Proseminar
Graphikprogrammierung

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http://cg.informatik.uni-freiburg.de/teaching.htm
Computer Science -> Computer Graphics -> Teaching
Registration

1. choose a topic today

2. check the web page for available topics
   - choose a topic
   - send an email with
     name, matriculation number, topic
   - web page is updated and a confirmation is sent
Outline

- introduction
- organization
- presentation
- project
Introduction to OpenGL

- Open Graphics Library
- API for generating 2D / 3D computer graphics
- incorporates several hundreds rendering, special effects, and visualization functions
- platform- and language-independent
- introduced in 1992
- specification guided by the OpenGL Working Group, Khronos Group (current version 4.5, August 2014)
- OpenGL processes points, lines and polygons and generates image pixels (realized by the graphics pipeline)
Motivation

- http://cg.informatik.uni-freiburg.de/software.htm
Motivation

http://www.youtube.com
Fluid simulation with 20 million particles
Outline

- introduction
- organization
- presentation
- project
Organization

- presentation of an OpenGL topic
- project in C++ using OpenGL
- short presentation of the implementation
- presentations *have to* be prepared in groups of three
- implementation *can* be realized in groups
- attendance of all presentations is mandatory
- recent information on http://cg.informatik.uni-freiburg.de/teaching.htm
Outline

- introduction
- organization
- presentation
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Presentation

- in groups of three
- 20 min – 25 min per presentation
- 5 min – 10 min discussion
  - technical questions
  - form of the presentation
Topics - Example

Homogene Koordinaten, Transformationen
  - homogene Notation für Punkte, Richtungen, Transformationen
  - affine Transformationen (Translation, Rotation, Skalierung, Scherung)
  - inverse Transformationen, Verkettung von Transformationen
  - mögliche Quellen:
    - ...
Topics - Example

- Viewing, Vertex Processing
  - Modelview Transformation, Projektive Transformation, Perspektivische Division, Screen Mapping (Viewport Transformation)
  - View Volume, Kanonisches View Volume, Orthographische Projektion, Perspektivische Projektion
- mögliche Quellen:
  - ...
Preparation

- know your topic *and the rendering pipeline*
  - examine relevant material thoroughly
  - do not try to circumvent problems
- prepare slides
  - allow 1 to 2 minutes per slide
  - slides should be uniform and not too dense
  - incorporate illustrations
  - slide titles should be helpful
- rehearse your presentation *within your group*
  - gather feedback
  - adapt your presentation accordingly
Presentation

- introduction
  - introduce yourself and the title of your presentation

- overview
  - give an idea, but not too detailed

- motivation
  - illustrate the principle and / or applications
  - explain the goal of your presentation
  - the audience should be eager to listen your presentation
Presentation

- main part
  - should consist of distinguished parts
  - separate different parts of the presentation explicitly
  - each part should be introduced and summarized

- summary
  - tell the audience what you have told them
  - ask for questions
introduce the title and yourself

motivate and introduce your topic thoroughly
  - it is essential to arouse the interest of the audience right at the beginning

give a brief overview
  - avoid too many details

structure your presentation
  - introduce and summarize parts of your presentation

summarize the entire presentation

clearly mark the end of your presentation
  - e.g. “Thank you for your attention.”
Presentation

- coordinate your presentation within your group
- check the presentation environment prior to the presentation
- do not occlude the projection
- avoid idiosyncrasies
- stay in time
Presentation

- do not learn your talk by heart
- do not read your talk
- do not read slides, but explain every item on your slide
- do not be shy or quiet
- communicate self-confidence
Outline

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Environment and Organization

- GLUT-based viewer, one object, one light source (see web page)
- alternatively, you can use your own environment
- in general, indicate and cite all third-party libraries and source code that you use
- up to three participants per group in the final project
- contributions of each member have to be indicated
Requirements per Person

- **minimum**
  - two or more objects
  - object animation (objects move relative to each other)
  - different material for each object
  - two or more light sources
  - light source animation (light sources move relative to each other)

- **optional**
  - texture mapping
  - object morphing / geometric deformation
  - fog, blending
  - user interaction
Presentation

- projects are presented in the last meeting on Feb 10
- slides, images, software
- per person: 1 min preparation, 5 min presentation, 1 min discussion
- groups have more time, accordingly
- focus on essential aspects of your project
- cite third-party code
- check the presentation environment
  - which laptop to use (if you do not have a laptop, ask for a laptop)
  - make sure your presentation including software is working on the laptop and the projector
Summary

- preparation of a presentation within a group of three
  - get familiar with your topic \textit{and} the rendering pipeline
- presentation (20 min – 25 min)
- software project
- start preparation in time
- employ various sources
- rehearse your talk within your group