Interactive Visual Data Analysis

Assignment 2 – *Mesh Rendering*

In this assignment, we will go on a trip through the D3D11 rendering pipeline to render a mesh.

2.1. Data Loading

First, we need to load some mesh data to render. In our vis tool, a scene will always be specified by a `.dat` file, which is a simple text file containing one `key: value` entry per line. For now, each `.dat` file may contain only two entries:

- `MeshFilename: <string>` gives the path to a mesh file in PLY format, relative to the location of the `.dat` file.
- `SliceThickness: <float> <float> <float>` specifies the size of the bounding box. (`SliceThickness` is a weird name; this will make sense later when we start working with volume data!)

Write a simple parser which can read `.dat` files in this format. Sample files are available in `data/mesh`.

Now that we know the path to the mesh file, we need to actually load it. Information on the layout of PLY files is easily found online, but creating a parser from scratch would be tedious. Instead, use the RPly library found in `external/rply-1.1.3`, which makes reading PLY files very straightforward.

Using RPly, write a parser that generates an array of vertices and an index list for a given PLY file. Your parser should be able to handle all meshes in `data/mesh`.

2.2. Mesh Rendering

Render a PLY file of your choice from `data/mesh`.

- Create index buffer, vertex buffer and input layout for the mesh and initialize them with the data provided by your PLY loader.
- Render the mesh using a `DrawIndexed()` call.
- Write a vertex shader and a pixel shader that apply **Phong lighting** using a **"head-light"** (i.e. light position = camera position). Add effect variables as needed and pass required variables from VS to PS. Configure the rasterizer to **cull back** facing triangles.
- Adjust the size of the bounding box from Assignment 1 based on the `SliceThickness` entry in the `.dat` file, so that it matches the rendered mesh.

The working solution must be committed till **October 30, 09:00am**. If anything is not working as described here or if you want a specific SVN-Revision to be rated, explain yourself in the `readme.txt` file within your `solution` directory.