

Introduction to Computer Graphics

COMP 30033J



COMP 30033J: Intro Computer Graphics

Applications

- Films
- Games
- Medical & Scientific Visualization
- Human-Computer Interaction
- Virtual & Augmented Reality
- &c., &c.



Major Fields

- Computer Graphics: rendering images
- Image Analysis: interpreting images
- Computer Vision: copying the eye
- Human-Computer Interaction
- Common factor: human visual system



Computer Graphics

- Teaching computers to draw
 - computers are mathematical
 - so we use mathematics for drawing
 - but so did Leonardo da Vinci!



Course Description

- Physics and biology of vision; mathematical foundations of computer graphics; geometric modelling of the world; geometric transformations; perspective & orthographic projections; models of computer rendering; animation; surface modelling; lighting, colour and textures; clipping, culling and compositing; performance optimization; modelling natural phenomena.



Unfortunately, . . .

- Graphics depends on mathematics:
 - Geometry
 - Linear Algebra
 - Calculus
- You have been warned!



Course Evaluation

- 60% final exam
- 40% practical
 - 3 lab assignments (3.33% each)
 - 2 small projects (15% each)
- lab material is examinable
- Subject to change
- Course uses standard grading scheme and not CS grading scheme.



Final Exam

- 6 mandatory questions
- 4 out of 6 optional questions
- Sample Exams will be provided



Software & Hardware

- The practicals in this course will use:
 - **OpenGL (Using Lightweight Java Game Library 2.9 Java3d)**
 - The version of will be OpenGL 1.1 – 2.0
- The practical's especially the later assignments require a recent video card and as such I will be checking the lab machines this week



Why OpenGL? (good)

- OpenGL is:
 - Industry standard
 - Fast, efficient
 - Hardware-accelerated
 - Platform-independent

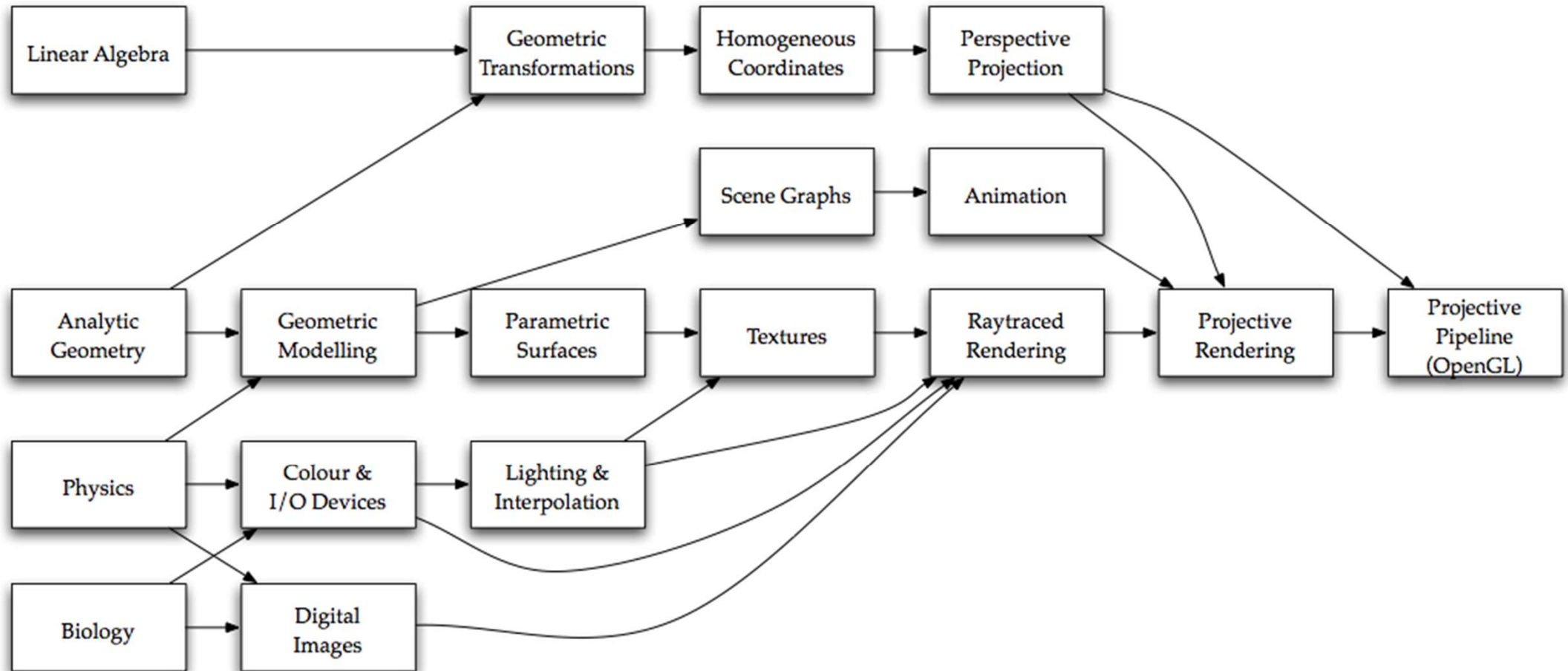


OpenGL (bad)

- Very low level access
- High versions require learn about Shaders before learning other more important graphical concepts. (That's why will use OpenGL 1.1 – 2)
- No inbuilt Scene Graph



Block Diagram



Text, Slides & Notes

- No required text
 - but some recommended references
- Slides will be on the Moodle:
- New MOODLE for Computer Science Students
- <https://csmoodle.ucd.ie/>
- Logon using your UCD connect account
 - Click on COMP3033J
 - And enrolment key is

“COMP3033Jab2019”



Computer Graphics

PRINCIPLES AND PRACTICE

Foley ♦ van Dam ♦ Feiner ♦ Hughes

SECOND EDITION in C

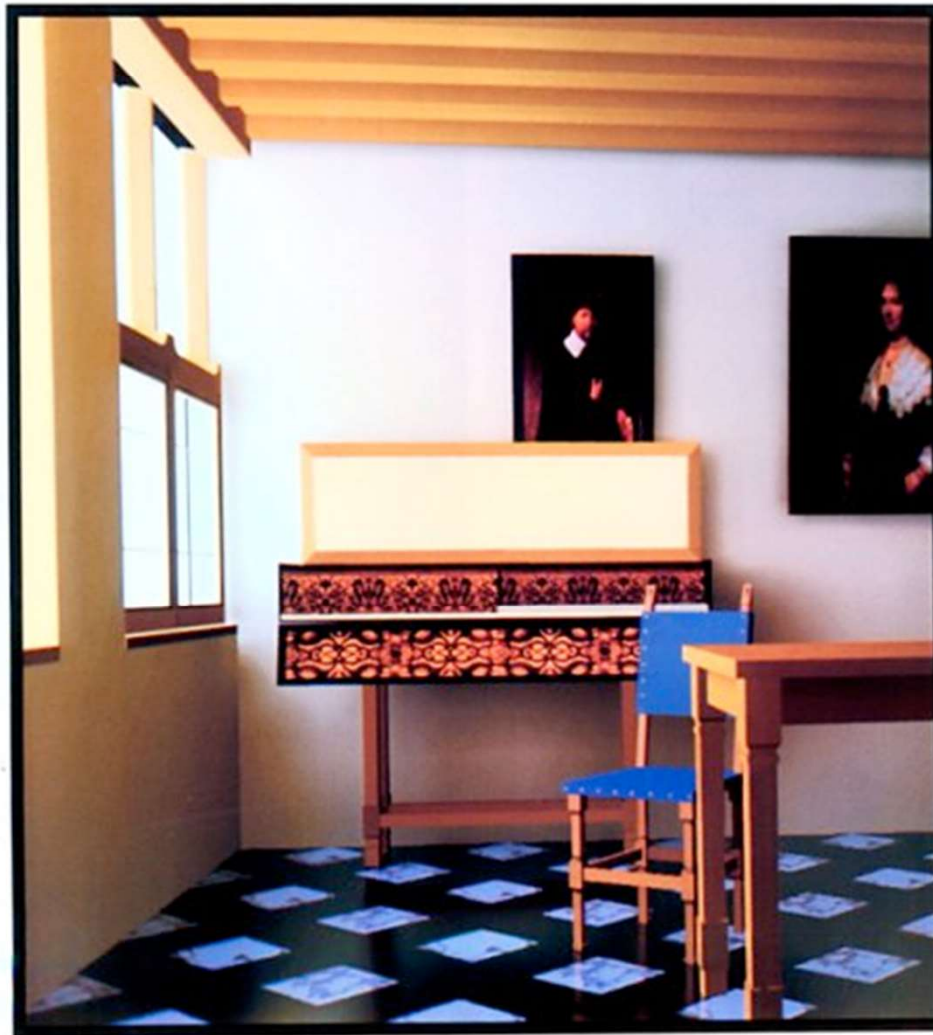
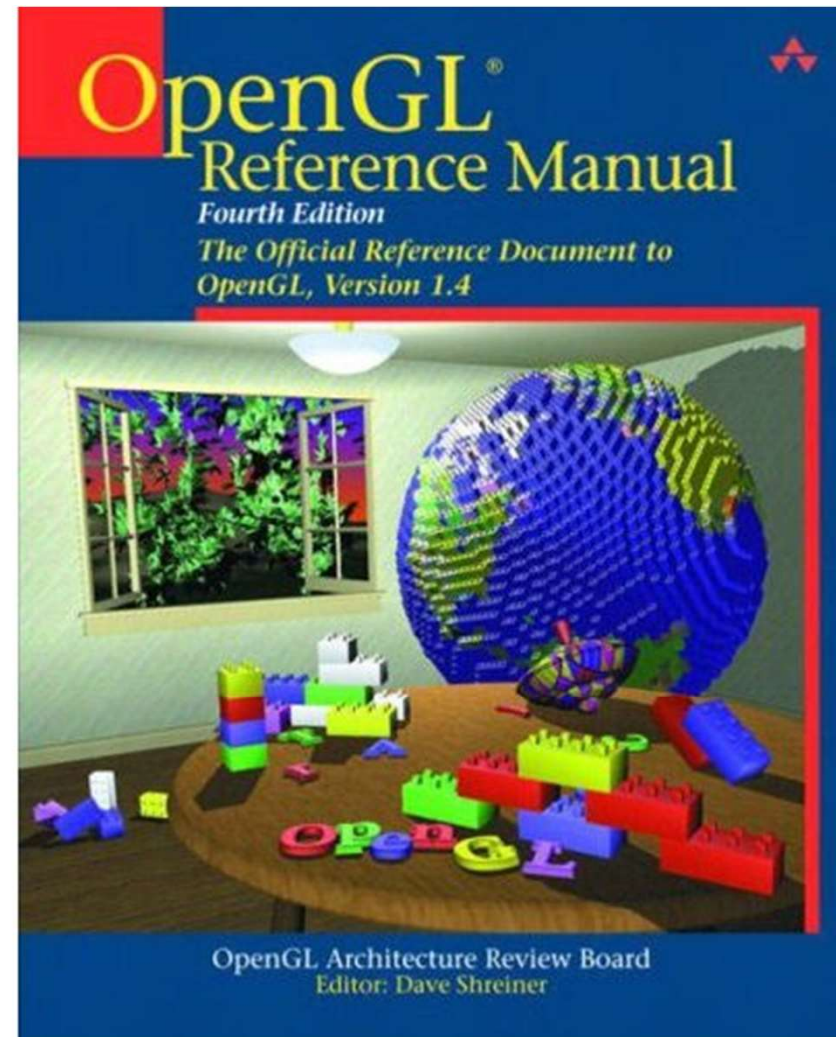
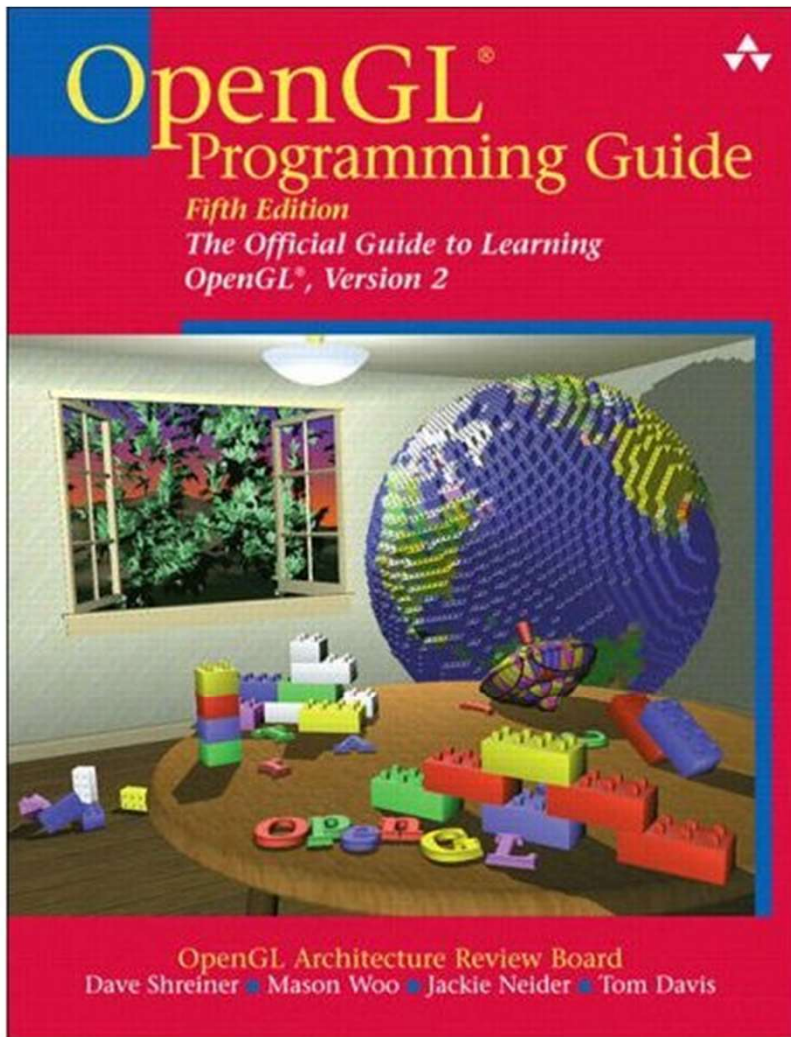


Image from
Amazon.com

Computer Graphics

THE SYSTEMS PROGRAMMING SERIES



Images from Amazon.com (REMEMBER its 2.0 VERSION)

COMP 30033J: Intro Computer Graphics





3D Game Engine Design: A Practical Approach to Real-Time Computer Graphics

2nd Edition
by David H. Eberly



Images from
Amazon.com

COMP 30033J: Intro Computer Graphics

Scheduling

- Lectures for on Thursday 8.00 in TB4 – 102
- Week 1 – 15
- In the 3rd week , your labs will start on Friday at 9:55 in TB3 – 313
- Only expectation to this schedule is CLASS on NOVEMBER 14th will be a Lab run by my TA's and the Lab on November 15th will be my lecture
- First lab will be to draw a line 😊

