Course title: Introduction to Computer Graphics

Lectures:
- EC122, 10:10~12:00 (Tues.) & 15:40~16:30 (Thurs.)

Pre-requisites:
- Computer programming skills in C/C++.
- Basic concepts of data structures.

Teacher:
- I-Chen Lin (林奕成), Assistant Professor
- Email: ichenlin@cs.nctu.edu.tw
- Office: EC 704 (工程三館)
- Tel ext: 56684
About the course (cont.)

- TAs:
  - 藍英綬、徐銘聲、顏志翰
  - Office: EC229B
  - Phone ext: 56676
- Course web page:
  - [http://www.cis.nctu.edu.tw/~ichenlin/courses.htm](http://www.cis.nctu.edu.tw/~ichenlin/courses.htm)
- Text book:
About the course (cont.)

- Reference:
What’s CG?

- **Computer Graphics.**
  - Mainly focusing on 3D graphics.
  - Displaying a realistic virtual environment by computers.
  - Or synthesizing virtual objects in the real world.

FF XII, Square-Enix corp.

Stuart Little, Sony pictures.

Star War III, ILM
What’s CG? (cont)

- Or displaying a virtual world with specific styles. (e.g. non-photorealistic rendering)

- CG tech. is the foundation of modern 3D animation, special effects and games.

DragonBall Z3 (PS2), BANDAI

NPR demo, ATI
Graphics and related fields

- 3 related fields.
  - Find features.
  - Eyes? a nose?
  - A face?
  - Structure?
  - 阿玲?
Graphics and related fields

- **Inputs**
  - images
  - descriptions

- **Outputs**
  - descriptions
  - images

**Computer Graphics**

**Computer Vision & Pattern Recognition**

**Image Processing**
Applications

- Movies
- Games
- Virtual characters
Applications (cont.)

- Virtual reality (VR)

Office of the future, UNC
Applications (cont.)

- Augmented reality (AR)
- Advanced human computer interfaces

AR, U. Columbia
Applications (cont.)

- Medical diagnosis.
- Virtual Surgery.
Applications (cont.)

- Computer aided design (CAD)
  - Collaborating on cyberspace.
  - Ex. Cabin design (Boem Inc.)

- Visualization tools
  - Meteorology
  - Flow display etc.

Syllabus

1. Introduction.
2. Graphics primitives
3. Geometric transformations
4. Viewing in 3D
5. Visible-surface detection
6. Illumination and surface rendering
7. Texture mapping
8. Curves and surfaces
9. Global illumination
About the course (cont.)

- Grades:
  - Homework (2 programs)
    - 3D wireframe viewer (15%)
    - Hidden surface removal (15%)
  - Project (performance competition)
    - Gouraud & Phong shading (20%)
  - Exam
    - Midterm (25%)
    - Final (25%)
- Class participation: bonus
What can I obtain in this course?

- Fundamentals of computer graphics techniques.
- Programming ability of 3D graphics pipeline.
- Improvement of computation performance
  - (Note: algorithm > programming skill)
What can I obtain in this course?

- 2D image special effects. **Somewhat**
- Digital art styles.
- Usage of editing tools.
  - Photoshop, 3DMax, Maya, etc.
Conclusion

- The role of graphics people in CS
  - Improving faithfulness or visual effects
  - Speed-up of CG generation
  - (by computer techniques)

*We give “wizards” the “wands” and “spells”!*