UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

Advanced Rendering Assignment sheet 4 – ST 2013
Prof. Dr. Gitta Domik, Stephan Arens
In Lab on May 6 to 10 – Homework due to May 15, 9:15
(Send homework to stephan.arens@upb.de)

Volume Rendering and 3D textures

Assignment 13

Download the volume rendering template and the volume texture (heart.raw). The template loads the volume and creates a 3D texture that lies from (0,0,0) to (1,1,1) in texture space. For orientation purposes this texture space is rendered by the template as a line-cube. Build a simple volume renderer, that displays arbitrary oriented slices of the volume:

1. Slice view:
    a. Run the template.
    b. Construct any triangle that intersects with the texture space.
    c. Use `glTexCoord3f` to assign 3D texture coordinates to the vertices of the triangle (Since both texture and world coordinates are the same, use the positions of the vertices as texture coordinates). Enable 3D texturing (`glEnable(GL.GL_TEXTURE_3D)`) and explain what is rendered.
    d. Create two textured quads, that can be positioned by the keys W, A, S and D. Let one quad be parallel to the XY-plane (move along Z axis with W and S) and the other parallel to the YZ-plane (move along X axis with A and D).

- **Homework:** Send 1 screenshot similar to the image underneath LEFT.

2. Volume view:
    a. Draw a second line-cube filled with 32 equally distributed textured quads parallel to the XY-plane.
    b. Enable blending for this second cube (a suitable blending function is already set).

- **Homework:** Send 1 screenshot similar to the image underneath RIGHT.