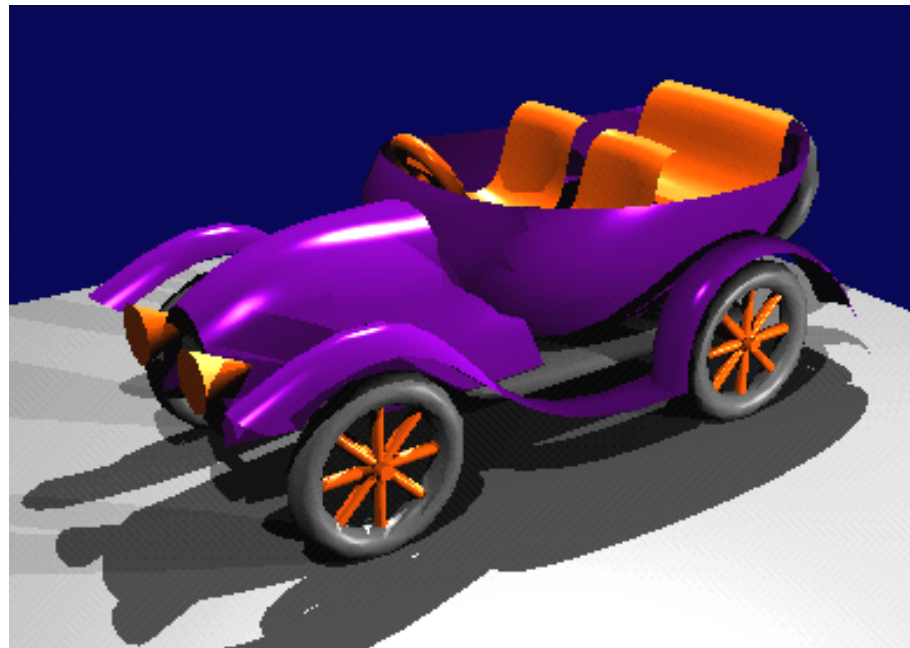


CEG477/CEG677

Computer Graphics II



Outline

0 Introduction

1 Three-Dimensional Object Representations

2 Visible-Surface Detection Methods

3 Illumination Models and Surface-Rendering Methods

4 Interactive Input Methods and Graphics User Interfaces

5 Color Models and Color Applications

Literature (books)

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Guide**, Addison Wesley, 2000,

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[Cast: 1959]	Casteljau de, P.: Outillage Méthodes Calcul. André Citroen Automobiles SA, Paris, 1959.
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Applications for Computer Graphics

- Computer games
- Special effects in movies
- Animation
- Advertisements
- Visualization of scientific data

Example: Happy Feet

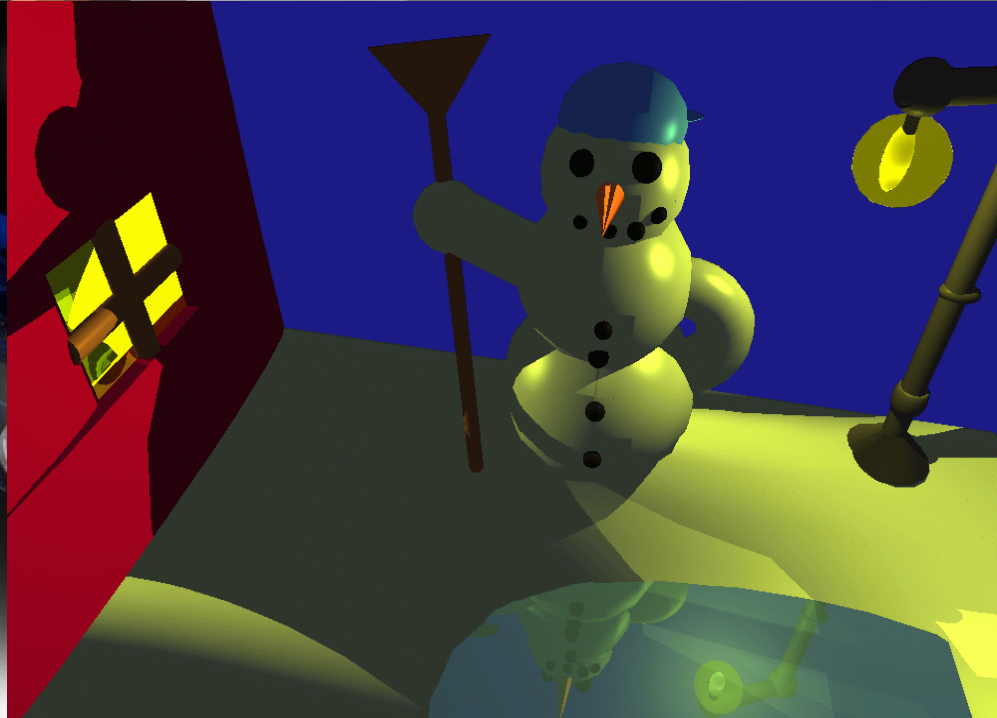
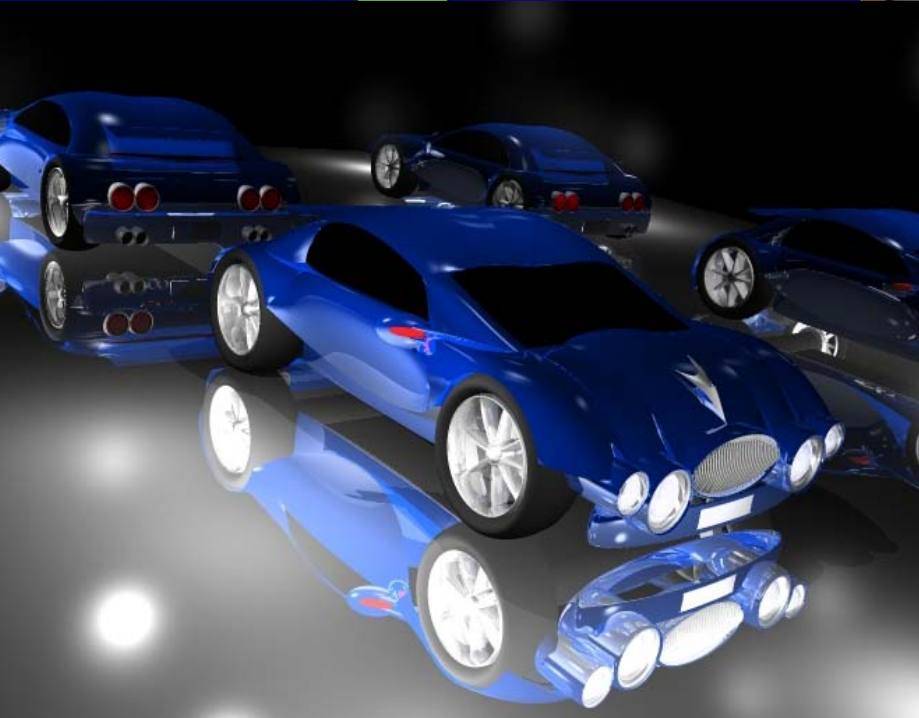
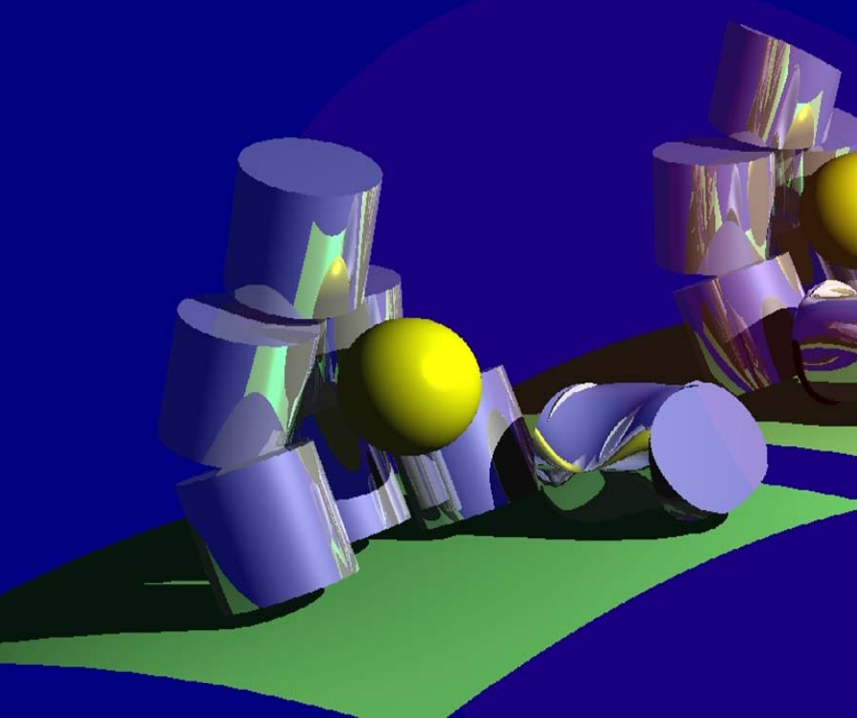
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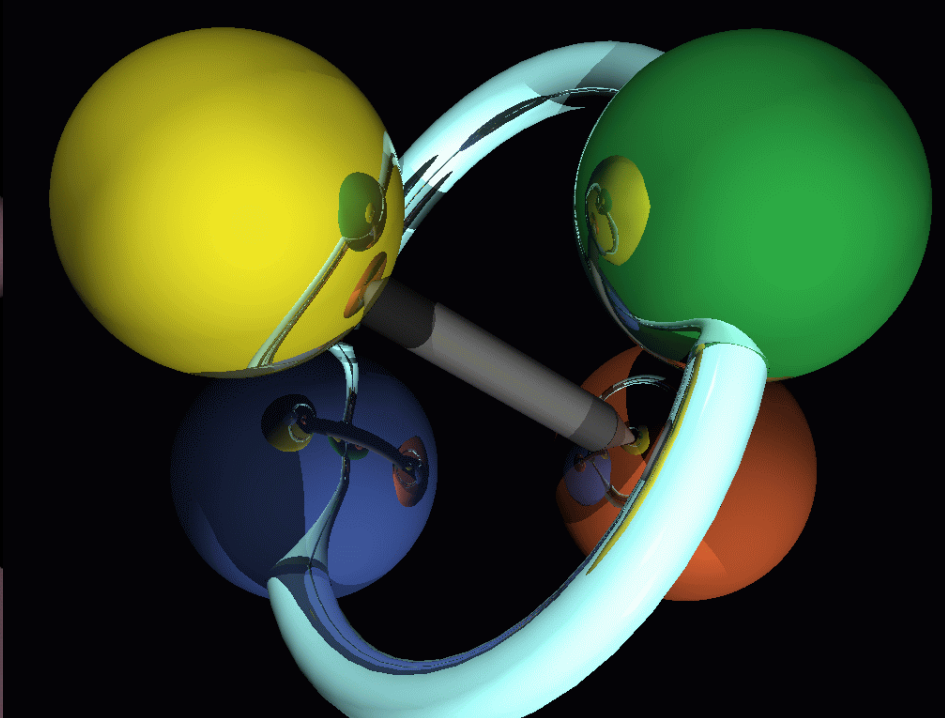
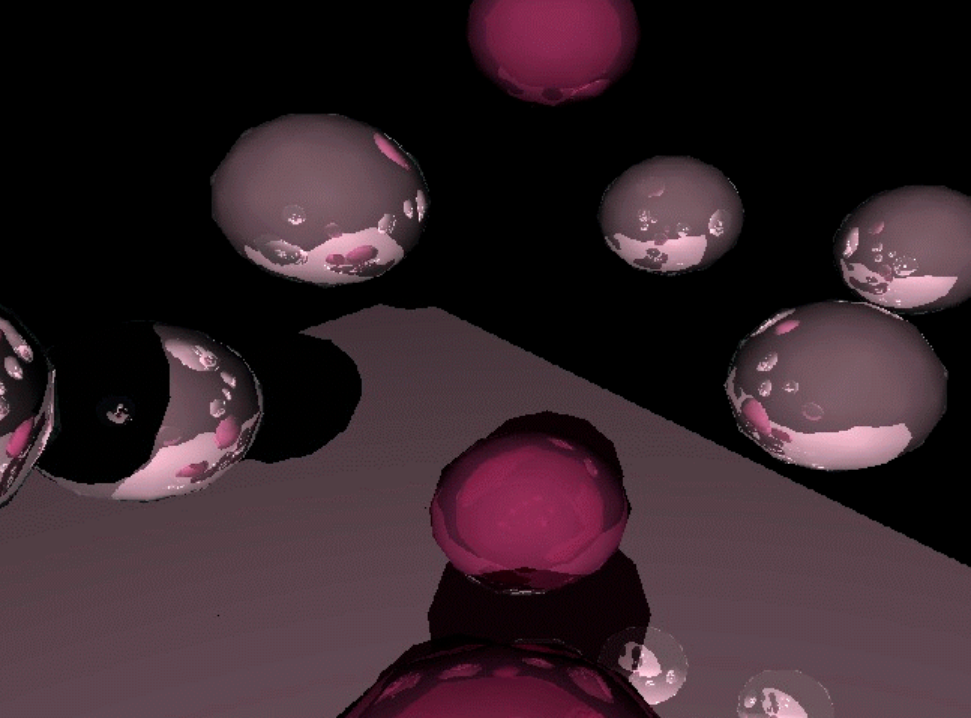
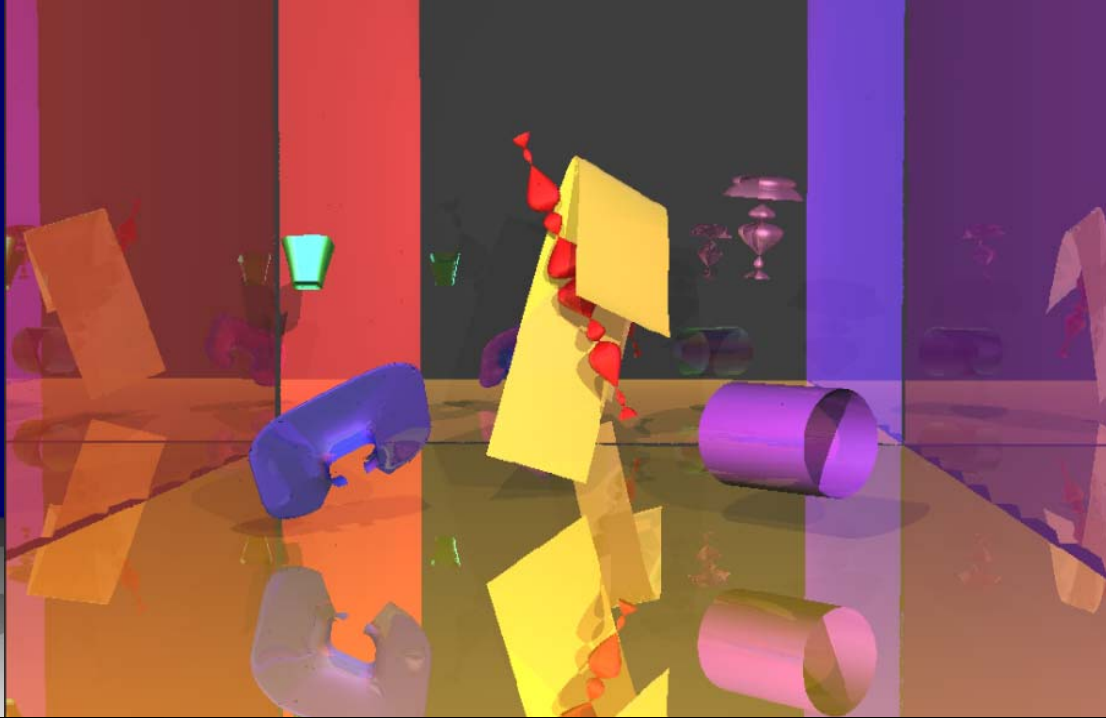
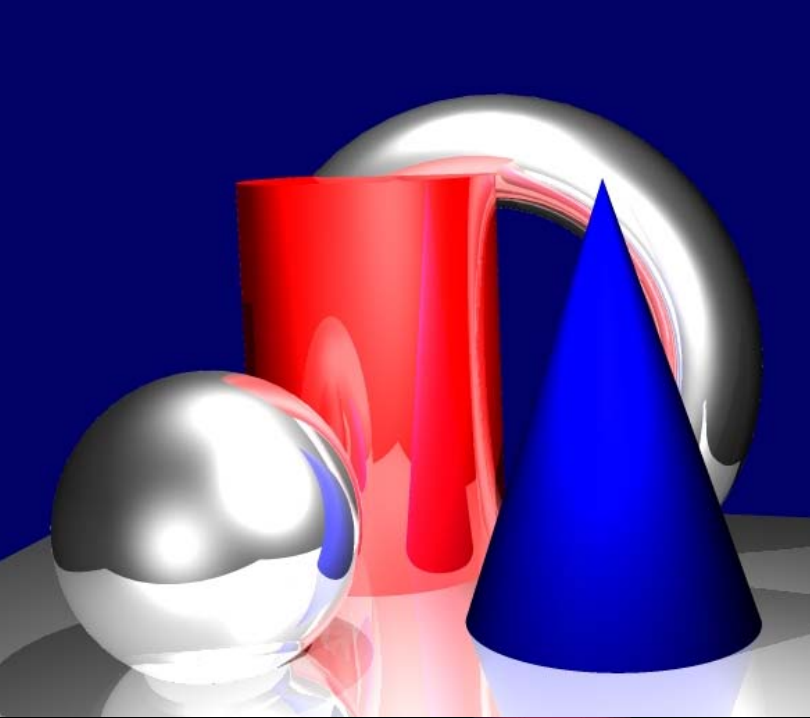
Example: Helm's Deep

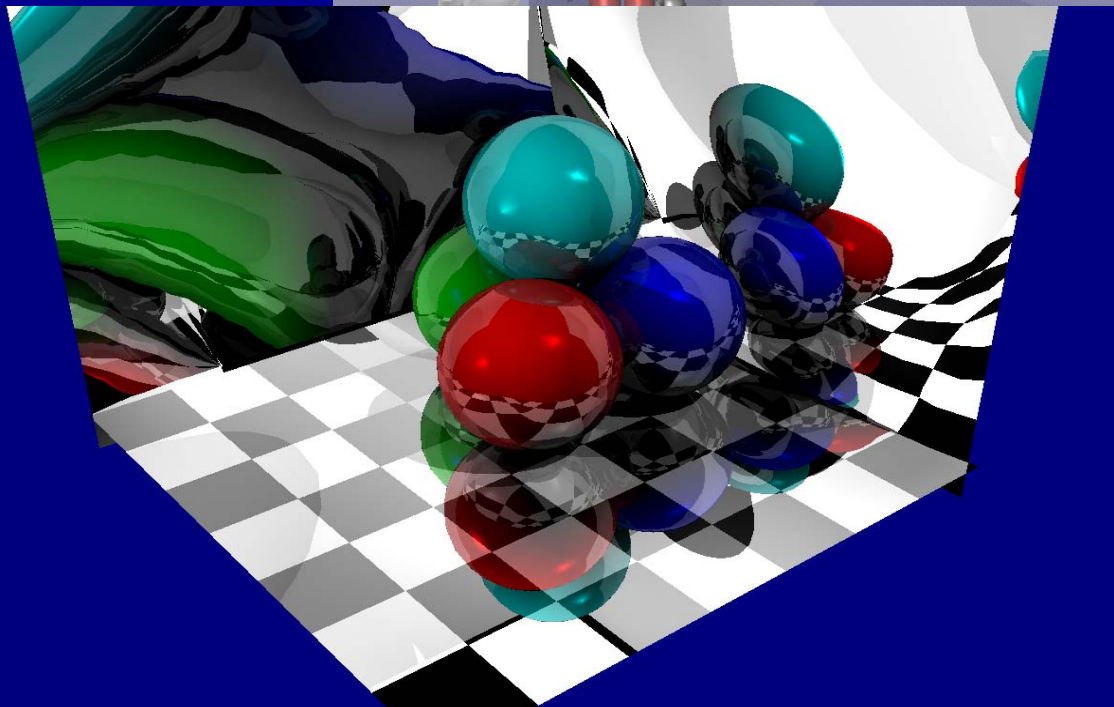
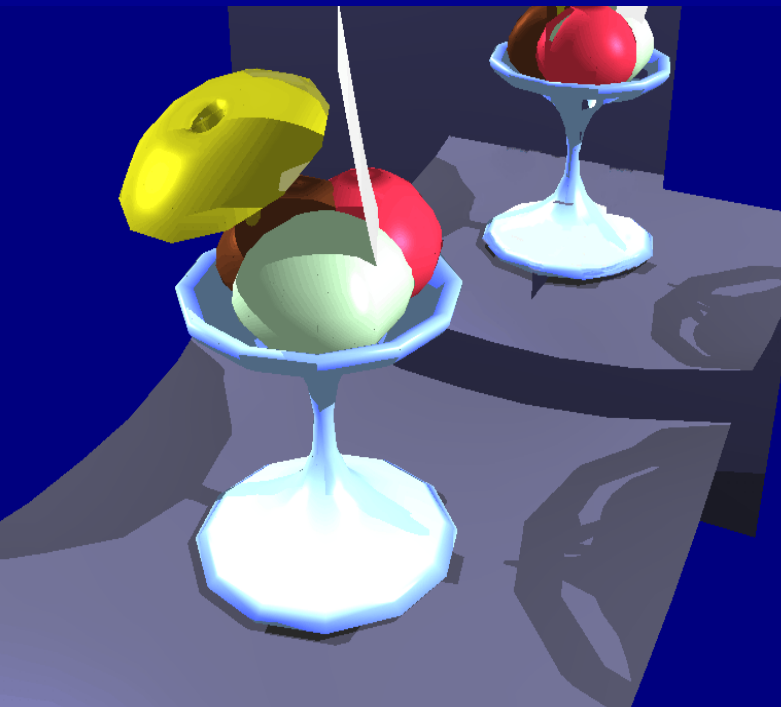
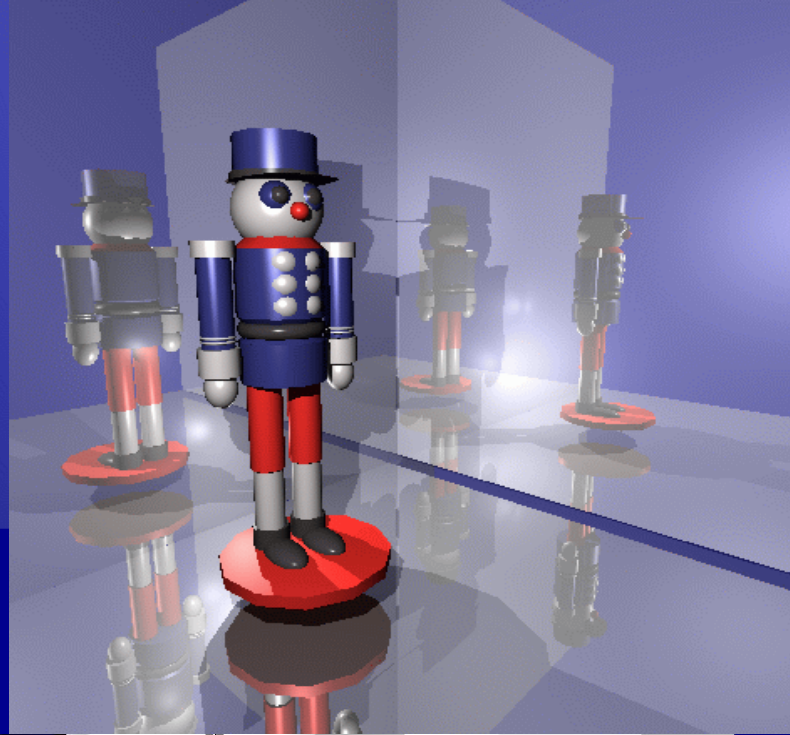
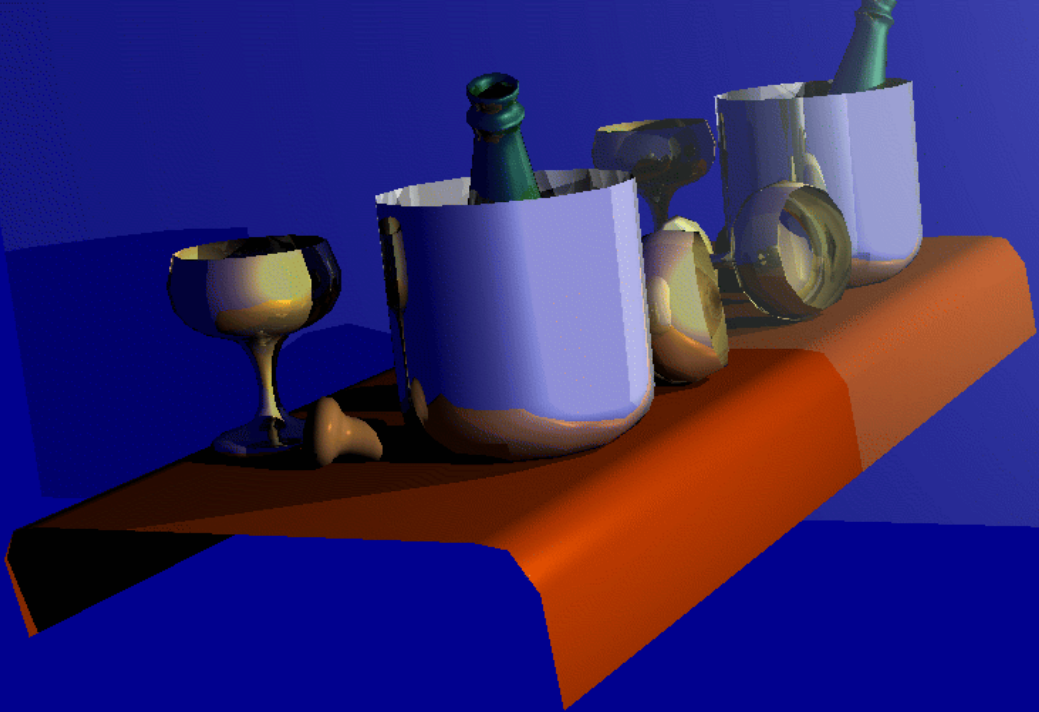
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Example: The Incredibles

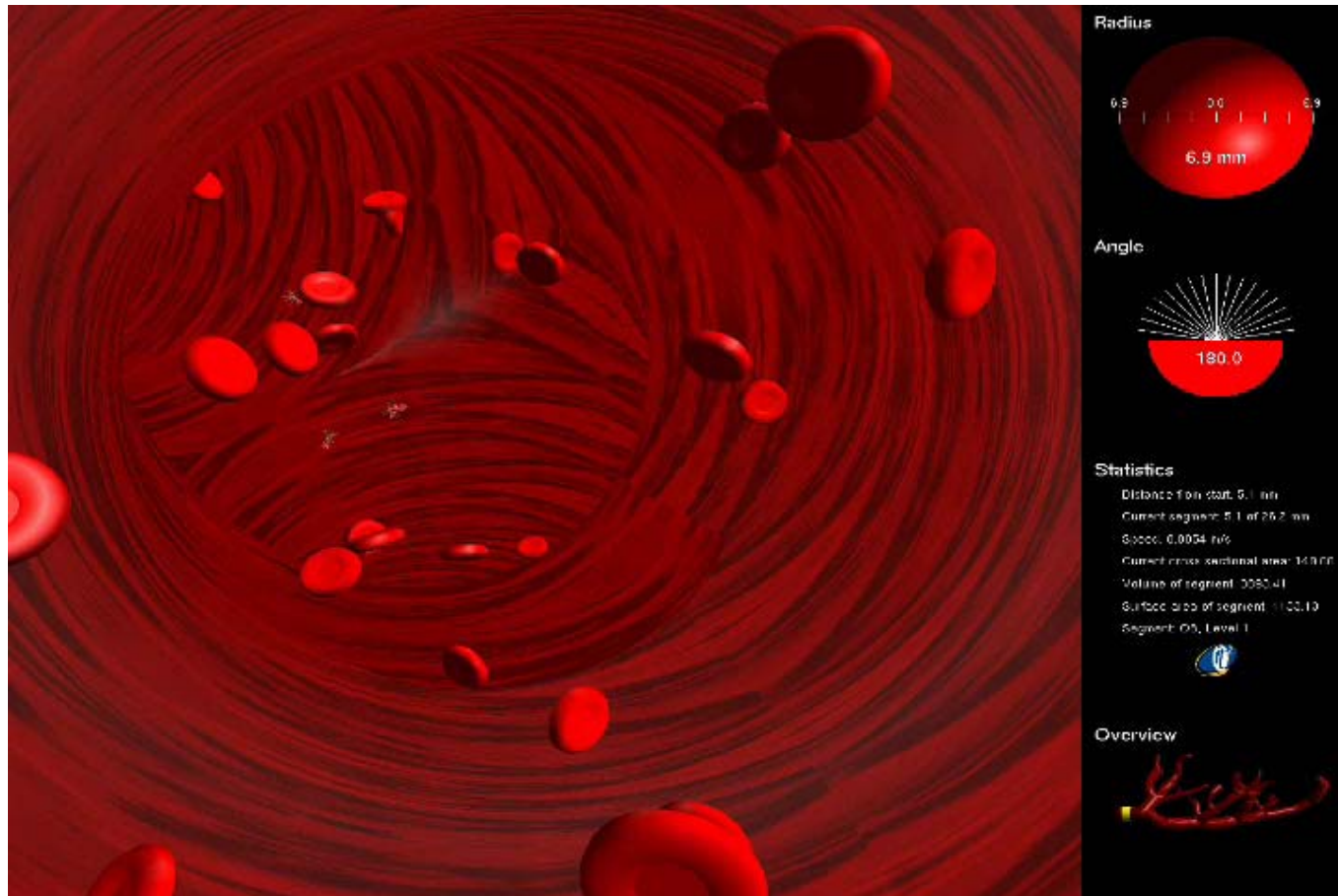
play







Animation



CEG476 Computer Graphics I

By now, you should be already familiar with the following techniques:

- Raster algorithms
- Geometric primitives and their attributes
- Clipping
- Anti-aliasing
- Geometric transformations
- Structures and hierarchical models
- Input devices
- Interactive techniques

Raster Algorithms

- Bresenham algorithm for
 - Lines
 - Circles
 - Ellipse
- Polygon filling algorithm
 - Scan line algorithms
 - Seed fill algorithms
- Anti-aliasing

Geometric primitives and their attributes

- Line attributes:
 - Width, style, ...
- Polygon attributes:
 - Fill styles
 - Fill color (solid, blended)
- Fill algorithms:
 - Flood fill
 - Scan-line fill
- Anti-aliasing

Clipping

- Line clipping algorithms
 - Cohen-Sutherland algorithm
 - Nichol-Lee-Nichol algorithm
- Polygon fill-area clipping
 - Sutherland-Hodgman algorithm
 - Weiler-Atherton algorithm
- Text clipping

Geometric Transformations

- Affine transformations
 - Rotation
 - Scaling
 - Transformation
- Homogeneous coordinates

Structures and Hierarchical Models

Reuse of geometry

Example:

Car with four wheels:

Geometry for each wheel can be reused and displayed at all four locations using different translation matrices

Input Devices

- Mouse
- Keyboard
- Scanner
- Digital camera
- Tracked stylus (virtual environment)
- Haptic devices (e.g. cyber grasp)

Interactive Techniques

- Camera flight path?