CS5500 計算機圖學 (Computer Graphics)

Spring 2006

Classroom: 資電館 Room 128

Time: M5M6R5 (Mon 1:10 pm – 3:00 pm and Thu 1:10 pm – 2:00 pm)

http://www.cs.nthu.edu.tw/~chunfa/cs5500

This course is about the programming of 3D computer graphics. During the first half of this course, we will focus on the high-level programming of 3D graphics applications using the OpenGL API. (This approach, as the author of the textbook describes it, is like leaning to drive a car without having to know what's under the hood.) Then, during the second half of this course, we will study the whole process of a 3D renderer, which we will implement as a three-parts assignment. There is also a final project. If time allows, we will also cover advanced topics such as texture mapping, curve surfaces, global illumination ...etc.

Note that this course may require intensive programming in C or C++ (possibly 5,000 to 15,000 lines of code).

Instructor: 張鈞法 (Chun-Fa Chang)

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Textbooks: None (You're recommended to have at least one of references #1 to #4.)

References:
1. Interactive Computer Graphics – A Top-Down Approach Using OpenGL (4th Edition) by Edward Angel.
2. Computer Graphics using Open GL (2nd Edition), by Francis Hill
3. 3D Computer Graphics (3rd Edition), by Alan Watt.
4. OpenGL Programming Guide.
5. The Art of 3D Computer Animations and Effects, by Isaac Victor Kerlow.

Grading: OpenGL Assignments: 25%, 3D Pipeline Implementation: 30%, Final Project: 35%, Class Participation: 10%

Topics and Schedule: (subject to change)

Part I: Leaning to Drive -- Writing 3D Applications
- Overview (1 week)
- OpenGL Programming (2 weeks)
- Transformations (1 week)
- Viewing (1 week)
- Shading (1 week)

Part II: Under the Hood: Implementation of a Renderer
- Geometric Processing (1 week)
- Clipping (1 week)
- Hidden Surface Removal (1 week)
- Scan Conversion (2 weeks)
- Texture Mapping (1 week)

Part III: Advanced Topics
- Culling techniques, Programmable shading, Curves and Surfaces, global illuminations, and Image-Based Rendering,…etc. (time permitted)