DM80 Computer Game Programming

Fall 2005

Project I

Department of Mathematics and Computer Science
University of Southern Denmark

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Introduction

The purpose of this project is to force you to start actual programming in the 3D library of your choice. The project serves as a warm-up for Project II, making you pass the initial parts of the learning curve early in the course, and in connection with a simple programming task. The project will also give you some experience which can guide you when choosing your level of ambition for Project II.

The project is to be done in groups, preferably of size three.

Requirements

You are to implement a 3D version of the well-known *15-puzzle*.

The 15-puzzle consists of 15 unit squares and one hole bound within a 4×4 area, the squares are labelled $1, 2, 3, \ldots 15$. The objective is to order an initially scrambled configuration of the squares by repeatedly exchanging the hole with one of its neighbors. In 3D, the squares become cubes (the playing area has depth), otherwise nothing is changed.

The minimal version of the project will require a game loop, the drawing of simple geometrical objects, some simple texturing (bitmaps or font based text) for marking the cubes, and the handling of user input. For input, the simplest way is probably to let the user move the hole using the arrow keys.

For generation of initial configuration, note that only half of all possible configurations can be solved into an ordered solution. However, it is easy to test for solvability, so one method could be to repeatedly generate and test a random configuration until a solvable one is found (expected number of trials is two). Details for testing can be found at `http://mathworld.wolfram.com/15Puzzle.html`.

Possible Additional Features

You are free to implement further features which will take you further along the learning curve. Some ideas:

- Sound effects.

- Moveable camera (e.g. rotate scene by dragging mouse).

- Nicer appearance of objects (textures not only for numbering).

- Lighting.

- Nicer surroundings (more objects, e.g. frame around cubes, background, sky,. . .).

- Choosing cube to move by mouse click (picking).

Formalities

You should hand in: A CD-ROM with the program (directly runnable on either Linux (machines in Imada terminal room) or Windows XP) and a printed report of 3 to 6 pages. The main aim of the report should be to describe the design choices made during development, the reasoning behind these choices, and the structure of the final solution, as well as give a simple user manual for the program. A copy of the source code should also be included on the CD-ROM.

You must hand in the report and the CD-ROM by

Tuesday, October 11