Graphics and Visualization Course Projects

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Introduction

In the second half of our course on Graphics and Visualization, you should demonstrate that you can use the knowledge you have to solve a practical visualization problem. As in most cases, the problem itself is unrelated to computer graphics, its origin may be the presentation of research results, the visualization of complex systems or simply the need for a visual component to create and keep the attention of the audience. You can either work on a problem alone or together with a second student.

The visualization problems are either defined by yourself or by the instructor of the course. In this document, you will find a short description of each of the problems together with a short list of the requirements.

The projects have to be handed in in electronic form with a PDF document describing the operation and the implementation and full source code. Then, the projects will be presented in class.

Grading

The project grade is 50% of the course grade. There are a number of factors that influence the project grade.

For this course, the properties of the problem are not part of the grading of the project, however what does count is whether the visualization is appropriate for the intended audience of the visualization which is defined by the nature of the problem. A visualization for a group of highly trained and experienced experts will look different from a visualization intended for elementary school children.

The number of students working on a project is also taken into account, two students working together should present a more complex implementation than one student working alone.

The grading for the project consists of the following components:

- Solving the problem: Does the project result match the visualization problem intended to solve? Is the program usable? Is it appropriate for the intended audience? Can it be used to visualize different instances of the same visualization problem? (25%)
- Implementation Quality: Is the problem solved with the appropriate methods? Are the algorithms used appropriate? Is the software documented and re-usable? (50%)
- Presentation of the project results: Is the result presented according to academic standards? (25%)

The Projects

Nevatia/Rathnam: Virtual Cricket The project visualizes the behavior of a ball in a field game. Its intended audience are persons familiar with the game that want to try out different game strategies.

Lazarevych: Firefighter Visualization The project visualizes the current situation of a team of firefighters in a building to the incident commander who is situated in a fire truck and needs a quick overview of the situation. He needs to see where his men are in the building and what they are doing.

Albu: Autonomous Wheelchair Obstacle Avoidance In order to test path planning and motion control for an autonomous wheelchair, this system visualizes and simulates the wheelchair and obstacles. The simulator is intended for experts testing obstacle avoiding mechanisms and for public demonstrations.

Giurgiu: Command-based OpenGL Scene Creator For testing the specific properties of an OpenGL implementation, this scene generator receives text-based input and creates OpenGL objects. It is capable to create a scene, set the surface and texture of objects and animate the scene by moving the camera.

Grychtol/Mahmudi: Cannon Shooting Game The objective of this game is to hit target boxes with cannon balls fired from a cannon. The boxes and the cannon are situated in a 3D fractal landscape, i.e. the boxes and the cannon are on different heights. The intended audience is an average computer user that wants to "kill time", i.e. the user interface of the game has to be very simple and easy to learn.

Pascanu: Dancing Snake This project demonstrates the creation of a smooth "snake" body that moves to the music of an MP3 file. The intended audience is a party-goer watching the dancing snake on a video projection wall.

Sucan: Molecule Simulation The simulation of the interaction of individual atoms is the goal of this project. For a configurable number of atoms, the simulator visualizes the interaction between these atoms according to a number of atomic interaction forces. The intended audience of this system are experts and students studying molecular interaction models.

Levin: Flying Savivon The project visualizes a traditional Israeli celebration on "Hanukah" day. Intended audience is an Israeli familiar with the tradition.

Final remarks

I compiled the project descriptions from the documents handed in by the students. In case there are misunderstandings, I will post an updated version of this document.