

# *Proseminar*

# *Graphikprogrammierung*

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# Contact

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<http://cg.informatik.uni-freiburg.de/teaching.htm>

Computer Science -> Computer Graphics ->  
Teaching

# Registration

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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

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- introduction
- organization
- presentation
- project

# Introduction to OpenGL

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- 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

University of Freiburg - Computer Science Department - Computer Graphics

# Outline

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# Organization

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- 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

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- introduction
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- project

# Presentation

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

# Topics - Example

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

# Topics - Example

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- 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

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- 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

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- 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

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- 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



# Presentation - Summary

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- 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

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- 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

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- 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*

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- 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

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- 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

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- 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

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