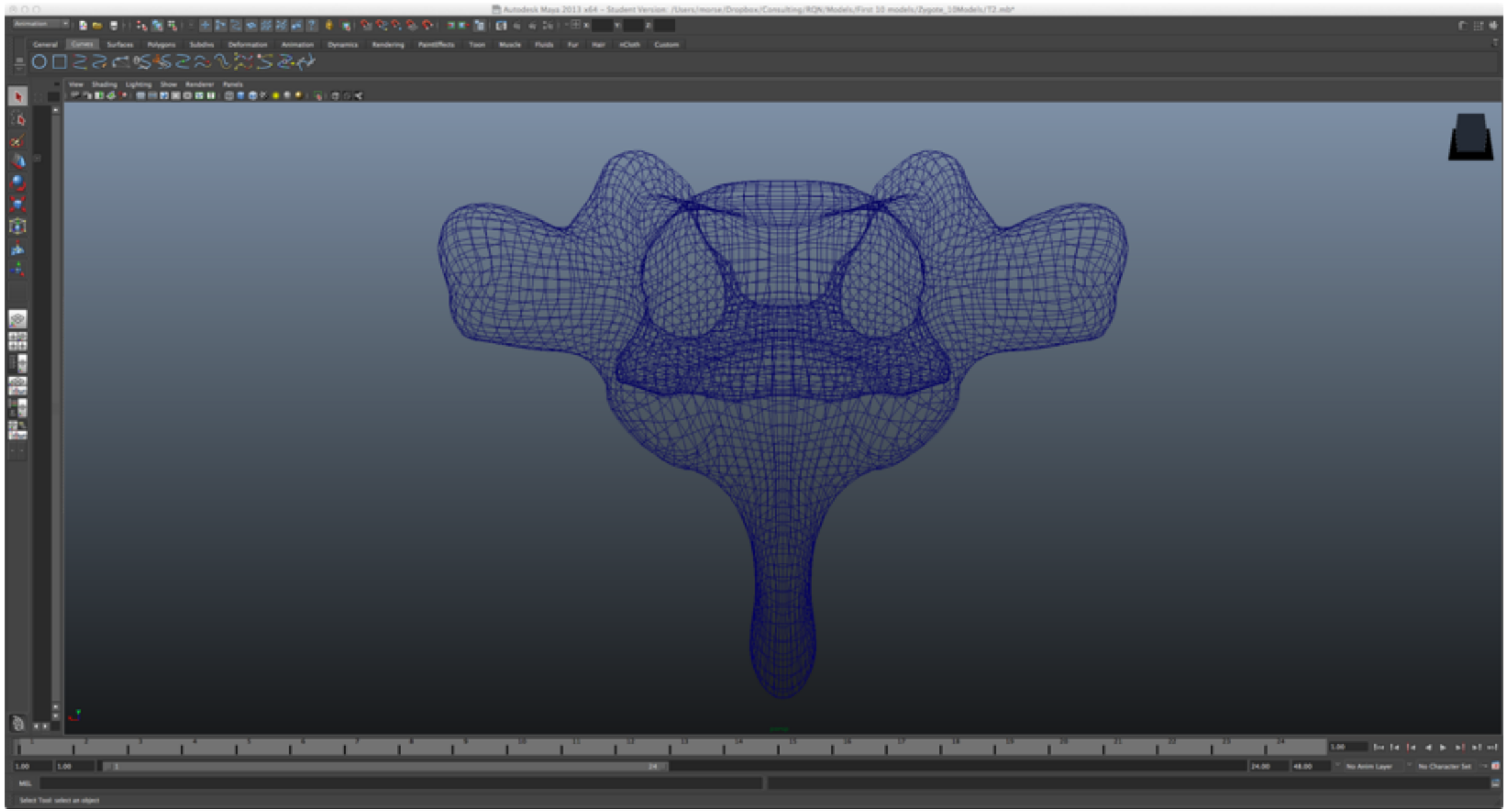
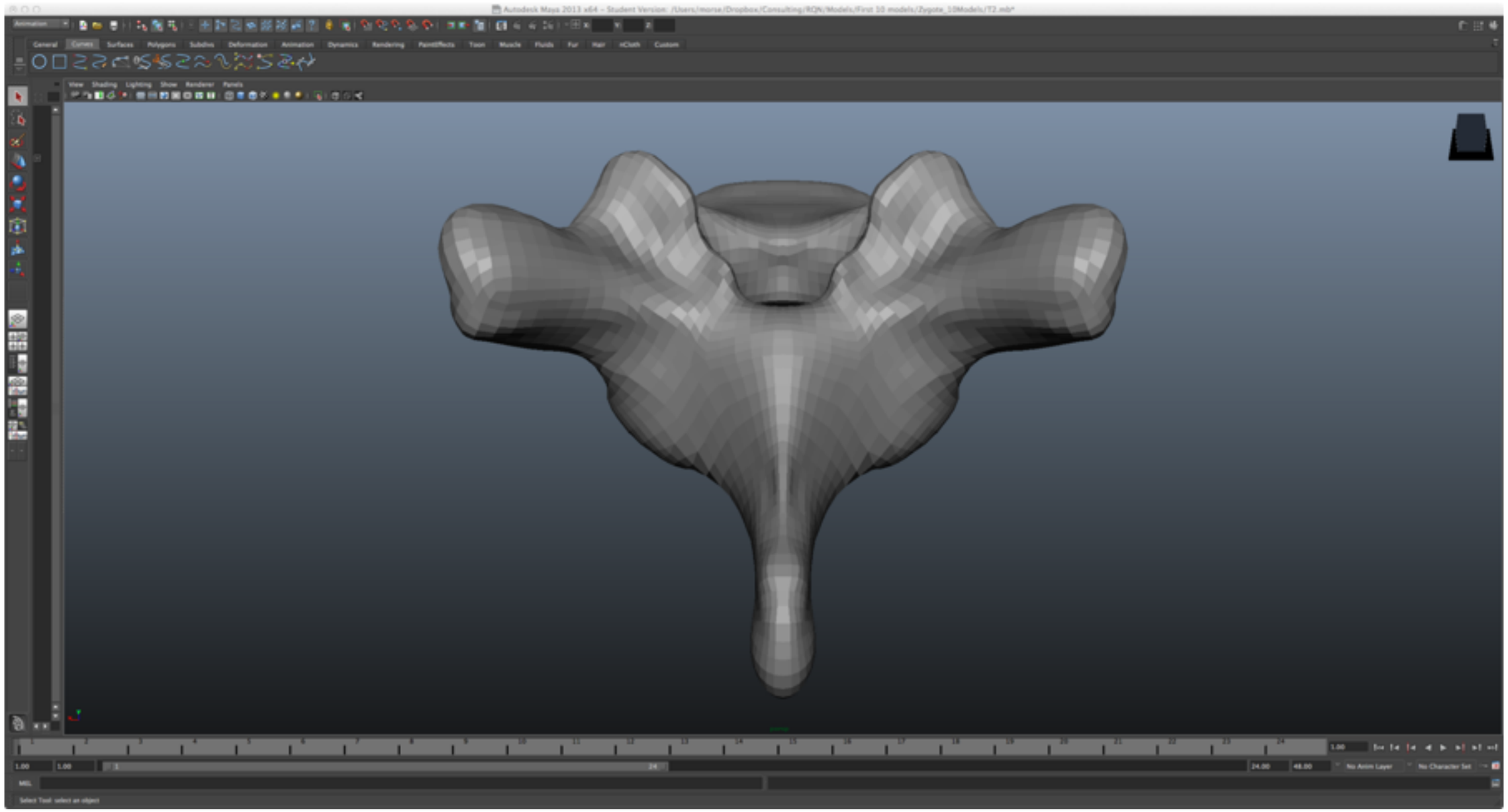
Points, Lines, and Polygons

CS 355: Interactive Graphics and Image Processing

Wireframe Meshes



Polygonal Faces

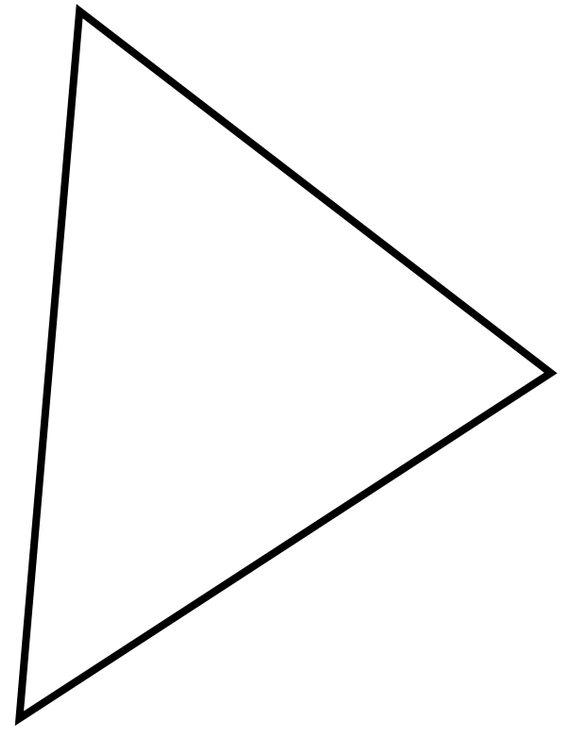


Primitives

- Vertex:
  A 3D point

- Edge:
  A line connecting two vertices

- Face:
  A polygon defined by a set of "adjacent" (connected by edges) vertices



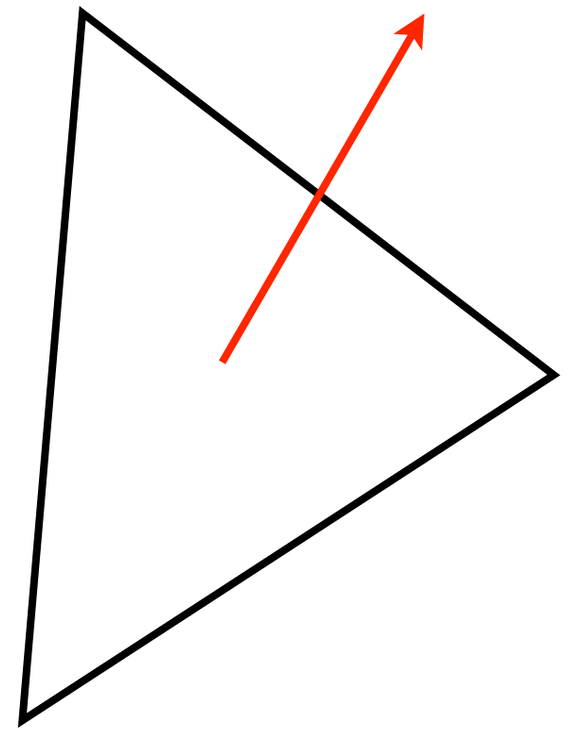
Storage

- Common way to store models:
  - List of vertices
  - List of edges between vertices (by index)
  - List of faces bound by vertices (by index)
- Avoids duplication of redundant data

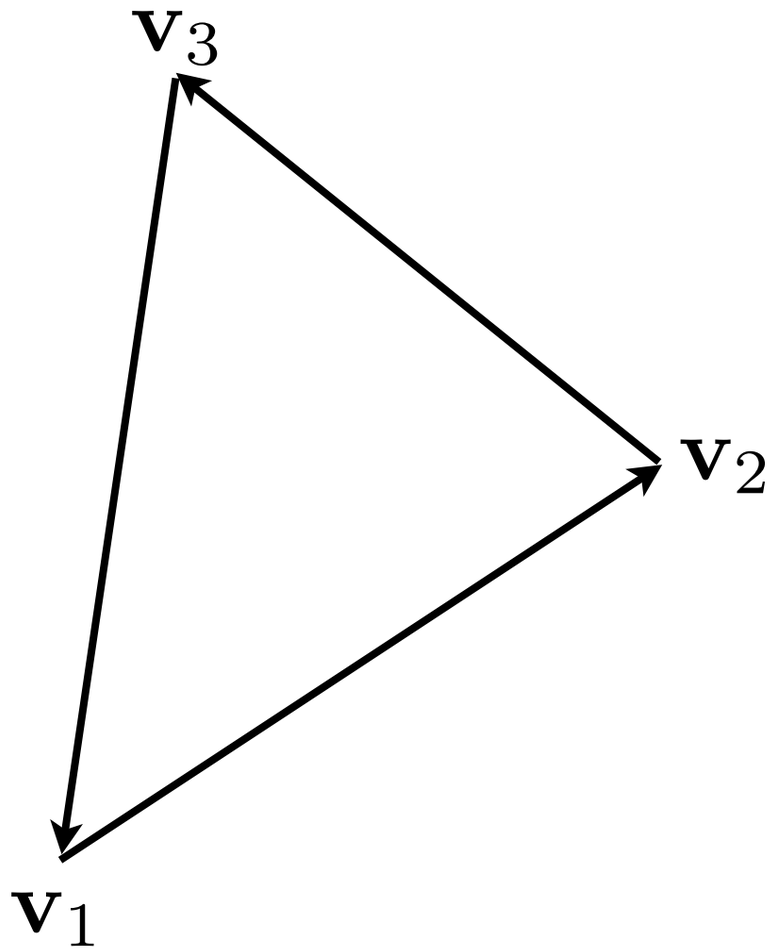
Normals

- It's useful to determine the *normal* to the polygonal face

- Be consistent—usually go with outward facing



Calculating Normals



$$\hat{\mathbf{n}} = \frac{(\mathbf{v}_2 - \mathbf{v}_1) \times (\mathbf{v}3 - \mathbf{v}2)}{\|(\mathbf{v}_2 - \mathbf{v}_1) \times (\mathbf{v}3 - \mathbf{v}2)\|}$$

Assumes a consistent
winding order

Coming up...

- Visibility testing