Why (not) Teach OpenGL?

Motivation

- Start Discussion
  - Hard Question: many trade-offs
- Raise Awareness
  - Important: influences future of the area
- Propose one Answer
  - IMPA’s experience (Graduate level)
- Get Feedback
  - Other contexts (Undergraduate, etc.)

OpenGL

- De facto standard for interactive 3D graphics
- Portable: UNIX / Windows / Macintosh
- Hardware implementation: Graphics Boards
- Free Software implementation: Mesa 3D
- Widely adopted: Industry and Academia

CG Education and OpenGL

- Professional Training
  - Conference Tutorials, Company Training
- Academic Education
  - Introductory Courses: CG-101
- Editorial Market
  - Manuals and Textbooks
- University Curriculum
  - SIGGRAPH educators program

Some Questions to Ask

- Should we teach OpenGL?
  – Technical Level: YES
  – Introductory Level: NO
- Why or why not?
  – Purpose and content
- How to best exploit it?
  – Understand its role

OpenGL Technical Training

- Who needs OpenGL?
  – Experienced Practitioners
  – Professional Developers
- What are the requirements?
  – Basic CG concepts understanding
  – Software development proficiency
- How to teach?
  – Application-oriented
  – Efficiency issues
OpenGL is not for CG101

• Content Issues
  – Standard: does not cover all key notions

• Pedagogical Issues
  – Professional System: too much detail

• Conceptual Issues
  – Rendering Engine: architecture, not algorithms

• Expository Issues
  – Programmers API: hides implementation

How to Teach CG101

Anatomy of an Introductory Graphics Course

• Key Concepts
  – Ideas behind most Standards

• Basic Theory
  – Fundamental Algorithms

• Simple Practice
  – Minimal Code, but Complete

(Lesson: solid ground for future development)

The Mock-Up Paradigm

Custom-made teaching tool

• Learning with Other Areas
  – Programming Languages
    • Pascal
    • Scheme
  – Operating Systems
    • MINIX
    • XINU

IMPA’s Experience

• Course: 3D Graphics Systems Design
  – Introductory Master’s level course
  – Math / CS students

• Toolkit: 3D Graphics Library
  – C Language
  – GNU environment: UNIX / Windows

• Book: Sistemas Gráficos 3D
  – Concepts and Algorithms

Issues for Discussion

• Scope
  – 2D Graphics / 3D Graphics

• Length
  – 1 Semester / 2 Semester

• Level
  – Undergraduate / Graduate

• Target Audience
  – Technical / Artistic