CPSC 453 Fall 2019 Assignment 1 (Legacy OpenGL)

Introduction

This program demonstrates how the menger sponge with different stage can be generated recursively from a normal cube. Meanwhile, it also provides the user a camera that is able to rotate the model, zoom in/out at the center of the model, move through three axes in the world space. The program has been tested in Linux's system of the UofC Lab.

Install

Run the script shell in a Linux's system on the lab by bash

```
bash ./compile_and_run.sh
```

Uninstall

Since there is only one output file, you can just remove it by

```
rm -rf ./assignment1_legacy_openGL.out
```

Usage

- To draw the Menger sponge with different stage, you can
    - Draw an ordinary cube by pressing **0**.
    - Draw the stage-1 Menger sponge by pressing **1**.
    - Draw the stage-2 Menger sponge by pressing **2**.
    - Draw the stage-3 Menger sponge by pressing **3**.
    - Draw the stage-4 Menger sponge by pressing **4**.
    - You can redraw by switching the stage anytime.
- Press **O** to switch the projection between perspective/parallel.
- Press **S** to print the size of the current window.
- Press **V** to print the version information.

- Press **H** to print the help information.
- Press **Esc** to quit the program.
- The camera has three modes: **ROTATION**, **ZOOM**, **PAN**.
    - The default mode is **ROTATION**.
    - Press **Z** to switch mode between **ZOOM** and **ROTATION**.
    - Press **P** to enter **PAN** or quit **PAN** and move to **ROTATION**
    - To switch from **PAN** to **ROTATION**/**ZOOM**, you must press **P** to quit **PAN** mode at first.
    - You can press **R** to restore the default location of the camera and the default type of projection **anytime**.
- Mouse control has different effects on three modes.
    - In **ROTATION**:
        - Drag mouse-left-button left/right to rotate the model along y-axis.
        - Drag mouse-right-button forward/backward to rotate the model along x-axis.
        - Drag mouse-scroll-wheel(press it, not scroll it) to rotate the model along z-axis.
    - In **ZOOM**:
        - Drag mouse-left-button forward/backward to zoom in/out.
    - In **PAN**:
        - Drag mouse-left-button left/right to move the camera along x-axis left/right.
        - Drag mouse-right-button forward/backward to move the camera along y-axis up/down.
        - Drag mouse-scroll-wheel(press it, not scroll it) forward/backward to move the camera along z-axis forward/backward.

Notice

- The aspect ratio is kept while resizing the window.
- Faces in different direction of the menger sponge have different colour, the gradient colour is changing from RGBA(226, 156, 94, 1.0).
- If near clipping happens, the best way is to reset by pressing **R**.
- A menu with current status of the camera will be shown from the standard output where you can interact with the program.