Image Processing and Computer Graphics

Computer Graphics

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Outline

- organization
- research of the graphics group
- rendering pipeline

Organization

- class
  - 082 006: Monday 10-12, Tuesday 10-12
  - Prof. Matthias Teschner
- exercises
  - 082 021, 028, 029: Tuesday 10-12
  - tba
- check web page for the exact schedule
  - http://cg.informatik.uni-freiburg.de/teaching.htm
- two parts
  - computer graphics
  - image processing (starts on Dec 4)

Contact

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

Exercises / Exam

- exercises
  - Nov 7, Nov 14, Nov 21,
  - practical exercises
  - check web page for information
  - 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

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. Encarnacao, W. Strasser, R. Klein:
  Graphische Datenverarbeitung
  Oldenburg Verlag, 1996

Syllabus

- Oct 16 - Rendering Pipeline
- Oct 17 - OpenGL
- Oct 23 - Transformations
- Oct 24 - Projections
- Oct 30 - Lighting
- Nov 6 - Lighting
- Nov 7 - *Exercise*
- Nov 13 - Rasterization
- Nov 14 - *Exercise*
- Nov 20 - Shadows
- Nov 21 - *Exercise*
- Nov 27 - Texturing
- Nov 28 - Transparency, Reflection
- tba - Evaluation, Q & A

Course Information

- key course
  - pattern recognition and computer graphics (rasterization-based rendering)
- specialization courses
  - advanced computer graphics (ray tracing)
  - simulation in computer graphics (e.g., fluids)
- master project, lab course, Master thesis
  - two tracks: simulation, rendering

Seminars / Projects / Theses in Graphics

Semester	Simulation Track	Rendering Track
Winter	Rasterization Course Simulation Course	Rasterization Course
Summer	Lab Course - simple fluid solver Simulation Seminar	Raytracing Course Lab Course - simple raytracer
Winter	Master Project - PPE fluid solver	Master Project - Monte Carlo raytracer Rendering Seminar
Summer	Master Thesis - research-oriented topic	Master Thesis - research-oriented topic