Computer Graphics
Slot K (Tu 5-6, W 12-1, F 5-6 – Th 6:30-7:30) Room IIA-305 (Bharti Building)

Tentative Evaluation Scheme

- Exams:
  - 2 Minors (30%), 1 Major (30%) Quiz (5%)

- Assignments:
  - 3-4 Programming Assignments (35%-40%)

TA(s):
- TBA

Web Page
http://www.cse.iitd.ac.in/~pkalra/col781
Books/Material

- Advanced Animation and Rendering Techniques (Theory and Practice)
Contents

• Introduction/Preliminaries
• Raster Graphics
• Clipping
• Transformations
• Curves and Surfaces
• Rendering
• Animation
Computer Graphics is the use of computer to define, store, manipulate, interrogate, and present pictorial output. A picture is 10,000 worth words!

Scope:
- Industry
- Art
- Entertainment
- Education
- Medicine
Basic Elements

• Modeling
  • Shape (geometry)

• Rendering
  • Display (shading, illumination, color, texture…)

• Animation
  • Movement (dynamics)
Basic Elements

• Modeling
Basic Elements

• Modeling
Modeling

Modeling as reverse engineering

Scanner → 3D Geometry → Rendering

Courtesy Dr. Niloy Mitra
Basic Elements

- Rendering
Basic Elements

• Rendering
Basic Elements

• Animation
1963: Sutherland First Graphics Workstation
1969: SIGGRAPH (ACM) (First conference in 1973)
Early 1970’s: Raster Graphics, Shading, Illumination
Late 1970’s: Texture Mapping, Ray Tracing
Early 1980’s: Realism in Rendering
Late 1980’s: Physically Based Animation
1989: Tin Toy (Pixar) wins Academy Award
1990’s: Interaction, Scientific Visualization, Virtual Reality, Augmented Reality, Multimedia, etc.
2000’s: Real-time Visualization of Large Data Sets, Data Compression, Vision and Graphics, etc.
2010’s: CG ubiquitous, GPUs, shader languages
Applications

- Engineering
Applications

• Design

Architectural Design

Google Earth
Applications

- Medical
- Bio-graphics
Applications

- Entertainment
Representation
Rendering is the conversion of a scene into an image:

3D Scene → Rendering → 2D Image