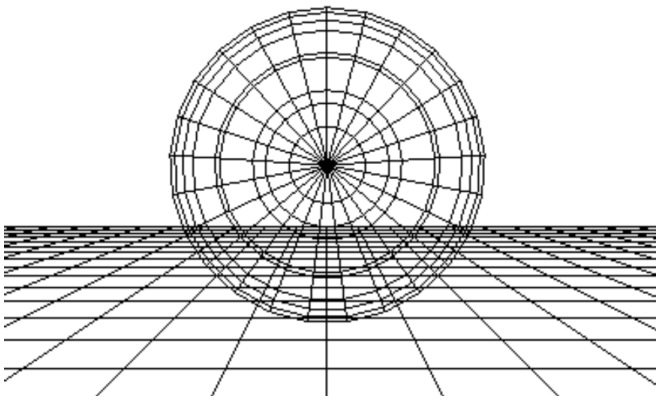
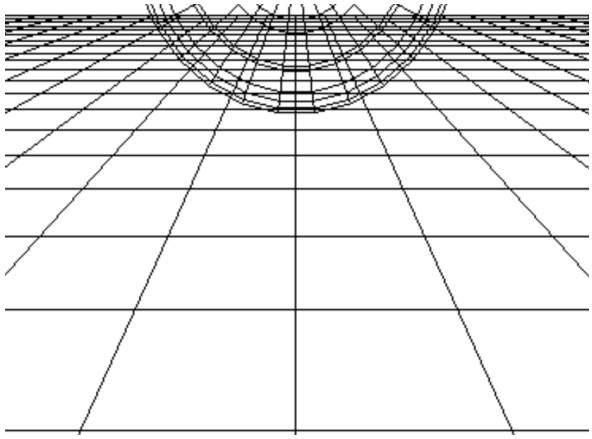
CS460 Assignment 3 Writeup Ryan Shendler

My program has two main functions: implement an active virtual camera and simulate the rotation of a lever. My program creates a window that is split into four viewports, with the lower right viewport displaying the active camera and the other three viewports showing different views of the lever object.

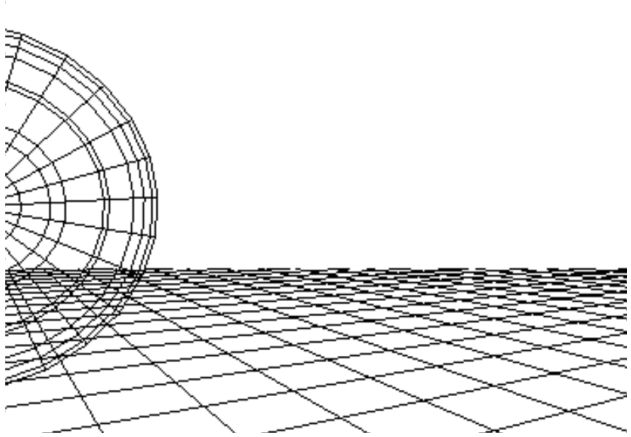
My implementation of the active camera allows the user to pitch, yaw, roll and slide the camera. The user can use the ‘w’ key to pitch up and the ‘s’ key to pitch down. The ‘a’ key is used to yaw left while the ‘d’ key is used to yaw right. The up and down arrow keys slide the camera forward and backward, while the left and right arrow keys roll the camera counter-clockwise or clockwise. My implementation of the active camera relies on 5 global three-element vectors: u, v, n, eye, and look. Each time the program needs to move the camera, it performs some calculation to determine the new values of these vectors and then calls glutPostRedisplay(). The display() function will then call gluLookAt(), with the new values of eye, look, and v being used as the eye location, the look-at point, and the view-up vector respectively.



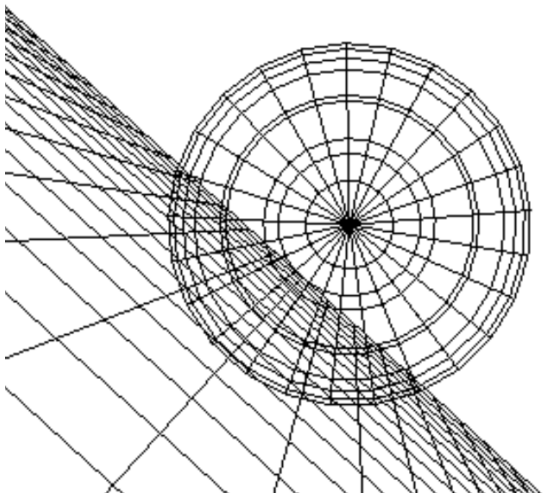
Original image before any camera movement



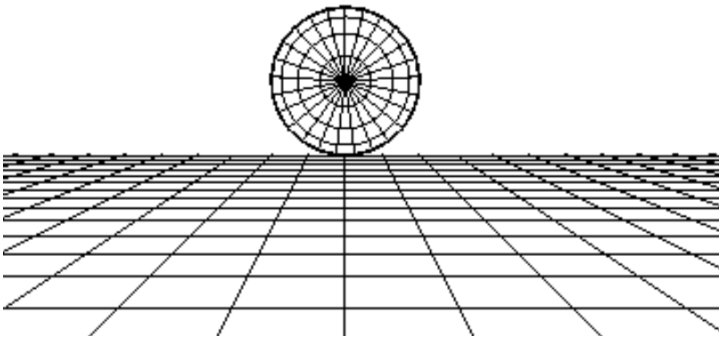
Camera has pitched down



Camera has yawed right

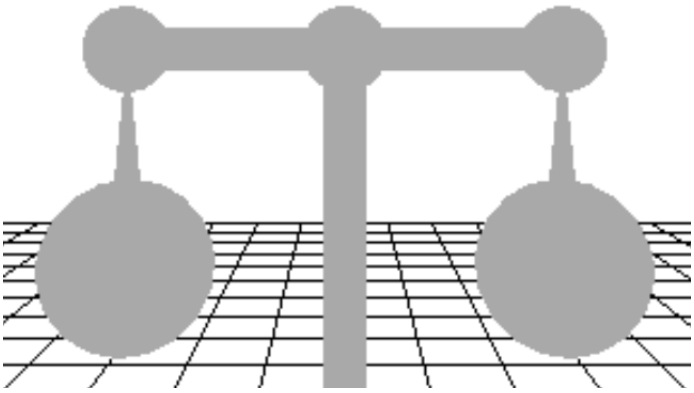


Camer has rolled clockwise

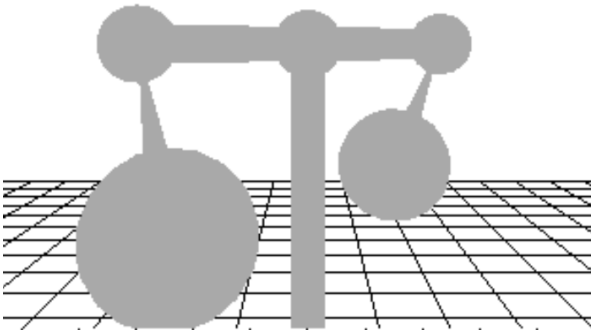


Camera has slid back along the viewing axis

Users can rotate the lever object by right-clicking in the window to open a menu and then selecting the menu option “Lever Rotation.” Selecting the lever rotation option will increment the global value “angle” by 10 degrees. The global value “angle,” stores the rotation angle for the current rotation matrix. After incrementing the value of “angle,” the program will redisplay the screen with the lever object being rotated 10 degrees from its previous position. This transformation of the lever object is implemented in the function drawLever().



Lever object before rotation



Lever object after several rotations