CSC 4356 / ME 4573 Interactive Computer Graphics

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Fall 2011

Interactive Computer Graphics

An introduction to 3D computer graphics, emphasizing real-time graphics programming using OPENGL and the C or C++ programming language. Topics include the fixed function and programmable 3D pipelines, transformation, interaction, texturing, lighting, performance analysis, optimization, and a variety of intermediate and advanced topics.

Prerequisites

- C / C++ (csc 1253-1254 *or eq.*)
- Data structures (csc 3102 *or eq.*)
- *No prior experience with 3D graphics or OpenGL*

Website

http://csc.lsu.edu/~kooima/csc4356/index.html

- Administrivia
- Course schedule
- Assignment details
- Grade sheets

OPENGL

OPENGL is the industry-standard cross-platform real-time 3D API. First released in 1992, OPENGL is a constantly-evolving interface that adapts to the changing capability of modern 3D graphics hardware.

OPENGL is in its fourth major revision, and we will emphasize the usage of the modern, high-performance API, ignoring a great deal of obsolete functionality that remains for backward-compatibility.

Version		Year	Version		Year	Version		Year
1.0	…	1992	2.1	…	2006	4.2	…	2011
1.1	…	1997	3.0	…	2008	ES 1.0	…	2004
1.2	…	1998	3.1	…	2009	ES 1.1	…	2005
1.3	…	2001	3.2	…	2009	ES 2.0	…	2007
1.4	…	2002	3.3	…	2010	ES 2.1	…	2011?
1.5	…	2003	4.0	…	2010			
2.0	…	2004	4.1	…	2010			

OPENGL supported platforms

MS Windows 7/Vista/XP	*Mac OS X*	*Linux*
iOS	Android	Symbian
Nintendo Wii & DS	Sony PS3 & PSP	Blackberry

DirectX

DirectX is the Microsoft real-time 3D API, first released in 1995 as Direct3D. Through 11 major revisions, DirectX has evolved into an excellent API, equivalent in capability to (and perhaps better-designed than) OpenGL.

But... supported platforms:

Windows   Xbox

DirectX 10+ supports Windows 7/Vista and Xbox 360 only.

Course software requirements

Most any OS:

- Windows 7/Vista/XP
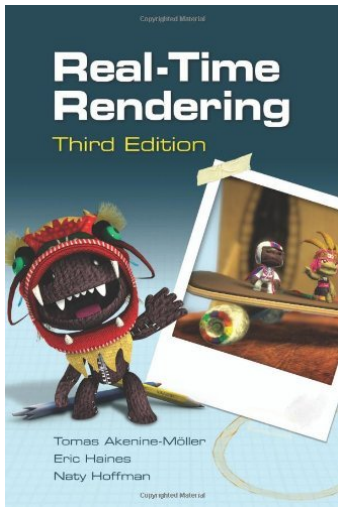- Mac OS X
- Linux

"Native" languages:

- C
- C++
- *no Java*

Course hardware requirements

Any machine with hardware accelerated 3D graphics…

- Your laptop
- Your desktop
- A lab workstation
- Your instructor's lab workstations

*You will make in-class demonstrations. Be ready. Be certain to **test** before class.*
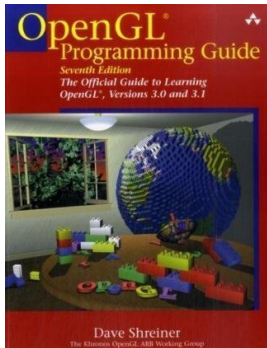
Real-Time Rendering

Tomas Akenine-Möller
Eric Haines
Naty Hoffman

ISBN 978-1568814247
$57.70 at Amazon
http://realtimerendering.com/

OpenGL Programming Guide

Dave Shreiner
Khronos OpenGL ARB Working Group

ISBN 978-0321552624
$40.43 at Amazon

Version 1.1 (old) at http://www.glprogramming.com/red/
Standard spec at http://www.opengl.org/documentation/specs/
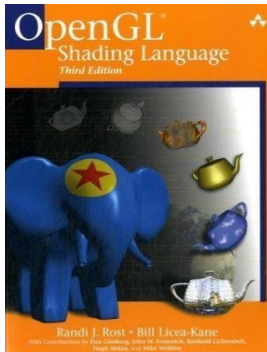
OpenGL Shading Language

Randi J. Rost
Bill Licea-Kane
et al

ISBN 978-0321637635
$38.67 at Amazon

Standard spec at http://www.opengl.org/documentation/glsl/
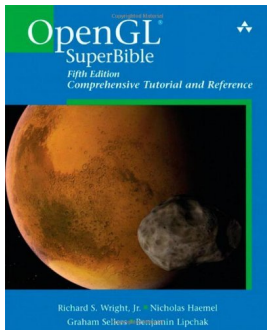
OpenGL SuperBible

Richard S. Wright
Nicholas Haemel
Graham Sellers
Benjamin Lipchak

ISBN 978-0321712615
$37.96 at Amazon
(You really won't need this.)

Course Assignments

Three individual programming projects

- Instructor assigns topic
- Brief informal in-class demonstration

One individual final programming project

- Student chooses topic
- Ten-minute formal in-class presentation
- Grad students will write an additional paper

The schedule is on the web site.

Project Grading

Each project is worth a total of 80 points.

+40	…	Implementation	A	…	> 70
+20	…	Documentation	B	…	> 60
+10	…	Demonstration	C	…	> 50
+10	…	Lagniappe	D	…	> 40

Final Project Grading

The final project is worth a total of 160 points.

+60	…	Implementation	A	…	> 140
+40	…	Documentation	B	…	> 120
+60	…	Presentation	C	…	> 100
			D	…	> 80

Piled higher & Deeper

The University demands that added requirements be placed upon *graduate students*. Thus, an additional 4-page paper will be required as a part of the presentation of the final project.

On the bright side, the schedule permits

- two extra weeks to finish it,
- and more time to present it.

Semester Grading

The semester total is 400 points.

$$
\begin{array}{lll}
\text{A} & \ldots & > 350 \\
\text{B} & \ldots & > 300 \\
\text{C} & \ldots & > 250 \\
\text{D} & \ldots & > 200 \\
\end{array}
$$

Grades will be posted to a spreadsheet on the course web site, anonymized using the last three digits of your LSUID.