The hotkeys for the items in the minibar from left to right are Q,W, E, R,T, Y.

Maya shelves are user defined. They can be created for several purposes but mainly are used to store commonly used organizations of commands. MEL (Maya Embedded Language) commands can be drag and dropped to the shelf to create a shelf button. To use the shelf icons you just need to click on one of the icons. For example if you click on the sphere icon in the shelf it will create a sphere.

- **Feedback Line:** The Feedback Line communicates information back to the user.

Depending on the manipulator or tool you are currently using, different information will be displayed in the Feedback Line. If you are rotating the camera for example, this rotation will be displayed in degrees on the Feedback Line.



Layer Bar



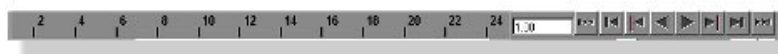
Layer Creation Button and Default Layer

- **Layer Bar:** The Layer Bar contains layer creation and display buttons.

Layers in Maya are a powerful method of organizing the display and collection of objects in your scene.

For example, in preparation for compositing, you could put all your background objects on one layer. Your hero object could exist on its own layer while the foreground objects could make up yet another layer.

Layers are mutually exclusive, an object can only exist in one layer at a time. **RMB** clicking on the layer in the layer bar displays a menu allowing you to control the contents and display characteristics of its contents. Clicking the button at the far left of the Layer Bar creates a new layer.



Time Slider



Time Slider Playback and Shuttle Buttons

- **Time Slider:** The Time Slider contains the display and control of time playback, pause, rewind and some keyframing functions.

From the Time Slider you can set the current frame as well as advance or retreat from the next **keyframe** on the selected object.

The **LMB** can be used to **LMB drag** and “scrub” the current time. **Shift + LMB drag** selects a region of time (highlighted in red) which can then be moved around the time slider, in effect moving keyframes around as a group.

Pressing **RMB** in the main region of the time slider displays a menu with a list of choices. For example you can **Cut and Paste** a selected region of keyframes back into the Time Slider or onto a different object entirely.



Range Slider



Start Frame and Range from 1 to 24

- **Range Slider:** The Range Slider contains more UI used for controlling animation parameters.

You can establish the range of animation frames in the scene and, by growing or shrinking the range slider, you can focus on certain regions of frames.

On the right-hand side of the range slider are buttons to select the current **Character**, and toggle **Auto Keyframing**. The button on the far right-hand side displays the General Preferences **Animation Preferences**.

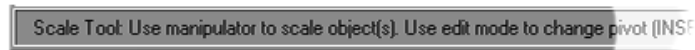
- **Command Line:** MEL stands for Maya Embedded Language and is Maya's built in scripting language. The Command Line contains a single line with which you can view and write MEL commands.

The left-hand portion of the command line is a text field where you can enter MEL commands. The right-hand portion is a text field that displays the last printed line of MEL feedback visible in the Script Editor.

The far right-hand side contains a button to raise the **Script Editor** window.



Help Line

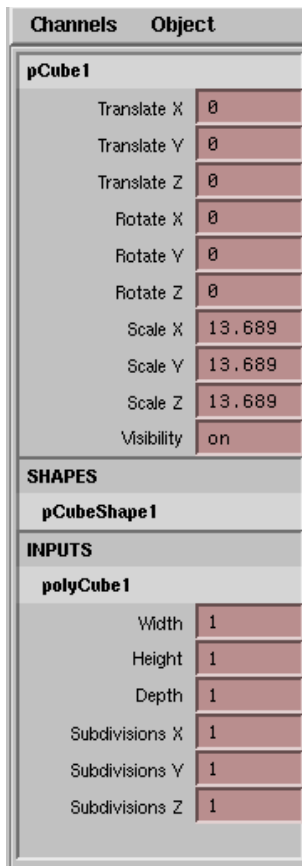


Help Line with Scale Tool Info

- **Help Line:** The Help Line is very useful for new users as this line displays information about tools and procedures that the user is presented with as you work in Maya.

As you drag your mouse over areas of the interface, information is displayed in the Help Line describing the item. When you are working with a command or tool the Help Line **prompts** you for the next expected action or present tips on using the current tool.

Popup Help is also available in Maya. Toggle Popup Help from the Help pull down menu.



Channel Box

The last two items in the Options list are **Channel Box** and **Attribute Editor**.

Since the Channel Box and Attribute Editor are similar in the information presented you will usually want one or the other displayed at one time. It is very handy to quickly change between these two windows. Also having them as part of the main Maya window is important to avoid cluttering the interface with floating windows.

- **Channel Box:** The Channel Box is the work horse UI of Maya. This is where you will view and enter information into Maya. Maya is about **nodes** and the **attributes** on these nodes. The Channel Box is a simple lightweight UI for accessing and editing these attributes.

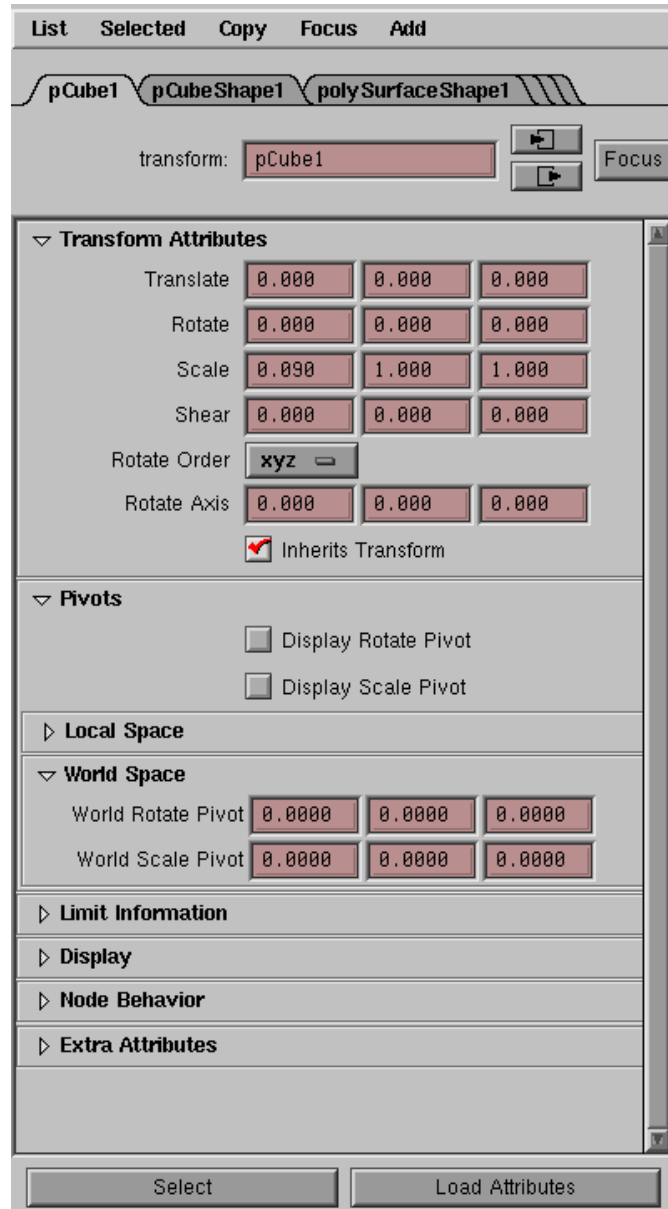
The top section of the Channel Box contains basic information about the selected object. These are the attributes that control where the object in the scene is.

Below this section are the nodes related to this object. The Shape nodes which carry information about an object beyond just its position, rotation and scale. For example the *makeNurbCube* shape node contains information about width, length to height ratio, and Patches in U and V directions. These attributes are editable and keyframable.

Also listed in the Channel Box are the input and output nodes related to the selected object. By selecting these objects you can address these related objects.

Some Attribute fields in the Channel Box contain preset pulldown choice menus where applicable. **LMB** on an attribute field to see if it also contains a pulldown choice menu.

Note: In the **Channel Box** and the **Attribute Editor** you can use your **RMB** when the cursor is over attributes and you will have access to a drop down menu specific to that attribute. **RMB** can be used in other areas as well. For example if you create a sphere and place the cursor over it and **RMB** a marking menu will show up specific to that object



Attribute Editor

ⁿ **Attribute Editor:** The Attribute Editor is a more detailed version of the Channel Box. Whereas the Channel Box is an abbreviated list of keyable attributes, the Attribute Editor is a listing of all attributes on the selected node or object.

The Attribute Editor includes things like sliders, pulldown menus and drag and drop connections functionality.

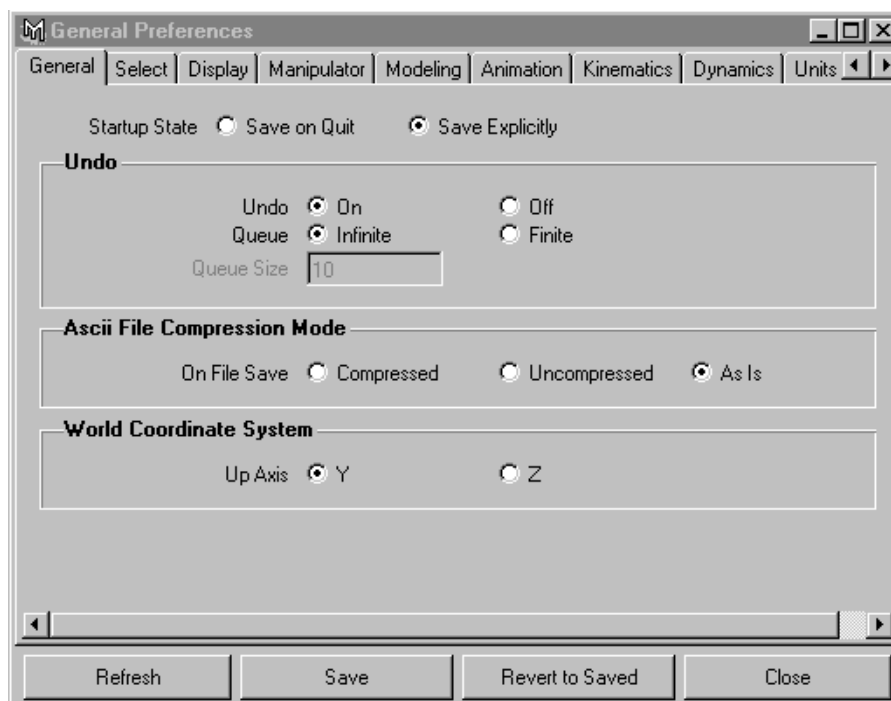
Objects in Maya have a top level node called a **Transform node**. This is the basic node used to control an object's position, rotation, and scale. These attributes are known as the **Transform Attributes**.

Objects in Maya have a secondary node known as a **Shape node**. The shape node contains information about an object's surface history, render properties, and display quality.

Other nodes like texture and material nodes are best edited using the Attribute Editor in conjunction with the Hypershade/Visor windows.

The tabs located at the top of the Attribute Editor let you choose which node to edit. The items displayed in the body of the Attribute Editor are the attributes associated with that node.

- **Preferences:** Maya's preferences are broken up into several areas. General, UI, and Customizing:



General Preferences

General Preferences: The General Preferences is where the majority of Maya's preference settings are modified. These settings control general usability and functionality of commands. In the **General Tab**, for example, you can establish how big your Undo Queue is. **TIP: For now set your Undo Queue to Infinite.** In the **Units Tab**, for example you can set your **frame rate** and **scene scale** units. In the above image in the top right corner you will see two buttons with arrows pointing left and right. They are used to scroll through the tabs.

UI Preferences: The UI Preferences allow you to set many of the options for how the UI will behave by default or on start up of Maya. For example in the **Windows Tab**, you should set the **Open Attribute Editor to: In Main Maya Window** so that the Attribute Editor will not be floating when you press the hotkey **Ctrl - a**.

Customize UI: The Customize UI menu contains separate editors for customizing your interaction with Maya:

Hotkeys...: The Hotkeys Editor is where you establish how commands are executed by short-cut key stroke combinations.

Colors...: The Colors Editor is where you set or change the way objects and interface components are colored.

Marking Menus...: The Marking Menus Editor is where you establish or customize the actions associated with Marking Menus. Marking Menus are a handy UI concept pioneered by Alias|Wavefront that display specialized menus at the location of your cursor.

To activate a marking menu you press a key while **LMB** dragging in the viewport. This action activates a system of menus that you can navigate. For example press the **w** key and then **m**. A marking menu will appear under the mouse which will allow you to change the move tool and the .

An example of marking menus exists by pressing the space bar to activate the **hotbox**. From in the hotbox you can **LMB** drag in different zones to initiate different related sets of marking menus.

Shelves...: The Shelves Editor is where you customize your shelves. From this editor you can create, reorganize and edit the contents of your shelves.

Panels...: The Panels Editor is also the Layout Editor. This editor lets you establish and edit the windows and configuration of windows (panels) that are displayed in Maya.

Working efficiently in Maya will demand that you become comfortable with building layouts made of groups of panels. By building layouts for certain tasks like rendering, modeling and animating you can avoid having floating windows that get in your way.

A common method of accessing layouts is by building shelf buttons that activate certain layouts. The Panels Editor is where you can build layouts and make shelf buttons to activate these layouts.

Animation | Modeling | Dynamics | Rendering

Maya has four basic modes of menu set organization. On the far right side of the Status Line is a pulldown menu for these menu sets. By selecting a menu set you are selecting the menus displayed in the main menu bar along the top of Maya. The four basic modes of menu set organization are:

- **Animation:** The Animation menu set contains menus for: Setting keyframes, creating Set Driven Key relationships, Path animation and Constraints. Skinning and IK skeleton creation menus are also part of this menu set as are the menus supporting the Deformers.
- **Modeling:** The Modeling menu set contains menus for creating curves and surfaces as well as Polygon creation and editing tools.
- **Dynamics:** The Dynamics menu set contains menus for Particles, Rigid and Soft Body creation and editing tools. The Effects menu contains many pre-made dynamics effects tools and examples of what can be done with Maya's dynamics tools.
- **Rendering:** The Rendering menu set contains menus for creating lights and materials as well as texture application tools. The Paint Effects toolset menus are also located in this menu set. Rendering menus are also located here that allow you to do batch rendering which is how you render out a sequence of animation.



Status Line

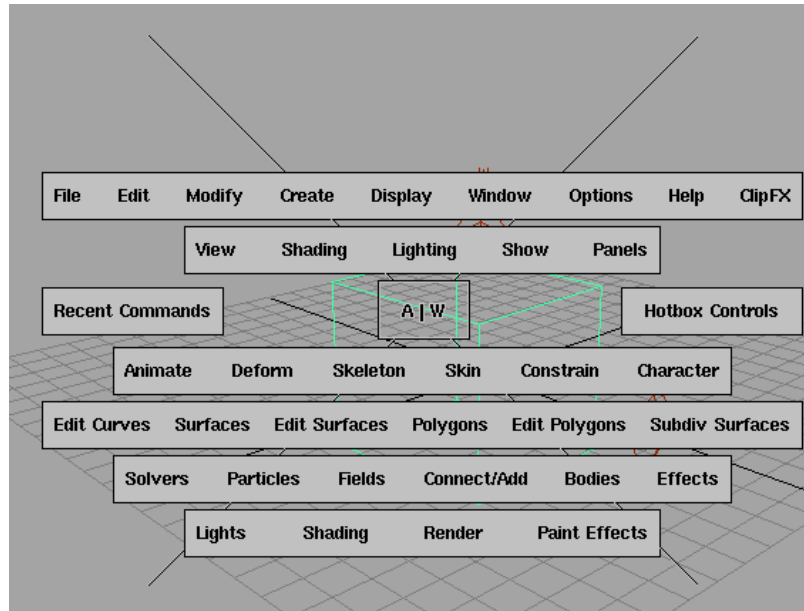


Modeling Menu Set Selected

Common Menus

The first seven menus from the left are common to all the menu sets: **File** | **Edit** | **Modify** | **Create** | **Display** | **Window** | **Options**. When the menu set is change, these seven menus do not change.

- **File:** The File menu contains scene management menus and tools. Scene saving and import/export commands are found here as are the project management commands and menus.
- **Edit:** The Edit menu contain the common commands that you perform on objects in the course of editing them. Duplicating, Deleting, Selecting, Parenting and Grouping are some of the commands presented here.
- **Modify:** The Modify menu is a potpourri of commands and menus used to work with objects in a special manner. Enabling and Disabling nodes, centering an object's pivot point, or enabling the Artisan tools are examples of some of the tools found here.
- **Create:** The Create menu is where you go to create curves, primitive objects, cameras and locators and text objects.
- **Display:** The Display menu contains commands that have to do with the display of objects and their components as well as Interface components like the grid and axes.
- **Window:** The Window menu is how you access the windows and editors in Maya.
- **Options:** The Options window as mentioned above is where you customize your Maya environment and set your preferences for how Maya will handle different circumstances.



Hotbox

Hotbox

By pressing and holding down the **space bar** you invoke the **Hotbox**. The Hotbox is a **centralized heads-up display** for all the menus in Maya. The Hotbox contains marking menus and zones of interaction that can greatly increase your productivity.

The Hotbox can take a while to get used to but it can also unlock a great amount of screen space by removing the need for the main menus.

Using the Hotbox:

Press and hold the **spacebar** to invoke the **Hotbox**.

The Hotbox is divided into quadrants. In the above image you can see a big X that radiates out from the A|W in the centre. This defines the quadrants. To access a quadrant while holding the spacebar just move the cursor into the quadrant (but not over a menu) and press the **LMB**:

North: LMB select the layout views marking menu

South: LMB select the editor windows marking menu

East: LMB select the UI components marking menu

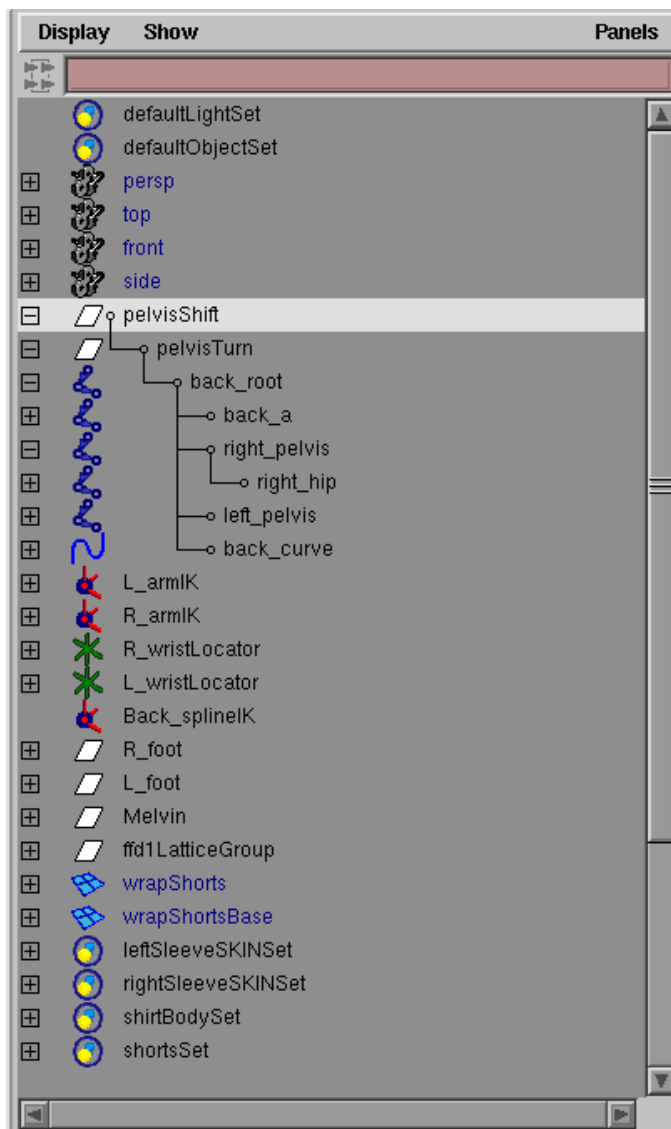
West: LMB select the object and component mask marking menu

The **Hotbox Controls** menu located in the West quadrant of the Hotbox contains menus for setting Hotbox properties. From this menu you can select how many menu sets are included in the Hotbox.

The **Center A|W** Hotbox button contains a marking menu for selecting **camera views** and the **Hotbox style**.

Windows and Editors in Maya

The following section explores the main windows and editors that you will use in Maya.



Outliner Window

Outliner

There are two main methods of looking at the contents of a Maya scene file: the **Outliner** and the **Hypergraph**. The Outliner displays the contents of your scene file in a listed format. The contents of the Outliner are presented as **nested** groups if the items under this group are part of a **hierarchy**.

Using the Outliner:

Create a few objects by clicking on the sphere and cone icons in the shelf bar or open a scene file from one of the other tutorials (**File** → **Open Scene...**)

Open the Outliner from **Window** → **Outliner**

Select an object with **LMB** click.

Re-order an object by **MMB** click drag (Line between other objects).

Parent on object by **MMB** click drag (Lines Outline parent).

Expand/Collapse hierarchy by **LMB** on the + and - symbols.

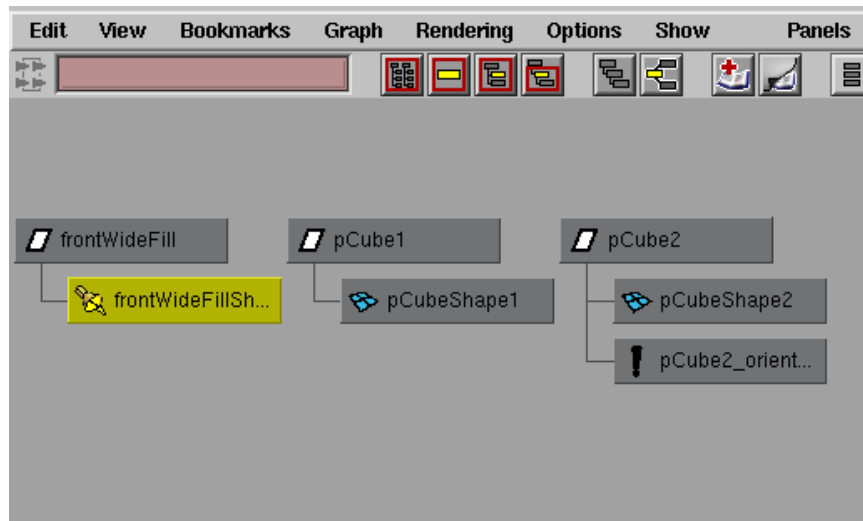
Show Shape Nodes by **RMB** click select **menu item**.

Select multiple continuous objects in list, **Shift LMB** select top object then bottom object of list.

Select multiple non-continuous objects in list, **Ctrl LMB** select each object.

Hypergraph

The Hypergraph presents the contents of your scene in a different manner. The Hypergraph has two modes of operation for looking at the contents of your scene in two different ways.



Hypergraph Scene Hierarchy mode

The first mode is the **Scene Hierarchy** mode. This mode lets you see objects and their hierarchies much like the Outliner does but in a more freeform layout.

Using the Hypergraph: Scene Hierarchy mode

Open the **Hypergraph** from **Window** → **Hypergraph**

Select an object with **LMB** click.

Navigate around the window using the camera controls:

Zoom: **alt + LMB +RMB**

Pan: **alt + MMB**

Frame selected: press **f**

Frame all: press **a**

Re-order an object by **LMB** click drag (First select **Options > Layout > Freeform Layout** from the **Hypergraph** menus).

Parent an object by **MMB** click dragging one object on top of another object or group.

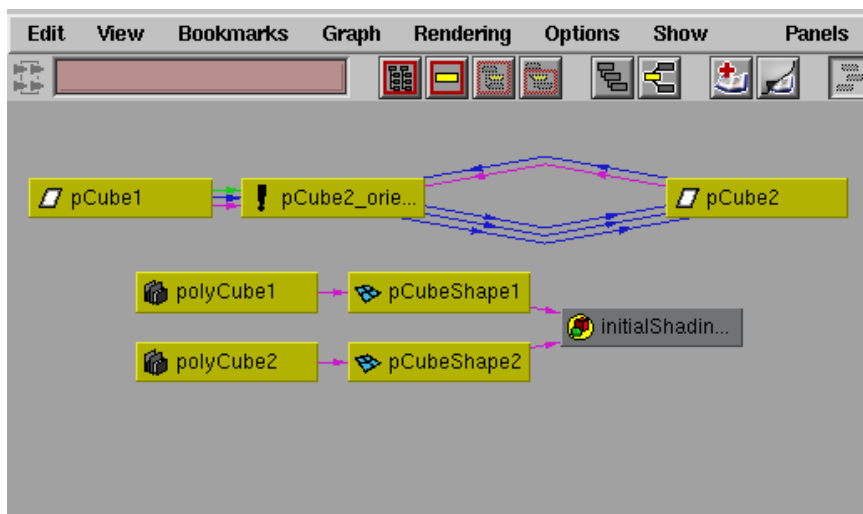
Expand/Collapse hierarchy by **RMB** select **Expand** or **Collapse** from menu.

Show Shape Nodes by selecting **Options > Display > Shape Nodes** in the **Hypergraph Options** menu.

Select multiple contiguous objects in list, **LMB** drag box around objects.

Select multiple non-contiguous objects in list, **Shift LMB** select each object.

The second mode is the **Upstream and Downstream Connections** mode. This mode lets you see how the flow of information is moving from one node to another through connected attributes. This can be thought of as similar to a production line where each information travels between nodes, each with a specific task it performs on the information before passing it along to the next node in the stream.



Hypergraph Upstream and Downstream mode

Using the Hypergraph: Upstream and Downstream Connections

Enable the **Upstream Downstream mode** by pressing the **Upstream Downstream button** or select **Graph > Up and Downstream Connections** in the **Hypergraph** menus.

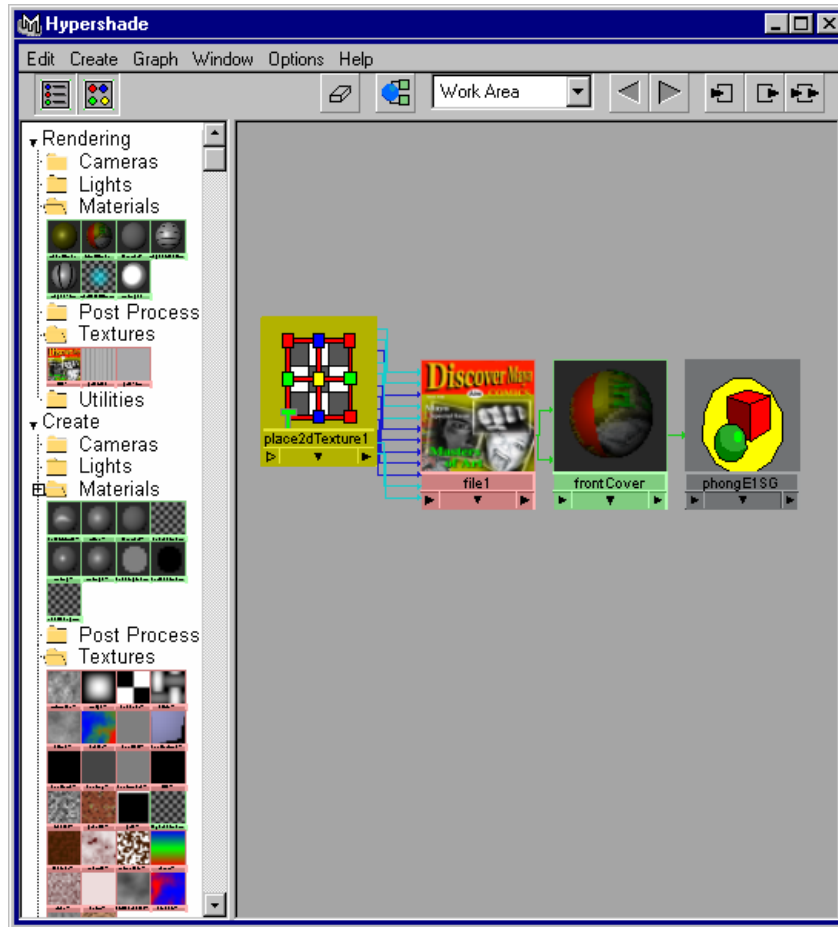
View Attribute Connections by moving your cursor over the **line** that connects the nodes together. The complete object names and input and output attributes are listed at each end.

Delete Connections by **LMB** selecting the **connecting line** then press backspace (The line will turn **yellow** to signify it has been selected).

Connect nodes together by **MMB** dragging one node on top of another node. If a logical and obvious connection can be made then it will be made automatically, otherwise, the **Connection Editor** will be opened with the correct nodes already inside the Connection Editor ready allowing you to specify which attributes should be connected.

Hypershade / Visor

The Hypershade and Visor windows are used to build and manage textures and materials for establishing the rendered look of your scene. Although these are listed as separate UI elements they are most often used together and appear as a single UI component.



Hypershade / Visor window

The **Hypershade** portion of the Hypershade/Visor shares similar functionality to the Hypergraph. In earlier versions of Maya the Hypergraph was used to create and manipulate shader networks. The Hypershade displays materials and textures much like the Hypergraph displays **nodes** and **attribute** connections.

The **Visor** is the portion of the Hypershade/Visor combination where you will find your scene elements that you have in your scene or may want to bring into your scene to help create the look of objects when they are rendered. **Lights, Cameras, Textures, Sourceimages,** and **Materials** can be found in the Visor. You can also use the Visor to navigate around your hard drives to find other elements not associated with your current project.

Using the Hypershade/Visor:

The **Hypershade/Visor** is found under **Window** → **Hypershade...** or **Window** → **Visor...**

The **Hypershade** area is a work area most commonly used for creating and editing shader networks.

Drag materials from the **Visor** to the Hypershade work area using **MMB**.

Clear the **Hypershade** work area by pressing the **eraser** icon.

Drag a material into the Hypershade work area then press the **show up and downstream connections** button to see the related nodes on the shader.

The Visor has two main areas; The **Rendering** area where you see the items already in your scene. The **Create** area where you can create items like materials, lights and textures to bring into your scene.

Navigate the view of the Hypershade and Visor windows with the same camera controls you use for the Hypergraph and modeling viewports.

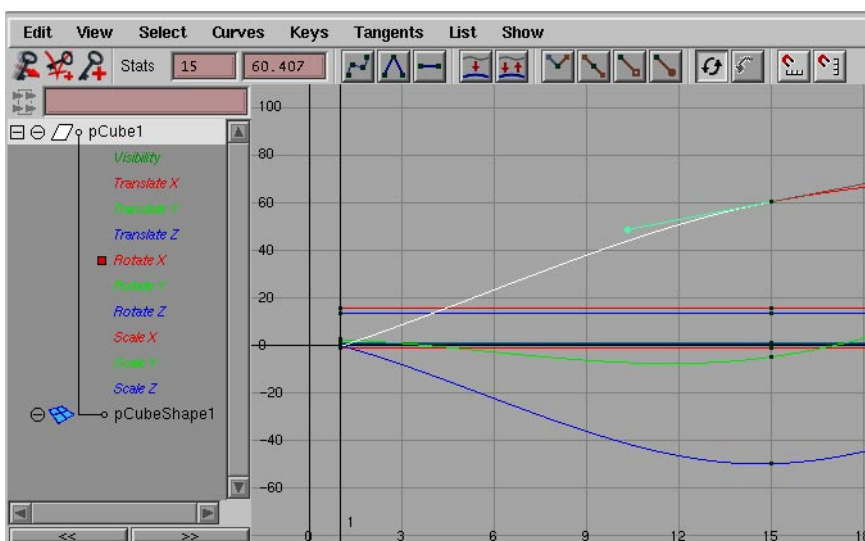
Zoom: alt + LMB +RMB

Pan: alt + MMB

Frame selected: press f

Frame all: press a

Graph Editor



Graph Editor

The Graph Editor is where you manage the keyframe animation that you have created. The Graph Editor presents keyframe animation in terms of curves called animCurves.

Using the Graph Editor:

Open up a scene file from one of the other tutorials first so you have something to work with. **File** → **Open Scene...** and select jelly4.ma.

The **Graph Editor** is found under **Window** → **Animation Editors** → **Graph Editor...**

Select **objects** and **attributes** for animation editing from the **left-hand side** “Outliner” type list. The related **animCurves** will be displayed in the right-hand graph portion.

Press **a** or **f** to **frame all** or the **selected** animCurves in the Graph Editor.

Select the animCurve with **LMB** and then select the keyframe knots on the curve to edit the tangency or position of the keyframe.

Press **w** to enable the **translate** manipulator (manip for short) then press **MMB** and drag to reposition or press **r** to enable the Scale manipulator.

You can **snap** to **time or value** by pressing the **Time Snap** button or the **Value Snap** button.

Buffer Curves allow you to see a ghosted image of where the curve was before you manipulated it. **Enable Buffer Curves** by **View > Buffer Curves** (In the Graph Editor menu).

You can **snap** your curve back to the original shape by **Curves > Swap Buffer Curve**. (In the Graph Editor menu)

The **Stats** section lets you see and edit the keyframe values manually.

Navigate the view of the window with the same camera controls you use for the Hypergraph:

Zoom: **alt + LMB +RMB**

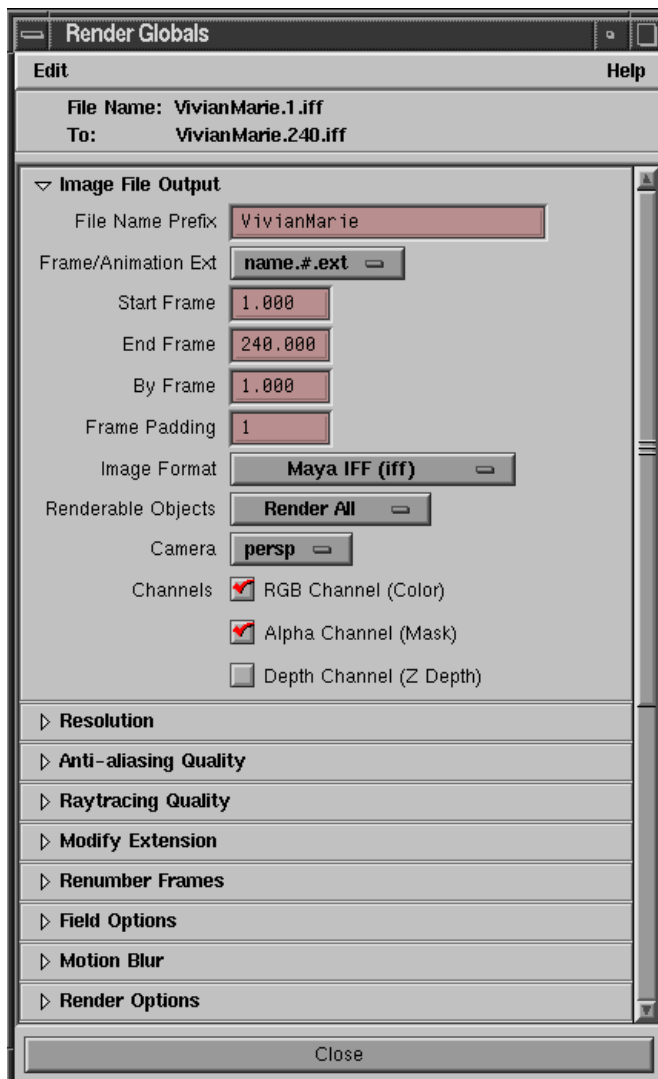
Pan: **alt + MMB**

Frame selected: press **f**

Frame all: press **a**

Render Globals

General rendering settings are made in the Render Globals window. From the Render Globals window you can adjust settings for the rendered image size or resolution, Anti-aliasing quality, Raytracing quality, Motion blur, and IPR options among many others.

*Render Globals*

Using the Render Globals:

Open the Render Globals from **Window** → **Render Globals...**

Set image naming syntax and padding from the Image File Output section.

Set render size or resolution aspect from the **Resolution** section. **Lock Device Aspect Ratio** should be **on** for digital video work that requires “*non-square*” pixels. You can choose from the list of common **standard formats** or create a **custom** resolution and aspect ratio.

Anti-aliasing Quality settings control how smoothly curved surfaces are rendered as well as filtering quality of textures. There are presets available for varying degrees of quality or you can create your own custom settings. These settings will have a large impact on render times vs. quality.

Raytracing can be turned on and off from this section. If you are Raytracing you can also control what degree of Raytracing is performed. Reflections, refractions, and shadows can have separate sampling rates.

Field Options is where field rendering settings are made. Field dominance and scanline ordering can be set from this section.

Motion Blur is essential for realistic motion as our eyes and the camera see movement. Maya has 2 types of motion blur:

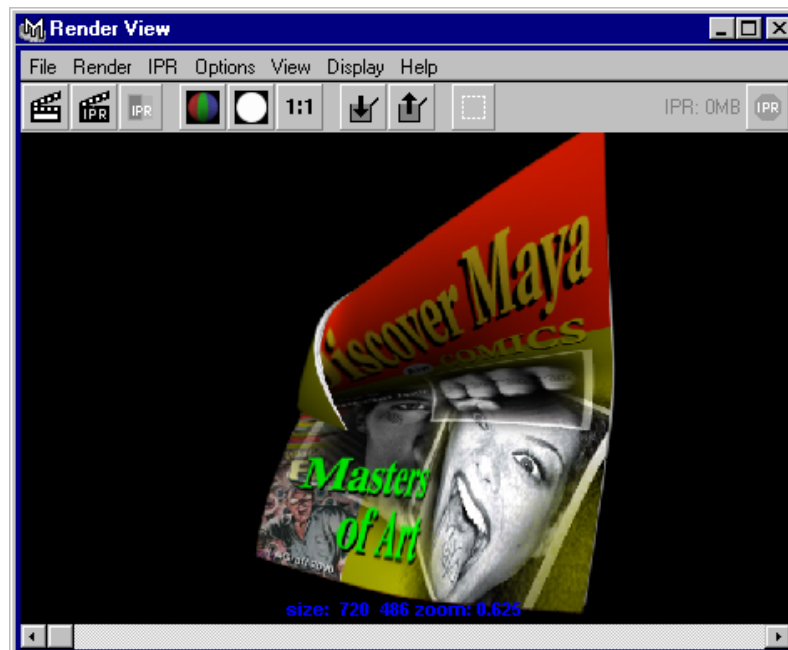
2D motion blur is done as a post process and, for many circumstances, will create very realistic motion blur effects. This is a much faster method of rendering motion blur. With the 2D blur being used you have options for setting the blur length and blur sharpness.

3D motion blur involves much more computation as object positions are calculated and used to establish the effect of blurring an object that is moving in 3 dimensions. If you have objects that are crossing in front of other moving objects or a complex movement of the camera you may want to use this method of motion blur.

Render Options section is where many special **post processes** are enabled and executed. **Environment Fog** is established from this section as well as **Gamma Correction** and other general settings.

IPR Options are set from this section. **IPR** is Maya's **Interactive Photorealistic Renderer**. With IPR you can edit your lighting and material assignment and settings very quickly. This section controls which parts of **IPR** rendering takes place. **Post process** effects are toggled **on** and **off**.

Paint Effects Rendering Options section enables you to render the paint effects strokes separately from the other elements in the scene. Very useful for compositing.



Render View

Render View

The Render View window is where you test render your scene. The Render View window is also where you use IPR, Maya's Interactive Photo-realistic Renderer.

Using the Render View Window:

Open the **Render View** window from **Window** → **Rendering Editors** → **Render View...**

Quickly establish a wire frame **Snapshot** of what you will be rendering by selecting **Render** → **Snapshot** → **Current** (In the Render View menu).

To **render a region** **LMB drag a box** around the area you want to render then select **Render** → **Render Region** (In the Render View menu).

To render the **full image** as the perspective camera sees things select **Render** → **Render** → **Current(persp)**.

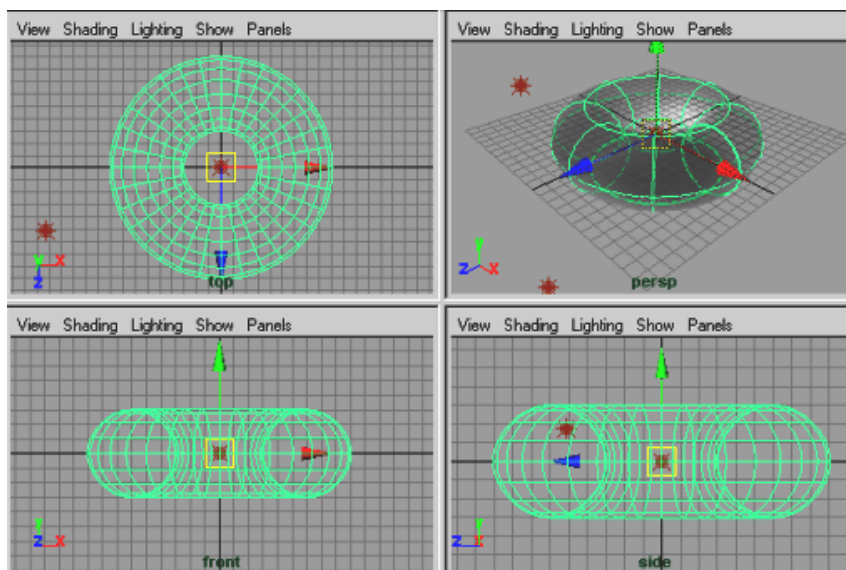
To **keep** an image for comparison in the Render View window's buffer select **File** → **Keep Image in Render View** (In the Render View menu) or press the Keep Image button.

To save the image to your hard drive select **File** → **Save Image...** (In the Render View menu).

To view separate components of the image select **Display** → **Mask Plane** or **Red Plane** for example.

To use **IPR** first you must create a deep raster image by selecting **IPR** → **IPR Render** → **Current (persp)** (In the Render View menu). Once the IPR image has been created you are prompted to select a region to update. **LMB drag a box** to **select a region** to IPR render. Now as you update your materials or light positions for example the region will update in a scrolling manner from bottom to top. Depending on your system configuration this update can happen very quickly and interactively.

Working in Maya's Camera Viewport



Using the Camera

Viewing your scene in 3D is made very easy in Maya using the camera viewports. The hotkey and mouse interaction for camera manipulation in Maya is widely regarded as the best in the industry.

Camera manipulation: By default a new scene in Maya will contain **4** cameras, a perspective camera and 3 orthogonal cameras.

Perspective Camera: The **perspective** camera mimics the way a film or television camera operates and displays your scene.

Orthogonal Camera: **Top, Side, Front, orthogonal** cameras are provided by default. These cameras display the scene without a *vanishing line of sight* or perspective view. They are used to accurately position objects in relation to world space and the grid that is used to measure distances.

Camera Hotkeys: The cameras and views in Maya are positioned and oriented by depressing the **alt** key in conjunction with the **LMB (Left Mouse Button)** and **MMB (Middle Mouse Button)**.

Orbit: alt + LMB

Zoom: alt + LMB + RMB

Pan: alt + MMB

Frame selected: press f

Frame all: press a

Display Hotkeys: The viewport has hotkeys that control display properties such as shaded and wireframe modes:

Press **1, 2, or 3** keys for lowest to highest resolution **display smoothness** on **selected** NURBS objects.

Press **4** key for **wireframe** display

Press **5** for **shaded display** no textures

Press **6** for shaded display with **textures**

Press **7** for shaded display with textures and **lights**

Viewport menus: The camera viewport has its own set of menus that further control viewport display properties and camera attributes.

View: Camera settings and bookmarking of camera views.

Shading: Various shading and display settings

Lighting: Lighting display settings

Show: Filtering for object type display

Panels: Shortcut to Panel and Layout settings as well as camera selection and creation.

1 Start a new scene and create a primitive object

▫ **File** → **New Scene**

▫ Create a **primitive** object to view and move.

Create → **NURBS Primitive** → **Torus**

Press **1, 2, 3, 4,** and **5** keys to see varying degrees of surfaces smoothness and shaded mode display.

2 View the primitive object with the perspective camera

In the **Perspective viewport:**

▫ Press **f** to frame this object

▫ **Orbit** the object by pressing and holding down the **alt** key while pressing and dragging the **LMB**.

▫ **Pan** the camera around using **alt + MMB**.

▫ **Zoom** in to the object using **alt + LMB + MMB**.

Translate | Rotate | Scale manips

Moving objects around your scene is made easy with Maya's move tools. To activate the move tool manipulator:

Translate: Press **w**

Rotate: Press **e**

Scale: Press **r**

Quit Move Tool: Press **q**

Special Tool manips: Press t

These keys make up the **QWERTY** keys on the keyboard. These keys have been chosen for these often used functions due to the comfortable and easy reach with which the left hand's fingers can reach them.

3 Duplicate and translate a series of primitive objects

In the **Perspective viewport**:

- **LMB** drag to select the primitive object in your perspective view.
- Press **Ctrl + d** to **duplicate** your primitive object.
- **Translate** the new duplicated object up.
 - Press **w** to activate the Translate manip.
 - Select the green **Y** manip handle arrow.
 - LMB** drag to move the object in the **Y** direction only.
- **Rotate** the primitive object.
- **Scale** the primitive object.
- Press **Backspace** to **delete** the duplicated torus.

4 Select the makeNurbsTorus node in channel box

Now you will select the node that controls a primitives construction history and manipulate these attributes with the shown manipulator tool associated with this object.

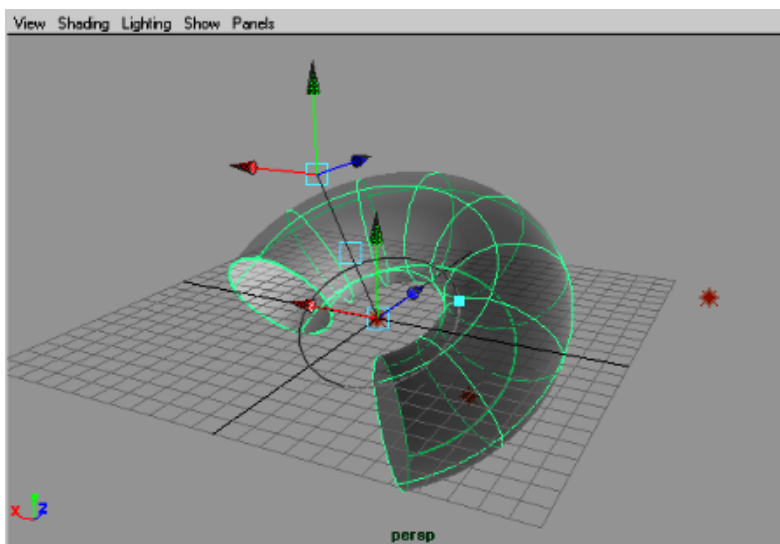
- **Display the Channel Box** if it is not displayed

Select **Options** → **Channel Box** to toggle the Channel Box

- Select the original NURBS torus that you created.

In the Channel Box the **nurbsTorus1** transform node is displayed. Below is the **nurbsTorusShape1** node and below that listed as an **Input** node is the **makeNurbTorus1** node.

- In the **Channel Box** click on the **makeNurbTorus1** node.



5 Manipulate the nurbsTorus using the Show Manipulator Tool

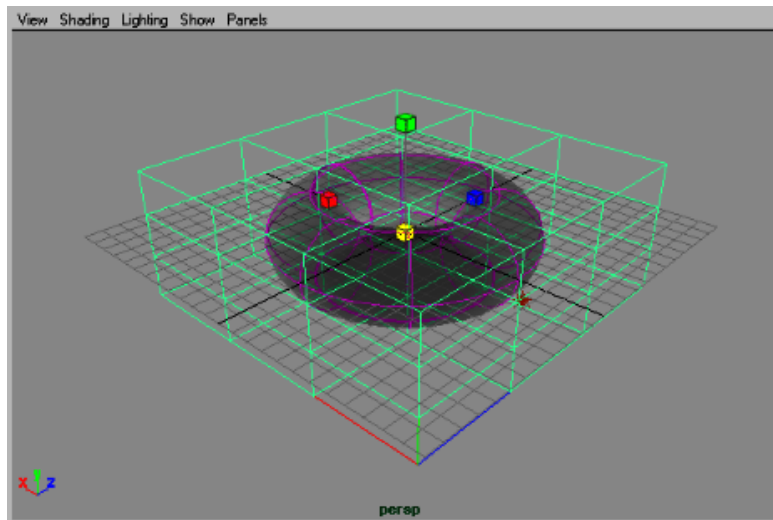
- Press **t** to **show** the **makeNurbTorus1** construction history **manipulator tool**.

Select the handles presented by the **Show Manipulator Tool** with your **LMB**. Drag these manipis to get a feel for what each one does.

As you move the manipulators notice the **values** change in the Channel Box. These values can be **keyframed** and animated. (**RMB** in the attribute field and select **key selected**)

Selection Action vs. Tool based Commands

In Maya there are two methods of carrying out commands on objects. A command is a process that you perform or apply to one or more objects or nodes. Applying a deformation to an object is an example of this process.



6 Apply a Lattice Deformer to your primitive object

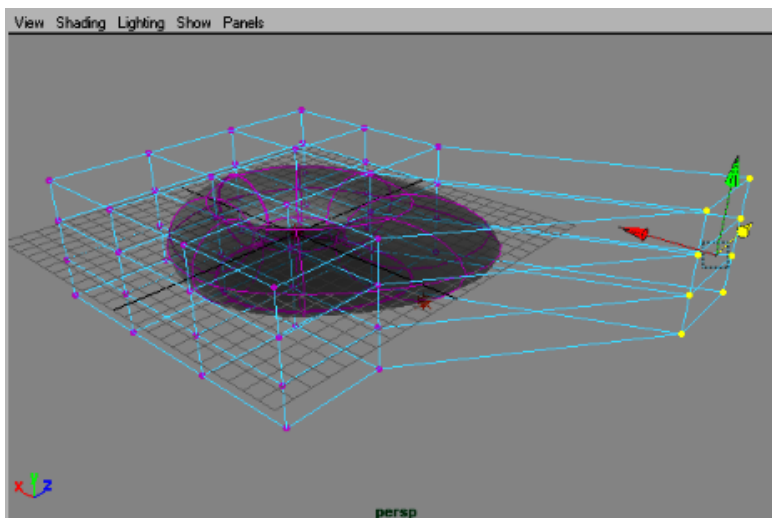
The Lattice Deformer is a very powerful deformer. A lattice is a cage shaped deforming tool that gets created around the selected object or objects. This lattice can be manipulated to deform the underlying object.

- **Select** your primitive object, in this example the **nurbsTorus1** object.
- Select **Deform** → **Create Lattice** (from the **Animation** Menu set)

A Lattice deformer is created and applied to the selected object.

This is an example of a **Selection/Action** command.

An object was **selected** and then an **Action** was applied to this object.



7 Adjust the Deformation Membership

Once you have applied a deformer you can control which part of the affected object is obeying the deformation. This is called Editing the Membership.

- Select the **Lattice Points**

LMB drag over the lattice to select it in the viewport

Press **RMB** over the Lattice

A marking menu is displayed with viable choices for the selected object. In this case the **Lattice Points** marking menu is displayed.

RMB gesture to select the **Lattice Points** marking menu

LMB drag a box around a collection of **Lattice Points**

- Press **w** to display the **Translate manip**

Translate the group of Lattice points to deform the primitive object.

Exit this component mode by pressing **F8** twice

- Select **Deform** → **Edit Membership Tool**

Note the name on this command includes the word **“Tool”**. This signifies that when you select this menu item you will be placed into a tool that will **prompt** your actions in order.

Note: To see these prompts make sure the **Help Line** is displayed.

Note the cursor changes to a special arrow shape

The Help Line prompts you with:

Edit Membership Tool: Select a Set or a Deformer

If the lattice is not selected.

- Select the Lattice in the viewport

The CVs of the torus are displayed and the Help Line prompts you with:

Edit Membership Tool: ffd1Set: Add with Shift+LMB. Remove with Ctrl+LMB.

- Follow these directions and **remove** some of the **CVs** from the Lattice's membership.

Note that the shape of deformation changes as these CVs are not participating in the deformation.

- Press **q** to quit the Edit Membership Tool

This is how a **Tool** based command in Maya will typically work. You enter a mode and you follow the directions in the **Help Line**. In multiple choice tools you may be prompted to press the **Enter** key to validate a certain step before moving to the next step of the tool.

CONCLUSION

This has been a brief exposure to the Maya user interface. The Maya on-line documentation is another place that you should investigate for answers to user interface questions and coverage of the other windows, editors and UI components omitted from this tutorial.

There are many options in Maya. These options are what make Maya a powerful and flexible application. As you get comfortable with one area of Maya you will also find yourself getting comfortable with other areas of Maya due to the continuity of usage and usability that is carried throughout the application.

Use the **Help Line**. By always displaying the Help Line and Pop Up Help you will have a prompt that explains what a button is and how to proceed in a tool based command.