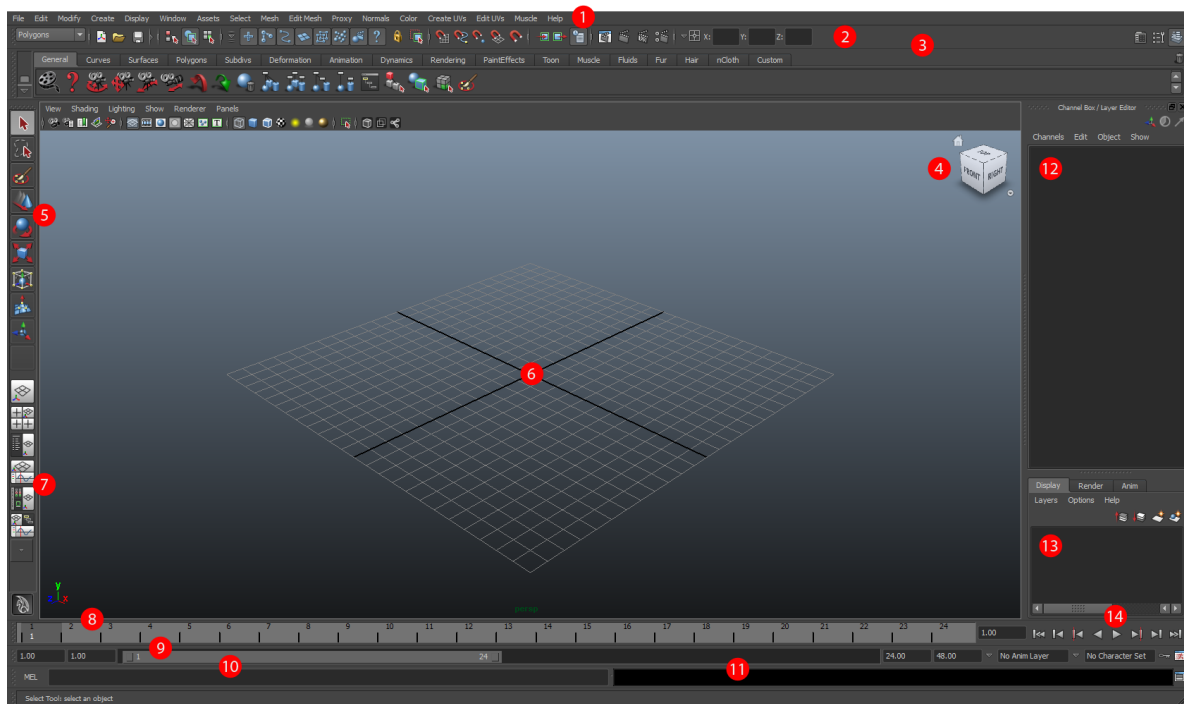


Chapter 1: Getting Started

Maya Interface

As you can edit the interface to your own preferences, we will need to ensure the correlation between this book and what you see on the interface in front of you. To bring Maya back to its default settings navigate to *Window > Settings/Preferences > Preferences* (In the dialogue box) *Edit > Restore Default Settings*.

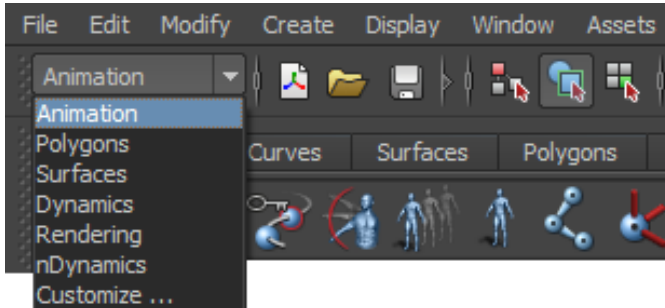


1. Main Menu Bar
2. Status Line
3. Maya Menu Set
4. Global Controller/Manipulator
5. Tools
6. Workspace
7. Workspace Pre-sets
8. Time slider
9. Range Slider
10. Command Line
11. Help Line
12. Channel Box
13. Layer Editor
14. Playback Controls

Chapter 1: Getting Started

Maya Menu System

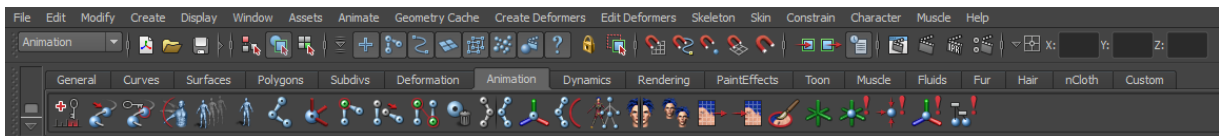
By default Maya opens up on the *Animation Menu Set*, this will present you with the following options:



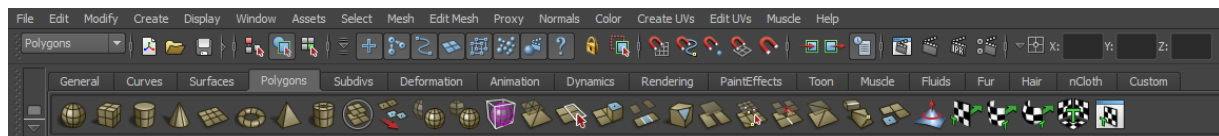
By selecting from the menu set it changes all icons apart from the first 7 (which are constant). This means whatever stage you are undertaking you have to ensure you're in the correct menu set, because you may find yourself looking for a tool you cannot access.

The below will illustrate examples of available options when selecting the different menu sets and the variety of tools that are available:

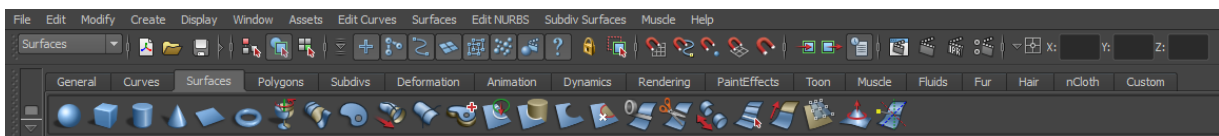
Animation:



Polygons:



Surface:



Chapter 1: Getting Started

Menu Shortcuts

F2 – Animation Menu F3 – Polygons Menu F4 – Surfaces Menu Set

F5 – Dynamics Menu F6 – Rendering

Overview of Processes and Terminologies

Workflow

Maya workflows may vary between you, so don't be alarmed if you end up doing things a little differently. Workflows are the order in which you would go through a project, but certain steps may be missed entirely depending on your goal. Our best practice would go something like this:

1. Concept Art and Storyboarding

Concept art is the first stage where any character is born and should always be used to relate back to during the design stages. Storyboarding is a sequence of illustrations with the sole purpose to pre-visualise your final animation.

2. Modelling

The 3 very different geometry types (Polygons, NURBS & Sub-Divisional Surfaces) each have their own unique attributes that once utilized will enable you to create models with ease. Each type can be converted into one another at any point throughout the modelling process and is often useful to do so as they each have key advantages that once utilized could lead to increased productivity.

Construction History: Every action you do will create a footprint how many sequential footprints that are recorded (i.e. how many times you can press *ctrl-z*) are editable within Maya preferences, the default is set to 50 actions. However, history is applied to a specific object every time something is changed, be it moved, stretched or interacted with by another. This enables you to tweak settings that have been previously applied, creating a kind of dynamic undo ability. It does however take up additional memory and unfortunately the more history that ties onto an object the more likely things will go wrong at later stages such as rigging. Therefore, once you're satisfied with your model and before moving onto the next stage save your file with the entire history (optional), delete the history *File > Delete by Type > History* and save using the sequential naming structure discussed on page 41.

Chapter 1: Getting Started

3. Textures & Shading

Shaders are what we use to provide our models with colour; contributing to their final appearance. Early on, you will most probably add default colours to objects but as your understanding increases along with your knowledge of the various Shader types, you will be able to create more elaborate and realistic effects depending on your requirements. Texture mapping adds additional levels to the standard Shader options; it allows you to import image files on various attributes allowing the manipulation of effects such as transparency or bump.

4. Lighting

There are various types of lighting used within Maya and arranging lights within your scene in order to complement models can often be overlooked by individuals or even missed off all together. Taking some time to learn the methodologies attached to this section will pay dividends when it comes time to render.

5. Rigging | Binding

Joints are forms of hierarchies, and once a skeleton (rig) has been created it allows you to bind with geometry in order to create deformations. They can be used to perform actions such as page turns in a book just as well as creating a fully functional character.

This section can also include:

- Painting Weights
- Creating Blendshapes
- Hair and Fur Rigs

Once your character is bound to the rig you will be able to facilitate movement.

6. Animating

This is where you can breathe life into your character. Traditionally, you will begin with key framing, however you'll soon learn this isn't the only way to meet your goals.

7. Rendering

Quintessentially, rendering is the process of compiling all (or selected) aspects of your scene into one. By default it will take into account all the characteristics such as applied textures, lighting, shadows, reflections, and transparency.

Chapter 1: Getting Started

Transform Hierarchy and Relationships

In Maya an objects relationship to another creates what is known as the transform hierarchy. A parent/child relationship would link attributes such as translate, rotate, and scale. These attributes can be linked to its parent, its parents' parent and so on and so forth.

Scripting

Almost every aspect of Maya can be manipulated using MEL script, based on C++. This allows a user to directly interact with Maya and write their own scripts. This is particularly aimed at technical animation and rigging, for example moving a large number of objects with a random variable, or automating a long drawn out task to be executed at the press of a button.

Maya has recently also added support for Python, a more powerful and cross compatible language, however, I would recommend this only to programmers who are already comfortable with Python as Maya will not break down the commands for you to reference like it does with MEL.

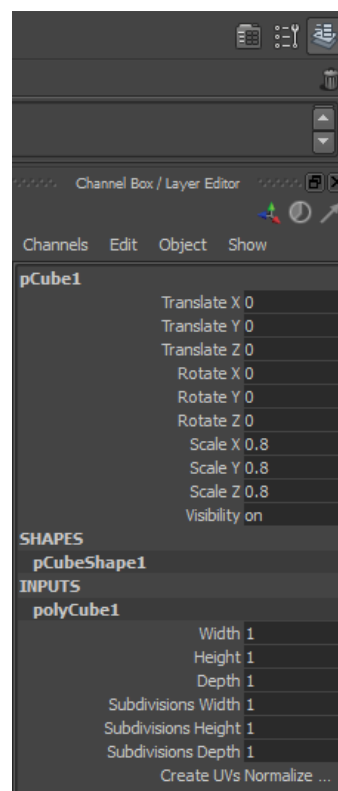
We will delve into an introduction to MEL scripting a little later and as part of this book, you will be eligible for a free Scripts via the Spotlight Studios website.

Channels Box and Nodes

The channel box is located on the right hand side of your screen and provides access to the most commonly used attributes. It has a coloured key (opposite) for quick reference illustrating if an attribute has been keyed, locked, or linked with another. The nodes on the right hand side (RHS) are split into three sections:

- **Transform:** General positioning information, affected if you translate rotate or scale your model.
- **Shape:** Holds all generic information to do with the overall shape appearance.
- **Input:** Generic creational input node, holds information on height, width and length as well as options such as how many subdivisions or sections, an item will have.

Note: *The input node can only be used for initial modifications as later usage will result in anomalies if you have edited your shape in any way. Should you delete the history at any point (on your model) this option be removed.*

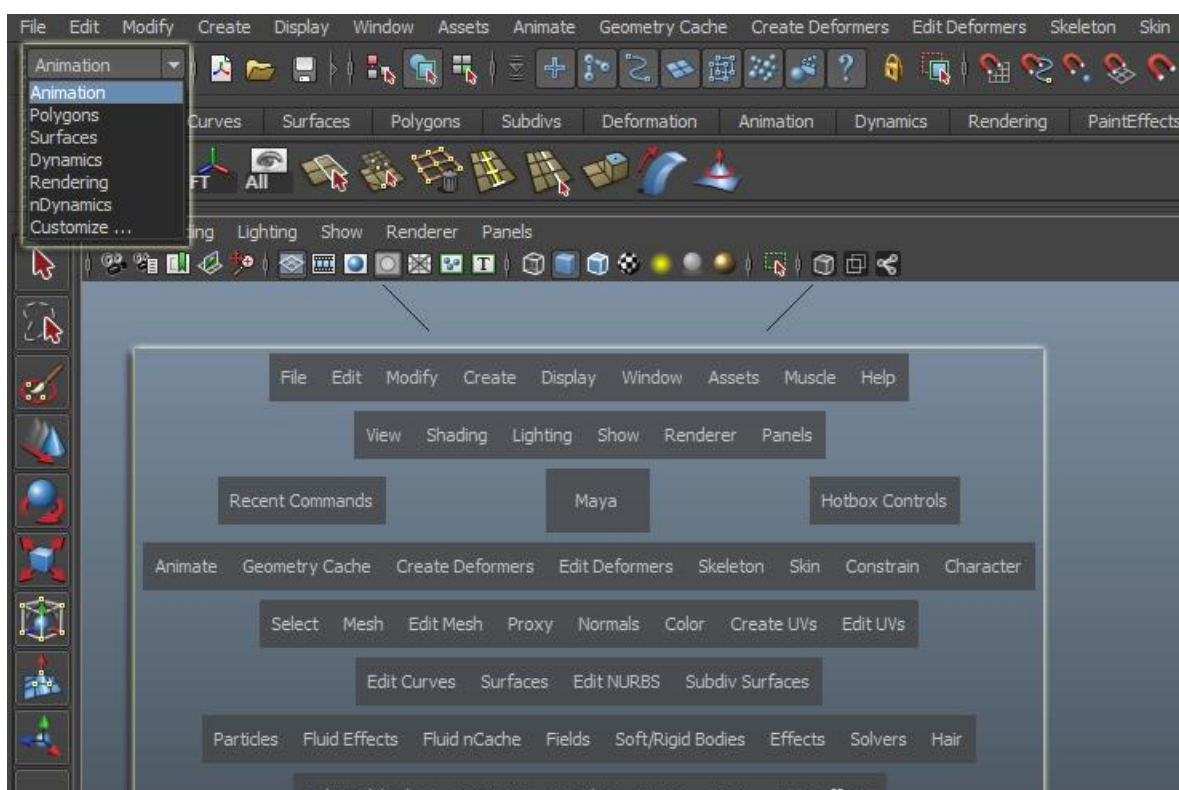


Chapter 1: Getting Started

Connection	Colour	Description	Using the Hot-Box
Muted Animation	Brown	The attribute has been animated but it has been muted, therefore playback will not commence.	The Hot-Box is another often untouched tool that we find incredibly useful.
Constraint	Blue	This attribute is linked to an attribute of another.	Holding down the Space Bar in any of you viewport
Locked	Grey	Un-editable whilst in this state.	
Non-keyable	Grey (Light)	Cannot be animated.	
Blended	Green	Blended with another attribute.	
Keyframed	Orange	A keyframe has been added to this attribute.	
Expression Control	Purple	An expression regulates this attribute.	
Connected Dynamic	/ Yellow	Shares identical values as another, or is dynamically influenced.	

windows will give you a series of white menus that duplicate the menu structure of Maya. This saves time changing menu modes and gives you all of Maya's controls at your fingertips; you can use this as well as, or instead of the standard menu, and can also display pane specific and custom menus.

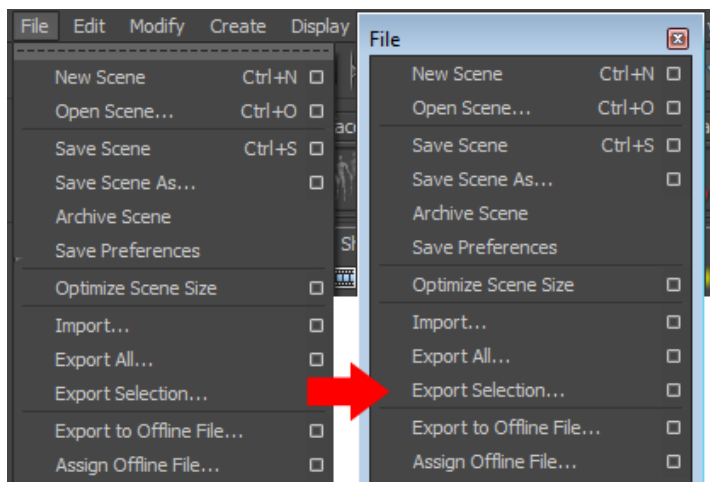
The Hot-Box also gives you quick access to difference layouts, masks, UI elements etc.



Note: *The hierarchical structure correlates directly from the menu at the top left (discussed earlier) and the Hot-Box controls that appear when pressing the space bar.*

Using the Menus efficiently

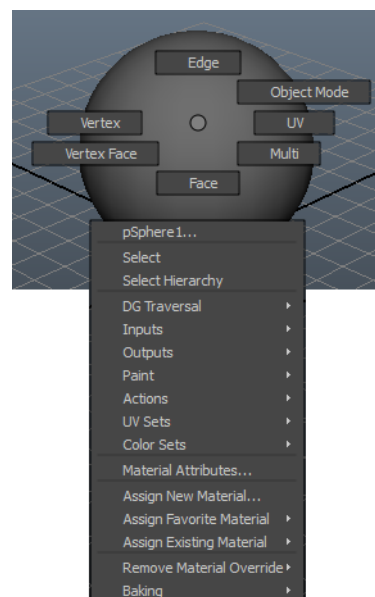
Wherever possible, get into the habit of using the small option box on the right hand side of the dropdown menu, even for mundane tasks like creating a cube. This provides access to an additional dialogue box, thus allowing you to see additional parameters, whilst ensuring the default settings are applied, unless you require otherwise. Many of these settings or parameters can be altered at a later point using the *Attribute Editor* or *Channel Box* so if you do forget initially this can be rectified.



Maya provides the ability to “tear off” nearly all menus and sub-menus to give you instant access to certain tools. To do this click on the dotted line at the top of a drop-down menu and this will create a pop-out version, very useful for circumstances such as Painting Weights.

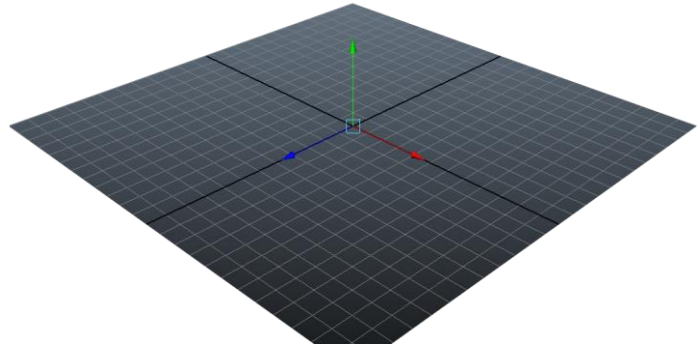
Marking Menus

These are selection sensitive, which means dependent on the item in question the menu will adapt accordingly. To access a marking menu hold down your *Right Mouse Button (RMB)* on an object; then by dragging it around and interactive line will emanate from the centre to illustrate what option you currently have selected, by releasing the *RMB* you will select the relevant option.



Working Within a 3D Environment

If you are not accustomed with 3D packages you should familiarise with their basic workspace principles. As you would expect the three dimensions are represented by axes which are:

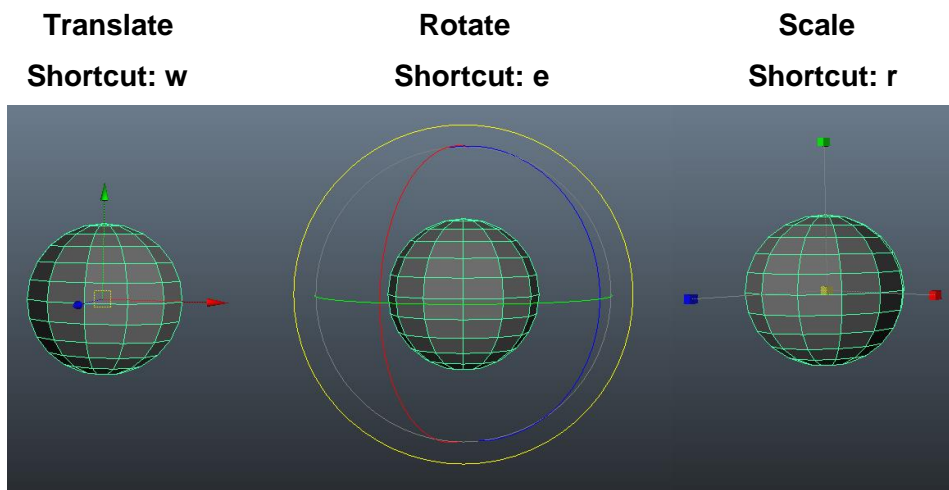


- Length (X – Red)
- Height (Y – Green)
- Width (Z – Blue)

These axes will always serve as your reference points and will be given specific co-ordinates based on the objects location, the default location of an object being 0,0,0.

Manipulators

There are three main types of manipulators that are used constantly throughout a project and these are:

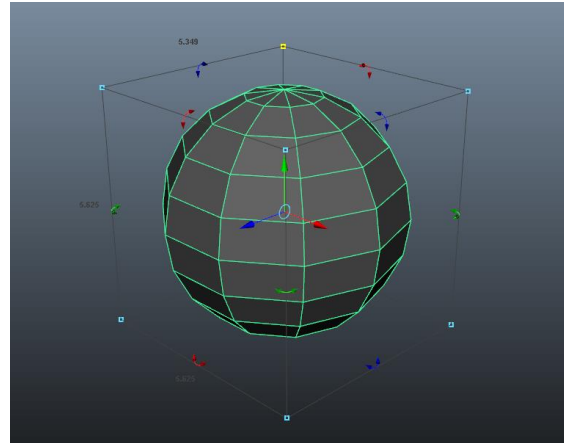


The manipulator handles that appear when the relevant tool is used are self-explanatory, nonetheless we recommend using them a little to fully understand their usability. Once you begin to use keyboard shortcuts (such as those highlighted above) it will considerably speed up your workflow.

Chapter 1: Getting Started

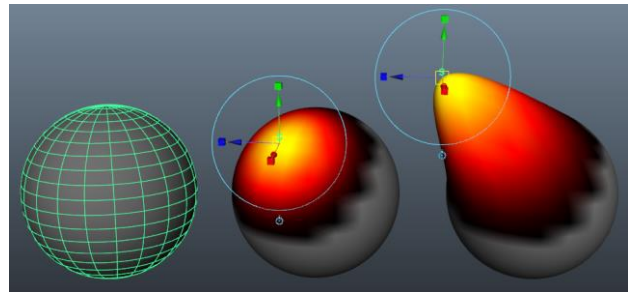
Universal Manipulator

This tool is a combination of all three of the above actions and allows for simultaneous manipulation without the need to change tools. Some users find this quicker and useful others prefer to edit each aspect individually ensuring errors are not made by selecting the wrong manipulation type.



Soft Select

Checking this box within the tool settings pane (or pressing 'b') for your selected manipulator (*translate, rotate or scale*) allows you to add a gradual falloff from the selected points. When active, you are presented with a colour coded selection area (Yellow / Red / Black) indicating the influence that will be affected. This is useful to give smooth deformation of an object, especially useful in creating and modifying organic shapes such as faces.



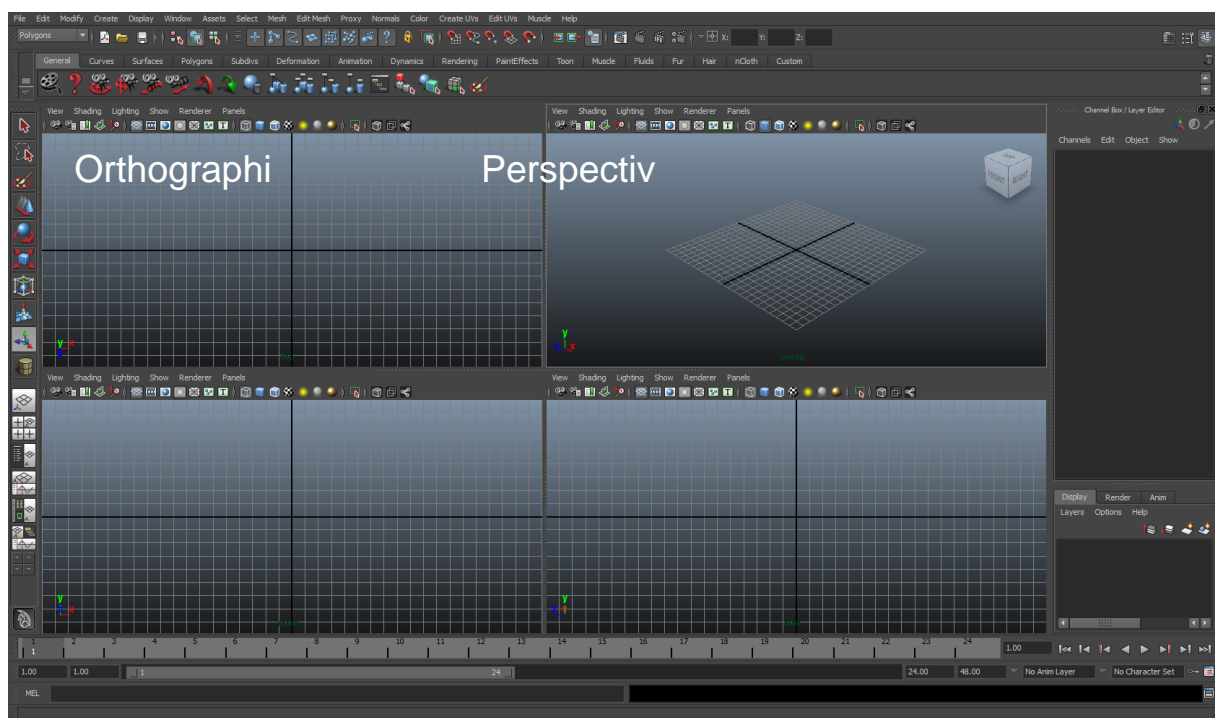
Note: *This is not to be confused with the Soft-Modification tool which we will get too later in the deformers section.*

Chapter 1: Getting Started

Workspace and Cameras

In order for you to be able to view a scene, you will always be looking through a camera. There are two main camera types in Maya, these are:

1. **Perspective** – These cameras provide depth illustrating that objects further away from the camera appear smaller than those closer to it, just as if you perceived the objects through a camera lens.
2. **Orthographic** – These will not add perspective in any way but will allow parallel viewing from any side, or the top of a scene. This is usual for comparing the actual length of various parts of a shape as their displayed size is irrespective of their distance from the viewer.



Switching Cameras / Workspace

By default you will see the (top right) perspective camera view screen upon launching Maya. To alternate views, press the spacebar to launch this screen, and simply ensure the mouse pointer is hovering over the workspace you require and tap the space bar again to select an alternate view.

Navigation

The majority of you will be using a mouse and keyboard to navigate around within Maya, there is another popular form of navigation which is the graphics tablet, which people will often customise to their own personal preference once they have had experience within Maya. If you are a first time user we would recommend the traditional keyboard and mouse at this point, but feel free to experiment in the near future.

Camera movement and control (Standard 3 button mouse):

- Left Mouse Button (LMB) - Selection tool.
- Alt + LMB - Rotates camera.
- Right mouse button (RMB) – Marking Menu.
- Alt + RMB - Dolly In and out (not zoom as it actually moves the camera).
- Middle Mouse Button (MMB) Scroll - zoom (changes focal length).
- Alt + MMB – Panning, horizontal or vertical depending on mouse movement.

1 or 2 Button Mouse controls

For Mac and Laptop users, we would highly recommend purchasing a 3 button mouse (Mac OSX is configured to work with them out of the box). On a Mac the Option button replaces Alt, and the Command (Apple) key will replace the windows Ctrl key.

However, if you are set on not having a 3 button mouse you can navigate to *preferences > Interface > Devices* and you can toggle between one, two, or three button mouse controls with or without the option of a scroll wheel.

Creating a Personalised shelf

The shelf is an invaluable tool at your disposal. Essentially it is a customisable shortcut bar to give you access to all of your favourite tools or scripts quickly and easily. Maya comes set up with a number of preset shelves for different areas of animation, such as Polygons, Rendering and nCloth.

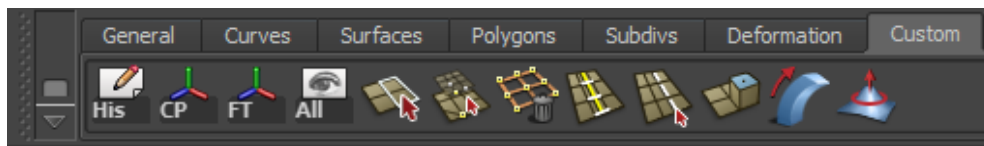
These provided a very useful basis for getting started, but it becomes much more valuable when you start creating your own shelves. You can change shelves by selecting the tab, or if you have a lot then you can click and hold the tab on the far left and select it from a drop down menu. The button under that gives you a menu where you can create, delete, load, save and modify the hierarchy of your shelves.

Chapter 1: Getting Started

Create a new shelf and give it a name. To add a button to a shelf you simply shift-ctrl-click the menu item, for example, to add to create poly button, go to *Menu > Create > Polygon > Primitives* and *Shift-Ctrl-LMB* the Cube option box.

You will see the button added to the end of the shelf. You can re-arrange shelf buttons by middle click and dragging the button, and remove shelf buttons by dragging them to the bin icon on the right hand corner. Now click the button and the Cube Create tool will be activated and the tool settings window will also appear.

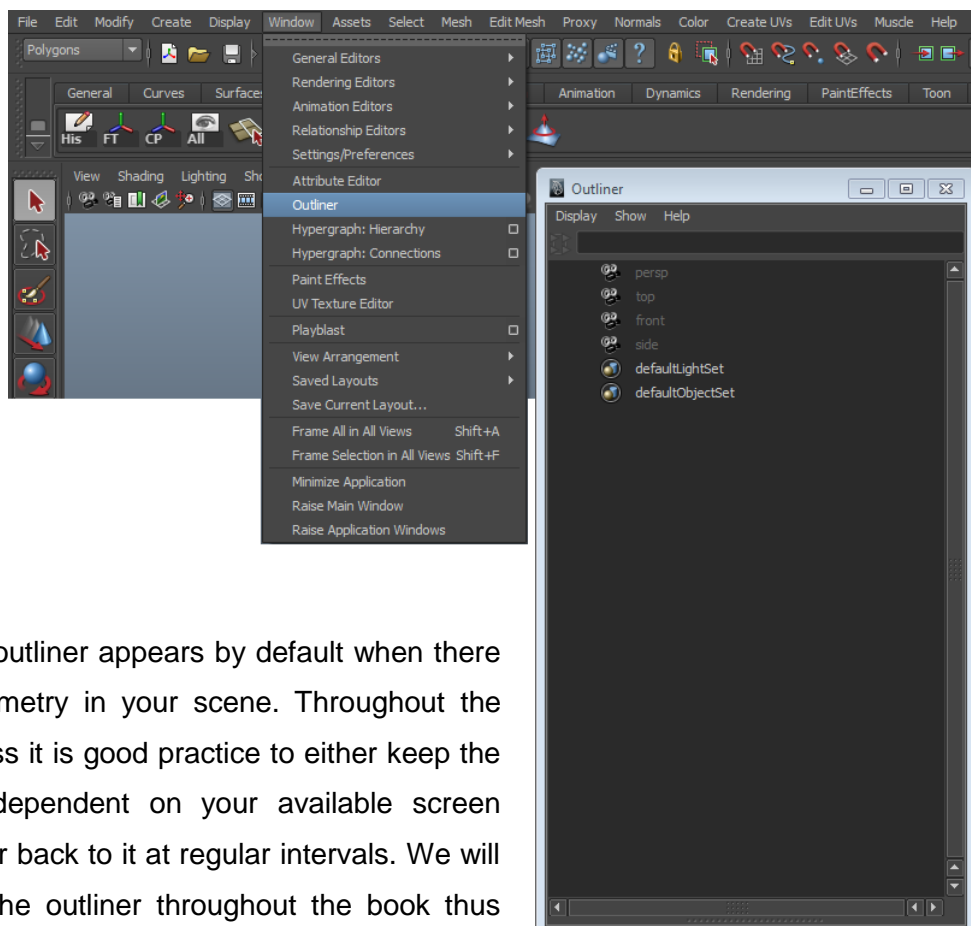
Example Shelf



From Left to Right: Delete by type History, Centre Pivot, Freeze Transformations, Show All, Split Polygon Tool, Merge Vertices/Edges, Insert Edge loop, Select Continuous Edge, Extrude, Bend, and Sculpt Geometry Tool.

Introduction to the Outliner

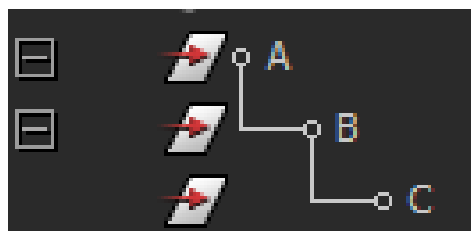
The outliner is one of the key areas when it comes to the organisation of your scene. Maya represents every object you create as a node (as well as a few defaults), these nodes can then be organised within the outliner to ensure organisation and continuity is kept throughout. This feature allows you to re-arrange the nodes into groups, thus creating hierarchies enabling them to be controlled as one. You may also use this to create and edit parent/child relationships explained previously.



This is how the outliner appears by default when there is no other geometry in your scene. Throughout the modelling process it is good practice to either keep the outliner open (dependent on your available screen space) or to refer back to it at regular intervals. We will be referencing the outliner throughout the book thus gradually introducing you to new aspects as a when you need them.

Outliner Hierarchy

The outliner hierarchy is structured as parents and children and the transform manipulations are passed from parent to child and so on. For example, if a parent node 'A' is moved along the X-axis by 2 then the child 'B' will also move along the X-axis by 2 and so will its child, 'C'.



One parent can have many children, a child can become a parent but will only ever have one, although can be influenced by its parents parent; known to the child as a grandparent node.

Viewing your Scene

Smooth Shaded: *Shading > Smooth Shade All* - This enables you to display the items in your scene as solid objects, if you have assigned colours they will be displayed accordingly (they can be disabled by selecting, *Shading > Use Default Material* very good for gauging what your image will render like.

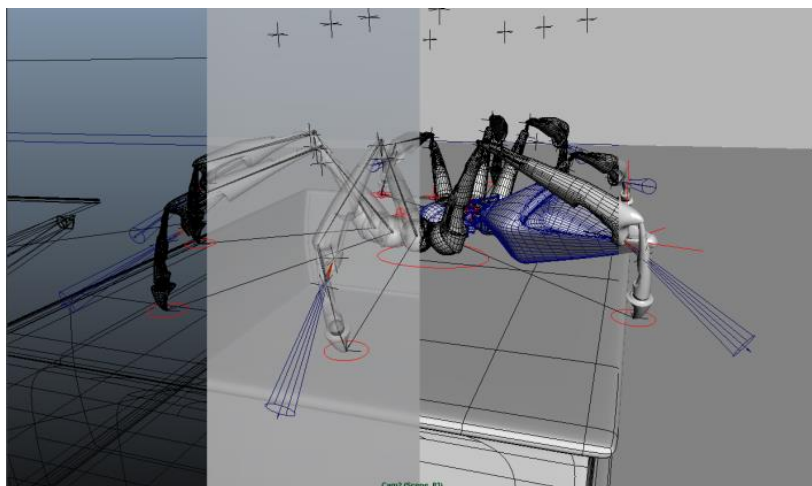
Wireframe: *Shading > Wireframe* - Often used when editing vertices, enabling you to see the individual make-up of an item, whether this be in poly's, NURBS or sub-D's.

Wireframe on Shaded: *Shading > Wireframe on Shaded* - A combination of the two shading options above. You're able to see the make-up of an object whilst keeping it in solid form, very useful when tidying up geometry.

X-Ray: *Shading > X-Ray* - As you will probably guess this gives you a semi-transparent view of any object within the scene.

Variations:

In the panel options there are various *Shading* options you can apply, the ones above are the most commonly used but there are others, so have a play and see what suits you.



Chapter 1: Getting Started

Scripting

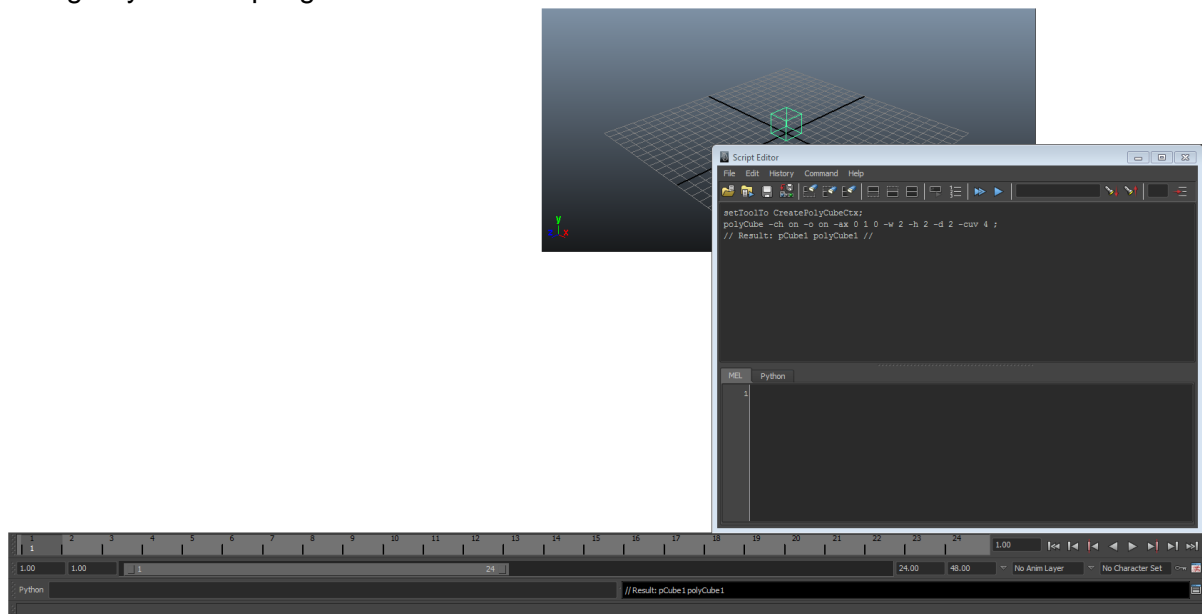
Scripting is using code (specifically MEL script) to directly interact with Maya. This can involve everything from automating tasks to tool development.

MEL (Maya Embedded Language)

For every action a piece of MEL code is created and implemented, you can use this to write scripts or execute simple commands. The image accompanying this text illustrates how the creation of a polygon cube generates MEL code and if we were to highlight the code in the top section, copy it to the bottom section and execute the command we would be presented with a second polygon cube. We will delve into MEL scripting a little later in the book and will introduce you to some of our scripts (available from our website) which you are welcome to use at your discretion.

Python

Some programmers who migrate over to Maya will be able to implement their own tools using this coding language. Maya has only allowed the default built-in commands to be accessed through Python scripting.



Chapter 1: Getting Started

Hot Keys

Note: Maya is case sensitive so if you are getting an unexpected action or nothing at all ensure Caps Lock is off. Also the *Option* key on a Mac replicates *Alt*.

Menu Selection

Hotkey	Action
<i>F1</i>	Help
<i>F2</i>	Animation Menu Set
<i>F3</i>	Polygons Menu Set
<i>F4</i>	Surfaces Menu Set
<i>F5</i>	Dynamic Menu Set
<i>F6</i>	Rendering Menu Set
<i>F8</i>	Toggle Component Type / Object Type Mode

Display

Hotkey	Action
<i>1</i>	Low Polygon (base)
<i>2</i>	Medium Polygon (Combination of base and smooth)
<i>3</i>	High Quality Polygon (Smooth Preview)
<i>4</i>	Wireframe
<i>5</i>	Shaded
<i>6</i>	Textured
<i>7</i>	Use Scene Lighting
<i>Alt-b</i>	Cycle Workspace Background Colour
<i>Space</i>	Hotbox Controls
<i>Ctrl-h</i>	Hide Selection (<i>Display > Hide > Hide Selection</i>)
Hotkey	Action

Chapter 1: Getting Started

<i>Ctrl-Shift-H</i>	Show Last Hidden (<i>Display > Show > Show Last Hidden</i>)
<i>Alt-h</i>	Hide Unselected (<i>Display > Hide > Hide unselected Objects</i>)
<i>Shift-I</i>	Isolate (<i>Show > Isolated > View Selected</i>)
<i>Shift-></i>	Increase Vertices Selection
<i>Shift-<</i>	Decrease Vertices Selection

Navigation

Hotkey	Action
<i>Alt-LMB</i>	Tumble / Rotate
<i>Alt-MMB</i>	Track / Pan
<i>Alt-RMB</i>	Dolly / Zoom

Moving Objects

Hotkey	Action
<i>Alt-Up</i>	Move Up One Pixel
<i>Alt-Down</i>	Move Down One Pixel
<i>Alt-Left</i>	Move Left One Pixel
<i>Alt-Right</i>	Move Right One Pixel

Tool Operations

Hotkey	Action
<i>Return</i>	Complete current action
<i>Insert</i>	Edit Pivot Point
<i>Q</i>	Select Tool

Chapter 1: Getting Started

Hotkey	Action
<i>W</i>	Translate (Move) Tool
<i>E</i>	Rotate Tool
<i>R</i>	Scale Tool
<i>T</i>	Show Manipulator Tool
<i>Y</i>	Select Last Used Tool
<i>+</i>	Increase Manipulator Handle Size
<i>-</i>	Decrease Manipulator Handle Size

Snapping

Hotkey	Action
<i>C</i>	Snap to Curve
<i>X</i>	Snap to Grid
<i>V</i>	Snap to Point

Editing

Hotkey	Action
<i>Ctrl-c</i>	Copy (<i>Edit > Copy</i>)
<i>Ctrl-d</i>	Duplicate (<i>Edit > Duplicate</i>)
<i>Ctrl-Shift-D</i>	Duplicate Special (<i>Edit > Duplicate Special</i>)
<i>g</i>	Repeat Last Action
<i>Ctrl-g</i>	Group (<i>Edit > Group</i>)
<i>p</i>	Parent (<i>Edit > Parent</i>)
<i>Shift-P</i>	Unparent (<i>Edit > Unparent</i>)
<i>Ctrl-s</i>	Save

Chapter 1: Getting Started

Hotkey	Action
<i>Ctrl-v</i>	Paste (<i>Edit > Paste</i>)
<i>Ctrl-x</i>	Cut (<i>Edit > Cut</i>)
<i>Ctrl-z</i>	Undo (<i>Edit > Undo</i>)
<i>Shift-Z</i>	Redo (<i>Edit > Redo</i>)

Animation Operations

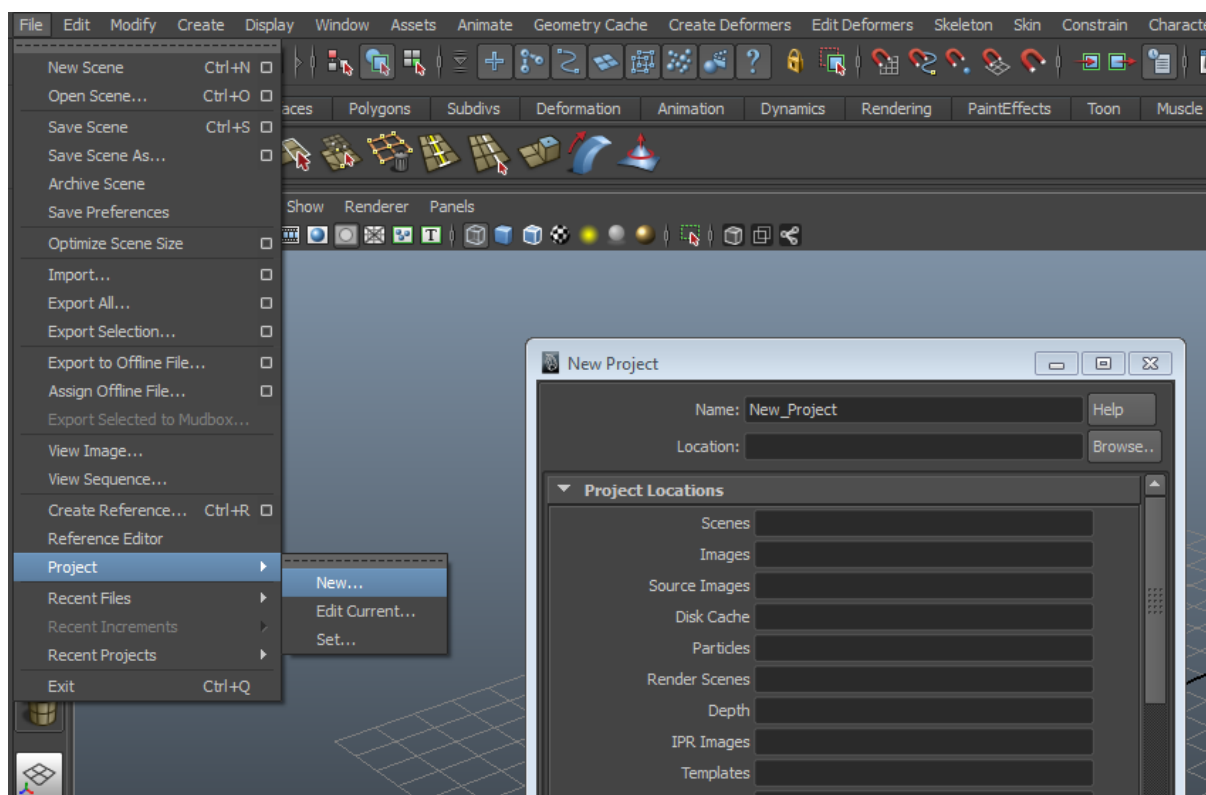
Hotkey	Action
<i>s</i>	Set Key (<i>Animate > Set Key</i>)
<i>Shift-E</i>	Set Key for Rotate
<i>Shift-R</i>	Set Key for Scale
<i>Shift-W</i>	Set Key for Translate

Note: To edit or create a new Hotkey navigate to *Window > Settings / Preferences > Hotkey Editor*

Chapter 1: Getting Started

Scene Setup

Creating a New Project



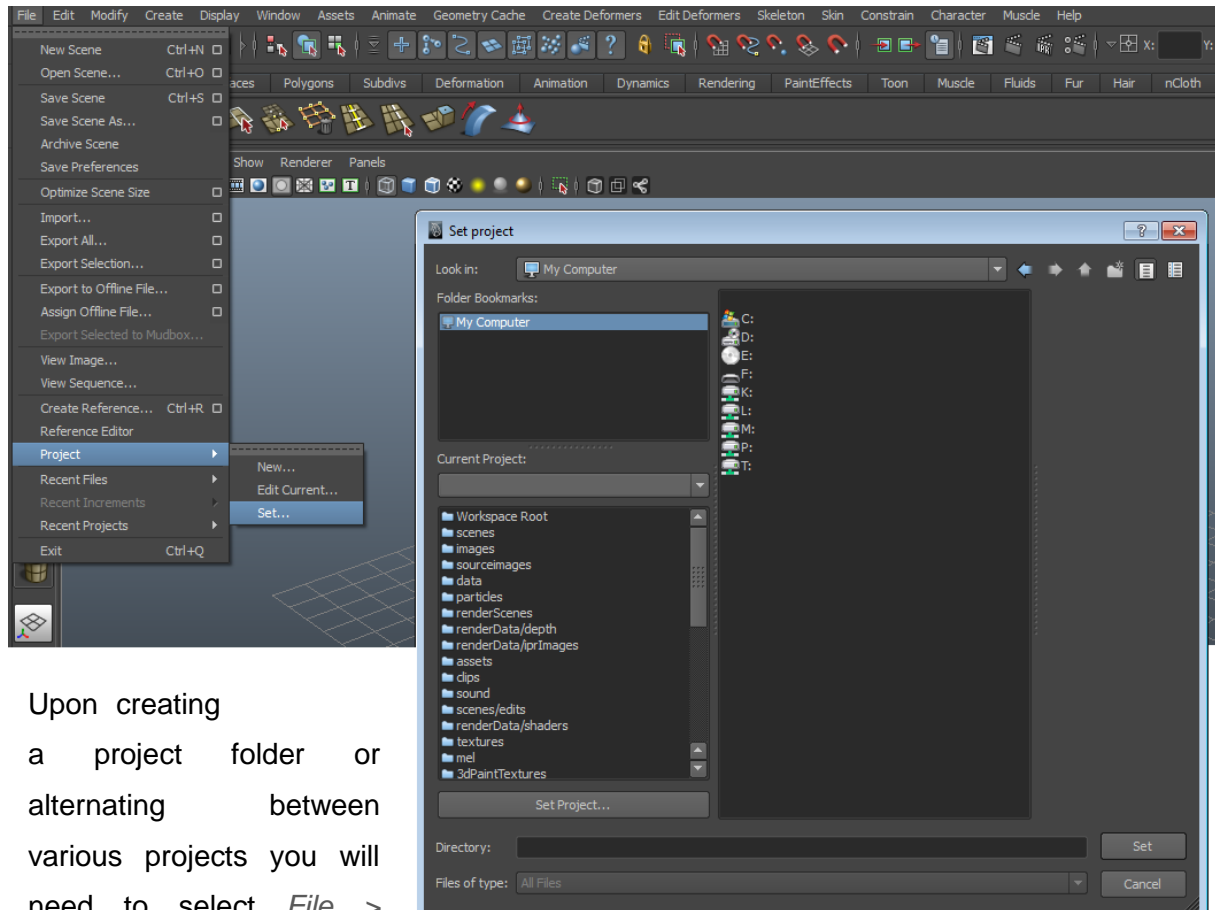
Upon launching Maya the first thing you should do is to set a Project. This essentially tells Maya how to organise a local folder to distribute scene files, textures, and images as well as saving the workspace information. This allows for easy integration within the project and allows the project to be distributed while maintaining links to assets, textures and other referenced scene data.

This ultimately means working from multiple workstations is effortless as you can just copy the project folder to a different location (or load the project from a network location) and images etc. will be referenced relative to the project location rather than an absolute path such as *C:\Documents and Settings\My Pictures*.

Chapter 1: Getting Started

To create a New Project click, *File > Project > New*, then enter a project name and click *use defaults* at the bottom (recommended). If you do however wish to fill them in manually you can write your folder names you require in the relevant empty fields. After either option you will need to select *Create*, to finalise the process.

Setting an Existing Project



Upon creating a project folder or alternating between various projects you will need to select *File >*

Project > Set and select the appropriate project file (remembering Maya looks at this folder for references)

Chapter 1: Getting Started

Save Sequentially

You should structure your saved files in generations, so that if you need to return to a previous point for whatever reason, or you incur file corruption, only the time between file generations is lost. This can be done daily, weekly, or for every save generation depending on how important the project is, how much the project changes and, ultimately, how much space you have available.

The simplest method is to simply use Maya's built in incremental save feature. Clicking the box next to *File > Save* will bring up a few options, turning the feature on and off, and also allowing you to automatically limit the number of generations that is kept on the computer at any one time.

An alternative manual method is to simply number each File <Scene_01_001.mb, Scene_01_002.mb etc.> alternatively if you're feeling adventurous you could incorporate the date, time, place of creation (home/labs/work) etc.

It is also worth mentioning here, that it is important to back up your work to an **external** drive or an online storage alternative as often as you feel necessary.

Hiding Un-Used Items to free up real-estate:

You can hide nearly every part of Maya's UI in order to dedicate a greater portion of the screen to the viewport. Everything is entirely subjective to an individual's way of working, but combined with the hotbox this can be a very powerful and visual way to work.

The Outliner is your friend:

Everyone works in different ways, but in our experience we have found that working in a very 'clean' and organised way tends to make the process much faster and more efficient in the long run, this makes problems that crop up much easier to fix and group work a lot less painful.

The Outliner is simply a Hierarchal list of your scene, like a simplified Hypergraph. You can select and move objects around between hierarchal levels and provides a very easy way of renaming (double click) and organising (*MMB and drag objects*) your scene. (Pg 32 for more details)

Chapter 1: Getting Started

Display Layers

You can use display layers to limit what is visible and selectable in your scene. These work in a very similar way to Photoshop layers.

For each display layer, objects that you put in the layer can act as normal, be referenced, or become a template.

When a layer is set to reference, the objects will appear as they would normally in the viewport, but they will not be selectable. This is very useful if you have background objects or geometry that may get in the way of you selecting your controls.

When a layer is set to template, the objects are neither selectable nor are they renderable. They will show up in your viewport, but only in a greyed out wireframe. This could be used to either limit the clutter on the screen (while still showing the objects' locations) or to show the position of an animated proxy object while you animate the main character over the top.

Large / Group Projects / Referencing

When working on large or group projects, organisation becomes even more important, and a clear file naming and storage should be designed and maintained very early on.

The more 'stuff' in your scene, the slower Maya will run and the more difficult it becomes to navigate, select and modify parts of the project. You may also have the same content in different scene files, what happens if you need to change the main characters dress? You can help to get around this to some extent managing layers, but it doesn't quite solve the problem.

The best way to properly address this kind of issue is to Reference in your different parts. This means that at the top level, you will not actually have any objects in the scene, but rather be changing the values of the objects you are referencing. This means that at any stage you can go back and edit the referenced objects without worrying about what you have used the objects in. This also means that in some cases you can animate a character in a scene whilst other people continue to work on the files, each time you open the scene or reload the references everything will be updated to the latest versions, but any changes you have made within your animation will stay the same.

With specific reference to speeding your scene up, you can animate your character to a very basic 'proxy' environment, and then when you have completed the animation, you can unload the environment and save the file as an animated asset. When you are ready to put the scene together, referencing this file will automatically follow through and also reference in the original character model, too.

Chapter 1: Getting Started

This kind of structure, as long as it is well managed allows you to be much more flexible with your animation.

To import an asset as a reference, simply click *File > Create Reference* and choose the file you wish to reference. You can use the Reference Editor (next button down) to manage and reload existing references.

It is worth noting that the organisational structure of the asset will stay unchanged, and referenced nodes cannot be moved or deleted. For this reason, it is strongly recommended by us that your assets always stem from a single named Node.