Computergrafik

Spiele 2D

Goal of the lecture

- For you to understand concepts
  - 2d computer graphics (raster graphics, vector graphics, …)
  - Software engineering (SCRUM, OOP, …)
- A working **game** analyze with
  MDA (Mechanics, Dynamics, Aesthetics) principles
  - Examples

Approach – SCRUM [with SE]

- Why?
  - Adaptable to changing targets
  - Introduce some organization – but little overhead
- Recitation
  - https://www.video2brain.com/de/videotraining/agile-softwareentwicklung-mit-scrum
    - Complete course (3h34)
- Product backlog (prioritized todo list)
- (Very short) meetings
- Sprints (implementation cycle)

Todo

- Form teams of 3-5 person(s) [with SE]

- Design and implement a 2D game [with SE]
  - Work in SCRUM teams
  - Meetings

- 5 project progress presentations [with SE]

- 1 minute let's play video on YouTube

Project: 2D game

- If existing game → introduce a twist
  - No exact copies allowed!
- C# and OpenGL
- **Free** textures/sprites/sounds from web ok

Grading

- Outcome at presentations

- Active participation at meetings with tutors

- Time spent on project

- Team gets one grade
  - Team members distribute grade within team

Lecture Content

- Game concept and design

- Game programing
  - OOP approaches

- 2D graphics (OpenGL and hardware internals)
  - Transformation
  - Culling/clipping
  - Rasterization
    - Drawing lines, triangles, polygons, text
  - Textures
  - Anti-aliasing

- Collision detection

LVA structure

	Month 1							Month 2							Month 3						Month 4					
Lecture	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C
Project		S			S			S			S			S			S			S			S			
Talks							P						P						P							P

T… theory, programming examples

C… coaching/meetings (tutors/myself)

S… sprints (2 week sprints) ~ 7 sprints total

P… project progress presentations (graded)

Both in T111

LVA structure (talks together with SE)

- 11.04.: Presentation game concept

- 02.05.: Presentation prototype

- 06.06.: Presentation game play implemented

- 27.06.: Presentation "final" game (+let's play video)

- Each time feedback of tutor/me afterwards

Moodle

- Deliverable/project upload
- Forums for questions
- Slides
- Examples
- Framework
- …

Programing framework

- C#
  - Mix of Java and C++

- MS Visual Studio
  - Linux/MacOS guys can use mono, but have to convert final version (a.k.a. upload version)

- Graphics: OpenGL graphics API (many details later)
  - OpenTK
    - C# wrapper for OpenGL

- Sound: Irrklang

- Additional libs check with me first

Books on OpenGL

- Basic knowledge about OpenGL
    - "Red Book"
    - Free: Google: "redbook pdf"
    - Newer version also contain **shader programming**
    - Latest: 8th Edition
    - Tutorials
        - nehe.gamedev.net
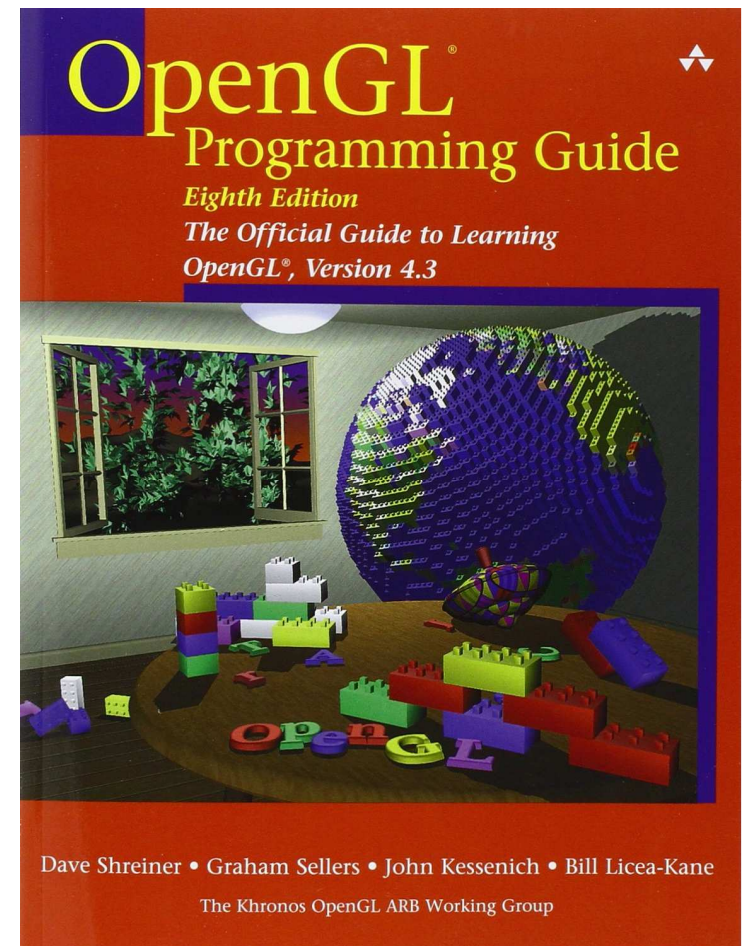
Books

- Foundations of 3D Computer Graphics
  - ST 320 G675 D771
- Mathematics for 3D game programming and computer graphics
  - ST 320 L566 M426(3)
- Interactive computer graphics
  - 346594154
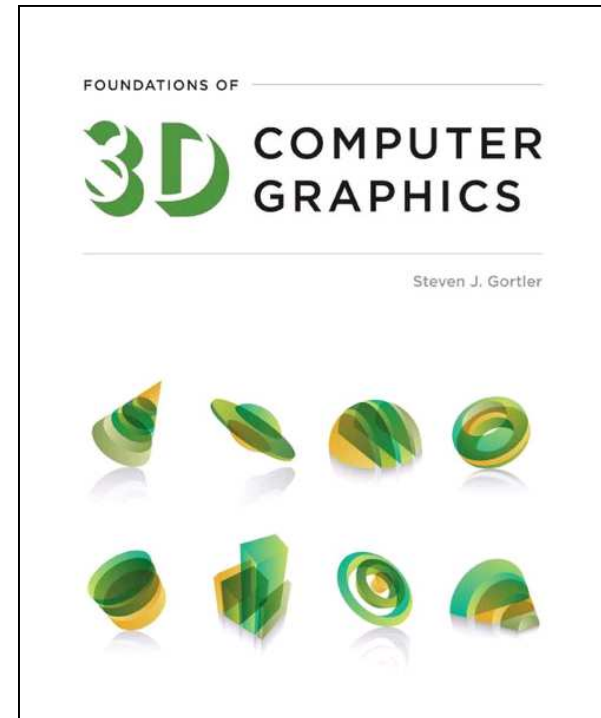
Resources

- portal.hs-weingarten.de/web/scherzer/links
    - Some links on games and computer graphics