Computer Graphics Assignment 1:
Basic OpenGL viewer & drawing a hierarchical model

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1. How to run my program

   I used version 3.7.2 of Python, version 1.16.2 of numpy, version 3.1.0 of OpenGL and version 1.7.1 of glfw.

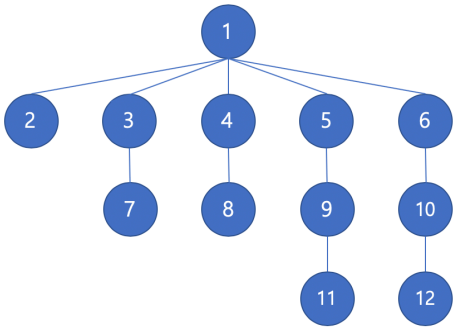
   You can just run using this command – "python3 2015005078-class1.py"

2. Which requirements I implemented

   I implemented requirements that I manipulate the camera with mouse movement and create an animating hierarchical model using OpenGL matrix stacks.

   First, I drew a rectangular grid with lines (not polygons) on xz plane as a reference ground plane (similar to Blender). I used 'button_callback' and 'cursor_callback' to get the difference in cursor position with dragging. If the mouse button is on the left, then the difference between the arguments to 'gluLookat' to use to implement the orbit is determined. If the mouse button is on the right, the offsets to multiply the u and v vectors of the camera are determined to implement panning. I adjusted the fovy to implement zooming and used 'scroll_callback' and 'gluPerspective'.

   Second, I made a dancing person. I made body(part 1), head(part 2), leftuparm(part 3), leftunderarm(part 7), leftupleg(part 5), leftunderleg(part 9), leftfoot(part 11), rightuparm(part 4), rightunderarm(part 8), rightupleg(part 6), rightunderleg(part 10), rightfoot(part 12). The model has a hierarchy of 4 levels.



Body(part 1) is moving up and down. Then, the remaining parts move up and down accordingly. Head(part 2) is nodding. Leftunderarm(part 7) is moving little by little. Rightuparm(part 4) is rotating about the long axis so rightunderarm(part 8) is also rotating. Rightleg(part 6, 10, 12) is moving like a kick. Overall, the person is playing popular dances recently.

3. A few screenshot images of your program