



Subdivision Surfaces

Thomas Funkhouser
Princeton University
COS 426, Fall 2000



Course Syllabus

I. Image processing

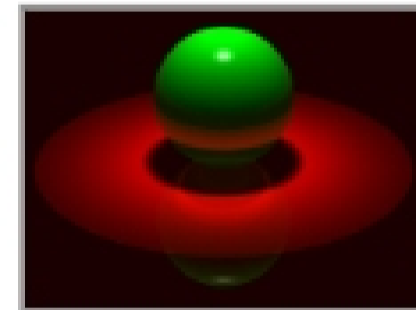
II. Rendering

III. Modeling

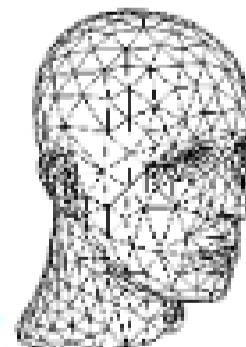
IV. Animation



Image Processing
(Rusty Coleman, CS426, Fall99)



Rendering
(Michael Bostock, CS426, Fall99)



Modeling
(Dennis Zorin, CalTech)



Animation
(Angel, Plate 1)

Course Syllabus



I. Image processing

II. Rendering

III. Modeling

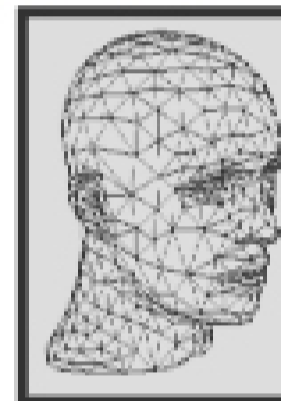
IV. Animation



Image Processing
(Rusty Coleman, CS426, Fall199)



Rendering
(Michael Bostock, CS426, Fall199)



Modeling
(Dennis Zorin, CalTech)

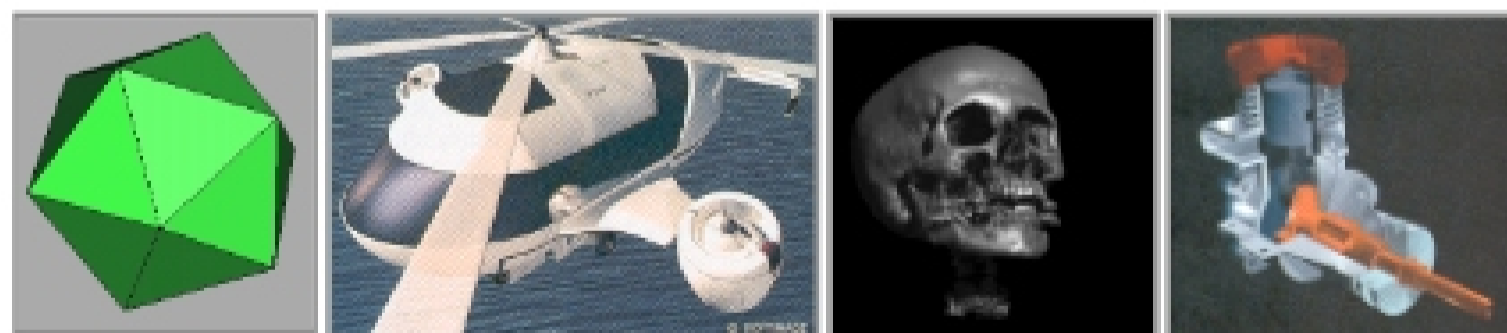


Animation
(Angel, Plate 1)

Modeling



- How do we ...
 - Represent 3D objects in a computer?
 - Construct 3D representations quickly/easily?
 - Manipulate 3D representations efficiently?



Different representations for different types of objects

3D Object Representations



- **Raw data**
 - Voxels
 - Point cloud
 - Range image
 - Polygons
- **Surfaces**
 - Mesh
 - Subdivision
 - Parametric
 - Implicit
- **Solids**
 - Octree
 - BSP tree
 - CSG
 - Sweep
- **High-level structures**
 - Scene graph
 - Skeleton
 - Application specific

Equivalence of Representations



- **Thesis:**
 - Each fundamental representation has enough expressive power to model the shape of any geometric object
 - It is possible to perform all geometric operations with any fundamental representation!
- **Analogous to Turing-Equivalence:**
 - All computers today are turing-equivalent, but we still have many different processors