Lecture Syllabus

- Introduction (1 week)
- Transformations (2 weeks)
- Line Drawing (1 week)
- Polygon Fill (1 week)
- Hidden Surface Removal (2 weeks)
- Lighting Models (1 week)
- Methods for improving realism (1 week)
  - Shadows
  - Texture
- Geometric Modeling (2 weeks)
- Image Improvement (1 week)
  - Aliasing and Anti-aliasing
  - Image manipulation
- Ray Tracing (1 week)
Literature

- Interactive Computer Graphics - Functional, Procedural and Device-Level Methods


- Advanced Animation and Rendering Techniques

- OpenGL Programming Guide
Teaching Staff

- Lecturer: Prof. Gershon Elber
  - Wednesday 9:30-11:30 (Ulman 304)
  - Contact info:
    - Taub 429, Monday 11:00-12:00
    - gershon@cs.technion.ac.il
    - http://www.cs.technion.ac.il/~gershon

- Teaching Assistants: Mr. Ben Ezair
  - Wednesday 11:30-12:30 (Ulman 304)
  - Contact info:
    - Taub 418
    - benezair@campus.technion.ac.il
Grading Policy and Classes

- **Programming Exercises**: 40% ‘Takef’
  - MFC Intro (5%)
  - Wire-frame rendering and 3D Transformations (10%)
  - Polygon Scan-conversion and Z-buffering and Texture Mapping (10%)
  - Advanced Selection (15%)

- **Exam**: 60% ‘Takef’
  - Moed A on Tue., February 12th
  - Moed B on Sun., March 10th

- **Best Rendering competitions**
  - By the end of the semester
  - See “Hall of Fame” under ‘Links’
  - 3 points for 1st place, 2 points for 2nd, 1 point for 3rd.
More Announcements

- Watch the WEB site regularly (Especially Messages)
- Slides are available on web site.
- Those without prerequisites – talk to me.
- Reusability of code - only as permitted to use code by the staff of the course
- Having a break!?
What is Computer Graphics?
Synthesis of static/dynamic 2D images from 3D geometry, using computers. Typically, scenes are photo-realistic:
What is Computer Graphics?
Synthesis of static/dynamic 2D images from 3D geometry, using computers. Sometimes they are surreal:
What is Computer Graphics?

In recent years non-photorealistic rendering (NPR) is becoming of major interest:
What is Computer Vision?

Analysis, reconstruction, and recognition of 3D objects from 2D images, using computers:

- Image enhancement
- Feature extraction
- 3D object reconstruction and recognition

Computer vision and computer graphics are two complementary processes.
2D Graphics Components

- Drawing tools
  - Lines
  - Paint/Colors
- Models
- Planar Transformations
3D Graphics Components

- Wireframe drawing
3D Graphics Components

- Photorealistic drawing:
3D Graphics Components

- Material Properties
  - Fog
  - Texture
  - Reflectivity
  - Refraction
What is CG used for?

- Geometric Modeling
- Mechanical Design
What is CG used for?

- Analysis
What is CG used for?

- Medical applications
What is CG used for?

- Special Effects
What is CG used for?

- Computer Games
What is CG used for?

- (scientific) Visualization
What is CG used for?

- Design
- Advertising
- Art
What is CG used for?

- Animation
Where is the 3D input geometry coming from?

1. Geometric Modeling
   - Solidworks
   - Maya
   - Catia

   PTC
Where is the 3D input geometry coming from?

2. Reverse Engineering

http://graphics.stanford.edu/projects/mich/
Where is the 3D input geometry coming from?

3. Motion capture
(animations)
In summary, it is all about the Eyes