

## DMM TUTORIAL 2: Creating more complex DMM objects

For more complex meshes, it is useful to create a simpler mesh to be used as a Tet Cage while keeping the detailed mesh as the Surface mesh. The rendering times can thus be minimized while keeping a visually satisfying result.

In this tutorial you will

- Create an optimized Tet Cage
- Attach a Surface Mesh to it

### Creating two polygon models of a chair

1. Create a new scene
2. Check that the Maya units are set to centimeters.
3. Create a polygon model of a chair such as Figure 1 (about 350 Tris)

This is the detailed model which will be used as the Surface Mesh. It is what will be seen in the final simulation.

4. Now build a less detailed polygon mesh of the same chair such as Figure 2 (about 150 Tris)
- This is the less detailed model which will be used by DMM to calculate the simulation.

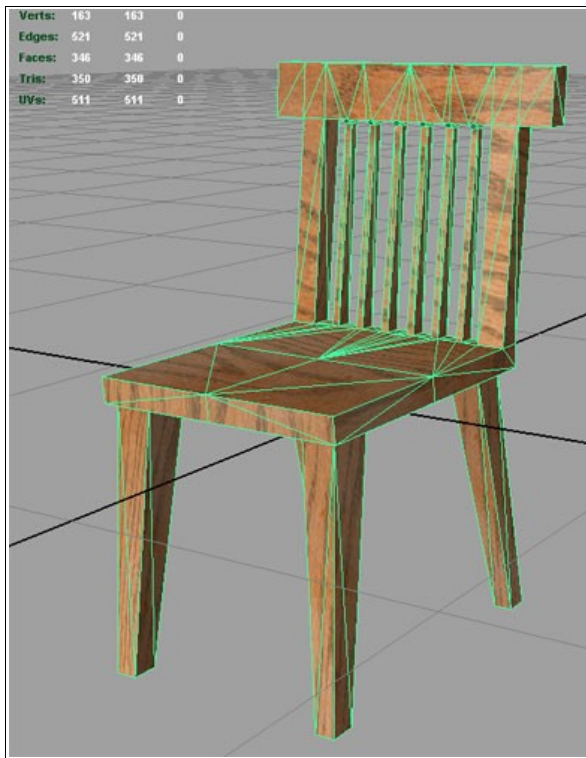


Figure 1

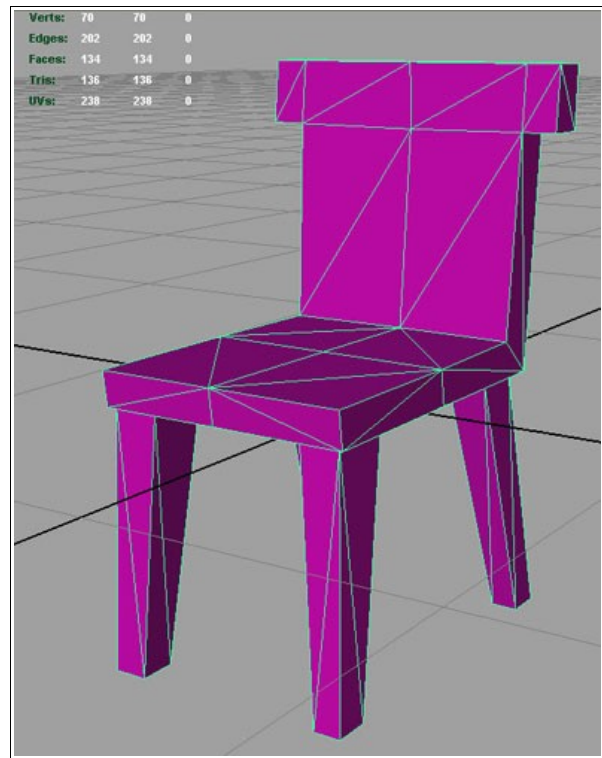
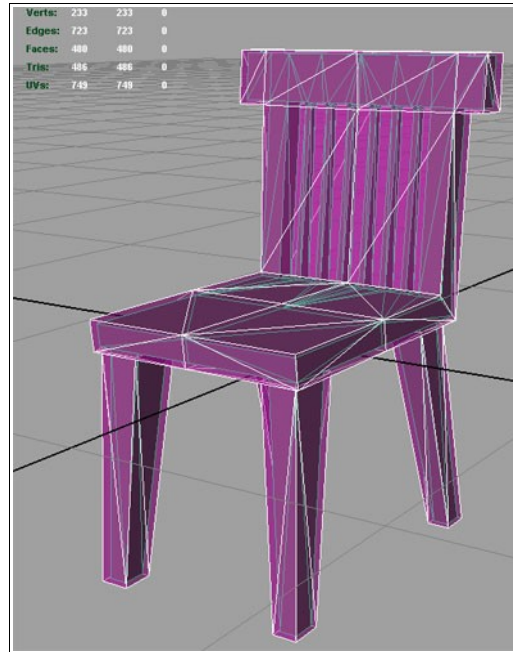


Figure 2

Note: As the Surface Mesh should be completely inside the DMM Object Tet Mesh before it is attached, make sure that your detailed model can fit completely inside your low res mesh.




5. Check that both your models are watertight and not self intersecting
  - Select *DMM Asset / Verify Polymesh*

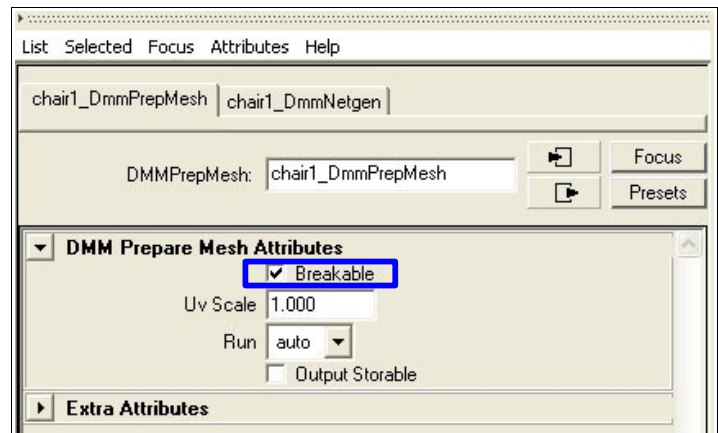
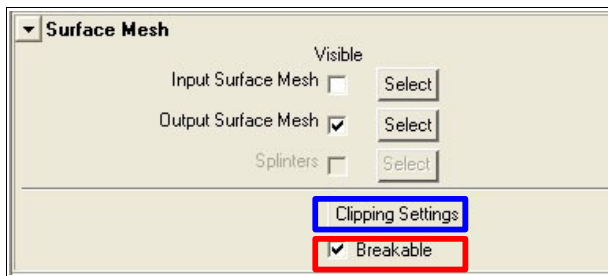
### Creating the Tet Cage

6. Turn the simple mesh into a Tet Cage
  - Select *DMM Asset / Create Bare DMM Object / from Polymesh*

It is now simulated by DMM. If you hit the play button you will see it fall under the effect of gravity.

### Attaching the Surface Mesh:

7. Attach the more detailed mesh to the Tet Cage
  - Select the Tet Cage and the polymesh
  - Select *DMM Asset / Add Surface Mesh to bare DMM Object* or 
8. Turn the chair into a breakable object
  - In the *DMM Asset Manager* check the *Breakable* box in the *Surface Mesh* section
  - or open the Prepared Mesh attributes (in the *DMM Asset Manager* click on the *Clipping Settings* Button; this will open the *Prepared Mesh Attributes* in the *Maya Attribute Editor*) and select the *Breakable* box there.



Note: About breakable objects:

- If the surface mesh does not have sufficient vertices, it will not deform well. Making the object breakable will automatically add vertices in order for it to simulate properly.
- Setting the prepared mesh to breakable also creates inside faces that will be shown when object breaks. This is why a breakable object needs to have water tight and manifold surface mesh.
- This does not affect the DMM simulation but only the output of the final mesh. If the DMM object breaks but the Surface Mesh is set to unbreakable, the output mesh will stretch around the different pieces, which can give some weird results!
- Objects which do not have separate Surface Meshes are always breakable.
- By clicking on the option box next to the *DMM Asset / Add Surface Mesh to bare DMM Object* tool, you can decide if the DMM object thus created is by default breakable or not.

#### 9. Apply a texture to the chair

- Select the Input Surface Mesh in the DMM Asset Manager
- Apply any texture of your choice
- Refresh the Surface Mesh (*Edit DMM / Refresh Surface Mesh*)

Note: This can be done to the detailed polymesh before it is attached to the Tet Cage. But if you do it after it is attached be sure to:

1. apply the texture to the Input Surface Mesh and not the Output Surface Mesh
2. refresh the surface mesh (otherwise the texture will not show in the simulation)

Note: For **breakable** DMM objects:

- If the object has one Maya material, that material is used for the outer faces and the inner faces.
- If the object has more than one Maya material, the least used material is assigned to the inner faces. Any outer face with the least used material is reassigned the most used material for the Output Surface Mesh. (The most used Maya material for an object is the Maya material that is assigned to the highest number of faces of the Input Surface Mesh.)