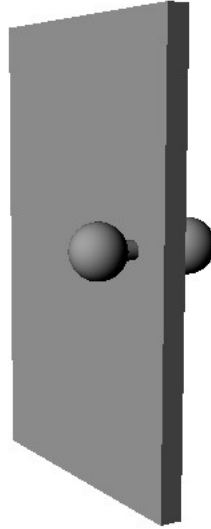


Intro to Hierarchies

Maya 2013



Concepts

- It is important to organize your models
 - so that you can operate either on the entire model
 - or on parts of the model
- That is...
 - you have to organize the way you transform (move, rotate, scale) your models and their parts
- To do this,
 - You organize your model parts into “groups” or “nodes”
 - These groups of parts are organized **hierarchically** under one another
- A node above other nodes is called a *parent* node
- A node under a parent is called a *child* node
- Transformations of a parent node
 - propagate downwards to all its children nodes
- Transformations of a child node
 - do *not* propagate upwards to parent

A Simple Door Model

- >Create >Polygon Primitives >Cube
 - Scale it to make it a flat door
- >Create >Polygon Primitives >Cylinder
 - Scale and translate it to make it a thin door-handle shaft
- >Create >NURBS Primitives >Sphere
 - Scale and translate it to make it one of the door knobs
- With the sphere still selected,
 - >Edit >Duplicate
 - Translate it to make the second door knob
- **TIP:** for precision,
 - make use of the Channel Box values

Defining a Hierarchy

- There are several techniques for defining hierarchies
 - A) Using Maya's menu selections
 - B) Dragging in the Hypergraph window
 - C) Dragging in the Outliner window
 - **CAREFUL:** Maya's terminology here is confusing
 - Maya speaks of "grouping"
 - And of "parenting"
- When Maya "groups" some models,
 - it makes them all children of a "null" node
 - A null node is one that does not contain any geometry
 - It only contains a transformation matrix
- When Maya "parents" two models,
 - it makes the second model the parent of the first model
- In both grouping and parenting,
 - you end up with children of a parent node

Use the "Group" function

- Shift-select the two spheres and the cylinder
 - That is, both spheres and the cylinder should be selected

- >Edit >Group
 - (Shortcut = Ctrl+g)
 - This makes a null node as a parent of all the selected objects
- >Window >Hypergraph: Hierarchy
 - to examine the hierarchical structure
 - There is a *group1* node
 - above the nodes for your geometry pieces
- Rename this new null node *DoorHandle*
- >Window >Outliner
 - This is a simpler, alternative way to see your scene structure
 - Click the + sign next to *DoorHandle*
 - to see the children of *DoorHandle*

Use the “Parent” function

- Select *DoorHandle*
- Shift-select the cube
 - – i.e., the door itself
- **CAREFUL:**
 - You must select the objects in this order
 - -- handle first, then door cube
- >Edit >Parent
 - (Shortcut key = **p**)
 - This makes the cube (the second object) a parent of the first
- Look at the structure in both the Hypergraph and Outliner windows
- Hit **z** to undo this last parenting operation
 - so we can try another technique
 - In Hypergraph or Outliner,
 - confirm that *DoorHandle* is no longer a child of cube

Dragging Technique

- Use either:
 - >Window >Outliner

or

- >Window >Hypergraph
- In those windows,
 - Middle mouse click on the *DoorHandle* node
 - Keep holding down the middle mouse button
 - Drag the *DoorHandle* node on top of the *cube* node
 - *DoorHandle* becomes a child of *cube*
 - (This has the same effect as the >Edit >Parent operation)
- For some models, this technique works fine
 - For others, it creates a problem
- For our particular model, it will create some problems
 - (See the *More on Hierarchies* tutorial in this set)
 - So....
- Hit **z** to undo this last operation
- In Hypergraph or Outliner,
 - confirm that *DoorHandle* is no longer a child of *cube*

Make the final Grouping

- Select the *DoorHandle* node
- Shift-select the cube of the door
- >Edit >Group
- This makes the two selected objects children of an invisible null node
- Look in the Hypergraph window to see the hierarchical structure
 - Select the top-level null node
 - Rename it to *DoorAll*

Selecting Hierarchies

- You can select any node of a hierarchy
 - by click/selecting the icons in the Outliner or Hypergraph windows
- When you select directly from the modeling windows,
 - Maya's default selection mode
 - is to select individual objects

- -- that is, to *not* select the entire hierarchy of a model
- You can change this default selection mode
 - In the top menu of tiny icons,
 - click on the little “Select by hierarchy and combinations” button
 - near the Menu selection word “Modify”
 - It looks like three little squares connected together
- Now click on any part of the door structure
 - The entire door structure is selected
- To return to selecting individual nodes within the hierarchy,
 - click the tiny “Select by object type” button
 - just to the right of the hierarchy-selection button

Local Origins

- In order for your hierarchy to work properly,
 - you must carefully define the local origins of your objects
 - (See the *Local Coordinate Systems* tutorial in this set)
- So....
- Select the *DoorHandle* node
- >Modify >Center Pivot
 - This places the local origin of the handle structure
 - in the center of the *DoorHandle* group
 - This will allow the door handle group to rotate properly
- Select the *DoorAll* node
 - Hit the **e** key for Rotation mode
 - Notice that the pivot point is by default at 0,0,0
 - Hit the *Insert* (Windows) or *Home* (Mac) key for local-origin mode
 - Drag the local origin to the far edge of the door,
 - so the door can rotate about that edge\
 - **TIP:** for precision,
 - use the Snap to Points option
 - Hit *Insert/Home* again to toggle out of local origin mode

- Test the rotations of the door
 - The door should rotate about its far edge
 - All the pieces (door handle) of the door should stay with it

Save your Scene File

- >File >Save Scene As...
 - You will re-use this model in later tutorials