Image Processing and Computer Graphics

Computer Graphics

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Outline

- organization
- research of the graphics group
- rendering pipeline
Organization

- **class**
  - 082 00-006: Monday, Tuesday 10-12
  - Prof. Matthias Teschner

- **exercises**
  - 082 00-021, 028, 029: Monday, Tuesday 10-12
  - Raphael Schmitt

- **check web page for the exact schedule**
  - [http://cg.informatik.uni-freiburg.de/teaching.htm](http://cg.informatik.uni-freiburg.de/teaching.htm)

- **two parts**
  - image processing
  - computer graphics (starts on Dec 8)
Contact

- Prof. Matthias Teschner
  - teschner@informatik.uni-freiburg.de
  - 052 / 01-005

- Raphael Schmitt
  - schmittr@informatik.uni-freiburg.de
Exercises / Exam

- exercises
  - Dec 22, Jan 26, Feb 2, Feb 9
  - theoretical and practical exercises
  - check web page for information and solutions
  - processing is optional, but recommended
  - use of the provided source code is optional

- exam
  - written exam
  - test exam
Course Goals

- introduction to the fundamentals of rasterization-based image generation
- functionality of the graphics rendering pipeline
- advanced rendering effects
- introduction to the OpenGL graphics API
- requirements
  - C / C++
  - basics in linear algebra
Slide Sets

- slide sets, exercises and solutions on http://cg.informatik.uni-freiburg.de/teaching.htm
Material

- T. Akenine-Möller, E. Haines: Real-time Rendering
  A. K. Peters Ltd.,
  http://www.realtimerendering.com

  Addison Wesley,
  http://www.opengl.org/
  http://nehe.gamedev.net/
Further Readings

- D. F. Rogers: Procedural Elements of Computer Graphics
  McGraw-Hill, 1997
- A. Watt: 3D Computer Graphics
  Addison-Wesley, 1999
- J. Foley, A. van Dam, S. Feiner, J. Hughes: Computer Graphics – Principles and Practice
  Addison-Wesley, 1990
- J. Encarnacaco, W. Strasser, R. Klein: Graphische Datenverarbeitung
  Oldenburg Verlag, 1996
Syllabus

- Dec 8  - Rendering Pipeline
- Dec 15 - Transformations
- Dec 16 - Projections
- Dec 22 - Exercise: Transformations
- Dec 23 - no class
- Jan 12, 13 - Lighting
- Jan 19  - Rasterization
- Jan 20  - Shadows
- Jan 26  - Exercise: Shadow Prerequisites
- Jan 27  - Texturing
- Feb 2   - Exercises: Shadow Volumes
- Feb 3   - Transparency, Reflection
- Feb 9   - Exercises: Shadow Maps
- Feb 10  - Evaluation, Q & A
Graphics Courses - Overview

- **key course**
  - image processing and computer graphics (rasterization)

- **specialization courses**
  - advanced computer graphics (raytracing)
  - simulation in computer graphics (animation)

- Bachelor thesis, Master lab course, Master project, Master thesis